

P15SMCJ6.8(C)A THRU P15SMCJ550(C)A

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P15SMCJ6.8(C)A THRU P15SMCJ550(C)A

1500W Surface Mount Transient Voltage Suppressors : 6.8V-440V

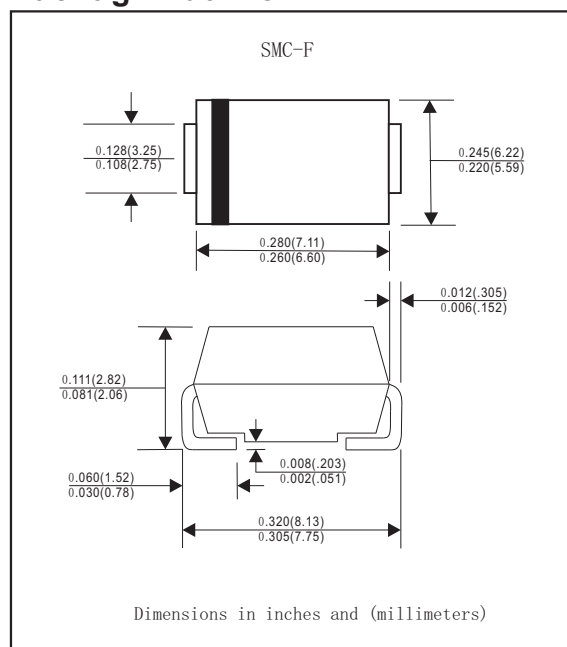
Features

- 1500W peak pulse power capability with a 10/1000 us waveform, repetition rate (duty cycle): 0.01%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to VBR, typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. P15SMCJ6.8A-H

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AB / SMC-F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.23 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 us waveform (Note 1, 2 & Fig. 1)	PPPM	1500	W
Peak Pulse current	with a 10/1000 us waveform	IPPM	See Table	A
Steady State Power Dissipation	at $T_A=50^{\circ}\text{C}$ (Note 2)	PM(AV)	6.5	W
Peak Forward Surge Current	8.3ms Single Half Sine-Wave (Note 3)	IFSM	200	A
Maximum Instantaneous Forward Voltage	at 100A For Uni-Directional Types Only (Note 4)	V_F	3.5/5.0	V
Typical Thermal resistance	Junction to case	$R_{\theta JC}$	15	$^{\circ}\text{C/W}$
	Junction to ambient	$R_{\theta JA}$	75	
Operating junction temperature range		T_J	-65 to +150	$^{\circ}\text{C}$
Storage temperature range		T_{STG}	-65 to +150	$^{\circ}\text{C}$

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^{\circ}\text{C}$ per Fig. 2

2. Mounted on copper pad area of 0.31"x0.31" (8.0x8.0 mm) to each terminal.

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

4. $V_F < 3.5\text{V}$ for $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ 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
P15SMCJ6.8A	P15SMCJ6.8CA	5.8	6.45	7.14	10	10.5	144.8	1000	6V8A	6V8C
P15SMCJ7.5A	P15SMCJ7.5CA	6.4	7.13	7.88	10	11.3	134.5	500	7V5A	7V5C
P15SMCJ8.2A	P15SMCJ8.2CA	7.02	7.79	8.61	10	12.1	125.6	200	8V2A	8V2C
P15SMCJ9.1A	P15SMCJ9.1CA	7.78	8.65	9.50	1.0	13.4	113.4	50	9V1A	9V1C
P15SMCJ10A	P15SMCJ10CA	8.55	9.50	10.5	1.0	14.5	104.8	10	10A	10C
P15SMCJ11A	P15SMCJ11CA	9.4	10.5	11.6	1.0	15.6	97.4	5	11A	11C
P15SMCJ12A	P15SMCJ12CA	10.2	11.4	12.6	1.0	16.7	91.0	5	12A	12C
P15SMCJ13A	P15SMCJ13CA	11.1	12.4	13.7	1.0	18.2	83.5	1	13A	13C
P15SMCJ15A	P15SMCJ15CA	12.8	14.3	15.8	1.0	21.2	71.7	1	15A	15C
P15SMCJ16A	P15SMCJ16CA	13.6	15.2	16.8	1.0	22.5	67.6	1	16A	16C
P15SMCJ18A	P15SMCJ18CA	15.3	17.1	18.9	1.0	25.2	60.3	1	18A	18C
P15SMCJ20A	P15SMCJ20CA	17.1	19.0	21.0	1.0	27.7	54.9	1	20A	20C
P15SMCJ22A	P15SMCJ22CA	18.8	20.9	23.1	1.0	30.6	49.7	1	22A	22C
P15SMCJ24A	P15SMCJ24CA	20.5	22.8	25.2	1.0	33.2	45.8	1	24A	24C
P15SMCJ27A	P15SMCJ27CA	23.1	25.7	28.4	1.0	37.5	40.5	1	27A	27C
P15SMCJ30A	P15SMCJ30CA	25.6	28.5	31.5	1.0	41.4	36.7	1	30A	30C
P15SMCJ33A	P15SMCJ33CA	28.2	31.4	34.7	1.0	45.7	33.3	1	33A	33C
P15SMCJ36A	P15SMCJ36CA	30.8	34.2	37.8	1.0	49.9	30.5	1	36A	36C
P15SMCJ39A	P15SMCJ39CA	33.3	37.1	41.0	1.0	53.9	28.2	1	39A	39C
P15SMCJ43A	P15SMCJ43CA	36.8	40.9	45.2	1.0	59.3	25.6	1	43A	43C
P15SMCJ47A	P15SMCJ47CA	40.2	44.7	49.4	1.0	64.8	23.5	1	47A	47C
P15SMCJ51A	P15SMCJ51CA	43.6	48.5	53.6	1.0	70.1	21.7	1	51A	51C
P15SMCJ56A	P15SMCJ56CA	47.8	53.2	58.8	1.0	77.0	19.7	1	56A	56C
P15SMCJ62A	P15SMCJ62CA	53.0	58.9	65.1	1.0	85.0	17.9	1	62A	62C
P15SMCJ68A	P15SMCJ68CA	58.1	64.6	71.4	1.0	92.0	16.5	1	68A	68C
P15SMCJ75A	P15SMCJ75CA	64.1	71.3	78.8	1.0	103	14.8	1	75A	75C
P15SMCJ82A	P15SMCJ82CA	70.1	77.9	86.1	1.0	113	13.5	1	82A	82C
P15SMCJ91A	P15SMCJ91CA	77.8	86.5	95.5	1.0	125	12.2	1	91A	91C
P15SMCJ100A	P15SMCJ100CA	88.5	95.0	105	1.0	137	11.1	1	100A	100C
P15SMCJ110A	P15SMCJ110CA	94	105	116	1.0	152	10.0	1	110A	110C
P15SMCJ120A	P15SMCJ120CA	102	114	126	1.0	165	9.2	1	120A	120C
P15SMCJ130A	P15SMCJ130CA	111	124	137	1.0	179	8.5	1	130A	130C
P15SMCJ150A	P15SMCJ150CA	128	143	158	1.0	207	7.3	1	150A	150C
P15SMCJ160A	P15SMCJ160CA	136	152	168	1.0	219	6.9	1	160A	160C
P15SMCJ170A	P15SMCJ170CA	145	162	179	1.0	234	6.5	1	170A	170C
P15SMCJ180A	P15SMCJ180CA	154	171	189	1.0	246	6.2	1	180A	180C
P15SMCJ200A	P15SMCJ200CA	171	190	210	1.0	274	5.5	1	200A	200C
P15SMCJ220A	P15SMCJ220CA	185	209	231	1.0	328	4.6	1	220A	220C

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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
P15SMCJ250A	P15SMCJ250CA	214	237	263	1.0	344	4.4	1	250A	250C
P15SMCJ300A	P15SMCJ300CA	256	285	315	1.0	414	3.7	1	300A	300C
P15SMCJ350A	P15SMCJ350CA	300	332	368	1.0	482	3.2	1	350A	350C
P15SMCJ400A	P15SMCJ400CA	342	380	420	1.0	548	2.8	1	400A	400C
P15SMCJ440A	P15SMCJ440CA	376	418	462	1.0	602	2.5	1	440A	440C
P15SMCJ480A	P15SMCJ480CA	408	456	504	1.0	658	2.3	1	480A	480C
P15SMCJ510A	P15SMCJ510CA	434	485	535	1.0	698	2.1	1	510A	510C
P15SMCJ530A	P15SMCJ530CA	477	503.5	556.5	1.0	725	2.1	1	530A	530C
P15SMCJ540A	P15SMCJ540CA	486	513	567	1.0	740	2.0	1	540A	540C
P15SMCJ550A	P15SMCJ550CA	495	522.5	577.5	1.0	760	2.0	1	550A	550C

Note 1. V_{BR} measured after I_T applied for 300 μs , I_T =square wave pulse or equivalent
 2. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
 3. The available parts are "A" type only, the parts without A (V_{BR} is $\pm 10\%$) is not available.

Rating and characteristic curves (P15SMCJ6.8(C)A THRU P15SMC550(C)A)

Fig.1 - Peak Pulse Power Rating Curve

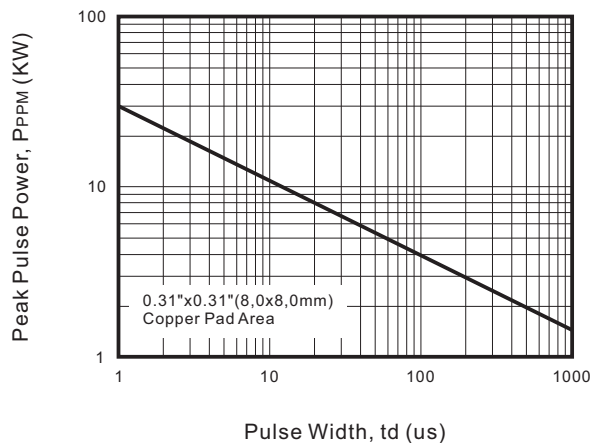


Fig.2 - Maximum Non-Repetitive Forward Surge Current

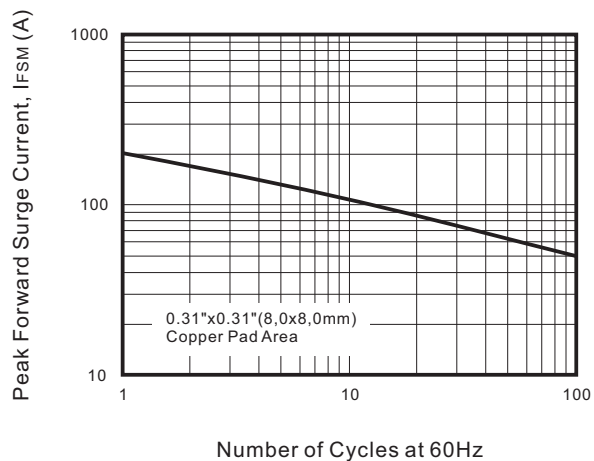


Fig.3 - Pulse Waveform

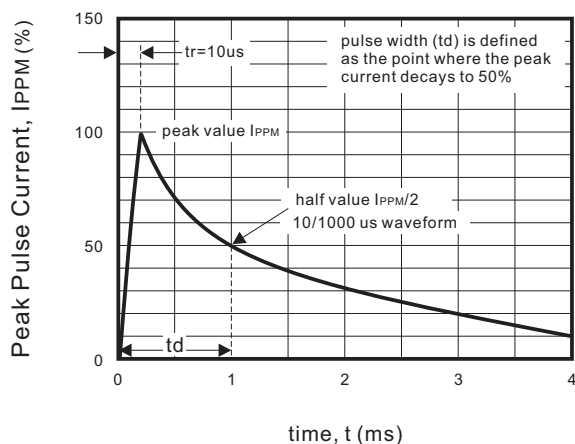


Fig.4 - Typical Junction Capacitance

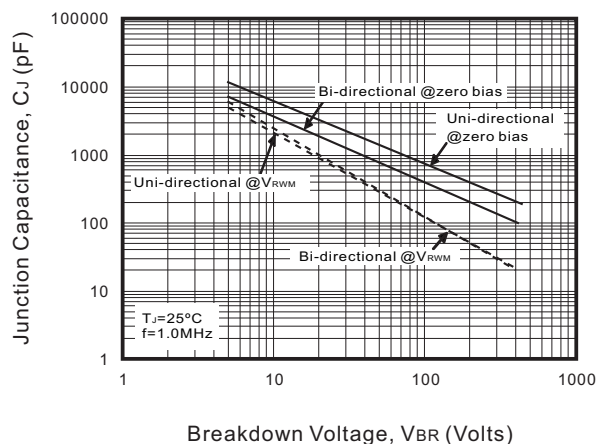


Fig.5 - Steady State Power Derating Curve

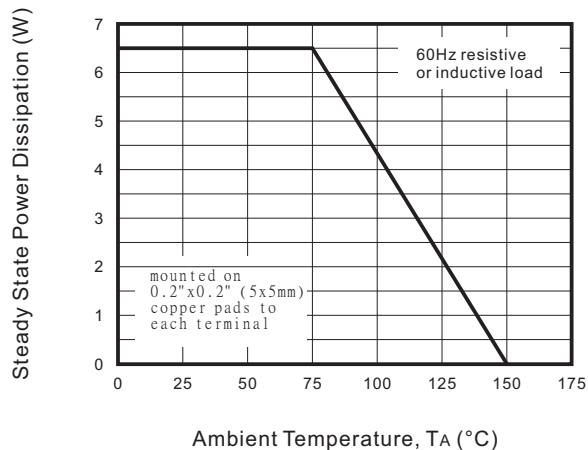
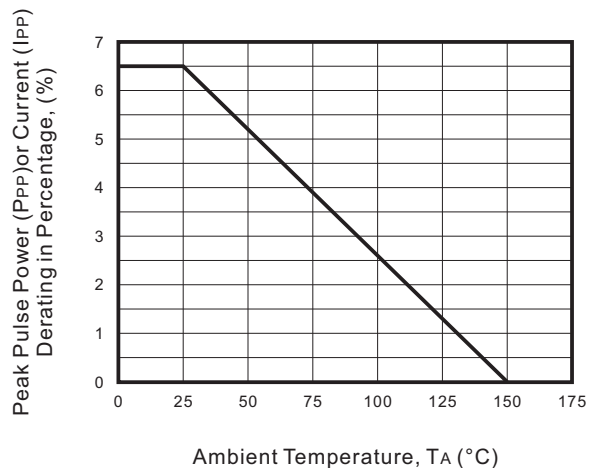


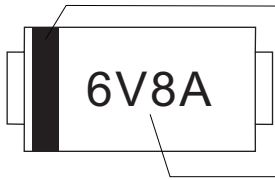
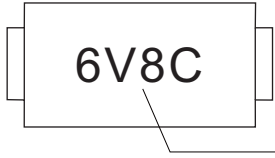
Fig.6 - Pulse Derating Curve

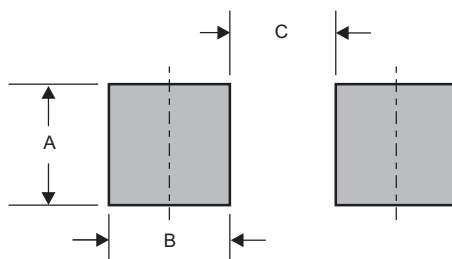


P15SMCJ6.8(C)A THRU P15SMCJ550(C)A**Pinning information**

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

Marking

Type number	Example
Uni-Directional	
Bi-Directional	

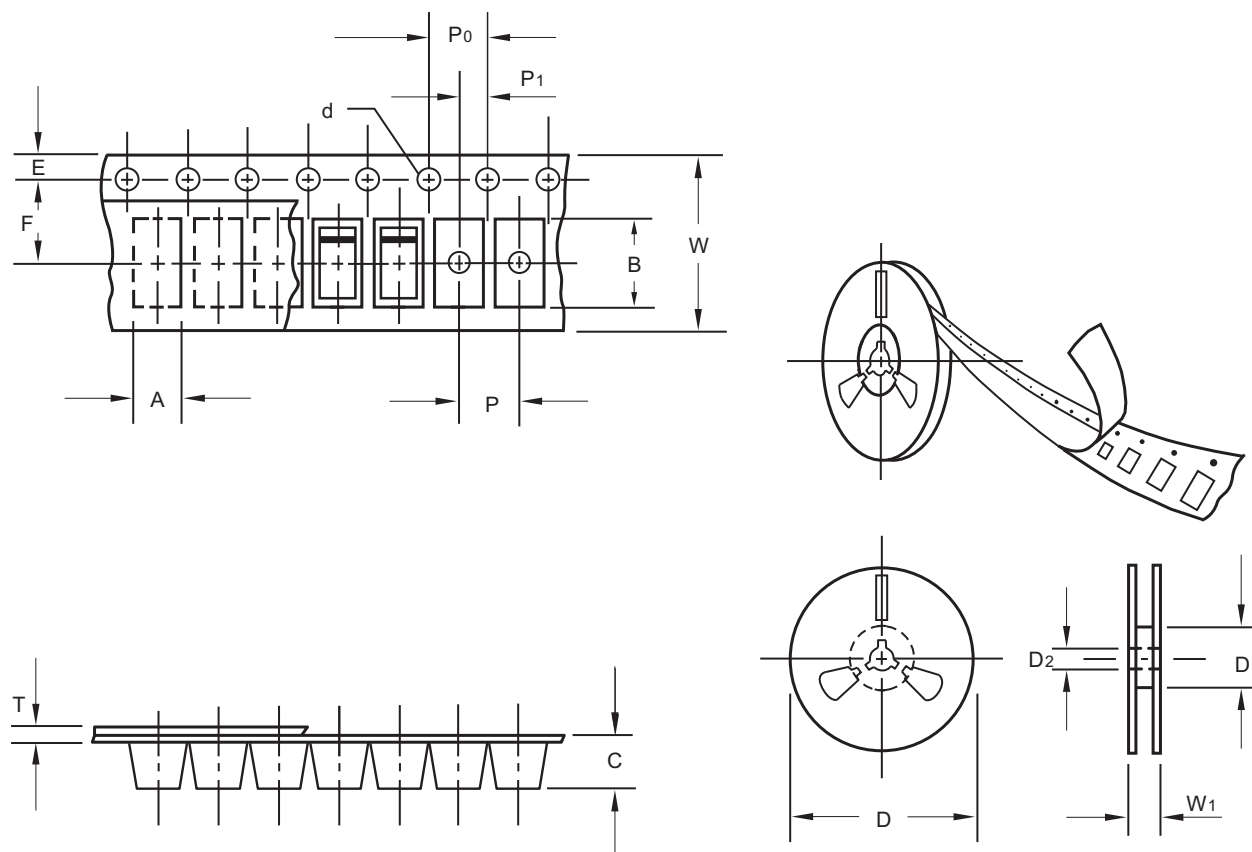
Suggested solder pad layout

Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMC-F	0.132 (3.30)	0.100 (2.50)	0.176 (4.40)

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Packing information



unit:mm

Item	Symbol	Tolerance	SMC-F
Carrier width	A	0.15	6.00
Carrier length	B	0.2	8.25
Carrier depth	C	0.1	2.36
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D ₁	min	50.00
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	7.50
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	0.23
Tape width	W	0.3	16.00
Reel width	W ₁	1.0	18.00

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

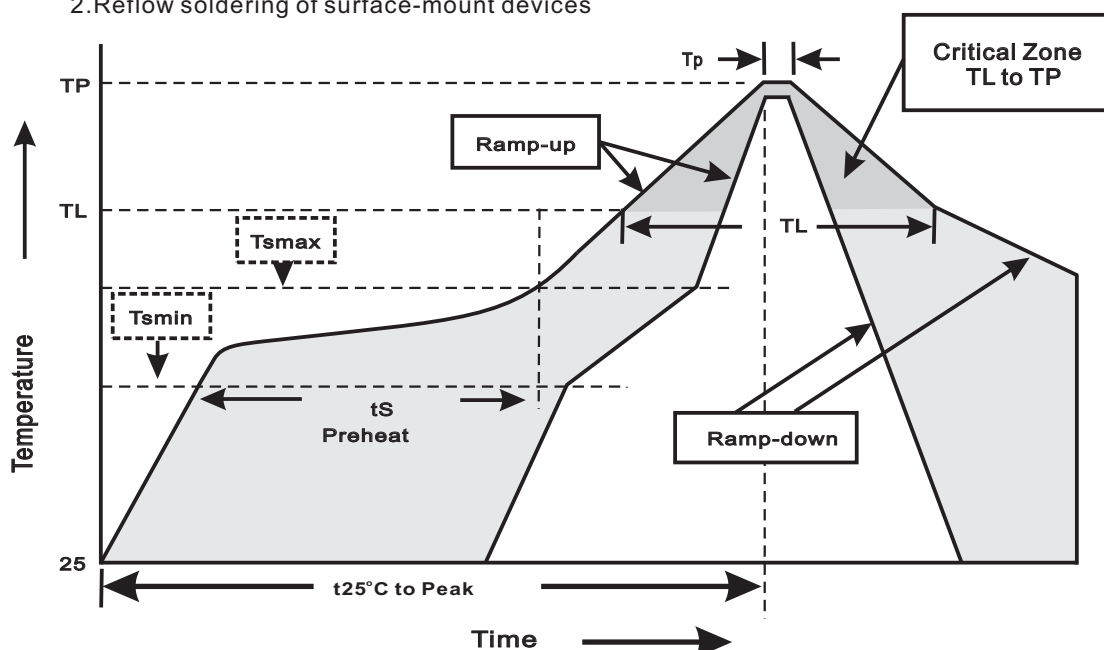
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Reel packing

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)
SMC-F	13"	3,000	8.0	6,000	330*330*50	330	365*365*360	48,000	18.00

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 _{Smin}) -Temperature Max(T _{Smax}) -Time(min to max)(t _S)	150°C 200°C 60~120sec
T _{Smax} 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

P15SMCJ6.8(C)A THRU P15SMCJ550(C)A**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm5^{\circ}\text{C}$ for $10\pm2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{\text{BR}}=V_{\text{BR NOM}}*80\%$ at $T_{\text{J}}=150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_{\text{A}}=121^{\circ}\text{C}$ 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 $T_{\text{A}}=85^{\circ}\text{C}$, 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