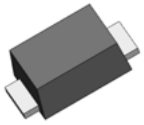
SMFE

200 W Transient voltage suppressor



Applications

- Consumer electronics
- Telecommunications
- Computing and servers
- Appliances
- Industrial automation
- Mobile and wearables

Product features

- Low profile SOD-123FL package
- Excellent clamping capability
- 200 W peak pulse power capability at 10/1000 µs waveform
- Typical I_R less than 1 µA above 10 V
- Fast response time: typically less than 1.0 ps from 0 V to V_{BR} minimum
- High temperature reflow soldering: +260 °C /40 s at terminal
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: Solder plated leads, solderable per J-STD-002
- For surface mounted applications in order to optimize board space

Environmental compliance and general specifications

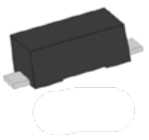
Pb HALOGEN HF FREE RoHS

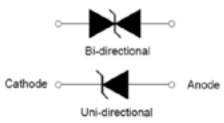
Ordering part number

SMFE 5-0 C A

- Family name
- V_R voltage ("-" indicates decimal point)
- Bi-/Uni-Directional (Blank=Uni, C=Bi)
- Voltage tolerance

PIN configuration





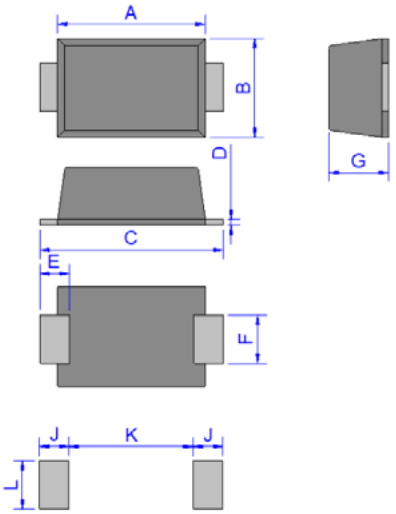
Powering Business Worldwide

Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

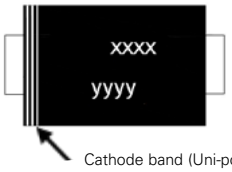
Parameter	Symbol	Value	Unit
Storage operating junction temperature range	T_{STG}/ T_J	-55 to +150	°C
Peak pulse power dissipation on 10/1000 µs waveform	P_{PP}	200	W
Maximum instantaneous forward voltage at 20 A for unidirectional	V_F	3.5	V
Typical thermal resistance junction to lead	$R_{\theta JL}$	100	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	220	°C/W

Mechanical parameters, pad layout- mm



	Millimeters		Inches	
Dimension	Minimum	Maximum	Minimum	Maximum
A	2.60	3.00	0.102	0.118
B	1.60	2.00	0.063	0.079
C	3.45	3.95	0.136	0.156
D	0.10	0.25	0.004	0.01
E	0.3	0.9	0.012	0.035
F	0.80	1.20	0.031	0.047
G	0.95	1.35	0.037	0.053
J	1.30		0.051	
K		1.70		0.067
L	1.30		0.051	

Part marking

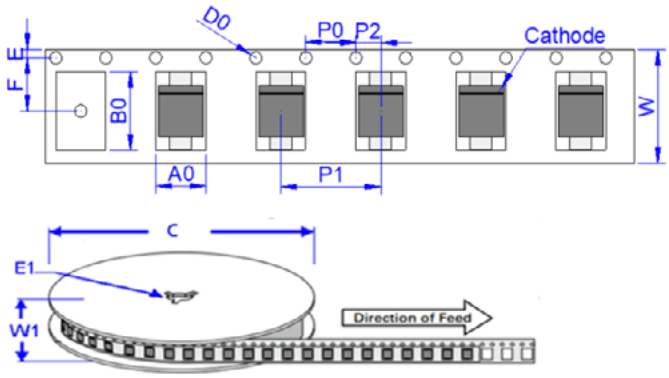


Part marking: xxxx = Date code
yyyy- Refer to marking designator listed in Electrical Characteristics table

Packaging information (mm)

Drawing not to scale.

Supplied in tape and reel packaging, 3,000 parts per 7" diameter reel (EIA-481 compliant)



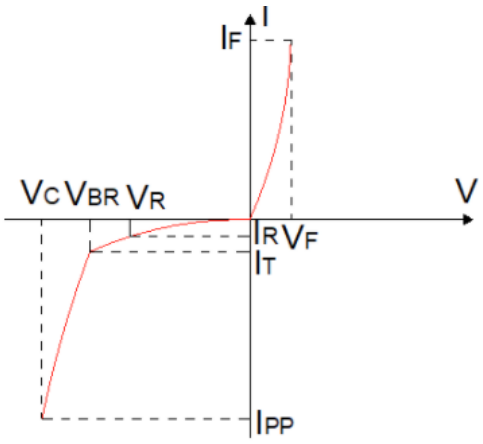
Dimension	Millimeters	Inches
A0	1.95 ± 0.3	0.077 ± 0.012
B0	3.95 ± 0.3	0.156 ± 0.012
C	178	7.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	3.50 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.0 ± 0.2	0.315 ± 0.008
W1	11.5 ± 1.0	0.453 ± 0.039

Electrical characteristics (+25 °C)

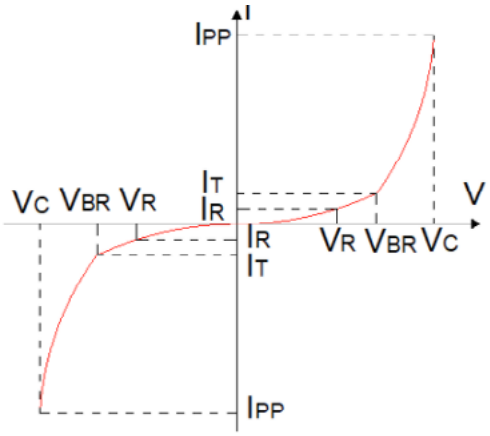
Part number		Marking		V_R	I_R @ V_R	V_{BR} @ I_T		I_T	V_C @ I_{PP}	I_{PP}
Uni-polar	**Bi-polar**	**Uni**	**Bi**	**(V)**	**(µA)**	**min (V)**	**max (V)**	**(mA)**	**max (V)**	**(A)**
SMFE5-0A	SMFE5-0CA	KE	5C	5	100	6.4	7	10	9.2	21.7
SMFE6-0A	SMFE6-0CA	KG	6C	6	100	6.67	7.37	10	10.3	19.4
SMFE6-5A	SMFE6-5CA	KK	6VC	6.5	30	7.22	7.98	10	11.2	17.9
SMFE7-0A	SMFE7-0CA	KM	7C	7	10	7.78	8.6	10	12	16.7
SMFE7-5A	SMFE7-5CA	KP	7VC	7.5	5	8.33	9.21	1	12.9	15.5
SMFE8-0A	SMFE8-0CA	KR	8C	8	2	8.89	9.83	1	13.6	14.7
SMFE8-5A	SMFE8-5CA	KT	8VC	8.5	2	9.44	10.4	1	14.4	13.8
SMFE9-0A	SMFE9-0CA	KV	9C	9	2	10	11.1	1	15.4	13
SMFE10A	SMFE10CA	KX	10C	10	1	11.1	12.3	1	17	11.8
SMFE11A	SMFE11CA	KZ	11C	11	1	12.2	13.5	1	18.2	11
SMFE12A	SMFE12CA	LE	12C	12	1	13.3	14.7	1	19.9	10.1
SMFE13A	SMFE13CA	LG	13C	13	1	14.4	15.9	1	21.5	9.3
SMFE14A	SMFE14CA	LK	14C	14	1	15.6	17.2	1	23.2	8.6
SMFE15A	SMFE15CA	LM	15C	15	1	16.7	18.5	1	24.4	8.2
SMFE16A	SMFE16CA	LP	16C	16	1	17.8	19.7	1	26	7.7
SMFE17A	SMFE17CA	LR	17C	17	1	18.9	20.9	1	27.6	7.2
SMFE18A	SMFE18CA	LT	18C	18	1	20	22.1	1	29.2	6.8
SMFE20A	SMFE20CA	LV	20C	20	1	22.2	24.5	1	32.4	6.2
SMFE22A	SMFE22CA	LX	22C	22	1	24.4	26.9	1	35.5	5.6
SMFE24A	SMFE24CA	LZ	24C	24	1	26.7	29.5	1	38.9	5.1
SMFE26A	SMFE26CA	ME	26C	26	1	28.9	31.9	1	42.1	4.8
SMFE28A	SMFE28CA	MG	28C	28	1	31.1	34.4	1	45.4	4.4
SMFE30A	SMFE30CA	MK	30C	30	1	33.3	36.8	1	48.4	4.1
SMFE33A	SMFE33CA	MM	33C	33	1	36.7	40.6	1	53.3	3.8
SMFE36A	SMFE36CA	MP	36C	36	1	40	44.2	1	58.1	3.4
SMFE40A	SMFE40CA	MR	40C	40	1	44.4	49.1	1	64.5	3.1
SMFE43A	SMFE43CA	MT	43C	43	1	47.8	52.8	1	69.4	2.8
SMFE45A	SMFE45CA	MV	45C	45	1	50	55.3	1	72.7	2.7
SMFE48A	SMFE48CA	MX	48C	48	1	53.3	58.9	1	77.4	2.6
SMFE51A	SMFE51CA	MZ	51C	51	1	56.7	62.7	1	82.4	2.4
SMFE54A	SMFE54CA	NE	54C	54	1	60	66.3	1	87.1	2.3
SMFE58A	SMFE58CA	NG	58C	58	1	64.4	71.2	1	93.6	2.1
SMFE60A	SMFE60CA	NK	60C	60	1	66.7	73.7	1	96.8	2
SMFE64A	SMFE64CA	NM	64C	64	1	71.1	78.6	1	103	1.9
SMFE70A	SMFE70CA	NP	70C	70	1	77.8	86	1	113	1.8
SMFE75A	SMFE75CA	NR	75C	75	1	83.3	92.1	1	121	1.7
SMFE78A	SMFE78CA	NV	78C	78	1	86.7	95.8	1	126	1.6
SMFE85A	SMFE85CA	NX	85C	85	1	94.4	104	1	137	1.5
SMFE90A	SMFE90CA	NZ	90C	90	1	100	111	1	146	1.4
SMFE100A	SMFE100CA	PE	100C	100	1	111	123	1	162	1.2
SMFE110A	SMFE110CA	PG	110C	110	1	122	135	1	177	1.1
SMFE120A	SMFE120CA	PK	120C	120	1	133	147	1	193	1
SMFE130A	SMFE130CA	PM	130C	130	1	144	159	1	209	0.9
SMFE150A	SMFE150CA	PR	150C	150	1	167	185	1	243	0.8
SMFE160A	SMFE160CA	PV	160C	160	1	178	197	1	259	0.8
SMFE170A	SMFE170CA	PX	170C	170	1	189	209	1	275	0.7
SMFE180A	SMFE180CA	PZ	180C	180	1	201	222	1	292	0.7
SMFE200A	SMFE200CA	QE	200C	200	1	224	247	1	324	0.6
SMFE220A	SMFE220CA	QR	220C	220	1	246	272	1	356	0.5

Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

V- I curve characteristics (Uni-directional)



V- I curve characteristics (Bi-directional)



Surge waveform: 10/1000 µs

V_R: Stand-off voltage – Maximum voltage that can be applied

V_{BR}: Breakdown voltage

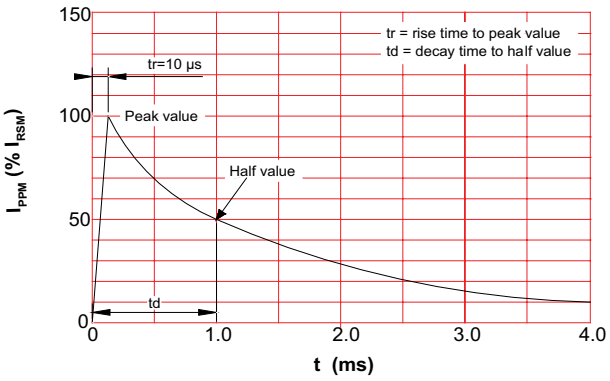
V_C: Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

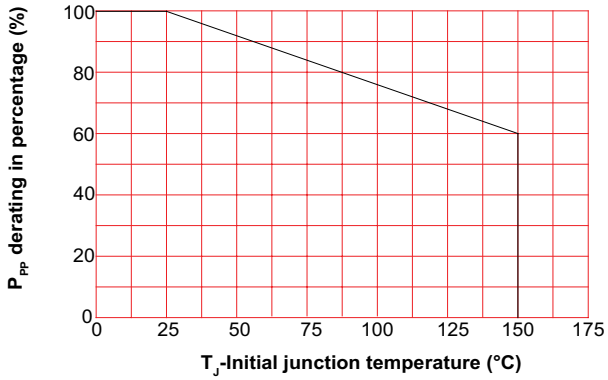
I_T: Test current

V_F: Forward voltage drop for Uni-directional TVS diode

Pulse waveform



Pulse derating curve



Solder reflow profile

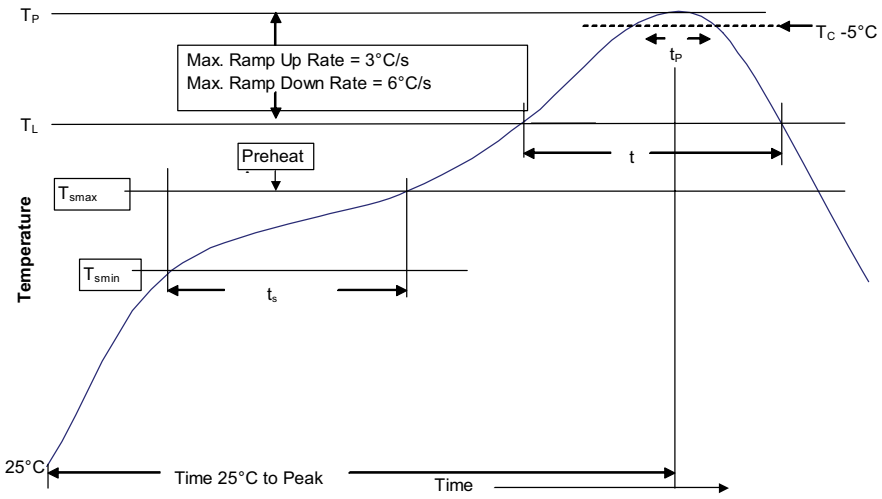


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference J-STD-020

Profile feature		Standard SnPb solder	Lead (Pb) free solder
Preheat and soak	• Temperature min. (T_{smin})	100 °C	150 °C
	• Temperature max. (T_{smax})	150 °C	200 °C
	• Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-180 seconds
Ramp up rate T_L to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L		183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body temperature (T_p)*		Table 1	Table 2
Time (t_p)* within 5 °C of the specified classification temperature (T_C)		20 seconds*	40 seconds*
Ramp-down rate (T_p to T_L)		6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature		6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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