

# SAFEFIT Reference: IEC 26380

## 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.  $x \geq 0$ .
- Real number ranges, e.g.  $x \geq 0.0$  [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 FilmLow 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
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Plastic  
Ceramic Temp  
Ceramic No Temp  
Tantalum  
Aluminium Non Solid Electrolyte  
Aluminium Solid Electrolyte

Aluminium Polymer Electrolyte  
Variable Ceramic Disk  
NTC

Applied Peak Voltage, Rated Peak  
Voltage, Applied Ripple Voltage, Rated  
Ripple Voltage

## 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 Occasional Reverse, Triac Permanent Forward, Triac Occasional Forward, Other
Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non

## Interface

Package	TO18, TO39, TO92, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 TO126, SOT82, DPACK SOT428, D2PACK, TO220, TO218 SOT93, TO247, ISOTOP, SOT90B, SO8, DO34 DO204AG, DO35 DO204AH, DO41 DO204AL Glass, DO41 DO204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB DO214, SMC DO215, DO220, 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 <sup>2</sup> ]

## 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

TO18, TO39, TO92, SOT23, SOT143, SOT223,  
SOT323, SOT343, SOT346, SOT363, SOT457,  
SOT89, SOT32 TO126, SOT82, DPACK  
SOT428, D2PACK, TO220, TO218 SOT93,  
TO247, ISOTOP, SOT90B, SO8, DO34  
DO204AG, DO35 DO204AH, DO41 DO204AL Glass,  
DO41 DO204AL Plastic, F126,  
Micromelf, SOD80 Minimelf, Melf,  
SOD110, SOD123, SOD323, SOD523, SMA, SMB  
DO214, SMC DO215, DO220, 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 >= 0.0 [1e-9]
Delta Temp	x >= 0.0 [°C]
Environment	Computer, Telecom Switching, Telecom Transmitting, Telecom Subscriber, Railway Payphone, Civilian Avionics, Voltage Supply Converter, Non Interface
Package	TO18, TO39, TO92, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 TO126, SOT82, DPACK SOT428, D2PACK, TO220, TO218 SOT93, TO247, ISOTOP, SOT90B, SO8, DO34 DO204AG, DO35 DO204AH, DO41 DO204AL Glass, DO41 DO204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB DO214, SMC DO215, DO220, SOD15
Applied Voltage	x >= 0.0 [V]
Insulation Voltage	x >= 0.0 [V]
Dissipated Power	x >= 0.0 [W]
Thermal Resistance	x >= 0.0 [°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 >= 0.0 [1e-9]
Type	Cir/Rect, Coaxial, PCB/Socket
Material	Gold, Silver, Tin, Other
Contacts	x >= 0
Operating Current	x >= 0.0 [A]
Rated Current	x >= 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 >= 0.0 [1e-9]
Type	Toggle, Push, Keyboard, Rotary
Type2	Reversible, Other, Keyboard
Contacts	x >= 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
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## 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	$x \geq 0.0 [1e-9]$
Type	LED Modules, Laser Modules, Photodiodes/RX Modules for Telecom, Passive Optic, Miscellaneous Optic
Delta Temp	$x \geq 0.0 [^{\circ}C]$
Power	$x \geq 0.0 [W]$
Optical Power	$x \geq 0.0 [W]$
Rth	$x \geq 0.0 [^{\circ}C/W]$
Subtype	<i>Depends on Type</i>
(LED Modules)	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 >= 0.0 [1e-9]
Holes	x >= 0
Area	x >= 0.0 [cm^2]
Solder Connections	x >= 0

Crimp Connections	x >= 0
Wrapped Connections	x >= 0
Pressfit Connections	x >= 0
Track Width	x >= 0.0 [mm]
Layers	x >= 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 >= 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
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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 >= 0.0 [1e-9]



## 17.2 Sensitivity

Only depends on mission profile.

# 18 Integrated Circuit

## 18.1 Parameters

Parameter	Value
Designator	(IC U)<Num>[<Char>] (e.g. U1A)
Description	Text
FIT	$\geq 0.0 [1e-9]$
Type	BICMOS: Digital, BICMOS: Linear/Digital ( $< 6V$ ), BICMOS: Linear/Digital ( $\geq 6V$ ), BICMOS: SRAM, BICMOS: Gate Array, Bipolar: Digital, Bipolar: Linear, Bipolar: MMIC, Bipolar: Linear/Digital ( $< 30V$ ), Bipolar: Linear/Digital ( $\geq 30V$ ), 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	>= 0.0 [°C]
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Parameter	Value
Package	TO18, TO39, TO92, SOT23, SOT143, SOT223, SOT323, SOT343, SOT346, SOT363, SOT457, SOT89, SOT32 TO126, SOT82, DPACK SOT428, D2PACK, TO220, TO218 SOT93, TO247, ISOTOP, SOT90B, SO8, DO34 DO204AG, DO35 DO204AH, DO41 DO204AL Glass, DO41 DO204AL Plastic, F126, Micromelf, SOD80 Minimelf, Melf, SOD110, SOD123, SOD323, SOD523, SMA, SMB DO214, SMC DO215, DO220, 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.