

SMB10J5.0(C)A THRU SMB10J480(C)A

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SMB10J5.0(C)A THRU SMB10J480(C)A

1000W Surface Mount Transient Voltage Suppressors 5.0V-480V

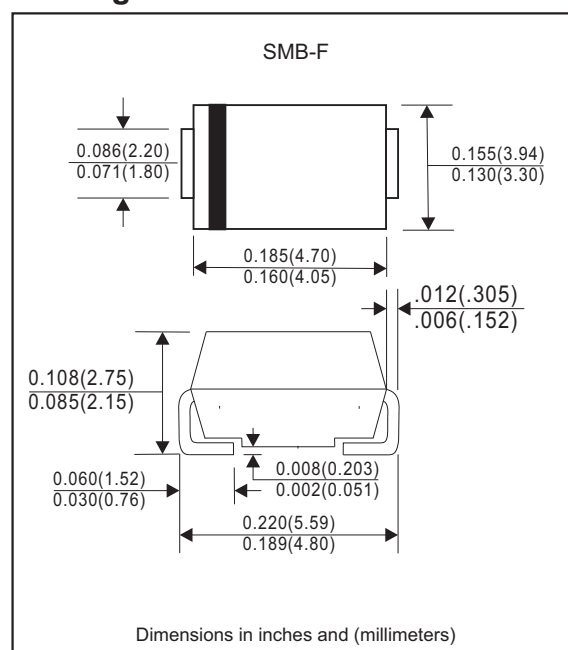
Features

- 1000W peak pulse power capability with a 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. SMB10J5.0A-H

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA / SMB-F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Color band denoted cathode except bidirectional
- Mounting Position : Any
- Weight : Approximated 0.11 gram

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Value	Unit
Peak power dissipation	with a 10/1000 μ s waveform (Note 1)	P _{PPM}	1000	W
Peak pulse current	with a 10/1000 μ s waveform	I _{PPM}	See Next Table	A
Power dissipation	on infinite heat sink at $T_L=75^\circ\text{C}$	P _D	5.0	W
Peak forward surge current	8.3ms single half sine-wave uni-directional only (Note 2)	I _{FSM}	100	A
Maximum instantaneous forward voltage	at 50A for uni-directional types only (Note 3)	V _F	3.5/6.5	V
Operating junction temperature range		T _J	-55 to +150	$^\circ\text{C}$
Storage temperature range		T _{STG}	-55 to +150	$^\circ\text{C}$

Notes 1: Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^\circ\text{C}$ per Fig. 5

2: Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

3: $V_F < 3.5\text{V}$ for $V_{BR} < 200\text{V}$ and $V_F < 6.5\text{V}$ for $V_{BR} > 201\text{V}$

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Electrical characteristics (at $T_A = 25^\circ\text{C}$ unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		V_{RWM}	$V_{BR Min}$	$V_{BR Max}$	I_T	V_C	I_{PP}	$I_R @ V_{RWM}$		
		Volts	Volts	Volts	mA	Volts	A	μA	Uni	Bi
SMB10J5.0A	SMB10J5.0CA	5.0	6.40	7.00	10	9.2	108.83	800	KKE	KAE
SMB10J6.0A	SMB10J6.0CA	6.0	6.67	7.37	10	10.3	97.17	800	KKG	KAG
SMB10J6.5A	SMB10J6.5CA	6.5	7.22	7.98	10	11.2	89.33	500	KKK	KAK
SMB10J7.0A	SMB10J7.0CA	7.0	7.78	8.60	10	12.0	83.33	200	KKM	KAM
SMB10J7.5A	SMB10J7.5CA	7.5	8.33	9.21	1.0	12.9	77.67	100	KKP	KAP
SMB10J8.0A	SMB10J8.0CA	8.0	8.89	9.83	1.0	13.6	73.67	50	KKR	KAR
SMB10J8.5A	SMB10J8.5CA	8.5	9.44	10.4	1.0	14.4	69.50	20	KKT	KAT
SMB10J9.0A	SMB10J9.0CA	9.0	10.0	11.1	1.0	15.4	65.00	10	KKV	KAV
SMB10J10A	SMB10J10CA	10	11.1	12.3	1.0	17.0	58.83	5	KKX	KAX
SMB10J11A	SMB10J11CA	11	12.2	13.5	1.0	18.2	55.00	1	KKZ	KAZ
SMB10J12A	SMB10J12CA	12	13.3	14.7	1.0	19.9	50.33	1	KLE	KBE
SMB10J13A	SMB10J13CA	13	14.4	15.9	1.0	21.5	46.67	1	KLG	KBG
SMB10J14A	SMB10J14CA	14	15.6	17.2	1.0	23.2	43.17	1	KLK	KBK
SMB10J15A	SMB10J15CA	15	16.7	18.5	1.0	24.4	41.00	1	KLM	KBM
SMB10J16A	SMB10J16CA	16	17.8	19.7	1.0	26.0	38.50	1	KLP	KBP
SMB10J17A	SMB10J17CA	17	18.9	20.9	1.0	27.6	36.33	1	KLR	KBR
SMB10J18A	SMB10J18CA	18	20.0	22.1	1.0	29.2	34.33	1	KLT	KBT
SMB10J20A	SMB10J20CA	20	22.2	24.5	1.0	32.4	31.00	1	KLV	KBV
SMB10J22A	SMB10J22CA	22	24.4	26.9	1.0	35.5	28.17	1	KLX	KBX
SMB10J24A	SMB10J24CA	24	26.7	29.5	1.0	38.9	25.83	1	KLZ	KBZ
SMB10J26A	SMB10J26CA	26	28.9	31.9	1.0	42.1	23.83	1	KME	KCE
SMB10J28A	SMB10J28CA	28	31.1	34.4	1.0	45.4	22.17	1	KMG	KCG
SMB10J30A	SMB10J30CA	30	33.5	36.8	1.0	48.4	20.67	1	KMK	KCK
SMB10J33A	SMB10J33CA	33	36.7	40.6	1.0	53.3	18.83	1	KMM	KCM
SMB10J36A	SMB10J36CA	36	40.0	44.2	1.0	58.1	17.33	1	KMP	KCP
SMB10J40A	SMB10J40CA	40	44.4	49.1	1.0	64.5	15.50	1	KMR	KCR
SMB10J43A	SMB10J43CA	43	47.8	52.8	1.0	69.4	14.50	1	KMT	KCT
SMB10J45A	SMB10J45CA	45	50.0	55.3	1.0	72.7	13.83	1	KMV	KCV
SMB10J48A	SMB10J48CA	48	53.3	58.9	1.0	77.4	13.00	1	KMX	KCX
SMB10J51A	SMB10J51CA	51	56.7	62.7	1.0	82.4	12.17	1	KMZ	KCZ
SMB10J54A	SMB10J54CA	54	60.0	66.3	1.0	87.1	11.50	1	KNE	KDE
SMB10J58A	SMB10J58CA	58	64.4	71.2	1.0	93.6	10.83	1	KNG	KDG
SMB10J60A	SMB10J60CA	60	66.7	73.7	1.0	96.8	10.33	1	KNK	KDK
SMB10J64A	SMB10J64CA	64	71.1	78.6	1.0	103.0	9.83	1	KNM	KDM
SMB10J70A	SMB10J70CA	70	77.8	86.6	1.0	113.0	8.83	1	KNP	KDP
SMB10J75A	SMB10J75CA	75	83.3	92.1	1.0	121.0	8.33	1	KNR	KDR
SMB10J78A	SMB10J78CA	78	86.7	95.8	1.0	126.0	8.00	1	KNT	KDT
SMB10J85A	SMB10J85CA	85	94.4	104	1.0	137.0	7.33	1	KNV	KDV

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Electrical characteristics (at $T_A = 25^\circ\text{C}$ unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		V_{RWM}	$V_{BR \text{ Min}}$	$V_{BR \text{ Max}}$	I_T	V_C	I_{PP}	$I_R @ V_{RWM}$		
		Volts	Volts	Volts	mA	Volts	A	μA	Uni	Bi
SMB10J90A	SMB10J90CA	90	100	111	1.0	146.0	6.83	1	KNX	KDX
SMB10J100A	SMB10J100CA	100	111	123	1.0	162.0	6.17	1	KNZ	KDZ
SMB10J110A	SMB10J110CA	110	122	135	1.0	177.0	5.67	1	KPE	KEE
SMB10J120A	SMB10J120CA	120	133	147	1.0	193.0	5.17	1	KPG	KEG
SMB10J130A	SMB10J130CA	130	144	159	1.0	209.0	4.83	1	KPK	KEK
SMB10J150A	SMB10J150CA	150	167	185	1.0	243.0	4.17	1	KPM	KEM
SMB10J160A	SMB10J160CA	160	178	197	1.0	259.0	3.83	1	KPP	KEP
SMB10J170A	SMB10J170CA	170	189	209	1.0	275.0	3.67	1	KPR	KER
SMB10J180A	SMB10J180CA	180	201	222	1.0	292.0	3.50	1	KPT	KET
SMB10J190A	SMB10J190CA	190	209	243	1.0	308.0	3.33	1	KPA	KEC
SMB10J200A	SMB10J200CA	200	224	247	1.0	324.0	3.17	1	KPV	KEV
SMB10J210A	SMB10J210CA	210	231	268	1.0	340.0	3.00	1	KPB	KED
SMB10J220A	SMB10J220CA	220	246	272	1.0	356.0	2.83	1	KPX	KEX
SMB10J250A	SMB10J250CA	250	279	309	1.0	405.0	2.50	1	KPZ	KEZ
SMB10J300A	SMB10J300CA	300	335	371	1.0	486.0	2.17	1	KQE	KFE
SMB10J350A	SMB10J350CA	350	391	432	1.0	567.0	1.83	1	KQG	KFG
SMB10J400A	SMB10J400CA	400	447	494	1.0	648.0	1.50	1	KQK	KFK
SMB10J440A	SMB10J440CA	440	492	543	1.0	713.0	1.50	1	KQM	KFM
SMB10J480A	SMB10J480CA	480	536	593	1.0	750.0	1.33	1	KQP	KFP

Notes 1: V_{BR} measured after I_T applied for 300 μs , I_T =square wave pulse or equivalent2: For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled

3: Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices

Rating and characteristic curves (SMB10J5.0(C)A THRU SMB10J480(C)A)

Fig.1 - Peak Pulse Power Rating Curve

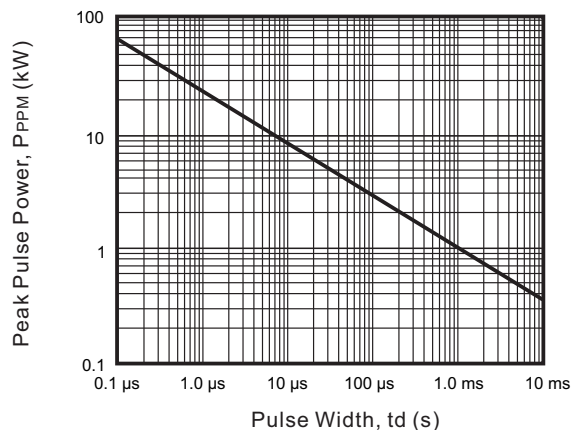


Fig.2 - Maximum Non-Repetitive Forward Surge Current

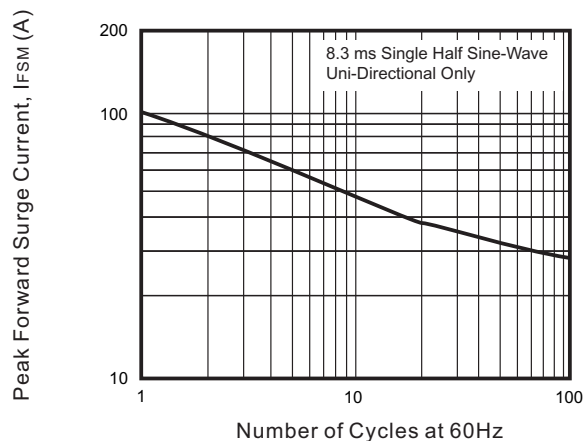


Fig.3 - Pulse Waveform

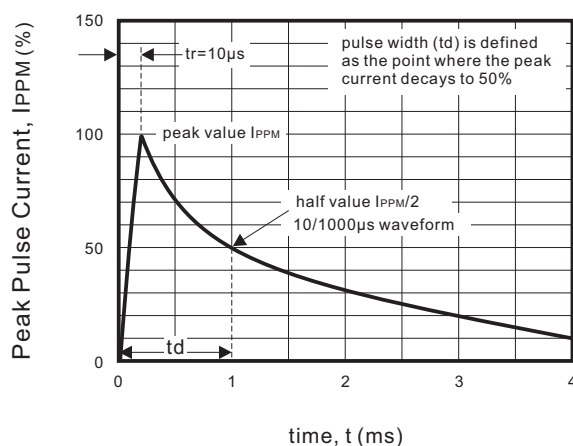


Fig.4 - Typical Junction Capacitance

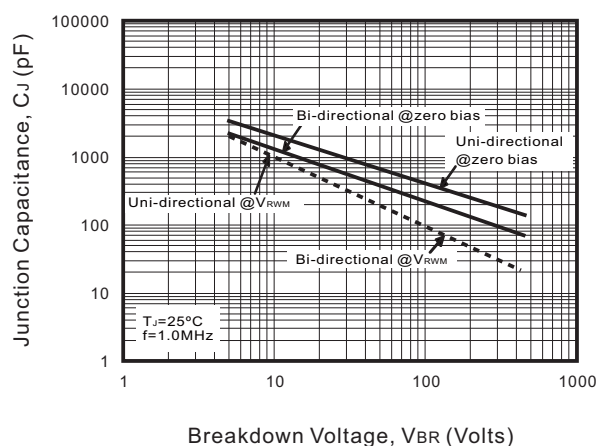


Fig.5 - Pulse Derating Curve

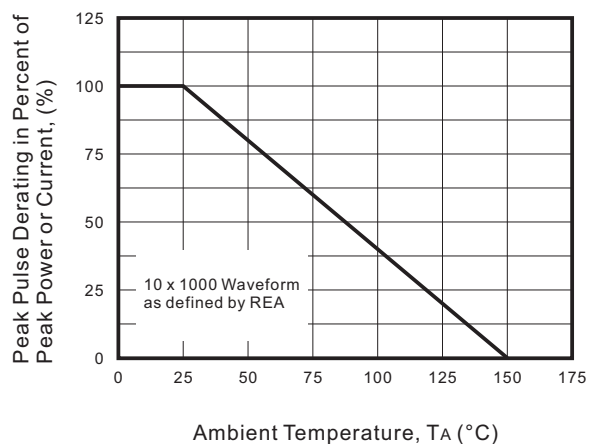
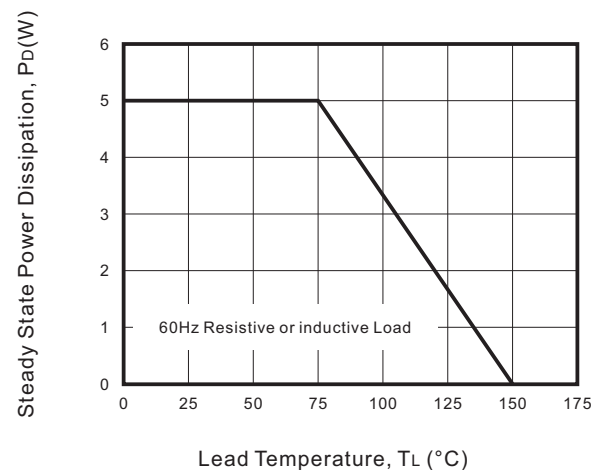
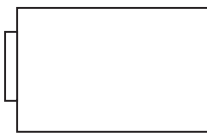


Fig.6 - Steady State Power Derating Curve

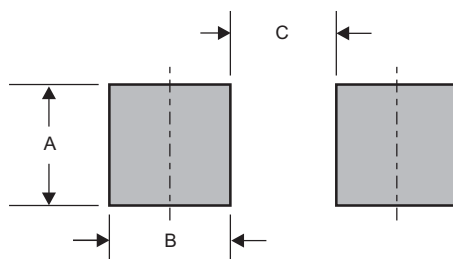


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Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		
Bi-Directional		

Suggested solder pad layout

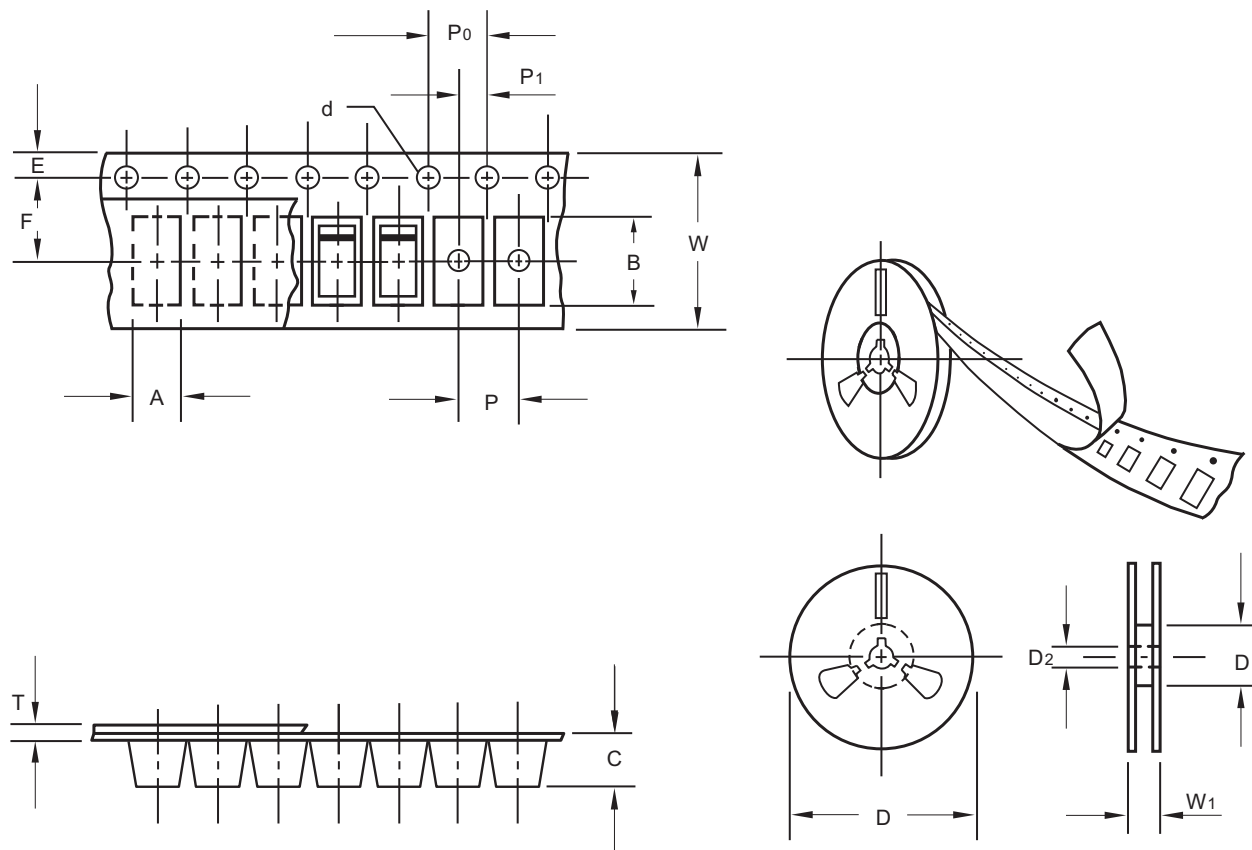


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMB-F	0.091 (2.30)	0.098 (2.50)	0.071 (1.80)

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Packing information



unit:mm

Item	Symbol	Tolerance	SMB-F
Carrier width	A	0.1	3.77
Carrier length	B	0.1	5.70
Carrier depth	C	0.1	2.45 / 2.67
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D ₁	min	75.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D ₁	min	-
Feed hole diameter	D ₂	1.0	13.50
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.05	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.25
Tape width	W	0.15	12.00
Reel width	W ₁	1.5	18.10

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

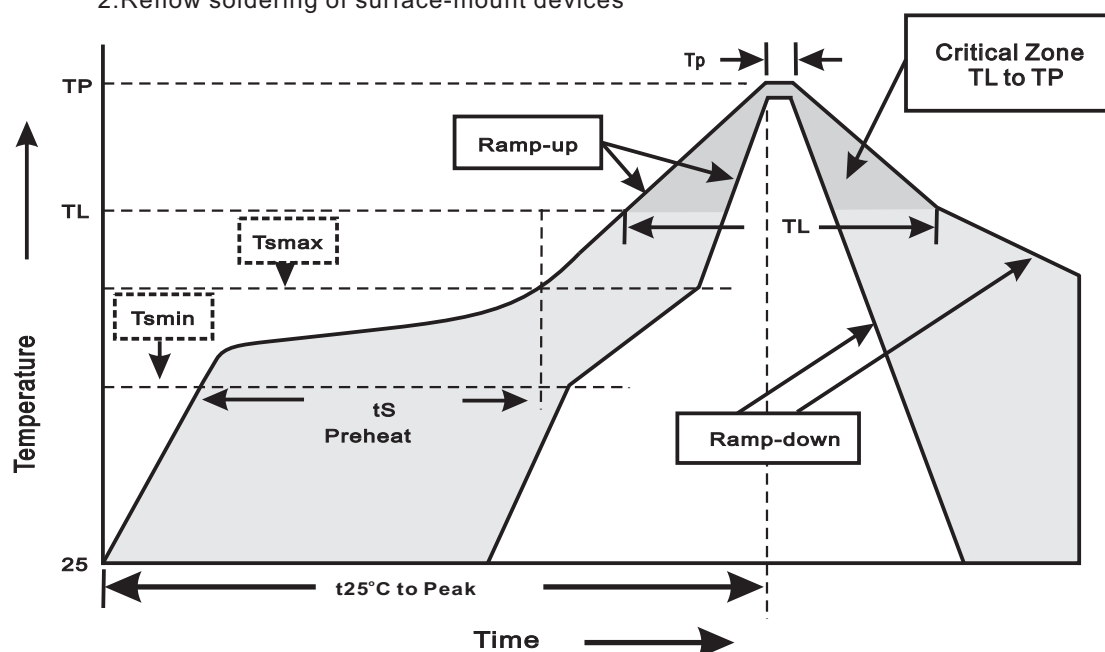
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SMB-F	13"	3,000	8.0	6,000	335*335*38	330	350*330*360	48,000	12.40

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

SMB10J5.0(C)A THRU SMB10J480(C)A**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{BR} = V_{BR\text{NOM}} * 80\%$ at $T_J = 150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031