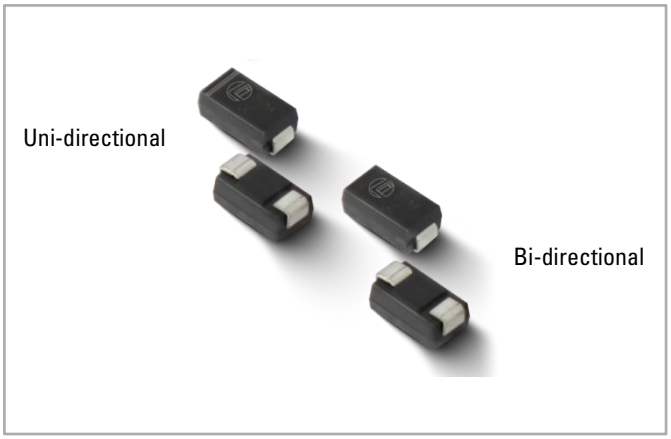
P6SMAJ-Q Series
Surface Mount – 600W

AUTOMOTIVE GRADE HF RoHS Pb e3



Additional Information

Resources | Accessories | Samples

Maximum Ratings and Thermal Characteristics

(T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000μs Waveform(Fig.1)(Note 1)(Note 2) -Single Die Parts	P_{PPM}	600	W
Power Dissipation on Infnite Heat Sink at T_L=50℃	P_D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	60	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only	V_F	3.5	V
Operating Temperature Range	T_J	-55 to 150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	30	℃/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	120	℃/W

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) =25℃ per Fig.2.
2. Mounted on 5.0x5.0mm copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.

Description

The P6SMAJ-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

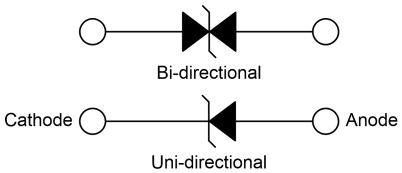
Features

- 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
- Typical I_R less than 1μA when V_B min>10V
- Surface mount footprint for compact PCB layout
- 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 1.0ps from 0V to V_B min
- High temperature to reflow soldering guaranteed: 260℃/20~40sec.
- V_B @ T_J= V_B@25℃ x (1+ α Tx (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



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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)
P6SMAJ5.0A	P6SMAJ5.0CA	Q	KE	AE	5.0	6.40	7.00	10	9.2	65.3	800
P6SMAJ6.0A	P6SMAJ6.0CA	Q	KG	AG	6.0	6.67	7.37	10	10.3	58.3	800
P6SMAJ6.5A	P6SMAJ6.5CA	Q	KK	AK	6.5	7.22	7.98	10	11.2	53.6	500
P6SMAJ7.0A	P6SMAJ7.0CA	Q	KM	AM	7.0	7.78	8.60	10	12.0	50.0	200
P6SMAJ7.5A	P6SMAJ7.5CA	Q	KP	AP	7.5	8.33	9.21	1	12.9	46.6	100
P6SMAJ8.0A	P6SMAJ8.0CA	Q	KR	AR	8.0	8.89	9.83	1	13.6	44.2	50
P6SMAJ8.5A	P6SMAJ8.5CA	Q	KT	AT	8.5	9.44	10.40	1	14.4	41.7	20
P6SMAJ9.0A	P6SMAJ9.0CA	Q	KV	AV	9.0	10.00	11.10	1	15.4	39.0	10
P6SMAJ10A	P6SMAJ10CA	Q	KX	AX	10.0	11.10	12.30	1	17.0	35.3	5
P6SMAJ11A	P6SMAJ11CA	Q	KZ	AZ	11.0	12.20	13.50	1	18.2	33.0	1
P6SMAJ12A	P6SMAJ12CA	Q	LE	BE	12.0	13.30	14.70	1	19.9	30.2	1
P6SMAJ13A	P6SMAJ13CA	Q	LG	BG	13.0	14.40	15.90	1	21.5	28.0	1
P6SMAJ14A	P6SMAJ14CA	Q	LK	BK	14.0	15.60	17.20	1	23.2	25.9	1
P6SMAJ15A	P6SMAJ15CA	Q	LM	BM	15.0	16.70	18.50	1	24.4	24.6	1
P6SMAJ16A	P6SMAJ16CA	Q	LP	BP	16.0	17.80	19.70	1	26.0	23.1	1
P6SMAJ17A	P6SMAJ17CA	Q	LR	BR	17.0	18.90	20.90	1	27.6	21.8	1
P6SMAJ18A	P6SMAJ18CA	Q	LT	BT	18.0	20.00	22.10	1	29.2	20.6	1
P6SMAJ20A	P6SMAJ20CA	Q	LV	BV	20.0	22.20	24.50	1	32.4	18.6	1
P6SMAJ22A	P6SMAJ22CA	Q	LX	BX	22.0	24.40	26.90	1	35.5	16.9	1
P6SMAJ24A	P6SMAJ24CA	Q	LZ	BZ	24.0	26.70	29.50	1	38.9	15.5	1
P6SMAJ26A	P6SMAJ26CA	Q	ME	CE	26.0	28.90	31.90	1	42.1	14.3	1
P6SMAJ28A	P6SMAJ28CA	Q	MG	CG	28.0	31.10	34.40	1	45.4	13.3	1
P6SMAJ30A	P6SMAJ30CA	Q	MK	CK	30.0	33.30	36.80	1	48.4	12.4	1
P6SMAJ33A	P6SMAJ33CA	Q	MM	CM	33.0	36.70	40.60	1	53.3	11.3	1
P6SMAJ36A	P6SMAJ36CA	Q	MP	CP	36.0	40.00	44.20	1	58.1	10.4	1
P6SMAJ40A	P6SMAJ40CA	Q	MR	CR	40.0	44.40	49.10	1	64.5	9.3	1
P6SMAJ43A	P6SMAJ43CA	Q	MT	CT	43.0	47.80	52.80	1	69.4	8.7	1
P6SMAJ45A	P6SMAJ45CA	Q	MV	CV	45.0	50.00	55.30	1	72.7	8.3	1
P6SMAJ48A	P6SMAJ48CA	Q	MX	CX	48.0	53.30	58.90	1	77.4	7.8	1
P6SMAJ51A	P6SMAJ51CA	Q	MZ	CZ	51.0	56.70	62.70	1	82.4	7.3	1
P6SMAJ54A	P6SMAJ54CA	Q	NE	DE	54.0	60.00	66.30	1	87.1	6.9	1
P6SMAJ58A	P6SMAJ58CA	Q	NG	DG	58.0	64.40	71.20	1	93.6	6.5	1

Notes:

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

V_B @ T_J= V_B@25℃ x(1+aT x (TJ - 25)) (aT:Temperature Coefficient)

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

Figure 1:
Peak Pulse Power Rating Curve

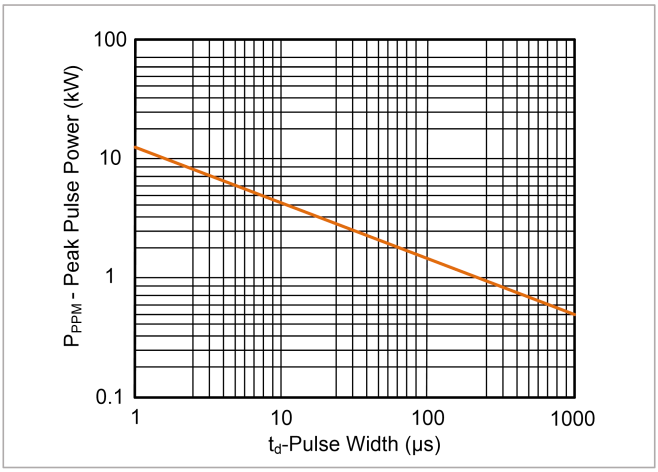


Figure 2:
Pulse Derating Curve

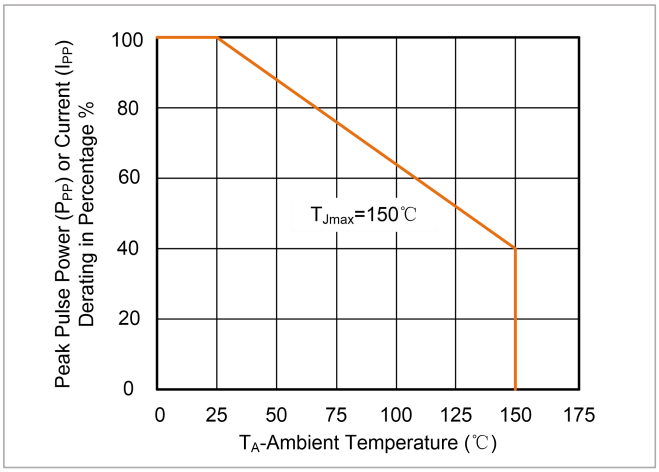


Figure 3:
Pulse Waveform

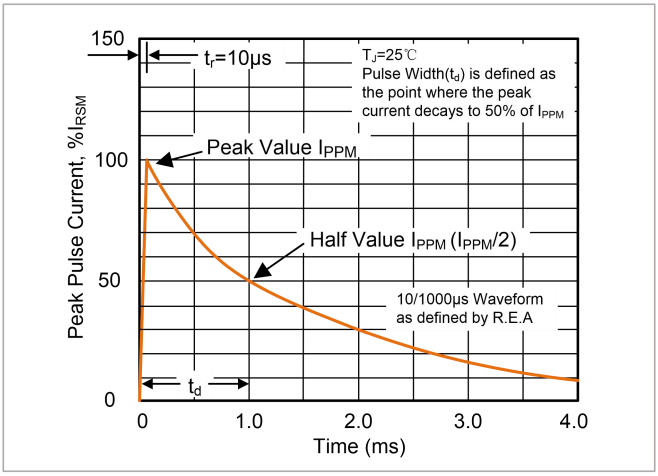


Figure 4:
Typical Junction Capacitance

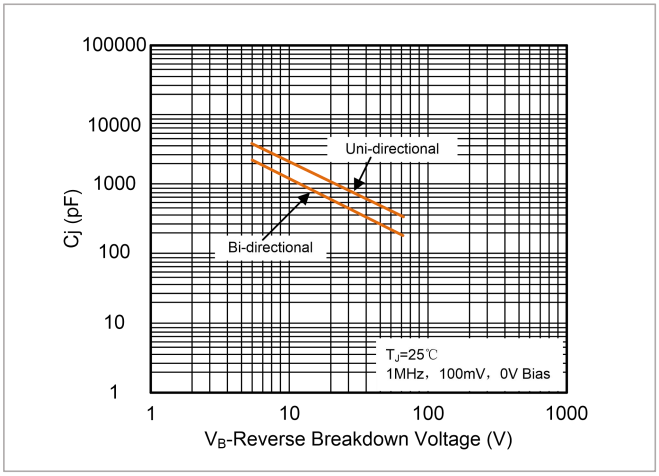


Figure 5:
Steady State Power Dissipation Derating Curve

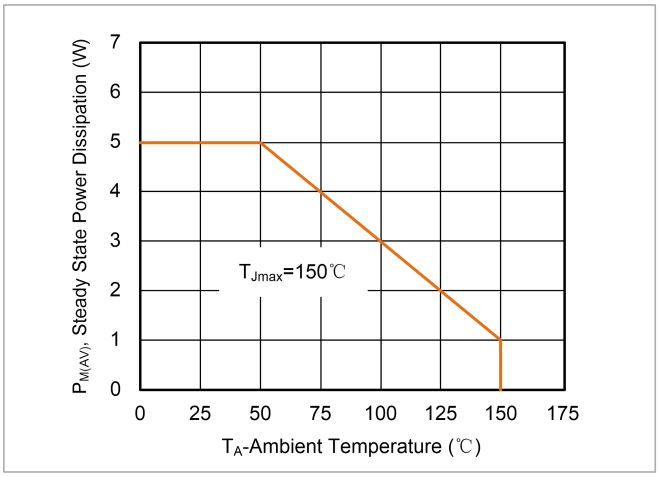
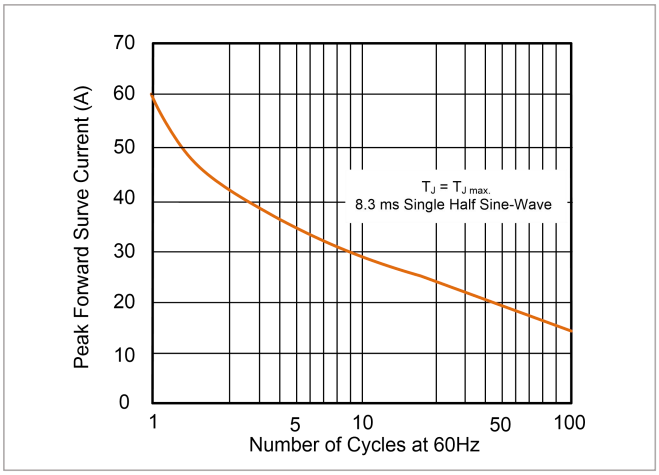


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional



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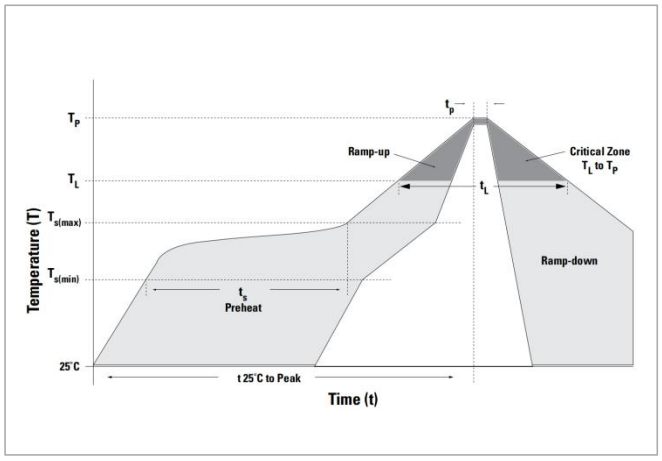
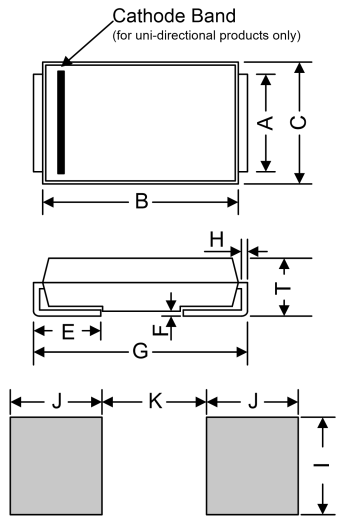
Soldering Parameters

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℃



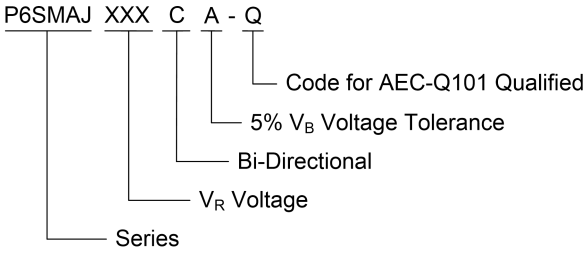
Dimensions

DO-214AC (SMA)

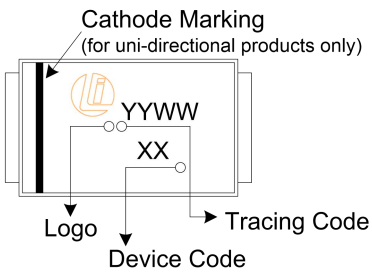


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.250	1.650	0.049	0.065
B	3.990	4.600	0.157	0.181
C	2.400	2.790	0.095	0.110
E	0.780	1.520	0.030	0.060
F	-	0.203	-	0.008
G	4.800	5.280	0.189	0.208
H	0.152	0.305	0.006	0.012
T	1.900	2.290	0.075	0.090
I	1.800	-	0.070	-
J	2.100	-	0.082	-
K	-	2.300	-	0.090

Part Numbering System



Part Marking System

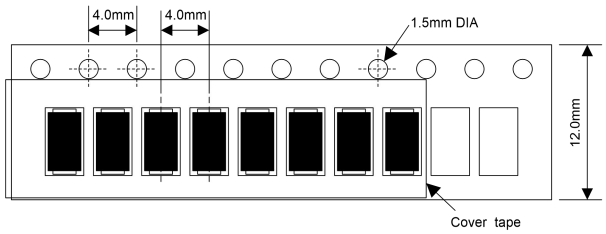


Packaging

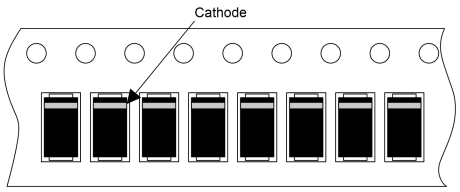
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
P6SMAJxxxXX-Q	DO-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

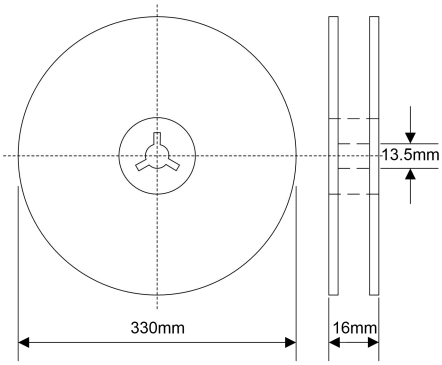
Tape



For Uni-Devices



13 Inches Reel



Quantity：5000pcs/reel