EUROPEAN PREFERRED PARTS LIST

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CHANGE LOG

Reason for change	Issue	Date
Periodic update.	36	July 2018

CHANGE RECORD

Issue 36	Paragraph	Page
Moved Exxelia's PM90S capacitors up to Part 1 from Part 2 as they achieved full Qualification	3.1 EPPL Part 1 Capacitors	7
Removed SFC filters 200V due to the suspension of their qualification as of May 2018	3.5 EPPL Part 1 Filters	13-14
Added Pt Sensors made by IST, CH, now qualified.	3.11 EPPL Part 1 Thermistors	28
Added CA5B, DTR5V and ADT1553-5V Hybrids made by Airbus DS, France	3.16 EPPL Part 1 Hybrids	34
Added TNC Very High Power RF Cable Assemblies made by Radiall, F, now qualified	(NEW) 3.17 EPPL Part 1 Cable Assemblies	35
Added circular SAVERS 3401/063 made by Glenair, UK	4.2 EPPL Part 2 Connectors	36
Added FM13 surface mount fuses, made by AEM, USA	4.5 EPPL Part 2 Fuses	37
Added SPPL 12420RH POL converter, made by Space IC, Germany	4.7 EPPL Part 2 Microcircuits	38
Added SiGe 0.25 BiCMOS process SGB25RH made by IHP, Germany	4.7 EPPL Part 2 Microcircuits	43
Removed Hybrid A0005367, 1553 RTC, due to obsolescence	4.12 EPPL Part 2 Hybrids	45

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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	Exxelia 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	Exxelia 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
CEC20xS	Ceramic, Type I	3009/003 &/040	0805	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC40xS	Ceramic, Type I	3009/004 &/040	1210	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC60xS	Ceramic, Type I	3009/005 &/040	1812	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC70xS	Ceramic, Type I	3009/006 &/040	2220	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC120xS	Ceramic, Type I	3009/022 &/040	1206	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC140xS	Ceramic, Type I	3009/037 &/040	0603	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC190xS	Ceramic, Type I	3009/040 & /042	0402	Exxelia 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	1210	AVX TPC / F	ESCC QPL	range in QPL
A_14G, A614Z	Ceramic, Type II	3009/010	1812	AVX TPC / F	ESCC QPL	range in QPL
A_15G, A615Z	Ceramic, Type II	3009/011	2220	AVX TPC / F	ESCC QPL	range in QPL
A_20G, A620Z	Ceramic, Type II	3009/023	1206	AVX TPC / F	ESCC QPL	range in QPL
CNC20xS	Ceramic, Type II	3009/008 &/039	0805	Exxelia Tech. / F	ESCC QPL	range in QPL
CNC40xS	Ceramic, Type II	3009/009 &/039	1210	Exxelia Tech. / F	ESCC QPL	range in QPL
CNC60xS	Ceramic, Type II	3009/010 &/039	1812	Exxelia Tech. / F	ESCC QPL	range in QPL
CNC70xS	Ceramic, Type II	3009/011 &/039	2220	Exxelia Tech. / F	ESCC QPL	range in QPL
CNC120xS	Ceramic, Type II	3009/023 &/039	1206	Exxelia Tech. / F	ESCC QPL	range in QPL
CNC140xS	Ceramic, Type II	3009/038 &/039	0603	Exxelia Tech. / F	ESCC QPL	range in QPL
CEC190xS	Ceramic, Type I	3009/039 & /043	0402	Exxelia 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
PM90S	Self-healing metallized film	3006/020	SMD and axial	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 401M	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	30uF -1200uF (6V) 25uF - 850uF (8V) 20uF - 750uF (10V) 15uF - 540uF (15V) 8uF - 300uF (30 V) 5uF - 160uF (50 V) 3.5uF -110uF (75V) 2.5uF- 86uF (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

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

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	Range as in QPL
1N5811U	Power rectifier	5101/013	LCC2-B	ST /F	ESCC QPL	
1N5819U	Power rectifier	5101/021	LCC2-B	ST /F	ESCC QPL	
1N5822U	Power rectifier	5106/020	LCC2-B	ST /F	ESCC QPL	
BYV54-200	Ultrafast 60A	5103/031	TO254	ST /F	ESCC QPL	
BYW81-200	Dual ultrafast	5103/029	SMD .5	ST /F	ESCC QPL	
STPS1045	Schottky barr.	5106/017	SMD	ST /F	ESCC QPL	
STPS6045	Schottky barr.	5106/018	SMD	ST /F	ESCC QPL	
STPS20100	Schottky barr.	5106/016	SMD	ST /F	ESCC QPL	
STPS40100	Schottky barr.	5106/019	SMD	ST /F	ESCC QPL	

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	Exxelia Tech. / F	ESCC QPL	Range in QPL, Note 1
SFC 100	C-filter, Hermetic glass fill	3008/027	axial	Exxelia Tech. / F	ESCC QPL	
SFP 060	Pi-filter, Hermetic glass fill	3008/021	axial	Exxelia Tech. / F	ESCC QPL	
SFP 100	Pi-filter, Hermetic glass fill	3008/028	axial	Exxelia Tech. / F	ESCC QPL	
SFL 100	L-filter, Hermetic glass fill	3008/029	axial	Exxelia Tech. / F	ESCC QPL	

(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	Range in QPL, Note 1
SFC 040	C-filter, non-hermetic resin fill	3008/032	axial	Exxelia Tech. / F	ESCC QPL	
SFC 060	C-filter, non-hermetic resin fill	3008/033	axial	Exxelia Tech. / F	ESCC QPL	
SFP 035	Pi-filter, non-hermetic resin fill	3008/025	axial	Exxelia Tech. / F	ESCC QPL	
SFP 040	Pi-filter, non-hermetic resin fill	3008/014	axial	Exxelia Tech. / F	ESCC QPL	
SFP 060	Pi-filter, non-hermetic resin fill	3008/030	axial	Exxelia Tech. / F	ESCC QPL	
SFC 030V	C-filter, mixed fill for sodlering	3008/020	axial	Exxelia Tech. / F	ESCC QPL	

Note 1: SFC filters rated 200V are not qualified since ESCC QPL released in May 2018

EPPL Part 1 Surface Acoustic Wave (SAW) filters:

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
SAW filters (transversal band pass / resonator / notch/ low lossimpedance 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 chocke	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	Microchip / F	ESCC QML	Also available with 5962-07224
TSC695F	Low voltage 32-bit SPARC Embed. Proc.	5962-00540	MQFP256	Microchip / F	MIL QML	Also available with 9512/003
TSC695FL	Low voltage 32-bit SPARC Embed. Proc.	5962-03246	MQFP256	Microchip / F	MIL QML	
ATF697FF	Reconfigurable SPARC V8 processor made with AT697F + ATF280F (FPGA)	5962-14229	MQFPT352	Microchip / F	MIL QML	Note 1
AT7913E	SpW RT controller with Leon2FT embedded processor	5962-10A03	LGA349	Microchip / 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	Microchip / F	MIL QML	Single Event Effects (SEE) sensitivity shall be verified where necessary
AT60142HT	512Kx8 5V-tolerant	5962-05208	FP36	Microchip / F	MIL QML	
AT68166H	16Mbit 3.3V MCM	5962-06229	MQFP68	Microchip / F	MIL QML	
AT68166HT	16Mbit 5V-toler. MCM	5962-06229	MQFP68	Microchip / F	MIL QML	
65609EV	128Kx8 3.3V	5962-02501	FP32	Microchip / 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	Microchip / F	Not qualified	Also available with 5962-03250
AT280F	SRAM-based reprogrammable 40K ASIC gates	9304/009	MQFPT352 and MQFPF256	Microchip / F	ESCC QML	Also available with 5962-12225

EPPL Part 1 ASIC Technologies Digital:

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
ATC18RHA	0.18µ CMOS ASIC standard cell	9202/080	MQFP	Microchip / F	ESCC QML	Also available to 5962-06B02
ATMX150RHA	0.150µ SOI CMOS ASIC standard cell – DIGITAL LIBRARIES	9202/083	MQFP	Microchip / 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
RHF200K-01V	Fully differential	5962-17210	FP-16	ST / F	MIL QML	
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	
RHR61K01V	Precision	5962-16204	FP-8	ST / F	MIL QML	
RHR64K01V	Precision Quad	5962-16205	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	
TPS7A4501	Ultra low drop-out 1.5A	5962-12224	FP-10	T.I. / USA	MIL QML	
TPS7H1101	Ultra low drop-out 3A	5962-13202	FP-16	T.I. / USA	MIL QML	
TPS7H3301	3A Sink/Source w/Vref	5962-14228	FP-16	T.I. / USA	MIL QML	

EPPL Part 1 Linear Voltage comparator:

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
AD584SH	Precision pin-progammable	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	9108/020	FP-8	ST / F	ESCC QPL	Note 1
ST1845FK	Current mode PWM	9108/021	FP-8	ST / F	ESCC QPL	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	
RHRDAC1612K01V	16 bit Sigma Delta DAC	5962-16211	FP-24	ST / F	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	
RHFLVDS217	Rad-hard LVDS serializer	5962-01534	FP-48	ST / F	MIL QML	
RHFLVDS218	Rad-hard LVDS de-serializer	5962-01535	FP-48	ST / F	MIL QML	
TPS50601-SP	Rad-hard 6.3V, 6A synch. Step-down converter	5962-10221	FP-20	T.I. / USA	MIL QML	Note 2
RHRPM4423K01V	Dual inverting MOSFET driver	5962-99511	FP-16	ST / F	MIL QML	
RHRPM4424K01V	Dual non-inverting MOSFET driver	5962-99560	FP-16	ST / F	MIL QML	

Note 1: this part is NOT ELDRS-free

Note 2: Users of these parts are encouraged to follow these recommendations in their designs:

a. Limit Vin to <= +5.5V
b. Limit the output (load) current of TPS50601 to < 4.5A
c. Add input filtering components such that the POL is compliant with the VI bus (ripple, impedance etc)
d. Add if needed, Over-voltage protection by external means
e. Add if needed, an external LCL protection for the intermediate bus (@ ca 5V)

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	
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	
4024B	7-STAGE RIPPLE CARRY BINARY COUNTER / DIVIDER	9204/024	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	
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	
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/DEMULTIPLEXER	9202/048	FP, DIL	ST / F	ESCC QPL	
4053B	TRIPLE 2-CHANNEL ANALOGUE MULTIPLEXER/DEMULTIPLEXER	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 ULTIPLEXER/DEMULTIPLEXER	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	
4081B	8 INPUT OR-NOR GATE	9201/052	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	SYNCHONOUS 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/DEMULTIPLEXER (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 Line 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	Synchrorous 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
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	
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	

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 0402, 0603, 0805, 1206, 2010	4001/023	SMD	Vishay / F	ESCC QPL	Range as in QPL
PFRR	Thin film 0402, 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
Pt sensors	PTC 100 ohm to 2 Kohm	4006/015	See spec	IST / CH	ESCC QPL	All variants

(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
JAXA 2160/B101 series	NTC, 2.2 to 10K, -55/+150C	JAXA-QTS-2160/B101	Radial (leads)	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
PxKx.232.7W	PTC Pt sensors	4006/015	See spec	Innovative Sensor Technology / Switzerland	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://eeepitnl.tksc.jaxa.jp/en/
- General specifications : JAXA-QTS-2160 (and App. A and B), JAXA-QTS-2180
- Detail specifications : JAXA-QTS-2160/A101B, JAXA-QTS-2180/103, 104 and /105, JAXA-QTS-2160/B101A
- Application data sheet : JAXA-ADS-2160/A101A, JAXA-ADS-2180/103-105, JAXA-ADS-2160/B101

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

(continued) EPPL Part 1 Bipolar Transistors:

Type	Description	Specification	Package	Manuf.	Qualification	Remarks
2N5415	Low power PNP	MIL-PRF-19500/485	TO39	MIC / U	MIL QML	
2N3637	Low power PNP	MIL-PRF-19500/357	TO205	MIC / U	MIL QML	
2N3867S, 2N3868S	Low power PNP	MIL-PRF-19500/350	TO205	MIC / U	MIL QML	
2N5401	Low power PNP	5202/014	LCC3, TO-18, LCCC3+1	ST / F	ESCC QPL	Range in QPL
2N2905A	Low power PNP	5202/002	TO39	ST / F	ESCC QPL	Range in QPL
2N2907A	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
BUY15CSXXXX01	N-channel	5205/031	See spec	INF/G	ESCC QPL	Var. 01 thru 04
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

EPPL Part 1 MOSFET Transistors (continued):

Type	Description	Specification	Package	Manuf.	Qualification	Remarks
JAXA R 2SK4214 thru 4216	N-channel	JAXA-QTS-2030/101	See spec	Fuji / J	JAXA QPL	Note 1 and 2
JAXA R 2SK4152 thu 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
JAXA R FRME60N25S JAXA R FRMF30N25S JAXA R FRMG13N25S	N-channel	JAXA-QTS-2030/108A	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
JAXA R FRMM42N25S	N-channel	JAXA-QTS-2030/108A	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
JAXA R FRMN20N25S	N-channel	JAXA-QTS-2030/108A	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
JAXA R FRME34N60S JAXA R FRMG06N60S	N-channel	JAXA-QTS-2030/109	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
JAXA R FRMM34N60S	N-channel	JAXA-QTS-2030/109	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
JAXA R FRMN05N60S	N-channel	JAXA-QTS-2030/109	See spec	Fuji / J	JAXA QPL	Note 1, 2 and 3
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, 108A, 109
- Application data sheets : JAXA-ADS-2030/101, 102, 103, 104, 108A, 109

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Note 3: These devices have been evaluated with SEE tests, see ADS documentation. Use only within Safe Operating Area as defined in QTS specification as applicable.

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
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 lightweight	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

EPPL Part 1 Low frequency wires and cables (continued):

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
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	Differentia; 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
BK1xxxx/BK3XXX	Circulators and isolators, coaxial	3202/026	See spec	Cobham / F	ESCC QPL	Var. 01, 02
BE11E2/BE12E2		3202/022				Range in QPL
BG11E2/BG12E2		3202/023				Range in QPL

3.16 EPPL PART1 HYBRIDS

Type	Description	Specification	Pack.	Manufacturer	Qualification	Remarks
JAXA2020/01011DBCR06	POL 1.5V/3A	JAXA-QTS-2020/0101	FP26	Avio Fukushima /J	JAXA QPL	Notes 1, 2
JAXA2020/01011DBCR09	POL 3.3V/2A		FP26	Avio Fukushima /J		Notes 1,2
A0015227-QAR-00 CA5-B FP AR	1553 BUS COUPLER	ARIA6HYB6SPEC6DA0031443	FP64	Airbus DS / F	Ariane 5	Note 3
DTR5V	1553 dual transceiver	DPN-A5-ST-0426	FP46	Airbus DS / F		
ADT1553-5V	1553 DUAL Rx and Tx	T1553-DT5V-SPEC-DA0032383-E-ASTR	FP40	Airbus DS / F		

Note 1: 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 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

Note 3: these devices are listed based on the ESA PCA certified for the Hybrid line, combined with type approval in the context of their application in Ariane 5. This is also relevant for the analysis of RHA with these hybrids. Their application in space systems other than launchers might require the repetition of radiation evaluation tests or design analyses.

3.17 EPPL PART 1 CABLE ASSEMBLIES

Type	Description	Specification	Pack.	Manufacturer	Qualification	Remarks
TNC, VHP Cable Assemblies	DC to 8 GHz	3408/001	-	Radiall / F	ESCC QPL	Notes 1, 2

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.

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		Not qualified	Notes 2 and 3
CT79, CT79E	Tantalum non-solid	3003/005	Axial		Not qualified	Range in specification
T583	Organic polymer Ta	3012/005	SMD	Kemet / Portugal	Not qualified	
G311P829**********	Ceramic chip multilayer	S-311-P-829	SMD	Presidio Comp. Inc / USA	GSFC QPLD	Custom made to GSFC spec. Note 4

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, 100µF 25V, 47µF 25V, 68µF 40V, 33µF 40V, 47µF 50V, 22µF 50V, 12µF 63V, 15µF 63V, 33µF 63V

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

Note 4. The restricted range of preferred values is: 0402 X7R 0.1uF 10V, 0603 X7R 0.22uF 10V, 0805 X7R 1uF 10V, 1206 X7R 1.8uF 10V, 1209 X7R 2.7uF 10V, 1812 X7R 4.7uF 10V, 0603 X7R 0.1uF 5V, 0508 X7R 0.12uF 10V, 0612 X7R 0.27uF 10V, 0912 X7R 0.68uF 16V

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	
Saver	Circular	3401/063	Circular	Glenair / UK	Not qualified	Not for Flight use

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	
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	
SIC-HT-SBD01	SiC blocking	5106/022	SMD	Alter Tech./ Spain	Not qualified	Note 1

Note 1. The listing of this part is based on project validation data; an adequate procurement approach, possibly including procurement inspections (PRECAP, DPA) and Lot Validation Testing, should be considered upon selection.

4.5 EPPL PART 2 FUSES

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
FM12	Subminiature fuse	MIL-PRF-23419	Flying leads	AEM / USA	NPSL	Note 1
FM13	Surface mount fuse	MIL-PRF-23419/13	SMD	AEM/USA	MIL QPL	

Note 1: refer to NPSL for recommended range and important application notes at https://nepp.nasa.gov/npsl/Fuses/23419/23419.htm

4.6 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	

4.7 EPPL PART2 MICROCIRCUITS

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
3DSD4G08VS8292	4Gb SDRAM	3DPA6140	SOP58-08	3D PLUS / F	Not qualified	Note 1
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	
SY1007S	GNSS Rx	SY1004s-Proc02	BGA36	Saphyrion/CH	Not qualified	Notes 2, 3
SY1017CS	GNSS AD/DAC/PLL	SY1017CS-Proc08	BGA36	Saphyrion/CH	Not qualified	Notes 2, 3
SPPL12420RH	Step-down converter	PRCS.PL12420.01 iss1.4	FP-16	Space IC / G	Not qualified	Note 4

Note 1: SDRAMs are sensitive to ion and protons induced degradation of their memory cells. The effect is the degradation of the retention time of the memory cells and the affected bits seem to be stuck in a preferential state (therefore the name of stuck bits or weakened memory cells). Depending on the level of degradation, some cells can recover full functionality very quickly, some cells cannot. A weakened cell detected as an error by an EDAC cannot be scrubbed. Because of this, several in-flight anomalies have been observed on design using simple 1 bit/nibble error correct/2 bits/nibbles errors detect EDAC schemes. The number of anomalies observed is relatively small but not negligible. Therefore, with SDRAMs, it is recommended to use stronger EDAC schemes that have the capability to correct at least 2 bits/nibbles in a data word.

Note 2: This device has been verified by test to be immune to destructive Single Event Latch-up, as may be induced by eth space environment, up to 45.4 MeV.cm2/mg only. Contact the manufacturer for additional details.

Note 2: Potential users of this component are encouraged to implement procurement inspections as PRECAP and DPA. Refer to ESCC guidelines available in documents ESCC 21001 and ESCC 21002.

Note 4. This device is sensitive to non-destructive AND destructive SEE induced by the space radiation environment. Refer to the manufacturer for additional information on both non-destructive (SET) and destructive SEE evaluation results. Adequate derating MUST be implemented to prevent some of these effects. The issue 1.4 of the specification provides the following rules based on thresholds obtained during SEE evaluation:

- LET ≤ 60MeV.cm2/mg : VIN ≤ 13V
- LET ≤ 85MeV.cm2/mg : VIN ≤ 11V

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

Type	Description	Manufacturer	Qualification	Remarks
PH25	GaAs process, 0.25µm P-HEMT for low noise, low level applications up to 100GHz	UMS / F	Others	
HB20P	HBT GaInP/GaAs Foundry Process, 0.7 µm GateApplications in Power Amplifiers up to Ku Band	UMS / F	Others	
PPH15X-10	GaAs process, 0.15µ P-HEMT. Absolute Maximum Ratings (AMR) for PPH15X-10: Drain to Source Voltage: Vds = 8V at Ids = 150mA/mm Maximum instantaneous RF Drain to Gate Voltage: Vdgmax = 14V at the maximum DC Operating point specified above (Vds = 8V and Ids = 150mA/mm) RF Compression = 7dB for Power matched 8x75m cell at Ids = 150mA/mm and Vds = 7V - Gate to Source Voltage: Vgs = -2.5V	UMS / F	Others	SEE testing under DC+RF was performed – report available from the manufacturer
CHA5350-99F	K-band Power Amplifier in die form. Available in accordance with ESCC 9012/002	UMS / F	Others	Made on PPH15X-10 process
ED02AH	0.18 µm Mixed Analog/Digital 60 GHz Ft Pseudomorphic Low Noise MMIC Process	Ommic / F	Others	Note 1
CGY2173UH	MMIC 6 bit phase shifter. Available in accordance with ESCC 9012/007	Ommic / F	Others	No Radiation test done. Note 1
D01MH	0.13 µm Low Power / Low Noise 150GHz Ft M-HEMT process. **Maximum ratings of D01MH MHEMT** (see nested table below)	Ommic / F	Others	Note 2 Note 3

Parameter	Unit	AMR	SOA (derating applied)
V_{gd} (reverse) (1)	V	-7	-7
V_{gd} (forward)	V	+0.8	+0.6
V_{gs} (reverse) (1)	V	-4	-4
V_{gs} (forward)	V	+0.8	+0.6
Gate current (Ig)	mA/finger	1	0.75
Dissipater power (P_{diss})	W/mm	0.26	0.21
V_{ds} (2)	V	1.7	1.3
Gain compression (depends on MMIC)	dBc	5	3
Channel temperature	°C	150	110

(1) derating not applicable
(2) I_{ds} = 125mA/mm and T_{ch} = 110°C

Note 1: EDO2AH Process is sensitive to Hydrogen poisoning. A Hydrogen getter is mandatory in case of hermetic encapsulation.
Note 2: Although not experienced during ESCC evaluation, D01MH process may be sensitive to Hydrogen poisoning. A hydrogen getter is strongly recommended in case of hermetic encapsulation.
Note 3: It is the responsibility of the users to check that the process design can withstand the radiation requirements for its application.

(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)
CHV1203-98S	Voltage controlled oscillator 2.75 – 3 GHz Available in accordance with ESCC 9012/003	UMS / F	Others	Made on HB20M process
CHV1206-98S	Voltage controlled oscillator 5.5 – 6.1 GHz Available in accordance with ESCC 9012/004	UMS/F	Others	
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/cm² for single cell transistor in CW mode and Jce = 22000A/cm² for bi-cell transistor in pulsed mode) - RF Compression = 5 dB (under maximum operating conditions) - Max DC Collector Emitter Current Density: Jce = 40000A/cm² per emitter area (in pulsed mode for Bi-Cell Transistor) - Base to Emitter Voltage: Vbe = 2.5V	UMS / F	Others	Note 4
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	UMS / F	Others	
BES	1µm Schottky diode process	UMS / F	Others	Note 4

Note 4: 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
GH50-10	0.5 µm GaN HEMT (AlGaN/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 6 Note 7 Note 8 Note 9 Note 10

Note 5: not used
Note 6: All conditions can be fulfilled simultaneously.
Note 7: 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 8: Recommended operating output power is defined as the input power level to operate at maximum power added efficiency (PAE)
Note 9: Junction temperature is specified as the maximum peak junction temperature
Note 10: 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.

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

GH25-10	0.25 µm GaN HEMT MMIC process for High Power amplifiers up to Ka band (AlGaN/GaN on SiC)	UMS / F	Others	Note 11 Note 12 Note 13

Note 11: Maximum ratings for transistor topologies and MIM capacitors are as follows:

Transistor V1S (power applications)					
Parameter	**Symbol**	**Conditons**	**Unit**	**ROR**	**AMR**
Drain-Source Biasing Voltage	Vds	Idq = 150mA/mm	V	30	45
RF compression such as Pin equal to:		Under power matched and ROR dc biasing conditions		PAEmax	PAEmax +2dBm
Gate-Source Voltage (DC+RF)	Vgs	Under ROR dc biasing conditions	V	-20	-25
Drain-Gate Voltage (DC+RF)	Vdg		V	90	120
Gate Current	Ig	Forward	mA/finger	2	5
Peak Junction Temperature	Tj	Under ROR dc biasing conditions	°C	200	230

Transistor V9S (low noise and wide band applications)					
Parameter	**Symbol**	**Conditons**	**Unit**	**ROR**	**AMR**
Drain-Source Voltage Bias	Vds	Idq = 150mA/mm	V	25	40
RF compression such as Pin equal to:		Under power matched and ROR DC biasing conditions		PAEmax	PAEmax +2dBm
Gate-Source Voltage (DC+RF)	Vgs	Under ROR dc biasing conditions	V	-20	-25
Drain-Gate Voltage (DC+RF)	Vdg		V	70	100
Gate Current	Ig	Forward	mA/finger	2	5
Peak Junction Temperature	Tj	Under ROR DC biasing conditions	°C	200	230

Transistor V1C (switch applications)					
Parameter	**Symbol**	**Conditions**	**Unit**	**ROR**	**AMR**
Drain-Source Voltage (DC+RF)	Vds	Vgs = -30V	V	90	100
RF Gate-Source/drain Voltage	Vgs	Vgs DC = 0V	V	-60	-80
Gate Current	Ig	Forward	mA/finger	2	5
Peak Junction Temperature	Tj	Under ROR DC biasing conditions	°C	200	230

MIM capacitors

Parameter	Unit	ROR	ROR Rad hard	AMR	Note
Voltage (DC+RF)	V	80	35	130	@ 175°C

For space applications, the Recommended Operating Rating on MIM capacitor is 35V including RF signal.

Note 12: Radiation tests have shown SEB occurrences on MIM capacitors. It is the responsibility of the users to verify their design's compatibility with mission radiation environment. UMS may provide additional information on request.

Note 13: Humidity test (85%/85C with biaising) has pointed out the necessity to mount devices in a safe environment to prevent rapid corrosion due to high voltage operation. It is therefore recommended to use circuits in hermetic package or in appropriate protective coating.

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

D01PH	0.13 µm 100 GHz ft 12V VBGD Pseudomorphic Power MMIC Process	Ommic / F	Others	Note 14 Note 15
CGY2135UH	MMIC K-band High Power Amplifier available in accordance with ESCC 9012/005	Ommic / F	Others	Uses D01PH Notes 14, 15
CGY2145UH	MMIC low noise wideband amplifier available in accordance with ESCC 9012/006			No radiation test done
PH15	MMIC GaAs Foumdry Process, 0.15 um (P-HEMT for low noise, low level applications up to W Band	UMS / F	Others	Note 16
PH10-10	0.1 µm Very low Noise P-HEMT technology (AlGaAs/InGaAs on GaAs substrate with AlTiAlNi gate)	UMS / F	Others	Note 17
PPH15X-20	0.15µm GaAs power PHEMT technology Power and High linearity applications up to 45GHz	UMS / F	Others	Note 18
SGB25RH	SiGe 0.25um BiCMOS process for Mixed-Signal applications up to Ku-band with peak fT / fMAX 75GHz / 95 GHz and BVCBO > 7V	IHP / G	Others	Note 19

Note 14: D01PH Process is sensitive to Hydrogen poisoning. A Hydrogen getter is mandatory in case of hermetic encapsulation.
Note 15: D01PH tested in DC+RF up to 8dB of Gain Compression with no evidence of SEE induced by heavy ions
Note 16: 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 17: TID, DD and SEE testing under DC biasing were performed. Reports are available from the manufacturer.
Note 18: TID and SEE testing under DC biasing were performed. Reports are available from the manufacturer. BCB protection layer option covered by ESCC evaluation

Note 19: It is recommended to perform additional TID testing on full-custom designed chips. Additional LAT is also recommended.

4.8 EPPL PART2 RELAYS

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

4.9 EPPL PART 2 RESISTORS

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

4.10 EPPL PART2 THERMISTORS

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
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	

4.11 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	
R4042106	RF coaxial load	3403/004	SMA conn	Radiall / F	Not qualified	
R4043706	RF coaxial load	3403/010	TNC conn	Radiall / F	Not qualified	

4.12 EPPL PART2 HYBRIDS

Type	Description	Specification	Package	Manufacturer	Qualification	Remarks
A0000055 (H757)	1553 dual transceiver	DPN-A5-ST-0426	Metallic FP64	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	
MXC-01	Triple balanced mixer (2 to 18 GHz)	TD102144-178	See spec	Cobham MW / F	Not qualified	

END OF DOCUMENT