DIN EN 16602-30-11:2014-12 (E)

Space product assurance - Derating - EEE components; English version EN 16602-30-11:2014

Contents

Page

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

4 User responsibility 13

5 Derating 14

5.1 Overview 14

5.2 Principles of derating 14

5.3 Applicability and component selection 15

5.4 Derating parameters 17

5.5 Additional rules and recommendations 18

6 Tables for load ratios or limits 19

6.1 Overview 19

6.2 Capacitors: ceramic - family-group code: 01-01 and 01-02 20

6.3 Capacitors: solid tantalum - family-group code: 01-03 21

6.4 Capacitors: non-solid tantalum - family-group code: 01-04 22

6.5 Capacitors: Plastic metallized - family-group code: 01-05 23

6.6 Capacitors: glass and porcelain - family-group code: 01-06 24

6.7 Capacitors: mica and reconstituted mica - family-group code: 01-07 25

6.8 Capacitors: feedthrough - family-group code: 01-10 26

6.9 Capacitors: semiconductor technology (MOS type) - family-group code: 01-11 27

6.10 Capacitors: miscellaneous (variable capacitors) - family-group code: 01-99 28

6.11 Connectors - family-group code: 02-01, 02-02, 02-03, 02-07 and 02-09 29

6.12 Connectors RF - family-group code: 02-05 30

6.13 Piezo-electric devices: crystal resonator - family-group code: 03-01 31
6.14 Diodes - family-group code: 04-01, 04-02, 04-03, 04-04, 04-06, 04-08, 04-10 and 04-14 32
6.15 Diodes: RF/microwave - family-group code: 04-05, 04-11 to 04-13, 04-15, 04-16 and 04-17 34
6.16 Feedthrough filters - family-group code: 05-01 35
6.17 Fuses: Cermet (metal film on ceramic) - family-group code: 06-01 36
6.18 Inductors and transformers - family-group code: 07-01 to 07-03 and 14-01 37
6.19 Integrated circuits: logic - family-group code: 08-10, 08-20, 08-21, 08-29 to 08-42, and 08-80 38
6.20 Integrated circuits: non-volatile memories - family-group code: 08-22, 08-23 and 08-24 39
6.21 Integrated circuits: linear - family-group code: 08-50 to 08-60 and 08-69 40
6.22 Integrated circuits: linear converters - family-group code: 08-61 and 08-62 41
6.23 Integrated circuits: MMICs - family-group code: 08-95 42
6.24 Integrated circuits: miscellaneous - family-group code: 08-99 43
6.25 Relays and switches - family-group code: 09-01, 09-02 and 16-01 44
6.26 Resistors - family-group code: 10-01 to 10-11 47
6.27 Thermistors - family-group code: 11-01 to 11-03 50
6.28 Transistors: bipolar - family-group code: 12-01 to 12-04 and 12-09 51
6.29 Transistors: FET - family-group code: 12-05 and 12-06 52
6.30 Transistors: RF: bipolar - family-group code: 12-10 and 12-13 53
6.31 Transistors: RF: FET - family-group code: 12-12, 12-14, 12-15(FET) and 12-16(FET) 55
6.32 Wires and cables - family-group code: 13-01 to 13-03 57
6.33 Opto-electronics - family-group code: 18-01 to 18-05 59
6.34 RF passive components: family-group code: 30-01, 30-07, 30-09, 30-10 and 30-99 60
6.35 Fibre optic components: fibre and cable: family-group-code: 27-01 61
6.36 Hybrids 62

Bibliography 68

Figures

Figure 5-1: Parameter stress versus strength relationship 15

Tabless

Table 6-1: Derating of parameters for capacitors family-group code 01-01 and 01-02 20
Table 6-2: Derating of parameters for capacitors family-group code 01-03 21
Table 6-3: Derating of parameters for capacitors family-group code 22

Table 6-4: Derating of parameters for capacitors family-group code 01-05 23
Table 6-5: Derating of parameters for capacitors family-group code 01-06 24
Table 6-6: Derating of parameters for capacitors family-group code 01-07 25
Table 6-7: Derating of parameters for capacitors family-group code 01-10 26
Table 6-8: Derating of parameters for capacitors family-group code 01-11 27
Table 6-9: Derating of parameters for capacitors family-group code 01-99 28
Table 6-10: Derating of parameters for connectors family-group code 02-01, 02-02, 02-03, 02-07 and 02-09 29
Table 6-11: Derating of parameters for connectors RF family-group code 02-05 30
Table 6-12: Derating of parameters for piezo-electric devices family-group code 03-01 31
Table 6-13: Derating of parameters for Diode (signal/switching, rectifier including Schottky, pin) 32
Table 6-14: Derating of parameters for Diode (Zener, reference, transient suppression) 32
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 34
Table 6-16: Derating of parameters for Feedthrough filters family-group code 05-01 35
Table 6-17: Derating of parameters for Fuses family-group code 06-01 36
Table 6-18: Derating of parameters for Inductors and transformers family-group code 07-01 to 07-03 and 14-01 37
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 38
Table 6-20: Derating of parameters for Integrated circuits family-group code: 08-22, 08-23 and 08-24 39
Table 6-21: Derating of parameters for Integrated circuits family-group code 08-50 to 08-60 and 08-69 40
Table 6-22: Derating of parameters for Integrated circuits family-group code 08-61 and 08-62 41
Table 6-23: Derating of parameters for Relays and switches family-group code 09-01, 09-02 and 16-01 45
Table 6-24: Derating of parameters for Metal film precision resistor (type RNC, except RNC 90) 47
Table 6-25: Derating of parameters for Metal film semi-precision resistor (type RLR) 47
Table 6-26: Derating of parameters for Foil resistor (type RNC 90) 48
Table 6-27: Derating of parameters Wire-wound high precision resistor (type RBR 56) 48
Table 6-28: Derating of parameters for Wire-wound power resistor (type RWR, RER) 48
Table 6-29: Derating of parameters for Chip resistor (RM), network resistor 49
Table 6-30: Derating of parameters for Carbon composition resistor 49
Table 6-31: Derating of parameters for Heaters 49
Table 6-32: Derating of parameters for Thermistors family-group code 11-01 to 11-03 50
Table 6-33: Derating of parameters for Transistors family-group code 12-01 to 12-04 and 12-09 51

Table 6-34: Derating of parameters for Transistors family-group code 12-05 and 12-06.....52
Table 6-35: Derating of parameters for Transistors family-group code 12-10 and 12-13.....54
Table 6-36: Derating of parameters for Transistors family-group code 12-12, 12-14, 12-15(FET) and 12-16(FET).....55
Table 6-37: Derating of parameters for Wires and cables family-group code 13-01 to 13-03.....57
Table 6-38: Bundle factor K for calculation of the derated current for each individual wire in bundles of N wires 58
Table 6-39: Derating of parameters for Opto-electronics family-group code 18-01 to 18-05.....59
Table 6-40: 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 60
Table 6-41: 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 60
Table 6-42: Derating of parameters for Fibre optic components 61