

DIN EN 16602-30-11:2022-08 (E)

Space product assurance - Derating-EEE components; English version EN 16602-30-11:2021

Contents	Page
European Foreword	6
Introduction	7
1 Scope.....	8
2 Normative references.....	9
3 Terms, definitions and abbreviated terms	10
3.1 Terms from other standards	10
3.2 Terms specific to the present standard.....	10
3.3 Abbreviated terms.....	11
3.4 Nomenclature.....	12
4 User responsibility	14
5 Derating.....	15
5.1 Overview	15
5.2 Principles of derating.....	15
5.3 Applicability and component selection.....	16
5.4 Derating parameters	18
5.5 Additional rules and recommendations.....	19
6 Tables for load ratios or limits	20
6.1 Overview	20
6.2 Capacitors: ceramic - family-group code: 01-01 and 01-02	21
6.3 Capacitors: solid tantalum - family-group code: 01-03	22
6.4 Capacitors: non-solid tantalum - family-group code: 01-04	24
6.5 Capacitors: Plastic metallized - family-group code: 01-05	25
6.6 Capacitors: glass and porcelain - family-group code: 01-06	27
6.7 Capacitors: mica and reconstituted mica - family-group code: 01-07.....	28
6.8 Capacitors: feedthrough - family-group code: 01-10.....	29

6.9	Capacitors: semiconductor technology (MOS type) - family-group code: 01-11.....	30
6.10	Capacitors: miscellaneous (variable capacitors) - family-group code: 01-99.....	31
6.11	Connectors - family-group code: 02-01, 02-02, 02-03, 02-07 and 02-09.....	32
6.12	Connectors RF - family-group code: 02-05.....	34
6.13	Piezo-electric devices: crystal resonator - family-group code: 03-01	35
6.14	Diodes - family-group code: 04-01, 04-02, 04-03, 04-04, 04-06, 04-08, 04-10 and 04-14.....	36
6.15	Diodes: RF/microwave - family-group code: 04-05, 04-11 to 04-13, 04-15, 04-16 and 04-17.....	38
6.16	Feedthrough filters - family-group code: 05-01	39
6.17	Fuses: Cermet (metal film on ceramic) - family-group code: 06-01.....	40
6.18	Inductors and transformers - family-group code: 07-01 to 07-03 and 14-01.....	41
6.19	Integrated circuits: logic - family-group code: 08-10, 08-20, 08-21, 08-29 to 08-42, and 08-80.....	42
6.20	Integrated circuits: non-volatile memories - family-group code: 08-22, 08-23 and 08-24.....	44
6.21	Integrated circuits: linear - family-group code: 08-50 to 08-60 and 08-69	46
6.22	Integrated circuits: linear converters - family-group code: 08-61 and 08-62.....	48
6.23	Integrated circuits: MMICs - family-group code: 08-95.....	49
6.24	Integrated circuits: miscellaneous - family-group code: 08-99	51
6.25	Relays and switches - family-group code: 09-01, 09-02 and 16-01	52
6.26	Resistors - family-group code: 10-01 to 10-11	55
6.27	Thermistors - family-group code: 11-01 to 11-03	59
6.28	Transistors: bipolar - family-group code: 12-01 to 12-04 and 12-09.....	60
6.29	Transistors: FET - family-group code: 12-05 and 12-06.....	62
6.30	Transistors: RF: bipolar - family-group code: 12-10 and 12-13	64
6.31	Transistors: RF: FET - family-group code: 12-12, 12-14, 12-15(FET) and 12-16(FET).....	67
6.32	Wires and cables - family-group code: 13-01 to 13-03.....	70
6.33	Opto-electronics - family-group code: 18-01 to 18-05.....	74
6.34	RF passive components: family-group code: 30-01, 30-07, 30-09, 30-10 and 30-99.....	75
6.35	Fibre optic components: fibre and cable: family-group-code: 27-01.....	77
6.36	Hybrids.....	78
	Bibliography	89

Figures

Figure 5-1: Parameter stress versus strength relationship 16

Tables

Table 6-1: Derating of parameters for capacitors family-group code 01-01 and 01-02	21
Table 6-2: Derating of parameters for capacitors family-group code 01-03	22
Table 6-3: Derating of parameters for capacitors family-group code	24
Table 6-4: Derating of parameters for capacitors family-group code 01-05	26
Table 6-5: Derating of parameters for capacitors family-group code 01-06	27
Table 6-6: Derating of parameters for capacitors family-group code 01-07	28
Table 6-7: Derating of parameters for capacitors family-group code 01-10	29
Table 6-8: Derating of parameters for capacitors family-group code 01-11	30
Table 6-9: Derating of parameters for capacitors family-group code 01-99	31
Table 6-10: Derating of parameters for connectors family-group code 02-01, 02-02, 02-03, 02-07 and 02-09	32
Table 6-11: Derating of parameters for connectors RF family-group code 02-05	34
Table 6-12: Derating of parameters for piezo-electric devices family-group code 03- 01	35
Table 6-13: Derating of parameters for Diode (signal/switching, rectifier including Schottky, pin).....	36
Table 6-14: Derating of parameters for Diode (Zener, reference, transient suppression).....	37
Table 6-15: Derating of parameters for Diodes family-group code 04-05, 04-11 to 04- 13, 04-15, 04-16 and 04-17	38
Table 6-16: Derating of parameters for Feedthrough filters family-group code 05-01	39
Table 6-17: Derating of parameters for Fuses family-group code 06-01	40
Table 6-18: Derating of parameters for Inductors and transformers family-group code 07-01 to 07-03 and 14-01	41
Table 6-19: Derating of parameters for Integrated circuits family-group code: 08-10, 08-20, 08-21, 08-29 to 08-42, and 08-80	42
Table 6-20: Derating of parameters for Integrated circuits family-group code: 08-22, 08-23 and 08-24	44
Table 6-21: Derating of parameters for Integrated circuits family-group code 08-50 to 08-60 and 08-69	47
Table 6-22: Derating of parameters for Integrated circuits family-group code 08-61 and 08-62	48

Table 6-23:Derating of parameters for non-custom MMICs.....	50
Table 6-24: Derating of parameters for Relays and switches family-group code 09-01, 09-02 and 16-01	53
Table 6-25: Derating of parameters for Metal film precision resistor (type RNC, except RNC 90).....	55
Table 6-26: Derating of parameters for Metal film semi-precision resistor (type RLR)	55
Table 6-27: Derating of parameters for Foil resistor (type RNC 90).....	56
Table 6-28: Derating of parameters Wire-wound high precision resistor (type RBR 56)	56
Table 6-29: Derating of parameters for Wire-wound power resistor (type RWR, RER).....	57
Table 6-30: Derating of parameters for Chip resistor (RM), network resistor	57
Table 6-31: Derating of parameters for Carbon composition resistor	57
Table 6-32: Derating of parameters for Heaters	58
Table 6-33: Derating of parameters for Thick Film Power	58
Table 6-34: Derating of parameters for Thermistors family-group code 11-01 to 11-03.....	59
Table 6-35: Derating of parameters for Transistors family-group code 12-01 to 12-04 and 12-09	60
Table 6-36: Derating of parameters for Transistors family-group code 12-05 and 12-06	62
Table 6-37: Derating of parameters for Transistors family-group code 12-10 and 12-13	65
Table 6-38: Derating of parameters for Transistors family-group code 12-12, 12-14, 12-15(FET) and 12-16(FET)	68
Table 6-39: <>deleted>>.....	70
Table 6-40: <>deleted>>.....	70
Table 6-41: Derating factor for bundles (fully loaded).....	72
Table 6-42: Additional factor for partially loaded bundles	72
Table 6-43: Derating of parameters for Opto-electronics family-group code 18-01 to 18-05	74
Table 6-44: Derating of parameters for RF passive components from family-group code 30-01, 30-07, 30-09, 30-10 and 30-99 - Low power < 5 W	75
Table 6-45: Derating of parameters for RF passive components from family-group code 30-01, 30-07, 30-09, 30-10 and 30-99 - Low power \geq 5 W	75
Table 6-46: Derating of parameters for Fibre optic components.....	77