



## **ESCC QUALIFIED PARTS LIST (QPL)**

**ESCC/RP/QPL005-238 (REP 005)**

**May 2023**



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**DOCUMENTATION CHANGE NOTICE**

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DCR No.	CHANGE DESCRIPTION
1580	<p><b>Extension:</b> 370A, Axon Cable (France)</p> <p><i>Extension: The validity date of the certificate is extended. The scope of the certificate might change.</i></p> <p><i>Revision: The scope of the certificate is changed. The validity date of the certificate remains the same.</i></p>

XON

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**1 FOREWORD**

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

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

**2 PROCURORS' RESPONSIBILITY**

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

**3 USE OF TABLES**

**3.1 PUBLICATION**

The individual entries are published in sections within this document and are presented by manufacturer on the web. Please refer to our [escies.org](http://escies.org) website.

**3.2 TYPE DESIGNATION**

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

**3.3 COMPONENTS CHARACTERISTICS**

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

**3.4 MANUFACTURER**

Plant locations are indicated in the individual listing; contact information is given in full on the appropriate web pages. Please refer to our [escies.org](http://escies.org) website.

**4**      **REVISION PROCEDURE**

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

**5**      **TABLE OF QUALIFIED COMPONENTS**

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

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

5.1

**TABLE OF COMPONENTS**

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



10 Resistors	Shunts	Isabellenhuetten	285G
	Fixed, Film	Vishay Electronic GmbH	256L, 289G
	Chip	Vishay SA, Sfernice	287G, 314E
	Flexible, Foil, Heaters	IRCA	184P, 330D
11 Thermistor Sensors	NTC	TE Connectivity MEAS	266Krev1
	PT	Innovative Sensor Technology IST AG	352B
14 Transformers	TO and CCM	Exxelia SAS, Flux A/S	356A, 364A
12 Transistors	Bipolar NPN, PNP, NPN/PNP	STMicroelectronics	361A
	MOSFET, Power, N- Channel	STMicroelectronics, Infineon	303F, 319E, 339C, 363A, 360A
	MOSFET, Power, P- Channel	STMicroelectronics	326D
	RF/Microwave, NPN, Low Power, Low Noise	Infineon	230K, 245K, 322E
13 Wires and Cables	Low Frequency	Draka Fileca, Axon'Cable, W.L. Gore, Bizlink, Tyco	07U, 132R, 292F, 138Q, 380, 268J, 159R, 267K, 215P, 216N, 300F, 293F, 257L, 299F, 305F, 328D, 373, 374
	Coaxial, RF, Flexible	W.L. Gore, Axon'Cable	255M, 298F, 291F, 304F, 335C
20 Thermostats	Switches	Comepa	275J
30 RF Passive	Attenuator and Load	Radiall	185L, 178M
50 Cable Assembly	RF Cable Assemblies	Radiall, Gore UK, Axon'Cable	348A, 358A, 365A, 383
	Optical Cable Assemblies	Diamond	355A

**6 COMPONENT CERTIFICATES**

6.1 CAPACITORS (01)

6.1.1 Ceramic Fixed

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

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

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

6.1.2 Ceramic Fixed Chip

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

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

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

CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II							<b>324D</b>	
Procurement Specifications	Manufacturer		Nature of Approval	Supervising Authority		Initial Qualification Date		
Generic ESCC 3009 Detail ESCC	ExxeliaTechnologies Chanteloup en Brie France		Qualification	CNES		Oct 2012		
3009/008, 3009/009, 3009/010, 3009/011, 3009/023, 3009/038, 3009/039, 3009/043								
Qualified range:								
Style	Model	Detail Spec	Variants	Capacitance Range			Rated Voltage	Tolerance (+%)
0805	CNC202S	3009/008	06	1 000	to	150 000	16	5, 10, 20
				1 000	to	100 000		
				1 000	to	47 000		
				1 000	to	10 000		
			07	1 000	to	390 000	16	5, 10, 20
				1 000	to	150 000		
				1 000	to	100 000		
				1 000	to	47 000		
0805	CNC204S	3009/039	02	1 000	to	150 000	16	5, 10, 20
				1 000	to	100 000		
				1 000	to	47 000		
				1 000	to	10 000		
			14	1 000	to	390 000	16	5, 10, 20
				1 000	to	150 000		
				1 000	to	100 000		
				1 000	to	47 000		
1210	CNC402S	3009/009	06	2 200	to	560 000	16	5, 10, 20
				2 200	to	390 000		
				2 200	to	220 000		
				2 200	to	56 000		
			07	2 200	to	820 000	16	5, 10, 20
				2 200	to	560 000		
				2 200	to	390 000		
				2 200	to	220 000		
	CNC404S	3009/039	04	2 200	to	560 000	16	5, 10, 20
				2 200	to	390 000		
				2 200	to	220 000		
				2 200	to	56 000		
			16	2 200	to	820 000	16	5, 10, 20
				2 200	to	560 000		
				2 200	to	390 000		
				2 200	to	220 000		
1812	CNC602S	3009/010	06	3 900	to	1 200 000	16	5, 10, 20
				3 900	to	680 000		
				3 900	to	470 000		
				3 900	to	120 000		



CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II							324D	
	CNC602S	3009/010	07	3 900 3 900 3 900 3 900	to to to to	1 800 000 1 200 000 820 000 470 000	16 25 50 100	5, 10, 20
	CNC604S	3009/039	05	3 900 3 900 3 900 3 900	to to to to	1 200 000 680 000 470 000 120 000	16 25 50 100	5, 10, 20
			17	3 900 3 900 3 900 3 900	to to to to	1 800 000 1 200 000 820 000 470 000	16 25 50 100	5, 10, 20
2220	CNC702S	3009/011	06	22 000 22 000 22 000 22 000	to to to to	2 700 000 1 500 000 1 000 000 270 000	16 25 50 100	5, 10, 20
			07	22 000 22 000 22 000 22 000	to to to to	3 900 000 2 200 000 1 800 000 1 000 000	16 25 50 100	5, 10, 20
	CNC704S	3009/039	06	22 000 22 000 22 000 22 000	to to to to	2 700 000 1 500 000 1 000 000 270 000	16 25 50 100	5, 10, 20
			18	22 000 22 000 22 000 22 000	to to to to	3 900 000 2 200 000 1 800 000 1 000 000	16 25 50 100	5, 10, 20
1206	CNC1202S	3009/023	06	1 800 1 800 1 800 1 800	to to to to	270 000 180 000 82 000 27 000	16 25 50 100	5, 10, 20
			07	1 800 1 800 1 800 1 800	to to to to	1 000 000 270 000 180 000 120 000	16 25 50 100	5, 10, 20
	CNC1204S	3009/039	03	1 800 1 800 1 800 1 800	to to to to	270 000 180 000 82 000 27 000	16 25 50 100	5, 10, 20
			15	1 800 1 800 1 800 1 800	to to to to	1 000 000 270 000 180 000 120 000	16 25 50 100	5, 10, 20
0603	CNC1402S	3009/038	06	270 270 270 270	to to to to	33 000 22 000 10 000 2 700	16 25 50 100	5, 10, 20
			07	270 270 270 270	to to to to	100 000 33 000 22 000 12 000	16 25 50 100	5, 10, 20
	CNC1404S	3009/039	01	270 270	to to	33 000 22 000	16 25	5, 10, 20

CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II							324D	
				270	to	10 000	50	
				270	to	2 700	100	
			13	270	to	100 000	16	5, 10, 20
				270	to	33 000	25	
				270	to	22 000	50	
				270	to	12 000	100	
0402	CNC1902S	3009/043	06	68	to	12 000	10	5, 10, 20
				68	to	8 200	16	
				68	to	5 600	25	
				68	to	3 300	50	
	CNC1904S	3009/039	25	68	to	12 000	10	5, 10, 20
				68	to	8 200	16	
				68	to	5 600	25	
				68	to	3 300	50	
Operating Temperature Range (°C), -55 to +125								

CAPACITORS, FIXED, CHIP, BASE METAL ELECTRODE, CERAMIC DIELECTRIC TYPE II, BASED ON TYPE TTP, 0402, 0603, 0805, 1206, 1210, 1812, 2220							<b>331C</b>	
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date				
Generic ESCC <b>3009</b> Detail ESCC <b>3009/041</b>	<b>Kyocera AVX</b>  <b>Northern Ireland</b>	Qualification	ESA	Apr 2015				
Remarks:								
Qualified Range:								
Value Series	Detailed Spec	Style	Component Variant	Capacitance Range (pF)			Rated Voltage (V)	Tolerance (+%)
E12	3009041	0402	01	2,200	to	33,000	16	5, 10, 20
				2,200	to	33,000	25	
				2,200	to	27,000	50	
				2,200	to	6,800	100	
E12	3009041	0603	02	2,200	to	180,000	16	5, 10, 20
				2,200	to	180,000	25	
				2,200	to	120,000	50	
				2,200	to	18,000	100	
E12	3009041	0805	03	4,700	to	1,000,000	16	5, 10, 20
				4,700	to	1,000,000	25	
				4,700	to	470,000	50	
				4,700	to	100,000	100	
E12	3009041	1206	04	18,000	to	2,200,000	16	5, 10, 20
				18,000	to	2,200,000	25	
				18,000	to	1,000,000	50	
				18,000	to	390,000	100	
E12	3009041	1210	05	47,000	to	1,000,000	16	5, 10, 20
				47,000	to	1,000,000	25	
				47,000	to	1,000,000	50	
				47,000	to	680,000	100	
E12	3009041	1812	06	150,000	to	8,200,000	16	5, 10, 20
				150,000	to	8,200,000	16	
				150,000	to	4,700,000	50	
				150,000	to	2,200,000	100	
E12	3009041	2220	07	560,000	to	22,000,000	16	5, 10, 20
				560,000	to	22,000,000	25	
				560,000	to	10,000,000	50	
				560,000	to	4,700,000	100	
Terminations: Cu and Ag-loaded epoxy + Ni barrier+ Sn/Pb plating finish (10% Pb minimum)								
Operating Temperature Range (°C):-55 to +125								

6.1.3 Tantalum

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

CAPACITORS, LEADLESS SURFACE MOUNTED, TANTALUM, SOLID ELECTROLYTE, TYPE TES				327D																																																																																																																													
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date																																																																																																																													
Generic ESCC 3012 Detail ESCC 3012/004	Kyocera AVX components sro Lanskroun Czech Republic	Qualification	ESA	Oct 2013																																																																																																																													
Remarks:																																																																																																																																	
<p>Qualified Range:</p> <p>Variants 01 to 05. Case styles A (1206), B (1210), C (2312), D (2917), E (2917)</p> <table border="1"> <thead> <tr> <th rowspan="2">Capacitance <math>C_n</math> (<math>\mu</math>F)</th> <th colspan="8">Rated Voltage <math>U_R</math></th> </tr> <tr> <th>6.3V</th> <th>10V</th> <th>12V</th> <th>16V</th> <th>20V</th> <th>25V</th> <th>35V</th> <th>50V</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>A 3000</td> <td></td> <td>B 2000</td> </tr> <tr> <td>3.3</td> <td></td> <td></td> <td></td> <td></td> <td>A 2500</td> <td></td> <td>B 1000</td> <td>C 1000</td> </tr> <tr> <td>4.7</td> <td></td> <td></td> <td></td> <td>A 2000</td> <td></td> <td>B 1000</td> <td>C 600</td> <td>D 200</td> </tr> <tr> <td>10</td> <td></td> <td>A 1800</td> <td></td> <td></td> <td>B 1000</td> <td>C 600</td> <td>D 120</td> <td></td> </tr> <tr> <td>22</td> <td>A 900</td> <td></td> <td></td> <td>B 600</td> <td>C 400</td> <td></td> <td>D 100</td> <td></td> </tr> <tr> <td>33</td> <td></td> <td>B 650</td> <td></td> <td></td> <td>C 300</td> <td>D 65</td> <td>E 65</td> <td></td> </tr> <tr> <td>47</td> <td>B 500</td> <td></td> <td></td> <td>C 350</td> <td>D 55</td> <td>E 65</td> <td></td> <td></td> </tr> <tr> <td>100</td> <td></td> <td>C 200</td> <td></td> <td>D 55</td> <td>E 45</td> <td></td> <td></td> <td></td> </tr> <tr> <td>150</td> <td>C 300</td> <td>D 45</td> <td></td> <td>E 40</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>220</td> <td></td> <td>D 35</td> <td>E 35</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>330</td> <td>D 35</td> <td>E 35</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>470</td> <td>E 30</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Operating Temperature Range (°C):-55 to +105</p>					Capacitance $C_n$ ( $\mu$ F)	Rated Voltage $U_R$								6.3V	10V	12V	16V	20V	25V	35V	50V	1						A 3000		B 2000	3.3					A 2500		B 1000	C 1000	4.7				A 2000		B 1000	C 600	D 200	10		A 1800			B 1000	C 600	D 120		22	A 900			B 600	C 400		D 100		33		B 650			C 300	D 65	E 65		47	B 500			C 350	D 55	E 65			100		C 200		D 55	E 45				150	C 300	D 45		E 40					220		D 35	E 35						330	D 35	E 35							470	E 30							
Capacitance $C_n$ ( $\mu$ F)	Rated Voltage $U_R$																																																																																																																																
	6.3V	10V	12V	16V	20V	25V	35V	50V																																																																																																																									
1						A 3000		B 2000																																																																																																																									
3.3					A 2500		B 1000	C 1000																																																																																																																									
4.7				A 2000		B 1000	C 600	D 200																																																																																																																									
10		A 1800			B 1000	C 600	D 120																																																																																																																										
22	A 900			B 600	C 400		D 100																																																																																																																										
33		B 650			C 300	D 65	E 65																																																																																																																										
47	B 500			C 350	D 55	E 65																																																																																																																											
100		C 200		D 55	E 45																																																																																																																												
150	C 300	D 45		E 40																																																																																																																													
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POLYMER MULTI ANODE TANTALUM CAPACITOR BASED ON TCS TYPE.				<b>366A</b>																																																														
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date																																																														
Generic ESCC 3012 Detail ESCC 3012/006	Kyocera AVX components sro Lanskroun Czech Republic	Qualification	ESA	Apr 2020																																																														
Remarks:																																																																		
<p>Qualified Range:</p> <p>Variant 01. Case style E (2917). Tolerance: <math>\pm 20\%</math>.</p> <table border="1" data-bbox="402 949 1104 1323"> <thead> <tr> <th rowspan="2">Capacitance <math>C_n</math></th> <th colspan="6">Rated Voltage <math>U_R</math></th> </tr> <tr> <th>6.3V</th> <th>10V</th> <th>16V</th> <th>20V</th> <th>25V</th> <th>35V</th> </tr> </thead> <tbody> <tr> <td>22<math>\mu</math>F</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>50m<math>\Omega</math></td> </tr> <tr> <td>33<math>\mu</math>F</td> <td></td> <td></td> <td></td> <td></td> <td>50m<math>\Omega</math></td> <td></td> </tr> <tr> <td>68<math>\mu</math>F</td> <td></td> <td></td> <td></td> <td>25m<math>\Omega</math></td> <td></td> <td></td> </tr> <tr> <td>150<math>\mu</math>F</td> <td></td> <td></td> <td>20m<math>\Omega</math></td> <td></td> <td></td> <td></td> </tr> <tr> <td>220<math>\mu</math>F</td> <td></td> <td>15m<math>\Omega</math></td> <td>20m<math>\Omega</math></td> <td></td> <td></td> <td></td> </tr> <tr> <td>330<math>\mu</math>F</td> <td>12m<math>\Omega</math></td> <td>15m<math>\Omega</math></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>470<math>\mu</math>F</td> <td>12m<math>\Omega</math></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Operating Temperature Range (<math>^{\circ}</math>C):-55 to +105</p>					Capacitance $C_n$	Rated Voltage $U_R$						6.3V	10V	16V	20V	25V	35V	22 $\mu$ F						50m $\Omega$	33 $\mu$ F					50m $\Omega$		68 $\mu$ F				25m $\Omega$			150 $\mu$ F			20m $\Omega$				220 $\mu$ F		15m $\Omega$	20m $\Omega$				330 $\mu$ F	12m $\Omega$	15m $\Omega$					470 $\mu$ F	12m $\Omega$					
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330 $\mu$ F	12m $\Omega$	15m $\Omega$																																																																
470 $\mu$ F	12m $\Omega$																																																																	

6.1.4 Fixed Film

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

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



6.1.5 Semiconductor

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

6.2 CONNECTORS (02)

6.2.1 Multipin, Solder Contacts

CONNECTORS, ELECTRICAL, SOLDER AND WIRE WRAP CONTACTS, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*M				71T
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	C&K Components Dole France	Qualification	CNES	Feb 1981
Detail ESCC		Remarks		
3401/001, 3401/004, 3401/022, 3401/040, 3401/072, 3401/080				
Qualified range:				
Shell Size:	E, A, B, C, D, F			
Range of Contacts:	9, 15, 25, 37 and 50 size 20 contacts for standard density layout 3W3 to 8W8, 5W1 to 47W1 combined contact arrangements 15, 26, 44, 62, 78 and 104 size 22 contacts for high density layout			
Mounting Type:	Blank: standard mounting holes; Y: floating mount; E: captive nuts			
Range of Connectors:	3401/001: Variants 01 & 02			
Range of Contacts:	3401/004: Variants 01 to 25; 3401/022: 01 to 59 and 65 to 97; 3401/040: 01 to 17; 3401/080: 01 3401/072: Variants 05 to 39, 46 to 65 and 72 to 153			
Termination type:	solder bucket, straight PCB, 90° PCB, wire wrap			
Coaxial contact arrangements:	3401/004 variants 01 to 25			
Power contact arrangements:	3401/040 variants 01 to 17			
Gold-plated non-magnetic coating				
Operating Temperature Range (°C): -55 to +125				

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

6.2.2 Multipin, Crimp Contacts

CONNECTORS, ELECTRICAL, CRIMP CONTACTS, RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*MA				72T
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401 Detail ESCC	C&K Components Dole France	Qualification	CNES	Feb 1981
Remarks				
3401/002, 3401/005, 3401/020, 3401/021, 3401/097				
<p>Qualified range:</p> <p>Complete range defined in the corresponding Detail Specifications are qualified.</p> <p>Shell size: E, A, B, C, D, F</p> <p>Range of Connectors: 3401/002: Variants 01 &amp; 02</p> <p>Range of Contacts: 3401/005: variants 01 to 08 3401/020: variants 01 &amp; 02 3401/021: variants 01 &amp; 02</p> <p>9, 15, 25, 37 and 50 size 20* contacts for standard density layout 15, 26, 44, 62, 78 and 104 size 22** contacts for high density layout</p> <p>*Accepts wire sizes : -AWG # 20 to 24 (standard bucket: variants 01 and 02) per 3401/005 -AWG # 26 and 28 (reduced bucket: variants 03 and 04) per 3401/005 -AWG # 18 and 20 (large bucket: variants 05 to 06) per 3401/005</p> <p>** Accepts wire sizes AWG # 22 to 26 (standard bucket: variants 07 to 08) per 3401/005</p> <p>Connecting pieces: 3401/097: variants 01 and 02 (only 4 way)</p> <p>Mounting Type: Blank: standard mounting holes; Y: floating mount; E: captive nuts</p> <p>Connector Savers: For usage with above connector range</p> <p>Gold-plated non-magnetic coating</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

CONNECTORS AND CONNECTOR SAVER, ELECTRICAL, CRIMP CONTACTS, REMOVABLE RECTANGULAR RECEPTACLE AND PLUG, BASED ON TYPE D*MA,				156P
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	Sep 1988
Detail ESCC		Remarks		
3401/002, 3401/005, 3401/020, 3401/021, 3401/022, 3401/072				
<p>Qualified range:</p> <p>Complete range as defined in the Detail Specifications are qualified except for high density 104 contacts arrangement</p> <p>Accessories variants qualified:      3401/022: variants 01 to 16 &amp; 44 to 57 &amp; 65 to 80  3401/072: variants 01 to 65</p> <p>Range of Connectors:      3401/002: variants 01 and 02  3401/005: variants 01 to 08  3401/021 &amp; 022: variants 01 and 02</p> <p>Range of contacts:      9, 15, 25, 37 and 50 contacts size 20 for standard contact arrangements  15, 26, 44, 62, 78 contacts size 22 for high density contact arrangements</p> <ul style="list-style-type: none"> <li>- Accepts wire sizes AWG # 20 to 24 (standard bucket: variants 01 and 02)</li> <li>- Accepts wire sizes AWG # 26 and 28 (reduced bucket: variants 03 and 04)</li> <li>- Accepts wire size AWG# 18 and 20 (large bucket: variants 05 and 06)</li> <li>- Accepts wire size AWG # 22, 24 and 26 (contact AWG # 22 for high density, contact arrangements, variants 07 and 08)</li> </ul> <p>Connector Savers:      For usage with connector range defined above</p> <p>Gold-plated non-magnetic coating</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

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

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

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



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

CONNECTORS, MINIATURE, ELECTRICAL, CIRCULAR, TRIPLE-START SELF- LOCKING COUPLING, SCOOP-PROOF, HERMETIC RECEPTACLE AND FEEDTHROUGH BASED ON TYPE MIL-C-38999, SERIES III				<b>223K</b>												
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date												
Generic ESCC 3401 Detail ESCC 3401/057	SOURIAU Connection Technology Marolles en Brie France	Qualification	CNES	May 1995												
Remarks																
<p>Qualified range:</p> <p>All variants are qualified.</p> <table border="1" data-bbox="555 958 956 1153"> <thead> <tr> <th>Contact size</th> <th>Ratings (A)</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>33</td> </tr> <tr> <td>12</td> <td>17</td> </tr> <tr> <td>16</td> <td>10</td> </tr> <tr> <td>20</td> <td>5.0</td> </tr> <tr> <td>22D</td> <td>3.0</td> </tr> </tbody> </table> <p># 20 with standard contact arrangements (3, 6, 10, 19, 26, 32, 41, 53, 61 contacts) # 22 with high density arrangements (6, 13, 22, 37, 55, 66, 79, 100, 128 contacts)</p> <p>Receptacle Shell Sizes: 09, 11, 13, 15, 17, 19, 21, 23, 25</p> <p>Receptacle (contacts # 8, 12, 16, 20, 22D) and Feedthrough (contacts # 8, 12, 16, 20, 22D)</p> <p>Operating Temperature Range (°C): -65 to +200</p>					Contact size	Ratings (A)	8	33	12	17	16	10	20	5.0	22D	3.0
Contact size	Ratings (A)															
8	33															
12	17															
16	10															
20	5.0															
22D	3.0															

6.2.3 For printed Circuit Board

CONNECTORS, ELECTRICAL, REMOVABLE CONTACTS, CRIMP WIRE-WRAP SOLDER AND SAVER, PRINTED CIRCUIT BOARD, BASED ON TYPE HE 801				99Rev1
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France and Genova Italie	Qualification	CNES	Nov 1982
Detail ESCC 3401/016 3401/017		Remarks		
<p>Qualified range:</p> <p>All Variants are qualified.</p> <p>Shell specifications and sizes: 3401/016</p> <p>Contacts:           3401/017 Crimp wire-wrap solder and savers, 1 to 22 and 64 to 70</p> <p>                          2 rows: 17, 29, 41, 53, 65, 72, 84, 96, 120 contacts</p> <p>                          3 rows: 62, 80, 98, 160 contacts</p> <p>                          Ratings: 5 A (1 contact AWG 22)</p> <p>  1.5 A (&gt;31 contacts, AWG 22)</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

CONNECTORS, ELECTRICAL, NON-REMOVABLE SOLDER AND WIRE-WRAP CONTACTS AND SAVERS, PRINTED CIRCUIT BOARD, BASED ON TYPE KMC				149Prev1
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France and Genova Italie	Qualification	CNES	Mar 1987
Detail ESCC 3401/039		Remarks		
<p>Qualified range:</p> <p>Contacts:                   3 rows contacts: 26, 44, 62, 80, 98, 144  Contact codes: 10, 30, 31, 40, 50, 51 and 91  Ratings: 2 A (1 contact)</p> <p>Guiding and locking devices codes: 110, 121, 143, 201, 202, 204, 206, 703</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

CONNECTORS AND SAVERS, ELECTRICAL, RECTANGULAR, NON-REMOVABLE, PRINTED CIRCUIT BOARD, BASED ON TYPE MHD				250K
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	Smiths Interconnect Hypertac Saint- Aubin-Lès-Elbeuf France	Qualification	CNES	Aug 1998
Detail ESCC 3401/065		Remarks		
<p>Qualified range:</p> <p>Contacts: 52, 100, 152, 200, 252, 300, 352 and 400 Codes: 10, 11, 12, 30, 31, 43, 45, 47 and 91</p> <p>Guiding and Locking Devices Codes: 110, 111, 121, 122, 124, 134 and 201</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

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

6.2.4 RF Coaxial

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

CONNECTORS, RF, COAXIAL, SOLDER AND CRIMP CONTACTS, MALE, FEMALE ADAPTORS AND CONNECTING PIECES, BASED ON TYPE SMA 2.9				283Grev1
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3402	RADIALL (Centr'alp), Voreppe France	Qualification	CNES	Dec 2007
Detail ESCC		Remarks		
3402/021, 3402/022, 3402/023				
<p>Qualified range:</p> <p>3402/021 Pin contact (Plug). Variants 01 to 05 and 07            3402/022 Socket contact (Receptacle). Variants 01 to 05            3402/023 Adapters. Variants 01 to 06</p> <p>Frequency Range 0-40 GHz            50 Ohms</p> <p>Crimp or solder type contact for flexible and semi-rigid cables, contacts for micro strip</p> <p>Shell material and finish: passivated amagnetic stainless steel.</p> <p>Operating Temperature Range (°C): -65 to +165</p>				



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

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

6.2.5 Microminiature, Crimp Contacts

CONNECTORS, ELECTRICAL, RECTANGULAR, MICROMINIATURE, CRIMP CONTACT, BASED ON TYPE MDM				140Rev1
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3401	C&K COMPONENTS Dole France	Qualification	CNES	Oct 1986
Detail ESCC		Remarks 3401/029 termination types GMR7580 and CMR7590 are NOT qualified		
3401/029, 3401/041, 3401/032, 3401/087				
<p>Qualified range:</p> <p>3401/029: 01 and 02            3401/041: 01 to 07            3401/032: 03, 04 and 07 to 21            3401/087: 01 to 56</p> <p>Layout: 9 - 15 - 21- 25 - 31 - 37 - 51 Contacts, Non removable crimp contacts</p> <p>Termination types: FR171, FR171M1 and FR171M2            AWG 25: Uninsulated rigid wire.            Bent and straight PCB - Max rated: 2.5 A            AWG 26: ESCC 390101302, ESCC 390100256, ESCC 390101203            - Max rated: 2.5 A            AWG 28: ESCC 390101301, ESCC 390100261, ESCC 390101202            - Max rated: 1.5 A            Solder bucket – Max rated 2.5 A</p> <p>Nickel or Gold Plated Shells</p> <p>Operating Temperature Range (°C): -55 to +125</p>				

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

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

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

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

6.3 CRYSTALS AND OSCILLATORS (03)

6.3.1 Crystals

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



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

6.3.2 Oscillators

CRYSTAL OSCILLATOR RK135, CLASS 2, 4MHz to 100MHz, AHCMOS compatible output, Rad-Hard				<b>371</b>		
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date		
Generic ESCC <a href="#">3503</a> Detail ESCC <a href="#">3503/001</a>	<a href="#">RAKON France</a> <a href="#">Pont Sainte Marie</a> <a href="#">France</a>	Qualification	CNES	Feb 2021		
Remarks: For frequencies below 24MHz, Customers should contact Rakon to confirm feasibility and availability.						
Qualified range:						
Variant Number	Nominal Output Frequency $f_{Nom}$ (MHz)	Case	Nominal Supply Voltage $V_{CCNom}$ (V)	Terminal Material and Finish	Weight max g	Total Dose Radiation Level Letter
01	4 to 100	FP1	3.3	D2	5	R [100krad(Si)]
02	4 to 100	FP2	3.3	D2	5	R [100krad(Si)]
03	4 to 100	FP3	3.3	D2	5	R [100krad(Si)]
04	4 to 100	FP4	3.3	D2	5	R [100krad(Si)]
05	4 to 100	DIL1	3.3	G2	5	R [100krad(Si)]
07	4 to 100	FP1	5	D2	5	R [100krad(Si)]
08	4 to 100	FP2	5	D2	5	R [100krad(Si)]
09	4 to 100	FP3	5	D2	5	R [100krad(Si)]
10	4 to 100	FP4	5	D2	5	R [100krad(Si)]
11	4 to 100	DIL1	5	G2	5	R [100krad(Si)]
Operating Temperature Range (°C): -55 to +110						

6.4 DIODES (04)

6.4.1 Bipolar PN

DIODES, POWER, BIPOLAR (PN) BASED ON TYPES BYV, BYW AND STTH									369Arev1
Procurement Specifications	Manufacturer		Nature of Approval	Supervising Authority		Initial Qualification Date			
Generic  ESCC 5000 Detail ESCC	STMicroelectronics Rennes France		Qualification	CNES		Nov 2020  Initial qualification date of certificates merged into 369: Cert 274: 08/2003 Cert 297: 11/2009 Cert 311: 05/2011			
			Remark:						
5101/026, 5101/027, 5101/013, 5101/014, 5103/029, 5103/031, 5103/032, 5103/033									
Qualified range:									
ESCC component No.	Variant	Type	V <sub>RWM</sub> (V)	I <sub>R</sub> (µA) @ V <sub>RWM</sub>	I <sub>FSM</sub> (A)	I <sub>FRMS</sub> @ T <sub>amb</sub> (A)	T <sub>jmax</sub> (°C)	Config.	Package
5101/014	13, 14	1N5806	150	0.5	33	2.5	175	Single	LCC2A
5101/013	11, 12	1N5811	150	2	100	6	175	Single	LCC2B
5101/027	07, 08	1N6640U	50	0.04	2	0.3	175	Single	LCC2D
5101/026	07, 08	1N6642U	75	0.05	2	0.3	175	Single	LCC2D
5103/029	05	BYW81-200	200	20	250	15	150	Single	SMD.5
5103/029	07, 08	BYW81-200	200	20	500	30	150	Dual	TO254
5103/031	02, 05	BYV54-200	200	50	400	40	150	Single	TO254, TO254AA
5103/032	01, 02	STTH60400	400	20	500	60	175	Single	SMD1
5103/033	01, 02	STTH40200	200	30	300	40	175	Single	TO254AA
5103/033	03, 04	STTH60200	200	30	300	60	175	Single	SMD1

6.4.2 Schottky

DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS									368Arev1
Procurement Specifications		Manufacturer		Nature of Approval		Supervising Authority		Initial Qualification Date	
Generic  ESCC 5000 Detail ESCC		STMicroelectronics Rennes France		Qualification		CNES		Sept 2020  Initial qualification date of certificates merged into 368: Cert 272: 11/2002 Cert 302: 09/2010	
				Remarks					
5106/020, 5106/021, 5106/016, 5106/017, 5106/018, 5106/019, 5106/023, 5106/024									
Qualified range:									
ESCC component No.	Variant	Type	V <sub>RRM</sub> (V)	I <sub>R</sub> (µA) @ V <sub>RRM</sub>	I <sub>FSM</sub> (A)	I <sub>FRMS</sub> @T <sub>amb</sub>	T <sub>jmax</sub> (°C)	Config.	Package
5106/021	02, 03	1N5819U	45	20	25	1A	150	Single	LCC2B
5106/020	01, 02	1N5822U	40	80	80	3A	150	Single	LCC2B
5106/016	05, 06, 07, 11	STPS20100	100	30	250	30A per diode	175	Single or Dual diode common cathode	TO-254, SMD0.5, SMD1
5106/017	01, 02	STPS1045S	45	100	200	15A per diode	175	Single or Dual diode common cathode	SMD0.5
5106/018	02	STPS6045	45	500	300	2 x 30A	175	Dual diode common cathode	SMD1
5106/019	03, 05	STPS40100	100	30	300	2 x 20A	175	Dual diode common cathode	TO254, SMD1
5106/023	01, 05	STPS80A150	150	14	190	2 x 40A	175	Dual diode common	SMD0.5

DIODES, POWER, SCHOTTKY BARRIER, BASED ON TYPES 1N5819U, 1N5822U AND STPS								368Arev1	
								cathode	
5106/023	02, 06	STPS60A150	150	14	190	2 x 30A	175	Dual diode common cathode	SMD0.5
5106/023	03, 04	STPS40A150	150	14	220	2 x 20A	175	Dual diode common cathode	TO- 254AA
5106/024	02, 03	STPS40A45C	45	25	200	2 x 20A	175	Dual diode common cathode	TO- 254AA
5106/024	01	STPS80A45C	45	25	200	2 x 40A	175	Dual diode common cathode	SMD0.5
Maximum dV/dt= 10 000V/μs									

6.4.3 RF/Microwave, Silicon Schottky

DIODES, MICROWAVE, SILICON, SCHOTTKY, GENERAL PURPOSE, BASED ON TYPES BAS 40, BAS 70, AND MICROWAVE, SILICON, PIN, BASED ON TYPES BXY42, BXY43 AND BXY44				<b>227J</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 5010 Detail ESCC	<b>INFINEON Technologies AG</b> Neubiberg Germany	Qualification	DLR	Sep 1995
Remarks Revision F includes devices previously qualified under Certificates 224 and 236.				
<a href="#">5512/020</a> , <a href="#">5513/017</a> , <a href="#">5513/030</a>				
Qualified range:  5512/020: Variants 01, 03, 04, 05 5512/017: Variants 01, 02, 03 5512/030: Variants 01, 02, 05, 06, 09, 10				

6.4.4 RF/Microwave, Varactors

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

6.5 FILTERS (05)

6.5.1 Feedthrough

CAPACITORS FILTERS, C-TYPE, FEED THROUGH, HERMETICALLY SEALED (ONE END ONLY), BASED ON TYPE SFC030				<b>375</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3008	EXXELIA Technologies Chanteloup en Brie France	Qualification	CNES	Sept 2021
Detail ESCC		Remarks The SFC filters were qualified and covered by certificate 252 (initial qualification date: August 1998). The certificate 252 was suspended in June 2020.		
<b>3008/020</b>				
<p>Qualified range:</p> <p>ESCC 3008/020: variants 01, 02, 04 and 05</p> <p>Operating Temperature Range (°C): -55 to +125</p>				



6.5.2 SAW

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

6.6 FUSES (06)

6.6.1 Thin Film

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

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

6.7 INDUCTORS (07)

6.7.1 Fixed, RF

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

6.7.2 Power

INDUCTORS, POWER, MOULDED, SURFACE MOUNT, BASED ON SERIES SESI AND CMC				<b>276Hrev1</b>																																																						
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date																																																						
Generic ESCC <b>3201</b> Detail ESCC <b>3201/009</b> <b>3201/010</b>	Exxelia SAS Illange France	Qualification	ESA/ESTEC	April 2004																																																						
Remarks Termination finish shall be Sn60Pb40																																																										
<p>Qualified range:</p> <p>3201/009: Variants 01 to 08 are qualified 3201/010 Variants 01, 03 and 05 are qualified</p> <p>Component types:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">3201/009</td> <td colspan="8"></td> </tr> <tr> <td style="text-align: center;">SESI</td> <td style="text-align: center;">14SR</td> <td style="text-align: center;">15SR</td> <td style="text-align: center;">15WR</td> <td style="text-align: center;">18WR</td> <td style="text-align: center;">9.1WR</td> <td style="text-align: center;">22WR</td> <td style="text-align: center;">32WR</td> <td style="text-align: center;">32PR</td> </tr> <tr> <td style="text-align: center;">Variant</td> <td style="text-align: center;">01</td> <td style="text-align: center;">02</td> <td style="text-align: center;">03</td> <td style="text-align: center;">04</td> <td style="text-align: center;">05</td> <td style="text-align: center;">06</td> <td style="text-align: center;">07</td> <td style="text-align: center;">08</td> </tr> <tr> <td>3201/010</td> <td colspan="8"></td> </tr> <tr> <td style="text-align: center;">CMC</td> <td style="text-align: center;">15WR</td> <td style="text-align: center;">18WR</td> <td style="text-align: center;">22WR</td> <td colspan="5"></td> </tr> <tr> <td style="text-align: center;">Variant</td> <td style="text-align: center;">01</td> <td style="text-align: center;">03</td> <td style="text-align: center;">05</td> <td colspan="5"></td> </tr> </table> <p>Operating Temperature Range (°C): -55 to +125</p>					3201/009									SESI	14SR	15SR	15WR	18WR	9.1WR	22WR	32WR	32PR	Variant	01	02	03	04	05	06	07	08	3201/010									CMC	15WR	18WR	22WR						Variant	01	03	05					
3201/009																																																										
SESI	14SR	15SR	15WR	18WR	9.1WR	22WR	32WR	32PR																																																		
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CMC	15WR	18WR	22WR																																																							
Variant	01	03	05																																																							

6.8 MICROCIRCUITS (08)

6.8.1 Digital C-MOS

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

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

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



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

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

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

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

Package Types:

Ceramic Dual-in-Line  
Ceramic Flat Pack

INTEGRATED CIRCUITS, SILICON MONOLITHIC, CMOS, CELL-BASED ARRAY, BASED ON TYPE ATC18RHA ASIC FAMILY				<b>357A</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC <a href="#">9000</a>	<a href="#">Microchip Technology</a> Nantes France	Qualification	CNES	Apr 2019
Detail ESCC <a href="#">9202/080</a> , <a href="#">9512/004</a> , <a href="#">9304/009</a> , <a href="#">9512/005</a>				
The Technology Flow is described into the current QML document ( <a href="#">REP006</a> ).				
<a href="#">9202/080</a>	Integrated circuits, silicon monolithic, CMOS, cell-based array	Based on type ATC18RHA		
Available standard components:				
<a href="#">9512/004</a>	Integrated Circuits, Silicon, 32-bit SPARC Processor	Based on type AT697F		
<a href="#">9304/009</a>	Integrated Circuits, Silicon, monolithic, CMOS digital, Field Programmable Gate Array, 280000 gates	Based on type ATF280F		
<a href="#">9512/005</a>	Integrated Circuits, Silicon, monolithic, SPARC V8 GNSS Controller	Based on type AT991		

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

INTEGRATED CIRCUITS, SILICON, MONOLITHIC, RADIATION-HARDENED 32-BIT ARM CORTEX-M7 MICROCONTROLLER				<b>372A</b>		
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date		
Generic ESCC 9000	Microchip Technology Nantes France	Qualification	ESA/ESTEC	May 2021		
Detail ESCC 9512/006		Remarks SAMRH71 rev.D (variant 01) has been replaced by SAMRH71 rev.E (variant 02) having enhanced ESD and SEL performances.				
Qualified range:						
Detail spec	Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g	Total Dose Radiation Level Letter
9512/006	02	SAMRH71E	CQFP-256	D2	18	R [100krad(Si)]
Operating Temperature Range (°C): -55 to +125						

INTEGRATED CIRCUITS, SILICON, MONOLITHIC, 35KLU T RADIATION-HARDENED FPGA (NG-MEDIUM)				<b>382</b>																		
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date																		
Generic ESCC <a href="#">9000</a> Detail ESCC <a href="#">9304/010</a> <a href="#">9202/086</a>	<a href="#">NanoXplore, Sèvres, France</a>	Qualification	ESA/ESTEC	Aug 2022																		
Remarks																						
<p>Qualified range:</p> <table border="1"> <thead> <tr> <th>Detail spec</th> <th>Variant Number</th> <th>Based on Type</th> <th>Case</th> <th>Terminal Material and Finish</th> <th>Weight max g</th> </tr> </thead> <tbody> <tr> <td>9304/010</td> <td>01</td> <td>NX1H35AS</td> <td>CQFP-352</td> <td>D2</td> <td>28.6</td> </tr> <tr> <td>9304/010</td> <td>02</td> <td>NX1H35AS</td> <td>CLGA-625</td> <td>D2</td> <td>8.8</td> </tr> </tbody> </table> <p>Based on STM C65SPACE ASIC platform technology. Qualified domain is listed in QML Technology Description in <a href="#">REP006</a>.</p> <p>Operating Temperature Range (°C): -55 to +125</p>					Detail spec	Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g	9304/010	01	NX1H35AS	CQFP-352	D2	28.6	9304/010	02	NX1H35AS	CLGA-625	D2	8.8
Detail spec	Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g																	
9304/010	01	NX1H35AS	CQFP-352	D2	28.6																	
9304/010	02	NX1H35AS	CLGA-625	D2	8.8																	

6.8.2 Pulse Width Modulator

IINTEGRATEC CIRCUITS, PULSE WIDTH MODULATOR, BASED ON TYPES ST1843 AND ST1845				<b>344C</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 9000 Detail ESCC 9108/020 9108/021	<a href="#">ST Microelectronics</a> <a href="#">Rennes</a> <a href="#">France</a>	Qualification	CNES	Nov 2016
Remarks				
Qualified range:  Variants 01, 02				



6.8.1 Step-down converter

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

6.9 RELAYS (09)

6.9.1 Non-Latching

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

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

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

6.9.2 Latching

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

RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL415				98K								
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date								
Generic ESCC 3602	REL-STPI Saint Jean de la Ruelle France	Qualification	CNES	Jan 1982								
Detail ESCC 3602/004		Remarks										
<p>Qualified range:</p> <p>Variants 04, 06, 09, 14, 16 and 19 (including Coil Voltage 28V and 12V) are qualified</p> <table border="1"> <tr> <td>Contact Rating</td> <td>15A at 28Vdc</td> </tr> <tr> <td>Contact Configuration</td> <td>4PDT Package</td> </tr> <tr> <td>Package Type</td> <td>Cubic inch can</td> </tr> <tr> <td>Coil Voltage</td> <td>12Vdc, 28Vdc</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +125</p>					Contact Rating	15A at 28Vdc	Contact Configuration	4PDT Package	Package Type	Cubic inch can	Coil Voltage	12Vdc, 28Vdc
Contact Rating	15A at 28Vdc											
Contact Configuration	4PDT Package											
Package Type	Cubic inch can											
Coil Voltage	12Vdc, 28Vdc											

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

RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL215				<b>167K</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3602 Detail ESCC 3602/009	REL STPI St Jean de la Ruelle France	Qualification	CNES	Feb 1990
Remarks				
<p>Qualified range:</p> <p>Variants 03, 04, 05, 06, 13, 14, 15, 16 are qualified</p> <p>Coil Voltage (Vdc): 28 and 12</p> <p>Operating Temperature Range (°C): -65 to +125</p>				



RELAY, LATCHING, ELECTROMAGNETIC, TYPE GP250 and GP2				<b>362A</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC <a href="#">3602</a>	<a href="#">LEACH</a> <a href="#">Sarralbe</a> <a href="#">France</a>	Qualification	CNES	Sep 2019
Detail ESCC <a href="#">3602/010</a> <a href="#">3602/003</a>		Remarks The production and test of GP250 with the same design was previously qualified at a different production location, from February 1982 to February 2017 under certificate No. 93.		
<p>Qualified range:</p> <p>ESCC 3602/003: Variants 01 to 06 (GP2)          ESCC 3602/010: Variants 01 to 06 (GP250)</p> <p>Operating Temperature Range (°C): -65 to +125</p>				

6.10 RESISTORS (10)

6.10.1 Shunts

RESISTORS, FIXED, CHIP, METAL FOIL, BASED ON TYPES SMP-PW, SMS-PW, SMT-PW and SMV-PW.				285G
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4001	ISABELLENHÜTTE HEUSLER GmbH & Co. KG Dillenburg Germany	Qualification	DLR	Nov 2008
Detail ESCC 4001/027 4001/028		Remarks		
<p>Qualified range:</p> <p>ESCC 4001/027 variants 01, 02, 03, 04, 05, 06 are qualified (SMP-PW, SMS-PW, SMT-PW) Tolerance (%) = <math>\pm 0.5</math> and <math>\pm 1</math> Operating Temperature Range (°C): -55 to +170</p> <p>ESCC 4001028 variant 02 is qualified (SMV-PW) Tolerance (%) = <math>\pm 0.5</math> and <math>\pm 1</math> Operating Temperature Range (°C): -55 to +140</p>				

6.10.2 Fixed, Film

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

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

6.10.3 Chip

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

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

**287G**

Variant	Style	Resistance Range (Note 1)		Tolerance ( $\pm\%$ ) (Note 2)	Temperature Coefficient ( $10^{-6}/^{\circ}\text{C}$ ) (Note 2)	Weight (g)
		Min ( $\Omega$ )	Max (M $\Omega$ )			
01, 05	0603	10	0.200 (0.160 for TC" $^{\circ}\text{C}$ ")	0.01; 0.02; 0.05; 0.1	$\pm 5$ ; $\pm 10$ ; $\pm 25$	0.003
02, 06	0805	10	0.250	0.01; 0.02; 0.05; 0.1	$\pm 5$ ; $\pm 10$ ; $\pm 25$	0.004
03, 07	1206	10	1.000	0.01; 0.02; 0.05; 0.1	$\pm 5$ ; $\pm 10$ ; $\pm 25$	0.01
04, 08	2010	10	3.000	0.01; 0.02; 0.05; 0.1	$\pm 5$ ; $\pm 10$ ; $\pm 25$	0.03
13, 14	0402	10	0.100 (0.067 for TC" $^{\circ}\text{C}$ ")	0.01; 0.02; 0.05; 0.1	$\pm 5$ ; $\pm 10$ ; $\pm 25$	0.002

Notes:

1.

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

2.

Resistance ( $\Omega$ )	Available Tolerances ( $\pm\%$ )	Series
$10 \leq R < 50$	0.1	Any value in the resistance range
$50 \leq R < 100$	0.05 and 0.1	
$100 \leq R < 250$	0.02; 0.05 and 0.1	
$R \geq 250$	0.01; 0.02; 0.05 and 0.1	

Resistance ( $\Omega$ )	Temperature Coefficient (ppm/ $^{\circ}\text{C}$ )	Series
$10 \leq R < 20$	E: 25 (-55 $^{\circ}\text{C}$ ; +155 $^{\circ}\text{C}$ )	Any value in the resistance range
$20 \leq R < 50$	Y: 10 (-55 $^{\circ}\text{C}$ ; +155 $^{\circ}\text{C}$ )	
$20 \leq R < 50$	Z: 5 (+22 $^{\circ}\text{C}$ ; +70 $^{\circ}\text{C}$ )	
$R \geq 50$	C: 5 (-55 $^{\circ}\text{C}$ ; +155 $^{\circ}\text{C}$ )	

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

**287G**

Type PFRR:

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

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

Type PRAHR/CNWHR:

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

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

Number of Resistors per Array: 2 to 8

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



6.10.4 Flexible, Foil, Heaters

RESISTORS, HEATERS, FLEXIBLE SINGLE AND DOUBLE LAYER				184P												
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date												
Generic ESCC 4009 Detail ESCC 4009/002	IRCA RICA Division Vitorio Veneto Italy	Qualification	ESA	Apr 1992												
<p>Remarks RICA recently observed a higher quantity of defects than usual in the supplied raw material of polyimide-fep, used as insulating layer of the heater, according to external visual inspection ESCC no. 2054009 issue 4. The manufacturing yield for ESCC heaters with high area has been reduced. As consequence, RICA estimates a delay up to 6 months in the production of the heaters whose dimensions have an area equal to or greater than 15000mm<sup>2</sup> compared to the delivery date expected by the customers. NCCS 2ERIC21 is opened and under investigation.</p>																
<p>Qualified range:</p> <p>Variants 01 through 48 are qualified</p> <p>Single, double layer and magnetically compensated heaters</p> <table border="1"> <tr> <td>Maximum Ohmic density</td> <td>200 Ω/cm<sup>2</sup></td> </tr> <tr> <td>Tolerances</td> <td>±2, 3, 5, 10 %</td> </tr> <tr> <td>Resistance</td> <td>1 to 5000 Ω</td> </tr> <tr> <td>Heating Area</td> <td>1.6 to 1300 cm<sup>2</sup></td> </tr> <tr> <td>Terminal Lead</td> <td>20, 22, 24, 26, 28, 30 AWG</td> </tr> <tr> <td>Temperature coefficient</td> <td>(10<sup>-6</sup>/°C): 175</td> </tr> </table> <p>Operating Temperature Range (°C): -65 to +200</p>					Maximum Ohmic density	200 Ω/cm <sup>2</sup>	Tolerances	±2, 3, 5, 10 %	Resistance	1 to 5000 Ω	Heating Area	1.6 to 1300 cm <sup>2</sup>	Terminal Lead	20, 22, 24, 26, 28, 30 AWG	Temperature coefficient	(10 <sup>-6</sup> /°C): 175
Maximum Ohmic density	200 Ω/cm <sup>2</sup>															
Tolerances	±2, 3, 5, 10 %															
Resistance	1 to 5000 Ω															
Heating Area	1.6 to 1300 cm <sup>2</sup>															
Terminal Lead	20, 22, 24, 26, 28, 30 AWG															
Temperature coefficient	(10 <sup>-6</sup> /°C): 175															

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

6.11 THERMISTORS (11)

6.11.1 NTC

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

6.11.2 PTC platinum

RESISTANCE TEMPERATURE DETECTOR, THIN FILM PLATINUM SENSOR, PTC, RANGE 100 TO 2000 OHMS AT 0°C				<b>352B</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 4006 Detail ESCC 4006/015	Innovative Sensor Technology IST AG, Ebnat-Kappel Switzerland	Qualification	ESA	February 2018
Remarks				
Qualified range: variants and options listed below.				
4006015	XX	XX	XXXX	
			Characteristic Code	
		0100 to 9999	Extension Cable/Wires Nominal Total Length [ mm ]	
		left blank	Sensor with platinum leads only	
			Characteristic Code: Termination Type	
	00	Sensor with platinum leads only (no extension cable/wires)		
	01	Twisted 2-core extension cable (no shield) / ESCC Component 390101910B		
	02	Twisted 4-core extension cable (no shield) / ESCC Component 390101926B		
	03	Twisted 2-core extension cable with shield and jacket/ ESCC Component 390101957B		
	04	Twisted 4-core extension cable with shield and jacket / ESCC Component 390101973B		
	05	2-wire extension (single extension wires) / ESCC Component 390101902B		
		ESCC Component Type Variant Number, Sensor element		
	01	Pt0k1, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 100 Ω at 0°C), (Nr 101410)		
	02	Pt0k1, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 100 Ω at 0°C), (Nr 101411)		
	03	Pt0k2, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 200 Ω at 0°C), (Nr 150026)		
	04	Pt0k2, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 200 Ω at 0°C), (Nr 101412)		
	05	Pt0k5, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 500 Ω at 0°C), (Nr 101413)		
	06	Pt0k5, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 500 Ω at 0°C), (Nr 101414)		
	07	Pt1k0, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 1000 Ω at 0°C), (Nr 101415)		
	08	Pt1k0, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 1000 Ω at 0°C), (Nr 101416)		
	09	Pt2k0, Temperature Range: -50 ° C to 150 ° C (Nominal RZ 2000 Ω at 0°C), (Nr 101417)		
	10	Pt2k0, Temperature Range: -200 ° C to 200 ° C (Nominal RZ 2000 Ω at 0°C), (Nr 101418)		

6.12 TRANSISTORS (12)

6.12.1 Bipolar NPN, PNP, NPN/PNP

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

-Qualified range for NPN type:

ESCC Spec No.	Component Type	Package	Qualified Variants
5201/001	2N2484	LCCC3, LCCC3 +1	04, 05, 06, 07
5201/002	2N2222A	LCCC3, LCCC3 +1	04, 05, 11, 12
5201/019	2N5551	LCCC3, LCCC3 +1	04, 05, 08, 09
5201/004	2N3700	LCCC3, LCCC3 +1	04, 05, 06, 07
5203/010	2N5154	TO-257, SMD.5	04, 05, 06, 07
5203/016	BUX77ESY	TO-257	06, 07
5207/002	2N2920A	LCCC6, FP-8	12, 15, 16, 17
5201/020	2ST15300	SMD.5	01

Maximum ratings:

	2N222A	2N2484	2N5551	2N3700	2N5154	BUX 77	2N2920A	2ST15300
V <sub>CBO</sub> (V):	75	60	180	140	100	100	60	300
V <sub>CEO</sub> (V):	50	60	160	80	80	80	60	100

-Qualified range for PNP:

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

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

**361A**

Maximum Ratings

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

-Qualified range for complementary NPN/PNP:

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

Maximum Ratings

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

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

6.12.2 MOSFET, Power, N-Channel

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

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



TRANSISTORS, POWER, MOSFET, N-CHANNEL, RADHARD BASED ON TYPE BUY 15CS				339C												
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date												
Generic ESCC 5000 Detail ESCC 5205/031	Infineon Technologies AG Neubiberg Germany	Qualification	DLR	May 2016												
Remarks																
<p>Qualified range:</p> <p>All Variants are qualified.</p> <p>Package:SMD0.5, SMD2, TO-254AA, TO-257AA</p> <p>Maximum ratings:</p> <table border="1"> <tr> <td><math>r_{DS(ON)}</math> (m<math>\Omega</math>) @ 25 °C</td> <td>150</td> </tr> <tr> <td><math>I_{DS}</math> (A)</td> <td>23</td> </tr> <tr> <td><math>V_{DS}</math> (V) max.</td> <td>150</td> </tr> <tr> <td><math>V_{GS}</math> (V) max.</td> <td><math>\pm 20</math></td> </tr> <tr> <td><math>P_{tot}</math> (W)</td> <td>75</td> </tr> <tr> <td><math>R_{th(j-c)}</math> (°C/W)</td> <td>1.66</td> </tr> </table> <p>These devices have a TID tested capability of 100 kRad (Si) SEE tested : LET (MeV-cm<sup>2</sup>/mg) 56 @ <math>V_{GS} = -10V</math>, <math>V_{DS} = 250V</math> SOA and SE SOA derating graphs are incorporated in the Detail Specifications.</p> <p>Operating Temperature Range (°C): Top = - 55 to +150</p>					$r_{DS(ON)}$ (m $\Omega$ ) @ 25 °C	150	$I_{DS}$ (A)	23	$V_{DS}$ (V) max.	150	$V_{GS}$ (V) max.	$\pm 20$	$P_{tot}$ (W)	75	$R_{th(j-c)}$ (°C/W)	1.66
$r_{DS(ON)}$ (m $\Omega$ ) @ 25 °C	150															
$I_{DS}$ (A)	23															
$V_{DS}$ (V) max.	150															
$V_{GS}$ (V) max.	$\pm 20$															
$P_{tot}$ (W)	75															
$R_{th(j-c)}$ (°C/W)	1.66															

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

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

6.12.3 MOSFET, Power, P-Channel

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

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

TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPE BFY 193				230K
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 5010 Detail ESCC 5611/006	Infineon Technologies AG Neubiberg Germany	Qualification	DLR	Jun 1996
Remarks				
Qualified range:				
Variants 01 to 09				
Characteristics for BFY 193:				
V <sub>CEO</sub> (V) max.			12	
V <sub>CBO</sub> (V)max.			20	
h <sub>FE</sub> min/max.			50/175	@ VCE = 8.0 V, IC = 30mA
NF (dB) max.	@ 2 GHz		2.9	@ VCE = 5.0 V, IC = 15mA
MAG/MSG (dB) min.	@ 2 GHz		12.5	@ VCE = 5.0 V, IC = 40mA
f <sub>T</sub> (GHz) min.	@ 500 MHz		6.5	@ VCE = 5.0 V, IC = 40mA
Package: " Micro-X1"				
Total Power Dissipation (P <sub>tot</sub> ) = 580 mW				
Operating Temperature Range (°C): Top = - 65 to +200				

TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPE BFY 450				245K																												
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date																												
Generic ESCC 5010 Detail ESCC 5611/008	Infineon Technologies AG Neubiberg Germany	Qualification	DLR	Jun 1997																												
Remarks																																
<p>Qualified range:</p> <p>Variants 01, 02 and 03 are qualified.</p> <p>Characteristics for BFY 450:</p> <table border="1"> <tbody> <tr> <td>V<sub>CEO</sub> (V) max.</td> <td></td> <td>4.5</td> <td></td> </tr> <tr> <td>V<sub>CBO</sub> (V)max.</td> <td></td> <td>15</td> <td></td> </tr> <tr> <td>I<sub>C</sub> (mA) max.</td> <td></td> <td>100</td> <td></td> </tr> <tr> <td>I<sub>B</sub> (mA) max.</td> <td></td> <td>10</td> <td></td> </tr> <tr> <td>h<sub>FE</sub> min/max.</td> <td></td> <td>50/150</td> <td>@ VCE = 1.0 V, IC = 20mA</td> </tr> <tr> <td>NF (dB) max.</td> <td>@ 1.8 GHz</td> <td>2.0</td> <td>@ VCE = 2.0 V, IC = 10mA</td> </tr> <tr> <td>f<sub>T</sub> (GHz) min.</td> <td>@ 1.0 GHz</td> <td>18</td> <td>@ VCE = 3.0 V, IC = 90mA</td> </tr> </tbody> </table> <p>Package: " Micro-X1"</p> <p>Total Power Dissipation (P<sub>tot</sub>) = 450 mW</p> <p>Operating Temperature Range (°C): Top = - 65 to +175</p>					V <sub>CEO</sub> (V) max.		4.5		V <sub>CBO</sub> (V)max.		15		I <sub>C</sub> (mA) max.		100		I <sub>B</sub> (mA) max.		10		h <sub>FE</sub> min/max.		50/150	@ VCE = 1.0 V, IC = 20mA	NF (dB) max.	@ 1.8 GHz	2.0	@ VCE = 2.0 V, IC = 10mA	f <sub>T</sub> (GHz) min.	@ 1.0 GHz	18	@ VCE = 3.0 V, IC = 90mA
V <sub>CEO</sub> (V) max.		4.5																														
V <sub>CBO</sub> (V)max.		15																														
I <sub>C</sub> (mA) max.		100																														
I <sub>B</sub> (mA) max.		10																														
h <sub>FE</sub> min/max.		50/150	@ VCE = 1.0 V, IC = 20mA																													
NF (dB) max.	@ 1.8 GHz	2.0	@ VCE = 2.0 V, IC = 10mA																													
f <sub>T</sub> (GHz) min.	@ 1.0 GHz	18	@ VCE = 3.0 V, IC = 90mA																													

TRANSISTORS, MICROWAVE, SMALL SIGNAL, BIPOLAR, BASED ON TYPES BFY 640, 640B, 650B and 740B				<b>322E</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 5010 Detail ESCC	<a href="#">Infineon Technologies AG</a> <a href="#">Neubiberg</a> <a href="#">Germany</a>	Qualification	DLR	Jun 1997
		Remarks This certificate, from its issue B, release in May 2016, includes in its scope of qualification some devices previously listed in the QPL under certificates No. 320 and 321, which are no longer maintained.		
<a href="#">5611/009</a> , <a href="#">5611/010</a> , <a href="#">5611/011</a>				
Qualified range:  5611/009: variants 01, 02, 03 5611/010: variants 01, 02, 03, 04, 05 5611/011: variant 01, 02				

6.13 WIRES AND CABLES (13)

6.13.1 Low Frequency

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



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

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

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

WIRES AND CABLES, SHIELDED WITH DRAIN WIRE, LOW FREQUENCY, PTFE/POLYIMIDE INSULATION, BASED ON TYPES SPL AND SPLD				<b>380</b>
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic  ESCC 3901 Detail ESCC 3901/019 3901/021	W.L. Gore & Co Pleinfeld Germany	Qualification	DLR	May 2022. 229M (Nov 1994) and 219N (Feb 1996) have been merged into 380
Remarks				
<p>Qualified range:</p> <p>3901/019: Variants 01 to 94 are qualified</p> <p>3901/021: Variants 01 to 41 are qualified</p> <p>Voltage Rating, maximum (Vrms): 600</p> <p>Temperature Range (°C): -200 to +200</p>				

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

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

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

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



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

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

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

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

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

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

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

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



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

6.13.2 Coaxial, RF, Flexible

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

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

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

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

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

6.1 TRANSFORMERS (14)

6.1.1 TO and CCM

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

6.1.2 Custom magnetics

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



6.2 THERMOSTATS (20)

6.2.1 Switches

SWITCHES, THERMOSTATIC, BIMETALLIC, SPST, OPENING CONTACT, BASED ON TYPE TH 47				275J
Procurement Specifications	Manufacturer	Nature of Approval	Supervising Authority	Initial Qualification Date
Generic ESCC 3702	COMEPA BAGNOLET France	Qualification	CNES	Mar 2004
Detail ESCC 3702/001 3702/002		Remarks The certificate validity has been extended to cover up to the latest lot to be manufactured in Comepa Bagnolet facility (DC 2315). The certificate will then be suspended up to successful ESCC qualification activities of the new Comepa manufacturing line (NCCS 2CCMP2301).		
<p>Qualified range:</p> <p>ESCC 3702/001 (naked thermostat):</p> <p>Variants 01 to 03 are qualified Range of Components: Grade Z and Grade Y</p> <p>ESCC 3702/002 (potted thermostat):</p> <p>Variants 01 to 06 are qualified Range of Components: Grade Z and Grade Y</p> <p>Maximum Ratings:</p> <p>Rated Current (I<sub>R</sub>): 4 A (30 Vdc resistive)</p> <p>Operating Temperature Range (°C), -50 to +150</p>				

6.3 RF PASSIVE (30)

6.3.1 Attenuator and Load

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

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

6.1 CABLE ASSEMBLY (50)

6.1.1 RF Cable Assemblies

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

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

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

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

6.1.2 Optical Cable Assemblies

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