

SafeFit Reference: IEC-62380

Rev. 01

May 2019



SAFETWICE

Change Control

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Abstract

This document lists all supported parameters in SafeFit for the standard **IEC-62380**.

Names in the **Parameter** column are the exact string of CSV columns recognized by SafeFit. The **Value** column indicates possible values, which can be:

- Designator specification, e.g. **R<Num>[<Char>]**. This means: a letter, an integer (any number digits), and an optional upper case character, e.g. **R1A**, **R15**, etc.
- Integer ranges, e.g. **x >= 0**.
- Real number ranges, e.g. **x >= 0.0 [W]**. Characters between square brackets **[]** specify the units in SI format (generally).
- Enumeration values, e.g. **Carbon (1)**, **Potentiometer (6)**. As with parameter names, these exact names are required for successful recognition. *Additionally*, their index in the list of values can also be used (zero-based). For a resistor, **Carbon** is 1, and **Potentiometer** is 6.

Sensitivity tables indicate which parameters are required to compute the FIT for a given component type. Some require all, a few depend only on global parameters, and the rest depend on a subset.



1 Resistor

1.1 Parameters

Parameter	Value
Designator	R<Num>[<Char>] (e.g. R1A)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Low Dissipation Film, Carbon, High Dissipation Film Low Dissipation Wirewound, High Dissipation Wirewound, Low Dissipation Array, Potentiometer
Delta Temp	x >= 0.0 [°C]
Operating Power	x >= 0.0 [W]
Rated Power	x >= 0.0 [W]
Max Temp	x >= 0 [°C]
Array Number	x >= 0
Annual Turns	x >= 0
Parallel Resistance	x >= 0.0 [Ω]
Linear Resistance	x >= 0.0 [Ω]
Operating Voltage	x >= 0.0 [V]

1.2 Sensitivity

Type	Sensitivity
Low Dissipation Film	Operating Power, Rated Power
Carbon	Operating Power, Rated Power, Max Temp
High Dissipation Film	Operating Power, Rated Power
Low Dissipation Wirewound	Operating Power, Rated Power
High Dissipation Wirewound	Operating Power, Rated Power
Low Dissipation Array	Operating Power, Rated Power, Max Temp, Array Number
Potentiometer	Operating Power, Rated Power, Max Temp, Annual Turns, Parallel Resistance, Linear Resistance, Operating Voltage

2 Capacitor

2.1 Parameters

Parameter	Value
Designator	C<Num>[<Char>] (e.g. C1A)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Plastic, Ceramic Temp, Ceramic No Temp, Tantalum, Aluminium Non Solid Electrolyte, Aluminium Solid Electrolyte, Aluminium Polymer Electrolyte, Variable Ceramic Disk, NTC
Delta Temp	x >= 0.0 [°C]
Applied Peak Voltage	x >= 0.0 [V]
Rated Peak Voltage	x >= 0.0 [V]
Applied Ripple Voltage	x >= 0.0 [V]
Rated Ripple Voltage	x >= 0.0 [V]

2.2 Sensitivity

Type	Sensitivity
Plastic	
Ceramic Temp	
Ceramic No Temp	
Tantalum	
Aluminium Non Solid Electrolyte	
Aluminium Solid Electrolyte	Applied Peak Voltage, Rated Peak Voltage, Applied Ripple Voltage, Rated Ripple Voltage
Aluminium Polymer Electrolyte	
Variable Ceramic Disk	
NTC	

3 Diode

3.1 Parameters

Parameter	Value
Designator	D<Num> (e.g. D1)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Signal LP, Recovery Rectifier LP, Zener LP, Suppressor LP, Suppressor Trigger LP, Gallium Arsenide LP, Triac LP, Recovery Rectifier HP, Zener HP, Suppressor HP, Suppressor Trigger HP, Gallium Arsenide HP, Triac HP
Delta Temp	x >= 0.0 [°C]
Usage	Triac Permanent Reverse, Triac Ocasional Reverse, Triac Permanent Forward, Triac Ocasional Forward, Other
Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non Interface
Package	T018, T039, T092, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 T0126, SOT82, DPACK SOT428, D2PACK, T0220, T0218 SOT93, T0247, ISOTOP, SOT90B, S08, D034 D0204AG, D035 D0204AH, D041 D0204AL Glass, D041 D0204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB D0214, SMC D0215, D0220, SOD15
Dissipated Power	x >= 0.0 [W]
Thermal Resistance	x >= 0.0 [°C/W]

3.2 Sensitivity

Complete - all parameters are used in all cases.

4 Inductor

4.1 Parameters

Parameter	Value
Designator	L<Num> (e.g. L1)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Fixed Low Current, Variable Low Current, Power inductor, Signal transformer, Power transformer
Delta Temp	x >= 0.0 [°C]
Power Loss	x >= 0.0 [W]
Radiant Surface	x >= 0.0 [dm ²]

4.2 Sensitivity

Complete - all parameters are used in all cases.

5 Transistor

5.1 Parameters

Parameter	Value
Designator	Q<Num> (e.g. Q1)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Bipolar, GaAs Bipolar, MOS, IGBT, FET, GaAs FET
Delta Temp	x >= 0.0 [°C]
Max Vds	x >= 0.0 [V]
Min Spec Vds	x >= 0.0 [V]
Max Vgs	x >= 0.0 [V]
Min Spec Vgs	x >= 0.0 [V]
Max Vce	x >= 0.0 [V]
Min Spec Vce	x >= 0.0 [V]
Dissipated Power	x >= 0.0 [W]
Thermal Resistance	x >= 0.0 [°C/W]
Power Type	LP, HP
Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non Interface
Package	T018, T039, T092, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 T0126, SOT82, DPACK SOT428, D2PACK, TO220, TO218 SOT93, TO247, ISOTOP, SOT90B, S08, D034 D0204AG, D035 D0204AH, D041 D0204AL Glass, D041 D0204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB D0214, SMC D0215, D0220, SOD15

5.2 Sensitivity

Type	Sensitivity
Bipolar	Max Vce, Min Spec Vce, Power Type, Environment, Package, Dissipated Power, Thermal Resistance
GaAs Bipolar	Max Vds, Min Spec Vds, Max Vgs, Min Spec Vgs, Power Type, Environment, Package, Dissipated Power, Thermal Resistance
MOS	Max Vds, Min Spec Vds, Max Vgs, Min Spec Vgs, Power Type, Environment, Package, Dissipated Power, Thermal Resistance
IGBT	Max Vds, Min Spec Vds, Max Vgs, Min Spec Vgs, Power Type, Environment, Package, Dissipated Power, Thermal Resistance
FET	Max Vds, Min Spec Vds, Max Vgs, Min Spec Vgs, Power Type, Environment, Package, Dissipated Power, Thermal Resistance
GaAs FET	Max Vds, Min Spec Vds, Max Vgs, Min Spec Vgs, Power Type, Environment, Package, Dissipated Power, Thermal Resistance

6 Optocoupler

6.1 Parameters

Parameter	Value
Designator	OC<Num> (e.g. OC1)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Delta Temp	$x \geq 0.0 [^{\circ}C]$
Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non Interface
Package	T018, T039, T092, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 T0126, SOT82, DPACK SOT428, D2PACK, T0220, T0218 SOT93, T0247, ISOTOP, SOT90B, S08, D034 D0204AG, D035 D0204AH, D041 D0204AL Glass, D041 D0204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB D0214, SMC D0215, D0220, SOD15
Applied Voltage	$x \geq 0.0 [V]$
Insulation Voltage	$x \geq 0.0 [V]$
Dissipated Power	$x \geq 0.0 [W]$
Thermal Resistance	$x \geq 0.0 [^{\circ}C/W]$

6.2 Sensitivity

Complete - all parameters are used in all cases.

7 Connector

7.1 Parameters

Parameter	Value
Designator	J<Num> (e.g. J1)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	Cir/Rect, Coaxial, PCB/Socket
Material	Gold, Silver, Tin, Other
Contacts	$x \geq 0$
Operating Current	$x \geq 0.0 [A]$
Rated Current	$x \geq 0.0 [A]$

7.2 Sensitivity

Type	Sensitivity
Cir/Rect	Material, Rated Current, Operating Current, Contacts
Coaxial	Material, Rated Current, Operating Current
PCB/Socket	Material, Rated Current, Operating Current, Contacts

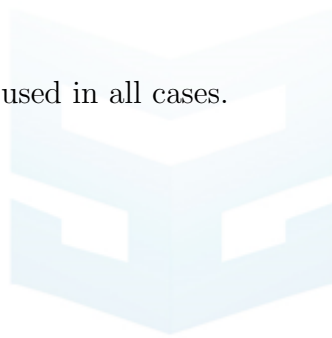
8 Switch/Keyboard

8.1 Parameters

Parameter	Value
Designator	(S SW)<Num> (e.g. SW1)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	Toggle, Push, Keyboard, Rotary
Type2	Reversible, Other, Keyboard
Contacts	$x \geq 0$

8.2 Sensitivity

Complete - all parameters are used in all cases.



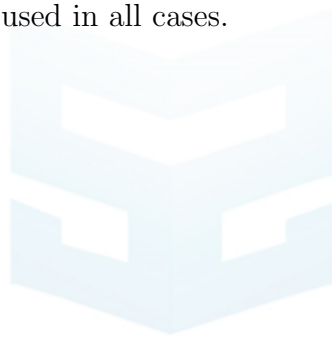
9 Converter

9.1 Parameters

Parameter	Value
Designator	CONV<Num>[<Char>] (e.g. CONV1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	Converter < 10W, Converter 10W to 30W

9.2 Sensitivity

Complete - all parameters are used in all cases.



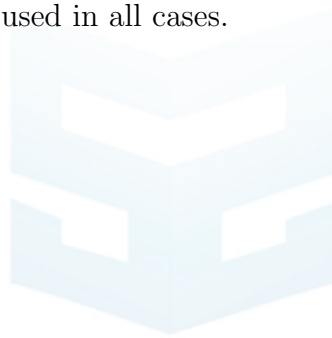
10 Display

10.1 Parameters

Parameter	Value
Designator	(DS DISP DISPLAY) <Num> [<Char>] (e.g. DISP1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	LCD 10-char, CRT, LCD

10.2 Sensitivity

Complete - all parameters are used in all cases.



11 Disk Drive

11.1 Parameters

Parameter	Value
Designator	DSK<Num>[<Char>] (e.g. DSK1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	Battery Primary Cells, Battery Secondary Cells Ni-Cd, Battery Secondary Cells Li-Ion, IC Fan, Ball Bearing Fan, Bearing Fan, Thermoelectric Cooler, Long Duration Disk Drive

11.2 Sensitivity

Complete - all parameters are used in all cases.

12 Microwave/Piezoelectric

12.1 Parameters

Parameter	Value
Designator	(MW MICROW PZ PIEZO)<Num>[<Char>] (e.g. PIEZO1A)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Microwave Passive: Fixed, Microwave Passive: Variable, Microwave Passive: w/Ferrite, Piezo Resonator, Piezo Oscillator: XO, PXO, Piezo Oscillator: VCXO, TCXO, Piezo Oscillator: OCXO, Acoustic Wave Filters

12.2 Sensitivity

Complete - all parameters are used in all cases.

13 Optoelectronic

13.1 Parameters

Parameter	Value
Designator	(DL LED LSR PHD LDR OPTIC) <Num> [<Char>] (e.g. DL10A, LDR1B)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	LED Modules, Laser Modules, Photodiodes/RX Modules for Telecom, Passive Optic, Miscellaneous Optic
Delta Temp	x >= 0.0 [°C]
Power	x >= 0.0 [W]
Optical Power	x >= 0.0 [W]
Rth	x >= 0.0 [°C/W]
Subtype (LED Modules)	<i>Depends on Type</i> Emitter DEL w/o Driver, Emitter DEL w/ Driver, Emitter/Receiver DEL + PIN w/ Driver, Emitter/Receiver DEL + APD w/ Driver
(Laser Modules)	Elementary Emitter: GaAlAs/GaAs, Elementary Emitter: InGaAs/InP, Emitter w/ Driver InGaAs/InP, Emitter Receiver PIN InGaAs/InP, Integrated Modulator InGaAs/InP, Pump Laser: LP InGaAs/InP, Pump Laser: HP InGaAs/InP, Pump Laser: InGaAs/GaAs
(Photodiodes/RX Modules for Telecom)	PIN Diode: Silicon, PIN Diode: InGaAs, APD Diode: Silicon, APD Diode: Germanium, APD Diode: InGaAs, PIN Module: w/ Driver, APD Module: w/ Driver

Parameter	Value
(Passive Optic)	Attenuator: Bulk, Attenuator: Fusion Splice <= 10db, Attenuator: Fusion Splice > 10db, Attenuator: Pasted Splice, Fusing: 1 to 2, Fusing: 1 to N (<= 5), Integrated Coupler, Mux/Demux: Fusing 1 to 2, Mux/Demux: Fusing 1 to N, Mux/Demux: Micro-optic, Connectors, Jumper/Optical Cord, Optical Fibre, Doped Optical Fibre
(Miscellaneous Optic)	LiNbO3 Modulator, Isolator, Accordable Filter, Bragg Array Filter, Optical Commutator: Mirror, Optical Commutator: Prism, VCSEL 840 nm, Thermoelectric Cooler, Thermistor

13.2 Sensitivity

Type	Sensitivity
LED Modules	Power, Rth, Subtype
Laser Modules	Power, Optical Power, Rth, Subtype
Photodiodes/RX Modules for Telecom	Power, Rth, Subtype
Passive Optic	Subtype
Miscellaneous Optic	Subtype

14 PCB

14.1 Parameters

Parameter	Value
Designator	PCB<Num>[<Char>] (e.g. PCB1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Holes	$x \geq 0$
Area	$x \geq 0.0 [cm^2]$
Solder Connections	$x \geq 0$
Crimp Connections	$x \geq 0$
Wrapped Connections	$x \geq 0$
Pressfit Connections	$x \geq 0$
Track Width	$x \geq 0.0 [mm]$
Layers	$x \geq 0$

14.2 Sensitivity

Complete - all parameters are used in all cases.

15 Protection

15.1 Parameters

Parameter	Value
Designator	(D PTC VAR F ARR) <Num> [<Char>] (e.g. PTC1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$
Type	Diode: TVS LP, Diode: Trigger TVS LP, Diode: TVS HP, Diode: Trigger TVS HP, Thermistor PTC, Varistor, Fuse, Arrestor: Solid State, Arrestor: Gas Tube
Environment	Computer, Telecom: Switching, Telecom: TX Access/Subs Card, Telecom: Subscriber, Railways/Payphone, Civilian Avionics, Voltage Supply/Converters

15.2 Sensitivity

Complete - all parameters are used in all cases.

16 Relay

16.1 Parameters

Parameter	Value
Designator	(K RY RLA)<Num>[<Char>] (e.g. RLA1A)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	Mercury Wetted Reed: LP Monostable, Mercury Wetted Reed: LP Bistable Latching, Dry Reed LP: Monostable, Dry Reed LP: Bistable Latching, Electromechanical: Miniature, Electromechanical: Thermal, Industrial, HV Vacuum, HP Mercury Wetted
Active Contacts	x >= 0
Inverse Contacts	x >= 0
Transient Voltage	x >= 0.0 [V]
Transient Current	x >= 0.0 [A]
Cycle Rate	x >= 0.0 [Hz]
Enclosure	Hermetically Sealed, Sealed, Dust Protected, Exposed Contact, Mercury Wetted
Pollution	Low, Moderate, High
Current Type	AC, DC

16.2 Sensitivity

Type	Sensitivity
Mercury Wetted Reed: LP Monostable	Active Contacts, Inverse Contacts, Cycle Rate
Mercury Wetted Reed: LP Bistable Latching	Active Contacts, Inverse Contacts, Cycle Rate
Dry Reed LP: Monostable	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current

Type	Sensitivity
Dry Reed LP: Bistable Latching	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current
Electromechanical: Miniature	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current, Enclosure, Pollution, Current Type
Electromechanical: Thermal	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current, Enclosure, Pollution, Current Type
Industrial	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current, Enclosure, Pollution, Current Type
HV Vacuum	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current, Enclosure, Pollution, Current Type
HP Mercury Wetted	Active Contacts, Inverse Contacts, Cycle Rate, Transient Voltage, Transient Current, Enclosure, Pollution, Current Type

17 Lamp

17.1 Parameters

Parameter	Value
Designator	LAMP<Num>[<Char>] (e.g. LAMP1A)
Description	Text
FIT	$x \geq 0.0 [1e-9]$

17.2 Sensitivity

Only depends on the Mission Profile.



18 Integrated Circuit

18.1 Parameters

Parameter	Value
Designator	(IC U)<Num>[<Char>] (e.g. U1A)
Description	Text
FIT	x >= 0.0 [1e-9]
Type	BICMOS: Digital, BICMOS: Linear/Digital (< 6V), BICMOS: Linear/Digital (>= 6V), BICMOS: SRAM, BICMOS: Gate Array, Bipolar: Digital, Bipolar: Linear, Bipolar: MMIC, Bipolar: Linear/Digital (< 30V), Bipolar: Linear/Digital (>= 30V), Bipolar: SRAM, Bipolar: PROM, Bipolar: PLD/PAL, Bipolar: Gate Array, GaAs: Digital, Normally ON, GaAs: Digital, Normally ON/OFF, GaAs: MMIC, Low-Noise LP, GaAs: MMIC, Power Microwave, ASIC: Std Cell/Full Custom, ASIC: Gate Array, ASIC: LCA, RAM-based, ASIC: PLD, GAL/PAL, ASIC: CPLD, EPLD/MAX/FLEX/FPGA, MOS: Digital/MCU/DSP, MOS: Linear, MOS: Digital/Linear, MOS: ROM, MOS: DRAM/VideRAM/AudioRAM, MOS: RAM, High Speed/FIFO, MOS: SRAM, LP, MOS: SRAM, Double Access, MOS: EPROM/UVPROM/REPROM, MOS: OTP, MOS: FLASH, MOS: EEPROM/Flash EEPROM
Delta Temp	x >= 0.0 [°C]

Parameter	Value
Package	T018, T039, T092, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 T0126, SOT82, DPACK SOT428, D2PACK, T0220, T0218 SOT93, T0247, ISOTOP, SOT90B, S08, D034 D0204AG, D035 D0204AH, D041 D0204AL Glass, D041 D0204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB D0214, SMC D0215, D0220, SOD15
Package Material	Plastic, Ceramic, Metallic
Technology	MOS/BICMOS LV, Bipolar/BICMOS HV, AsGa Numerical, AsGa MMIC
Power Dissipation	$x \geq 0.0$ [W]
Cooling	Natural Convection, Slightly Assisted, Fan Assisted, Forced
Pins	$x \geq 0$
Transistor Number	$x \geq 0$
Year	$x \geq 0$
Substrate	Epoxy Glass, PTFE Glass, Flexible, Cu-Invar-Cu
Electrical Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non Interface

18.2 Sensitivity

Complete - all parameters are used in all cases.