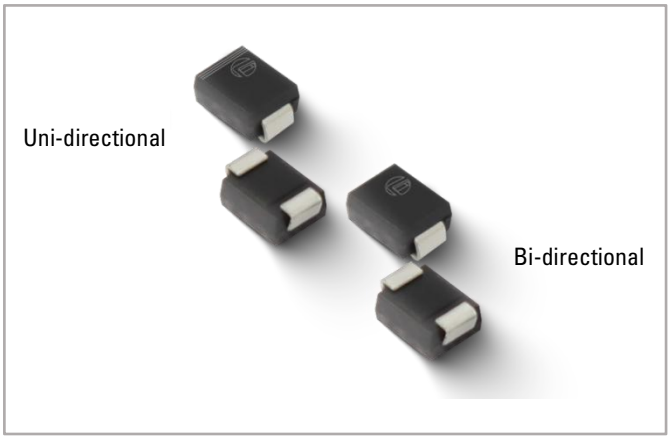
P6SMB-Q Series
Surface Mount – 600W

AUTOMOTIVE GRADE HF RoHS Pb e3



Additional Information

Resources | Accessories | Samples

Agency Approvals

Agency	Agency File Number
	E528309

Maximum Ratings and Thermal Characteristics

(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000μs Waveform(Fig.1)(Note1)(Note2) -Single Die Parts	P_{PPM}	600	W
Power Dissipation on Infinite Heat Sink at T_L=50℃	P_D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	100	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only (Note 4)	V_F	3.5/5.0	V
Operating Temperature Range	T_J	-55 to 150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	℃/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	℃/W

Notes:

1. Non-repetitive current pulse , per Fig.3 and derated above T_J (initial) =25℃ per Fig.2
2. Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.
4. V_F < 3.5V for single die parts and V_F< 5.0V for stacked-die parts.

Description

The P6SMB-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

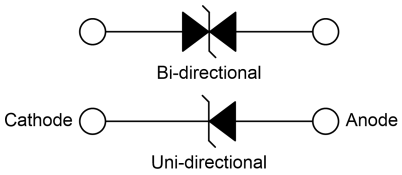
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 600W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1μA when V_B min>12V
- Optimized surface mount footprint for minimal PCB space impact
- Low profile package
- Typical failure mode due to exceeding maximum ratings is a short circuit condition
- Whisker test conducted based on Table 4a and 4c of JEDEC JESD201A
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC61000-4-4
- Built-in strain relief
- Fast response time: typically less than 1.0psfrom 0V to V_B min
- High temperature to reflow soldering guaranteed: 260℃/20~40sec.
- V_B @ T_J= V_B@25℃x (1+ α T x (T_J - 25)) (α T:Temperature Coefficient, typical value is 0.1%)
- Meet MSL level1, per J-STD-020, LF maximum peak of 260℃
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD 609A.01)

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Functional Diagram



P6SMB-Q Series
Surface Mount – 600W

Electrical Characteristics (T_A=25℃ unless otherwise noted)

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}	Peak Pulse Current	Reverse Leakage @V_R
Uni.	Bi.		Uni.	Bi.	V_R(V)	$V_{B\ Min.}$(V)	$V_{B\ Max.}$(V)	I_T(mA)	V_C(V)	I_{PP}(A)	I_R(μA)
P6SMB6.8A	P6SMB6.8CA	Q	6V8A	6V8C	5.80	6.45	7.14	10	10.5	58.1	1000
P6SMB7.5A	P6SMB7.5CA	Q	7V5A	7V5C	6.40	7.13	7.88	10	11.3	54.0	500
P6SMB8.2A	P6SMB8.2CA	Q	8V2A	8V2C	7.02	7.79	8.61	10	12.1	50.4	200
P6SMB9.1A	P6SMB9.1CA	Q	9V1A	9V1C	7.78	8.65	9.55	1	13.4	45.5	50
P6SMB10A	P6SMB10CA	Q	10A	10C	8.55	9.50	10.50	1	14.5	42.1	10
P6SMB11A	P6SMB11CA	Q	11A	11C	9.40	10.50	11.60	1	15.6	39.1	5
P6SMB12A	P6SMB12CA	Q	12A	12C	10.20	11.40	12.60	1	16.7	36.5	5
P6SMB13A	P6SMB13CA	Q	13A	13C	11.10	12.40	13.70	1	18.2	33.5	1
P6SMB15A	P6SMB15CA	Q	15A	15C	12.80	14.30	15.80	1	21.2	28.8	1
P6SMB16A	P6SMB16CA	Q	16A	16C	13.60	15.20	16.80	1	22.5	27.1	1
P6SMB18A	P6SMB18CA	Q	18A	18C	15.30	17.10	18.90	1	25.2	24.2	1
P6SMB20A	P6SMB20CA	Q	20A	20C	17.10	19.00	21.00	1	27.7	22.0	1
P6SMB22A	P6SMB22CA	Q	22A	22C	18.80	20.90	23.10	1	30.6	19.9	1
P6SMB24A	P6SMB24CA	Q	24A	24C	20.50	22.80	25.20	1	33.2	18.4	1
P6SMB27A	P6SMB27CA	Q	27A	27C	23.10	25.70	28.40	1	37.5	16.3	1
P6SMB30A	P6SMB30CA	Q	30A	30C	25.60	28.50	31.50	1	41.4	14.7	1
P6SMB33A	P6SMB33CA	Q	33A	33C	28.20	31.40	34.70	1	45.7	13.3	1
P6SMB36A	P6SMB36CA	Q	36A	36C	30.80	34.20	37.80	1	49.9	12.2	1
P6SMB39A	P6SMB39CA	Q	39A	39C	33.30	37.10	41.00	1	53.9	11.3	1
P6SMB43A	P6SMB43CA	Q	43A	43C	36.80	40.90	45.20	1	59.3	10.3	1
P6SMB47A	P6SMB47CA	Q	47A	47C	40.20	44.70	49.40	1	64.8	9.4	1
P6SMB51A	P6SMB51CA	Q	51A	51C	43.60	48.50	53.60	1	70.1	8.7	1
P6SMB56A	P6SMB56CA	Q	56A	56C	47.80	53.20	58.80	1	77.0	7.9	1
P6SMB62A	P6SMB62CA	Q	62A	62C	53.00	58.90	65.10	1	85.0	7.2	1
P6SMB68A	P6SMB68CA	Q	68A	68C	58.10	64.60	71.40	1	92.0	6.6	1
P6SMB75A	P6SMB75CA	Q	75A	75C	64.10	71.30	78.80	1	103.0	5.9	1
P6SMB82A	P6SMB82CA	Q	82A	82C	70.10	77.90	86.10	1	113.0	5.4	1
P6SMB91A	P6SMB91CA	Q	91A	91C	77.80	86.50	95.50	1	125.0	4.9	1
P6SMB100A	P6SMB100CA	Q	100A	100C	85.50	95.00	105.00	1	137.0	4.5	1
P6SMB110A	P6SMB110CA	Q	110A	110C	94.00	105.00	116.00	1	152.0	4.0	1
P6SMB120A	P6SMB120CA	Q	120A	120C	102.00	114.00	126.00	1	165.0	3.7	1
P6SMB130A	P6SMB130CA	Q	130A	130C	111.00	124.00	137.00	1	179.0	3.4	1
P6SMB150A	P6SMB150CA	Q	150A	150C	128.00	143.00	158.00	1	207.0	2.9	1
P6SMB160A	P6SMB160CA	Q	160A	160C	136.00	152.00	168.00	1	219.0	2.8	1
P6SMB170A	P6SMB170CA	Q	170A	170C	145.00	162.00	179.00	1	234.0	2.6	1
P6SMB180A	P6SMB180CA	Q	180A	180C	154.00	171.00	189.00	1	246.0	2.5	1
P6SMB200A	P6SMB200CA	Q	200A	200C	171.00	190.00	210.00	1	274.0	2.2	1
P6SMB220A	P6SMB220CA	Q	220A	220C	185.00	209.00	231.00	1	328.0	1.9	1
P6SMB250A	P6SMB250CA	Q	250A	250C	214.00	237.00	263.00	1	344.0	1.8	1
P6SMB300A	P6SMB300CA	Q	300A	300C	256.00	285.00	315.00	1	414.0	1.5	1

Notes:
For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

P6SMB-Q Series
Surface Mount – 600W

Ratings and Characteristic Curves (T_A=25℃ unless otherwise noted)

Figure 1:
Peak Pulse Power Rating Curve

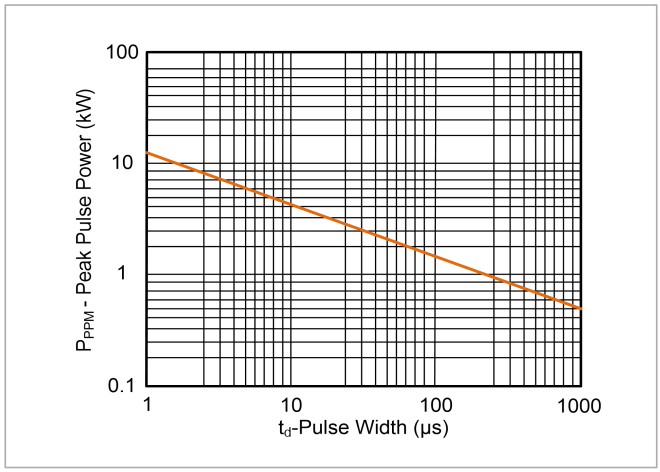


Figure 2:
Pulse Derating Curve

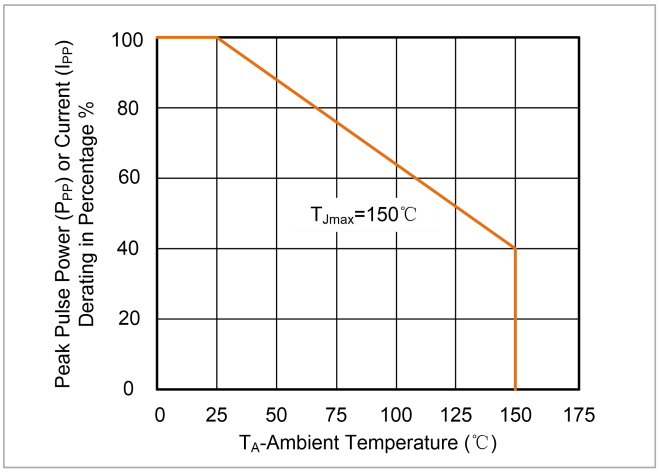


Figure 3:
Pulse Waveform

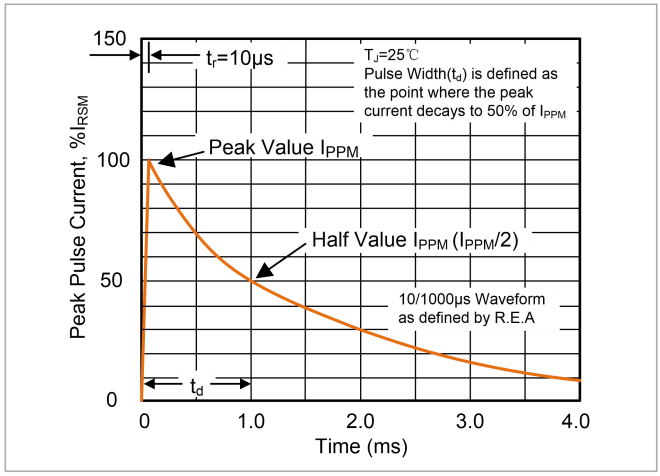


Figure 4:
Typical Junction Capacitance

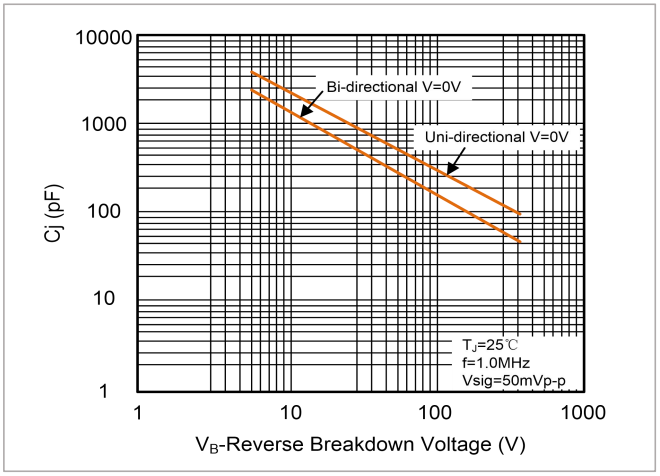


Figure 5:
Steady State Power Dissipation Derating Curve

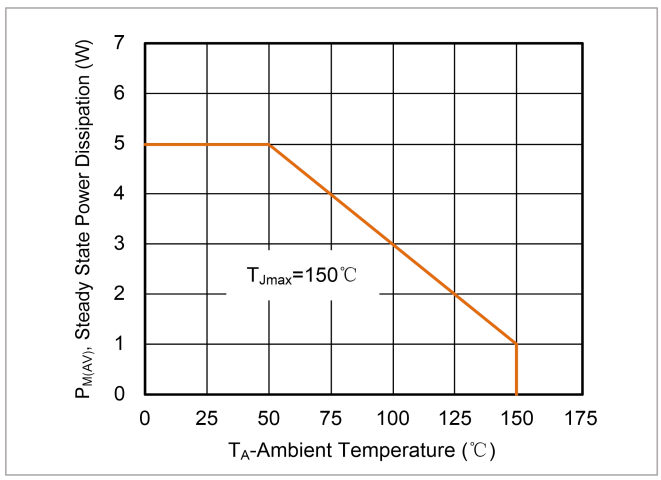
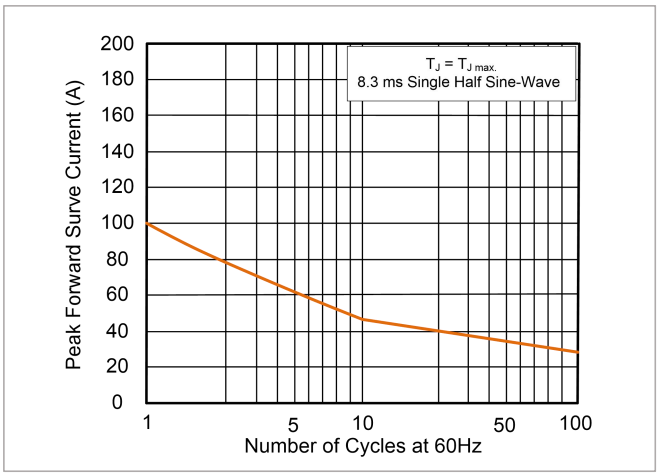


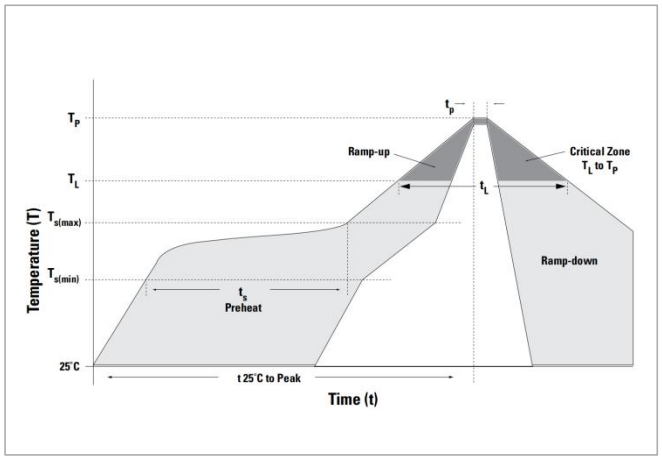
Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional



P6SMB-Q Series
Surface Mount – 600W

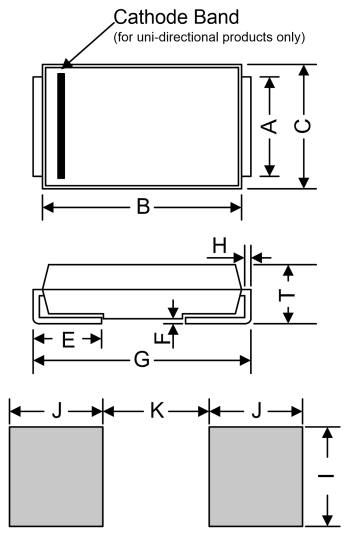
Soldering Parameters

Reflow Condition		Lead–free assembly
Pre Heat	**-Temperature Min ($T_{S\ min}$)**	150℃
	-Temperature Max ($T_{S\ max}$)	200℃
	-Time (min to max) (t_S)	60 – 180 secs
Average ramp-up rate(Liquidus Temp (T_L) to peak		3℃/second max.
$T_{S\ (max)}$ to T_L-Ramp-up Rate		3℃/second max.
Reflow	**-Temperature (T_L) (Liquidus)**	217℃
	-Time (min to max) (t_L)	60-150 seconds
Peak Temperature (T_P)		260℃
Time within 5℃ of actual Peak Temperature (t_P)		20-40 seconds
Ramp-down Rate		6℃/second max.
Time 25℃ to Peak Temperature		8 minutes max.
Do not exceed		260℃



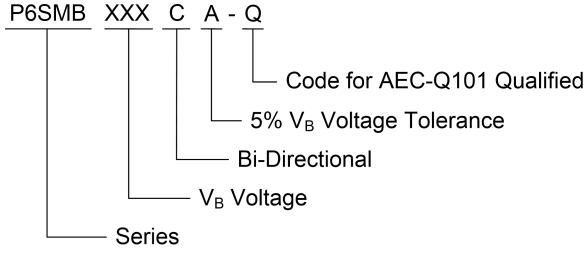
Dimensions

DO-214AA (SMB)

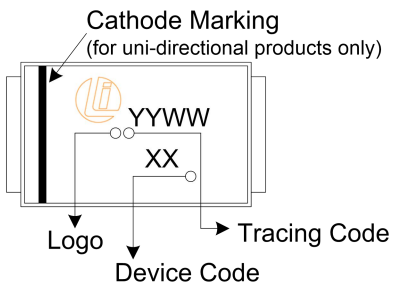


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.930	2.200	0.076	0.086
B	4.060	4.570	0.160	0.180
C	3.300	3.940	0.130	0.155
E	0.760	1.520	0.030	0.060
F	-	0.203	-	0.008
G	5.100	5.480	0.201	0.216
H	0.152	0.305	0.006	0.012
T	2.160	2.440	0.085	0.096
I	2.260	-	0.089	-
J	2.160	-	0.085	-
K	-	2.740	-	0.107

Part Numbering System



Part Marking System

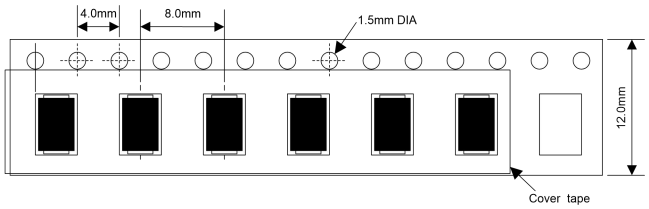


Packaging

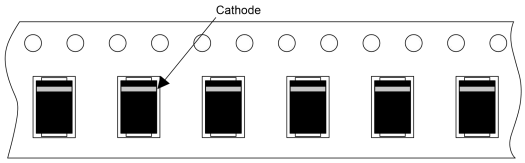
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
P6SMBxxxXX-Q	DO-214AA	3000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

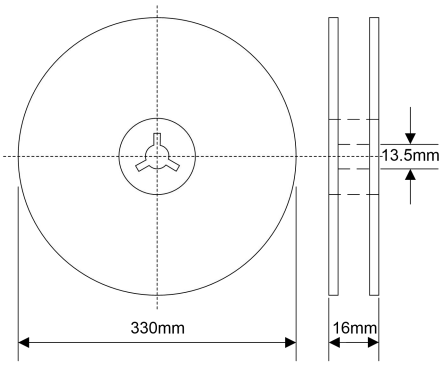
Tape



For Uni-Devices



13 Inches Reel



Quantity：3000pcs/reel