



ESCC QUALIFIED PARTS LIST (QPL)

ESCC/RP/QPL005-221 (REP 005)

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DOCUMENTATION CHANGE NOTICE

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| DCR No. | CHANGE DESCRIPTION |
|---------|---|
| 1465 | <p>New: 374, Leoni (Germany) Wires and cables, low frequency, insulated, polyimide/fluorothermoplast, based on ESCC 3901-018, -019, -021</p> <p>375, Exxelia SAS (France) Capacitors Filters, C-type, Feed through, Hermetically Sealed (One End Only), based on type SFC030</p> <p>Extension: 327D, Kyocera AVX (Czech Republic) 356A, Exxelia SAS (France)</p> <p>Removal: 294, 295, 296 Leoni (Germany) Wires and cables merged into new certificate 374.</p> <p><i>Extension: The validity date of the certificate is extended. The scope of the certificate might change.</i></p> <p><i>Revision: The scope of the certificate is changed. The validity date of the certificate remains the same.</i></p> |

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1 FOREWORD

This document contains a list of components that have been qualified to the rules of the ESCC System and are intended for use in ESA and other spacecraft and associated equipment in accordance with the requirements of the ECSS Standard ESCC-Q-ST-60.

It is permitted to advertise the ESCC qualification status of a product provided such publicity or advertisement does not state or imply that the product is the only qualified or capability approved one of that particular type, range or family.

2 PROCURORS' RESPONSIBILITY

When procuring ESCC qualified or capability approved components, the procurer is responsible for ensuring that the qualification or capability approval status is valid and that delivered components fulfill the specified requirements of the applicable ESCC specifications. The procurer is advised to utilise the ESCC non-conformance system in the event that a qualified or capability approved manufacturer delivers non-conforming components.

3 USE OF TABLES

3.1 PUBLICATION

The individual entries are published in sections within this document and are presented by manufacturer on the web. Please refer to our escies.org website.

3.2 TYPE DESIGNATION

The referenced type (style) designations are derived from industrial standards (i.e., JEDEC PRO-ELECTRON, MIL, IEC and CECC). The purpose is to identify the similarity of a listed qualified component to a standard type designation.

3.3 COMPONENTS CHARACTERISTICS

The electrical characteristics are listed for guidance only and, unless otherwise stated, are specified at +25°C. The precise characteristics of the qualified component are defined in the referenced ESCC specification.

3.4 MANUFACTURER

Plant locations are indicated in the individual listing; contact information is given in full on the appropriate web pages. Please refer to our escies.org website.

4 REVISION PROCEDURE

Amendments to the previous issue of the QPL implemented herein are indicated by the content of the "Documentation Changes" page and by its respective DCR number. The new issue number of the QPL document and its associate date are indicated in the front page.

5 **TABLE OF QUALIFIED COMPONENTS**

Components qualified to the ESCC System are grouped by component type designations. Individual components are listed within the relevant sections as indicated in Table 5.1.

| Section | Component Types |
|---------|--------------------------|
| 01 | Capacitors |
| 02 | Connectors |
| 03 | Crystals and Oscillators |
| 04 | Diodes |
| 05 | Filters |
| 06 | Fuses |
| 07 | Inductors |
| 08 | Microcircuits |
| 09 | Relays |
| 10 | Resistors |
| 11 | Thermistor Sensors |
| 12 | Transistors |
| 13 | Wires and Cables |
| 14 | Transformers |
| 18 | Optoelectronics |
| 20 | Thermostats |
| 30 | RF Passive |
| 40 | Hybrids and Modules |
| 50 | Cable Assembly |
| 99 | Miscellaneous |

5.1

TABLE OF COMPONENTS

| Components | Sub-Section | Manufacturers | Certificates |
|--------------------------------|--|---|--|
| 01 Capacitors | Ceramic Fixed | AVX (N.I), Exxelia Technologies | 367, 315D, 306Drev1 |
| | Ceramic Fixed Chip | AVX (Fr), Exxelia Technologies, AVX (N.I) | 109Q, 323C, 110Q, 324C, 331B |
| | Tantalum, (Solid), Fixed, Electrolytic | Kyocera AVX (CZ) | 196J, 327D, 366 |
| | Fixed Film | Exxelia Technologies | 251K, 353A |
| | Semiconductor | Cobham Microwave | 286F |
| 02 Connectors | Multipin, Solder Contacts | C&K Components, Souriau | 71Srev1, 155P |
| | Multipin, Crimp Contacts | C&K Components, Souriau, Deutsch, Axon Cable | 72Srev1, 156N, 25S, 220K, 221K, 222K, 223J |
| | For printed Circuit Board | Smiths Interconnect Hypertac | 99Q, 149N, 250J, 281F |
| | RF Coaxial | Radiall, Rosenberger | 68Q, 283F, 329C, 350A |
| | Microminiature, Crimp Contacts | C&K Components, Souriau, Axon Cable | 140Q, 141Q, 290E, 301E, 370 |
| 03 Crystals and Oscillators | Crystals | Rakon | 333Brev1, 334Brev1 |
| | Oscillators | Rakon | 371 |
| 04 Diodes | Bipolar (PN) | STMicroelectronics | 369 |
| | Schottky | STMicroelectronics | 368rev1 |
| | RF/Microwave, Silicon Schottky | Infineon | 227H |
| | RF/Microwave, Varactors | Cobham Microwave | 225J |
| 05 Filters | Feedthrough | Exxelia Technologies | 375 |
| | SAW | Kongsberg Space Electronic | 313D |
| 06 Fuses | Thin Film | Schurter | 284F, 336C |
| 07 Inductors | Fixed, RF | Exxelia Magnetics | 241K |
| | Power | Exxelia Magnetics | 276G |
| 08 Microcircuits | Digital C-MOS | STMicroelectronics, Microchip Technology Nantes | 73S, 190N, 357A, 359A, 372 |
| | Linear Switching Regulator | ST Microelectronics | 344B |
| 09 Relays | Non-Latching | REL-STPI, Leach Sarralbe | 102K, 205H, 318D |
| | Latching | REL-STPI, Leach Sarralbe | 88L, 98Jrev2, 317D, 167J, 310D, 362 |

| | | | |
|-----------------------------|--|---|---|
| 10 Resistors | Shunts | Isabellenhuetten | 285F |
| | Fixed, Film | Vishay Electronic GmbH | 256K, 289F |
| | Chip | Vishay SA, Sfernice | 287G, 314E |
| | Flexible, Foil, Heaters | IRCA, Minco | 184N, 325D, 330C |
| 11 Thermistor Sensors | NTC | TE Connectivity MEAS | 266Krev1 |
| | PT | Innovative Sensor Technology IST AG | 352A |
| 14 Transformers | TO and CCM | Exxelia SAS, Flux A/S | 356A, 364 |
| 12 Transistors | Bipolar NPN, PNP, NPN/PNP | STMicroelectronics | 361A |
| | MOSFET, Power, N- Channel | STMicroelectronics, Infineon | 303E, 319D, 339B, 363, 360 |
| | MOSFET, Power, P- Channel | STMicroelectronics | 326D |
| | RF/Microwave, NPN, Low Power, Low Noise | Infineon | 230J, 245J, 322D |
| 13 Wires and Cables | Low Frequency | Draka Fileca, Nexans, Axon' Cable, W.L. Gore, Leoni, Tyco | 07T, 09S, 132R, 08T, 292F, 138P, 219N, 268J, 159Q, 267K, 215N, 216M, 300F, 229M, 293F, 257K, 299F, 305E, 328C, 373, 374 |
| | Coaxial, RF, Flexible | Nexans, W.L. Gore, Axon' Cable | 24U, 255L, 298F, 291F, 304E, 335C |
| 20 Thermostats | Switches | Comepa | 275H |
| 30 RF Passive | Circulator and Isolator | Cobham | 340A |
| | Attenuator and Load | Radiall | 185K, 178L |
| 50 Cable Assembly | RF Cable Assemblies | Radiall, Gore UK, Axon' Cable | 348A, 358A, 365 |
| | Optical Cable Assemblies | Diamond | 355A |

6 **COMPONENT CERTIFICATES**

6.1 CAPACITORS (01)

6.1.1 Ceramic Fixed

| Capacitors, Ceramic, Type II, High Capacitance, Based on Case Styles BR, CV, and CH | | | | 367 |
|---|---|--------------------|-----------------------|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3001 | | Qualification | UK Space Agency | June 2020 Initial qualification dates of certificates merged into 367. Cert 231: Jul 1996 Cert 262: Sept 2000 Cert 264: Feb 2001 |
| Details ESCC 3001/030 3001/034 3009/034 | AVX Limited Coleraine Northern Ireland | Remarks | | |
| <p>Qualified Range:</p> <p>3001/030 - Capacitors, Ceramic, Type II, High Capacitance, Based on Case Styles BR, CV, and CH</p> <p style="padding-left: 40px;">E12 series Variants 01 to 74 capacitance range for 50V, 100V and 200V Variants 01 to 52, and 59 to 60, for 500V are qualified</p> <p>3001/034 - Capacitors, ceramic, type II, high voltage, 1.0 to 5.0 kV, based on case styles VR, CV, and CH</p> <p style="padding-left: 40px;">E12 series Variants 01 to 22 are qualified</p> <p>3009/034 - Capacitors, fixed, chip, ceramic, type ii, high voltage, based on 1812 and 1825</p> <p style="padding-left: 40px;">Variants 01 to 12 are qualified Terminations: Variants 01 to 12 with metallised pads</p> <p>±10% tolerance Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CAPACITORS, CERAMIC, TYPE II, MULTIPLE LAYERS, BASED ON TYPES CNC 31 to 34, LEAD TYPES NE, PE, LE AND PLE | | | | 315D |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3001 | Exxelia Technologies Chanteloup en Brie France | Qualification | CNES | Nov 2011 |
| Detail ESCC 3001/037 | | Remarks | | |
| <p>Qualified Range:</p> <p>Variants 01 to 16. 16V : 2.2 to 68 μF 25V: 1.2 to 39 μF</p> <p>E12 \pm10% tolerance</p> <p>DIL format with equal number of leads per side Lead material : type A with type 10 finish (electro-deposited 98% Ag min.)</p> <p>Operating Temperature Range ($^{\circ}$C): -55 to +125</p> | | | | |

| CAPACITORS, CERAMIC, TYPE II, 50V to 500V, BASED ON TYPES CNC53 to CNC56. | | | | 306Drev1 |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3001 | Exxelia Technologies Chanteloup en Brie France | Qualification | CNES | Mar 2011 |
| Detail ESCC 3001/038 | | Remarks: | | |
| <p>Qualified Range:</p> <p>Variants 01 to 04, 08 to 11, 15 to 18 and 22 to 25 are qualified All values 50V to 500V E12: ±10% tolerance</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

6.1.2 Ceramic Fixed Chip

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE | | | | | 109Q | | |
|--|---------------------------------|--------------------|-----------------------|---|--------------------------|-------------------------------------|-------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | |
| Generic ESCC 3009 | AVX St Apollinaire France | Qualification | CNES | Feb 1983 | | | |
| Detail ESCC | | Remarks: | | | | | |
| 3009/003, 3009/004, 3009/005, 3009/006, 3009/022 | | | | | | | |
| Qualified range: | | | | | | | |
| Variants 03 and 06 are qualified | | | | | | | |
| Style | Model | Detail Spec | Variants | Capacitance Range (pF) | Rated Voltage (V) | Tolerance (+%) | TC (ppm/°C) |
| 0805 | A_12C | 3009/003 | 03, 06 | 4.7 to 9.1 10 to 1 500 1800 to 2200 | 50, 100 50, 100 50 | 0.5pF 1, 2, 5, 10 1, 2, 5, 10 | ±30 |
| 1206 | A_20C | 3009/022 | 03, 06 | 10 to 3 900 4700 | 50, 100 50 | 1, 2, 5, 10 | ±30 |
| 1210 | A_13C | 3009/004 | 03, 06 | 22 to 6 800 8 200 to 10 000 | 50, 100 50 | 1, 2, 5, 10 | ±30 |
| 1812 | A_14C | 3009/005 | 03, 06 | 100 to 15 000 | 50, 100 | 1, 2, 5, 10 | ±30 |
| 2220 | A_15C | 3009/006 | 03, 06 | 470 to 33 000 | 50, 100 | 1, 2, 5, 10 | ±30 |
| Operating Temp. Range (°C), -55 to +125 | | | | | | | |

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE I | | | | | | | 323C | |
|--|----------|---|----------|--------------------|-----|-----------------------|----------------------------|---|
| Procurement Specifications | | Manufacturer | | Nature of Approval | | Supervising Authority | Initial Qualification Date | |
| Generic ESCC 3009 | | ExxeliaTechnologies Chanteloup en Brie France | | Qualification | | CNES | Oct 2012 | |
| Detail ESCC | | | | Remarks: | | | | |
| 3009/003, 3009/004, 3009/005, 3009/006, 3009/022, 3009/037, 3009/040, 3009/042 | | | | | | | | |
| Qualified range: | | | | | | | | |
| Style | Model | Detail Spec | Variants | Capacitance Range | | | Rated Voltage | Tolerance (+%) |
| 0805 | CEC202S | 3009/003 | 06 | 1 | to | 2 700 | 16 | <10pF 0.25—0.5 – 1 (pF) ≥10pF 1, 2, 5, 10 |
| | CEC204S | 3009/040 | 02 | 1 | to | 2 200 | 25 | |
| | | | | 1 | to | 1 800 | 50 | |
| | | | | | 1 | to | 1 200 | |
| 1210 | CEC402S | 3009/004 | 06 | 10 | to | 15 000 | 16 | |
| | CEC404S | 3009/040 | 04 | 10 | to | 12 000 | 25 | |
| | | | | 10 | to | 12 000 | 50 | |
| | | | | | 10 | To | 6 800 | |
| 1812 | CEC602S | 3009/005 | 06 | 100 | to | 33 000 | 16 | |
| | CEC604S | 3009/040 | 05 | 100 | to | 27 000 | 25 | |
| | | | | 100 | to | 22 000 | 50 | |
| | | | | | 100 | to | 12 000 | |
| 2220 | CEC702S | 3009/006 | 06 | 470 | to | 68 000 | 16 | |
| | CEC704S | 3009/040 | 06 | 470 | to | 56 000 | 25 | |
| | | | | 470 | to | 47 000 | 50 | |
| | | | | | 470 | to | 27 000 | |
| 1206 | CEC1202S | 3009/022 | 06 | 1 | to | 6 800 | 16 | |
| | CEC1204S | 3009/040 | 03 | 1 | to | 5 600 | 25 | |
| | | | | 1 | to | 5 600 | 50 | |
| | | | | | 1 | to | 3 900 | |
| 0603 | CEC1402S | 3009/037 | 06 | 1 | to | 1 000 | 16 | |
| | CEC1404S | 3009/040 | 01 | 1 | to | 680 | 25 | |
| | | | | 1 | to | 560 | 50 | |
| | | | | | 1 | to | 330 | |
| 0402 | CEC1902S | 3009/042 | 06 | 1 | to | 330 | 10 | |
| | CEC1904S | 3009/040 | 13 | 1 | to | 120 | 16 | |
| | | | | 1 | to | 100 | 25 | |
| | | | | | 1 | to | 82 | |
| Operating Temp. Range (°C), -55 to +125 | | | | | | | | |

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II | | | | | | | 110Q | |
|--|-------|---------------------------------|----------|--------------------|----|-----------------------|----------------------------|----------------|
| Procurement Specifications | | Manufacturer | | Nature of Approval | | Supervising Authority | Initial Qualification Date | |
| Generic ESCC 3009 | | AVX St Apollinaire France | | Qualification | | CNES | Feb 1983 | |
| Detail ESCC | | | | Remarks: | | | | |
| 3009/008, 3009/009, 3009/010, 3009/011, 3009/023 | | | | | | | | |
| Qualified range: | | | | | | | | |
| Style | Model | Detail Spec | Variants | Capacitance Range | | | Rated Voltage | Tolerance (+%) |
| 0805 | A_12G | 3009/008 | 03, 06 | 820 | to | 47 000 | 25 | 5, 10, 20 |
| | | | | 820 | to | 27 000 | 50 | 5, 10, 20 |
| | | | | 820 | to | 10 000 | 100 | 5, 10, 20 |
| 0805 | A612Z | 3009/008 | 07, 10 | 2 700 | to | 150 000 | 25 | 5, 10, 20 |
| | | | | 2 700 | to | 100 000 | 50 | |
| | | | | 2 700 | To | 47 000 | 100 | |
| | | | | 330 | to | 15 000 | 200 | |
| 1210 | A_13G | 3009/009 | 03, 06 | 3 900 | to | 220 000 | 25 | 5, 10, 20 |
| | | | | 3 900 | to | 150 000 | 50 | 5, 10, 20 |
| | | | | 3 900 | to | 47 000 | 100 | 5, 10, 20 |
| 1210 | A613Z | 3009/009 | 07, 10 | 3 900 | to | 470 000 | 25 | 5, 10, 20 |
| | | | | 3 900 | to | 330 000 | 50 | |
| | | | | 3 900 | to | 220 000 | 100 | |
| | | | | 680 | to | 68 000 | 200 | |
| 1812 | A_14G | 3009/010 | 03, 06 | 6 800 | to | 470 000 | 25 | 5, 10, 20 |
| | | | | 6 800 | to | 270 000 | 50 | 5, 10, 20 |
| | | | | 6 800 | to | 82 000 | 100 | 5, 10, 20 |
| 1812 | A614Z | 3009/010 | 07, 10 | 22 000 | to | 1 000 000 | 25 | 5, 10, 20 |
| | | | | 22 000 | to | 680 000 | 50 | |
| | | | | 22 000 | to | 470 000 | 100 | |
| | | | | 3 300 | to | 150 000 | 200 | |
| 2220 | A_15G | 3009/011 | 03, 06 | 18 000 | to | 1 000 000 | 25 | 5, 10, 20 |
| | | | | 18 000 | to | 680 000 | 50 | 5, 10, 20 |
| | | | | 18 000 | to | 180 000 | 100 | 5, 10, 20 |
| 2220 | A615Z | 3009/011 | 07, 10 | 100 000 | to | 2 200 000 | 25 | 5, 10, 20 |
| | | | | 100 000 | To | 1 500 000 | 50 | |
| | | | | 100 000 | To | 1 000 000 | 100 | |
| | | | | 6 800 | to | 330 000 | 200 | |
| 1206 | A_20G | 3009/023 | 03, 06 | 2 200 | to | 100 000 | 25 | 5, 10, 20 |
| | | | | 2 200 | to | 68 000 | 50 | 5, 10, 20 |
| | | | | 2 200 | to | 22 000 | 100 | 5, 10, 20 |
| 1206 | A620Z | 3009/023 | 07, 10 | 3 300 | to | 220 000 | 25 | 5, 10, 20 |
| | | | | 3 300 | to | 150 000 | 50 | |
| | | | | 3 300 | To | 100 000 | 100 | |
| | | | | 470 | to | 47 000 | 200 | |
| Operating Temperature Range (°C), -55 to +125 | | | | | | | | |

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II | | | | | | | 324C | |
|---|---|-------------|--------------------|-----------------------|----|----------------------------|---------------|----------------|
| Procurement Specifications | Manufacturer | | Nature of Approval | Supervising Authority | | Initial Qualification Date | | |
| Generic ESCC 3009 Detail ESCC | ExxeliaTechnologies Chanteloup en Brie France | | Qualification | CNES | | Oct 2012 | | |
| Remark: The range included in previous certificate (324B) has been limited for the CNC6 50V and X7R 100V products for all chip sizes (NCCS 2CETE001). | | | | | | | | |
| 3009/008, 3009/009, 3009/010, 3009/011, 3009/023, 3009/038, 3009/039, 3009/043 | | | | | | | | |
| Qualified range: | | | | | | | | |
| Style | Model | Detail Spec | Variants | Capacitance Range | | | Rated Voltage | Tolerance (+%) |
| 0805 | CNC202S | 3009/008 | 06 | 6 800 | to | 150 000 | 16 | 5, 10, 20 |
| | | | | 6 800 | to | 100 000 | 25 | |
| | | | | 100 | to | 47 000 | 50 | |
| | | | | 68 | to | 10 000 | 100 | |
| | | | 07 | 6 800 | to | 390 000 | 16 | 5, 10, 20 |
| | | | | 6 800 | to | 150 000 | 25 | |
| | | | | 100 | to | 100 000 | 50 | |
| | | | | 68 | to | 10 000 | 100 | |
| 0805 | CNC204S | 3009/039 | 02 | 6 800 | to | 150 000 | 16 | 5, 10, 20 |
| | | | | 6 800 | to | 100 000 | 25 | |
| | | | | 100 | to | 47 000 | 50 | |
| | | | | 68 | to | 10 000 | 100 | |
| | | | 14 | 6 800 | to | 390 000 | 16 | 5, 10, 20 |
| | | | | 6 800 | to | 150 000 | 25 | |
| | | | | 100 | to | 47 000 | 50 | |
| | | | | 68 | to | 10 000 | 100 | |
| 1210 | CNC402S | 3009/009 | 06 | 33 000 | to | 560 000 | 16 | 5, 10, 20 |
| | | | | 33 000 | to | 330 000 | 25 | |
| | | | | 2 200 | to | 220 000 | 50 | |
| | | | | 2 200 | to | 56 000 | 100 | |
| | | | 07 | 33 000 | to | 820 000 | 16 | 5, 10, 20 |
| | | | | 33 000 | to | 560 000 | 25 | |
| | | | | 2 200 | to | 220 000 | 50 | |
| | | | | 2 200 | to | 56 000 | 100 | |
| | CNC404S | 3009/039 | 04 | 33 000 | to | 560 000 | 16 | 5, 10, 20 |
| | | | | 33 000 | to | 330 000 | 25 | |
| | | | | 2 200 | to | 220 000 | 50 | |
| | | | | 2 200 | to | 56 000 | 100 | |
| | | | 16 | 33 000 | to | 820 000 | 16 | 5, 10, 20 |
| | | | | 33 000 | to | 560 000 | 25 | |
| | | | | 2 200 | to | 220 000 | 50 | |
| | | | | 2 200 | to | 56 000 | 100 | |
| 1812 | CNC602S | 3009/010 | 06 | 100 000 | to | 1 200 000 | 16 | 5, 10, 20 |
| | | | | 100 000 | to | 680 000 | 25 | |
| | | | | 3 900 | to | 470 000 | 50 | |
| | | | | 3 900 | to | 120 000 | 100 | |

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II | | | | | | | 324C | |
|---|----------|----------|----|--|----------------------|--|-----------------------|-----------|
| | CNC602S | 3009/010 | 07 | 100 000 100 000 3 900 3 900 | to to to to | 1 800 000 1 200 000 470 000 120 000 | 16 25 50 100 | 5, 10, 20 |
| | CNC604S | 3009/039 | 05 | 100 000 100 000 3 900 3 900 | to to to to | 1 200 000 680 000 470 000 120 000 | 16 25 50 100 | 5, 10, 20 |
| | | | 17 | 100 000 100 000 3 900 3 900 | to to to to | 1 800 000 1 200 000 470 000 120 000 | 16 25 50 100 | 5, 10, 20 |
| 2220 | CNC702S | 3009/011 | 06 | 150 000 150 22 000 22 000 | to to to to | 2 700 000 1 500 000 1 000 000 270 000 | 16 25 50 100 | 5, 10, 20 |
| | | | 07 | 150 000 150 000 22 000 22 000 | to to to to | 3 900 000 2 200 000 1 000 000 270 000 | 16 25 50 100 | 5, 10, 20 |
| | CNC704S | 3009/039 | 06 | 150 000 150 22 000 22 000 | to to to to | 2 700 000 1 500 000 1 000 000 270 000 | 16 25 50 100 | 5, 10, 20 |
| | | | 18 | 150 000 150 000 22 000 22 000 | to to to to | 3 900 000 2 200 000 1 000 000 270 000 | 16 25 50 100 | 5, 10, 20 |
| 1206 | CNC1202S | 3009/023 | 06 | 10 000 10 000 470 470 | to to to to | 270 000 180 000 82 000 27 000 | 16 25 50 100 | 5, 10, 20 |
| | | | 07 | 10 000 10 000 470 470 | to to to to | 1 000 000 270 000 82 000 27 000 | 16 25 50 100 | 5, 10, 20 |
| | CNC1204S | 3009/039 | 03 | 10 000 10 000 470 470 | to to to to | 270 000 180 000 82 000 27 000 | 16 25 50 100 | 5, 10, 20 |
| | | | 15 | 10 000 10 000 470 470 | to to to to | 1 000 000 270 000 82000 27000 | 16 25 50 100 | 5, 10, 20 |
| 0603 | CNC1402S | 3009/038 | 06 | 390 390 10 10 | to to to to | 33 000 22 000 10 000 2 700 | 16 25 50 100 | 5, 10, 20 |
| | | | 07 | 390 390 10 10 | to to to to | 100 000 33 000 10000 2700 | 16 25 50 100 | 5, 10, 20 |
| | CNC1404S | 3009/039 | 01 | 390 390 | to to | 33 000 22 000 | 16 25 | 5, 10, 20 |

| CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II | | | | | | | 324C | |
|---|----------|----------|----|------------------------|----------------------|------------------------------------|-----------------------|-----------|
| | | | | 10 10 | to to | 10 000 2 700 | 50 100 | |
| | | | 13 | 390 390 10 10 | to to to to | 100 000 33 000 10000 2700 | 16 25 50 100 | 5, 10, 20 |
| 0402 | CNC1902S | 3009/043 | 06 | 68 68 68 68 | to to to to | 12 000 8 200 5 600 3300 | 10 16 25 50 | 5, 10, 20 |
| | CNC1904S | 3009/039 | 25 | 68 68 68 68 | to to to to | 12 000 8 200 5 600 3300 | 10 16 25 50 | 5, 10, 20 |
| Operating Temperature Range (°C), -55 to +125 | | | | | | | | |

| CAPACITORS, FIXED, CHIP, BASE METAL ELECTRODE, CERAMIC DIELECTRIC TYPE II, BASED ON TYPE TTP, 0402, 0603, 0805, 1206, 1210, 1812, 2220 | | | | | | | 331B | |
|--|---------------|--|-------------------|------------------------|----|-----------------------|-------------------|----------------------------|
| Procurement Specifications | | Manufacturer | | Nature of Approval | | Supervising Authority | | Initial Qualification Date |
| Generic ESCC 3009 Detail ESCC 3009/041 | | AVX Limited Coleraine Northern Ireland | | Qualification | | ESA | | Apr 2015 |
| Remarks: | | | | | | | | |
| Qualified Range: | | | | | | | | |
| Value Series | Detailed Spec | Style | Component Variant | Capacitance Range (pF) | | | Rated Voltage (V) | Tolerance (+%) |
| E12 | 3009041 | 0402 | 01 | 2,200 | to | 33,000 | 16 | 5, 10, 20 |
| | | | | 2,200 | to | 33,000 | 25 | |
| | | | | 2,200 | to | 27,000 | 50 | |
| | | | | 2,200 | to | 6,800 | 100 | |
| E12 | 3009041 | 0603 | 02 | 2,200 | to | 184,000 | 16 | 5, 10, 20 |
| | | | | 2,200 | to | 184,000 | 25 | |
| | | | | 2,200 | to | 124,000 | 50 | |
| | | | | 2,200 | to | 18,000 | 100 | |
| E12 | 3009041 | 0805 | 03 | 4,700 | to | 1,000,000 | 16 | 5, 10, 20 |
| | | | | 4,700 | to | 1,000,000 | 25 | |
| | | | | 4,700 | to | 474,000 | 50 | |
| | | | | 4,700 | to | 100,000 | 100 | |
| E12 | 3009041 | 1206 | 04 | 18,000 | to | 2,200,000 | 16 | 5, 10, 20 |
| | | | | 18,000 | to | 2,200,000 | 25 | |
| | | | | 18,000 | to | 1,000,000 | 50 | |
| | | | | 18,000 | to | 394,000 | 100 | |
| E12 | 3009041 | 1210 | 05 | 47,000 | to | 1,000,000 | 16 | 5, 10, 20 |
| | | | | 47,000 | to | 1,000,000 | 25 | |
| | | | | 47,000 | to | 1,000,000 | 50 | |
| | | | | 47,000 | to | 684,000 | 100 | |
| E12 | 3009041 | 1812 | 06 | 154,000 | to | 8,200,000 | 16 | 5, 10, 20 |
| | | | | 154,000 | to | 8,200,000 | 16 | |
| | | | | 154,000 | to | 4,700,000 | 50 | |
| | | | | 154,000 | to | 2,200,000 | 100 | |
| E12 | 3009041 | 2220 | 07 | 564,000 | to | 22,000,000 | 16 | 5, 10, 20 |
| | | | | 564,000 | to | 22,000,000 | 25 | |
| | | | | 564,000 | to | 10,000,000 | 50 | |
| | | | | 564,000 | to | 4,700,000 | 100 | |

Terminations: Cu and Ag-loaded epoxy + Ni barrier+ Sn/Pb plating finish (10% Pb minimum)

Operating Temperature Range (°C):-55 to +125

6.1.3 Tantalum

| CAPACITORS, LEADLESS SURFACE MOUNTED, TANTALUM, SOLID ELECTROLYTE, TYPE TAJ | | | | 196J |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3012 | Kyocera AVX components sro Lanskroun Czech Republic | Qualification | ESA | Jun 1993 |
| Detail ESCC 3012/001 | | Remarks: | | |
| <p>Qualified Range:</p> <p>Variants 01 to 07 and 11 to 17 are qualified</p> <p>Termination finish:</p> <ul style="list-style-type: none"> • A and B case sizes are available in NILO only, e.g., Variant 01 (A case), Variant 02 (B case) • C, D, E case sizes are available as Copper only, e.g., Variant 13 (C case), Variant 14 (D case), Variant 17 (E case) | | | | |

| CAPACITORS, LEADLESS SURFACE MOUNTED, TANTALUM, SOLID ELECTROLYTE, TYPE TES | | | | 327D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|------------------------------------|---------------------|--------|--------|--|--|--|--|--|------|-----|-----|-----|-----|-----|-----|-----|---|--|--|--|--|--|--------|--|--------|-----|--|--|--|--|--------|--|--------|--------|-----|--|--|--|--------|--|--------|-------|-------|----|--|--------|--|--|--------|-------|-------|--|----|-------|--|--|-------|-------|--|-------|--|----|--|-------|--|--|-------|------|------|--|----|-------|--|--|-------|------|------|--|--|-----|--|-------|--|------|------|--|--|--|-----|-------|------|--|------|--|--|--|--|-----|--|------|------|--|--|--|--|--|-----|------|------|--|--|--|--|--|--|-----|------|--|--|--|--|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3012 Detail ESCC 3012/004 | Kyocera AVX components sro Lanskroun Czech Republic | Qualification | ESA | Oct 2013 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified Range:</p> <p>Variants 01 to 05. Case styles A (1206), B (1210), C (2312), D (2917), E (2917)</p> <table border="1"> <thead> <tr> <th rowspan="2">Capacitance C_n (μF)</th> <th colspan="8">Rated Voltage U_R</th> </tr> <tr> <th>6.3V</th> <th>10V</th> <th>12V</th> <th>16V</th> <th>20V</th> <th>25V</th> <th>35V</th> <th>50V</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>A 3000</td> <td></td> <td>B 2000</td> </tr> <tr> <td>3.3</td> <td></td> <td></td> <td></td> <td></td> <td>A 2500</td> <td></td> <td>B 1000</td> <td>C 1000</td> </tr> <tr> <td>4.7</td> <td></td> <td></td> <td></td> <td>A 2000</td> <td></td> <td>B 1000</td> <td>C 600</td> <td>D 200</td> </tr> <tr> <td>10</td> <td></td> <td>A 1800</td> <td></td> <td></td> <td>B 1000</td> <td>C 600</td> <td>D 120</td> <td></td> </tr> <tr> <td>22</td> <td>A 900</td> <td></td> <td></td> <td>B 600</td> <td>C 400</td> <td></td> <td>D 100</td> <td></td> </tr> <tr> <td>33</td> <td></td> <td>B 650</td> <td></td> <td></td> <td>C 300</td> <td>D 65</td> <td>E 65</td> <td></td> </tr> <tr> <td>47</td> <td>B 500</td> <td></td> <td></td> <td>C 350</td> <td>D 55</td> <td>E 65</td> <td></td> <td></td> </tr> <tr> <td>100</td> <td></td> <td>C 200</td> <td></td> <td>D 55</td> <td>E 45</td> <td></td> <td></td> <td></td> </tr> <tr> <td>150</td> <td>C 300</td> <td>D 45</td> <td></td> <td>E 40</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>220</td> <td></td> <td>D 35</td> <td>E 35</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>330</td> <td>D 35</td> <td>E 35</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>470</td> <td>E 30</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Operating Temperature Range (°C):-55 to +105</p> | | | | | Capacitance C_n (μ F) | Rated Voltage U_R | | | | | | | | 6.3V | 10V | 12V | 16V | 20V | 25V | 35V | 50V | 1 | | | | | | A 3000 | | B 2000 | 3.3 | | | | | A 2500 | | B 1000 | C 1000 | 4.7 | | | | A 2000 | | B 1000 | C 600 | D 200 | 10 | | A 1800 | | | B 1000 | C 600 | D 120 | | 22 | A 900 | | | B 600 | C 400 | | D 100 | | 33 | | B 650 | | | C 300 | D 65 | E 65 | | 47 | B 500 | | | C 350 | D 55 | E 65 | | | 100 | | C 200 | | D 55 | E 45 | | | | 150 | C 300 | D 45 | | E 40 | | | | | 220 | | D 35 | E 35 | | | | | | 330 | D 35 | E 35 | | | | | | | 470 | E 30 | | | | | | | |
| Capacitance C_n (μ F) | Rated Voltage U_R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6.3V | 10V | 12V | 16V | 20V | 25V | 35V | 50V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | A 3000 | | B 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.3 | | | | | A 2500 | | B 1000 | C 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.7 | | | | A 2000 | | B 1000 | C 600 | D 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | A 1800 | | | B 1000 | C 600 | D 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | A 900 | | | B 600 | C 400 | | D 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | | B 650 | | | C 300 | D 65 | E 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | B 500 | | | C 350 | D 55 | E 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | | C 200 | | D 55 | E 45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | C 300 | D 45 | | E 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 | | D 35 | E 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 330 | D 35 | E 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 470 | E 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| POLYMER MULTI ANODE TANTALUM CAPACITOR BASED ON TCS TYPE. | | | | 366 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|----------------------|---------------------|--|--|--|--|--|------|-----|-----|-----|-----|-----|------------|--|--|--|--|--|--------------|------------|--|--|--|--|--------------|--|------------|--|--|--|--------------|--|--|-------------|--|--|--------------|--|--|--|-------------|--|--------------|--------------|--|--|--|-------------|--------------|--------------|--|--|--|--|-------------|--------------|--|--|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3012 Detail ESCC 3012/006 | Kyocera AVX components sro Lanskroun Czech Republic | Qualification | ESA | Apr 2020 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified Range:</p> <p>Variant 01. Case style E (2917). Tolerance: $\pm 20\%$.</p> <table border="1" data-bbox="402 949 1104 1323"> <thead> <tr> <th rowspan="2">Capacitance C_n</th> <th colspan="6">Rated Voltage U_R</th> </tr> <tr> <th>6.3V</th> <th>10V</th> <th>16V</th> <th>20V</th> <th>25V</th> <th>35V</th> </tr> </thead> <tbody> <tr> <td>22μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>50mΩ</td> </tr> <tr> <td>33μF</td> <td></td> <td></td> <td></td> <td></td> <td>50mΩ</td> <td></td> </tr> <tr> <td>68μF</td> <td></td> <td></td> <td></td> <td>25mΩ</td> <td></td> <td></td> </tr> <tr> <td>150μF</td> <td></td> <td></td> <td>20mΩ</td> <td></td> <td></td> <td></td> </tr> <tr> <td>220μF</td> <td></td> <td>15mΩ</td> <td>20mΩ</td> <td></td> <td></td> <td></td> </tr> <tr> <td>330μF</td> <td>12mΩ</td> <td>15mΩ</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>470μF</td> <td>12mΩ</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Operating Temperature Range ($^{\circ}$C):-55 to +105</p> | | | | | Capacitance C_n | Rated Voltage U_R | | | | | | 6.3V | 10V | 16V | 20V | 25V | 35V | 22 μ F | | | | | | 50m Ω | 33 μ F | | | | | 50m Ω | | 68 μ F | | | | 25m Ω | | | 150 μ F | | | 20m Ω | | | | 220 μ F | | 15m Ω | 20m Ω | | | | 330 μ F | 12m Ω | 15m Ω | | | | | 470 μ F | 12m Ω | | | | | |
| Capacitance C_n | Rated Voltage U_R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6.3V | 10V | 16V | 20V | 25V | 35V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 μ F | | | | | | 50m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 μ F | | | | | 50m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68 μ F | | | | 25m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 μ F | | | 20m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 μ F | | 15m Ω | 20m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 330 μ F | 12m Ω | 15m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 470 μ F | 12m Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.1.4 Fixed Film

| CAPACITORS, FIXED, RECONSTITUTED MICA, HIGH VOLTAGE, BASED ON TYPE HT86PS | | | | 251K | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|------------------------|--|--|-----------|--------|----|----|-------|----|-----|----|----|-------|----|-----|----|----|-------|----|-----|-----|----|-----|----|-----|-----|----|-----|----|-----|-----|----|-----|----|------|-----|----|----|----|------|-----|----|----|----|------|------|----|----|----|------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3006 | Exxelia Technologies Chanteloup en Brie France | Qualification | CNES | Aug 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Detail ESCC 3006/022 | | Remarks: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified Range:</p> <p>All values defined by the ESCC Detail Specification</p> <table border="1"> <thead> <tr> <th colspan="3">Capacitance Range (nF)</th> <th>Tol. (±%)</th> <th>UR(kV)</th> </tr> </thead> <tbody> <tr> <td>33</td> <td>to</td> <td>2 200</td> <td>10</td> <td>1.5</td> </tr> <tr> <td>15</td> <td>to</td> <td>1 500</td> <td>10</td> <td>2.5</td> </tr> <tr> <td>15</td> <td>to</td> <td>1 000</td> <td>10</td> <td>3.5</td> </tr> <tr> <td>6.8</td> <td>to</td> <td>470</td> <td>10</td> <td>5.0</td> </tr> <tr> <td>2.2</td> <td>to</td> <td>220</td> <td>10</td> <td>7.5</td> </tr> <tr> <td>1.0</td> <td>to</td> <td>100</td> <td>10</td> <td>10.0</td> </tr> <tr> <td>3.3</td> <td>to</td> <td>68</td> <td>10</td> <td>12.5</td> </tr> <tr> <td>1.5</td> <td>to</td> <td>33</td> <td>10</td> <td>15.0</td> </tr> <tr> <td>0.68</td> <td>to</td> <td>15</td> <td>10</td> <td>20.0</td> </tr> </tbody> </table> <p>Operating Temperature Range, (°C): -55 to +125</p> | | | | | Capacitance Range (nF) | | | Tol. (±%) | UR(kV) | 33 | to | 2 200 | 10 | 1.5 | 15 | to | 1 500 | 10 | 2.5 | 15 | to | 1 000 | 10 | 3.5 | 6.8 | to | 470 | 10 | 5.0 | 2.2 | to | 220 | 10 | 7.5 | 1.0 | to | 100 | 10 | 10.0 | 3.3 | to | 68 | 10 | 12.5 | 1.5 | to | 33 | 10 | 15.0 | 0.68 | to | 15 | 10 | 20.0 |
| Capacitance Range (nF) | | | Tol. (±%) | UR(kV) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | to | 2 200 | 10 | 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | to | 1 500 | 10 | 2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | to | 1 000 | 10 | 3.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.8 | to | 470 | 10 | 5.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2 | to | 220 | 10 | 7.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.0 | to | 100 | 10 | 10.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.3 | to | 68 | 10 | 12.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.5 | to | 33 | 10 | 15.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.68 | to | 15 | 10 | 20.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| CAPACITORS, FIXED, SURFACE MOUNT, D.C SELF-HEALING, NON-INDUCTIVE, POLYTEREPHTALATE DIELECTRIC, BASED ON TYPE PM948S/94S, PM907S/90S | | | | 353A |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3006 | Exxelia Technologies Marmoutier France | Qualification | CNES | Jun 2018 |
| Detail ESCC 3006/020 3006/024 3006/025 3006/026 | | Remarks: | | |
| <p>Qualified range:</p> <p>All variants in the ESCC Detail specifications 3006/020, 3006/024, 3006/025 and 3006/026 are qualified.</p> <p>Operating Temperature Range, (°C): -55 to +125</p> <p>The qualified range includes parts previously qualified under other certificates:</p> <ul style="list-style-type: none"> - Certificate 270 with initial qualification date in August 2002, for parts based on type PM94S (ESCC 3006/024). - Certificate 338 with initial qualification date in March 2016, for parts based on types PM907S and PM948S (ESCC 3006/025 and 3006/026). | | | | |

6.1.5 Semiconductor

| CAPACITORS, MICROWAVE, SILICON, NAKED DIE, MOS, BASED ON TYPES 101M, 201M, 400M AND 401M | | | | 286F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------------|-----------------------|----------------------------|------|------------------------|--------------------|--------------|-----------------|----|-----------------|--------------------|--------------|------------|--------------|---------|-----------------|----|--------------|--------------------|-----|-----------------|------------|--------------|----------------|----------|---------------|-----|----------|--|-----------------|-------------------------|--------------|----------------|-----------------|------------|----------|-------|-----|----------|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 5010 Detail ESCC 5711/002 | COBHAM MICROWAVE Les Ulis France | Qualification | CNES | Dec 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All variants defined by the ESCC Detail Specification</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Capacitance Range (pF)</th> <th>U_r(V)</th> </tr> </thead> <tbody> <tr> <td>400M106A & C</td> <td>8.2, 10, 12, 15</td> <td rowspan="5">40</td> </tr> <tr> <td>400M10xA & 107C</td> <td>18, 22, 27, 33, 39</td> </tr> <tr> <td>400M108A & C</td> <td>47, 56, 68</td> </tr> <tr> <td>400M110A & C</td> <td>81, 100</td> </tr> <tr> <td>400M113J & 114J</td> <td>10</td> </tr> <tr> <td>101M106A & C</td> <td>3.9, 4.7, 5.6, 6.8</td> <td rowspan="3">100</td> </tr> <tr> <td>101M10xA & 107C</td> <td>10, 12, 15</td> </tr> <tr> <td>101M108A & C</td> <td>22, 27, 33, 39</td> </tr> <tr> <td>201M106C</td> <td>2.2, 2.7, 3.3</td> <td rowspan="5">200</td> </tr> <tr> <td>201M106A</td> <td>0.1X (201M106C, -107C, -108C) + 210M106C</td> </tr> <tr> <td>201M10xA & 107C</td> <td>3.9, 4.7, 5.6, 6.8, 8.2</td> </tr> <tr> <td>201M108A & C</td> <td>10, 12, 15, 18</td> </tr> <tr> <td>201M111J & 112J</td> <td>0.25 & 0.4</td> </tr> <tr> <td>401M111J</td> <td>0.125</td> <td rowspan="2">400</td> </tr> <tr> <td>401M112J</td> <td>0.2</td> </tr> </tbody> </table> <p>Operating Temperature Range, (°C): -55 to +150</p> | | | | | Type | Capacitance Range (pF) | U _r (V) | 400M106A & C | 8.2, 10, 12, 15 | 40 | 400M10xA & 107C | 18, 22, 27, 33, 39 | 400M108A & C | 47, 56, 68 | 400M110A & C | 81, 100 | 400M113J & 114J | 10 | 101M106A & C | 3.9, 4.7, 5.6, 6.8 | 100 | 101M10xA & 107C | 10, 12, 15 | 101M108A & C | 22, 27, 33, 39 | 201M106C | 2.2, 2.7, 3.3 | 200 | 201M106A | 0.1X (201M106C, -107C, -108C) + 210M106C | 201M10xA & 107C | 3.9, 4.7, 5.6, 6.8, 8.2 | 201M108A & C | 10, 12, 15, 18 | 201M111J & 112J | 0.25 & 0.4 | 401M111J | 0.125 | 400 | 401M112J | 0.2 |
| Type | Capacitance Range (pF) | U _r (V) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400M106A & C | 8.2, 10, 12, 15 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400M10xA & 107C | 18, 22, 27, 33, 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400M108A & C | 47, 56, 68 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400M110A & C | 81, 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400M113J & 114J | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101M106A & C | 3.9, 4.7, 5.6, 6.8 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101M10xA & 107C | 10, 12, 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101M108A & C | 22, 27, 33, 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201M106C | 2.2, 2.7, 3.3 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201M106A | 0.1X (201M106C, -107C, -108C) + 210M106C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201M10xA & 107C | 3.9, 4.7, 5.6, 6.8, 8.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201M108A & C | 10, 12, 15, 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201M111J & 112J | 0.25 & 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 401M111J | 0.125 | 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 401M112J | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.2 CONNECTORS (02)

6.2.1 Multipin, Solder Contacts

| CONNECTORS, ELECTRICAL, SOLDER AND WIRE WRAP CONTACTS, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*M | | | | 71Srev1 |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | C&K Components Dole France | Qualification | CNES | Feb 1981 |
| Detail ESCC | | Remarks | | |
| 3401/001, 3401/004, 3401/022, 3401/040, 3401/072, 3401/080 | | | | |
| Qualified range: | | | | |
| Shell Size: | E, A, B, C, D, F | | | |
| Range of Contacts: | 9, 15, 25, 37 and 50 size 20 contacts for standard density layout 3W3 to 8W8, 5W1 to 47W1 combined contact arrangements 15, 26, 44, 62, 78 and 104 size 22 contacts for high density layout | | | |
| Mounting Type: | Blank: standard mounting holes; Y: floating mount; E: captive nuts | | | |
| Range of Connectors: | 3401/001: Variants 01 & 02 | | | |
| Range of Contacts: | 3401/004: Variants 01 to 25; 3401/022: 01 to 59 and 65 to 97; 3401/040: 01 to 17; 3401/080: 01 3401/072: Variants 05 to 39, 46 to 65 and 72 to 82 | | | |
| Termination type: | solder bucket, straight PCB, 90° PCB, wire wrap | | | |
| Coaxial contact arrangements: | 3401/004 variants 01 to 25 | | | |
| Power contact arrangements: | 3401/040 variants 01 to 17 | | | |
| Gold-plated non-magnetic coating | | | | |
| Operating Temperature Range (°C): -55 to +125 | | | | |

| CONNECTORS, ELECTRICAL, SOLDER AND WIRE WRAP CONTACTS, NON-REMOVABLE, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*M | | | | 155P |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | SOURIAU Connection Technology Marolles en Brie France | Qualification | CNES | Sep 1988 |
| Detail ESCC | | Remarks | | |
| 3401/001, 3401/022, 3401/072, 3401/004, 3401/040 | | | | |
| <p>Qualified range:</p> <p>Complete range as defined in the Detail Specifications are qualified except for:</p> <ul style="list-style-type: none"> • high density 104 contacts arrangement • coaxial and power contacts and arrangement <p>Range of Connectors: 3401/001: variants 01 to 02</p> <p>Range of Contacts: Size 20 : 9, 15, 25, 37 and 50 contacts, Size 22: 15, 26, 44, 62, 78 contacts 3401/022: variants 01 to 16 & 44 to 57 & 65 to 80 3401/072: variants 01 to 65 3401/004: variants 01 to 20 3401/040: variants 01 to 12</p> <p>Mounting Type: blank: standard mounting holes; Y: floating mount; E: captive nuts</p> <p>Gold-plated non-magnetic coating</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

6.2.2 Multipin, Crimp Contacts

| CONNECTORS, ELECTRICAL, CRIMP CONTACTS, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*MA | | | | 72Srev1 |
|--|----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 Detail ESCC | C&K Components Dole France | Qualification | CNES | Feb 1981 |
| Remarks | | | | |
| 3401/002, 3401/005, 3401/020, 3401/021 | | | | |
| <p>Qualified range:</p> <p>Complete range defined in the corresponding Detail Specifications are qualified.</p> <p>Shell size: E, A, B, C, D, F</p> <p>Range of Connectors: 3401/002: Variants 01 & 02</p> <p>Range of Contacts: 3401/005: variants 01 to 08 3401/020 variants 01 & 02 3401/021: variants 01 & 02</p> <p>9, 15, 25, 37 and 50 size 20* contacts for standard density layout 15, 26, 44, 62, 78 and 104 size 22** contacts for high density layout</p> <p>*Accepts wire sizes : -AWG # 20 to 24 (standard bucket: variants 01 and 02) per 3401/005 -AWG # 26 and 28 (reduced bucket: variants 03 and 04) per 3401/005 -AWG # 18 and 20 (large bucket: variants 05 to 06) per 3401/005</p> <p>** Accepts wire sizes AWG # 22 to 26 (standard bucket: variants 07 to 08) per 3401/005</p> <p>Mounting Type: Blank: standard mounting holes; Y: floating mount; E: captive nuts</p> <p>Connector Savers; For usage with above connector range</p> <p>Gold-plated non-magnetic coating</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS MINIATURE, ELECTRICAL, CIRCULAR, PUSH-PULL COUPLING, REMOVABLE CRIMP CONTACTS, BASED ON TYPE DBAS | | | | 025S |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | TE Connectivity Deutsch Evreux France | Qualification | CNES | Jul 1979 |
| Detail ESCC | | Remarks | | |
| 3401/008, 3401/009, 3401/012, 3401/064 | | | | |
| <p>Qualified range:</p> <p>3401/008: Variant 01 3401/009: Variants 01 to 20 3401/012: Variants 01 to 04 3401/064: Variants 01 to 41</p> <p>Circular Multicontact connectors</p> <p>Standard contact arrangements with 3, 7, 12, 19, 27, 37 or 61 contacts in wire size AWG #20</p> <p>Special contact arrangements with contacts size AWG 22, 20, 16, 12 and 8</p> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | |

| CONNECTORS, ELECTRICAL, CIRCULAR, BAYONET COUPLING, SCOOP-PROOF, REMOVABLE CRIMP CONTACTS, BASED ON TYPE MIL-C-38999, SERIES | | | | 220K | | | | | | | | | | | | | | |
|--|---|--------------------|-----------------------|----------------------------|--------------|-------------|---|----|---|------|----|------|----|------|----|-----|----|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | |
| Generic ESCC 3401 | SOURIAU Connection Technology Marolles en Brie France | Qualification | CNES | May 1995 | | | | | | | | | | | | | | |
| Detail ESCC | | Remarks | | | | | | | | | | | | | | | | |
| 3401/052, 3401/058, 3401/062 | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All connector variants are qualified For 3401/058, variants 01 to 14 are qualified For 3401/062, variants 01 to 27 are qualified</p> <p># 20 with standard contact arrangements 3, 6, 10, 19, 26, 32, 41, 53, 61 # 22 with high density arrangements 6, 13, 22, 37, 55, 66, 79, 100, 128</p> <table border="1" data-bbox="555 1167 956 1395"> <thead> <tr> <th>Contact size</th> <th>Ratings (A)</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>80</td> </tr> <tr> <td>8</td> <td>46.0</td> </tr> <tr> <td>12</td> <td>23.0</td> </tr> <tr> <td>16</td> <td>13.0</td> </tr> <tr> <td>20</td> <td>7.5</td> </tr> <tr> <td>22</td> <td>5.0</td> </tr> </tbody> </table> <p>Other arrangements with contact sizes: 20, 16, 12, 8</p> <p>Receptacle and Plug Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25</p> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | | Contact size | Ratings (A) | 4 | 80 | 8 | 46.0 | 12 | 23.0 | 16 | 13.0 | 20 | 7.5 | 22 | 5.0 |
| Contact size | Ratings (A) | | | | | | | | | | | | | | | | | |
| 4 | 80 | | | | | | | | | | | | | | | | | |
| 8 | 46.0 | | | | | | | | | | | | | | | | | |
| 12 | 23.0 | | | | | | | | | | | | | | | | | |
| 16 | 13.0 | | | | | | | | | | | | | | | | | |
| 20 | 7.5 | | | | | | | | | | | | | | | | | |
| 22 | 5.0 | | | | | | | | | | | | | | | | | |

| CONNECTORS, ELECTRICAL, CIRCULAR, BAYONET COUPLING, REMOVABLE CRIMP CONTACTS, BASED ON TYPE MIL-C-38999, SERIES II | | | | 221K | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|--------------|-------------|----|------|----|------|----|-----|----|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | |
| Generic ESCC 3401 | SOURIAU Connection Technology Marolles en Brie France | Qualification | CNES | May 1995 | | | | | | | | | | |
| Detail ESCC | | Remarks | | | | | | | | | | | | |
| 3401/044, 3401/045, 3401/062 | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>For 3401/044, all variants are qualified For 3401/045, variants 01 to 08 are qualified For 3401/062, variants 01 to 27 are qualified</p> <table border="1"> <thead> <tr> <th>Contact size</th> <th>Ratings (A)</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>23.0</td> </tr> <tr> <td>16</td> <td>13.0</td> </tr> <tr> <td>20</td> <td>7.5</td> </tr> <tr> <td>22</td> <td>5.0</td> </tr> </tbody> </table> <p># 20 with standard contact arrangements 3, 6, 10, 18, 26, 32, 41, 55, 61 # 22 with high density arrangements 6, 13, 22, 37, 55, 66, 79, 100, 128</p> <p>Other arrangements with contact sizes: 20, 16, 12</p> <p>Receptacle and Plug Shell Sizes: 08, 10, 12, 14, 16, 18, 20, 22, 24</p> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | | Contact size | Ratings (A) | 12 | 23.0 | 16 | 13.0 | 20 | 7.5 | 22 | 5.0 |
| Contact size | Ratings (A) | | | | | | | | | | | | | |
| 12 | 23.0 | | | | | | | | | | | | | |
| 16 | 13.0 | | | | | | | | | | | | | |
| 20 | 7.5 | | | | | | | | | | | | | |
| 22 | 5.0 | | | | | | | | | | | | | |

| CONNECTORS, MINIATURE, ELECTRICAL, CIRCULAR, TRIPLE-START SELF- LOCKING COUPLING, SCOOP-PROOF, REMOVABLE AND NON-REMOVABLE CRIMP CONTACTS BASED ON TYPE MIL-C-38999, SERIES III | | | | 222K | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|--------------------|-------------|------------------|-------------|---|------|--|--|---|------|----|------|----|------|----|-----|----|------|----|-----|----|-----|--|--|----|-----|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3401 | SOURIAU Connection Technology Marolles en Brie France | Qualification | CNES | May 1995 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Detail ESCC | | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3401/056, 3401/058, 3401/062, 3401/066, 3401/070 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>3401/056, all variants are qualified 3401/058, variants 01 to 14 are qualified 3401/062, variants 28 to 54 are qualified 3401/066, variants 01 and 02 are qualified 3401/058 crimp contacts and 3401/066 triax contacts to be mounted on 3401/056 connectors 3401/070 connector receptacles with PCB contacts</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Crimp contact size</th> <th>Ratings (A)</th> <th>PCB contact size</th> <th>Ratings (A)</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>80.0</td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>46.0</td> <td>16</td> <td>10.0</td> </tr> <tr> <td>12</td> <td>23.0</td> <td>20</td> <td>5.0</td> </tr> <tr> <td>16</td> <td>13.0</td> <td>22</td> <td>3.0</td> </tr> <tr> <td>20</td> <td>7.5</td> <td></td> <td></td> </tr> <tr> <td>22</td> <td>5.0</td> <td></td> <td></td> </tr> </tbody> </table> <p>#20 with standard contact arrangements (3, 4, 5, 6, 7, 8, 10, 18, 19, 26, 32, 41, 53, 55, 61 contacts) #22 with high density arrangements (6, 13, 22, 37, 55, 66, 79, 100, 128 contacts)</p> <p>Other arrangements with contact sizes:# 20, 16, 12, 8 ,4</p> <p>Receptacle and Plug Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25. Triax contacts</p> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | | Crimp contact size | Ratings (A) | PCB contact size | Ratings (A) | 4 | 80.0 | | | 8 | 46.0 | 16 | 10.0 | 12 | 23.0 | 20 | 5.0 | 16 | 13.0 | 22 | 3.0 | 20 | 7.5 | | | 22 | 5.0 | | |
| Crimp contact size | Ratings (A) | PCB contact size | Ratings (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 80.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 46.0 | 16 | 10.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 23.0 | 20 | 5.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 13.0 | 22 | 3.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 7.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 5.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| CONNECTORS, MINIATURE, ELECTRICAL, CIRCULAR, TRIPLE-START SELF- LOCKING COUPLING, SCOOP-PROOF, HERMETIC RECEPTACLE AND FEEDTHROUGH BASED ON TYPE MIL-C-38999, SERIES III | | | | 223J | | | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|--------------|-------------|---|----|----|----|----|----|----|-----|-----|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 3401 Detail ESCC 3401/057 | SOURIAU Connection Technology Marolles en Brie France | Qualification | CNES | May 1995 | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All variants are qualified.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Contact size</th> <th>Ratings (A)</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>33</td> </tr> <tr> <td>12</td> <td>17</td> </tr> <tr> <td>16</td> <td>10</td> </tr> <tr> <td>20</td> <td>5.0</td> </tr> <tr> <td>22D</td> <td>3.0</td> </tr> </tbody> </table> <p># 20 with standard contact arrangements (3, 6, 10, 19, 26, 32, 41, 53, 61 contacts) # 22 with high density arrangements (6, 13, 22, 37, 55, 66, 79, 100, 128 contacts)</p> <p>Receptacle Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25</p> <p>Receptacle (contacts # 8, 12, 16, 20, 22D) and Feedthrough (contacts # 8, 12, 16, 20, 22D)</p> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | | Contact size | Ratings (A) | 8 | 33 | 12 | 17 | 16 | 10 | 20 | 5.0 | 22D | 3.0 |
| Contact size | Ratings (A) | | | | | | | | | | | | | | | |
| 8 | 33 | | | | | | | | | | | | | | | |
| 12 | 17 | | | | | | | | | | | | | | | |
| 16 | 10 | | | | | | | | | | | | | | | |
| 20 | 5.0 | | | | | | | | | | | | | | | |
| 22D | 3.0 | | | | | | | | | | | | | | | |

6.2.3 For printed Circuit Board

| CONNECTORS, ELECTRICAL, REMOVABLE CONTACTS, CRIMP WIRE-WRAP SOLDER AND SAVER, PRINTED CIRCUIT BOARD, BASED ON TYPE HE 801 | | | | 99Q |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France | Qualification | CNES | Nov 1982 |
| Detail ESCC 3401/016 3401/017 | | Remarks | | |
| <p>Qualified range:</p> <p>All Variants are qualified.</p> <p>Shell specifications and sizes: 3401/016</p> <p>Contacts: 3401/017 Crimp wire-wrap solder and savers, 1 to 22 and 64 to 70</p> <p> 2 rows: 17, 29, 41, 53, 65, 72, 84, 96, 120 contacts</p> <p> 3 rows: 62, 80, 98, 160 contacts</p> <p> Ratings: 5 A (1 contact AWG 22)</p> <p> 1.5 A (>31 contacts, AWG 22)</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, NON-REMOVABLE SOLDER AND WIRE-WRAP CONTACTS AND SAVERS, PRINTED CIRCUIT BOARD, BASED ON TYPE KMC | | | | 149N |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France | Qualification | CNES | Mar 1987 |
| Detail ESCC 3401/039 | | Remarks | | |
| <p>Qualified range:</p> <p>Contacts: 3 rows contacts: 26, 44, 62, 80, 98, 144 Contact codes: 10, 30, 31, 40, 50, 51 and 91 Ratings: 2 A (1 contact)</p> <p>Guiding and locking devices codes: 110, 121, 143, 201, 202, 204, 206, 703</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS AND SAVERS, ELECTRICAL, RECTANGULAR, NON-REMOVABLE, PRINTED CIRCUIT BOARD, BASED ON TYPE MHD | | | | 250J |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France | Qualification | CNES | Aug 1998 |
| Detail ESCC 3401/065 | | Remarks | | |
| <p>Qualified range:</p> <p>Contacts: 52, 100, 152, 200, 252, 300, 352 and 400 Codes: 10, 11, 12, 30, 31, 43, 45, 47 and 91</p> <p>Guiding and Locking Devices Codes: 110, 111, 121, 124, 134 and 201</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, CRIMP CONTACTS, Z-AXIS INTERPOSER, PRINTED CIRCUIT BOARD, BASED ON TYPE RX | | | | 281F |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France | Qualification | CNES | Aug 1998 |
| Detail ESCC 3401/076 | | Remarks | | |
| <p>Qualified range:</p> <p>All design envelops specified in Table 1(a) of ESCC Detail Specification are qualified</p> <p>Max number of rows: 11 Max number of contacts: 660</p> <p>Locking and Guiding Devices: -Through holes only -M2 studs with locking nuts and washers -Locating pins not available</p> <p>Rated current: 1A each contact</p> <p>Total contact compression range: 0.1 to 0.65 mm per contact</p> <p>Compression force: 1.6N per contact</p> <p>Torque for locking devices: 10 N-cm</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

6.2.4 RF Coaxial

| CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPE SMA | | | | 68Q |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3402 | RADIALL Saint-Quentin- Fallavier France | Qualification | CNES | Feb 1981 |
| Detail ESCC | | Remarks | | |
| 3402/001, 3402/002, 3402/003 | | | | |
| <p>Qualified range:</p> <p>3402/001 Pin contact (Plug). Variants 01 to 47 (except 11, 19, 31 –not in use) 3402/002 socket contact (Receptacle). Variants 01 to 85 (except 33, 35, 52 –not in use) 3402/003 Adapters. Variants 01 to 14</p> <p>Frequency Range 0-18 GHz</p> <p>Crimp or solder type contact for flexible and semi-rigid cables, contacts for micro strip</p> <p>Shell material and finish: Beryllium copper gold plated, copper or nickel underplate; stainless steel, electro- passivated or gold plated.</p> <p>Operating Temperature Range (°C): See Detail Specifications</p> | | | | |

| CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPE SMA 2.9 | | | | 283F |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3402 | RADIALL Saint-Quentin- Fallavier France | Qualification | CNES | Dec 2007 |
| Detail ESCC | | Remarks | | |
| 3402/021, 3402/022, 3402/023 | | | | |
| <p>Qualified range:</p> <p>3402/021 Pin contact (Plug). Variants 01 to 05 and 07 3402/022 Socket contact (Receptacle). Variants 01 to 05 3402/023 Adapters. Variants 01 to 06</p> <p>Frequency Range 0-40 GHz 50 Ohms</p> <p>Crimp or solder type contact for flexible and semi-rigid cables, contacts for micro strip</p> <p>Shell material and finish: passivated amagnetic stainless steel.</p> <p>Operating Temperature Range (°C): -65 to +165</p> | | | | |

| CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPES SMA, SMA 2.92 TNC and SMP | | | | 329C |
|---|--------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3402 | Rosenberger Fridolfing Germany | Qualification | DLR | Dec 2013 |
| Detail ESCC | | Remarks | | |
| 3402/001, 3402/002, 3402/003 (SMA range) 3402/008, 3402/009, 3402/010 (TNC range) 3402/021, 3402/022, 3402/023 (SMA 2.9 range) 3402/024, 3402/025, 3402/026 (SMP range) | | | | |
| Qualified range: 3402/001: 1 to 10, 12 to 18, 20 to 30, 32 to 35, 37 to 47 3402/002: 1 to 24, 27 to 32, 34, 36 to 51, 53 to 61, 65 to 72 3402/003: 1 to 6, 8 to 14 3402/008: 1 to 7; 3402/009: 1 to 3; 3402/010: 1 to 5 3402/021: 1 to 5, 7; 3402/022: 1 to 5; 3402/023: 1 to 6 3402/024: 1 to 26, 28 to 35; 3402/025: 1 to 14; 3402/026: 1 to 13 | | | | |

| CONNECTORS, RF COAXIAL TNC, VERY HIGH POWER, 50 OHMS, BASED ON TYPE TNC-VHP | | | | 350A |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3402 | RADIALL Saint-Quentin- Fallavier France | Qualification | CNES | Jan 2018 |
| Detail ESCC | | Remarks | | |
| 3402/027, 3402/028 | | | | |
| <p>Qualified range: 3402/027 Variants 01 & 02 3402/028 Variants 01 to 06</p> <p>Frequency Range 0-8 GHz designed for RF Power Applications</p> <p>Panel connectors, straight and right angle adaptators</p> <p>Operating Temperature Range (°C): -65 to +165</p> | | | | |

6.2.5 Microminiature, Crimp Contacts

| CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, CRIMP CONTACT, BASED ON TYPE MDM | | | | 140Q |
|--|-------------------------------------|--|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | C&K COMPONENTS Dole France | Qualification | CNES | Oct 1986 |
| Detail ESCC | | Remarks 3401/029 termination types GMR7580 and CMR7590 are NOT qualified | | |
| 3401/029, 3401/041, 3401/032, 3401/087 | | | | |
| <p>Qualified range:</p> <p>3401/029: 01 and 02 3401/041: 01 to 07 3401/032: 03, 04 and 07 to 21 3401/087: 01 to 56</p> <p>Layout: 9 - 15 - 21- 25 - 31 - 37 - 51 Contacts, Non removable crimp contacts</p> <p>Termination types: AWG 25: Uninsulated rigid wire. Bent and straight PCB - Max rated: 2.5 A AWG 26: ESCC 390101302, ESCC 390100256, ESCC 390101203 - Max rated: 2.5 A AWG 28: ESCC 390101301, ESCC 390100261, ESCC 390101202 - Max rated: 1.5 A Solder bucket – Max rated 2.5 A</p> <p>Nickel or Gold Plated Shells</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, MICROMINIATURE, CRIMP CONTACT, SINGLE-IN-LINE, BASED ON TYPE MTB | | | | 141Q |
|--|-------------------------------------|--|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | C&K COMPONENTS Dole France | Qualification | CNES | Oct 1986 |
| Detail ESCC 3401/031 | | Remarks 3401/029 termination types GMR7580 and CMR7590 are NOT qualified | | |
| <p>Qualified range: 3401/031: 01 and 02</p> <p>Insulator sizes: 5 through 50 contacts,</p> <p>Termination types: AWG 25: Uninsulated rigid wire. Bent PCB - Max rated: 2.5 A AWG 26: ESCC 390101302 - Max rated: 2.5 A AWG 28: ESCC 390101301 - Max rated: 1.5 A Solder bucket – Max rated 2.5 A Non removable crimp contacts</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, REMOVABLE CRIMP CONTACT, BASED ON TYPE MDMA | | | | 290E |
|--|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | C&K COMPONENTS Dole France | Qualification | CNES | Jun 2009 |
| Detail ESCC 3401/077 3401/078 | | Remarks | | |
| <p>Qualified range: All variants are qualified</p> <p>Range of Contacts: 9, 15, 21, 25, 31, 37, 51</p> <p>Accepts wires AWG 24, AWG 26, AWG 28 and 2xAWG 28 in crimping barrel AWG 24 Accepts wires AWG 26 and 28 in crimping barrel AWG 26</p> <p>Max. rating for 1 isolated contact: AWG 24 wire: 3.5 A AWG 26 wire and uninsulated AWG 25 solid wire: 2.5 A AWG 28 wire: 1.5 A</p> <p>Working Voltage (Max.) 150Vrms</p> <p>Nickel or Gold Plated Shells</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, REMOVABLE AND NON- REMOVABLE, GAUGE 26, PCB PIN CONTACT, BASED ON TYPE 8MCG | | | | 301E |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | SOURIAU CONNECTION TECHNOLOGY Marolles en Brie France | Qualification | CNES | Jun 2010 |
| Detail ESCC | | Remarks | | |
| 3401/081, 3401/082, 3401/083, 3401/084, 3401/088 | | | | |
| <p>Qualified range:</p> <p>3401/081: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).</p> <p>Contacts arrangements: 7, 13, 25, 51, 104 contacts. Contacts termination: OL3 (straight PCB), 1A7N (900 PCB 2.54mm spacing), 1B7N (900 PCB 2.54mm spacing). Gold-plated shells.</p> <p>3401/082: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).</p> <p>Contacts arrangements: 7, 13, 25, 51, 104 contacts.</p> <p>3401/083: Contacts variant 01 (male crimp barrel 26), 02 (female crimp barrel 26), 03 (male crimp barrel 24), 04 (female crimp barrel 24).</p> <p>Accepts wires AWG 24, 26, 28</p> <p>3401/084: Accessories variants 01 to 62.</p> <p>3401/088: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).</p> <p>Contacts arrangements: 7, 13, 25, 51, 104 contacts.</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

| CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE BASED ON TYPE MDM and MDSA D-CLICK. | | | | 370 |
|---|------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3401 | Axon' Cable, France | Qualification | CNES | Jan 2021 |
| Detail ESCC | | Remarks | | |
| 3401/029, 3401/032, 3401/091 | | | | |
| <p>Qualified range:</p> <p>3401/029 (MDSA): Shell variant 01 (Nickel finish). Contacts arrangements: 09-15-21-25-31-37-51 (non removable crimp contacts). Contacts termination type: FR112 to FR116, FR112A to FR115A, FR112B to FR115B, FR123, FR123A, FR123B, FR139,75SBB, 75SBT, 75RBB, 75RBT, CBRB, CBRT.</p> <p>3401/091 (MDSA D-CLICK): Connector variants 01 to 06, Jumper variants 07 to 09. Contacts arrangements: 09-15-21-25-31-37 (non removable crimp contacts).</p> <p>3401/032: Accessories variants 07, 08, 21 to 38</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

6.3 CRYSTALS AND OSCILLATORS (03)

6.3.1 Crystals

| CRYSTALS, TO-5 CAN | | | | 333Brev1 | | | | | | | | | | | | |
|---|---|--|-----------------------|----------------------------|--|----------|----------|----|----------|----------|----|-----------|-----------|----|-----------|-----------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic | RAKON France Pont Sainte Marie France | Qualification | CNES | Sept 2015 | | | | | | | | | | | | |
| ESCC 3501 | | Previously qualified in Argenteuil site | | (Oct. 1979) | | | | | | | | | | | | |
| Detail ESCC 3501/018 | | Remarks Upon receipt of a request for any retired Variant, the Manufacturer will allocate a new Specific Crystal Identification Number in accordance with 3501/018. It will have identical crystal characteristics to those of the retired variant. | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All variants are qualified.</p> <p>Types covered by similarity:</p> <p>All variants previously specified in (retired) specifications: 3501/001, 3501/008, 3501/011, 3501/012</p> <p>TO-5 Can (T 807)</p> <p>Frequency Ranges:</p> <table border="1" data-bbox="507 1592 1002 1778"> <thead> <tr> <th></th> <th>AT (MHz)</th> <th>SC (MHz)</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>14 to 35</td> <td>15 to 38</td> </tr> <tr> <td>P3</td> <td>20 to 100</td> <td>22 to 110</td> </tr> <tr> <td>P5</td> <td>45 to 140</td> <td>55 to 140</td> </tr> </tbody> </table> | | | | | | AT (MHz) | SC (MHz) | P1 | 14 to 35 | 15 to 38 | P3 | 20 to 100 | 22 to 110 | P5 | 45 to 140 | 55 to 140 |
| | AT (MHz) | SC (MHz) | | | | | | | | | | | | | | |
| P1 | 14 to 35 | 15 to 38 | | | | | | | | | | | | | | |
| P3 | 20 to 100 | 22 to 110 | | | | | | | | | | | | | | |
| P5 | 45 to 140 | 55 to 140 | | | | | | | | | | | | | | |

| CRYSTALS, TO-8 CAN | | | | 334Brev1 | | | | | | | | | | | | |
|--|---|--|-----------------------|----------------------------|--|----------|----------|----|---------|---------|----|----------|----------|----|----------|----------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 3501 Detail ESCC 3501/019 | RAKON France Pont Sainte Marie France | Qualification | CNES | Sept 2015 | | | | | | | | | | | | |
| | | Previously qualified in Argenteuil site | | (Oct. 1979) | | | | | | | | | | | | |
| | | Remarks Upon receipt of a request for any retired Variant, the Manufacturer will allocate a new Specific Crystal Identification Number in accordance with 3501/019. It will have identical crystal characteristics to those of the retired variant. | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All variants are qualified.</p> <p>Types covered by similarity:</p> <p>All variants previously specified in (retired) specifications: 3501/002, 3501/009</p> <p>TO-8 Can (T 1507)</p> <p>Frequency Ranges:</p> <table border="1" data-bbox="507 1355 1002 1541"> <thead> <tr> <th></th> <th>AT (MHz)</th> <th>SC (MHz)</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>3 to 20</td> <td>3 to 22</td> </tr> <tr> <td>P3</td> <td>10 to 30</td> <td>10 to 33</td> </tr> <tr> <td>P5</td> <td>15 to 65</td> <td>16 to 71</td> </tr> </tbody> </table> | | | | | | AT (MHz) | SC (MHz) | P1 | 3 to 20 | 3 to 22 | P3 | 10 to 30 | 10 to 33 | P5 | 15 to 65 | 16 to 71 |
| | AT (MHz) | SC (MHz) | | | | | | | | | | | | | | |
| P1 | 3 to 20 | 3 to 22 | | | | | | | | | | | | | | |
| P3 | 10 to 30 | 10 to 33 | | | | | | | | | | | | | | |
| P5 | 15 to 65 | 16 to 71 | | | | | | | | | | | | | | |

6.3.2 Oscillators

| CRYSTAL OSCILLATOR RK135, CLASS 2, 4MHz to 100MHz, AHCMOS compatible output, Rad-Hard | | | | 371 | | |
|---|---|--------------------|--|------------------------------|--------------|-----------------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | |
| Generic ESCC 3503 Detail ESCC 3503/001 | RAKON France Pont Sainte Marie France | Qualification | CNES | Feb 2021 | | |
| Remarks | | | | | | |
| Qualified range: | | | | | | |
| Variant Number | Nominal Output Frequency f_{Nom} (MHz) | Case | Nominal Supply Voltage V_{CCNom} (V) | Terminal Material and Finish | Weight max g | Total Dose Radiation Level Letter |
| 01 | 4 to 100 | FP1 | 3.3 | D2 | 5 | R [100krad(Si)] |
| 02 | 4 to 100 | FP2 | 3.3 | D2 | 5 | R [100krad(Si)] |
| 03 | 4 to 100 | FP3 | 3.3 | D2 | 5 | R [100krad(Si)] |
| 04 | 4 to 100 | FP4 | 3.3 | D2 | 5 | R [100krad(Si)] |
| 05 | 4 to 100 | DIL1 | 3.3 | G2 | 5 | R [100krad(Si)] |
| 07 | 4 to 100 | FP1 | 5 | D2 | 5 | R [100krad(Si)] |
| 08 | 4 to 100 | FP2 | 5 | D2 | 5 | R [100krad(Si)] |
| 09 | 4 to 100 | FP3 | 5 | D2 | 5 | R [100krad(Si)] |
| 10 | 4 to 100 | FP4 | 5 | D2 | 5 | R [100krad(Si)] |
| 11 | 4 to 100 | DIL1 | 5 | G2 | 5 | R [100krad(Si)] |
| Operating Temperature Range (°C): -55 to +110 | | | | | | |

6.4 DIODES (04)

6.4.1 Bipolar PN

| DIODES, POWER, BIPOLAR (PN) BASED ON TYPES BYV, BYW AND STTH | | | | | 369 | | | | |
|--|--|-----------|----------------------|--|--|--|------------------------|---------|----------------|
| Procurement Specifications | Manufacturer | | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | |
| Generic ESCC 5000 Detail ESCC | STMicroelectronics Rennes France | | Qualification | CNES | Nov 2020 Initial qualification date of certificates merged into 369: Cert 274: 08/2003 Cert 297: 11/2009 Cert 311: 05/2011 | | | | |
| | | | Remark: | | | | | | |
| 5101/026, 5101/027, 5101/013, 5101/014, 5103/029, 5103/031, 5103/032, 5103/033 | | | | | | | | | |
| Qualified range: | | | | | | | | | |
| ESCC component No. | Variant | Type | V _{RWM} (V) | I _R (μA) @ V _{RWM} | I _{FSM} (A) | I _{FRMS} @ T _{amb} (A) | T _{jmax} (°C) | Config. | Package |
| 5101/014 | 13, 14 | 1N5806 | 150 | 0.5 | 33 | 2.5 | 175 | Single | LCC2A |
| 5101/013 | 11, 12 | 1N5811 | 150 | 2 | 100 | 6 | 175 | Single | LCC2B |
| 5101/027 | 07, 08 | 1N6640U | 50 | 0.04 | 2 | 0.3 | 175 | Single | LCC2D |
| 5101/026 | 07, 08 | 1N6642U | 75 | 0.05 | 2 | 0.3 | 175 | Single | LCC2D |
| 5103/029 | 05 | BYW81-200 | 200 | 20 | 250 | 15 | 150 | Single | SMD.5 |
| 5103/029 | 07, 08 | BYW81-200 | 200 | 20 | 500 | 30 | 150 | Dual | TO254 |
| 5103/031 | 02, 05 | BYV54-200 | 200 | 50 | 400 | 40 | 150 | Single | TO254, TO254AA |
| 5103/032 | 01 | STTH60400 | 400 | 20 | 500 | 60 | 175 | Single | SMD1 |
| 5103/033 | 01, 02 | STTH40200 | 200 | 30 | 300 | 40 | 175 | Single | TO254AA |
| 5103/033 | 03 | STTH60200 | 200 | 30 | 300 | 60 | 175 | Single | SMD1 |

6.4.2 Schottky

| DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS | | | | | | | | | 368rev1 |
|--|----------------|--|----------------------|--|----------------------|-------------------------------------|------------------------|--|----------------------|
| Procurement Specifications | | Manufacturer | | Nature of Approval | | Supervising Authority | | Initial Qualification Date | |
| Generic ESCC 5000 Detail ESCC | | STMicroelectronics Rennes France | | Qualification | | CNES | | Sept 2020 Initial qualification date of certificates merged into 368: Cert 272: 11/2002 Cert 302: 09/2010 | |
| | | | | Remarks | | | | | |
| 5106/020, 5106/021, 5106/016, 5106/017, 5106/018, 5106/019, 5106/023, 5106/024 | | | | | | | | | |
| Qualified range: | | | | | | | | | |
| ESCC component No. | Variant | Type | V _{RRM} (V) | I _R (µA) @ V _{RRM} | I _{FSM} (A) | I _{FRMS} @T _{amb} | T _{jmax} (°C) | Config. | Package |
| 5106/021 | 02, 03 | 1N5819U | 45 | 20 | 25 | 1A | 150 | Single | LCC2B |
| 5106/020 | 01, 02 | 1N5822U | 40 | 80 | 80 | 3A | 150 | Single | LCC2B |
| 5106/016 | 05, 06, 07, 11 | STPS20100 | 100 | 30 | 250 | 30A per diode | 175 | Single or Dual diode common cathode | TO-254, SMD0.5, SMD1 |
| 5106/017 | 01, 02 | STPS1045S | 45 | 100 | 200 | 15A per diode | 175 | Single or Dual diode common cathode | SMD0.5 |
| 5106/018 | 02 | STPS6045 | 45 | 500 | 300 | 2 x 30A | 175 | Dual diode common cathode | SMD1 |
| 5106/019 | 03, 05 | STPS40100 | 100 | 30 | 300 | 2 x 20A | 175 | Dual diode common cathode | TO254, SMD1 |
| 5106/023 | 01 | STPS80A150 | 150 | 14 | 190 | 2 x 40A | 175 | Dual diode common | SMD0.5 |

| DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS | | | | | | | | 368rev1 | |
|--|--------|------------|-----|----|-----|------------|-----|------------------------------------|--------------|
| | | | | | | | | cathode | |
| 5106/023 | 02 | STPS60A150 | 150 | 14 | 190 | 2 x 30A | 175 | Dual diode common cathode | SMD0.5 |
| 5106/023 | 03, 04 | STPS40A150 | 150 | 14 | 220 | 2 x 20A | 175 | Dual diode common cathode | TO- 254AA |
| 5106/024 | 02, 03 | STPS40A45C | 45 | 25 | 200 | 2 x 20A | 175 | Dual diode common cathode | TO- 254AA |
| 5106/024 | 01 | STPS80A45C | 45 | 25 | 200 | 2 x 40A | 175 | Dual diode common cathode | SMD0.5 |
| Maximum dV/dt= 10 000V/μs | | | | | | | | | |

6.4.3 RF/Microwave, Silicon Schottky

| DIODES, MICROWAVE, SILICON, SCHOTTKY, GENERAL PURPOSE, BASED ON TYPES BAS 40, BAS 70, AND MICROWAVE, SILICON, PIN, BASED ON TYPES BXY42, BXY43 AND BXY44 | | | | 227H |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5010 Detail ESCC | INFINEON Technologies AG Neubiberg Germany | Qualification | DLR | Sep 1995 |
| Remarks Revision F includes devices previously qualified under Certificates 224 and 236. | | | | |
| 5512/020 , 5513/017 , 5513/030 | | | | |
| Qualified range: Variants 01 and 03 are qualified (5512/020) Variants 01 and 02 are qualified (5513/017) Variants 01, 02, 05, and 06 are qualified (5513/030) | | | | |

6.4.4 RF/Microwave, Varactors

| DIODES, MICROWAVE, SILICON, MULTIPLIER AND PIN, BASED ON TYPES DH 2XX, DH 50XXX and DH76XXX | | | | 225J | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|----------------------|-----------------------|----------------------------|---------------|----------|----------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|----------------------|----------|----------|--------|----------|----------|--------|----------|----------|--------|----------|----------|--------|----------|----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 5010 Detail ESCC | COBHAM MICROWAVE Villebon Sur Yvette France | Qualification | CNES | Jun 1995 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks Certificate 259C has been merged with this certificate in February 2012. Certificate 273F has been merged with this certificate in September 2019. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/031, 5513/032, 5513/033, 5513/034, 5513/036, 5513/037, 5513/038, 5512/016, 5512/023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Qualified range: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>ESCC Spec No.</th> <th>Variants</th> <th>Component type</th> </tr> </thead> <tbody> <tr><td>5513/031</td><td>01 to 56</td><td>DH 50151 to DH 50157</td></tr> <tr><td>5513/032</td><td>01 to 40</td><td>DH 50033 to DH 50037</td></tr> <tr><td>5513/033</td><td>01 to 70</td><td>DH 50201 to DH 50209</td></tr> <tr><td>5513/034</td><td>01 to 41</td><td>DH 50251 to DH 50256</td></tr> <tr><td>5513/036</td><td>01 to 48</td><td>DH 50052 to DH 50057</td></tr> <tr><td>5513/037</td><td>01 to 56</td><td>DH 50071 to DH 50077</td></tr> <tr><td>5513/038</td><td>01 to 56</td><td>DH 50101 to DH 50107</td></tr> <tr><td>5512/016</td><td>10 to 16</td><td>DH 267</td></tr> <tr><td>5512/016</td><td>20 to 26</td><td>DH 292</td></tr> <tr><td>5512/016</td><td>30 to 36</td><td>DH 256</td></tr> <tr><td>5512/016</td><td>40 to 46</td><td>DH 252</td></tr> <tr><td>5512/016</td><td>50 to 56</td><td>DH 294</td></tr> <tr><td>5512/023</td><td>01 to 09</td><td>DH 76010</td></tr> <tr><td>5512/023</td><td>10 to 18</td><td>DH 76015</td></tr> <tr><td>5512/023</td><td>19 to 27</td><td>DH 76022</td></tr> <tr><td>5512/023</td><td>28 to 36</td><td>DH 76033</td></tr> <tr><td>5512/023</td><td>37 to 45</td><td>DH 76047</td></tr> <tr><td>5512/023</td><td>46 to 54</td><td>DH 76068</td></tr> <tr><td>5512/023</td><td>55 to 63</td><td>DH 76100</td></tr> <tr><td>5512/023</td><td>64 to 72</td><td>DH 76150</td></tr> </tbody> </table> | | | | | ESCC Spec No. | Variants | Component type | 5513/031 | 01 to 56 | DH 50151 to DH 50157 | 5513/032 | 01 to 40 | DH 50033 to DH 50037 | 5513/033 | 01 to 70 | DH 50201 to DH 50209 | 5513/034 | 01 to 41 | DH 50251 to DH 50256 | 5513/036 | 01 to 48 | DH 50052 to DH 50057 | 5513/037 | 01 to 56 | DH 50071 to DH 50077 | 5513/038 | 01 to 56 | DH 50101 to DH 50107 | 5512/016 | 10 to 16 | DH 267 | 5512/016 | 20 to 26 | DH 292 | 5512/016 | 30 to 36 | DH 256 | 5512/016 | 40 to 46 | DH 252 | 5512/016 | 50 to 56 | DH 294 | 5512/023 | 01 to 09 | DH 76010 | 5512/023 | 10 to 18 | DH 76015 | 5512/023 | 19 to 27 | DH 76022 | 5512/023 | 28 to 36 | DH 76033 | 5512/023 | 37 to 45 | DH 76047 | 5512/023 | 46 to 54 | DH 76068 | 5512/023 | 55 to 63 | DH 76100 | 5512/023 | 64 to 72 | DH 76150 |
| ESCC Spec No. | Variants | Component type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/031 | 01 to 56 | DH 50151 to DH 50157 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/032 | 01 to 40 | DH 50033 to DH 50037 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/033 | 01 to 70 | DH 50201 to DH 50209 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/034 | 01 to 41 | DH 50251 to DH 50256 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/036 | 01 to 48 | DH 50052 to DH 50057 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/037 | 01 to 56 | DH 50071 to DH 50077 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5513/038 | 01 to 56 | DH 50101 to DH 50107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/016 | 10 to 16 | DH 267 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/016 | 20 to 26 | DH 292 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/016 | 30 to 36 | DH 256 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/016 | 40 to 46 | DH 252 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/016 | 50 to 56 | DH 294 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 01 to 09 | DH 76010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 10 to 18 | DH 76015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 19 to 27 | DH 76022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 28 to 36 | DH 76033 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 37 to 45 | DH 76047 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 46 to 54 | DH 76068 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 55 to 63 | DH 76100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5512/023 | 64 to 72 | DH 76150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Temperature Range (°C): -55 to +155 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.5 FILTERS (05)

6.5.1 Feedthrough

| CAPACITORS FILTERS, C-TYPE, FEED THROUGH, HERMETICALLY SEALED (ONE END ONLY), BASED ON TYPE SFC030 | | | | 375 |
|---|---|---|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3008 | EXXELIA Technologies Chanteloup en Brie France | Qualification | CNES | Sept 2021 |
| Detail ESCC | | Remarks The SFC filters were qualified and covered by certificate 252 (initial qualification date: August 1998). The certificate 252 was suspended in June 2020. | | |
| 3008/020 | | | | |
| <p>Qualified range:</p> <p>ESCC 3008/020: variants 01 to 05</p> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | |

6.5.2 SAW

| SAW FILTERS (TRANSVERSAL BAND PASS/RESONATOR/NOTCH/ LOW LOSS IMPEDANCE ELEMENT) | | | | 313D |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3502 Detail ESCC 3502/002 | Kongsberg Space Electronics Norway | Qualification | ESA/ESTEC | Aug 2011 |
| Remarks | | | | |
| The Technology Flow is described into the current QML document (REP006). | | | | |

| | |
|--|--------------------|
| <p>SAW FILTERS (TRANSVERSAL BAND PASS/RESONATOR/NOTCH/ LOW LOSS IMPEDANCE ELEMENT)</p> | <p>313D</p> |
| | |

6.6 FUSES (06)

6.6.1 Thin Film

| FUSES, SURFACE MOUNT, THIN FILM, 0.14 TO 3.5 AMPS, BASED ON TYPE MGA-S | | | | 284F |
|--|---------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 4008 | Schurter Lucerne Switzerland | Qualification | ESA/ESTEC | Jun 2008 |
| Detail ESCC 4008/001 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 12 are qualified.</p> <p>Rated Voltage (VAC or VDC): 125V/125V, 63V/125V and 32V/125V by variant</p> <p>Rated Current (I_R): 0.14 to 3.5 A by variant</p> <p>AC Interrupt Current (A): 50 at maximum rated voltage, power factor > 0.95 DC Interrupt Current (A): at maximum rated voltage, time constant ≤ 1 ms Variants 01 to 10: 300, Variants 11 and 12: 50</p> <p>Operating Temperature Range, (°C): -50 to +125 (90% I_R to 107% I_R)</p> | | | | |

| <p>FUSES, SOLID STATE, THIN FILM, BASED ON TYPE HCSF</p> | | | | <p>336C</p> |
|---|---|----------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| <p>Generic ESCC 4008 Detail ESCC 4008/002</p> | <p>Schurter Lucerne Switzerland</p> | <p>Qualification</p> | <p>ESA/ESTEC</p> | <p>Jun 2016</p> |
| <p>Remarks</p> | | | | |
| <p>Qualified range:</p> <p>Variants 24, 26, 28, 32 are qualified.</p> <p>Operating Temperature Range, (°C): -50 to +125 (106% IR to 80% IR)</p> | | | | |

6.7 INDUCTORS (07)

6.7.1 Fixed, RF

| INDUCTORS, FIXED, RF, MINIATURE, MOULDED, SURFACE MOUNT, BASED ON SERIES MSC1 10k, 12k, 20k and H01 | | | | 241K | | |
|---|----------------------------------|--------------------|-----------------------|-------------------------------|-------------------------------|---------------------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | |
| Generic ESCC 3201 | Exxelia SAS Illange France | Qualification | ESA/ESTEC | Jun 2016 | | |
| Detail ESCC 3201/008 | | Remarks | | | | |
| Qualified range: | | | | | | |
| Variants 01 to 05 are qualified | | | | | | |
| Series No. | Range (µH) | Tolerance (±%) | Q min. | Min. SRF f _r (MHz) | Max. DCR, R _{dc} (Ω) | Rated DC Current, I _R (mA) |
| 10k | 0.010- 10 | 2.0, 5.0, 10 | 60 - 42 | 1000 -33 | 0.025 -3.3 | 750 - 87 |
| 12k | 12- 1000 | 2.0, 5.0, 10 | 56 - 12 | 26 - 1.5 | 2.0 - 120 | 110 - 15 |
| 20k | 0.010 -1000 | 10 | 75 - 30 | 1000 - 1.7 | 0.04 - 80 | 1000 - 25 |
| H01 | 0.380 - 100 | 15 | 30 | 8 | 0.029 - 3.8 | 1500 - 100 |
| Dielectric Withstanding Voltage (DWV): 200 Vrms | | | | | | |
| Operating Temperature Range (°C): -55 to +125 | | | | | | |

6.7.2 Power

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------------------|-----------------------|----------------------------|----------|------|------|------|--|--|--|--|--|------|------|------|------|------|-------|------|------|------|---------|----|----|----|----|----|----|----|----|----------|--|--|--|--|--|--|--|--|-----|------|------|------|--|--|--|--|--|---------|----|----|----|--|--|--|--|--|
| INDUCTORS, POWER, MOULDED, SURFACE MOUNT, BASED ON SERIES SESI AND CMC | | | | 276G | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3201 Detail ESCC 3201/009 3201/010 | Exxelia SAS Illange France | Qualification | ESA/ESTEC | April 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks Termination finish shall be Sn60Pb40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>3201/009: Variants 01 to 08 are qualified 3201/010 Variants 01, 03 and 05 are qualified</p> <p>Component types:</p> <table border="1"> <tr> <td>3201/009</td> <td colspan="8"></td> </tr> <tr> <td>SESI</td> <td>14SR</td> <td>15SR</td> <td>15WR</td> <td>18WR</td> <td>9.1WR</td> <td>22WR</td> <td>32WR</td> <td>32PR</td> </tr> <tr> <td>Variant</td> <td>01</td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td>06</td> <td>07</td> <td>08</td> </tr> <tr> <td>3201/010</td> <td colspan="8"></td> </tr> <tr> <td>CMC</td> <td>15WR</td> <td>18WR</td> <td>22WR</td> <td colspan="5"></td> </tr> <tr> <td>Variant</td> <td>01</td> <td>03</td> <td>05</td> <td colspan="5"></td> </tr> </table> <p>Operating Temperature Range (°C): -55 to +125</p> | | | | | 3201/009 | | | | | | | | | SESI | 14SR | 15SR | 15WR | 18WR | 9.1WR | 22WR | 32WR | 32PR | Variant | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 3201/010 | | | | | | | | | CMC | 15WR | 18WR | 22WR | | | | | | Variant | 01 | 03 | 05 | | | | | |
| 3201/009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SESI | 14SR | 15SR | 15WR | 18WR | 9.1WR | 22WR | 32WR | 32PR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variant | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3201/010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CMC | 15WR | 18WR | 22WR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variant | 01 | 03 | 05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.8 MICROCIRCUITS (08)

6.8.1 Digital C-MOS

| MICROCIRCUITS, DIGITAL, C-MOS-B, 4000B SERIES | | | | 73S |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 9000 | ST Microelectronics Rennes France | Qualification | CNES | Apr 1981 |
| Detail ESCC | | Remarks: | | |
| 9201/041, 9201/042, 9201/043, 9201/047, 9201/048, 9201/052, 9201/055, 9201/061, 9201/063, 9201/064, 9201/065, 9201/082, 9202/039, 9202/040, 9202/042, 9202/043, 9202/044, 9202/045, 9202/046, 9202/047, 9202/048, 9202/049, 9202/051, 9202/065, 9203/022, 9203/023, 9203/038, 9204/020, 9204/021, 9204/022, 9204/023, 9204/025, 9204/026, 9204/028, 9204/036, 9204/041, 9204/045, 9204/052, 9204/054, 9205/010, 9205/011, 9206/003, 9207/003, 9207/007, 9209/001, 9306/014, 9306/015, 9306/016, 9306/022, 9306/026, 9401/010, 9401/013, 9401/030, 9407/003, 9408/005, 9408/006, 9408/009, 9408/011, 9408/012, 9408/025, 9409/002, 9409/005 | | | | |
| Qualified range: | | | | |
| 9201/041 | Quad 2-input NOR gate | | 4001B | |
| 9201/042 | Dual 4-input NOR gate | | 4002B | |
| 9202/039 | 4-bit full adder | | 4008B | |
| 9201/043 | Quad 2-input NAND gate | | 4011B | |
| 9203/023 | Dual D-type flip-flop | | 4013B | |
| 9306/014 | 8-stage synchronous static shift register | | 4014B | |
| 9306/015 | Dual 4-stage static shift register with serial input/parallel input | | 4015B | |
| 9204/020 | Decade counter/divider | | 4017B | |
| 9204/021 | Presettable divide-by-N counter | | 4018B | |
| 9202/051 | Quad AND/OR select gate | | 4019B | |
| 9204/022 | 14-stage ripple carry binary counter/divider | | 4020B | |
| 9306/016 | 8-stage static shift register | | 4021B | |
| 9204/023 | Octal counter/divider | | 4022B | |
| 9203/022 | Dual J-K master slave flip-flop | | 4027B | |
| 9205/010 | BCD-to-decimal or binary-to-octal decoder | | 4028B | |
| 9204/025 | Presettable up/down counter binary or BCD decade | | 4029B | |
| 9201/047 | Quad 2-input exclusive OR gates | | 4030B | |
| 9204/026 | 12-stage ripple carry binary counter/divider | | 4040B | |
| 9202/040 | Quad true/complement buffer with unbuffered outputs | | 4041UB | |

| MICROCIRCUITS, DIGITAL, C-MOS-B, 4000B SERIES | | 73S |
|--|--|--------|
| 9202/042 | Quad NOR 3-state R/S latches | 4043B |
| 9202/043 | Quad NAND 3-state R/S latch | 4044B |
| 9202/044 | Micropower phase-locked loop | 4046B |
| 9207/003 | Low power monostable/astable multivibrator | 4047B |
| 9202/045 | Hex buffer/converter (inverting type) | 4049UB |
| 9202/046 | Hex buffer/converter (non-inverting type) | 4050B |
| 9202/047 | Analogue multiplexer/demultiplexer | 4051B |
| 9202/048 | Analogue multiplexer/demultiplexer | 4052B |
| 9202/049 | Triple 2-channel analogue multiplexer/demultiplexer | 4053B |
| 9209/001 | 4-bit magnitude comparator | 4063B |
| 9204/052 | 14-stage ripple-carry binary counter/divider and oscillator | 4060B |
| 9408/005 | Quad bilateral switch | 4066B |
| 9408/009 | Analogue multiplexer/demultiplexer | 4067B |
| 9201/061 | 8-input NAND gate | 4068B |
| 9401/010 | Hex inverter | 4069UB |
| 9201/048 | Quad exclusive OR gate | 4070B |
| 9201/063 | Quad 2-input OR gate | 4071B |
| 9201/082 | Dual 4-input OR gate | 4072B |
| 9201/064 | Triple 3-input AND gate | 4073B |
| 9201/065 | Triple 3-input OR gate | 4075B |
| 9306/022 | 4-bit D-type register with 3-state output | 4076B |
| 9201/055 | Quad exclusive NOR gate | 4077B |
| 9201/052 | Quad 2-input AND gate | 4081B |
| 9409/002 | Quad 2-input NAND gate with Schmitt trigger input | 4093B |
| 9306/026 | 8-stage shift and store bus register with synchronous serial outputs and 3-state parallel output | 4094B |
| 9206/003 | Dual monostable multivibrator | 4098B |
| 9408/006 | 8-channel multiplexer with 3-state output | 4512B |
| 9408/012 | 4-bit latch/4-to-16 decoder | 4514B |
| 9205/011 | 4-bit latch/4-to-16 line decoder | 4515B |
| 9204/045 | Synchronous quad presettable up/down binary counter | 4516B |
| 9204/028 | Dual binary up counter | 4520B |
| 9202/065 | 8-bit priority encoder | 4532B |
| 9207/007 | Dual monostable multivibrator with reset | 4538B |
| 9408/011 | Dual 1-of-4 decoder/demultiplexer | 4555B |
| 9408/025 | Dual 1-of-4 decoder/demultiplexer (output low on select) | 4556B |
| 9204/036 | Presettable 8-bit synchronous down-counter | 40103B |
| 9409/005 | Hex Schmitt-trigger | 40106B |
| 9401/013 | Dual 2-input NAND buffer/driffer | 40107B |
| 9407/003 | Quad low-to-high 3-state voltage level shifter | 40109B |
| 9204/054 | Programmable 4-bit binary counter with | 40161B |

| | | |
|--|---|------------|
| MICROCIRCUITS, DIGITAL, C-MOS-B, 4000B SERIES | | 73S |
| | asynchronous clear | |
| 9203/038 | Hex D-type flip-flop | 40174B |
| 9204/041 | Presetable binary up/down counter (dual clock with reset) | 40193B |
| <p>Package Types:</p> <p>Ceramic Dual-in-Line</p> <p>Ceramic Flat Pack</p> | | |

| MICROCIRCUITS, DIGITAL, MONOLITHIC, HIGH SPEED CMOS, 54HC AND 54HCT SERIES | | | | 190N | |
|---|--|--------------------|-----------------------|----------------------------|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | |
| Generic ESCC 9000 Detail ESCC | ST Microelectronics Rennes France | Qualification | CNES | Nov 1992 | |
| Remarks | | | | | |
| 9201/105, 9201/106, 9201/107, 9201/108, 9201/109, 9201/110, 9201/111, 9201/113, 9201/114, 9201/117, 9201/118, 9201/119, 9201/120, 9201/123, 9202/072, 9202/075, 9203/050, 9203/052, 9203/053, 9203/054, 9203/059, 9203/060, 9203/064, 9203/070, 9203/073, 9204/059, 9204/062, 9204/065, 9204/066, 9204/069, 9204/070, 9204/071, 9204/074, 9204/076, 9205/013, 9205/017, 9205/019, 9205/021, 9205/023, 9207/006, 9208/003, 9209/004, 9209/005, 9306/041, 9306/042, 9306/043, 9306/047, 9306/048, 9306/050, 9306/051, 9306/052, 9306/054, 9401/033, 9401/034, 9401/037, 9401/038, 9401/039, 9401/044, 9401/047, 9401/048, 9401/049, 9402/009, 9405/013, 9405/014, 9408/038, 9408/046, 9408/047, 9408/048, 9408/052, 9408/054, 9408/057, 9408/059, 9408/064, 9408/065, 9409/007, 9410/017, | | | | | |
| Qualified range: | | | | | |
| ESCC Spec. No. | Component Type | | Component Type | Note | |
| 9201/105 | Quad 2-input NAND gate | | 54HC 00 | 1 | |
| 9201/113 | Quad 2-input NOR gate | | 02 | 1 | |
| 9201/114 | Quad 2-input NAND gate with open drain output | | 03 | 1 | |
| 9401/033 | Hex inverter | | 04 | 1 | |
| 9201/106 | Quad 2-input positive AND gate | | 08 | 1 | |
| 9201/107 | Triple 3-input NAND gate | | 10 | 1 | |
| 9201/117 | Triple 3-input AND gate | | 11 | 1 | |
| 9409/007 | Hex Schmitt trigger inverter | | 14 | 1 | |
| 9201/118 | Dual 4-input NAND gate | | 20 | 1 | |
| 9201/108 | Dual 4-input AND gate | | 21 | 1 | |
| 9201/109 | Triple 3-input NOR gate | | 27 | 1 | |
| 9201/110 | 8-input NAND gate | | 30 | 1 | |
| 9201/111 | Quad 2-input OR gate | | 32 | 1 | |
| 9203/050 | Dual D-type flip-flop with preset and clear | | 74 | 1 | |
| 9209/004 | 4-bit magnitude comparator | | 85 | 1 | |
| 9201/119 | Quad 2-input exclusive OR gate | | 86 | 1 | |
| 9306/048 | Dual J-K positive edge triggered flip-flop with preset and clear | | 109 | 1 | |
| 9207/006 | Dual positive or negative edge Schmitt-retriggerable monostable multivibrator with clear | | 123 | 1 | |
| 9401/039 | Quad bus buffer with 3 state output | | 125 | 1 | |
| 9201/120 | Quad 2-input NAND gate with Schmitt-trigger input | | 132 | 1 | |
| 9205/013 | 3-to-8 line decoder/demultiplexer with address latch and inverted output | | 137 | 1 | |
| 9408/046 | 3-to-8 line decoder/demultiplexer with inverted output | | 54HC 138 | 1 | |

| MICROCIRCUITS, DIGITAL, MONOLITHIC, HIGH SPEED CMOS, 54HC AND 54HCT SERIES | | | 190N | |
|--|---|------|------|---|
| 9205/017 | Dual 2-to4 line decoder/demultiplexer with inverted output | 54HC | 139 | 1 |
| 9410/017 | 8-line to 3-line priority encoder | | 148 | 1 |
| 9408/054 | 8-line to 1-line data selector/multiplexer | | 151 | 1 |
| 9408/038 | Dual 4-line to 1-line data selectors/multiplexer | | 153 | 1 |
| 9205/023 | 4-to-16 line decoder/demultiplexer with inverted output | | 154 | 1 |
| 9408/057 | Quad 2-line to 1-line data selector/multiplexer | | 157 | 1 |
| 9408/059 | Quad 2-line to 1-line data selector/multiplexer with inverted output | | 158 | 1 |
| 9204/062 | Synchronous presettable 4-bit decade counter with direct clear | | 160 | 1 |
| 9204/059 | Asynchronous 4-bit binary counter | | 161 | 1 |
| 9306/041 | 8-bit SIPO shift register | | 164 | 1 |
| 9306/042 | 8-bit PISO shift register | | 165 | 1 |
| 9306/043 | 8-bit PISO shift register | | 166 | 1 |
| 9306/052 | Hex D-type edge-triggered flip-flop with clear | | 174 | 1 |
| 9203/052 | Quad D-type edge-triggered flip-flop with clear | | 175 | 1 |
| 9204/066 | Synchronous 4-bit up/down binary counter | | 191 | 1 |
| 9204/065 | Synchronous 4-bit up/down binary counter (dual clock with clear) | | 193 | 1 |
| 9306/047 | 4-bit PIPO shift register | | 194 | 1 |
| 9205/021 | 3-line to 8-line decoder/demultiplexer with address latch | | 237 | 1 |
| 9401/034 | Octal bus buffer with inverted 3-state output | | 240 | 1 |
| 9401/048 | Octal bus buffer with 3-state output | | 244 | 1 |
| 9405/013 | Octal bus transceiver with 3-state output | | 245 | 1 |
| 9408/048 | 1-to-8 data selector/multiplexer with 3-state output | | 251 | 1 |
| 9408/047 | Quad 2-line to 1-line data selector/multiplexer with 3-state output | | 257 | 1 |
| 9203/073 | 8-bit addressable latch | | 259 | 1 |
| 9203/053 | Octal D-type edge-triggered flip-flop with clear | | 273 | 1 |
| 9208/003 | 9-bit odd/even parity generator/checker | | 280 | 1 |
| 9202/075 | 4-bit binary full adder with fast carry | | 283 | 1 |
| 9401/044 | Hex bus buffer with 3-state output | | 367 | 1 |
| 9203/059 | Octal D-type transparent latch with 3-state output | | 373 | 1 |
| 9203/060 | Octal D-type edge-triggered flip-flop with 3-state output | | 374 | 1 |
| 9204/074 | Dual 4-bit negative edge-triggered binary counter | | 393 | 1 |
| 9401/049 | Octal bus buffer with inverted 3-state output | | 540 | 1 |
| 9401/047 | Octal bus buffer with 3-state output | | 541 | 1 |
| 9202/072 | Octal D-type transparent latch with 3-state output | | 573 | 1 |
| 9203/054 | Octal D-type edge-triggered flip-flop with 3-state output | | 574 | 1 |
| 9204/071 | 8-bit binary counter with 3-state output register | | 590 | 1 |
| 9306/051 | 8-bit shift register with 3-state output register | | 595 | 1 |
| 9306/054 | 8-bit PISO shift register | | 597 | 1 |
| 9209/005 | 8-bit identify comparator | | 688 | 1 |
| 9204/070 | Asynchronous negative-edge-triggered 14-bit binary counter | | 4020 | 1 |
| 9204/069 | Asynchronous negative edge-triggered 12-bit binary counter | | 4040 | 1 |
| 9401/037 | Hex buffer/converter with inverted output | | 4049 | 1 |
| 9401/038 | Hex buffer/converter | | 4050 | 1 |
| 9408/064 | Analogue multiplexer/demultiplexer | | 4051 | 1 |
| 9408/065 | Analogue multiplexer/demultiplexer (triple 2-channel) | | 4053 | 1 |
| 9204/076 | Asynchronous negative-edge-triggered 14-bit binary counter and oscillator | 54HC | 4060 | 1 |
| 9408/052 | Quad bilateral switch | 54HC | 4066 | 1 |

| MICROCIRCUITS, DIGITAL, MONOLOTHIC, HIGH SPEED CMOS, 54HC AND 54HCT SERIES | | | | 190N |
|--|---|-------|------|------|
| 9201/123 | 8-input OR/NOR gate | | 4078 | 1 |
| 9306/050 | 8-bit SIPO shift latch register with 3-state output | | 4094 | 1 |
| 9205/019 | 4-to-16 line decoder/latch | | 4514 | 1 |
| 9203/070 | Dual D-type flip-flop with preset and clear | 54HCT | 74 | 1 |
| 9402/009 | Octal bus buffer with 3-state output | | 244 | 1 |
| 9405/014 | Octal bus transceiver with 3-state output | | 245 | 1 |
| 9203/064 | Octal D-type transparent latch with 3-state output | | 373 | 1 |

NOTES, 1. These parts have successfully passed radiation testing to 50 kRads.

Package Types:

Ceramic Dual-in-Line
Ceramic Flat Pack

| INTEGRATED CIRCUITS, SILICON MONOLITHIC, CMOS, CELL-BASED ARRAY, BASED ON TYPE ATC18RHA ASIC FAMILY | | | | 357A |
|---|---|------------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 9000 | Microchip Technology Nantes France | Qualification | CNES | Apr 2019 |
| Detail ESCC 9202/080, 9512/004, 9304/165, 9512/005 | | | | |
| The Technology Flow is described into the current QML document (REP006). | | | | |
| 9202/080 | Integrated circuits, silicon monolithic, CMOS, cell-based array | Based on type ATC18RHA | | |
| Available standard components: | | | | |
| 9512/004 | Integrated Circuits, Silicon, 32-bit SPARC Processor | Based on type AT697F | | |
| 9304/165 | Integrated Circuits, Silicon, monolithic, CMOS digital, Field Programmable Gate Array, 280000 gates | Based on type ATF280F | | |
| 9512/005 | Integrated Circuits, Silicon, monolithic, SPARC V8 GNSS Controller | Based on type AT991 | | |

| INTEGRATED CIRCUITS, CMOS, CELL-BASED ARRAY, BASED ON ATMX150RHA ASIC FAMILY | | | | 359A |
|---|--|--------------------|--------------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 9000 | Microchip Technology Nantes France | Qualification | ESA/ESTEC | Apr 2019 |
| Detail ESCC 9202/083 | | Remarks | | |
| <p>The Technology Flow is described into the current QML document (REP006).</p> <p>The qualified range includes variants 75 to 164 from ESCC 9202/083 (Flat-Substrate package).</p> | | | | |
| 9202/083 | Integrated circuits, CMOS, cell-based array. Ph2, Digital only, up to 22Mgates, 5ML+ thick metal layer. | | Based on type ATMX150RHA | |

| | | | | | | |
|---|--|--------------------|-----------------------|------------------------------|--------------|-----------------------------------|
| INTEGRATED CIRCUITS, SILICON, MONOLITHIC, RADIATION-HARDENED 32-BIT ARM CORTEX-M7 MICROCONTROLLER | | | | 372 | | |
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | |
| Generic ESCC 9000 Detail ESCC 9512/006 | Microchip Technology Nantes France | Qualification | ESA/ESTEC | May 2021 | | |
| Remarks | | | | | | |
| Qualified range: | | | | | | |
| Detail spec | Variant Number | Based on Type | Case | Terminal Material and Finish | Weight max g | Total Dose Radiation Level Letter |
| 9512/006 | 01 | SAMRH71 | CQFP-256 | D2 | 18 | R [100krad(Si)] |
| Operating Temperature Range (°C): -55 to +125 | | | | | | |

6.8.2 Linear Switching Regulator

| IINTEGRATEC CIRCUITS, PULSE WIDTH MODULATOR, BASED ON TYPES ST1843 AND ST1845 | | | | 344B |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 9000 Detail ESCC 9108/020 9108/021 | ST Microelectronics Rennes France | Qualification | CNES | Nov 2016 |
| Remarks | | | | |
| Qualified range: Variants 01, 02 | | | | |

6.9 RELAYS (09)

6.9.1 Non-Latching

| RELAY, NON-LATCHING, ELECTROMAGNETIC, TYPE T ** | | | | 102K | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|----------------|---------------|-----------------------|-------|--------------|----------|--------------|--------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3601 | REL-STPI St Jean de la Ruelle France | Qualification | CNES | Feb 1983 | | | | | | | | |
| Detail ESCC 3601/002 | | Remarks | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01 to 06 are qualified</p> <table border="1"> <tr> <td>Contact Rating</td> <td>1 A at 28 Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2 PDT</td> </tr> <tr> <td>Package Type</td> <td>TO-5 Can</td> </tr> <tr> <td>Coil Voltage</td> <td>5 - 26.5 Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p> | | | | | Contact Rating | 1 A at 28 Vdc | Contact Configuration | 2 PDT | Package Type | TO-5 Can | Coil Voltage | 5 - 26.5 Vdc |
| Contact Rating | 1 A at 28 Vdc | | | | | | | | | | | |
| Contact Configuration | 2 PDT | | | | | | | | | | | |
| Package Type | TO-5 Can | | | | | | | | | | | |
| Coil Voltage | 5 - 26.5 Vdc | | | | | | | | | | | |

| RELAY, NON-LATCHING, ELECTROMAGNETIC, TYPE E 215 | | | | 205H | | | | | | | | |
|---|--|--------------------|-----------------------|----------------------------|----------------|----------------|-----------------------|-------|--------------|---------------------|--------------|--------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3601 | REL-STPI St Jean de la Ruelle France | Qualification | CNES | Jan 1994 | | | | | | | | |
| Detail ESCC 3601/007 | | Remarks | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 03, 04 and 06 are qualified</p> <table border="1"> <tr> <td>Contact Rating</td> <td>15 A at 28 Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2 PDT</td> </tr> <tr> <td>Package Type</td> <td>Half cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>12 and 28Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p> | | | | | Contact Rating | 15 A at 28 Vdc | Contact Configuration | 2 PDT | Package Type | Half cubic inch can | Coil Voltage | 12 and 28Vdc |
| Contact Rating | 15 A at 28 Vdc | | | | | | | | | | | |
| Contact Configuration | 2 PDT | | | | | | | | | | | |
| Package Type | Half cubic inch can | | | | | | | | | | | |
| Coil Voltage | 12 and 28Vdc | | | | | | | | | | | |

| RELAY, NON-LATCHING, ELECTROMAGNETIC, TYPE M300 | | | | 318D | | | | | | | | |
|--|-----------------------------|--------------------|-----------------------|----------------------------|----------------|----------------|-----------------------|-------|--------------|---------------------|--------------|--------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3601 Detail ESCC 3601/007 | Leach Sarralbe France | Qualification | CNES | Feb 2012 | | | | | | | | |
| Remarks | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 03, 04 and 06 are qualified</p> <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>15 A at 28 Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2 PDT</td> </tr> <tr> <td>Package Type</td> <td>Half cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>12 and 28Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p> | | | | | Contact Rating | 15 A at 28 Vdc | Contact Configuration | 2 PDT | Package Type | Half cubic inch can | Coil Voltage | 12 and 28Vdc |
| Contact Rating | 15 A at 28 Vdc | | | | | | | | | | | |
| Contact Configuration | 2 PDT | | | | | | | | | | | |
| Package Type | Half cubic inch can | | | | | | | | | | | |
| Coil Voltage | 12 and 28Vdc | | | | | | | | | | | |

6.9.2 Latching

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE TL | | | | 88L | | | | | | | | |
|---|--|--------------------|-----------------------|----------------------------|----------------|---------------|-----------------------|-------|--------------|----------|--------------|----------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 | REL-STPI Saint Jean de la Ruelle France | Qualification | CNES | Jan 1982 | | | | | | | | |
| Detail ESCC 3602/002 | | Remarks | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01 to 06 are qualified</p> <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>1 A at 28 Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2 PDT</td> </tr> <tr> <td>Package Type</td> <td>TO-5 can</td> </tr> <tr> <td>Coil Voltage</td> <td>26.5 Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p> | | | | | Contact Rating | 1 A at 28 Vdc | Contact Configuration | 2 PDT | Package Type | TO-5 can | Coil Voltage | 26.5 Vdc |
| Contact Rating | 1 A at 28 Vdc | | | | | | | | | | | |
| Contact Configuration | 2 PDT | | | | | | | | | | | |
| Package Type | TO-5 can | | | | | | | | | | | |
| Coil Voltage | 26.5 Vdc | | | | | | | | | | | |

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL415 | | | | 98Jrev2 | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|--------------|--------------|----------------|--------------|-------|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 Detail ESCC 3602/004 | REL-STPI Saint Jean de la Ruelle France | Qualification | CNES | Jan 1982 | | | | | | | | |
| Remarks | | | | | | | | | | | | |
| Qualified range: Variants 04, 06 and 09 and 14, 16 and 19 are qualified | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>15A at 28Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>4PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>28Vdc</td> </tr> </table> | | Contact Rating | 15A at 28Vdc | Contact Configuration | 4PDT Package | Package Type | Cubic inch can | Coil Voltage | 28Vdc | | | |
| Contact Rating | 15A at 28Vdc | | | | | | | | | | | |
| Contact Configuration | 4PDT Package | | | | | | | | | | | |
| Package Type | Cubic inch can | | | | | | | | | | | |
| Coil Voltage | 28Vdc | | | | | | | | | | | |
| Operating Temperature Range (°C): -65 to +125 | | | | | | | | | | | | |

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE M402 | | | | 317D | | | | | | | | |
|--|------------------------------------|--------------------|-----------------------|----------------------------|--------------|--------------|----------------|--------------|-------|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 Detail ESCC 3602/004 | LEACH Sarralbe France | Qualification | CNES | Feb 2012 | | | | | | | | |
| Remarks | | | | | | | | | | | | |
| Qualified range: Variants 04, 06 and 09 and 14, 16 and 19 are qualified | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>15A at 28Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>4PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>28Vdc</td> </tr> </table> | | Contact Rating | 15A at 28Vdc | Contact Configuration | 4PDT Package | Package Type | Cubic inch can | Coil Voltage | 28Vdc | | | |
| Contact Rating | 15A at 28Vdc | | | | | | | | | | | |
| Contact Configuration | 4PDT Package | | | | | | | | | | | |
| Package Type | Cubic inch can | | | | | | | | | | | |
| Coil Voltage | 28Vdc | | | | | | | | | | | |
| Operating Temperature Range (°C): -65 to +125 | | | | | | | | | | | | |

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL215 | | | | 167J | | | | | | | | |
|---|--|--------------------|-----------------------|----------------------------|----------------|--------------|-----------------------|--------------|--------------|---------------------|--------------|-------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 Detail ESCC 3602/009 | REL STPI St Jean de la Ruelle France | Qualification | CNES | Feb 1990 | | | | | | | | |
| Remarks | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 03, 04, 06 and 13, 14 and 16 are qualified</p> <table border="1" data-bbox="113 974 930 1108"> <tr> <td>Contact Rating</td> <td>15A at 28Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Half-cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>28Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p> | | | | | Contact Rating | 15A at 28Vdc | Contact Configuration | 2PDT Package | Package Type | Half-cubic inch can | Coil Voltage | 28Vdc |
| Contact Rating | 15A at 28Vdc | | | | | | | | | | | |
| Contact Configuration | 2PDT Package | | | | | | | | | | | |
| Package Type | Half-cubic inch can | | | | | | | | | | | |
| Coil Voltage | 28Vdc | | | | | | | | | | | |

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE M302 | | | | 310D | | | | | | | | |
|--|------------------------------------|--------------------|-----------------------|----------------------------|--------------|--------------|---------------------|--------------|----------|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 Detail ESCC 3602/009 | LEACH Sarralbe France | Qualification | CNES | Feb 1990 | | | | | | | | |
| Remarks | | | | | | | | | | | | |
| Qualified range: Variants 03, 04, 06, 13, 14 and 16 are qualified | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>15A at 28Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Half-cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>26.5V dc</td> </tr> </table> | | Contact Rating | 15A at 28Vdc | Contact Configuration | 2PDT Package | Package Type | Half-cubic inch can | Coil Voltage | 26.5V dc | | | |
| Contact Rating | 15A at 28Vdc | | | | | | | | | | | |
| Contact Configuration | 2PDT Package | | | | | | | | | | | |
| Package Type | Half-cubic inch can | | | | | | | | | | | |
| Coil Voltage | 26.5V dc | | | | | | | | | | | |
| Operating Temperature Range (°C): -65 to +125 | | | | | | | | | | | | |

| RELAY, LATCHING, ELECTROMAGNETIC, TYPE GP250 | | | | 362 | | | | | | | | |
|--|---|--------------------|-----------------------|----------------------------|--------------|--------------|-----------------------|--------------|-------|--|--|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | |
| Generic ESCC 3602 Detail ESCC 3602/010 | LEACH Sarralbe France | Qualification | CNES | Sep 2019 | | | | | | | | |
| Remarks The production and test of GP250 with the same design was previously qualified at a different production location, from February 1982 to February 2017 under certificate No. 93. | | | | | | | | | | | | |
| Qualified range: Variants 01 to 06 | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <tr> <td>Contact Rating</td> <td>2A at 50Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>2PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Half-size crystal CAN</td> </tr> <tr> <td>Coil Voltage</td> <td>28Vdc</td> </tr> </table> | | Contact Rating | 2A at 50Vdc | Contact Configuration | 2PDT Package | Package Type | Half-size crystal CAN | Coil Voltage | 28Vdc | | | |
| Contact Rating | 2A at 50Vdc | | | | | | | | | | | |
| Contact Configuration | 2PDT Package | | | | | | | | | | | |
| Package Type | Half-size crystal CAN | | | | | | | | | | | |
| Coil Voltage | 28Vdc | | | | | | | | | | | |
| Operating Temperature Range (°C): -65 to +125 | | | | | | | | | | | | |

6.10 RESISTORS (10)

6.10.1 Shunts

| RESISTORS, FIXED, CHIP, METAL FOIL, BASED ON TYPES SMP-PW, SMS-PW, SMT-PW and SMV-PW. | | | | 285F |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 4001 | ISABELLENHÜTTE HEUSLER GmbH & Co. KG Dillenburg Germany | Qualification | DLR | Nov 2008 |
| Detail ESCC 4001/027 4001/028 | | Remarks | | |
| <p>Qualified range:</p> <p>ESCC 4001/027 variants 01, 02, 03, 04, 05, 06 are qualified (SMP-PW, SMS-PW, SMT-PW) ESCC 4001/028 variant 02 is qualified (SMV-PW)</p> <p>Tolerance (%) = ±1</p> <p>Operating Temperature Range (°C): -55 to +170</p> | | | | |

6.10.2 Fixed, Film

| RESISTORS, FILM, FIXED, SURFACE MOUNT, NON-HERMETICALLY SEALED, BASED ON TYPE MS1 | | | | 256K | | |
|---|---|-------------------------|-----------------------|----------------------------|------|--------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | |
| Generic ESCC 4001 Detail ESCC 4001/022 | VISHAY Electronic GmbH Division Draloric Selb Germany | Qualification | DLR | Oct 1999 | | |
| Remarks | | | | | | |
| Qualified range: | | | | | | |
| Temperature coefficient, TCR ($10^{-6}/K$) | Tolerance (%) | Resistance Range R_n | | | | Value Series |
| | | Min | | Max | | |
| | | Resistance (Ω) | Code | Resistance ($M\Omega$) | Code | |
| ±50 | ±0.1 | 43.2 | 43R2 | 1 | 1004 | E96 |
| | ±0.5 | 10 | 10R0 | 1 | 1004 | E96 |
| | ±1 | 2.21 | 2R21 | 5.11 | 5114 | E96 |
| ±25 | ±0.1 | 43.2 | 43R2 | 1 | 1004 | E96 |
| | ±0.5 | 10 | 10R0 | 1 | 1004 | E96 |
| | ±1 | 10 | 10R0 | 1 | 1004 | E96 |
| ±15 | ±0.1 | 43.2 | 43R2 | 0.221 | 2213 | E96 |
| | ±0.5 | 10 | 10R0 | 0.511 | 5113 | E96 |
| Critical R = 160 k Ω | | | | | | |
| Operating Temperature Range ($^{\circ}C$): -55 to +125 | | | | | | |

| RESISTORS, FILM, FIXED, SURFACE MOUNT, NON-HERMETICALLY SEALED, BASED ON TYPE TNPS | | | | | 289F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|------------------------|-----------------------|----------------------------|--------------|----------------|----------------|---|-----------------------------------|----------------------|--------------|---|-----------------------------------|----------------|------------------|-------------------|----|------|----|-------|-------------|-----|------------|-------|-------|----|------|----|-------|-------------|-----|------------|-----|-------|----|------|----|---|-------------|-----|------------|-----|-------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 4001 Detail ESCC 4001/029 | VISHAY Electronic GmbH Division Draloric Selb Germany | Qualification | DLR | May 2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01, 02 and 03 are qualified</p> <table border="1"> <thead> <tr> <th rowspan="2">Variant Number</th> <th rowspan="2">Style (Note 1)</th> <th colspan="2">Resistance Range R_n</th> <th rowspan="2">Tolerance (\pm %)</th> <th rowspan="2">Value Series</th> <th rowspan="2">Temperature Coefficient TC ($\pm 10^{-6}/^{\circ}\text{C}$)</th> <th rowspan="2">Critical Resistance (kΩ)</th> <th rowspan="2">Weight max (g)</th> </tr> <tr> <th>Min (Ω)</th> <th>Max (MΩ)</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>0603</td> <td>10</td> <td>0.221</td> <td>0.1, 0.5, 1</td> <td>E96</td> <td>15, 25, 50</td> <td>56.25</td> <td>0.002</td> </tr> <tr> <td>02</td> <td>0805</td> <td>10</td> <td>0.422</td> <td>0.1, 0.5, 1</td> <td>E96</td> <td>15, 25, 50</td> <td>180</td> <td>0.006</td> </tr> <tr> <td>03</td> <td>1206</td> <td>10</td> <td>1</td> <td>0.1, 0.5, 1</td> <td>E96</td> <td>15, 25, 50</td> <td>160</td> <td>0.008</td> </tr> </tbody> </table> <p>Operating Temperature Range ($^{\circ}\text{C}$): -55 to +125</p> | | | | | | Variant Number | Style (Note 1) | Resistance Range R_n | | Tolerance (\pm %) | Value Series | Temperature Coefficient TC ($\pm 10^{-6}/^{\circ}\text{C}$) | Critical Resistance (k Ω) | Weight max (g) | Min (Ω) | Max (M Ω) | 01 | 0603 | 10 | 0.221 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 56.25 | 0.002 | 02 | 0805 | 10 | 0.422 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 180 | 0.006 | 03 | 1206 | 10 | 1 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 160 | 0.008 |
| Variant Number | Style (Note 1) | Resistance Range R_n | | Tolerance (\pm %) | Value Series | | | Temperature Coefficient TC ($\pm 10^{-6}/^{\circ}\text{C}$) | Critical Resistance (k Ω) | | | | | | Weight max (g) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Min (Ω) | Max (M Ω) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | 0603 | 10 | 0.221 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 56.25 | 0.002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02 | 0805 | 10 | 0.422 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 180 | 0.006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03 | 1206 | 10 | 1 | 0.1, 0.5, 1 | E96 | 15, 25, 50 | 160 | 0.008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.10.3 Chip

| RESISTORS, FILM, FIXED, CHIP AND ARRAY, THIN FILM, BASED ON TYPES PHR; PFRR; PRAHR/CNWHR | | | | 287G | |
|--|--|--|-----------------------|------------------------------|--------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | |
| Generic ESCC 4001 Detail ESCC 4001/023 4001/025 | VISHAY S.A. Division Sfernice Nice France | Qualification | CNES | Feb 2009 | |
| Remarks Components under ESCC QML qualification. Refer to Technology Flow description in REP006 . | | | | | |
| Qualified range: | | | | | |
| Type PHR, Variants 01 to 08, 13 and 14 are qualified | | | | | |
| Type PFRR, Variants 09 to 12 and 15 are qualified | | | | | |
| Type PRAHR/CNWHR, Variants 01 to 42 are qualified | | | | | |
| 4001/023 | PHR | High Stability and Precision Chip | | | |
| 4001/023 | PFRR | High Stability and Precision Chip with Established Reliability Level R | | | |
| 4001/025 | PRA/CNWHR | High Stability and Precision Surface Mount Array | | | |
| The Established Reliability Level R is evaluated according to the ESCC Basic Specification 26000. | | | | | |
| Lead material is E with either Type 2 or Type 4 finish. The terminal material and finish of some of these variants makes them unsuitable for solder assembly methods. They shall be assembled using glue or wire bond techniques. See Detail specifications. | | | | | |
| Operating Temperature Range, (°C): -55 to +155 | | | | | |
| Type PHR: | | | | | |
| Detail Specification | Style | Critical R (kΩ) | Rated Dissipation (W) | Limiting Element Voltage (V) | Type Variant |
| 4001/023 | 0402 | 18 | 0.050 | 30 | 13; 14 |
| | 0603 | 12.25 | 0.100 | 35 | 01; 05 |
| | 0805 | 45 | 0.125 | 75 | 02; 06 |
| | 1206 | 40 | 0.250 | 100 | 03; 07 |
| | 2010 | 45 | 0.500 | 150 | 04; 08 |

**RESISTORS,
FILM, FIXED, CHIP AND ARRAY, THIN FILM,
BASED ON TYPES PHR; PFRR; PRAHR/CNWHR**

287G

| Variant | Style | Resistance Range (Note 1) | | Tolerance (±%) (Note 2) | Temperature Coefficient (10 ⁻⁶ /°C) (Note 2) | Weight (g) |
|---------|-------|---------------------------|-----------------------------|-------------------------|---|------------|
| | | Min (Ω) | Max (MΩ) | | | |
| 01, 05 | 0603 | 10 | 0.200 (0.160 for TC"°C") | 0.01; 0.02; 0.05; 0.1 | ±5; ±10; ±25 | 0.003 |
| 02, 06 | 0805 | 10 | 0.250 | 0.01; 0.02; 0.05; 0.1 | ±5; ±10; ±25 | 0.004 |
| 03, 07 | 1206 | 10 | 1.000 | 0.01; 0.02; 0.05; 0.1 | ±5; ±10; ±25 | 0.01 |
| 04,08 | 2010 | 10 | 3.000 | 0.01; 0.02; 0.05; 0.1 | ±5; ±10; ±25 | 0.03 |
| 13, 14 | 0402 | 10 | 0.100 (0.067 for TC"°C") | 0.01; 0.02; 0.05; 0.1 | ±5; ±10; ±25 | 0.002 |

Notes:

1.

| Variant | Style | Critical Resistance (KΩ) |
|---------|-------|--------------------------|
| 01 - 05 | 0603 | 12.25 |
| 02 - 06 | 0805 | 45 |
| 03 - 07 | 1206 | 40 |
| 04 - 08 | 2010 | 45 |
| 13 - 14 | 0402 | 18 |

2.

| Resistance (Ω) | Available Tolerances (±%) | Series |
|----------------|---------------------------|-----------------------------------|
| 10 ≤ R < 50 | 0.1 | Any value in the resistance range |
| 50 ≤ R < 100 | 0.05 and 0.1 | |
| 100 ≤ R < 250 | 0.02; 0.05 and 0.1 | |
| R ≥ 250 | 0.01; 0.02; 0.05 and 0.1 | |

| Resistance (Ω) | Temperature Coefficient (ppm/°C) | Series |
|----------------|----------------------------------|-----------------------------------|
| 10 ≤ R < 20 | E: 25 (-55°C; +155 °C) | Any value in the resistance range |
| 20 ≤ R < 50 | Y: 10 (-55°C; +155 °C) | |
| 20 ≤ R < 50 | Z: 5 (+22°C; +70 °C) | |
| R ≥ 50 | C: 5 (-55°C; +155 °C) | |

**RESISTORS,
FILM, FIXED, CHIP AND ARRAY, THIN FILM,
BASED ON TYPES PHR; PFRR; PRAHR/CNWHR**

287G

Type PFRR:

| Detail Specification | Style | Critical R (kΩ) | Rated Dissipation (W) | Limiting Element Voltage (V) | Type Variant |
|----------------------|-------|-----------------|-----------------------|------------------------------|--------------|
| 4001/023 | 0402 | 32 | 0.050 | 40 | 15 |
| | 0603 | 25 | 0.100 | 50 | 09 |
| | 0805 | 80 | 0.125 | 100 | 10 |
| | 1206 | 90 | 0.250 | 150 | 11 |
| | 2010 | 80 | 0.500 | 200 | 12 |

| Style | Resistance Range (Ω) | Tolerance (±%) | Temperature Coefficient TC(±10 ⁻⁶ /°C) |
|------------------------------|----------------------|----------------|---|
| 0402; 0603; 0805; 1206; 2010 | From 100 to ≤ 100K | 0.05; 0.1 | 10; 25 |
| 0603; 0805; 1206; 2010 | From 100 to ≤ 261K | 0.05; 0.1 | 10; 25 |
| 0805; 1206; 2010 | From 261K to ≤ 301K | 0.05; 0.1 | 10; 25 |
| 1206; 2010 | From 301K to ≤ 1M | 0.05; 0.1 | 10; 25 |
| 2010 | From 1M to 3M01 | 0.05; 0.1 | 10; 25 |

Type PRAHR/CNWHR:

| Detail Specification | Style | Critical R (K Ω) | Rated Dissipation (W/resistor) | Limiting Element Voltage (V/resistor) | Type Variant | |
|----------------------|--------|------------------|--------------------------------|---------------------------------------|-------------------|------------------------|
| | | | | | Same Ohmic Values | Different Ohmic Values |
| 4001/025 | PRA100 | 12.25 | 0.100 | 35 | 01 to 07 | 22 to 28 |
| | PRA135 | 56.25 | 0.100 | 75 | 08 to 14 | 29 to 35 |
| | PRA182 | 100 | 0.100 | 100 | 15 to 21 | 36 to 42 |

| Style | Resistance Range (Ω) | Tolerance (±%) | | Temperature Coefficient TC(±10 ⁻⁶ /°C) | |
|------------------------|----------------------|----------------|-----------|---|----------|
| | | Absolute | Relative | Absolute | Relative |
| PRA100; PRA135; PRA182 | From 100 to 200K | 0.1; 0.5; 1 | 0.05; 0.1 | 10 | 3; 5 |
| PRA135; PRA182 | From 200K to 250K | 0.1; 0.5; 1 | 0.05; 0.1 | 10 | 3; 5 |
| PRA182 | From 250K to 1M | 0.1; 0.5; 1 | 0.05; 0.1 | 10 | 3; 5 |

Number of Resistors per Array: 2 to 8

| RESISTORS, FIXED, CHIP, THICK FILM, BASED ON TYPE CHP | | | | 314E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--------------------|------------------------------|----------------------------|-------|--------------------------|-------------------|-----------------------------|--------------|------|----|-------|----|----------------|------|----|-------|-----|----------------|------|-----|-------|-----|----------------|------|-----|-------|-----|----------------|------|-------|-------|-----|----------------|-------|-------------------|------------------|------------------------------|--------------------------|----------------|------|-----|--------------------------|-----------------|---------|----------|--------------------------|-----------------------|------|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 4001 Detail ESCC 4001/026 | VISHAY S.A. Division Sfernice Nice France | Qualification | CNES | Oct 2011 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Type CHPHR, variants 01 to 10 are qualified.</p> <p>Type CHPFR, variants 11 to 20 are qualified.</p> <p>The qualified range is restricted as below:</p> <table border="1"> <thead> <tr> <th>Style</th> <th>Critical R (KΩ)</th> <th>Rated Dissipation</th> <th>Limited Element Voltage (V)</th> <th>Type Variant</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>25</td> <td>0.100</td> <td>50</td> <td>01, 06, 11, 16</td> </tr> <tr> <td>0805</td> <td>50</td> <td>0.200</td> <td>100</td> <td>02, 07, 12, 17</td> </tr> <tr> <td>1206</td> <td>160</td> <td>0.250</td> <td>200</td> <td>03, 08, 13, 18</td> </tr> <tr> <td>2010</td> <td>180</td> <td>0.500</td> <td>300</td> <td>04, 09, 14, 19</td> </tr> <tr> <td>2512</td> <td>112.5</td> <td>0.800</td> <td>300</td> <td>05, 10, 15, 20</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Style</th> <th>Range(Ω)</th> <th>Tol. ($\pm\%$)</th> <th>TC(\pmppm/$^{\circ}$C)</th> </tr> </thead> <tbody> <tr> <td>0603;0805;1206;2010;2512</td> <td>From 1 to < 10</td> <td>2; 5</td> <td>200</td> </tr> <tr> <td>0603;0805;1206;2010;2512</td> <td>From 10 to < 1M</td> <td>1; 2; 5</td> <td>100; 200</td> </tr> <tr> <td>0603;0805;1206;2010;2512</td> <td>From 1M to \leq 10M</td> <td>2; 5</td> <td>200</td> </tr> </tbody> </table> <p>Lead material is E with either Type 2 or Type 4 finish</p> <p>Operating Temperature Range ($^{\circ}$C): -55 to +155</p> | | | | | Style | Critical R (K Ω) | Rated Dissipation | Limited Element Voltage (V) | Type Variant | 0603 | 25 | 0.100 | 50 | 01, 06, 11, 16 | 0805 | 50 | 0.200 | 100 | 02, 07, 12, 17 | 1206 | 160 | 0.250 | 200 | 03, 08, 13, 18 | 2010 | 180 | 0.500 | 300 | 04, 09, 14, 19 | 2512 | 112.5 | 0.800 | 300 | 05, 10, 15, 20 | Style | Range(Ω) | Tol. ($\pm\%$) | TC(\pm ppm/ $^{\circ}$ C) | 0603;0805;1206;2010;2512 | From 1 to < 10 | 2; 5 | 200 | 0603;0805;1206;2010;2512 | From 10 to < 1M | 1; 2; 5 | 100; 200 | 0603;0805;1206;2010;2512 | From 1M to \leq 10M | 2; 5 | 200 |
| Style | Critical R (K Ω) | Rated Dissipation | Limited Element Voltage (V) | Type Variant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0603 | 25 | 0.100 | 50 | 01, 06, 11, 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0805 | 50 | 0.200 | 100 | 02, 07, 12, 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1206 | 160 | 0.250 | 200 | 03, 08, 13, 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2010 | 180 | 0.500 | 300 | 04, 09, 14, 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2512 | 112.5 | 0.800 | 300 | 05, 10, 15, 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Style | Range(Ω) | Tol. ($\pm\%$) | TC(\pm ppm/ $^{\circ}$ C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0603;0805;1206;2010;2512 | From 1 to < 10 | 2; 5 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0603;0805;1206;2010;2512 | From 10 to < 1M | 1; 2; 5 | 100; 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0603;0805;1206;2010;2512 | From 1M to \leq 10M | 2; 5 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.10.4 Flexible, Foil, Heaters

| RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER | | | | 184N | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|-----------------------|-----------------------|------------|----------------|------------|-------------|--------------|-----------------------------|---------------|----------------------------|-------------------------|-----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 4009 | IRCA RICA Division Vitorio Veneto Italy | Qualification | ESA | Apr 1992 | | | | | | | | | | | | |
| Detail ESCC 4009/002 | | Remarks | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01 through 48 are qualified</p> <p>Single, double layer and magnetically compensated heaters</p> <table border="1"> <tr> <td>Maximum Ohmic density</td> <td>200 Ω/cm²</td> </tr> <tr> <td>Tolerances</td> <td>±2, 3, 5, 10 %</td> </tr> <tr> <td>Resistance</td> <td>1 to 5000 Ω</td> </tr> <tr> <td>Heating Area</td> <td>1.6 to 1300 cm²</td> </tr> <tr> <td>Terminal Lead</td> <td>20, 22, 24, 26, 28, 30 AWG</td> </tr> <tr> <td>Temperature coefficient</td> <td>(10⁻⁶/°C): 175</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +200</p> | | | | | Maximum Ohmic density | 200 Ω/cm ² | Tolerances | ±2, 3, 5, 10 % | Resistance | 1 to 5000 Ω | Heating Area | 1.6 to 1300 cm ² | Terminal Lead | 20, 22, 24, 26, 28, 30 AWG | Temperature coefficient | (10 ⁻⁶ /°C): 175 |
| Maximum Ohmic density | 200 Ω/cm ² | | | | | | | | | | | | | | | |
| Tolerances | ±2, 3, 5, 10 % | | | | | | | | | | | | | | | |
| Resistance | 1 to 5000 Ω | | | | | | | | | | | | | | | |
| Heating Area | 1.6 to 1300 cm ² | | | | | | | | | | | | | | | |
| Terminal Lead | 20, 22, 24, 26, 28, 30 AWG | | | | | | | | | | | | | | | |
| Temperature coefficient | (10 ⁻⁶ /°C): 175 | | | | | | | | | | | | | | | |

| RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER | | | | 325D | | | | | | | | | | | | |
|--|---|--------------------|-----------------------|----------------------------|--------------------|---|---------------------|--|------------|---------------------|--------------|----------------------------|---------------|----------------------------|----------------------|--------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 4009 | Minco SAS Aston France | Qualification | CNES | Mar 2013 | | | | | | | | | | | | |
| Detail ESCC 4009/003 | | Remarks | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01, 02 and 03 are qualified</p> <p>Single, double layer heaters</p> <p>Options qualified:</p> <table border="1"> <tr> <td>Resistance density</td> <td>0.1 to 400 Ω/cm^2 (variant 01) 0.1 to 250 Ω/cm^2 (variants 02, 03)</td> </tr> <tr> <td>Rated Power density</td> <td>0.38 (variants 01, 03), 0.54 (variant 02) W/cm^2</td> </tr> <tr> <td>Resistance</td> <td>1 to 10000 Ω</td> </tr> <tr> <td>Heating Area</td> <td>0.26 to 1000 cm^2</td> </tr> <tr> <td>Terminal Lead</td> <td>20, 22, 24, 26, 28, 30 AWG</td> </tr> <tr> <td>Resistance Tolerance</td> <td>(%): ± 1 to ± 10</td> </tr> </table> <p>Operating Temperature Range ($^{\circ}\text{C}$):</p> <p>-65 to +150 for variants 01 and 03;</p> <p>-65 to +200 for variant 02</p> | | | | | Resistance density | 0.1 to 400 Ω/cm^2 (variant 01) 0.1 to 250 Ω/cm^2 (variants 02, 03) | Rated Power density | 0.38 (variants 01, 03), 0.54 (variant 02) W/cm^2 | Resistance | 1 to 10000 Ω | Heating Area | 0.26 to 1000 cm^2 | Terminal Lead | 20, 22, 24, 26, 28, 30 AWG | Resistance Tolerance | (%): ± 1 to ± 10 |
| Resistance density | 0.1 to 400 Ω/cm^2 (variant 01) 0.1 to 250 Ω/cm^2 (variants 02, 03) | | | | | | | | | | | | | | | |
| Rated Power density | 0.38 (variants 01, 03), 0.54 (variant 02) W/cm^2 | | | | | | | | | | | | | | | |
| Resistance | 1 to 10000 Ω | | | | | | | | | | | | | | | |
| Heating Area | 0.26 to 1000 cm^2 | | | | | | | | | | | | | | | |
| Terminal Lead | 20, 22, 24, 26, 28, 30 AWG | | | | | | | | | | | | | | | |
| Resistance Tolerance | (%): ± 1 to ± 10 | | | | | | | | | | | | | | | |

| RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER | | | | 330C | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|-----------------------|-----------------------|---------------------|------|------------|--------------|--------------|------------------------------|---------------|--------------|----------------------|----------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 4009 | IRCA RICA Division Vitorio Veneto Italy | Qualification | ESA | Jan 2015 | | | | | | | | | | | | |
| Detail ESCC 4009/004 | | Remarks | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All variants with heating area from 1.66 to 1300 cm² are qualified.</p> <p>Single, double layer heaters</p> <p>Special characteristics:</p> <table border="1"> <tr> <td>Maximum Ohmic density</td> <td>330 Ω/cm²</td> </tr> <tr> <td>Rated power density</td> <td>0.38</td> </tr> <tr> <td>Resistance</td> <td>1 to 10000 Ω</td> </tr> <tr> <td>Heating Area</td> <td>1.66 to 1300 cm²</td> </tr> <tr> <td>Terminal Lead</td> <td>20 to 30 AWG</td> </tr> <tr> <td>Resistance Tolerance</td> <td>(%): ±2 to ±10</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +150</p> | | | | | Maximum Ohmic density | 330 Ω/cm ² | Rated power density | 0.38 | Resistance | 1 to 10000 Ω | Heating Area | 1.66 to 1300 cm ² | Terminal Lead | 20 to 30 AWG | Resistance Tolerance | (%): ±2 to ±10 |
| Maximum Ohmic density | 330 Ω/cm ² | | | | | | | | | | | | | | | |
| Rated power density | 0.38 | | | | | | | | | | | | | | | |
| Resistance | 1 to 10000 Ω | | | | | | | | | | | | | | | |
| Heating Area | 1.66 to 1300 cm ² | | | | | | | | | | | | | | | |
| Terminal Lead | 20 to 30 AWG | | | | | | | | | | | | | | | |
| Resistance Tolerance | (%): ±2 to ±10 | | | | | | | | | | | | | | | |

6.11 THERMISTORS (11)

6.11.1 NTC

| THERMISTORS, (THERMALLY SENSITIVE RESISTORS), NTC, BASED ON TYPES G15K4D489 AND *K3A35* | | | | 266Krev1 |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 4006 | TE Connectivity MEAS (Betatherm) Galway Ireland | Qualification | ESA | Jul 2001 |
| Detail ESCC 4006/013 4006/014 | | Remarks | | |
| <p>Qualified range:</p> <p>4006/013: Variants 01 to 05 and 06 to 07 are qualified.</p> <p>4006/014: Variants 08, 09 and 13 are qualified.</p> <p>Refer to variants table 1(a) in the Detail Specifications for resistance to temperature characteristics.</p> <p>Operating Temperature Range (°C):</p> <p>4006/013 : -55 to +115 4006/014 : -60 to +160</p> | | | | |

6.11.2 PTC platinum

| RESISTANCE TEMPERATURE DETECTOR, THIN FILM PLATINUM SENSOR, PTC, RANGE 100 TO 2000 OHMS AT 0°C | | | | 352A | |
|--|--|---|---|---|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | |
| Generic ESCC 4006 Detail ESCC 4006/015 | Innovative Sensor Technology IST AG, Ebnat-Kappel Switzerland | Qualification | ESA | February 2018 | |
| Remarks | | | | | |
| Qualified range: variants 01 to 10 | | | | | |
| Variant Number | Based on Type (Article Number) | Nominal R _z (Ω) (at 0°C) | Operating Temperature Range T _{op} (°C) | Maximum Operating Current I _{OP} (mA) | Maximum Rated Current I _{MAX} (mA) |
| 01 | P0K1.232.7W (010.02991) | 100 | -50 to +150 | 1 | 4 |
| 02 | P0K1.232.7W (010.02992) | 100 | -200 to +200 | 1 | 4 |
| 03 | P0K2.232.7W (010.02993) | 200 | -50 to +150 | 0.7 | 2.8 |
| 04 | P0K2.232.7W (010.02994) | 200 | -200 to +200 | 0.7 | 2.8 |
| 05 | P0K5.232.7W (010.02995) | 500 | -50 to +150 | 0.45 | 1.3 |
| 06 | P0K5.232.7W (010.02996) | 500 | -200 to +200 | 0.45 | 1.3 |
| 07 | P1K0.232.7W (010.02997) | 1000 | -50 to +150 | 0.3 | 1.3 |
| 08 | P1K0.232.7W (010.02998) | 1000 | -200 to +200 | 0.3 | 1.3 |
| 09 | P2K0.232.7W (010.02998) | 2000 | -50 to +150 | 0.2 | 0.9 |
| 10 | P2K0.232.7W (010.03000) | 2000 | -200 to +200 | 0.2 | 0.9 |

6.12 TRANSISTORS (12)

6.12.1 Bipolar NPN, PNP, NPN/PNP

| TRANSISTOR BIPOLAR LOW AND HIGH POWER SINGLE DUAL MATCH AND COMPLEMENTARY NPN/PNP | | | | 361A |
|--|--|--------------------|-----------------------|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic | STMicroelectronics Rennes France | Qualification | CNES | Jul 2019 Old Certificates 233 and 234 (Sept 1996) have been included into 361 |
| ESCC 5000 Detail ESCC | | Remark | | |
| 5201/001, 5201/002, 5201/004, 5201/019, 5203/010, 5203/016, 5207/002, 5202/001, 5202/014, 5204/002, 5204/006, 5207/005, 5207/009, 5201/020 | | | | |

-Qualified range for NPN type:

| ESCC Spec No. | Component Type | Package | Qualified Variants |
|---------------|----------------|-----------------|--------------------|
| 5201/001 | 2N 2484 | LCCC3, LCCC3 +1 | 04, 05, 06, 07 |
| 5201/002 | 2N 2222A | LCCC3, LCCC3 +1 | 04, 05, 11, 12 |
| 5201/019 | 2N 5551 | LCCC3, LCCC3 +1 | 04, 05, 08, 09 |
| 5201/004 | 2N 3700 | LCCC3, LCCC3 +1 | 04, 05, 06, 07 |
| 5203/010 | 2N 5154 | TO-257, SMD.5 | 04, 05, 06, 07 |
| 5203/016 | BUX 77ESY | TO-257 | 06, 07 |
| 5207/002 | 2N 2920A | LCCC6, FP-8 | 12, 15, 16, 17 |
| 5201/020 | 2ST15300 | SMD.5 | 01 |

Maximum ratings:

| | 2N222 A | 2N2484 | 2N5551 | 2N3700 | 2N5154 | BUX 77 | 2N2920A | 2ST15300 |
|-----------------------|---------|--------|--------|--------|--------|--------|---------|----------|
| V _{CBO} (V): | 75 | 60 | 180 | 140 | 100 | 100 | 60 | 300 |
| V _{CEO} (V): | 50 | 60 | 160 | 80 | 80 | 80 | 60 | 100 |

-Qualified range for PNP:

| ESCC Specification No. | Component Type | Package | Qualified Variants |
|------------------------|----------------|------------------|--------------------|
| 5202/001 | 2N2907A | LCCC3, LCCC3 +1 | 04, 05, 06, 07 |
| 5202/014 | 2N5401 | LCCC3, LCCC3 +1 | 04, 05, 06, 07 |
| 5204/002 | 2N5153 | TO-257, SMD.5 | 04, 05, 06, 07 |
| 5204/006 | BUX78 | TO-257 | 06, 07 |
| 5207/005 | 2N3810 | TO-78, LCCC6, FP | 07, 09, 10, 11 |

TRANSISTOR BIPOLAR LOW AND HIGH POWER SINGLE DUAL MATCH
AND COMPLEMENTARY NPN/PNP

361A

Maximum Ratings

| | 2N2907A | 2N3810 | 2N5153 | BUX78 | 2N5401 |
|---------------|---------|--------|--------|-------|--------|
| $BV_{CBO}(V)$ | 60 | 60 | 100 | 100 | 160 |
| $BV_{CEO}(V)$ | 60 | 60 | 80 | 80 | 150 |

-Qualified range for complementary NPN/PNP:

| ESCC Specification No. | Component Type | Package | Qualified Variants |
|------------------------|----------------|---------|--------------------|
| 5207/009 | 2ST3360 | FP | 01,02 |

Maximum Ratings

| | 2ST3360 (NPN) | 2ST3360 (PNP) |
|---------------|---------------|---------------|
| $BV_{CBO}(V)$ | 60 | -60 |
| $BV_{CEO}(V)$ | 60 | -60 |

Operating Temperature Range (°C): -65 to +200

6.12.2 MOSFET, Power, N-Channel

| TRANSISTORS, MOSFET, N-CHANNEL, POWER, BASED ON TYPES STRH100N10, STRH40N6, STRH100N6 AND STRH8N10 | | | | 303E | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|--------------|----------------------------|-----------------------------|------------------------------|--------------|-------------------------------------|-----------------|------------------------------|-----------------|----------|-------------|--------------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic | STMicroelectronics Rennes France | Qualification | CNES | Oct 2010 | | | | | | | | | | | | |
| ESCC 5000 | | Remarks | | | | | | | | | | | | | | |
| Detail ESCC | | | | | | | | | | | | | | | | |
| 5205/021, 5205/022, 5205/023, 5205/024 | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>5205/021 & 5205/022: Variants 01 and 02 are qualified 5205/023 & 5205/024: Variant 01 is qualified</p> <p>Package Types: TO-254AA, SMD.5 for STRH40N6 and STRH8N10</p> <p>Maximum Ratings for 5205/021:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>$V_{GS(th)}$</td> <td>2 –4.5 min/max, $I_D=1$ mA</td> </tr> <tr> <td>$r_{DS(on)}$ (m Ω):</td> <td>35, $V_{GS}=12V$, $I_D=24A$</td> </tr> <tr> <td>I_{DS} (A)</td> <td>48, T_{case} ($^{\circ}C$)= +25</td> </tr> <tr> <td>V_{DS} (Vdc):</td> <td>100 over Top , $V_{GS}= 0$ V</td> </tr> <tr> <td>V_{GS} (Vdc):</td> <td>± 20</td> </tr> <tr> <td>P_{TOT}:</td> <td>170 W at $T_{case} \leq +25$ C</td> </tr> </table> <p>Operating Temperature Range ($^{\circ}C$): -55 to +150</p> | | | | | $V_{GS(th)}$ | 2 –4.5 min/max, $I_D=1$ mA | $r_{DS(on)}$ (m Ω): | 35, $V_{GS}=12V$, $I_D=24A$ | I_{DS} (A) | 48, T_{case} ($^{\circ}C$)= +25 | V_{DS} (Vdc): | 100 over Top , $V_{GS}= 0$ V | V_{GS} (Vdc): | ± 20 | P_{TOT} : | 170 W at $T_{case} \leq +25$ C |
| $V_{GS(th)}$ | 2 –4.5 min/max, $I_D=1$ mA | | | | | | | | | | | | | | | |
| $r_{DS(on)}$ (m Ω): | 35, $V_{GS}=12V$, $I_D=24A$ | | | | | | | | | | | | | | | |
| I_{DS} (A) | 48, T_{case} ($^{\circ}C$)= +25 | | | | | | | | | | | | | | | |
| V_{DS} (Vdc): | 100 over Top , $V_{GS}= 0$ V | | | | | | | | | | | | | | | |
| V_{GS} (Vdc): | ± 20 | | | | | | | | | | | | | | | |
| P_{TOT} : | 170 W at $T_{case} \leq +25$ C | | | | | | | | | | | | | | | |

| TRANSISTORS, POWER, MOSFET, N-CHANNEL, BASED ON TYPE BUY **CS*** | | | | 319D |
|---|--|--|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5000 Detail ESCC | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | Aug 2012 |
| | | Remarks These devices have a TID tested capability of 100 kRad (Si) SEE tested : LET (MeV-cm ² /mg) 56 @ V _{GS} = -10V, V _{DS} = 250V SOA and SE SOA derating graphs are incorporated in the Detail Specifications. | | |
| 5205/026 , 5205/027 , 5205/028 , 5205/030 | | | | |
| Qualified range: 5205/026 — variants 01R, 02R 5205/027 — variant 01R 5205/028 — variant 01R 5205/030 — variants 01R, 02R, 03R | | | | |

| TRANSISTORS, POWER, MOSFET, N-CHANNEL, RADHARD BASED ON TYPE BUY 15CS | | | | 339B | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|------------------------------------|-----|--------------|----|-------------------|-----|-------------------|----------|---------------|----|----------------------|------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 5000 Detail ESCC 5205/031 | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | May 2016 | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>All Variants are qualified.</p> <p>Package:SMD0.5, SMD2, TO-254AA, TO-257AA</p> <p>Maximum ratings:</p> <table border="1"> <tbody> <tr> <td>$r_{DS(ON)}$ (mΩ) @ 25 °C</td> <td>150</td> </tr> <tr> <td>I_{DS} (A)</td> <td>23</td> </tr> <tr> <td>V_{DS} (V) max.</td> <td>150</td> </tr> <tr> <td>V_{GS} (V) max.</td> <td>± 20</td> </tr> <tr> <td>P_{tot} (W)</td> <td>75</td> </tr> <tr> <td>$R_{th(j-c)}$ (°C/W)</td> <td>1.66</td> </tr> </tbody> </table> <p>These devices have a TID tested capability of 100 kRad (Si) SEE tested : LET (MeV-cm²/mg) 56 @ $V_{GS} = -10V$, $V_{DS} = 250V$ SOA and SE SOA derating graphs are incorporated in the Detail Specifications.</p> <p>Operating Temperature Range (°C): Top = - 55 to +150</p> | | | | | $r_{DS(ON)}$ (m Ω) @ 25 °C | 150 | I_{DS} (A) | 23 | V_{DS} (V) max. | 150 | V_{GS} (V) max. | ± 20 | P_{tot} (W) | 75 | $R_{th(j-c)}$ (°C/W) | 1.66 |
| $r_{DS(ON)}$ (m Ω) @ 25 °C | 150 | | | | | | | | | | | | | | | |
| I_{DS} (A) | 23 | | | | | | | | | | | | | | | |
| V_{DS} (V) max. | 150 | | | | | | | | | | | | | | | |
| V_{GS} (V) max. | ± 20 | | | | | | | | | | | | | | | |
| P_{tot} (W) | 75 | | | | | | | | | | | | | | | |
| $R_{th(j-c)}$ (°C/W) | 1.66 | | | | | | | | | | | | | | | |

| TRANSISTORS, POWER, MOSFET, N-CHANNEL, RADHARD BASED ON TYPE BUY 06CS | | | | 363 |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5000 Detail ESCC 5205/032 | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | January 2020 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>Variants 01, 02, 03 and 04 based on types BUY06CS35J-01, BUY06CS80A 01,BUY06CS23K-01 and BUY06CS45B-01 are qualified.</p> <p>Package:SMD0.5, SMD2, TO-254AA, TO-257AA</p> <p>These devices have a TID tested capability of 100 kRad (Si) SOA derating graphs are incorporated in the Detail Specification.</p> <p>Operating Temperature Range (°C): Top = - 55 to +150</p> | | | | |

| TRANSISTORS, POWER, MOSFET, N-CHANNEL, RAD-HARD BASED ON TYPES BUY65CS08J-01, BUY65CS28A-01 | | | | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|--|---|------------------|--|--|--|---|------------------|--|-------------------|---|----|---------------|---|---|-----|--------|-----|-----|-----------------|----|---------------|----|----|-----|------|-----|-----|-----------------|----------------|----|----|----------------|-------|-------|----------------|--------|--------|-----------|------|-------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 5000 Detail ESCC 5205/033 | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | May 2020 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01 and 02 are qualified.</p> <table border="1"> <thead> <tr> <th>Variant Number</th> <th>Based on Type</th> <th>$I_{DS} @ T_{case} \leq +25^{\circ}C$ max (A) (Note 1)</th> <th>$I_{DS} @ T_{case} = +100^{\circ}C$ max (A) (Note 1)</th> <th>$r_{DS(on)} @ T_{amb} = +25^{\circ}C$ max (mΩ) (Note 2)</th> <th>Case (Note 3)</th> <th>Terminal Material and Finish (Note 4)</th> <th>Weight max (g)</th> <th>Total Dose Radiation Level Letter (Note 5)</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>BUY65CS08J-01</td> <td>8</td> <td>5</td> <td>450</td> <td>SMD0.5</td> <td>Q14</td> <td>1.1</td> <td>R [100kRAD(Si)]</td> </tr> <tr> <td>02</td> <td>BUY65CS28A-01</td> <td>28</td> <td>18</td> <td>150</td> <td>SMD2</td> <td>Q14</td> <td>3.3</td> <td>R [100kRAD(Si)]</td> </tr> </tbody> </table> <p>Notes 1-5 are included in the Detail specification.</p> <p>Maximum ratings:</p> <table border="1"> <thead> <tr> <th>Variant number</th> <th>01</th> <th>02</th> </tr> </thead> <tbody> <tr> <td>V_{DS} (Vdc)</td> <td>650 V</td> <td>650 V</td> </tr> <tr> <td>V_{GS} (Vdc)</td> <td>± 20 V</td> <td>± 20 V</td> </tr> <tr> <td>P_{TOT}</td> <td>75 W</td> <td>215 W</td> </tr> </tbody> </table> <p>SOA derating graphs are incorporated in the Detail Specification.</p> <p>Operating Temperature Range (°C): Top = - 55 to +150</p> | | | | | Variant Number | Based on Type | $I_{DS} @ T_{case} \leq +25^{\circ}C$ max (A) (Note 1) | $I_{DS} @ T_{case} = +100^{\circ}C$ max (A) (Note 1) | $r_{DS(on)} @ T_{amb} = +25^{\circ}C$ max (mΩ) (Note 2) | Case (Note 3) | Terminal Material and Finish (Note 4) | Weight max (g) | Total Dose Radiation Level Letter (Note 5) | 01 | BUY65CS08J-01 | 8 | 5 | 450 | SMD0.5 | Q14 | 1.1 | R [100kRAD(Si)] | 02 | BUY65CS28A-01 | 28 | 18 | 150 | SMD2 | Q14 | 3.3 | R [100kRAD(Si)] | Variant number | 01 | 02 | V_{DS} (Vdc) | 650 V | 650 V | V_{GS} (Vdc) | ± 20 V | ± 20 V | P_{TOT} | 75 W | 215 W |
| Variant Number | Based on Type | $I_{DS} @ T_{case} \leq +25^{\circ}C$ max (A) (Note 1) | $I_{DS} @ T_{case} = +100^{\circ}C$ max (A) (Note 1) | $r_{DS(on)} @ T_{amb} = +25^{\circ}C$ max (mΩ) (Note 2) | Case (Note 3) | Terminal Material and Finish (Note 4) | Weight max (g) | Total Dose Radiation Level Letter (Note 5) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | BUY65CS08J-01 | 8 | 5 | 450 | SMD0.5 | Q14 | 1.1 | R [100kRAD(Si)] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02 | BUY65CS28A-01 | 28 | 18 | 150 | SMD2 | Q14 | 3.3 | R [100kRAD(Si)] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variant number | 01 | 02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V_{DS} (Vdc) | 650 V | 650 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V_{GS} (Vdc) | ± 20 V | ± 20 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P_{TOT} | 75 W | 215 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.12.3 MOSFET, Power, P-Channel

| TRANSISTORS, MOSFET, P-CHANNEL, POWER, TYPE STRH40P10 and STRH12P10 | | | | 326D |
|--|---|---|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5000 Detail ESCC 5205/025 5205/029 | ST Microelectronics Rennes France | Qualification | DLR | Mar 2013 |
| | | Remarks These devices have a TID tested capability of 100kRAD(Si). | | |
| <p>Qualified range:</p> <p>Variants 01 and 02 in 5205/025 are qualified. Variants 01 and 02 in 5205/029 are qualified.</p> | | | | |

6.12.4 RF/Microwave, NPN, Low Power, Low Noise

| TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPE BFY 193 | | | | 230J |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5010 Detail ESCC 5611/006 | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | Jun 1996 |
| Remarks | | | | |
| Qualified range: | | | | |
| Variants 01 to 08 | | | | |
| Characteristics for BFY 193: | | | | |
| V _{CEO} (V) max. | | | 12 | |
| V _{CBO} (V)max. | | | 20 | |
| h _{FE} min/max. | | | 50/175 | @ VCE = 8.0 V, IC = 30mA |
| NF (dB) max. | @ 2 GHz | | 2.9 | @ VCE = 5.0 V, IC = 15mA |
| MAG/MSG (dB) min. | @ 2 GHz | | 12.5 | @ VCE = 5.0 V, IC = 40mA |
| f _T (GHz) min. | @ 500 MHz | | 6.5 | @ VCE = 5.0 V, IC = 40mA |
| Package: " Micro-X1" | | | | |
| Total Power Dissipation (P _{tot}) = 580 mW | | | | |
| Operating Temperature Range (°C): Top = - 65 to +200 | | | | |

| TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPE BFY 450 | | | | 245J | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------------------|-----------------------|----------------------------|-----------|-------|------------|---------------------------|-----|--|---------------------------|----|--|--------------------------|-----|--|--------------------------|----|--|--------------------------|--------|--------------------------|--------------|-----|--------------------------|---------------------------|----|--------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 5010 | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | Jun 1997 | | | | | | | | | | | | | | | | | | | | | | | | |
| Detail ESCC 5611/008 | | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variants 01, 02 and 03 are qualified.</p> <p>Characteristics for BFY 450:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Value</th> <th>Conditions</th> </tr> </thead> <tbody> <tr> <td>V_{CEO} (V) max.</td> <td>4.5</td> <td></td> </tr> <tr> <td>V_{CBO} (V) max.</td> <td>15</td> <td></td> </tr> <tr> <td>I_C (mA) max.</td> <td>100</td> <td></td> </tr> <tr> <td>I_B (mA) max.</td> <td>10</td> <td></td> </tr> <tr> <td>h_{FE} min/max.</td> <td>50/150</td> <td>@ VCE = 1.0 V, IC = 20mA</td> </tr> <tr> <td>NF (dB) max.</td> <td>2.0</td> <td>@ VCE = 2.0 V, IC = 10mA</td> </tr> <tr> <td>f_T (GHz) min.</td> <td>18</td> <td>@ VCE = 3.0 V, IC = 90mA</td> </tr> </tbody> </table> <p>Package: " Micro-X1"</p> <p>Total Power Dissipation (P_{tot}) = 450 mW</p> <p>Operating Temperature Range (°C): Top = - 65 to +175</p> | | | | | Parameter | Value | Conditions | V _{CEO} (V) max. | 4.5 | | V _{CBO} (V) max. | 15 | | I _C (mA) max. | 100 | | I _B (mA) max. | 10 | | h _{FE} min/max. | 50/150 | @ VCE = 1.0 V, IC = 20mA | NF (dB) max. | 2.0 | @ VCE = 2.0 V, IC = 10mA | f _T (GHz) min. | 18 | @ VCE = 3.0 V, IC = 90mA |
| Parameter | Value | Conditions | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V _{CEO} (V) max. | 4.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V _{CBO} (V) max. | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I _C (mA) max. | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I _B (mA) max. | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| h _{FE} min/max. | 50/150 | @ VCE = 1.0 V, IC = 20mA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NF (dB) max. | 2.0 | @ VCE = 2.0 V, IC = 10mA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f _T (GHz) min. | 18 | @ VCE = 3.0 V, IC = 90mA | | | | | | | | | | | | | | | | | | | | | | | | | | |

| TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPES BFY 640, 640B, 650B and 740B | | | | 322D |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 5010 Detail ESCC | Infineon Technologies AG Neubiberg Germany | Qualification | DLR | Jun 1997 |
| Remarks This certificate, from its issue B, release in May 2016, includes in its scope of qualification some devices previously listed in the QPL under certificates No. 320 and 321, which are no longer maintained. | | | | |
| 5611/009 , 5611/010 , 5611/011 | | | | |
| Qualified range: 5611/009: variants 01, 02, 03 5611/010: variants 01, 02, 03, 04 5611/011: variant 01, 02 | | | | |

6.13 WIRES AND CABLES (13)

6.13.1 Low Frequency

| WIRES AND CABLES, LOW FREQUENCY, POLYIMIDE INSULATION BASED ON TYPES FA 3901-1, FA 3901-2 | | | | 07T |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | Draka Fileca Ste-Genevieve France | Qualification | CNES | Jan 1979 |
| Detail ESCC 3901/001 3901/002 | | Remarks | | |
| <p>Qualified range:</p> <p>FA 3901-1 All Variants defined in the Detail Specification 3901/001 are qualified except those based on AWG 12-14 FA</p> <p>FA 3901-2 Variants 31 to 73 and 74 to 91 as defined in the Detail Specification 3901/002 are qualified</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, POLYIMIDE INSULATION BASED ON TYPES 1871-1872 | | | | 09S |
|--|-----------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | Nexans Draveil France | Qualification | CNES | Jan 1979 |
| Detail ESCC 3901/001 3901/002 | | Remarks | | |
| <p>Qualified range:</p> <p>Medium weight 1871 - n/1871 - 871 (3901/001): Variants 24 to 47 are qualified Light weight 1872 - n/1872 - 872 (3901/002): Variants 31 to 73 are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, POLYIMIDE INSULATION BASED ON TYPES 3901001**B and 3901002**B | | | | 132R |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | AXON' CABLE Montmirail France | Qualification | CNES | Jan 1979 |
| Detail ESCC 3901/001 3901/002 | | Remarks | | |
| <p>Qualified range:</p> <p>3901/001: variants 24 to 47 3901/002: variants 31 to 73</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES MTV-BTV | | | | 08T |
|--|-----------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | Nexans Draveil France | Qualification | CNES | Jan 1979 |
| Detail ESCC 3901/013 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 77 are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES 3901013**B | | | | 292F |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/013 | AXON' CABLE Montmirail France | Qualification | CNES | Jun 2009 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>All variants are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES SPC 2110 | | | | 138P |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/009 | W.L. Gore & Co Pleinfeld Germany | Qualification | DLR | Aug 1986 |
| Remarks Qualified range: Variants 01 to 66 are qualified Voltage Rating, maximum (Vrms):600 Temperature Range (°C): -200 to +200 | | | | |

| WIRES AND CABLES, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES SPL | | | | 219N |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/019 | W.L. Gore & Co Pleinfeld Germany | Qualification | DLR | Nov 1994 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>Variants 01 to 94 are qualified</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES 3901019**B | | | | 268J |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | AXON' CABLE Montmirail France | Qualification | CNES | Jun 2002 |
| Detail ESCC 3901/019 | | Remarks | | |
| <p>Qualified range:</p> <p>All variants are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |



| WIRES AND CABLES, LOW FREQUENCY, 600V, SILVER-PLATED COPPER, EXTRUDED CROSSLINKED FLUOROPOLYMER INSULATION, BASED ON TYPE 55/995X | | | | 159Q |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/012 | Tyco Electronics Dorcan, Swindon England | Qualification | UK Space Agency | Feb 1989 |
| Remarks This product is not intended for human space flight applications. | | | | |
| <p>Qualified range:</p> <p>Variants 01 to 80 are qualified</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, 600V, SILVER-PLATED COPPER, EXTRUDED CROSSLINKED FLUOROPOLYMER INSULATION, BASED ON TYPE 3901012**B | | | | 267K |
|---|-------------------------------------|--|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/012 | AXON' CABLE Montmirail France | Qualification | CNES | Mar 2002 |
| | | Remarks This product is not intended for human space flight applications. | | |
| <p>Qualified range:</p> <p>All variants are qualified</p> <p>Wire code ISO 2635</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| POWER WIRES FOR CRIMPING, LOW FREQUENCY, BASED ON TYPE SPP | | | | 215N |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/017 | W.L. Gore & Co. Pleinfeld Germany | Qualification | DLR | Jul 1994 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>All variants are qualified</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>I_{max} (A): 45, 81 and 133 for AWG: 8, 4, and 0, respectively</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, INSULATED, POLYIMIDE/FLUOROTHERMOPLAST, BASED ON TYPE SPM | | | | 216M |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | W.L. Gore & Co. Pleinfeld Germany | Qualification | DLR | Jul 1994 |
| Detail ESCC 3901/018 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 88 are qualified.</p> <p>Expanded PTFE, extruded polyimide/ FEP, sintered PTFE insulated wires. Expanded PTFE, extruded polyimide/fluorothermoplast insulated cables, shielded and jacketed.</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, INSULATED, POLYIMIDE/FLUOROTHERMOPLAST, BASED ON TYPEs 3901-018, -019, 021 | | | | 374 |
|--|--|--|-----------------------|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic | LEONI Special Cables GmbH Friesoythe Germany | Qualification | DLR | Sept 2021 Merged from certificates 294, 295 and 296 (initial qualification: Oct 2009) |
| ESCC 3901 Detail ESCC 3901/018 3901/019 3901/021 | | Remarks | | |
| Qualified range: | | | | |
| Detail specifications | | Variants | | |
| ESCC 3901/018 | | 01 to 88 | | |
| ESCC 3901/019 | | 02 to 08, 10 to 16, 18 to 23, 26 to 31, 33 to 47, 49 to 55, 57 to 63, 65 to 71, 73 to 78, 80 to 94 | | |
| ESCC 3901/021 | | 01 to 41 | | |
| Temperature Range (°C): -200 to +200 | | | | |

| WIRES AND CABLES, LOW FREQUENCY, INSULATED, POLYIMIDE/FLUOROTHERMOPLAST, BASED ON TYPE SPM | | | | 300F |
|--|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | AXON' CABLE Montmirail France | Qualification | CNES | Dec 2009 |
| Detail ESCC 3901/018 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 88 are qualified AWG 30 and 32 variants are qualified.</p> <p>Expanded PTFE, extruded polyimide/ FEP, sintered PTFE insulated wires.</p> <p>Voltage Rating, maximum (Vrms) : 600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| POLYIMIDE INSULATED SHIELDED CABLES WITH DRAIN WIRE, LOW FREQUENCY, BASED ON TYPE SPLD | | | | 229M |
|--|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/021 | W.L. Gore & Co. Pleinfeld Germany | Qualification | DLR | Feb 1996 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>All variants (01 to 41) are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| POLYIMIDE INSULATED SHIELDED CABLES WITH DRAIN WIRE, LOW FREQUENCY, BASED ON TYPES 3901021**B | | | | 293F |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | AXON' CABLE Montmirail France | Qualification | CNES | Jun 2009 |
| Detail ESCC 3901/021 | | Remarks | | |
| <p>Qualified range:</p> <p>All variants are qualified</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |



| WIRES AND CABLES, LOW FREQUENCY, 600V, SILVER-PLATED COPPER, EXTRUDED CROSSLINKED MODIFIED ETFE, LIGHTWEIGHT | | | | 257K |
|---|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/020 3901/022 | Tyco Electronics Dorcan, Swindon England | Qualification | UK Space Agency | Oct 1999 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>3901/020: All variants (01 to 80) are qualified 3901/022: All variants (01 to 72) are qualified.</p> <p>Wires and Cables variants consist of 1, 2, 3 and 4 cores with and without jackets and shields</p> <p>ESCC Detail Specification No. 3901/020 cables are silver-plated copper braided, and ESCC Detail Specification No. 3901/022 cables are silver-plated copper spiral shielded,</p> <p>Wire sizes are in accordance with ISO 2635.</p> <p>Voltage Rating, maximum (V_{rms}):600</p> <p>Temperature Range (°C): -100 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, FLUROPOLYMER INSULATION, 600V, BASED ON TYPE CSWL | | | | 299F |
|--|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | AXON' CABLE Montmirail France | Qualification | CNES | Dec 2009 |
| Detail ESCC 3901/024 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 64 are qualified (AWG 30 variants is qualified)</p> <p>Wires and Cables variants consist of 1, 2, 3 and 4 cores with and without jackets and shields</p> <p>NOTE: The high strength toughened fluoropolymer PTFE tape (HST-F) use for the manufacturing of the primary insulation of the wire is named "ART tape".</p> <p>Voltage Rating, maximum (Vrms):600</p> <p>Temperature Range (°C): -200 to +200</p> | | | | |

| WIRES AND CABLES, LOW FREQUENCY, FLUROPOLYMER INSULATION, 600V, BASED ON TYPE CSWL | | | | 305E |
|--|-----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | W.L. Gore Pleinfeld Germany | Qualification | DLR | Jan 2011 |
| Detail ESCC 3901/024 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 to 64 inclusive are qualified</p> <p>The specification contains 64 variants with several wire sizes, single wires and cables with several cores, either shielded or unshielded.</p> <p>Cable construction: 1, 2, 3 and 4 twisted wires are in one core with or without shield</p> <p>Voltage Rating, maximum (Vrms):600</p> | | | | |

| WIRES AND CABLES, LIGHTWEIGHT, EXTRA THIN, FLUORTHHERMOPLASTIC / POLYIMIDE INSULATED WIRES AND CABLES BASED ON TYPE CSC | | | | 328C |
|---|-----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 | W.L. Gore Pleinfeld Germany | Qualification | DLR | Jun 2014 |
| Detail ESCC 3901/025 | | Remarks | | |
| <p>Qualified range:</p> <p>All variants 01 to 21 are qualified</p> <p>The specification contains 21 variants with several wire sizes, single wires and cables with several cores, either shielded or unshielded.</p> <p>Cable construction: 1, 2, 3 and 4 twisted wires are in one core with or without shield</p> <p>Maximum voltage: 600 Vrms</p> <p>Operating temperature range (°C): -200 to +200</p> | | | | |

| WIRES AND CABLE, LIGHTWEIGHT, EXTRA THIN, FLUOROPOLYMER, INSULATED WIRES AND CABEL, LOW FREQUENCY, BASED ON TYPE LEW 600V | | | | 373 |
|---|-----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3901 Detail ESCC 3901/026 | W.L. Gore Pleinfeld Germany | Qualification | DLR | March 2021 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>All variants 01 to 21 are qualified</p> <p>Operating temperature range (°C): -200 to +200</p> | | | | |

6.13.2 Coaxial, RF, Flexible

| WIRES AND CABLES, RF COAXIAL, PTFE/POLYIMIDE INSULATION, BASED ON TYPE 50 CIS | | | | 24U |
|--|-----------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3902 | Nexans Draveil France | Qualification | CNES | Jul 1979 |
| Detail ESCC 3902/001 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01, 02, and 03 are qualified</p> <p>Miniature flexible 50 ohm coaxial cable PTFE Dielectric Polyimide Jacketed, Double Shield and Shielded / Jacketed</p> <p>Maximum voltage: 900 Vrms</p> <p>Operating temperature range (°C): -80 to +200 (- 100 for variant 01)</p> | | | | |

| WIRES AND CABLES, RADIO FREQUENCY, FLEXIBLE, COAXIAL, TRIAXIAL AND SYMMETRIC, BASED ON TYPES GCX, GTX, GSC AND GBL | | | | 255L |
|--|-----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3902 | W.L. Gore Pleinfeld Germany | Qualification | DLR | Jan 1999 |
| Detail ESCC 3902/002 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 03 to 06, 10 to 13 and 20 to 30 are qualified</p> <p>Variants encompass coaxial, triaxial, and balanced shielded line</p> <p>Operating Voltage (Continuous), maximum ratings, (Vrms): Variants 03: 180 Variants 04, 10, 21, 22, 23, 24: 200 Variants 06, 25: 250 All Other Variants: 300</p> <p>AWG Range: 20, 22, 24, 26, 28, 30 dependent on variant</p> | | | | |

| WIRES AND CABLES, RADIO FREQUENCY, FLEXIBLE, COAXIAL, TRIAXIAL AND SYMMETRIC, BASED ON TYPE 3902/002 | | | | 298F |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3902 Detail ESCC 3902/002 | AXON' CABLE Montmirail France | Qualification | CNES | Dec 2009 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>Variants 03 to 06, 10 to 13 and 20 to 30 are qualified</p> <p>Variants encompass coaxial, triaxial, and balanced shielded line</p> <p>Temperature range (°C): -200 to +180</p> | | | | |

| WIRES AND CABLES, SPACEWIRE, ROUND, QUAD SYMMETRIC, FLEXIBLE, BASED ON TYPE SPACEWIRE | | | | 291F | | | | | | | | | | | | |
|---|-------------------------------------|--|-----------------------|----------------------------|---------|-----------|--|-------------|----|------------------|-----|-----|----|------------------|-----|-----|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | |
| Generic ESCC 3902 Detail ESCC 3902/003 | AXON' CABLE Montmirail France | Qualification | CNES | Dec 2009 | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | |
| <p>Qualified range:</p> <p>Variant 01 AWG 28/07 (white) and variant 02 AWG 26/07 (blue) are qualified</p> <table border="1"> <thead> <tr> <th>Variant</th> <th>Data Rate</th> <th>Operating Voltage (Continuous), (Vrms)</th> <th>Current (A)</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>100Mb/s - 400MHz</td> <td>200</td> <td>1.5</td> </tr> <tr> <td>02</td> <td>200Mb/s - 400MHz</td> <td>200</td> <td>2.5</td> </tr> </tbody> </table> <p>Temperature range (°C): -200 to +180</p> | | | | | Variant | Data Rate | Operating Voltage (Continuous), (Vrms) | Current (A) | 01 | 100Mb/s - 400MHz | 200 | 1.5 | 02 | 200Mb/s - 400MHz | 200 | 2.5 |
| Variant | Data Rate | Operating Voltage (Continuous), (Vrms) | Current (A) | | | | | | | | | | | | | |
| 01 | 100Mb/s - 400MHz | 200 | 1.5 | | | | | | | | | | | | | |
| 02 | 200Mb/s - 400MHz | 200 | 2.5 | | | | | | | | | | | | | |

| | | | | |
|--|-----------------------------------|-----------------------------------|-----------------------|----------------------------|
| WIRES AND CABLES, SPACEWIRE, ROUND, QUAD SYMMETRIC, FLEXIBLE, BASED ON TYPE SPACEWIRE | | | | 304E |
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3902 Detail ESCC 3902/003 | W.L. Gore Pleinfeld Germany | Qualification | DLR | Jan 2011 |
| Remarks | | | | |
| <p>Qualified range:</p> <p>Variant 01 AWG 28/07 (white) and Variant 02 AWG 26/07 (blue) are qualified, 100 Ω</p> | | | | |
| Variant | Data Rate | Operating Voltage (Continuous) | Current (A) | |
| 01 | 100 Mb/s | 400 MHz 200 V | 1.5 | |
| 02 | 200 Mb/s | 400 MHz 200 V | 2.5 | |
| <p>Temperature range (°C): -200 to +180</p> | | | | |

| WIRES AND CABLES, SPACEWIRE, ROUND, QUAD SYMMETRIC, FLEXIBLE, BASED ON TYPE SPACEWIRE | | | | 335C |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3902 | AXON' CABLE Montmirail France | Qualification | CNES | Oct 2015 |
| Detail ESCC 3902/004 | | Remarks | | |
| <p>Qualified range:</p> <p>Variant 01 is qualified.</p> <p>Temperature range (°C): -100 to +150</p> | | | | |

6.1 TRANSFORMERS (14)

6.1.1 TO and CCM

| Molded SMD Custom Magnetics Components, Toroidal (TO) or Linear (CCM) Winding Technology | | | | 356A | | | |
|---|----------------------------------|--------------------|----------------------------|----------------------------|----------------------|---------------------|----------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | |
| Generic ESCC 3201 Detail ESCC 3201/011 3201/012 | Exxelia SAS Illange France | Qualification | ESA/ESTEC | Jan 2019 | | | |
| Remarks | | | | | | | |
| Technology Flow qualified as defined into the current QML published document REP006 (ESCC/RP/QML006). | | | | | | | |
| Variant Number | Type | Design Domain | Electrical Characteristics | No. of Terminals | Terminal Finish | Weight Max (g) | |
| 01 | TO10 | Note 1 from QML | Note 2 from QML | 10 | Sn60Pb40 | 3.1 | |
| 02 | TO12 | | | 10 | Sn60Pb40 | 5.9 | |
| 03 | TO16 | | | 12 | Sn60Pb40 | 11.6 | |
| 04 | TO20 | | | 14 | Sn60Pb40 | 21.8 | |
| 05 | TO25 | | | 18 | Sn60Pb40 | 41.2 | |
| 06 | TO30 | | | 22 | Sn60Pb40 | 80.4 | |
| 07 | TO36 | | | 24 | Sn60Pb40 | 172.1 | |
| Variant Number | Type | Design Domain | Electrical Characteristics | Total Power Max (W) | No. of Terminals (3) | Terminal Finish (4) | Weight Max (g) |
| 01 | CCM4 | Note 1 from QML | Note 2 from QML | ≤ 18 | 12 | Sn60Pb40 | 5.1 |
| 02 | CCM5 | | | ≤ 40 | 16 | Sn60Pb40 | 7.4 |
| 03 | CCM6 | | | ≤ 50 | 16 | Sn60Pb40 | 12.1 |
| 04 | CCM20 | | | ≤ 120 | 16 | Sn60Pb40 | 21.4 |
| 05 | CCM25 | | | ≤ 150 | 20 | Sn60Pb40 | 44.2 |

6.1.2 Custom magnetics

| Custom Magnetics (Inductors, Chokes and Transformers) | | | | 364 | | | | | | | | | | | | | | |
|--|--|--------------------|-----------------------|----------------------------|--|-------------------|---------------|--|--------------|-----------------------------------|------------------|---------------------------------|--------------|---|---------------|--|-------------------------------|--------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | |
| Generic ESCC 3201 | Flux A/S Asnaes Denmark | Qualification | ESA/ESTEC | March 2020 | | | | | | | | | | | | | | |
| Detail ESCC 3201/013 | | Remarks | | | | | | | | | | | | | | | | |
| <p>Technology Flow qualified as defined into the current QML published document REP006 (ESCC/RP/QML006).</p> <p>The range of components applicable are described into the ESCC 3201/013 as follows:</p> <table border="1"> <thead> <tr> <th>Physical, Electrical and Thermal Configuration</th> <th>Available Options</th> </tr> </thead> <tbody> <tr> <td>Magnetic Type</td> <td>Single element assemblies only: Inductor(s); Transformer</td> </tr> <tr> <td>Package Type</td> <td>Open Construction; Housed; Potted</td> </tr> <tr> <td>Termination Type</td> <td>Through-hole; SMD; Flying Leads</td> </tr> <tr> <td>Winding Wire</td> <td>Ø0.1mm to 2mm wires per IEC 60317-0-1; Custom Foils</td> </tr> <tr> <td>Maximum Power</td> <td>2.5kW Maximum Operating Temperature +130°C</td> </tr> <tr> <td>Maximum Operating Temperature</td> <td>+130°C</td> </tr> </tbody> </table> <p>Physical, electrical and thermal configuration for a particular component will be specified in the applicable Magnetic Sheet.</p> <p>The requirements which shall be specified in the Magnetic Sheet for a particular component are described into the ESCC 3201/013.</p> | | | | | Physical, Electrical and Thermal Configuration | Available Options | Magnetic Type | Single element assemblies only: Inductor(s); Transformer | Package Type | Open Construction; Housed; Potted | Termination Type | Through-hole; SMD; Flying Leads | Winding Wire | Ø0.1mm to 2mm wires per IEC 60317-0-1; Custom Foils | Maximum Power | 2.5kW Maximum Operating Temperature +130°C | Maximum Operating Temperature | +130°C |
| Physical, Electrical and Thermal Configuration | Available Options | | | | | | | | | | | | | | | | | |
| Magnetic Type | Single element assemblies only: Inductor(s); Transformer | | | | | | | | | | | | | | | | | |
| Package Type | Open Construction; Housed; Potted | | | | | | | | | | | | | | | | | |
| Termination Type | Through-hole; SMD; Flying Leads | | | | | | | | | | | | | | | | | |
| Winding Wire | Ø0.1mm to 2mm wires per IEC 60317-0-1; Custom Foils | | | | | | | | | | | | | | | | | |
| Maximum Power | 2.5kW Maximum Operating Temperature +130°C | | | | | | | | | | | | | | | | | |
| Maximum Operating Temperature | +130°C | | | | | | | | | | | | | | | | | |

6.2 THERMOSTATS (20)

6.2.1 Switches

| SWITCHES, THERMOSTATIC, BIMETALLIC, SPST, OPENING CONTACT, BASED ON TYPE TH 47 | | | | 275H |
|---|------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3702 | COMEPA BAGNOLET France | Qualification | CNES | Mar 2004 |
| Detail ESCC 3702/001 3702/002 | | Remarks | | |
| <p>Qualified range:</p> <p>ESCC 3702/001 (naked thermostat):</p> <p>Variants 01 to 03 are qualified Range of Components: Grade Z and Grade Y</p> <p>ESCC 3702/002 (potted thermostat):</p> <p>Variants 01 to 06 are qualified Range of Components: Grade Z and Grade Y</p> <p>Maximum Ratings: Rated Current (I_R): 4 A (30 Vdc resistive)</p> <p>Operating Temperature Range (°C), -50 to +150</p> | | | | |

6.3 RF PASSIVE (30)

6.3.1 Circulator and Isolator

| ISOLATORS AND CIRCULATORS, LOW POWER, KA-BAND (22GHz—32 GHz), WITH NON-INTEGRAL SMA 2.9 COAXIAL CONNECTORS, BASED ON TYPES BK1XXX and BK3XXX | | | | 340A |
|---|---|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3202 | Cobham Microwave Villebon-sur Yvette France | Qualification | CNES | Jun 2016 |
| Detail ESCC 3202/026 | | Remarks | | |
| <p>Qualified range:</p> <p>Variants 01 and 02 are qualified</p> | | | | |

6.3.2 Attenuator and Load

| PASSIVE DEVICES, R.F. COAXIAL LOADS BASED ON TYPE R404 | | | | 185K |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3403 Detail ESCC 3403/004 3403/006 3403/009 | RADIALL Saint-Quentin- Fallavier France | Qualification | CNES | Jul 1992 |
| <p>Remarks Qualified variants from ESCC 3403/004 have been replaced with variants from ESCC 3403/006. ESCC 3403/004 Variants 04 and 05 will be discontinued with a Last Time Buy order possibility up to October 2020.</p> | | | | |
| <p>Qualified range:</p> <ul style="list-style-type: none"> - Type SMA, DC to 18GHz (ESCC 3403/004 Issue 6): variants 04,05 - Type SMA, DC to 22 GHz (ESCC 3403/006 Issue 5): variants 03,04,05,06 - Type SMA 2.9, DC to 31.5 GHz (ESCC 3403/009 Issue 6): variants 03,04 <p>Operating Temperature Range (°C), -55 to +125</p> | | | | |

| R.F. ATTENUATORS FIXED, COAXIAL BASED ON TYPE R413 | | | | 178L |
|--|--|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3403 | RADIALL Saint-Quentin- Fallavier France | Qualification | CNES | Jan 1991 |
| Detail ESCC 3403/005 3403/008 | | Remarks | | |
| <p>Qualified range:</p> <p>-Type SMA, DC to 22 GHz (ESCC 3403/005 Issue 6): variants 33 to 63</p> <p>-Type SMA 2.9, DC to 31.5 GHz (ESCC 3403/008 Issue 6): variants 23 to 43</p> <p>Operating Temperature Range (°C), -55 to +125</p> | | | | |

6.1 CABLE ASSEMBLY (50)

6.1.1 RF Cable Assemblies

| RF Flexible Cable Assembly, TNC, Very High Power, 50 Ohms, DC to 8GHz, based on type TNC-VHP | | | | 348A |
|---|--------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3408 | Radiall Chateau-Renault France | Qualification | CNES | April 2018 |
| Detail ESCC 3408/001 | | Remarks | | |
| <p>Qualified range: see specification</p> <p>NOTE 1: Actual RF Power-handling capability could only be verified directly by qualification test up to 350W@2 GHz and 200W@4GHz due to limitations in test equipment.</p> <p>NOTE 2: Regarding Total Dose radiation testing, insertion loss degradation affects these cables as they are made with PTFE dielectric (see ESCC 3408/001 Para. 1.8). Conformance with the specification's maximum Insertion Loss could only be verified by test up to 10 MRad while the material integrity of the cable's jacket was verified through further testing up to 120MRad.</p> | | | | |

| RF Cable Assembly, SMA, 50 OHMS, 2.2mm flexible cable, DC to 22Ghz based on type 8S-SMA | | | | 358A |
|---|-------------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3408 Detail ESCC 3408/002 | WL. Gore Dundee, Scotland, UK | Qualification | CNES | May 2019 |
| Remarks | | | | |
| Qualified range: variants 01 to 21. | | | | |

| RF Cable Assembly, 2.4mm connectors, low power, 50 ohms, flexible cable, DC to 45Ghz based on type Axowave SL34SQ | | | | 365 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------|--------------------|-----------------------------|----------------------------|-----------------|-----------------|-------|---------|-------------------|----|---|--|---------------------------|----------|-----|-----------------------------|-----------------|-----|------|--|------------------------|----|----|--|-----------------------------|-------------|----|--|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date | | | | | | | | | | | | | | | | | | | | | | | | |
| Generic ESCC 3408 Detail ESCC 3408/003 | Axon' Cable, France | Qualification | CNES | February 2020 | | | | | | | | | | | | | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All variants qualified | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Characteristics</th> <th>Maximum Ratings</th> <th>Units</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>Nominal Impedance</td> <td>50</td> <td>Ω</td> <td></td> </tr> <tr> <td>Operating Frequency Range</td> <td>DC to 45</td> <td>GHz</td> <td>AC (50Hz) without breakdown</td> </tr> <tr> <td>Working Voltage</td> <td>500</td> <td>Vrms</td> <td></td> </tr> <tr> <td>Minimum Bending Radius</td> <td>40</td> <td>mm</td> <td></td> </tr> <tr> <td>Operating Temperature Range</td> <td>-55 to +125</td> <td>°C</td> <td></td> </tr> </tbody> </table> | | | | | Characteristics | Maximum Ratings | Units | Remarks | Nominal Impedance | 50 | Ω | | Operating Frequency Range | DC to 45 | GHz | AC (50Hz) without breakdown | Working Voltage | 500 | Vrms | | Minimum Bending Radius | 40 | mm | | Operating Temperature Range | -55 to +125 | °C | |
| Characteristics | Maximum Ratings | Units | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nominal Impedance | 50 | Ω | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Frequency Range | DC to 45 | GHz | AC (50Hz) without breakdown | | | | | | | | | | | | | | | | | | | | | | | | | |
| Working Voltage | 500 | Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Bending Radius | 40 | mm | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Temperature Range | -55 to +125 | °C | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shielding effectiveness 90dB from DC to 18GHz and 70dB from 18 to 40GHZ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.1.2 Optical Cable Assemblies

| Optical Fibre Cable Assemblies based on type mini AVIM | | | | 355A |
|---|----------------------------------|--------------------|-----------------------|----------------------------|
| Procurement Specifications | Manufacturer | Nature of Approval | Supervising Authority | Initial Qualification Date |
| Generic ESCC 3420 | Diamond Losone Switzerland | Qualification | ESA | October 2018 |
| Detail ESCC 3420/001 | | Remarks | | |
| <p>Qualified range:</p> <p>3420/001: Variant 01 – Mini AVIM cable assemblies</p> <p>Part number 342000101-**P-MY*-MY*-* (*, from detail specification)</p> <p>Qualified options</p> <p style="padding-left: 40px;">Fiber type 01, 02, 03, 04 Optical function S for 02, 03 and P for 01, 04 P, Cable type variant PEEK tube only M, Connector type on side A and B Mini AVIM Y, Polishing type PC 0°, APC 8° or not applicable (pigtail)</p> <p style="padding-left: 40px;">(Radiation and outgassing data for each fiber will be provided)</p> <p>3420/001: Variant 02 – Mating adapters</p> | | | | |