ESCC QUALIFIED PARTS LIST (QPL)

ESCC/RP/QPL005-234 (REP 005)

January 2023

Document Custodian: European Space Agency – see https://escies.org

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DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
1550	**Extension:** 241L, Exxelia Magnetics (France) 304F, WL Gore (Germany) 305F, WL Gore (Germany) 344C, STM (France) **Extension with re-scope:** 167K, REL STPI (France) Added new variants: ESCC 3602/009 variants 5 and 15 **Revision:** 368Arev1, STM (France) Added new variants with SnPb finishes (Q4): ESCC 5106/023 variants 05 and 06 369Arev1, STM (France) Added new variants with SnPb finishes (Q4): ESCC 5103/032 variants 02 and ESCC 5103/033 variants 04 *Extension: The validity date of the certificate is extended. The scope of the certificate might change.* *Revision: The scope of the certificate is changed. The validity date of the certificate remains the same.*

TABLE OF CONTENTS

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	Kyocera AVX (N.I), Exxelia Technologies	367A, 315E, 306E
	Ceramic Fixed Chip	Kyocera AVX (FR), Exxelia Technologies, Kyocera AVX (N.I)	109Q, 323D, 110Q, 324C, 331C
	Tantalum, (Solid), Fixed, Electrolytic	Kyocera AVX Components (CZ)	196K, 327D, 366A
	Fixed Film	Exxelia Technologies	251K, 353A
	Semiconductor	Cobham Microwave	286F
02 Connectors	Multipin, Solder Contacts	C&K Components, Souriau	71T, 155Q
	Multipin, Crimp Contacts	C&K Components, Souriau, Deutsch, Axon Cable	72T,156P, 25S, 220L, 221L, 222L, 223K
	For printed Circuit Board	Smiths Interconnect Hypertac	99Rrev1, 149Prev1, 250K, 281G
	RF Coaxial	Radiall, Rosenberger	68R, 283Grev1, 329D, 350B
	Microminiature, Crimp Contacts	C&K Components, Souriau, Axon Cable	140Rrev1, 141R, 290F, 301E, 370
03 Crystals and Oscillators	Crystals	Rakon	333C, 334C
	Oscillators	Rakon	371
04 Diodes	Bipolar (PN)	STMicroelectronics	369Arev1
	Schottky	STMicroelectronics	368Arev1
	RF/Microwave, Silicon Schottky	Infineon	227J
	RF/Microwave, Varactors	Cobham Microwave	225J
05 Filters	Feedthrough	Exxelia Technologies	375
	SAW	Kongsberg Space Electronic	313E
06 Fuses	Thin Film	Schurter	284G, 336D
07 Inductors	Fixed, RF	Exxelia Magnetics	241L
	Power	Exxelia Magnetics	276Hrev1
08 Microcircuits	Digital C-MOS	STMicroelectronics, Microchip Technology Nantes, NanoXplore	73T, 190P, 357A, 359A, 372, 382
	Linear Switching Regulator	ST Microelectronics	344C
	Step-down convertor	Space IC	376
09 Relays	Non-Latching	REL-STPI, Leach Sarralbe	102K, 205H, 318D
	Latching	REL-STPI, Leach Sarralbe	88L, 98K, 317D, 167K, 362A

10 Resistors	Shunts	Isabellenhuette	285G
	Fixed, Film	Vishay Electronic GmbH	256L, 289F
	Chip	Vishay SA, Sfernice	287G, 314E
	Flexible, Foil, Heaters	IRCA, Minco	184P, 325D, 330D
11 Thermistor Sensors	NTC	TE Connectivity MEAS	266Krev1
	PT	Innovative Sensor Technology IST AG	352B
14 Transformers	TO and CCM	Exxelia SAS, Flux A/S	356A, 364A
12 Transistors	Bipolar NPN, PNP, NPN/PNP	STMicroelectronics	361A
	MOSFET, Power, N-Channel	STMicroelectronics, Infineon	303F, 319E, 339C, 363A, 360A
	MOSFET, Power, P-Channel	STMicroelectronics	326D
	RF/Microwave, NPN, Low Power, Low Noise	Infineon	230K, 245K, 322E
13 Wires and Cables	Low Frequency	Draka Fileca, Nexans, Axon'Cable, W.L. Gore, Bizlink, Tyco	07U, 09S, 132R, 08T, 292F, 138P, 380, 268J, 159Q, 267K, 215P, 216N, 300F, 293F, 257K, 299F, 305F, 328D, 373, 374
	Coaxial, RF, Flexible	Nexans, W.L. Gore, Axon'Cable	24U, 255M, 298F, 291F, 304F, 335C
20 Thermostats	Switches	Comepa	275H
30 RF Passive	Attenuator and Load	Radiall	185L,178M
50 Cable Assembly	RF Cable Assemblies	Radiall, Gore UK, Axon'Cable	348A, 358A, 365, 383
	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				**367A**
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	Kyocera AVX Northern Ireland	Remarks		

Qualified Range:

3001/030 - Capacitors, Ceramic, Type II, High Capacitance, Based on Case Styles BR, CV, and CH

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

3001/034 - Capacitors, ceramic, type II, high voltage, 1.0 to 5.0 kV, based on case styles VR, CV, and CH

E12 series
Variants 01 to 22 are qualified

3009/034 - Capacitors, fixed, chip, ceramic, type ii, high voltage, based on 1812 and 1825

Variants 01 to 12 are qualified
Terminations: Variants 01 to 12 with metallised pads

±10% tolerance
Operating Temperature Range (°C): -55 to +125

CAPACITORS, CERAMIC, TYPE II, MULTIPLE LAYERS, BASED ON TYPES CNC 31 to 34, LEAD TYPES NE, PE, LE AND PLE				**315E**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3001 Detail ESCC 3001/037	Exxelia Technologies Chanteloup en Brie France	Qualification	CNES	Nov 2011
		Remarks		

Qualified Range:

Variants 01 to 16.
16V : 2.2 to 68 µF
25V: 1.2 to 39 µF

E12 ±10% tolerance

DIL format with equal number of leads per side
Lead material : type A with type 10 finish (electro-deposited 98% Ag min.)

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

CAPACITORS, CERAMIC, TYPE II, 50V to 500V, BASED ON TYPES CNC53 to CNC56.				**306E**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3001 Detail ESCC 3001/038	Exxelia Technologies Chanteloup en Brie France	Qualification	CNES	Mar 2011
		Remarks:		

Qualified Range:

Variants 01 to 04, 08 to 11, 15 to 18 and 22 to 25 are qualified
All values 50V to 500V
E12: ±10% tolerance

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

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 Detail ESCC	Kyocera AVX Components St Apollinaire France	Qualification	CNES	Feb 1983
		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				323D
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
		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 CEC204S	3009/003 3009/040	06 02	1 1 1 1	to to to to	2 700 2 200 1 800 1 200	16 25 50 100	<10pF 0.25—0.5 – 1 (pF) ≥10pF
1210	CEC402S CEC404S	3009/004 3009/040	06 04	10 10 10 10	to to to To	15 000 12 000 12 000 6 800	16 25 50 100	1, 2, 5, 10
1812	CEC602S CEC604S	3009/005 3009/040	06 05	100 100 100 100	to to to to	33 000 27 000 22 000 12 000	16 25 50 100	
2220	CEC702S CEC704S	3009/006 3009/040	06 06	470 470 470 470	to to to to	68 000 56 000 47 000 27 000	16 25 50 100	
1206	CEC1202S CEC1204S	3009/022 3009/040	06 03	1 1 1 1	to to to to	6 800 5 600 5 600 3 900	16 25 50 100	
0603	CEC1402S CEC1404S	3009/037 3009/040	06 01	1 1 1 1	to to to to	1 000 680 560 330	16 25 50 100	
0402	CEC1902S CEC1904S	3009/042 3009/040	06 13	1 1 1 1	to to to to	330 120 100 82	10 16 25 50	

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 Detail ESCC	Kyocera AVX Components St Apollinaire France	Qualification	CNES	Feb 1983
		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	820 820 820	to to to	47 000 27 000 10 000	25 50 100	5, 10, 20 5, 10, 20 5, 10, 20
0805	A612Z	3009/008	07, 10	2 700 2 700 2 700 330	to to To to	150 000 100 000 47 000 15 000	25 50 100 200	5, 10, 20
1210	A_13G	3009/009	03, 06	3 900 3 900 3 900	to to to	220 000 150 000 47 000	25 50 100	5, 10, 20 5, 10, 20 5, 10, 20
1210	A613Z	3009/009	07, 10	3 900 3 900 3 900 680	to to to to	470 000 330 000 220 000 68 000	25 50 100 200	5, 10, 20
1812	A_14G	3009/010	03, 06	6 800 6 800 6 800	to to to	470 000 270 000 82 000	25 50 100	5, 10, 20 5, 10, 20 5, 10, 20
1812	A614Z	3009/010	07, 10	22 000 22 000 22 000 3 300	to to to to	1 000 000 680 000 470 000 150 000	25 50 100 200	5, 10, 20
2220	A_15G	3009/011	03, 06	18 000 18 000 18 000	to to to	1 000 000 680 000 180 000	25 50 100	5, 10, 20 5, 10, 20 5, 10, 20
2220	A615Z	3009/011	07, 10	100 000 100 000 100 000 6 800	to To To to	2 200 000 1 500 000 1 000 000 330 000	25 50 100 200	5, 10, 20
1206	A_20G	3009/023	03, 06	2 200 2 200 2 200	to to to	100 000 68 000 22 000	25 50 100	5, 10, 20 5, 10, 20 5, 10, 20
1206	A620Z	3009/023	07, 10	3 300 3 300 3 300 470	to to To to	220 000 150 000 100 000 47 000	25 50 100 200	5, 10, 20

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	1 000	to	150 000	16	5, 10, 20
				1 000	to	100 000	25	
				1 000	to	47 000	50	
				1 000	to	10 000	100	
			07	1 000	to	390 000	16	5, 10, 20
				1 000	to	150 000	25	
				1 000	to	47 000	50	
				1 000	to	10 000	100	
0805	CNC204S	3009/039	02	1 000	to	150 000	16	5, 10, 20
				1 000	to	100 000	25	
				1 000	to	47 000	50	
				1 000	to	10 000	100	
			14	1 000	to	390 000	16	5, 10, 20
				1 000	to	150 000	25	
				1 000	to	47 000	50	
				1 000	to	10 000	100	
1210	CNC402S	3009/009	06	2 200	to	560 000	16	5, 10, 20
				2 200	to	390 000	25	
				2 200	to	220 000	50	
				2 200	to	56 000	100	
			07	2 200	to	820 000	16	5, 10, 20
				2 200	to	560 000	25	
				2 200	to	220 000	50	
				2 200	to	56 000	100	
	CNC404S	3009/039	04	2 200	to	560 000	16	5, 10, 20
				2 200	to	390 000	25	
				2 200	to	220 000	50	
				2 200	to	56 000	100	
			16	2 200	to	820 000	16	5, 10, 20
				2 200	to	560 000	25	
				2 200	to	220 000	50	
				2 200	to	56 000	100	
1812	CNC602S	3009/010	06	3 900	to	1 200 000	16	5, 10, 20
				3 900	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	3 900	to	1 800 000	16	5, 10, 20
				3 900	to	1 200 000	25	
				3 900	to	470 000	50	
				3 900	to	120 000	100	
	CNC604S	3009/039	05	3 900	to	1 200 000	16	5, 10, 20
				3 900	to	680 000	25	
				3 900	to	470 000	50	
				3 900	to	120 000	100	
			17	3 900	to	1 800 000	16	5, 10, 20
				3 900	to	1 200 000	25	
				3 900	to	470 000	50	
				3 900	to	120 000	100	
2220	CNC702S	3009/011	06	22 000	to	2 700 000	16	5, 10, 20
				22 000	to	1 500 000	25	
				22 000	to	1 000 000	50	
				22 000	to	270 000	100	
			07	22 000	to	3 900 000	16	5, 10, 20
				22 000	to	2 200 000	25	
				22 000	to	1 000 000	50	
				22 000	to	270 000	100	
	CNC704S	3009/039	06	22 000	to	2 700 000	16	5, 10, 20
				22 000	to	1 500 000	25	
				22 000	to	1 000 000	50	
				22 000	to	270 000	100	
			18	22 000	to	3 900 000	16	5, 10, 20
				22 000	to	2 200 000	25	
				22 000	to	1 000 000	50	
				22 000	to	270 000	100	
1206	CNC1202S	3009/023	06	1 800	to	270 000	16	5, 10, 20
				1 800	to	180 000	25	
				1 800	to	82 000	50	
				1 800	to	27 000	100	
			07	1 800	to	1 000 000	16	5, 10, 20
				1 800	to	270 000	25	
				1 800	to	82 000	50	
				1 800	to	27 000	100	
	CNC1204S	3009/039	03	1 800	to	270 000	16	5, 10, 20
				1 800	to	180 000	25	
				1 800	to	82 000	50	
				1 800	to	27 000	100	
			15	1 800	to	1 000 000	16	5, 10, 20
				1 800	to	270 000	25	
				1 800	to	82 000	50	
				1 800	to	27 000	100	
0603	CNC1402S	3009/038	06	270	to	33 000	16	5, 10, 20
				270	to	22 000	25	
				270	to	10 000	50	
				270	to	2 700	100	
			07	270	to	100 000	16	5, 10, 20
				270	to	33 000	25	
				270	to	10 000	50	
				270	to	2 700	100	
	CNC1404S	3009/039	01	270	to	33 000	16	5, 10, 20
				270	to	22 000	25	

CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II								324C
				270	to	10 000	50	
				270	to	2 700	100	
			13	270	to	100 000	16	5, 10, 20
				270	to	33 000	25	
				270	to	10 000	50	
				270	to	2 700	100	
0402	CNC1902S	3009/043	06	68	to	12 000	10	5, 10, 20
				68	to	8 200	16	
				68	to	5 600	25	
				68	to	3 300	50	
	CNC1904S	3009/039	25	68	to	12 000	10	5, 10, 20
				68	to	8 200	16	
				68	to	5 600	25	
				68	to	3 300	50	
Operating Temperature Range (°C), -55 to +125								

CAPACITORS,FIXED, CHIP, BASE METAL ELECTRODE, CERAMIC DIELETRIC TYPE II, BASED ON TYPE TTP, 0402, 0603, 0805, 1206, 1210, 1812, 2220				**331C**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3009 Detail ESCC 3009/041	Kyocera AVX 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	180,000	16	5, 10, 20
				2,200	to	180,000	25	
				2,200	to	120,000	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	470,000	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	390,000	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	680,000	100	
E12	3009041	1812	06	150,000	to	8,200,000	16	5, 10, 20
				150,000	to	8,200,000	16	
				150,000	to	4,700,000	50	
				150,000	to	2,200,000	100	
E12	3009041	2220	07	560,000	to	22,000,000	16	5, 10, 20
				560,000	to	22,000,000	25	
				560,000	to	10,000,000	50	
				560,000	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				**196K**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3012 Detail ESCC 3012/001	Kyocera AVX components sro Lanskroun Czech Republic	Qualification	ESA	Jun 1993
		Remarks:		

Qualified Range:

Variants 01 to 07 and 11 to 17 are qualified

Termination finish:

- 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:		

Qualified Range:

Variants 01 to 05. Case styles A (1206), B (1210), C (2312), D (2917), E (2917)

Capacitance C_n (µF)	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							

Operating Temperature Range (°C):-55 to +105

POLYMER MULTI ANODE TANTALUM CAPACITOR BASED ON TCS TYPE.				**366A**
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:		

Qualified Range:

Variant 01. Case style E (2917). Tolerance: ± 20%.

Capacitance C_n	Rated Voltage U_R					
	6.3V	10V	16V	20V	25V	35V
22µF						50mΩ
33µF					50mΩ	
68µF				25mΩ		
150µF			20mΩ			
220µF		15mΩ	20mΩ			
330µF	12mΩ	15mΩ				
470µF	12mΩ					

Operating Temperature Range (°C):-55 to +105

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 Detail ESCC 3006/022	Exxelia Technologies Chanteloup en Brie France	Qualification	CNES	Aug 1998
		Remarks:		

Qualified Range:

All values defined by the ESCC Detail Specification

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

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

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 Detail ESCC 3006/020 3006/024 3006/025 3006/026	Exxelia Technologies Marmoutier France	Qualification	CNES	Jun 2018
		Remarks:		

Qualified range:

All variants in the ESCC Detail specifications 3006/020, 3006/024, 3006/025 and 3006/026 are qualified.

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

The qualified range includes parts previously qualified under other certificates:

- 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:		

Qualified range:

All variants defined by the ESCC Detail Specification

Type	Capacitance Range (pF)	U_R(V)
400M106A & C 400M10xA & 107C 400M108A & C 400M110A & C 400M113J & 114J	8.2, 10, 12, 15 18, 22, 27, 33, 39 47, 56, 68 81, 100 10	40
101M106A & C 101M10xA & 107C 101M108A & C	3.9, 4.7, 5.6, 6.8 10, 12, 15 22, 27, 33, 39	100
201M106C 201M106A 201M10xA & 107C 201M108A & C 201M111J & 112J	2.2, 2.7, 3.3 0.1X (201M106C, -107C, -108C) + 210M106C 3.9, 4.7, 5.6, 6.8, 8.2 10, 12, 15, 18 0.25 & 0.4	200
401M111J 401M112J	0.125 0.2	400

Operating Temperature Range, (°C): -55 to +150

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				**71T**
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		
3401/001, 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 153
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				**155Q**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	Sep 1988
		Remarks		
3401/001, 3401/022, 3401/072, 3401/004, 3401/040				

Qualified range:

Complete range as defined in the Detail Specifications are qualified except for:

- high density 104 contacts arrangement
- coaxial and power contacts and arrangement

Range of Connectors: 3401/001: variants 01 to 02

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

Mounting Type: blank: standard mounting holes; Y: floating mount; E: captive nuts

Gold-plated non-magnetic coating

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

6.2.2 Multipin, Crimp Contacts

CONNECTORS, ELECTRICAL, CRIMP CONTACTS, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*MA				**72T**
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, 3401/097				

Qualified range:

Complete range defined in the corresponding Detail Specifications are qualified.

Shell size: E, A, B, C, D, F

Range of Connectors: 3401/002: Variants 01 & 02

Range of Contacts: 3401/005: variants 01 to 08
3401/020: variants 01 & 02
3401/021: variants 01 & 02

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

*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
** Accepts wire sizes
AWG # 22 to 26 (standard bucket: variants 07 to 08) per 3401/005

Connecting pieces: 3401/097: variants 01 and 02 (only 4 way)

Mounting Type: Blank: standard mounting holes; Y: floating mount; E: captive nuts

Connector Savers: For usage with above connector range

Gold-plated non-magnetic coating

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

CONNECTORS AND CONNECTOR SAVER, ELECTRICAL, CRIMP CONTACTS, REMOVABLE RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*MA,				**156P**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	Sep 1988
		Remarks		
3401/002, 3401/005, 3401/020, 3401/021, 3401/022, 3401/072				

Qualified range:

Complete range as defined in the Detail Specifications are qualified except for high density 104 contacts arrangement

Accessories variants qualified: 3401/022: variants 01 to 16 & 44 to 57 & 65 to 80
3401/072: variants 01 to 65

Range of Connectors: 3401/002: variants 01 and 02
3401/005: variants 01 to 08
3401/021 & 022: variants 01 and 02

Range of contacts: 9, 15, 25, 37 and 50 contacts size 20 for standard contact arrangements
15, 26, 44, 62, 78 contacts size 22 for high density contact arrangements

- Accepts wire sizes AWG # 20 to 24 (standard bucket: variants 01 and 02)
- Accepts wire sizes AWG # 26 and 28 (reduced bucket: variants 03 and 04)
- Accepts wire size AWG# 18 and 20 (large bucket: variants 05 and 06)
- Accepts wire size AWG # 22, 24 and 26 (contact AWG # 22 for high density, contact arrangements, variants 07 and 08)

Connector Savers: For usage with connector range defined above

Gold-plated non-magnetic coating

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

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 Detail ESCC	TE Connectivity Deutsch Evreux France	Qualification	CNES	Jul 1979
		Remarks		
3401/008, 3401/009, 3401/012, 3401/064				
Qualified range: 3401/008: Variant 01 3401/009: Variants 01 to 20 3401/012: Variants 01 to 04 3401/064: Variants 01 to 41 Circular Multicontact connectors Standard contact arrangements with 3, 7, 12, 19, 27, 37 or 61 contacts in wire size AWG #20 Special contact arrangements with contacts size AWG 22, 20, 16, 12 and 8 Operating Temperature Range (°C): -65 to +200				

CONNECTORS, ELECTRICAL, CIRCULAR, BAYONET COUPLING, SCOOP-PROOF, REMOVABLE CRIMP CONTACTS, BASED ON TYPE MIL-C-38999, SERIES				**220L**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	May 1995
		Remarks		
3401/052, 3401/058, 3401/062				

Qualified range:

All connector variants are qualified
For 3401/058, variants 01 to 14 are qualified
For 3401/062, variants 01 to 27 are qualified

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

Contact size	Ratings (A)
4	80
8	46.0
12	23.0
16	13.0
20	7.5
22	5.0

Other arrangements with contact sizes: 20, 16, 12, 8

Receptacle and Plug Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25

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

CONNECTORS, ELECTRICAL, CIRCULAR, BAYONET COUPLING, REMOVABLE CRIMP CONTACTS, BASED ON TYPE MIL-C-38999, SERIES II				**221L**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	May 1995
		Remarks		
3401/044, 3401/045, 3401/062				

Qualified range:

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

Contact size	Ratings (A)
12	23.0
16	13.0
20	7.5
22	5.0

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

Other arrangements with contact sizes: 20, 16, 12

Receptacle and Plug Shell Sizes: 08, 10, 12, 14, 16, 18, 20, 22, 24

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

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				**222L**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	May 1995
		Remarks		
3401/056, 3401/058, 3401/062, 3401/066, 3401/070				

Qualified range:

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

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		

#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)

Other arrangements with contact sizes:# 20, 16, 12, 8 ,4

Receptacle and Plug Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25. Triax contacts

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

CONNECTORS, MINIATURE, ELECTRICAL, CIRCULAR, TRIPLE-START SELF- LOCKING COUPLING, SCOOP-PROOF, HERMETIC RECEPTACLE AND FEEDTHROUGH BASED ON TYPE MIL-C-38999, SERIES III				**223K**
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		

Qualified range:

All variants are qualified.

Contact size	Ratings (A)
8	33
12	17
16	10
20	5.0
22D	3.0

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)

Receptacle Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25

Receptacle (contacts # 8, 12, 16, 20, 22D) and Feedthrough (contacts # 8, 12, 16, 20, 22D)

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

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				**99Rrev1**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/016 3401/017	Smiths Interconnect Hypertac Saint-Aubin-Lès-Elbeuf France and Genova Italie	Qualification	CNES	Nov 1982
		Remarks		

Qualified range:

All Variants are qualified.

Shell specifications and sizes: 3401/016

Contacts: 3401/017 Crimp wire-wrap solder and savers, 1 to 22 and 64 to 70

2 rows: 17, 29, 41, 53, 65, 72, 84, 96, 120 contacts
3 rows: 62, 80, 98, 160 contacts

Ratings: 5 A (1 contact AWG 22)
1.5 A (>31 contacts, AWG 22)

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

CONNECTORS, ELECTRICAL, NON-REMOVABLE SOLDER AND WIRE-WRAP CONTACTS AND SAVERS, PRINTED CIRCUIT BOARD, BASED ON TYPE KMC				**149Prev1**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/039	Smiths Interconnect Hypertac Saint-Aubin-Lès-Elbeuf France and Genova Italie	Qualification	CNES	Mar 1987
		Remarks		

Qualified range:

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)

Guiding and locking devices codes: 110, 121, 143, 201, 202, 204, 206, 703

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

CONNECTORS AND SAVERS, ELECTRICAL, RECTANGULAR, NON-REMOVABLE, PRINTED CIRCUIT BOARD, BASED ON TYPE MHD				**250K**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/065	Smiths Interconnect Hypertac Saint-Aubin-Lès-Elbeuf France	Qualification	CNES	Aug 1998
		Remarks		

Qualified range:

Contacts: 52, 100, 152, 200, 252, 300, 352 and 400
Codes: 10, 11, 12, 30, 31, 43, 45, 47 and 91

Guiding and Locking Devices Codes: 110, 111, 121, 122, 124, 134 and 201

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

CONNECTORS, ELECTRICAL, CRIMP CONTACTS, Z-AXIS INTERPOSER, PRINTED CIRCUIT BOARD, BASED ON TYPE RX				**281G**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/076	Smiths Interconnect Hypertac Saint-Aubin-Lès-Elbeuf France	Qualification	CNES	Aug 1998
		Remarks		

Qualified range:

All design envelops specified in Table 1(a) of ESCC Detail Specification are qualified

Max number of rows: 11
Max number of contacts: 660

Locking and Guiding Devices: -Through holes only
-M2 studs with locking nuts and washers
-Locating pins not available

Rated current: 1A each contact

Total contact compression range: 0.1 to 0.65 mm per contact

Compression force: 1.6N per contact

Torque for locking devices: 10 N-cm

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

6.2.4 RF Coaxial

CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPE SMA				**68R**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3402 Detail ESCC	RADIALL (Centr'alp), Voreppe France	Qualification	CNES	Feb 1981
		Remarks		
3402/001, 3402/002, 3402/003				
Qualified range: 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 Frequency Range 0-18 GHz Crimp or solder type contact for flexible and semi-rigid cables, contacts for micro strip Shell material and finish: Berylium copper gold plated, copper or nickel underplate; stainless steel, electro- passivated or gold plated. Operating Temperature Range (°C): See Detail Specifications				

CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPE SMA 2.9				**283Grev1**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3402 Detail ESCC	RADIALL (Centr'alp), Voreppe France	Qualification	CNES	Dec 2007
		Remarks		
3402/021, 3402/022, 3402/023				
Qualified range: 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 Frequency Range 0-40 GHz 50 Ohms Crimp or solder type contact for flexible and semi-rigid cables, contacts for micro strip Shell material and finish: passivated amagnetic stainless steel. Operating Temperature Range (°C): -65 to +165				

CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPES SMA, SMA 2.92 TNC and SMP				**329D**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3402 Detail ESCC	Rosenberger Fridolfing Germany	Qualification	DLR	Dec 2013
		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				**350B**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3402 Detail ESCC	RADIALL (Centr'alp), Voreppe France	Qualification	CNES	Jan 2018
		Remarks		
3402/027, 3402/028				
Qualified range: 3402/027 Variants 01 & 02 3402/028 Variants 01 to 06 Frequency Range 0-8 GHz designed for RF Power Applications Panel connectors, straight and right angle adaptators Operating Temperature Range (°C): -65 to +165				

6.2.5 Microminiature, Crimp Contacts

CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, CRIMP CONTACT, BASED ON TYPE MDM				**140Rrev1**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	C&K COMPONENTS Dole France	Qualification	CNES	Oct 1986
		Remarks 3401/029 termination types GMR7580 and CMR7590 are NOT qualified		
3401/029, 3401/041, 3401/032, 3401/087				

Qualified range:

3401/029: 01 and 02
3401/041: 01 to 07
3401/032: 03, 04 and 07 to 21
3401/087: 01 to 56

Layout: 9 - 15 - 21- 25 - 31 - 37 - 51 Contacts,
Non removable crimp contacts

Termination types: FR171, FR171M1 and FR171M2
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

Nickel or Gold Plated Shells

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

CONNECTORS, ELECTRICAL, MICROMINIATURE, CRIMP CONTACT, SINGLE-IN-LINE, BASED ON TYPE MTB				**141R**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/031	C&K COMPONENTS Dole France	Qualification	CNES	Oct 1986
		Remarks 3401/029 termination types GMR7580 and CMR7590 are NOT qualified		

Qualified range: 3401/031: 01 and 02

Insulator sizes: 5 through 50 contacts,

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

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

CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, REMOVABLE CRIMP CONTACT, BASED ON TYPE MDMA				**290F**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC 3401/077 3401/078	C&K COMPONENTS Dole France	Qualification	CNES	Jun 2009
		Remarks		

Qualified range: All variants are qualified

Range of Contacts: 9, 15, 21, 25, 31, 37, 51

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

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

Working Voltage (Max.) 150Vrms

Nickel or Gold Plated Shells

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

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 Detail ESCC	SOURIAU CONNECTION TECHNOLOGY Marolles en Brie France	Qualification	CNES	Jun 2010
		Remarks		
3401/081, 3401/082, 3401/083, 3401/084, 3401/088				

Qualified range:

3401/081: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).

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.

3401/082: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).

Contacts arrangements: 7, 13, 25, 51, 104 contacts.

3401/083: Contacts variant 01 (male crimp barrel 26), 02 (female crimp barrel 26), 03 (male crimp barrel 24), 04 (female crimp barrel 24).

Accepts wires AWG 24, 26, 28

3401/084: Accessories variants 01 to 62.

3401/088: Shell variant 01 (glass-fibre reinforced thermoplastic), variant 02 (aluminium alloy).

Contacts arrangements: 7, 13, 25, 51, 104 contacts.

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

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 Detail ESCC	Axon' Cable, France	Qualification	CNES	Jan 2021
		Remarks		
3401/029, 3401/032, 3401/091				

Qualified range:

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.
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).
3401/032:	Accessories variants 07, 08, 21 to 38

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

6.3 CRYSTALS AND OSCILLATORS (03)

6.3.1 Crystals

<table>
<tr><td colspan="4">CRYSTALS, TO-5 CAN</td><td>333C</td></tr>
<tr><td>Procurement Specifications</td><td>Manufacturer</td><td>Nature of Approval</td><td>Supervising Authority</td><td>Initial Qualification Date</td></tr>
<tr><td rowspan="3">Generic
ESCC 3501
Detail ESCC
3501/018</td><td rowspan="3">RAKON France
Pont Sainte Marie
France</td><td>Qualification</td><td>CNES</td><td>Sept 2015</td></tr>
<tr><td colspan="2">Previously qualified in Argenteuil site</td><td>(Oct. 1979)</td></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td colspan="5">Qualified range:

All variants are qualified.

Types covered by similarity:

All variants previously specified in (retired) specifications:
3501/001, 3501/008, 3501/011, 3501/012

TO-5 Can (T 807)

Frequency Ranges:

<table>
<tr><td></td><td>AT (MHz)</td><td>SC (MHz)</td></tr>
<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>
</table>
</td></tr>
</table>

CRYSTALS, TO-8 CAN				334C
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.		

Qualified range:

All variants are qualified.

Types covered by similarity:

All variants previously specified in (retired) specifications: 3501/002, 3501/009

TO-8 Can (T 1507)

Frequency Ranges:

	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: For frequencies below 24MHz, Customers should contact Rakon to confirm feasibility and availability.		

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				**369Arev1**
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, 02	STTH60400	400	20	500	60	175	Single	SMD1
5103/033	01, 02	STTH40200	200	30	300	40	175	Single	TO254AA
5103/033	03, 04	STTH60200	200	30	300	60	175	Single	SMD1

6.4.2 Schottky

DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS				368Arev1
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, 05	STPS80A150	150	14	190	2 x 40A	175	Dual diode common	SMD0.5

DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS	368Arev1

								cathode	
5106/023	02, 06	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				**227J**
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: 5512/020: Variants 01, 03, 04, 05 5512/017: Variants 01, 02, 03 5512/030: Variants 01, 02, 05, 06, 09, 10				

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:

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 Detail ESCC	EXXELIA Technologies Chanteloup en Brie France	Qualification	CNES	Sept 2021
		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				
Qualified range: ESCC 3008/020: variants 01, 02, 04 and 05 Operating Temperature Range (°C): -55 to +125				

6.5.2 SAW

SAW FILTERS (TRANSVERSAL BAND PASS/RESONATOR/NOTCH/ LOW LOSS IMPEDANCE ELEMENT)				313E
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).				

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				**284G**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4008 Detail ESCC 4008/001	Schurter Lucerne Switzerland	Qualification	ESA/ESTEC	Jun 2008
		Remarks		

Qualified range:

Variants 01 to 12 are qualified.

Rated Voltage (VAC or VDC): 125V/125V, 63V/125V and 32V/125V by variant

Rated Current (I_R): 0.14 to 3.5 A by variant

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

Operating Temperature Range, (°C): -50 to +125 (90% I_R to 107% I_R)

FUSES, SOLID STATE, THIN FILM, BASED ON TYPE HCSF				**336D**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4008 Detail ESCC 4008/002	Schurter Lucerne Switzerland	Qualification	ESA/ESTEC	Jun 2016
		Remarks		

Qualified range:

Variants 24, 26, 28, 32 are qualified.

Operating Temperature Range, (°C): -50 to +125 (106% IR to 80% IR)

6.7 INDUCTORS (07)

6.7.1 Fixed, RF

INDUCTORS, FIXED, RF, MINIATURE, MOULDED, SURFACE MOUNT, BASED ON SERIES MSCI 10k, 12k, 20k and H01				**241L**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3201 Detail ESCC 3201/008	Exxelia SAS Illange France	Qualification	ESA/ESTEC	Jun 2016
		Remarks		

Qualified range:

Variants 01 to 05 are qualified

Series No.	Range (µH)	Tolerance (±%)	Q min.	Min. SRF f_r (MHz)	Max. DCR, $R_{dc}(\Omega)$	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				**276Hrev1**
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		

Qualified range:

3201/009: Variants 01 to 08 are qualified
3201/010 Variants 01, 03 and 05 are qualified

Component types:

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					

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

6.8 MICROCIRCUITS (08)

6.8.1 Digital C-MOS

MICROCIRCUITS, DIGITAL, C-MOS-B, 4000B SERIES				**73T**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 9000 Detail ESCC	ST Microelectronics Rennes France	Qualification	CNES	Apr 1981
		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		73T
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		73T
	asynchronous clear	
9203/038	Hex D-type flip-flop	40174B
9204/041	Presettable binary up/down counter (dual clock with reset)	40193B

Package Types:

Ceramic Dual-in-Line
Ceramic Flat Pack

MICROCIRCUITS, DIGITAL, MONOLOTHIC, HIGH SPEED CMOS, 54HC AND 54HCT SERIES					**190P**
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, MONOLOTHIC, HIGH SPEED CMOS, 54HC AND 54HCT SERIES			**190P**	
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	Synchrorous 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			**190P**	
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 Detail ESCC 9202/080, 9512/004, 9304/009, 9512/005	Microchip Technology Nantes France	Qualification	CNES	Apr 2019

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
9304/009	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 Detail ESCC 9202/083	Microchip Technology Nantes France	Qualification	ESA/ESTEC	Apr 2019
		Remarks		

The Technology Flow is described into the current QML document (REP006).

The qualified range includes variants 75 to 164 from ESCC 9202/083 (Flat-Substrate package).

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

INTEGRATED CIRCUITS, SILICON, MONOLITHIC, 35KLUT RADIATION-HARDENED FPGA (NG-MEDIUM)				**382**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 9000 Detail ESCC 9304/010 9202/086	NanoXplore, Sèvres, France	Qualification	ESA/ESTEC	Aug 2022
		Remarks		

Qualified range:

Detail spec	Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g
9304/010	01	NX1H35AS	CQFP-352	D2	28.6
9304/010	02	NX1H35AS	CLGA-625	D2	8.8

Based on STM C65SPACE ASIC platform technology. Qualified domain is listed in QML Technology Description in REP006.

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

6.8.2 Pulse Width Modulator

IINTEGRATEC CIRCUITS, PULSE WIDTH MODULATOR, BASED ON TYPES ST1843 AND ST1845				**344C**
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				

6.8.1 Step-down converter

IINTEGRATEC CIRCUITS, 2A SYNCHONOUS RECTIFIED STEP-DOWN CONVERTER SPPL12420RH				**376**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 9000 Detail ESCC 9102/014	Space IC GmbH Hannover Germany	Qualification	DLR	Oct 2021
		Remarks TID testing performed until 40.5KRads (biased) and 100KRads (unbiased), showing performance within the specification limits. For applications beyond 43.5KRads (biased) please contact manufacturer about potential re-start limitations.		
Qualified range: Variant 01				

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 Detail ESCC 3601/002	REL-STPI St Jean de la Ruelle France	Qualification	CNES	Feb 1983
		Remarks		

Qualified range:

Variants 01 to 06 are qualified

Contact Rating	1 A at 28 Vdc
Contact Configuration	2 PDT
Package Type	TO-5 Can
Coil Voltage	5 - 26.5 Vdc

Operating Temperature Range (°C): -65 to +125

RELAY, NON-LATCHING, ELECTROMAGNETIC, TYPE E 215				**205H**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3601 Detail ESCC 3601/007	REL-STPI St Jean de la Ruelle France	Qualification	CNES	Jan 1994
		Remarks		

Qualified range:

Variants 03, 04 and 06 are qualified

Contact Rating	15 A at 28 Vdc
Contact Configuration	2 PDT
Package Type	Half cubic inch can
Coil Voltage	12 and 28Vdc

Operating Temperature Range (°C): -65 to +125

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		

Qualified range:

Variants 03, 04 and 06 are qualified

Contact Rating	15 A at 28 Vdc
Contact Configuration	2 PDT
Package Type	Half cubic inch can
Coil Voltage	12 and 28Vdc

Operating Temperature Range (°C): -65 to +125

6.9.2 Latching

RELAY, LATCHING, ELECTROMAGNETIC, TYPE TL				**88L**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3602 Detail ESCC 3602/002	REL-STPI Saint Jean de la Ruelle France	Qualification	CNES	Jan 1982
		Remarks		

Qualified range:

Variants 01 to 06 are qualified

Contact Rating	1 A at 28 Vdc
Contact Configuration	2 PDT
Package Type	TO-5 can
Coil Voltage	26.5 Vdc

Operating Temperature Range (°C): -65 to +125

RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL415				**98K**
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, 09, 14, 16 and 19 (including Coil Voltage 28V and 12V) are qualified

Contact Rating	15A at 28Vdc
Contact Configuration	4PDT Package
Package Type	Cubic inch can
Coil Voltage	12Vdc, 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

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				**167K**
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		

Qualified range:

Variants 03, 04, 05, 06, 13, 14, 15, 16 are qualified

Coil Voltage (Vdc): 28 and 12

Operating Temperature Range (°C): -65 to +125

RELAY, LATCHING, ELECTROMAGNETIC, TYPE GP250 and GP2				**362A**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3602 Detail ESCC 3602/010 3602/003	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:

ESCC 3602/003: Variants 01 to 06 (GP2)
ESCC 3602/010: Variants 01 to 06 (GP250)

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.				**285G**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4001 Detail ESCC 4001/027 4001/028	ISABELLENHÜTTE HEUSLER GmbH & Co. KG Dillenburg Germany	Qualification	DLR	Nov 2008
		Remarks		

Qualified range:

ESCC 4001/027
variants 01, 02, 03, 04, 05, 06 are qualified (SMP-PW, SMS-PW, SMT-PW)
Tolerance (%) = ±0.5 and ±1
Operating Temperature Range (°C): -55 to +170

ESCC 4001028
variant 02 is qualified (SMV-PW)
Tolerance (%) = ±0.5 and ±1
Operating Temperature Range (°C): -55 to +140

6.10.2 Fixed, Film

RESISTORS, FILM, FIXED, SURFACE MOUNT, NON-HERMETICALLY SEALED, BASED ON TYPE MS1				**256L**
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 (MΩ)*	*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 kΩ

Operating Temperature Range (°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		

Qualified range:

Variants 01, 02 and 03 are qualified

Variant Number	Style (Note 1)	Resistance Range R_n		Tolerance (± %)	Value Series	Temperature Coefficient TC ($\pm 10^{-6}/°C$)	Critical Resistance (kΩ)	Weight max (g)
		Min (Ω)	Max (MΩ)					
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

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

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}/ºC) (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/ºC)	Series
10 ≤ R < 20	E: 25 (-55ºC; +155 ºC)	Any value in the resistance range
20 ≤ R < 50	Y: 10 (-55ºC; +155 ºC)	
20 ≤ R < 50	Z: 5 (+22ºC; +70 ºC)	
R ≥ 50	C: 5 (-55ºC; +155 ºC)	

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		

Qualified range:

Type CHPHR, variants 01 to 10 are qualified.

Type CHPFR, variants 11 to 20 are qualified.

The qualified range is restricted as below:

Style	Critical R (KΩ)	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. (±%)	TC(±ppm/°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 ≤ 10M	2; 5	200

Lead material is E with either Type 2 or Type 4 finish

Operating Temperature Range (°C): -55 to +155

6.10.4 Flexible, Foil, Heaters

RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER				**184P**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4009 Detail ESCC 4009/002	IRCA RICA Division Vitorio Veneto Italy	Qualification	ESA	Apr 1992
		Remarks RICA recently observed a higher quantity of defects than usual in the supplied raw material of polyimide-fep, used as insulating layer of the heater, according to external visual inspection ESCC no. 2054009 issue 4. The manufacturing yield for ESCC heaters with high area has been reduced. As consequence, RICA estimates a delay up to 6 months in the production of the heaters whose dimensions have an area equal to or greater than 15000mm² compared to the delivery date expected by the customers. NCCS 2ERIC21 is opened and under investigation.		

Qualified range:

Variants 01 through 48 are qualified

Single, double layer and magnetically compensated heaters

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

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

RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER				**325D**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4009 Detail ESCC 4009/003	Minco SAS Aston France	Qualification	CNES	Mar 2013
		Remarks		

Qualified range:

Variants 01, 02 and 03 are qualified

Single, double layer heaters

Options qualified:

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

Operating Temperature Range (°C):

-65 to +150 for variants 01 and 03;

-65 to +200 for variant 02

RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER	**330D**

Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4009 Detail ESCC 4009/004	IRCA RICA Division Vitorio Veneto Italy	Qualification	ESA	Jan 2015
		Remarks		

Qualified range:

All variants with heating area from1.66 to 1300 cm2 are qualified.

Single, double layer heaters

Special characteristics:

Maximum Ohmic density	330 Ω/cm2
Rated power density	0.38
Resistance	1 to 10000 Ω
Heating Area	1.66 to 1300 cm2
Terminal Lead	20 to 30 AWG
Resistance Tolerance	(%): ±2 to ±10

Operating Temperature Range (°C): -65 to +150

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 Detail ESCC 4006/013 4006/014	TE Connectivity MEAS (Betatherm) Galway Ireland	Qualification	ESA	Jul 2001
		Remarks		

Qualified range:

4006/013: Variants 01 to 05 and 06 to 07 are qualified.

4006/014: Variants 08, 09 and 13 are qualified.

Refer to variants table 1(a) in the Detail Specifications for resistance to temperature characteristics.

Operating Temperature Range (°C):

4006/013 : -55 to +115
4006/014 : -60 to +160

6.11.2 PTC platinium

RESISTANCE TEMPERATURE DETECTOR, THIN FILM PLATINUM SENSOR, PTC, RANGE 100 TO 2000 OHMS AT 0ºC				**352B**
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 and options listed below.

4006015	XX	XX	XXXX	
			Characteristic Code	
			0100 to 9999	Extension Cable/Wires Nominal Total Length [mm]
			left blank	Sensor with platinum leads only
		Characteristic Code: Termination Type		
		00	Sensor with platinum leads only (no extension cable/wires)	
		01	Twisted 2-core extension cable (no shield) / ESCC Component 390101910B	
		02	Twisted 4-core extension cable (no shield) / ESCC Component 390101926B	
		03	Twisted 2-core extension cable with shield and jacket/ ESCC Component 390101957B	
		04	Twisted 4-core extension cable with shield and jacket / ESCC Component 390101973B	
		05	2-wire extension (single extension wires) / ESCC Component 390101902B	
	ESCC Component Type Variant Number, Sensor element			
	01	Pt0k1, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 100 Ω at 0°C), (Nr 101410)		
	02	Pt0k1, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 100 Ω at 0°C), (Nr 101411)		
	03	Pt0k2, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 200 Ω at 0°C), (Nr 150026)		
	04	Pt0k2, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 200 Ω at 0°C), (Nr 101412)		
	05	Pt0k5, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 500 Ω at 0°C), (Nr 101413)		
	06	Pt0k5, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 500 Ω at 0°C), (Nr 101414)		
	07	Pt1k0, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 1000 Ω at 0°C), (Nr 101415)		
	08	Pt1k0, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 1000 Ω at 0°C), (Nr 101416)		
	09	Pt2k0, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 2000 Ω at 0°C), (Nr 101417)		
	10	Pt2k0, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 2000 Ω at 0°C , (Nr 101418)		

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 ESCC 5000 Detail ESCC	STMicroelectronics Rennes France	Qualification	CNES	Jul 2019 Old Certificates 233 and 234 (Sept 1996) have been included into 361
		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	2N2484	LCCC3, LCCC3 +1	04, 05, 06, 07
5201/002	2N2222A	LCCC3, LCCC3 +1	04, 05, 11, 12
5201/019	2N5551	LCCC3, LCCC3 +1	04, 05, 08, 09
5201/004	2N3700	LCCC3, LCCC3 +1	04, 05, 06, 07
5203/010	2N5154	TO-257, SMD.5	04, 05, 06, 07
5203/016	BUX77ESY	TO-257	06, 07
5207/002	2N2920A	LCCC6, FP-8	12, 15, 16, 17
5201/020	2ST15300	SMD.5	01

Maximum ratings:

	2N222A	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				**303F**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 5000 Detail ESCC	STMicroectronics Rennes France	Qualification	CNES	Oct 2010
		Remarks		
5205/021, 5205/022, 5205/023, 5205/024				

Qualified range:

5205/021 & 5205/022: Variants 01 and 02 are qualified
5205/023 & 5205/024: Variant 01 is qualified

Package Types:TO-254AA, SMD.5 for STRH40N6 and STRH8N10

Maximum Ratings for 5205/021:

$V_{GS(th)}$	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} (°C)= +25
V_{DS} (Vdc):	100 over Top , V_{GS}= 0 V
V_{GS} (Vdc):	± 20
P_{TOT}:	170 W at T_{case} ≤+25 C

Operating Temperature Range (°C): -55 to +150

TRANSISTORS, POWER, MOSFET, N-CHANNEL, BASED ON TYPE BUY **CS***				**319E**
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	**339C**

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		

Qualified range:

All Variants are qualified.

Package:SMD0.5, SMD2, TO-254AA, TO-257AA

Maximum ratings:

$r_{DS(ON)}$ (mΩ) @ 25 ºC	150
I_{DS} (A)	23
V_{DS} (V) max.	150
V_{GS} (V) max.	±20
P_{tot} (W)	75
$R_{th(j-c)}$ (ºC/W)	1.66

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.

Operating Temperature Range (°C): Top = - 55 to +150

TRANSISTORS, POWER, MOSFET, N-CHANNEL, RADHARD BASED ON TYPE BUY 06CS				**363A**
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		

Qualified range:

Variants 01, 02, 03 and 04 based on types BUY06CS35J-01, BUY06CS80A 01,BUY06CS23K-01 and BUY06CS45B-01 are qualified.

Package:SMD0.5, SMD2, TO-254AA, TO-257AA

These devices have a TID tested capability of 100 kRad (Si)
SOA derating graphs are incorporated in the Detail Specification.

Operating Temperature Range (°C): Top = - 55 to +150

TRANSISTORS, POWER, MOSFET, N-CHANNEL, RAD-HARD BASED ON TYPES BUY65CS08J-01, BUY65CS28A-01				**360A**
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		

Qualified range:

Variants 01 and 02 are qualified.

Variant Number	Based on Type	I_{DS} @ $T_{case} \leq +25°C$ max (A) (Note 1)	I_{DS} @ $T_{case} = +100°C$ max (A) (Note 1)	$r_{DS(on)}$ @ $T_{amb} = +25°C$ 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)]

Notes 1-5 are included in the Detail specification.

Maximum ratings:

Variant number	01	02
V_{DS} (Vdc)	650 V	650 V
V_{GS} (Vdc)	± 20 V	± 20 V
P_{TOT}	75 W	215 W

SOA derating graphs are incorporated in the Detail Specification.

Operating Temperature Range (°C): Top = - 55 to +150

6.12.3 MOSFET, Power, P-Channel

<table>
<tr><td colspan="4">TRANSISTORS, MOSFET,
P-CHANNEL, POWER,
TYPE STRH40P10 and STRH12P10</td><td>326D</td></tr>
<tr><td>Procurement Specifications</td><td>Manufacturer</td><td>Nature of Approval</td><td>Supervising Authority</td><td>Initial Qualification Date</td></tr>
<tr><td rowspan="2">Generic
ESCC 5000
Detail ESCC
5205/025
5205/029</td><td rowspan="2">ST Microelectronics
Rennes
France</td><td>Qualification</td><td>DLR</td><td>Mar 2013</td></tr>
<tr><td colspan="3">Remarks
These devices have a TID tested capability of 100kRAD(Si).</td></tr>
<tr><td colspan="5">Qualified range:

Variants 01 and 02 in 5205/025 are qualified.
Variants 01 and 02 in 5205/029 are qualified.</td></tr>
</table>

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

TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPE BFY 193				**230K**
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 09

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	**245K**

Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 5010 Detail ESCC 5611/008	Infineon Technologies AG Neubiberg Germany	Qualification	DLR	Jun 1997
		Remarks		

Qualified range:

Variants 01, 02 and 03 are qualified.

Characteristics for BFY 450:

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.	@ 1.8 GHz	2.0	@ VCE = 2.0 V, IC = 10mA
f_T (GHz) min.	@ 1.0 GHz	18	@ VCE = 3.0 V, IC = 90mA

Package: “ Micro-X1”

Total Power Dissipation (Ptot) = 450 mW

Operating Temperature Range (°C): Top = - 65 to +175

TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPES BFY 640, 640B, 650B and 740B				**322E**
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, 05 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				**07U**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3901 Detail ESCC 3901/001 3901/002	Draka Fileca Ste-Genevieve France	Qualification	CNES	Jan 1979
		Remarks		

Qualified range:

FA 3901-1
All Variants defined in the Detail Specification 3901/001 are qualified except those based on AWG 12-14 FA

FA 3901-2
Variants 31 to 73 and 74 to 91 as defined in the Detail Specification 3901/002 are qualified

Voltage Rating, maximum (Vrms): 600

Temperature Range (°C): -100 to +200

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 Detail ESCC 3901/001 3901/002	Nexans Draveil France	Qualification	CNES	Jan 1979
		Remarks		

Qualified range:

Medium weight 1871 - n/1871 - 871 (3901/001): Variants 24 to 47 are qualified
Light weight1872 - n/1872 - 872 (3901/002): Variants 31 to 73 are qualified

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -100 to +200

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 Detail ESCC 3901/001 3901/002	AXON' CABLE Montmirail France	Qualification	CNES	Jan 1979
		Remarks		

Qualified range:

3901/001: variants 24 to 47
3901/002: variants 31 to 73

Voltage Rating, maximum (Vrms): 600

Temperature Range (°C): -100 to +200

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 Detail ESCC 3901/013	Nexans Draveil France	Qualification	CNES	Jan 1979
		Remarks		

Qualified range:

Variants 01 to 77 are qualified

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -100 to +200

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		

Qualified range:

All variants are qualified

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -100 to +200

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, SHIELDED WITH DRAIN WIRE, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES SPL AND SPLD	**380**

Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3901 Detail ESCC 3901/019 3901/021	W.L. Gore & Co Pleinfeld Germany	Qualification	DLR	May 2022. 229M (Nov 1994) and 219N (Feb 1996) have been merged into 380
		Remarks		

Qualified range:

3901/019: Variants 01 to 94 are qualified

3901/021: Variants 01 to 41 are qualified

Voltage Rating, maximum (Vrms): 600

Temperature Range (°C): -200 to +200

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 Detail ESCC 3901/019	AXON' CABLE Montmirail France	Qualification	CNES	Jun 2002
		Remarks		

Qualified range:

All variants are qualified

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -200 to +200

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.		

Qualified range:

Variants 01 to 80 are qualified

Voltage Rating, maximum (Vrms): 600

Temperature Range (°C): -100 to +200

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.		

Qualified range:

All variants are qualified

Wire code ISO 2635

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -100 to +200

POWER WIRES FOR CRIMPING, LOW FREQUENCY, BASED ON TYPE SPP				**215P**
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		

Qualified range:

All variants are qualified

Voltage Rating, maximum (Vrms): 600

Imax (A): 45, 81 and 133 for AWG: 8, 4, and 0, respectively

Temperature Range (°C): -200 to +200

WIRES AND CABLES, LOW FREQUENCY, INSULATED, POLYIMIDE/FLUOROTHERMOPLAST, BASED ON TYPE SPM				**216N**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3901 Detail ESCC 3901/018	W.L. Gore & Co. Pleinfeld Germany	Qualification	DLR	Jul 1994
		Remarks		

Qualified range:

Variants 01 to 88 are qualified.

Expanded PTFE, extruded polyimide/ FEP, sintered PTFE insulated wires.
Expanded PTFE, extruded polyimide/fluorothermoplast insulated cables, shielded and jacketed.

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -200 to +200

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 ESCC 3901 Detail ESCC 3901/018 3901/019 3901/021	Bizlink Special Cables GmbH Friesoythe Germany	Qualification	DLR	Sept 2021 Merged from certificates 294, 295 and 296 (initial qualification: Oct 2009)
		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 Detail ESCC 3901/018	AXON' CABLE Montmirail France	Qualification	CNES	Dec 2009
		Remarks		

Qualified range:

Variants 01 to 88 are qualified
AWG 30 and 32 variants are qualified.

Expanded PTFE, extruded polyimide/ FEP, sintered PTFE insulated wires.

Voltage Rating, maximum (Vrms) : 600

Temperature Range (°C): -200 to +200

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 Detail ESCC 3901/021	AXON' CABLE Montmirail France	Qualification	CNES	Jun 2009
		Remarks		

Qualified range:

All variants are qualified

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -200 to +200

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		

Qualified range:

3901/020: All variants (01 to 80) are qualified
3901/022: All variants (01 to 72) are qualified.

Wires and Cables variants consist of 1, 2, 3 and 4 cores with and without jackets and shields

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,

Wire sizes are in accordance with ISO 2635.

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -100 to +200

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 Detail ESCC 3901/024	AXON' CABLE Montmirail France	Qualification	CNES	Dec 2009
		Remarks		

Qualified range:

Variants 01 to 64 are qualified (AWG 30 variants is qualified)

Wires and Cables variants consist of 1, 2, 3 and 4 cores with and without jackets and shields

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”.

Voltage Rating, maximum (Vrms):600

Temperature Range (°C): -200 to +200

WIRES AND CABLES, LOW FREQUENCY, FLUROPOLYMER INSULATION, 600V, BASED ON TYPE CSWL	**305F**

Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3901 Detail ESCC 3901/024	W.L. Gore Pleinfeld Germany	Qualification	DLR	Jan 2011
		Remarks		

Qualified range:

Variants 01 to 64 inclusive are qualified

The specification contains 64 variants with several wire sizes, single wires and cables with several cores, either shielded or unshielded.

Cable construction: 1, 2, 3 and 4 twisted wires are in one core with or without shield

Voltage Rating, maximum (Vrms):600

WIRES AND CABLES, LIGHTWEIGHT, EXTRA THIN, FLUORTHERMOPLASTIC / POLYIMIDE INSULATED WIRES AND CABLES BASED ON TYPE CSC	**328D**

Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3901 Detail ESCC 3901/025	W.L. Gore Pleinfeld Germany	Qualification	DLR	Jun 2014
		Remarks		

Qualified range:

All variants 01 to 21 are qualified

The specification contains 21 variants with several wire sizes, single wires and cables with several cores, either shielded or unshielded.

Cable construction: 1, 2, 3 and 4 twisted wires are in one core with or without shield

Maximum voltage: 600 Vrms

Operating temperature range (°C): -200 to +200

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		

Qualified range:

All variants 01 to 21 are qualified

Operating temperature range (°C): -200 to +200

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 Detail ESCC 3902/001	Nexans Draveil France	Qualification	CNES	Jul 1979
		Remarks		

Qualified range:

Variants 01, 02, and 03 are qualified

Miniature flexible 50 ohm coaxial cable
PTFE Dielectric
Polyimide Jacketed, Double Shield and Shielded / Jacketed

Maximum voltage: 900 Vrms

Operating temperature range (°C): -80 to +200 (- 100 for variant 01)

WIRES AND CABLES, RADIO FREQUENCY, FLEXIBLE, COAXIAL, TRIAXIAL AND SYMMETRIC, BASED ON TYPES GCX, GTX, GSC AND GBL				**255M**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3902 Detail ESCC 3902/002	W.L. Gore Pleinfeld Germany	Qualification	DLR	Jan 1999
		Remarks		

Qualified range:

Variants 03 to 06, 10 to 13 and 20 to 30 are qualified

Variants encompass coaxial, triaxial, and balanced shielded line

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

AWG Range: 20, 22, 24, 26, 28, 30 dependent on variant

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		

Qualified range:

Variants 03 to 06, 10 to 13 and 20 to 30 are qualified

Variants encompass coaxial, triaxial, and balanced shielded line

Temperature range (°C): -200 to +180

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		

Qualified range:

Variant 01 AWG 28/07 (white) and variant 02 AWG 26/07 (blue) are qualified

Variant	Data Rate	Operating Voltage (Continuous), (Vrms)	Current (A)
01	100Mb/s - 400MHz	200	1.5
02	200Mb/s - 400MHz	200	2.5

Temperature range (°C): -200 to +180

WIRES AND CABLES, SPACEWIRE, ROUND, QUAD SYMMETRIC, FLEXIBLE, BASED ON TYPE SPACEWIRE	**304F**

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		

Qualified range:

Variant 01 AWG 28/07 (white) and Variant 02 AWG 26/07 (blue) are qualified, 100 Ω

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

Temperature range (°C): -200 to +180

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 Detail ESCC 3902/004	AXON' CABLE Montmirail France	Qualification	CNES	Oct 2015
		Remarks		

Qualified range:

Variant 01 is qualified.

Temperature range (°C): -100 to +150

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)				364A
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3201 Detail ESCC 3201/013	Flux A/S Asnaes Denmark	Qualification	ESA/ESTEC	March 2020
		Remarks		

Technology Flow qualified as defined into the current QML published document REP006 (ESCC/RP/QML006).

The range of components applicable are described into the ESCC 3201/013 as follows:

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 for a particular component will be specified in the applicable Magnetic Sheet.
The requirements which shall be specified in the Magnetic Sheet for a particular component are described into the ESCC 3201/013.

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 Detail ESCC 3702/001 3702/002	COMEPA BAGNOLET France	Qualification	CNES	Mar 2004
		Remarks		

Qualified range:

ESCC 3702/001 (naked thermostat):

Variants 01 to 03 are qualified
Range of Components: Grade Z and Grade Y

ESCC 3702/002 (potted thermostat):
Variants 01 to 06 are qualified
Range of Components: Grade Z and Grade Y

Maximum Ratings:
Rated Current (I_R): 4 A (30 Vdc resistive)

Operating Temperature Range (°C), -50 to +150

6.3 RF PASSIVE (30)

6.3.1 Attenuator and Load

PASSIVE DEVICES, R.F. COAXIAL LOADS BASED ON TYPE R404				**185L**
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
		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.		

Qualified range:

- 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

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

R.F. ATTENUATORS FIXED, COAXIAL BASED ON TYPE R413				**178M**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3403 Detail ESCC 3403/005 3403/008	RADIALL Saint-Quentin-Fallavier France	Qualification	CNES	Jan 1991
		Remarks		

Qualified range:

-Type SMA, DC to 22 GHz (ESCC 3403/005 Issue 6): variants 33 to 63

-Type SMA 2.9, DC to 31.5 GHz (ESCC 3403/008 Issue 6): variants 23 to 43

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

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 Detail ESCC 3408/001	Radiall Chateau-Renault France	Qualification	CNES	April 2018
		Remarks		

Qualified range: see specification

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.

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.

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

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

RF Cable assembly, 2.92mm connectors, low power, 50 ohms, flexible cable, DC to 32 Ghz, based on type AXOWAVE 44SLQ				**383**
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3408 Detail ESCC 3408/004	Axon' Cable, France	Qualification	CNES	September 2022
		Remarks		
Variants 01,02 and 03 are qualified Operating Temperature Range -55 to +125 °C				

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 Detail ESCC 3420/001	Diamond Losone Switzerland	Qualification	ESA	October 2018
		Remarks		

Qualified range:

3420/001: Variant 01 – Mini AVIM cable assemblies

Part number 342000101-**P-MY*-MY*-* (*, from detail specification)

Qualified options

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)

(Radiation and outgassing data for each fiber will be provided)

3420/001: Variant 02 – Mating adapters