



EUROPEAN PREFERRED PARTS LIST

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CHANGE LOG

| Reason for change | Issue | Date |
|---|-------|------------|
| Periodic update as per Technical Authority meeting No30 | 30 | 04-12-2015 |
| Correction of editorial errors and one omission | 30A | 19-01-2016 |
| Periodic update as per Technical Authority meeting No31 | 31 | 18-03-2016 |

CHANGE RECORD

| Issue 31, 18-March-2016: | Paragraph | Page |
|--|-------------------------------|-------|
| Added PM907S and PM948S made by Exxelia Technologies / France | 3.1 EPPL Part 1 Capacitors | 7 |
| Added fast-locking screw lock assemblies made by C&K, France | 3.2 EPPL Part 1 Connectors | 8 |
| Added HCSF fuses made by Schurter / Switzerland | 3.6 EPPL Part 1 Fuses | 14 |
| Removed Note 2 under ASIC Technologies digital | 3.8 EPPL Part 1 Microcircuits | 16 |
| Added 10-bit 200GHz ADC 1.5Gsp/s made by e2v / France | 3.8 EPPL Part1 Microcircuits | 18 |
| Added 10-bit 3Gsp/s Mux DAC made by e2v / France | 3.8 EPPL Part1 Microcircuits | 19 |
| Added 12bit 3Gsp/s Mux DAC made by e2v / France | 3.8 EPPL Part1 Microcircuits | 19 |
| Removed PE43751 and PE43652 DSA | 3.8 EPPL Part1 Microcircuits | - |
| Amended info. for bip. transistors made by STM / France | 3.12 EPPL Part 1 transistors | 29-30 |
| Removed PM907S and 948S from Part 2 as they are now approved for listing in Part 1 | 4.1 EPPL Part 2 Capacitors | - |
| Added 1N5811US, 1N6640US and 1N6642US made by Sensitron Semiconductor / USA | 4.4 EPPL Part 2 Diodes | 35 |
| Removed 10-bit ADC and 12-bit DAC from Part 2 as they are now approved for listing in Part 1 | 4.6 EPPL Part 2 Microcircuits | - |
| Added 311P18-xx type made by Quality Thermistor Inc. / USA | 4.9 EPPL Part 2 Thermistors | 40 |

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1 **INTRODUCTION**

The European Preferred Parts List (EPPL) is a publication of ESCC. It is published in the relevant section of the ESCIES website <https://escies.org>

The ESCC procedure No.12300 includes the requirements and provisions applicable to the maintenance of the EPPL. More information on the EPPL and on ESCC can be found at <https://spacecomponents.org>.

For every entry in the EPPL, manufacturers' details are available in the ESCC website at [this link](#). Active NASA GSFC component specifications S-311 are available at the [NEPP website](#). Active MIL specifications and drawings are available at the US DoS [DLA website](#). JAXA component specifications are available from their [website](#).

2 **RULES FOR INCLUSION, MAINTENANCE AND REMOVAL OF COMPONENTS IN THE EPPL**

The EPPL is maintained by a Technical Authority (TA) tasked to achieve conformance with ESCC Procedure No. 12300. The EPPL contains two different lists: Part 1 and Part 2.

The mentioned procedure provides requirements for the inclusion, maintenance and removal of components from the EPPL. For a certain component type, the TA has to confirm whether the component can be listed in the EPPL and, if so, in which of the two parts of the list. The requirements for listing in the EPPL Part1 and Part2 are found in the same procedure No 12300.

All readers of the EPPL are encouraged to make proposals for the addition, partial edition or complete removal of any entries to the EPPL. The relevant section of ESCIES provides means for the submission of proposals for the edition of the EPPL. The EPPL TA reviews proposals three times per year. The deadlines for submission of any proposals are always announced in ESCIES

2.1 **ESCC QPL COMPONENTS IN THE EPPL**

The ESCC Qualified Parts List (QPL) is updated and maintained every month. The most updated QPL can always be found at the relevant section of the ESCIES website <https://escies.org>

In accordance with ESCC12300, all component types for which a valid ESCC qualification has been certified may be listed in the EPPL Part 1.

As the EPPL is to be updated 3 times every year, there may be temporary conflicts between both QPL and EPPL publications. On one hand, component variants which have lost their ESCC qualification status may still be listed in EPPL part 1 for a short period of time and until the next revision of the EPPL is published. On the other hand, component variants which achieve ESCC qualification, as confirmed by their listing in the ESCC QPL, may not be found in the EPPL Part1 until the following update of the list is published. In case of any conflict as described above, the ESCC QPL shall prevail as it is updated more frequently.

3 EPPL PART 1

3.1 EPPL PART1 CAPACITORS

Ceramic capacitors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------------|--|---------------|------------|--------------------|---------------|--------------|
| | Ceramic, Type II, High C, BR, CV, CH | 3001/030 | see spec | AVX / UK | ESCC QPL | range in QPL |
| CNC31 thru 34 | Ceramic, Type II | 3001/037 | see spec | Exxelium Tech. / F | ESCC QPL | range in QPL |
| | Ceramic, Type II, High V 1.0 to 5.0 KV | 3001/034 | see spec | AVX / UK | ESCC QPL | range in QPL |
| CNC53 thru 56 | Ceramic, Type II | 3001/038 | see spec | Exxelium Tech. / F | ESCC QPL | range in QPL |
| A_12C | Ceramic, Type I | 3009/003 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| A_20C | Ceramic, Type I | 3009/022 | 1206 | AVX TPC / F | ESCC QPL | range in QPL |
| A_13C | Ceramic, Type I | 3009/004 | 1210 | AVX TPC / F | ESCC QPL | range in QPL |
| A_14C | Ceramic, Type I | 3009/005 | 1812 | AVX TPC / F | ESCC QPL | range in QPL |
| A_15C | Ceramic, Type I | 3009/006 | 2220 | AVX TPC / F | ESCC QPL | range in QPL |
| CEC2S | Ceramic, Type I | 3009/003 | 0805 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CEC4S | Ceramic, Type I | 3009/004 | 1210 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CEC6S | Ceramic, Type I | 3009/005 | 1812 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CEC7S | Ceramic, Type I | 3009/006 | 2220 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CEC12S | Ceramic, Type I | 3009/022 | 1206 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CEC14S | Ceramic, Type I | 3009/037 | 0603 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| A_12G, A612Z | Ceramic, Type II | 3009/008 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| A_13G, A613Z | Ceramic, Type II | 3009/009 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| A_14G, A614Z | Ceramic, Type II | 3009/010 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| A_15G, A615Z | Ceramic, Type II | 3009/011 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| A_20G, A620Z | Ceramic, Type II | 3009/023 | 0805 | AVX TPC / F | ESCC QPL | range in QPL |
| CNC2S | Ceramic, Type II | 3009/008 | 0805 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC4S | Ceramic, Type II | 3009/009 | 1210 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC6S | Ceramic, Type II | 3009/010 | 1812 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC7S | Ceramic, Type II | 3009/011 | 2220 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC12S | Ceramic, Type II | 3009/023 | 1206 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC14S | Ceramic, Type II | 3009/038 | 0603 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| CNC14 04S | Ceramic, Type II | 3009/039 | 0603 | Exxelium Tech. / F | ESCC QPL | range in QPL |
| | Ceramic, Type II, High C, chip | 3009/034 | 1812, 1825 | AVX / UK | ESCC QPL | range in QPL |
| Ceramic, BME | TTP, Type II | 3009/041 | see spec | AVX / UK | ESCC QPL | range in QPL |

EPPL Part 1 capacitors, other technologies:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------------|---|------------------|-----------------|-----------------------|---------------|---|
| TAJ | Solid Ta | 3012/001 | SMD | AVX / CzR | ESCC QPL | range in QPL |
| TES | Solis Ta, low ESR | 3012/004 | SMD | AVX / CzR | ESCC QPL | range in QPL |
| HT86PS | Reconstituted MICA, High V | 3006/022 | see spec | Exxelia Tech. / F | ESCC QPL | range in QPL |
| PM94S | DC self-healing, polyterephthalate | 3006/024 | SMD | Exxelia Tech. / F | ESCC QPL | range in QPL |
| PM907S | Plastic metallised | 3006/025 | SMD | Exxelia Tech. / F | ESCC QPL | range in QPL |
| PM948S | Plastic metallised | 3006/026 | SMD | Exxelia Tech. / F | ESCC QPL | range in QPL |
| 101M, 201M, 400M and | Microwave, naked Si die | 5711/002 | die | Cobham MW / F | ESCC QPL | range in QPL |
| CTC21 | Solid Ta | 3012/002 | SMD | Exxelia Tantalum / F | Not Qualified | Note 1 |
| CWS11 FH686 | 68µF, 10V | JAXA-QTS-2040 | CASE CODE 7343H | Matsuo Electric / J | JAXA QPL | Recommended as output capacitor for POL DC/DC converter JAXA2020/01011DBCR** Notes 2 and 3 apply. |
| CLR79 | 30µF - 1200µF (6V) 25µF - 850µF (8V) 20µF - 750µF (10V) 15µF - 540µF (15V) 8µF - 300µF (30 V) 5µF - 160µF (50 V) 3.5µF - 110µF (75V) 2.5µF - 86µF (100V) | MIL-PRF-39006/22 | A,B,C,D | Vishay Tansitor / USA | MIL QPL | Characteristic: H (80g sine, 54g random, 500g shock) shall be procured |
| CLR81 | Voltage range: 6V to 100V Capacitance range: 6.8µF to 2200µF | MIL-PRF-39006/25 | A,B,C,D | Vishay Tansitor / USA | MIL QPL | Characteristic: H (80g sine, 54g random, 500g shock) shall be procured |

Note1. The CTC21 preferred range is limited to 10% tolerance and is restricted to the following values: (330µF, 6.3V), (150 µF, 6.3V), (220µF, 10V), (100µF, 10V), (150µF, 16V), (68µF, 16V), (100µF, 20V), (47µF, 20V), (68µF, 25V), (33µF, 25V), (47µF, 40V), (22µF, 40V), (15µF, 50V), (22µF, 63V), (10µF, 63V)

Note 2: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>
 - General specification : JAXA-QTS-2040 , JAXA-QTS-2040 Appendix K
 - Detail specification : JAXA-QTS-2040/K201
 - Application data sheet : JAXA-ADS- 2040/K201

Note 3: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use.

3.2 EPPL PART1 CONNECTORS
Multipin, solder and crimp contacts:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------------------|---|--|-------------|--------------|---------------|--------------|
| D*M | Rectangular receptacles and plugs, solder and wire wrap contacts | 3401/001 3401/004 3401/022 3401/040 3401/072 3401/080 3401/085 | Rectangular | C&K / F | ESCC QPL | range in QPL |
| D*M | Rectangular receptacles and plugs, solder and wire wrap contacts | 3401/001 3401/022 3401/072 | Rectangular | Souriau / F | ESCC QPL | range in QPL |
| D*MA | Rectangular receptacles and plugs, crimp contacts | 3401/002 3401/005 3401/020 3401/021 3401/085 | Rectangular | C&K / F | ESCC QPL | range in QPL |
| D*MA | Rectangular receptacles and plugs, crimp contacts | 3401/002 3401/005 3401/020 3401/021 3401/022 3401/072 | Rectangular | Souriau / F | ESCC QPL | range in QPL |
| DBAS | Miniature circular push-pull coupling, removable crimp contacts | 3401/008 3401/009 3401/012 3401/064 | Circular | Deutsch / F | ESCC QPL | range in QPL |
| MIL-C-38999, series I | Circular, bayonet coupling, scoop-proof, removable crimp contacts | 3401/052 3401/058 3401/062 | Circular | Souriau / F | ESCC QPL | range in QPL |
| MIL-C-38999, series II | Circular, bayonet coupling, removable crimp contacts | 3401/044 3401/045 3401/062 | Circular | Souriau / F | ESCC QPL | range in QPL |
| MIL-C-38999, series III | Circular, triple-start self-locking coupling, scoop-proof, removable and non-removable crimp contacts | 3401/056 3401/058 3401/062 3401/066 3401/070 | Circular | Souriau / F | ESCC QPL | range in QPL |

(continued) EPPL Part 1 connectors, crimp contacts:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------------------------|--|---------------|----------|--------------|---------------|--------------|
| MIL-C-38999, series III | Circular, triple-start self-locking coupling, scoop-proof, hermetic receptacle and feedthrough | 3401/057 | Circular | Souriau / F | ESCC QPL | range in QPL |
| ACB1, MIL-STD-1553B DATA BUS | Triaxial, bayonet coupling, non-removable crimp contacts | 3401/079 | Triaxial | Axon / F | ESCC QPL | range in QPL |

EPPL Part 1 PCB connectors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------|-----------------------------------|----------------------|----------|--------------|---------------|--------------|
| H801 | PCB removable crimp contacts | 3401/016 3401/017 | see spec | Hypertac / F | ESCC QPL | range in QPL |
| KMC | PCB non removable solder contacts | 3401/039 | see spec | Hypertac / F | ESCC QPL | range in QPL |
| MHD | PCB non removable solder contacts | 3401/065 | see spec | Hypertac / F | ESCC QPL | range in QPL |
| RX | PCB, Z axis interposer, crimp | 3401/076 | see spec | Hypertac / F | ESCC QPL | range in QPL |

EPPL Part 1 Coaxial connectors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------|---|----------------------------------|----------|--------------|---------------|--------------|
| SMA | Coaxial, solder and crimp, male, female, adaptors | 3402/001 3402/002 3402/003 | see spec | Radiall / F | ESCC QPL | range in QPL |

(continued) EPPL Part1 coaxial connectors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------------|---|--|----------|-----------------|---------------|--------------|
| SMA 2.9 | Coaxial, solder and crimp, male, female, adaptors | 3402/021 3402/022 3402/023 | see spec | Radiall /F | ESCC QPL | range in QPL |
| Coaxial range | SMA, TNC, SMA 2.9, SMP | 3402/001 3402/002 3402/003 3402/008 3402/009 3402/010 3402/021 3402/022 3402/023 3402/024 3402/025 3402/026 | see spec | Rosenberger / G | ESCC QPL | range in QPL |

EPPL Part 1 Micro-miniature connectors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------|---|--|-------------|--------------|---------------|--------------|
| MDM | Rectangular, Micro-miniature, crimp | 3401/029 3401/041 3401/032 3401/087 | Rectangular | C&K / F | ESCC QPL | range in QPL |
| MTB | Micro-miniature, crimp contact, single-in-line | 3401/031 | see spec | C&K / F | ESCC QPL | range in QPL |
| MDMA | Rectangular, Micro-miniature, removable crimp | 3401/077 3401/078 | Rectangular | C&K / F | ESCC QPL | range in QPL |
| 8MCG | Micro-miniature, removable and non-removable, gauge 26, PCB PIN contact | 3401/081 3401/082 3401/083 3401/084 | Rectangular | Souriau / F | ESCC QPL | range in QPL |

3.3 EPPL PART1 CRYSTALS AND PIEZO-ELECTRIC DEVICES

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------|-------------|---------------|---------|--------------|---------------|---------|
| T1507 | 2.5 – 20MHz | 3501/019 | TO8 | Rakon / F | ESCC QPL | Note 1 |
| T807 | 15 – 140MHz | 3501/018 | TO5 | Rakon / F | ESCC QPL | Note 1 |
| T1507 | 2.5 – 26MHz | 3501/019 | TO8 | KVG / G | ESCC QPL | Note 1 |
| T807 | 8 – 140MHz | 3501/018 | TO5 | KVG / G | ESCC QPL | Note 1 |

Note1. Operating temperature range depends on type variant

3.4 EPPL PART1 DIODES

Switching diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------------|-------------|---------------|-----------|--------------|---------------|--------------|
| 1N6640U | 75V, 2A | 5101/027 | LCC2-D | ST /F | ESCC QPL | range in QPL |
| 1N6642U | 100V, 2A | 5101/026 | LCC2-D | ST /F | ESCC QPL | range in QPL |
| BAY6642 (ES) | 100V, | 5101/029 | HSL2-1808 | Infineon / G | ESCC QPL | |

Rectifier diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------------------|------------------|-------------------|---------|-----------------|---------------|----------------|
| 1N5416,5417,5418,5420 | Power rectifiers | MIL-PRF-19500/411 | Axial | Microsemi / USA | MIL QML | |
| 1N5614, 5616, 5618 | Power rectifiers | MIL-PRF-19500/427 | Axial | Microsemi / USA | MIL QML | |
| 1N5806US | Power rectifier | MIL-PRF-19500/477 | D-5A | Microsemi / USA | MIL QML | |
| 1N5806U | Power rectifier | 5101/014 | LCC2-A | ST /F | ESCC QPL | Var. 13 & 14 |
| 1N5811U | Power rectifier | 5101/013 | LCC2-B | ST /F | ESCC QPL | Var. 11 & 12 |
| 1N5819U | Power rectifier | 5101/021 | LCC2-B | ST /F | ESCC QPL | Var. 02 & 03 |
| 1N5822U | Power rectifier | 5106/020 | LCC2-B | ST /F | ESCC QPL | Var. 01 & 02 |
| BYV52-200 | Ultrafast 30A | 5103/030 | TO254 | ST /F | ESCC QPL | Variant 03 |
| BYV54-200 | Ultrafast 60A | 5103/031 | TO254 | ST /F | ESCC QPL | Var. 02 & 05 |
| BYW81-200 | Dual ultrafast | 5103/029 | SMD .5 | ST /F | ESCC QPL | Var. 1, 3-5, 7 |
| STPS1045 | Schottky barr. | 5106/017 | SMD | ST /F | ESCC QPL | Var. 01 & 02 |
| STPS6045 | Schottky barr. | 5106/018 | SMD | ST /F | ESCC QPL | Var. 01 & 02 |
| STPS20100 | Schottky barr. | 5106/016 | SMD | ST /F | ESCC QPL | Var. 01-07,11 |
| STPS40100 | Schottky barr. | 5106/019 | SMD | ST /F | ESCC QPL | Var. 02,03,05 |

EPPL Part1 Voltage regulator, reference/Zener diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------------------|----------------|-------------------|----------|-----------------|---------------|---------|
| 1N6320U thru 1N6336US | Si V regulator | MIL-PRF-19500/533 | MELF | Microsemi / USA | MIL QML | |
| 1N4099UR-1 thru 1N4135UR-1 | Si V regulator | MIL-PRF-19500/435 | DO-213AA | Microsemi / USA | MIL QML | |
| 1N4464 thru 1N4496 | Si V regulator | MIL-PRF-19500/406 | axial | Microsemi / USA | MIL QML | |
| 1N4954 thru 1N4992 | Si V regulator | MIL-PRF-19500/356 | axial | Microsemi / USA | MIL QML | |
| 1N6309US thru 1N6319US | Si V regulator | MIL-PRF-19500/533 | MELF | Microsemi / USA | MIL QML | |
| 1N4568AUR-1 | Si V ref | MIL-PRF-19500/452 | DO-213AA | Microsemi / USA | MIL QML | |
| 1N4614UR-1 thru 1N4627UR-1 | Si V regulator | MIL-PRF-19500/435 | DO-213AA | Microsemi / USA | MIL QML | |

EPPL Part1 RF/Microwave Schottky, Si diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------------|-------------|---------------|---------|--------------|---------------|----------------|
| BAS70 and BAS40 | MW Si | 5512/020 | T1 | Infineon / G | ESCC QPL | Var. 01 and 03 |

EPPL Part1 RF/Microwave Varactor, Si diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---|-------------|--|----------|------------------------|---------------|--------------|
| ML43xx and ML44yy ranges | Tuning var. | 5512/001 5512/003 5512/004 5512/005 5512/006 5512/007 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| DH252 DH256 DH267 DH292 DH294 | Tuning var. | 5512/016 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH76010 thru DH760150 | Tuning var. | 5512/023 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |

EPPL Part1 RF/Microwave PIN, Si diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------------------------|-------------|---------------|------------|---------------------|---------------|---------------|
| ML4207 thru ML4209 | PIN Si | 5513/007 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| ML4617, 4618, 4619 | PIN Si | 5513/009 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| ML4611, 4612, 4614, 4615 | PIN Si | 5513/010 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| ML46122 to 4624 | PIN Si | 5513/014 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| ML4627 to 4629 | PIN Si | 5513/015 | see spec | api Microwave/ UK | ESCC QPL | range in QPL |
| DH50151 thru DH50157 | PIN Si | 5513/031 | M208, F27D | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50033 thru DH50037 | PIN Si | 5513/032 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50201 thru DH50209 | PIN Si | 5513/033 | M208, F27D | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50251 thru DH0256 | PIN Si | 5513/034 | M208, F27D | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50052 thru DH50057 | PIN Si | 5513/036 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50071 thru DH50077 | PIN Si | 5513/037 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |
| DH50101 thru DH50107 | PIN Si | 5513/038 | see spec | Cobham Microwave/ F | ESCC QPL | range in QPL |
| BXY42-MESA | PIN Si | 5513/017 | T, T1 | Infineon / G | ESCC QPL | Var 01 and 02 |
| BXY43 and BXY44 | PIN Si | 5513/030 | see spec | Infineon / G | ESCC QPL | Var 1,2, 5,6 |

3.5 EPPL PART1 FILTERS

Feed-through, Electromagnetic interference suppression filters:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|--------------------------------|---------------|---------|--------------------|---------------|--------------|
| SFC 060 | C-filter, Hermetic glass fill | 3008/026 | axial | Exxelvia Tech. / F | ESCC QPL | Var 01 to 06 |
| SFC 100 | C-filter, Hermetic glass fill | 3008/027 | axial | Exxelvia Tech. / F | ESCC QPL | Var 01 to 06 |
| SFP 060 | Pi-filter, Hermetic glass fill | 3008/021 | axial | Exxelvia Tech. / F | ESCC QPL | Var 01 to 14 |
| SFP 100 | Pi-filter, Hermetic glass fill | 3008/028 | axial | Exxelvia Tech. / F | ESCC QPL | Var 01 to 06 |
| SFL 100 | L-filter, Hermetic glass fill | 3008/029 | axial | Exxelvia Tech. / F | ESCC QPL | Var 01 to 48 |

(continued) EPPL Part 1 Feed-through, Electromagnetic interference suppression filters:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|------------------------------------|---------------|---------|-------------------|---------------|--------------|
| SFC 035 | C-filter, non-hermetic resin fill | 3008/031 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 06 |
| SFC 040 | C-filter, non-hermetic resin fill | 3008/032 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 12 |
| SFC 060 | C-filter, non-hermetic resin fill | 3008/033 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 12 |
| SFP 035 | Pi-filter, non-hermetic resin fill | 3008/025 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 20 |
| SFP 040 | Pi-filter, non-hermetic resin fill | 3008/014 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 40 |
| SFP 060 | Pi-filter, non-hermetic resin fill | 3008/030 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 28 |
| SFC 030V | C-filter, mixed fill for sodtering | 3008/020 | axial | Exxelia Tech. / F | ESCC QPL | Var 01 to 12 |

EPPL Part 1 Surface Acoustic Wave (SAW) filters:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---|-------------|---------------|---------------|------------------------|---------------|---------|
| SAW filters (transversal band pass / resonator / notch/ low loss impedance element) Hermetically sealed, 10MHz-4GHz | | 3502/002 | Surface mount | Kongsberg Norspace / N | ESCC QML | |

3.6 EPPL PART1 FUSES

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------------------|-------------|--------------------|---------|---------------------|---------------|----------------|
| MGA-S 0.14 to 3.5A | Thin film | 4008/001 | SMD | Schurter / CH | ESCC QPL | Var 1 to 12 |
| HCSF 5A, 7.5A, 10A | Thin film | 4008/001 | SMD | Schurter / CH | ESCC QPL | Var 24, 26, 28 |
| JAXA 2210/101 | see spec | JAXA-QTS-2210/101B | axial | Tateyama Kagaku / J | JAXA QPL | Note 1 and 2 |
| JAXA 2210/102 | see spec | JAXA-QTS-2210/102 | SMD | Tateyama Kagaku / J | JAXA QPL | Note 1 and 2 |

Note 1: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>
 - General specification : JAXA-QTS-22210
 - Detail specifications : JAXA-QTS-2210/101B, JAXA-QTS-2210/102
 - Application data sheet : JAXA-ADS- 2210/101B, AXA-ADS- 2210/102

Note 2: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use.

3.7 EPPL PART1 INDUCTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------------------------|-------------------|---------------|---------|---------------|---------------|--------------|
| MSCI 10000, 12000 and 20000 | RF coils | 3201/008 | SMD | Microspire /F | ESCC QPL | range in QPL |
| SESI | Power inductors | 3201/009 | SMD | Microspire /F | ESCC QPL | range in QPL |
| CMC15, 18, 22 | Common mode choke | 3201/010 | SMD | Microspire /F | ESCC QPL | range in QPL |

3.8 EPPL PART1 MICROCIRCUITS

Microprocessor/controller:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|---|---------------|-----------------|--------------|---------------|--------------------------------|
| AT697F | 32-bit SPARC V8 Processor, Leon2FT | 9512/004 | MQFP256 MCGA349 | Atmel / F | ESCC QML | Also available with 5962-07224 |
| TSC695F | Low voltage 32-bit SPARC Embed. Proc. | 5962-00540 | MQFP256 | Atmel / F | MIL QML | Also available with 9512/003 |
| TSC695FL | Low voltage 32-bit SPARC Embed. Proc. | 5962-03246 | MQFP256 | Atmel / F | MIL QML | |
| ATF697FF | Reconfigurable SPARC V8 processor made with AT697F + ATF280F (FPGA) | 5962-14229 | MQFP352 | Atmel / F | MIL QML | Note 1 |
| AT7913E | SpW RT controller with Leon2FT embedded processor | 5962-10A03 | LGA349 | Atmel / F | MIL QML | |

Note 1: The bottom pads of this device are used only by the manufacturer for test purposes; the user must leave them unconnected in the end user application. It is recommended not to have routing under the pads area.

Memory SRAM:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------|----------------------|---------------|---------|--------------|---------------|--|
| AT60142H | 512Kx8 3.3V | 5962-05208 | FP36 | Atmel / F | MIL QML | Single Event Effects (SEE) sensitivity shall be verified where necessary |
| AT60142HT | 512Kx8 5V-tolerant | 5962-05208 | FP36 | Atmel / F | MIL QML | |
| AT68166H | 16Mbit 3.3V MCM | 5962-06229 | MQFP68 | Atmel / F | MIL QML | |
| AT68166HT | 16Mbit 5V-toler. MCM | 5962-06229 | MQFP68 | Atmel / F | MIL QML | |
| 65609EV | 128Kx8 3.3V | 5962-02501 | FP32 | Atmel / F | MIL QML | Note 1 |

Note 1: In addition to SEUs, this device has exhibited Multiple Bit Upset (MBU) sensitivity in the form of double upset in the same 8bit word. Refer to the manufacturer for details. Error-correction codes may need to be implemented accordingly.

EPPL Part 1 Programmable Logic:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------|--|---------------|---------------------|--------------|---------------|--------------------------------|
| AT40KEL040 | SRAM-based reprogrammable 40K ASIC gates | 9304/008 | MQFP 160 | Atmel / F | Not qualified | Also available with 5962-03250 |
| AT280F | SRAM-based reprogrammable 40K ASIC gates | 9304/009 | MQFP352 and MQFP256 | Atmel / F | ESCC QML | Also available with 5962-12225 |

EPPL Part 1 ASIC Technologies Digital:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------|---|---------------|---------|--------------|---------------|------------------------------|
| ATC18RHA | 0.18 μ CMOS ASIC standard cell | 9202/080 | MQFP | Atmel / F | ESCC QML | Also available to 5962-06B02 |
| ATMX150RHA | 0.150 μ SOI CMOS ASIC standard cell – DIGITAL LIBRARIES | 9202/083 | MQFP | Atmel / F | Not qualified | Note 1 |

Note 1. ESCC QML CERTIFICATION in accordance with ESCC 2549000 is in progress for the domain which includes up to 7 million gates, 3.3 and 2.5V I/Os, memory cells compiled (SRAM, DPRA, register file memory cells)

EPPL Part 1 Linear Operational Amplifier

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------|-------------------|---------------|---------|--------------|---------------|---------|
| RHF330K-01V | Current feedback | 5962-07231 | FP-8 | ST / F | MIL QML | |
| RHF310K-01V | Current feedback | 5962-07233 | FP-8 | ST / F | MIL QML | |
| LM124AW | Low power Bipolar | 5962-99504 | FP-14 | T.I. / USA | MIL QML | Note 1 |

Note 1: part is R level (100 krad(Si)) tolerant, Var. 02 is "not sensitive to low dose rate"; it is recommended to procure 5962R9950402VDA (no lower TID levels)

(continued) EPPL Part 1 Linear Operational Amplifier:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------|------------------|---------------|-------------|----------------------|---------------|---------|
| OP27A | Ultra low-noise | 5962-94680 | FP10 | Analog Devices / USA | MIL QML | |
| OP470A | Very low noise | 5962-88565 | FP24 | Analog Devices / USA | MIL QML | |
| RHF484K-01V | Precision quad | 5962-08222 | FP-14 | ST / F | MIL QML | |
| RHF43B | Single | 5962-06237 | FP-8 | ST / F | MIL QML | |
| RHF350K-01V | 550MHz low noise | 5962-07232 | FP-8 | ST / F | MIL QML | |
| OP77 | Ultralow offset | 5962-87738 | LCC20, FP10 | Analog Devices / USA | MIL QML | |

EPPL Part 1 Linear Voltage regulator:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------------|----------------------------|---------------|---------------|--------------|---------------|---------|
| RH-L4913 ADJ | Positive ADJ , low dropout | 5962-02524 | FP-16 | ST / F | MIL QML | |
| RH-L4913 2.5V | Positive 2.5V, 2A | 5962-02534 | FP-16, SMD.5 | ST / F | MIL QML | |
| RH-L4913 3.3V | Positive 3.3V, 2A | 5962-02535 | FP-16, SMD.5 | ST / F | MIL QML | |
| RH-L4913 5V | Positive 5V, 2A | 5962-02536 | FP-16, SMD.5 | ST / F | MIL QML | |
| RH-L7913 ADJ | Positive ADJ , low dropout | 5962-02532 | FP-16 | ST / F | MIL QML | |
| LM117H | Positive ADJ, 0.5A | 5962-07229 | TO39, cerSOIC | T.I. / USA | MIL QML | |
| LM117K | Positive ADJ, 1.5A | 5962-99517 | TO-3 | T.I. / USA | MIL QML | |
| LM137H | Negative ADJ, 0.5A | 5962-99517 | TO-39 | T.I. / USA | MIL QML | |

EPPL Part 1 Linear Voltage comparator:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|-----------------------------|---------------|----------------|--------------|---------------|---------|
| AD584SH | Precision pin-programmable | 5962-38128 | 8pin metal can | A. D. / USA | MIL QML | Var01 |
| LM119 | Dual, high speed | 5962-96798 | FP | T.I. / USA | MIL QML | Note 1 |
| LM139AH | Quad, low power | 5962-96738 | FP-14 | T.I. / USA | MIL QML | |
| LM193AH | Dual, low power, low offset | 5962-94526 | Metal can | T.I. / USA | MIL QML | Note 1 |
| LM111W | Precision | 5962-00524 | FP | T.I. / USA | MIL QML | |
| RHR801 | Very high speed | 5962-10215 | FP-8 | ST / F | MIL QML | |

Note 1: this part is NOT ELDRS-free

EPPL Part 1 Linear switching regulator:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|----------------------|---------------------|---------|--------------|---------------|---------|
| ST1843FK | High Performance PWM | RNS/AS/10-323-01/ce | FP-8 | ST / F | Not qualified | Note 1 |
| ST1845FK | Current mode PWM | RNS/AS/10-326-01/ce | FP-8 | ST / F | Not qualified | Note 1 |

Note 1: this part is VERY sensitive to Single Event Transients (SET)

EPPL Part 1 Linear Line driver:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------|-----------------------|---------------|---------|--------------|---------------|---------|
| RHFLVDS31A | Quad LVDS low voltage | 5962-98651 | FP-16 | ST / F | MIL QML | |

EPPL Part 1 Linear Line receiver:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------|-----------------------|---------------|---------|--------------|---------------|---------|
| RHFLVDS32A | Quad LVDS low voltage | 5962-98652 | FP-16 | ST / F | MIL QML | |

EPPL Part 1 Linear multiplexer / demultiplexer:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------|---|---------------|---------|--------------|---------------|---------|
| RHFLVDS2281 | 8-ch 4x4 cross point switch internal fail-safe | 5962-14234 | FP-64 | ST / F | MIL QML | |

EPPL Part 1 Linear Analog to Digital converter:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|-----------------|---|---------------|---------|------------|---------------|---------|
| RHF1201 | 12 bit, 0.5 to 50 MHz sample | 5962-05217 | SO-48 | ST / F | MIL QML | |
| RHF1401 | 14 bit, 20 Msps | 5962-06260 | SO-48 | ST / F | MIL QML | |
| AD574AT | 12 bit with microprocessor IF | 5962-85127 | FP | A.D. / USA | MIL QML | |
| EV10AS180AMxx-V | 10bit 1.5Gsps 200GHz bipolar DEMux ADC | 5962-15223 | Note 1 | e2v / F | MIL QML | Note 2 |

Note 1: The following packages are available:

- 255 terminals, CLGA-Au pad termination
- 255 terminals, CI-CGA-Solder column interposer (SCI). A limited stock of SCI is available until Feb. 2019.
- 255 terminals CCGA-Cu spiral column

Note 2: these devices are sensitive to SEU/SET – contact the manufacturer for SEE sensitivity detailed evaluation data

EPPL Part 1 Linear Digital to Analog converter:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|-----------------|-------------------------------|---------------|---------|------------|---------------|---------|
| DAC08 | 8 bit DAC | 5962-89932 | FP-16 | A.D. / USA | MIL QML | |
| EV10DS130AMxx-V | 10bit 3Gsps with 4/2:1MUX DAC | 5962-15221 | Note 1 | e2v / F | MIL QML | Note 2 |
| EV12DS130AMxx-V | 12bit 3Gsps with 4/2:1MUX DAC | 5962-15222 | Note 1 | e2v / F | MIL QML | Note 2 |

Note 1: The following packages are available:

- 255 terminals, CLGA-Au pad termination
- 255 terminals, CI-CGA-Solder column interposer (SCI). A limited stock of SCI is available until Feb. 2019.
- 255 terminals CCGA-Cu spiral column

Note 2: these devices are sensitive to SEU/SET – contact the manufacturer for SEE sensitivity detailed evaluation data

EPPL Part 1 Linear Other functions:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------|--------------------------|---------------|-------------|--------------|---------------|---------|
| RHFLVDSR2D2 | Dual LVDS transceiver | 5962-06202 | FP-18 | ST / F | MIL QML | |
| RHF100 | Precision shunt 1.2 Vref | 5962-14225 | FP-10 | ST / F | MIL QML | |
| AD590M | Temp. transducer | 5962-87571 | FP | A.D. / USA | MIL QML | |
| UC1707 | High speed power driver | 5962-87619 | DIL16 LCC20 | T. I. / USA | MIL QML | Note 1 |
| RHF1009A | Adjustable 2.5/5.5V Vref | 5962-14222 | FP-10 | ST / F | MIL QML | |

Note 1: this part is NOT ELDRS-free

EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------|--|---------------|---------|--------------|---------------|---------|
| 4001B | QUAD 2-INPUT NOR GATE | 9201/041 | FP, DIL | ST / F | ESCC QPL | |
| 4002B | DUAL 4-INPUT NOR GATE | 9201/042 | FP, DIL | ST / F | ESCC QPL | |
| 4008B | 4-BIT FULL ADDER | 9202/039 | FP, DIL | ST / F | ESCC QPL | |
| 40103B | PRESETTABLE 8-BIT SYNCHRONOUS DOWN-COUNTER | 9204/036 | FP, DIL | ST / F | ESCC QPL | |
| 40106B | HEX SCHMITT TRIGGER | 9409/005 | FP, DIL | ST / F | ESCC QPL | |
| 40107B | DUAL 2-INPUT NAND BUFFER / DRIVER | 9401/013 | FP, DIL | ST / F | ESCC QPL | |
| 40109B | QUAD LOW-TO-HIGH 3-STATE VOLTAGE LEVEL SHIFTER | 9407/003 | FP, DIL | ST / F | ESCC QPL | |
| 4011B | QUAD 2 INPUT NAND GATE | 9201/043 | FP, DIL | ST / F | ESCC QPL | |
| 4012B | DUAL 4-INPUT NAND GATE | 9201/044 | FP, DIL | ST / F | ESCC QPL | |
| 4013B | DUAL D-TYPE FLIP-FLOP | 9203/023 | FP, DIL | ST / F | ESCC QPL | |
| 4014B | 8-STAGE SYNCHRONOUS STATIC SHIFT REGISTER | 9306/014 | FP, DIL | ST / F | ESCC QPL | |
| 4015B | DUAL 4-STAGE STATIC SHIFT REGISTER WITH SERIAL INPUT / PARALLEL OUTPUT | 9306/015 | FP, DIL | ST / F | ESCC QPL | |
| 40161B | PROGRAMMABLE 4-BIT BINARY COUNTER WITH ASYNCHRONOUS CLEAR | 9204/054 | FP, DIL | ST / F | ESCC QPL | |
| 40174B | HEX D-TYPE FLIP-FLOP | 9203/038 | FP, DIL | ST / F | ESCC QPL | |
| 4017B | DECADE COUNTER / DIVIDER | 9204/020 | FP, DIL | ST / F | ESCC QPL | |
| 4018B | PRESETTABLE DIVIDE-BY-N COUNTER | 9204/021 | FP, DIL | ST / F | ESCC QPL | |
| 40193B | PRESETTABLE BINARY UP/DOWN COUNTER (DUAL CLOCK WITH RESET) | 9204/041 | FP, DIL | ST / F | ESCC QPL | |
| 4019B | QUAD AND/OR SELECT GATE | 9202/051 | FP, DIL | ST / F | ESCC QPL | |
| 4020B | 14-STAGE RIPPLE CARRY BINARY COUNTER / DIVIDER | 9204/022 | FP, DIL | ST / F | ESCC QPL | |

(continued) EPPL1 Logic families:

| | | | | | | |
|--------|---|----------|---------|--------|----------|--|
| 4021B | 8-STAGE STATIC SHIFT REGISTER | 9306/016 | FP, DIL | ST / F | ESCC QPL | |
| 4022B | OCTAL COUNTER/DIVIDER | 9204/023 | FP, DIL | ST / F | ESCC QPL | |
| 4023B | TRIPLE 3-INPUT NAND GATE | 9201/045 | FP, DIL | ST / F | ESCC QPL | |
| 4024B | 7-STAGE RIPPLE CARRY BINARY COUNTER / DIVIDER | 9204/024 | FP, DIL | ST / F | ESCC QPL | |
| 4025B | TRIPLE 3-INPUT NOR GATE | 9201/046 | FP, DIL | ST / F | ESCC QPL | |
| 4027B | DUAL J-K MASTER-SLAVE FLIP-FLOP | 9203/022 | FP, DIL | ST / F | ESCC QPL | |
| 4028B | BCD-TO-DECIMAL OR BINARY-TO-OCTAL DECODER | 9205/010 | FP, DIL | ST / F | ESCC QPL | |
| 4029B | PRESETTABLE UP/DOWN COUNTER BINARY OR BCD DECADE | 9204/025 | FP, DIL | ST / F | ESCC QPL | |
| 4030B | QUAD 2-INPUT EXCLUSIVE OR GATE | 9201/047 | FP, DIL | ST / F | ESCC QPL | |
| 4034B | 8-STAGE STATIC BIDIRECTIONAL PARALLEL/SERIAL INPUT/OUTPUT BUSN REGISTER WITH 3 STATE OUTPUT | 9306/025 | FP, DIL | ST / F | ESCC QPL | |
| 4040B | 12-STAGE RIPPLE CARRY BINARY COUNTER / DIVIDER | 9204/026 | FP, DIL | ST / F | ESCC QPL | |
| 4041UB | QUAD TRUE/COMPLEMENT BUFFER WITH UNBUFFERED OUTPUTS | 9202/040 | FP, DIL | ST / F | ESCC QPL | |
| 4042B | QUAD CLOCKED D LATCH | 9202/041 | FP, DIL | ST / F | ESCC QPL | |
| 4043B | QUAD NOR 3-STATE R/S LATCHES | 9202/042 | FP, DIL | ST / F | ESCC QPL | |
| 4044B | QUAD NAND 3-STATE R/S LATCH | 9202/043 | FP, DIL | ST / F | ESCC QPL | |
| 4046B | MICROPOWER PHASE-LOCKED LOOP | 9202/044 | FP, DIL | ST / F | ESCC QPL | |
| 4047B | LOW POWER MONOSTABLE / ASTABLE MULTIVIBRATOR | 9207/003 | FP, DIL | ST / F | ESCC QPL | |
| | | | | | | |
| 4049UB | HEX BUFFER-CONVERTER (INVERTING TYPE) | 9202/045 | FP, DIL | ST / F | ESCC QPL | |
| 4050B | HEX BUFFER-CONVERTER (NON-INVERTING TYPE) | 9202/046 | FP, DIL | ST / F | ESCC QPL | |
| 4051B | ANALOGUE MULTIPLEXER / DEMULTIPLEXER | 9202/047 | FP, DIL | ST / F | ESCC QPL | |
| 4052B | ANALOGUE MULTIPLEXER/DEMUTIPLEXER | 9202/048 | FP, DIL | ST / F | ESCC QPL | |
| 4053B | TRIPLE 2-CHANNEL ANALOGUE MULTIPLEXER/DEMUTIPLEXER | 9202/049 | FP, DIL | ST / F | ESCC QPL | |
| 4060B | 14-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER AND OSCILLATOR | 9204/052 | FP, DIL | ST / F | ESCC QPL | |
| | | | | | | |
| 4063B | 4-BIT MAGNITUDE COMPARATOR | 9209/001 | FP, DIL | ST / F | ESCC QPL | |
| 4066B | QUAD BILATERAL SWITCH | 9408/005 | FP, DIL | ST / F | ESCC QPL | |
| 4067B | ANALOGUE MULTIPLEXER/DEMUTIPLEXER | 9408/009 | FP, DIL | ST / F | ESCC QPL | |
| 4068B | 8-INPUT NAND GATE | 9201/061 | FP, DIL | ST / F | ESCC QPL | |

(continued) EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|--|----------------|---------|--------------|---------------|---------|
| 4069UB | HEX INVERTER | 9401/010 | FP, DIL | ST / F | ESCC QPL | |
| 4071B | QUAD 2-INPUT OR GATE | 9201/063 | FP, DIL | ST / F | ESCC QPL | |
| 4072B | DUAL 4-INPUT OR GATE | 9201/082 | FP, DIL | ST / F | ESCC QPL | |
| 4073B | TRIPLE 3-INPUT AND GATE | 9201/064 | FP, DIL | ST / F | ESCC QPL | |
| 4075B | TRIPLE 3-INPUT OR GATE | 9201/065 | FP, DIL | ST / F | ESCC QPL | |
| 4076B | 4-BIT D TYPE REGISTER WITH 3-STATE OUTPUT | 9306/022 | FP | ST / F | ESCC QPL | |
| 4077B | QUAD EXCLUSIVE NOR GATE | 9201/055 | FP, DIL | ST / F | ESCC QPL | |
| 4078B | 8-INPUT OR/NOR GATE | 9201/062 | FP, DIL | ST / F | ESCC QPL | |
| 4081B | 8 INPUT OR-NOR GATE | 9201/052 | FP, DIL | ST / F | ESCC QPL | |
| 4082B | DUAL 4-INPUT AND GATE | 9201/066 | FP, DIL | ST / F | ESCC QPL | |
| 4093B | QUAD 2 INPUT NAND GATE WITH SCHMITT TRIGGER INPUT | 9409/002 | FP, DIL | ST / F | ESCC QPL | |
| 4094B | 8-STAGE SHIFT AND STORE BUS REGISTER WITH SYNCHRONOUS SERIAL OUTPUTS AND 3-STATE PARALLEL OUTPUT | 9306/026 | FP, DIL | ST / F | ESCC QPL | |
| 4098B | DUAL MONOSTABLE MULTIVIBRATOR | 9206/003 | FP, DIL | ST / F | ESCC QPL | |
| 4503B | HEX NON-INVERTING BUFFER WITH 3-STATE OUTPUT | 9401/030 | FP, DIL | ST / F | ESCC QPL | |
| 4512B | 8-CHANNEL MULTIPLEXER WITH 3-STATE OUTPUT | 9408/006 | FP, DIL | ST / F | ESCC QPL | |
| 4514B | 4-BIT LATCH/4-TO-16 DECODER | 9408/012 | FP, DIL | ST / F | ESCC QPL | |
| 4515B | 4-BIT LATCH/4-TO-16 LINE DECODER | 9205/011 | FP, DIL | ST / F | ESCC QPL | |
| 4516B | SYNCHRONOUS QUAD PRESETTABLE UP/DOWN BINARY COUNTER | 9204/045 | FP, DIL | ST / F | ESCC QPL | |
| 4520B | DUAL BINARY UP COUNTER | 9204/028 | FP, DIL | ST / F | ESCC QPL | |
| 4532B | 8-BIT PRIORITY ENCODER | 9202/065 | FP, DIL | ST / F | ESCC QPL | |
| 4538B | DUAL MONOSTABLE MULTIVIBRATOR WITH RESET | 9207/007 | FP, DIL | ST / F | ESCC QPL | |
| 4555B | DUAL 1-OF-4 DECODER / DEMULTIPLEXER | 9408/011 | FP, DIL | ST / F | ESCC QPL | |
| 4556B | DUAL 1-OF-4 DECODER/DEMUTIPLEXER (OUPUT LOW ON SELECT) | 9408/025 | FP, DIL | ST / F | ESCC QPL | |
| 54AC00 | Quad 2-Input NAND Gate | 5962-87549 | FP | ST / F | MIL QML | |
| 54AC02 | Quad 2-Input NOR Gate | 5962-87612 | FP | ST / F | MIL QML | |
| 54AC04 | Hex Inverter | 5962-87609 | FP | ST / F | MIL QML | |
| 54AC08 | Quad 2-Input AND Gate | 5962-87615 | FP | ST / F | MIL QML | |
| 54AC10 | Triple 3-Input NAND Gate | 5962-87610 | FP | ST / F | MIL QML | |
| 54AC11 | Triple 3-Input AND Gate | 5962-87611 | FP | ST / F | MIL QML | |
| 54AC138 | Decoder/Demultiplexer, 3-to-8 line | 5962-87622 | FP | ST / F | MIL QML | |
| 54AC139 | Dual 2 To 4 Line Decoder/Demultiplexer, with Inverted Outputs | 5962-87623 | FP | ST / F | MIL QML | |
| 54AC14 | Hex Schmitt Trigger Inverter | 5962-87624 | FP | ST / F | MIL QML | |
| 54AC157 | Quad 2-Input Multiplexer | SMD 5962-89539 | FP | ST / F | MIL QML | |

(continued) EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------|--|---------------|---------|--------------|---------------|---------|
| 54AC161 | Synchronous 4-Bit Binary Counter | 5962-89561 | FP | ST / F | MIL QML | |
| 54AC16244 | 16 bit Buffer/Driver with three-state outputs | 5962-04210 | FP | ST / F | MIL QML | |
| 54AC240 | Octal Bus Buffer with Inverted 3-State Outputs | 5962-87550 | FP | ST / F | MIL QML | |
| 54AC244 | Octal Buffer/Line Driver with 3-State Outputs | 5962-87552 | FP | ST / F | MIL QML | |
| 54AC245 | Bus Transceiver, 8-Bit, Bidirectional, with 3-State Inputs/Outputs | 5962-87758 | FP | ST / F | MIL QML | |
| 54AC273 | Octal D-Type Flip-Flop with Clear | 5962-87756 | FP | ST / F | MIL QML | |
| 54AC32 | Quad 2-Input OR Gate | 5962-87614 | FP | ST / F | MIL QML | |
| 54AC373 | Octal D-Type Transparent Latches with 3-State Outputs | 5962-87555 | FP | ST / F | MIL QML | |
| 54AC374 | Octal D-Type Flip-Flop with 3-State Outputs | 5962-87694 | FP | ST / F | MIL QML | |
| 54AC541 | Octal Bus Buffer with 3-State Outputs | 5962-88706 | FP | ST / F | MIL QML | |
| 54AC74 | Octal D-Type Flip-Flop with 3-State Outputs | 5962-88520 | FP | ST / F | MIL QML | |
| 54AC86 | Quad 2-Input Exclusive OR Gate | 5962-89550 | FP | ST / F | MIL QML | |
| 54ACT00 | Quad 2-Input NAND Gate, with TTL Compatible Inputs | 5962-87699 | FP | ST / F | MIL QML | |
| 54ACT240 | Octal Bus Buffer with Inverted 3-State Outputs, TTL Compatible Inputs | 5962-87759 | FP | ST / F | MIL QML | |
| 54ACT244 | Octal Buffer/Line Driver with 3-State Outputs, TTL Compatible Inputs | 5962-87760 | FP | ST / F | MIL QML | |
| 54ACT245 | Octal Bidirectional Transceiver with 3-State Outputs, TTL Compatible Inputs | 5962-87663 | FP | ST / F | MIL QML | |
| 54ACT574 | Octal D-Type Flip-Flop with 3-State Outputs, TTL Compatible Inputs | 5962-89601 | FP | ST / F | MIL QML | |
| 54ACT86 | Quad 2-Input Exclusive OR Gate, TTL Compatible Inputs | 5962-90687 | FP | ST / F | MIL QML | |
| 54HC00 | Quad 2-Input NAND Gate | 9201/105 | FP, DIL | ST / F | ESCC QPL | |
| 54HC02 | Quad 2-Input NOR Gate | 9201/113 | FP, DIL | ST / F | ESCC QPL | |
| 54HC03 | Quad 2-Input Nand Gate with Open Drain Output | 9201/114 | FP, DIL | ST / F | ESCC QPL | |
| 54HC04 | Hex Inverter | 9401/033 | FP, DIL | ST / F | ESCC QPL | |
| 54HC08 | Quad 2-Input Positive AND Gate | 9201/106 | FP, DIL | ST / F | ESCC QPL | |
| 54HC10 | Triple 3-Input NAND Gate | 9201/107 | FP, DIL | ST / F | ESCC QPL | |
| 54HC109 | Dual J-K Positive Edge Triggered Flip-Flop with Preset and Clear | 9306/048 | FP, DIL | ST / F | ESCC QPL | |
| 54HC11 | Triple 3-Input AND Gate | 9201/117 | FP, DIL | ST / F | ESCC QPL | |
| 54HC123 | Dual positive or negative edge Schmitt-retriggerable monostable multivibrator with clear | 9207/006 | FP, DIL | ST / F | ESCC QPL | |
| 54HC125 | Quad Bus Buffers with 3 State Outputs | 9401/039 | FP, DIL | ST / F | ESCC QPL | |
| 54HC132 | Quad 2-Input NAND Gate with Schmitt-trigger Inputs | 9201/120 | FP, DIL | ST / F | ESCC QPL | |

(continued) EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|--|---------------|---------|--------------|---------------|---------|
| 54HC137 | 3-to-8 line decoder/demultiplexer with address latch and inverted output | 9205/013 | FP, DIL | ST / F | ESCC QPL | |
| 54HC138 | 3-to-8 Decoders/Demultiplexers with Inverted Outputs | 9408/046 | FP, DIL | ST / F | ESCC QPL | |
| 54HC139 | Dual 2-to-4-line Decoders/Demultiplexers with Inverted Outputs | 9205/017 | FP, DIL | ST / F | ESCC QPL | |
| 54HC14 | Hex Schmitt Trigger Inverter | 9409/007 | FP, DIL | ST / F | ESCC QPL | |
| 54HC148 | 8-line to -3line priority encoder | 9410/017 | FP, DIL | ST / F | ESCC QPL | |
| 54HC151 | 8-line to 1-line Data Selectors/Multiplexer | 9408/054 | FP, DIL | ST / F | ESCC QPL | |
| 54HC153 | Dual 4-line to 1-line data selectors/multiplexer | 9408/038 | FP, DIL | ST / F | ESCC QPL | |
| 54HC154 | 4-to-6 Line Decoder/Demultiplexer with Inverted Output | 9205/023 | FP, DIL | ST / F | ESCC QPL | |
| 54HC157 | Quad 2-line to 1-line Data Selectors/Multiplexers | 9408/057 | FP, DIL | ST / F | ESCC QPL | |
| 54HC158 | Quad 2-to-1-Line Data Selectors/Multiplexers with Inverted Outputs | 9408/059 | FP, DIL | ST / F | ESCC QPL | |
| 54HC160 | Synchronous presettable 4-bit decade counter with direct clear | 9204/062 | FP, DIL | ST / F | ESCC QPL | |
| 54HC161 | Asynchronous 4-Bit Binary Counter | 9204/059 | FP,DIL | ST / F | ESCC QPL | |
| 54HC164 | 8-bit Sipo Shift Register | 9306/041 | FP, DIL | ST / F | ESCC QPL | |
| 54HC165 | 8-bit Sipo Shift Register | 9306/042 | FP, DIL | ST / F | ESCC QPL | |
| 54HC166 | 8-bit Piso Shift Register | 9306/043 | FP, DIL | ST / F | ESCC QPL | |
| 54HC174 | Hex D-Type Edge-triggered Flip-Flop with Clear | 9306/052 | FP, DIL | ST / F | ESCC QPL | |
| 54HC175 | Quad D-Type Edge-triggered Flip-Flop with Clear | 9203/052 | FP,DIL | ST / F | ESCC QPL | |
| 54HC191 | Synchronous 4-Bit Up/Down Binary Counter | 9204/066 | FP, DIL | ST / F | ESCC QPL | |
| 54HC193 | Synchronous 4-Bit Up/Down Binary Counter (Dual Clock with Clear) | 9204/065 | FP, DIL | ST / F | ESCC QPL | |
| 54HC194 | 4-bit PIPO shift register | 9306/047 | FP, DIL | ST / F | ESCC QPL | |
| 54HC20 | Dual 4-Input NAND Gate | 9201/118 | FP, DIL | ST / F | ESCC QPL | |
| 54HC21 | Dual 4-Input AND Gate | 9201/108 | FP, DIL | ST / F | ESCC QPL | |
| 54HC237 | 3-to-8-Line Decoder/Demultiplexer with Address Latch | 9205/021 | FP, DIL | ST / F | ESCC QPL | |
| 54HC240 | Octal Bus Buffer with Inverted 3-State Outputs | 9401/034 | FP, DIL | ST / F | ESCC QPL | |
| 54HC244 | Octal Bus Buffer with 3-State Outputs | 9401/048 | FP, DIL | ST / F | ESCC QPL | |
| 54HC245 | Octal Bus Transceiver with 3-State Outputs | 9405/013 | FP, DIL | ST / F | ESCC QPL | |
| 54HC251 | 1-to-8 data selector/multiplexer with 3-state output | 9408/048 | FP, DIL | ST / F | ESCC QPL | |
| 54HC257 | Quad 2-to-1-Line Data Selector/Multiplexer with 3-State Outputs | 9408/047 | FP, DIL | ST / F | ESCC QPL | |
| 54HC259 | 8-bit addressable latch | 9203/073 | FP, DIL | ST / F | ESCC QPL | |

(continued) EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|---|---------------|---------|--------------|---------------|---------|
| 54HC27 | Triple 3-Input NOR Gate | 9201/109 | FP, DIL | ST / F | ESCC QPL | |
| 54HC273 | Octal D-Type Edge-triggered Flip-Flop with Clear | 9203/053 | FP, DIL | ST / F | ESCC QPL | |
| 54HC280 | 9-bit odd/even parity generator/checker | 9208/003 | FP, DIL | ST / F | ESCC QPL | |
| 54HC283 | 4-Bit Binary Full Adders with Fast Carry | 9202/075 | FP, DIL | ST / F | ESCC QPL | |
| 54HC30 | 8-input NAND gate | 9201/111 | FP, DIL | ST / F | ESCC QPL | |
| 54HC32 | Quad 2-Input OR Gate | 9201/111 | FP, DIL | ST / F | ESCC QPL | |
| 54HC367 | Hex bus buffer with 3-state output | 9401/044 | FP, DIL | ST / F | ESCC QPL | |
| 54HC373 | Octal D-Type Transparent Latches with 3-State Outputs | 9203/059 | FP, DIL | ST / F | ESCC QPL | |
| 54HC374 | Octal D-Type Edge-triggered Flip-Flop with 3-State Outputs | 9203/060 | FP, DIL | ST / F | ESCC QPL | |
| 54HC393 | Dual 4-bit negative edge-triggered binary counter | 9204/074 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4020 | Asynchronous negative-edge-triggered 14-bit binary counter | 9204/070 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4040 | Asynchronous Negative Edge-triggered 12-Bit Binary Counters | 9204/069 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4049 | Hex Buffer Converter with Inverted Outputs | 9401/037 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4050 | Hex Buffer Converter | 9401/038 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4051 | Analogue multiplexer/demultiplexer | 9408/064 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4053 | Analogue multiplexer/demultiplexer (triple 2-channel) | 9408/065 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4060 | Asynchronous negative-edge-triggered 14-bit binary counter and oscillator | 9204/076 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4066 | Quad bilateral switch | 9408/052 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4078 | 8-input OR/NOR gate | 9201/123 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4094 | 8-bit SIPO shift latch register with 3-state output | 9306/050 | FP, DIL | ST / F | ESCC QPL | |
| 54HC4514 | 4-to-16 line decoder/latch | 9205/019 | FP, DIL | ST / F | ESCC QPL | |
| 54HC540 | Octal Bus Buffer with Inverted 3-State Outputs | 9401/049 | FP, DIL | ST / F | ESCC QPL | |
| 54HC541 | Octal bus buffer with 3-state output | 9401/047 | FP, DIL | ST / F | ESCC QPL | |
| 54HC573 | Octal D-type transparent latch with 3-state output | 9202/072 | FP, DIL | ST / F | ESCC QPL | |
| 54HC574 | Octal D-type edge-triggered flip-flop with 3-state output | 9203/054 | FP, DIL | ST / F | ESCC QPL | |
| 54HC590 | 8-Bit Binary Counter with 3-State Output Registers | 9204/071 | FP, DIL | ST / F | ESCC QPL | |
| 54HC595 | 8-Bit Shift Registers with 3-State Output Registers | 9306/051 | FP, DIL | ST / F | ESCC QPL | |
| 54HC597 | 8-Bit PISO Shift Register | 9306/054 | FP, DIL | ST / F | ESCC QPL | |
| 54HC688 | 8-bit identify comparator | 9209/005 | FP, DIL | ST / F | ESCC QPL | |
| 54HC74 | Dual Negative Edge Triggered D-Type Flip-Flop with Clear | 9203/050 | FP, DIL | ST / F | ESCC QPL | |
| 54HC85 | 4-Bit Magnitude Comparator | 9209/004 | FP | ST / F | ESCC QPL | |
| 54HC86 | Quad 2-Input Exclusive OR Gate | 9201/119 | FP, DIL | ST / F | ESCC QPL | |

(continued) EPPL1 Logic families:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------------|---|----------------|---------|--------------|---------------|---------|
| 54HCT244 | Octal Bus Buffer with 3-State Outputs | 9402/009 | FP, DIL | ST / F | ESCC QPL | |
| 54HCT245 | Octal Bus Transceiver with 3-State Outputs | 9405/014 | FP, DIL | ST / F | ESCC QPL | |
| 54HCT373 | Octal D-Type Transparent Latch with 3-State Outputs | 9203/064 | FP, DIL | ST / F | ESCC QPL | |
| 54HCT74 | Dual D-Type Flip-Flop with Preset and Clear | 9203/070 | FP, DIL | ST / F | ESCC QPL | |
| 54VCXH162244 | Low Voltage CMOS 16-bit Bus Buffer with Bus hold, series Output Resistors and three-state Outputs | 5962-05210 | FP-48 | ST / F | MIL QML | |
| 54VCXH162373 | Low Voltage CMOS 16-bit D-type Latch with Bus hold, series Output Resistors and three-state Outputs | 5962-05211 | FP-48 | ST / F | MIL QML | |
| 54VCXH162374 | Low Voltage CMOS 16-bit D-type Flip-Flop with Bus hold, series Output Resistors and three-state Outputs | SMD 5962-05212 | FP-48 | ST / F | MIL QML | |
| 54VCXHR162245 | Rad-Hard low voltage CMOS, 16-bit bus transceiver with bus hold, Series Output Resistors, and Three-State Outputs | 5962-05213 | FP-48 | ST / F | MIL QML | |
| AC16245 | AC16245 is an advanced CMOS 16-bit bus transceiver with three-state outputs. | 5962-04211 | Flat 48 | ST / F | MIL QML | |
| AC164245 | 16-channel bidirectional multi-purpose transceiver | SMD 5962-98580 | Flat 48 | ST / F | MIL QML | |

EPPL1 Other functions:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|-------------------------------------|---------------|---------|--------------|---------------|---------|
| RHF1009 | Adjustable 2.5V/5.5V precision Vref | 5962-14222 | FP10 | ST / F | MIL QML | |

EPPL1 Miscellaneous:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|--|---------------|---------|--------------|---------------|---------|
| AT7910E | SpW-10X router: it includes 8 bi-directional SpaceWire serial ports and 2 bidirectional parallel external interfaces | 5962-09A03 | MQFP196 | ATM / F | MIL QML | |

3.9 EPPL PART1 RELAYS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------|--------------|---------------|---------|--------------|---------------|---------|
| GP5 | Non-latching | 3601/003 | Can | Leach / F | ESCC QPL | |
| T | Non-latching | 3601/002 | TO5 | STPI / F | ESCC QPL | |
| M300 | Non-latching | 3601/007 | Can | Leach / F | ESCC QPL | |
| E215 | Non-latching | 3601/007 | Can | STPI / F | ESCC QPL | |
| GP2 | Latching | 3602/003 | Can | Leach / F | ESCC QPL | |
| GP250 | Latching | 3602/010 | Can | Leach / F | ESCC QPL | |
| TL | Latching | 3602/002 | Can | STPI / F | ESCC QPL | |
| EL415 | Latching | 3602/004 | Can | STPI / F | ESCC QPL | |
| M402 | Latching | 3602/004 | Can | Leach / F | ESCC QPL | |
| EL215 | Latching | 3602/009 | Can | STPI / F | ESCC QPL | |
| M302 | Latching | 3602/009 | Can | Leach / F | ESCC QPL | |
| D | Latching | 3602/019 | Can | Leach/F | ESCC QPL | |

3.10 EPPL PART1 RESISTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------------|--|---------------|---------|--------------|---------------|-----------------|
| SMP/SMS/SMT | Shunts | 4001/027 | SMD | ISA / G | ESCC QPL | Range as in QPL |
| TNPS | Thin film | 4001/029 | SMD | Vishay / G | ESCC QPL | Range as in QPL |
| MS1 | Fixed film | 4001/022 | SMD | Vishay / G | ESCC QPL | Range as in QPL |
| P HR | Thin film 0603, 0805, 1206, 2010 | 4001/023 | SMD | Vishay / F | ESCC QPL | Range as in QPL |
| PFRR | Thin film 0603, 0805, 1206, 2010 with ER | 4001/023 | SMD | Vishay / F | ESCC QML | Range as in QPL |
| PRA Hr & CNW HR | Thin film arrays | 4001/025 | SMD | Vishay / F | ESCC QML | Range as in QPL |

(continued) EPPL Part 1 Resistors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------|--|------------------------|----------|-------------------|---------------|--------------------|
| CHP | Thick film 0603, 0805, 1206, 2010, 2512 | 4001/026 | SMD | Vishay / F | ESCC QML | Range as in QPL |
| JAXA 2050/J401 | 1005, 1608, 2012, 3216, 3225 | JAXA-QTS- 2050/J401 | SMD | SANADA KOA / J | JAXA QPL | Note 1 and 2 |
| SMV | Shunts | 4001/028 | SMD | ISA / G | ESCC QPL | Range as in QPL |
| Heater | Flexible, single and double layer | 4009/002 | See spec | IRCA / I | ESCC QPL | Range as in QPL |
| Heater | Flexible, single and double layer | 4009/004 | See spec | IRCA / I | ESCC QPL | Range as in QPL |
| Heater | Flexible, single and double layer | 4009/003 | See spec | MINCO / F | ESCC QPL | Range as in QPL |

Note 1: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>

- General specification : JAXA-QTS-2050 (and App. J)
- Detail specification : JAXA-QTS-2050/J401
- Application data sheet : JAXA-ADS-2050/J401

Note 2: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use.

3.11 EPPL PART1 THERMISTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------------|----------------------------------|---------------|----------|--------------|---------------|------------------------|
| G15K and G10K | NTC 2K to 100K, -40 + 160C | 4006/014 | See spec | MEAS / I | ESCC QPL | Var. 08, 09, 12, 13 |

(continued) EPPL Part 1 Thermistors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------------------------|----------------------------|---------------------|----------|---------------------------------|---------------|-----------------|
| JAXA 2160/A101-2012B*** | NTC | JAXA-QTS-2160/A101B | Chip | Tateyama Kagaku / J | JAXA QPL | Note 1 and 2 |
| K3A35 | NTC 1K to 100K, -55 + 115C | 4006/013 | See spec | MEAS / I | ESCC QPL | Range as in QPL |
| N1043/301 | Pt sensor | JAXA-QTS-2180/103 | See spec | Mitsubishi Heavy Industries / J | JAXA QPL | Note 1 and 2 |
| N1043/501 | Pt sensor | JAXA-QTS-2180/105 | See spec | Mitsubishi Heavy Industries / J | JAXA QPL | Note 1 and 2 |
| N1043/401 | Pt sensor | JAXA-QTS-2180/104 | See spec | Mitsubishi Heavy Industries / J | JAXA QPL | Note 1 and 2 |

Note 1: The following documents are available at JAXA Qualified EEE parts database <https://eepitnl.tksc.jaxa.jp/en/>

- General specifications : JAXA-QTS-2160 (and App. A), JAXA-QTS-2180
- Detail specifications : JAXA-QTS-2160/A101B, JAXA-QTS-2180/103, 104 and /105
- Application data sheet : JAXA-ADS-2160/A101A, JAXA-ADS-2180/103-105

Note 2: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use

3.12 EPPL PART1 TRANSISTORS

Bipolar transistors:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|------------------|---------------|-------------------|---------|---------|---------------|--------------|
| 2N5666, 2N5667 | Low power NPN | MIL-PRF-19500/455 | TO205 | MIC / U | MIL QML | |
| 2N3501 | Low power NPN | MIL-PRF- | TO205 | MIC / U | MIL QML | |
| 2N2484 | Low power NPN | 5201/001 | LCC3 | ST / F | ESCC QPL | Range in QPL |
| 2N2222A | Low power NPN | 5201/002 | TO18 | ST / F | ESCC QPL | Range in QPL |
| 2N3700 | Low power NPN | 5201/004 | LCC3+1 | ST / F | ESCC QPL | Range in QPL |
| 2N5551 | Low power NPN | 5201/019 | LCC3+1 | ST / F | ESCC QPL | Range in QPL |
| 2N2219 | Low power NPN | 5201/003 | TO-39 | ST / F | ESCC QPL | Range in QPL |
| 2N3019 | Low power NPN | 5201/011 | TO-39 | ST / F | ESCC QPL | Range in QPL |
| 2N5415 | Low power PNP | MIL-PRF- | TO39 | MIC / U | MIL QML | |
| 2N3637 | Low power PNP | MIL-PRF- | TO205 | MIC / U | MIL QML | |
| 2N3867S, 2N3868S | Low power PNP | MIL-PRF-19500/350 | TO205 | MIC / U | MIL QML | |

(continued) EPPL Part 1 Bipolar Transistors:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|---------|------------------|---------------|----------------------|--------|---------------|--------------|
| 2N5401 | Low power PNP | 5202/014 | LCC3, TO-18, LCCC3+1 | ST / F | ESCC QPL | Range in QPL |
| 2N2905 | Low power PNP | 5202/002 | TO39 | ST / F | ESCC QPL | Range in QPL |
| 2N2907 | Low power PNP | 5202/001 | LCC3, TO-18, LCCC3+1 | ST / F | ESCC QPL | Range in QPL |
| 2N5154 | High power NPN | 5203/010 | TO-257, TO39 | ST / F | ESCC QPL | Range in QPL |
| 2N5153 | High power PNP | 5204/002 | SMD .5 | ST / F | ESCC QPL | Range in QPL |
| BUX77 | High power NPN | 5203/016 | TO-257 | ST / F | ESCC QPL | Range in QPL |
| BUX78 | High power PNP | 5204/006 | TO-257 | ST / F | ESCC QPL | Range in QPL |
| 2N2920A | Matched dual NPN | 5207/002 | TO77, LCC6 | ST / F | ESCC QPL | Range in QPL |
| 2N3810 | Matched dual PNP | 5207/005 | TO78, LCC6, FP8 | ST / F | ESCC QPL | Range in QPL |

EPPL Part 1 MOSFET Transistors:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|--------------------------|-------------|-------------------|------------------|----------|---------------|------------------|
| STRH100N10FSY3 | N-channel | 5205/021 | TO254AA | ST / F | ESCC QPL | Variants 1 and 2 |
| STRH100N6 | N-channel | 5205/022 | TO254AA | ST / F | ESCC QPL | Variants 1 and 2 |
| STRH8N10 | N-channel | 5205/023 | SMD .5 | ST / F | ESCC QPL | Variant 01 |
| STRH40N6 | N-channel | 5205/024 | SMD .5 | ST / F | ESCC QPL | Variant 01 |
| BUY25CS12J-01 | N-channel | 5205/026 | SMD0.5 | INF / G | ESCC QPL | Variant 01 |
| BUY25CS54A-01 | N-channel | 5205/027 | SMD2 | INF / G | ESCC QPL | Variant 01 |
| BUY10CS12J-01 | N-channel | 5205/028 | SMD0.5 | INF / G | ESCC QPL | Variant 01 |
| BUY25CS12K-01 | N-channel | 5205/030 | TO257AA | INF / G | ESCC QPL | Variant 01 |
| STRH40P10 | P-channel | 5205/025 | TO254AA | ST / F | ESCC QPL | Variants 1 and 2 |
| STRH12P10 | P-channel | 5205/029 | TO254AA, TO257AA | ST / F | ESCC QPL | Variants 1 and 2 |
| JAXA R 2SK4048 thru 4056 | N-channel | JAXA-QTS-2030/101 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |
| JAXA R 2SK4214 thru 4216 | N-channel | JAXA-QTS-2030/101 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |
| JAXA R 2SK4152 thru 4160 | N-channel | JAXA-QTS-2030/102 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |
| JAXA R 2SK4217 thru 4219 | N-channel | JAXA-QTS-2030/102 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |
| JAXA R 2SK4185 thru 4190 | N-channel | JAXA-QTS-2030/103 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |

(continued) EPPL Part 1 MOSFET Transistors:

| Type | Description | Specification | Package | Manuf. | Qualification | Remarks |
|--------------------------|-------------|-------------------|--------------|------------|---------------|--------------|
| JAXA R 2SJ1A01 thru 1A12 | P-channel | JAXA-QTS-2030/104 | See spec | Fuji / J | JAXA QPL | Note 1 and 2 |
| 2N7389 | P-channel | MIL-PRF-19500/630 | TO205AF, LCC | I.R. / USA | MIL QML | |

Note 1: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>

- General specification : JAXA-QTS-2030
- Detail specifications : JAXA-QTS-2030/101, 102, 103, 104
- Application data sheets : JAXA-ADS-2030/101, 102, 103, 104,

Note 2: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use

EPPL Part 1 Microwave transistors:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------------------------------------|-----------------------|---------------|----------|--------------|---------------|---------------|
| BFY180 thru 183, 193, 193C, 196, 280 | Small signal, bipolar | 5611/006 | Micro-X1 | INF / G | ESCC QPL | Var. 01 to 08 |
| BFY450 | Small signal, bipolar | 5611/008 | Micro-X | INF / G | ESCC QPL | Var. 01 to 03 |
| BFY460 | Small signal, bipolar | 5611/009 | Micro-X | INF / G | ESCC QPL | Var. 01 to 03 |
| BFY640B, 650B | Small signal, bipolar | 5611/010 | Micro-X | INF / G | ESCC QPL | Var. 01 to 04 |
| BFY740B | Small signal, bipolar | 5611/011 | Micro-X | INF / G | ESCC QPL | Var. 01 |

3.13 EPPL PART1 WIRES AND CABLES

Low frequency wires and cables:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------|-------------|---------------|---------|--------------|---------------|--------------|
| 1871 | Polymide | 3901/001 | N/A | Nexans / F | ESCC QPL | Range in QPL |
| 1872 | Polymide | 3901/002 | N/A | Nexans / F | ESCC QPL | Range in QPL |

(continued) EPPL Part 1 Low frequency wires and cables

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------|----------------|---------------|---------|---------------|---------------|--------------|
| FA-3901-1 | Polymide | 3901/001 | N/A | Draka | ESCC QPL | Range in QPL |
| FA-3901-2 | Polymide | 3901/002 | N/A | Draka | ESCC QPL | Range in QPL |
| - | PTFE/polym. | 3901/013 | N/A | Axon / F | ESCC QPL | Range in QPL |
| SPC2110 | Polymide | 3901/009 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| - | Polymide | 3901/019 | N/A | Axon / F | ESCC QPL | Range in QPL |
| - | Polymide | 3901/019 | N/A | Leoni / G | ESCC QPL | Range in QPL |
| - | Fluoropolymer | 3901/012 | N/A | Axon / F | ESCC QPL | Range in QPL |
| SPM | Polym/fluorth. | 3901/018 | N/A | Axon / F | ESCC QPL | Range in QPL |
| SPLD | Polymide | 3901/021 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| - | Polymide | 3901/021 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| - | ETFE | 3901/020 | N/A | TE Conn / UK | ESCC QPL | Range in QPL |
| - | ETFE | 3901/022 | N/A | TE Conn / UK | ESCC QPL | Range in QPL |
| CSWL | Fluoropolymer | 3901/024 | N/A | Axon / F | ESCC QPL | Range in QPL |
| CSWL | Fluoropolymer | 3901/024 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| CSC | Polym/fluorth. | 3901/025 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| SPM | Polym/fluorth. | 3901/018 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| 55/995X | Fluoropolymer | 3901/012 | N/A | TE Conn / UK | ESCC QPL | Range in QPL |
| MTV-BTV | PTFE/polymide | 3901/013 | N/A | Nexans / F | ESCC QPL | Range in QPL |
| SPL | Polymide | 3901/019 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| - | Polym/fluorth. | 3901/018 | N/A | Leoni / G | ESCC QPL | Range in QPL |
| - | Polymide | 3901/001 | N/A | Axon / F | ESCC QPL | Range in QPL |
| - | Polymide | 3901/021 | N/A | Leoni / G | ESCC QPL | Range in QPL |
| - | Polymide | 3901/002 | N/A | Axon / F | ESCC QPL | Range in QPL |
| SPP | Power wires | 3901/017 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |

EPPL Part 1 Coaxial and miscellaneous wires and cables:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------------------|--|--------------------|---------|---------------|---------------|--------------|
| - | HF cable | 3902/002 | N/A | Axon / F | ESCC QPL | Range in QPL |
| GCX, GTX, GSC, GBL | HF cable | 3902/002 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| 50CIS | HF cable | 3902/001 | N/A | Nexans / F | ESCC QPL | Range in QPL |
| JAXA2120 /D101 | Differential transmission cable (1 pair) | JAXA-QTS-2120/D101 | N/A | Junkosha / J | JAXA QPL | Note 1 and 2 |
| JAXA2120 /D101 | Differential; transmission cable (4 pairs) | JAXA-QTS-2120/D102 | N/A | Junkosha / J | JAXA QPL | Note 1 and 2 |
| - | Spacewire | 3902/003 | N/A | Axon / F | ESCC QPL | Range in QPL |
| - | Spacewire | 3902/003 | N/A | W.L. Gore / G | ESCC QPL | Range in QPL |
| - | Spacewire | 3902/004 | N/A | Axon / F | ESCC QPL | Range in QPL |

Note 1: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>

- General specification : JAXA-QTS-2120 and its Appendix D

- Detail specifications : JAXA-QTS-2120/D101, 102, Application data sheets : JAXA-ADS-2120/D101-102

Note 2: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use

3.14 EPPL PART1 THERMOSTAT

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------|-------------|---------------|----------|--------------|---------------|--------------|
| TH47 | SPST 4A 30V | 3702/001 | See spec | COMEPA / F | ESCC QPL | Range in QPL |

3.15 EPPL PART1 RF PASSIVE COMPONENTS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|------------|-------------|---------------|----------|--------------|---------------|--------------|
| Attenuator | Coaxial | 3403/005 | See spec | Radiall / F | ESCC QPL | Range in QPL |
| RF loads | Coaxial | 3403/006 | See spec | Radiall / F | ESCC QPL | Range in QPL |

3.16 EPPL PART1 HYBRIDS

| Type | Description | Specification | Pack. | Manufacturer | Qualification | Remarks |
|----------------------|-------------|---------------|-------|-------------------|---------------|------------|
| 8090.0832.G03 | PWM control | 8090 | CQFP | TAS ETCA / B | Not | Note 1 |
| JAXA2020/01011DBCR06 | POL 1.5V/3A | JAXA-QTS- | FP26 | Avio Fukushima /J | JAXA | Notes 2, 3 |
| JAXA2020/01011DBCR09 | POL 3.3V/2A | 2020/0101 | FP26 | Avio Fukushima /J | JAXA | Notes 2, 3 |

Note 1: PID 9100.0683 as per ESA Capability Approval, HTIF HYB-GEN-ES-0017-01-02-HTIF-80900832G03 ISS 1.2

Note 2: The following documents are available at JAXA Qualified EEE parts database <https://eeepitnl.tksc.jaxa.jp/en/>
- General spec.: JAXA-QTS-2020, Detail spec. : JAXA-QTS-2020/0101, Application data sheet : JAXA-ADS-0101

Note 3: As to Export License, Manufacturer will apply to METI (Ministry of Economy, Trade and Industry) for license in accordance with "Foreign Exchange and Foreign Trade Act (Law)" with information such as End User/End Use

4 EPPL PART 2

4.1 EPPL PART2 CAPACITORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------|------------------------------|---------------|---------------|---------------------|---------------|------------------------|
| CTC21E | Solid Ta electrolyte | 3012/003 | SMD | Exxelia Tantalum /F | Not qualified | Note 1 |
| ST79 | Tantalum non-solid | 3003/006 | Axial | Exxelia Tantalum /F | Not qualified | Notes 2 and 3 |
| CT79, CT79E | Tantalum non-solid | 3003/005 | Axial | Exxelia Tantalum /F | Not qualified | Range in specification |
| PM90S | Self-healing metallized film | 3006/020 | SMD and axial | Exxelia / F | Not qualified | Range in specification |
| T583 | Organic polymer Ta | 3012/005 | SMD | Kemet / Portugal | Not qualified | |

Note 1. The restricted range of preferred values in 10% tolerance are: 680µF 6.3V, 330µF 6.3V, 470µF 10V, 220µF 10V, 330µF 16V, 150µF 16V, 220µF 20V, 100µF 20V, 100µ 25V F, 47µF 25V, 68µF 40V, 33µF 40V, 47µF 50V, 22µF 50V

Note 2: 125V rated values shall be avoided

Note 3. The restricted range of preferred values in 10% tolerance are: 560µF 60V, 700µF 60V, 500µF 63V, 330µF 75V, 470µF 75V, 150µF 100V, 220µF 100V

4.2 EPPL PART2 CONNECTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|--------|--------------|----------------------|-------------|--------------|---------------|---------|
| TNC | Coaxial | 3402/008, /009, /010 | TNC | Radiall / F | Not qualified | |
| SMP | Coaxial | RAD-DET-CONN-019 | SMP | Radiall / F | Not qualified | |
| MDSA | Micro D | 05039-ST-01 | Rectangular | Axon / F | Not qualified | |
| Nano | Nano D | 3401/086 | Rectangular | Axon / F | Not qualified | |
| D*J | Filtered | CSFR 165 | Rectangular | C & K / F | Not qualified | |
| Splice | Space splice | 3401/005 + CS FR039 | Wire joint | C & K / F | Not qualified | |

4.3 EPPL PART2 CRYSTALS AND PIEZO-ELECTRIC DEVICES

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------|-------------|---------------|----------|--------------|---------------|---------|
| AXIOM6060 | OCXO | AXIOM6060 | 60x60x30 | Axtal / G | Others | |

4.4 EPPL PART2 DIODES

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|-------------|-------------------|---------|--------------|---------------|---------|
| 1N5811US | Rectifier | MIL-PRF-19500/477 | D-5B | SEN / USA | MIL QML | |

(continued) EPPL Part 2 Diodes:

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---|---------------------------|-----------------------------------|----------------------|---------------------------|-------------------------|---------|
| 1N5806US | Rectifier | MIL-PRF-19500/477 | D-5A | SEN / USA | MIL QML | |
| 1N5416US thru 1N5418US, 1N5420US | Rectifier | MIL-PRF-19500/411 | MELF | SEN / USA | MIL QML | |
| 1N5819UR-1 | Rectifier | MIL-PRF-19500/586 | DO-2123AB | MIC / USA | MIL QML | |
| 1N5615, 1N5617 (A/UN), 1N5619, 1N5623 | Rectifier | MIL-PRF-19500/429 | AXIAL | MIC / USA | MIL QML | |
| 1N5811US | Rectifier | MIL-PRF-19500/477 | D-5B | MIC / USA | MIL QML | |
| 1N5811US | Rectifier | MIL-PRF-19500/477 | D-5B | SEN / USA | MIL QML | |
| 1N5550, 1N5552, 1N5554 | Rectifier | MIL-PRF-19500/420 | AXIAL | MIC / USA | MIL QML | |
| 1N6124A | Transient suppressor | MIL-PRF-19500/516 | AXIAL | MIC / USA | MIL QML | |
| 1N6640US | Switching | MIL-PRF-19500/609 | SMD | SEN / USA | MIL QML | |
| 1N6642US | Switching | MIL-PRF-19500/578 | SMD | SEN / USA | MIL QML | |

4.5 EPPL PART2 INDUCTORS AND TRANSFORMERS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------|---------------------------------------|----------------|--------------|----------------|---------------|-----------------------|
| 12XXXXXX | RF filter air coil and toroidal cores | FT08690020 | Flying leads | Flux / DK | Others | THM, SMT optional |
| 14XXXXXX | Power transformer | FT08690020 | THM, SMT | Flux / DK | Others | Optional flying leads |
| 19XXXXXX | Power transformer assembly | FT08690020 | SMT | Flux / DK | Others | THM optional |
| DBIT | 1553 transformer | MSP-003 | See spec | Microspire / F | Not qualified | |
| AE458RFW | Wideband transformer | 1501+ ES424N-1 | See specs | Coilcraft /USA | Not qualified | |

4.6 EPPL PART2 MICROCIRCUITS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------|-------------------|---------------|----------|--------------|---------------|---------|
| 3DSD4G08VS8292 | 4Gb SDRAM | 3DPA6140 | SOP58-08 | 3D+ / F | Not qualified | |
| 3DEE8M08VS8190 | EEPROM 8Mbit 1Mx8 | 3DPA-1630-11 | G8 | 3D PLUS / F | Not qualified | |
| DFN64G08VS8305 | Flash NAND 8Gx8 | 3DPA-3420-7 | D8a | 3D PLUS / F | Not qualified | |

EPPL Part 2. Microwave Monolithic Integrated Circuits (MMIC):

| Type | Description | Manufacturer | Qualification | Remarks |
|-----------|--|--------------|---------------|--|
| PH25 | GaAs process, 0.25 μ m P-HEMT for low noise, low level applications up to 100GHz | UMS / F | Others | |
| HB20P | HBT GaInP/GaAs Foundry Process, 0.7 μ m Gate Applications in Power Amplifiers up to Ku Band | UMS / F | Others | |
| PPH15X-10 | GaAs process, 0.15 μ P-HEMT. Absolute Maximum Ratings (AMR) for PPH15X-10: Drain to Source Voltage: $V_{ds} = 8V$ at $I_{ds} = 150mA/mm$ Maximum instantaneous RF Drain to Gate Voltage: $V_{dgm} = 14V$ at the maximum DC Operating point specified above ($V_{ds} = 8V$ and $I_{ds} = 150mA/mm$) RF Compression = 7dB for Power matched 8x75m cell at $I_{ds} = 150mA/mm$ and $V_{ds} = 7V$ - Gate to Source Voltage: $V_{gs} = -2.5V$ | UMS / F | Others | SEE testing under DC+RF was performed – report available from the manufacturer |
| ED02AH | 0.18 μ m Mixed Analog/Digital 60 GHz Ft Pseudomorphic Low Noise MMIC Process | Ommic / F | Others | Note 1 |

Note 1: EDO2AH Process is sensitive to Hydrogen poisoning. A Hydrogen getter is mandatory in case of hermetic encapsulation.

(continued) EPPL Part 2. Microwave Monolithic Integrated Circuits (MMIC):

| Type | Description | Manufacturer | Qualification | Remarks |
|-----------|--|--------------|---------------|--|
| HP07-20 | MMIC, GaAs Foundry Process, MESFET 0.7 um for power applications up to Ku Band. Replacement of HP07 Process by HP07-20 process due to a change in the gate lithography process | UMS / F | Others | DO NOT USE BEYOND Vgdmax/2 DUE TO SENSITIVITY TO HEAVY IONS. |
| HB20M | Mixed digital/analog MMIC HBT process InGaP HBT (Application in mixed digital/analog circuits up to Ku band) | UMS / F | Others | SEE to be considered (digital elements) |
| HB20PX-10 | HBT InGaP (2 μm emitter width) MMIC process Applications in Power Amplifiers up to Ku Band Absolute Maximum Ratings (AMR) for HB20PX-10: - Base to Collector Voltage : Vbc = 11.0V - Collector to Emitter Voltage: Vce = 9.5V (VSWRmax = 2 and 4dBC of Compression, Jce = 33000A/cm ² for single cell transistor in CW mode and Jce = 22000A/cm ² for bi-cell transistor in pulsed mode) - RF Compression = 5 dB (under maximum operating conditions) - Max DC Collector Emitter Current Density: Jce = 40000A/cm ² per emitter area (in pulsed mode for Bi-Cell Transistor) | UMS / F | Others | Note 2 |
| PPH25 | 0.25μm Power P-HEMT (AlGaAs/InGaAs/GaAs) with double gate recess. Technology suitable for power switch / attenuator and power amplifiers up to 35GHz. | UMS / F | Others | |
| PPH25X-10 | 0.25 μm Power P-HEMT process Application in Power Amplifiers C to K band Absolute Maximum Ratings (AMR) for PPH25X-10: - Drain to Source Voltage: Vds = 9.5V (VSWR max of 2 and 3dBc) - Gate to Drain Voltage: Vgdmax= -11.5V - RF Compression = 7dB (Vds =8.0V and VSWR of 3) - Gate to Source Voltage: Vgs = -3.0V μm | UMS / F | Others | |
| BES | 1μm Schottky diode process | UMS / F | Others | Note 2 |

Note 2: It is the responsibility of the users to check that the process design can withstand the radiation requirements for its application. Max ratings should be in conformance with the application

(continued) EPPL Part 2. Microwave Monolithic Integrated Circuits (MMIC):

| Type | Description | Manufacturer | Qualification | Remarks |
|-------------|--|--------------|---------------|--|
| HB20S | Power HBT process. Application in Power Transistors for L to C band amplifiers | UMS / F | Others | Note 3 |
| GH50-10 | 0.5 μm GaN HEMT (AlGaIn/GaN on SiC substrate) for Power amplifier up to C band. MAXIMUM RATING for AB class operation: ** Vds (at Ids = 50 mA/mm): 60V (50V recommended) ** Vgs: -7V ** Output power at PAEmax +1dB ** Maximum VSWR under recommended ratings: 5:1 all phases (sustained operation should stay below a recommended VSWR of 3:1 to safeguard reliability) ** Ig (under DC bias only) > -0.5mA/mm ** Tj (under recommended conditions): 160C | UMS / F | Others | Note 4 Note 5 Note 6 Note 7 Note 8 |
| CHA5350-99F | K-band Power Amplifier in die form. Available in accordance with ESCC 9012/002 | UMS / F | Others | Made on PPH15X-10 process |
| D01PH | 0.13 μm 100 GHz ft 12V VBGD Pseudomorphic Power MMIC Process | Ommic / F | Others | Note 9 Note 10 |
| PH15 | MMIC GaAs Foundry Process, 0.15 μm (P-HEMT for low noise, low level applications up to W Band | UMS / F | Others | Note 11 |
| PH10-10 | 0.1 μm Very low Noise P-HEMT technology (AlGaAs/InGaAs on GaAs substrate with AlTiAlNi gate) | UMS / F | Others | Note 12 |

Note 3: No radiation tests were performed on this process. It is the responsibility of the users to check that their design can withstand the radiation requirements for its application

Note 4: All conditions can be fulfilled simultaneously.

Note 5: The given values must not be exceeded at the same time even momentarily for any parameter, since each parameter is independent from each other, otherwise deterioration or destruction of the device may take place

Note 6: Recommended operating output power is defined as the input power level to operate at maximum power added efficiency (PAE)

Note 7: Junction temperature is specified as the maximum peak junction temperature

Note 8: Maximum power bar size tested during evaluation was 25.6mm under pulsed conditions (CHZ180A topology), the space evaluation domain is accordingly limited to powers bars with maximum 25.6mm of total periphery. For different usage of power bars of this size (as for example continuous mode operation) and for total periphery higher than 25.6mm it is the responsibility of the users to perform relevant reliability tests.

Note 9: D01PH Process is sensitive to Hydrogen poisoning. A Hydrogen getter is mandatory in case of hermetic encapsulation.

Note 10: D01PH tested in DC+RF up to 8dB of Gain Compression with no evidence of SEE induced by heavy ions

Note 11: Passive elements are similar to PH25 Process. No radiation tests were performed on this process. Therefore it is the responsibility of the users to check that its design can withstand the radiation requirements for its application (especially for SEE).

Note 12: TID, DD and SEE testing under DC biasing were performed. Reports are available from the manufacturer.

4.7 EPPL PART2 RELAYS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-------|-------------|---------------|----------|--------------|---------------|---------|
| PHL50 | Latching | 3602/014 | See spec | STPI / F | Not qualified | |

4.8 EPPL PART2 RESISTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|---------|---------------|---------------|---------|------------------|---------------|---------|
| VCS1625 | Wraparound 1W | 303119 | Chip | Vishay Precision | Not qualified | |

4.9 EPPL PART2 THERMISTORS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------------------|-------------|---------------|----------|-------------------------------------|---------------|---------|
| 0805 PTC 150Ω - 2K @25C 1% | | S-311-P-827 | 0805 | Quality Thermistor/ USA | Others | |
| 0805 NTC 50K @25C 1% | | S-311-P-827 | 0805 | Quality Thermistor/ USA | Others | |
| 44900 NTC | | S-311-P-18 | See spec | Measurement specialties (YSI) / USA | MIL QPL | |
| 311P18-xx | | S-311-P-18 | See spec | Quality Thermistor/ USA | MIL QPL | |

4.10 EPPL PART2 RF PASSIVE COMPONENTS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|----------------------------|---------------------------------------|-----------------|-------------|---------------|---------------|---------|
| T10 | Coax isol / circul. 7.9GHz to 21.5 | 60102965-069 | T10 SMA | Cobham MW / F | Not qualified | |
| BK1150 BK1250 BK1350 | Coax isol / circul. 22GHz to 32GHz | 3202/193 draftA | See spec | Cobham MW / F | Not qualified | |
| R4042106 | RF coaxial load | 3403/004 | SMA conn | Radiall / F | Not qualified | |
| R4043706 | RF coaxial load | 3403/010 | TNC conn | Radiall / F | Not qualified | |

4.11 EPPL PART2 HYBRIDS

| Type | Description | Specification | Package | Manufacturer | Qualification | Remarks |
|-----------------|--|---------------------------|---------------|---------------|---------------|---------|
| A0005367 | 1553 RTC | A5-PS-CA5-491-MMV | Metallic FP64 | Airbus DS / F | Others | |
| A0000055 (H757) | 1553 dual transceiver | DPN-A5-ST-0426 | Metallic FP64 | Airbus DS / F | Others | |
| MCM ERC32 | Processing module with ERC32SC, VASI ASIC and memories | MCM-ERC32-SP-00306-V-ASTR | CQFP334 | Airbus DS / F | Others | |
| MXF-02 | Double balanced mixer 10 to 1500MHz | TD200370-178 | FP | Cobham MW / F | Not qualified | |
| MXF-01 | Double balanced mixer 0.5 to 500MHz | TD200369-178 | FP | Cobham MW / F | Not qualified | |
| MXF-03 | Termination-insensitive mixer 1 to 3500MHz | TD200542-178 | FP | Cobham MW / F | Not qualified | |

END OF DOCUMENT