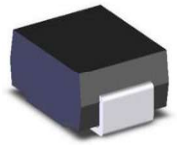
Description

The P6SMAJ-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. For surface mounted applications in order to optimize board space.

Features



- Halogen free and RoHS compliant
- Low profile package
- Built-in strain relief design
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical I_R less than 1μA above 10V devices
- Peak 260℃ high temperature Reflow Soldering withstanding
- Meet MSL level1, per J-STD-020
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- Unit Weight: 0.07g
- AEC-Q101 Qualified

Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in telecom, computer, Industrial and consumer electronic applications.

Maximum Ratings and Characteristics (T_A=25℃)

Rating	Symbol	Value
Peak pulse power dissipation at 10/1000μs waveform (Note1, Note2, Fig.1)	P_{PPM}	600W
Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3)	I_{PPM}	See Table(A)
Steady state power dissipation at T_A=50℃ (Fig.5)	$P_{M(AV)}$	5.0W
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only	V_F	3.5V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	I_{FSM}	60A
Operating junction and Storage Temperature Ranges	T_J,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 derating above T_A=25℃ per Fig.2.

2. Each terminal is surface Mounted on the 5.0mm×5.0mm (0.03mm thick) copper pads.

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

Electrical Characteristics (T_A=25℃)

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

Electrical Characteristics (T_A=25℃)

Part Number		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)
P6SMAJ43A-Q	P6SMAJ43CA-Q	MT	CT	43.0	47.80	52.80	1	69.4	8.7	1
P6SMAJ45A-Q	P6SMAJ45CA-Q	MV	CV	45.0	50.00	55.30	1	72.7	8.3	1
P6SMAJ48A-Q	P6SMAJ48CA-Q	MX	CX	48.0	53.30	58.90	1	77.4	7.8	1
P6SMAJ51A-Q	P6SMAJ51CA-Q	MZ	CZ	51.0	56.70	62.70	1	82.4	7.3	1
P6SMAJ54A-Q	P6SMAJ54CA-Q	NE	DE	54.0	60.00	66.30	1	87.1	6.9	1
P6SMAJ58A-Q	P6SMAJ58CA-Q	NG	DG	58.0	64.40	71.20	1	93.6	6.5	1
P6SMAJ60A-Q	P6SMAJ60CA-Q	NK	DK	60.0	66.70	73.70	1	96.8	6.2	1
P6SMAJ64A-Q	P6SMAJ64CA-Q	NM	DM	64.0	71.10	78.60	1	103.0	5.9	1
P6SMAJ70A-Q	P6SMAJ70CA-Q	NP	DP	70.0	77.80	86.00	1	113.0	5.3	1
P6SMAJ75A-Q	P6SMAJ75CA-Q	NR	DR	75.0	83.30	92.10	1	121.0	5.0	1
P6SMAJ78A-Q	P6SMAJ78CA-Q	NT	DT	78.0	86.70	95.80	1	126.0	4.8	1
P6SMAJ85A-Q	P6SMAJ85CA-Q	NV	DV	85.0	94.40	104.0	1	137.0	4.4	1
P6SMAJ90A-Q	P6SMAJ90CA-Q	NX	DX	90.0	100.0	111.0	1	146.0	4.1	1
P6SMAJ100A-Q	P6SMAJ100CA-Q	NZ	DZ	100.0	111.00	123.00	1	162.0	3.7	1
P6SMAJ110A-Q	P6SMAJ110CA-Q	PE	EE	110.0	122.0	135.0	1	177.0	3.4	1
P6SMAJ120A-Q	P6SMAJ120CA-Q	PG	EG	120.0	133.0	147.0	1	193.0	3.1	1
P6SMAJ130A-Q	P6SMAJ130CA-Q	PK	EK	130.0	144.0	159.0	1	209.0	2.9	1
P6SMAJ150A-Q	P6SMAJ150CA-Q	PM	EM	150.0	167.0	185.0	1	243.0	2.5	1
P6SMAJ160A-Q	P6SMAJ160CA-Q	PP	EP	160.0	178.0	197.0	1	259.0	2.3	1
P6SMAJ170A-Q	P6SMAJ170CA-Q	PR	ER	170.0	189.0	209.0	1	275.0	2.2	1
P6SMAJ180A-Q	P6SMAJ180CA-Q	PT	ET	180.0	201.0	222.0	1	292.0	2.1	1
P6SMAJ190A-Q	P6SMAJ190CA-Q	PA	EC	190.0	211.0	233.0	1	308.0	2.0	1
P6SMAJ200A-Q	P6SMAJ200CA-Q	PV	EV	200.0	224.0	247.0	1	324.0	1.9	1
P6SMAJ210A-Q	P6SMAJ210CA-Q	PB	ED	210.0	237.0	263.0	1	340.0	1.8	1
P6SMAJ220A-Q	P6SMAJ220CA-Q	PX	EX	220.0	246.0	272.0	1	356.0	1.7	1
P6SMAJ250A-Q	P6SMAJ250CA-Q	PZ	EZ	250.0	279.0	309.0	1	405.0	1.5	1

Ratings and Characteristic Curves (T_A=25℃)

Figure 1. Peak Pulse Power Rating Curve

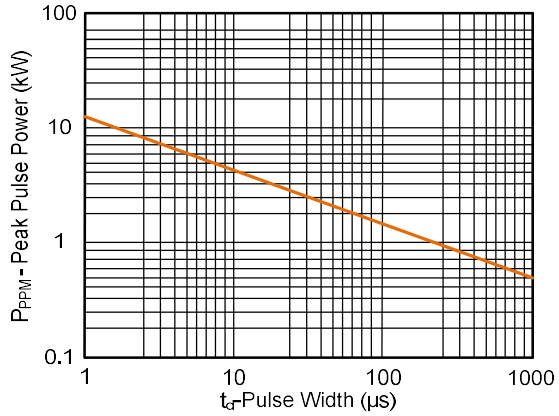


Figure 2. Pulse Derating Curve

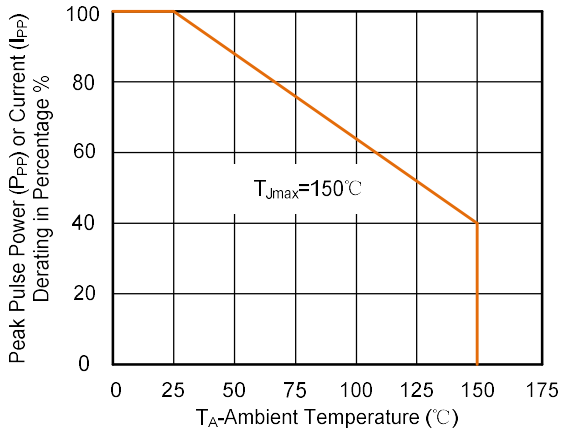


Figure 3. Pulse Waveform

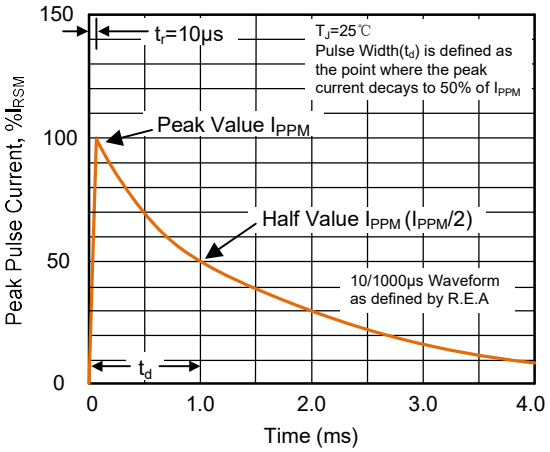


Figure 4. Typical Junction Capacitance

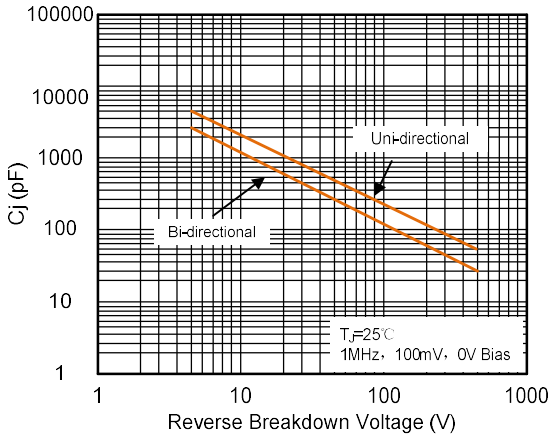


Figure 5. Steady State Power Dissipation Derating Curve

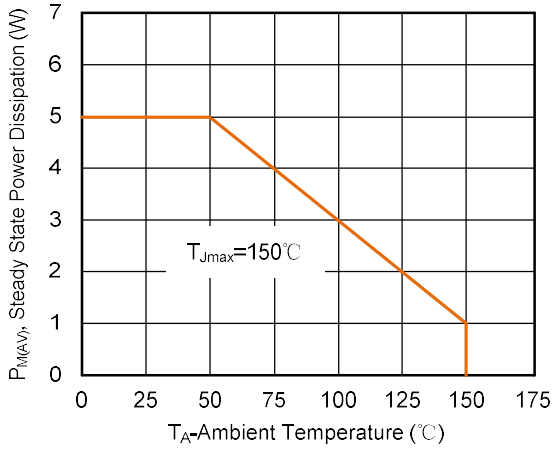
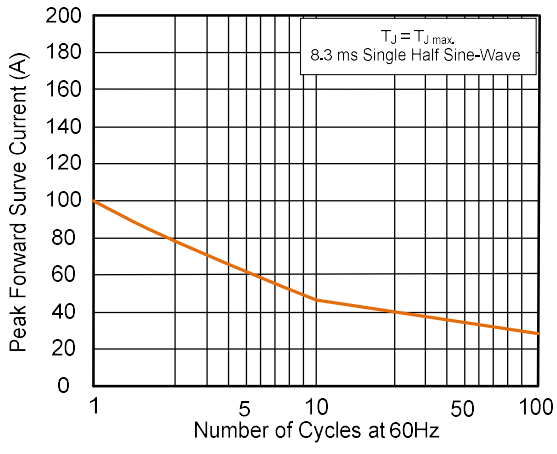
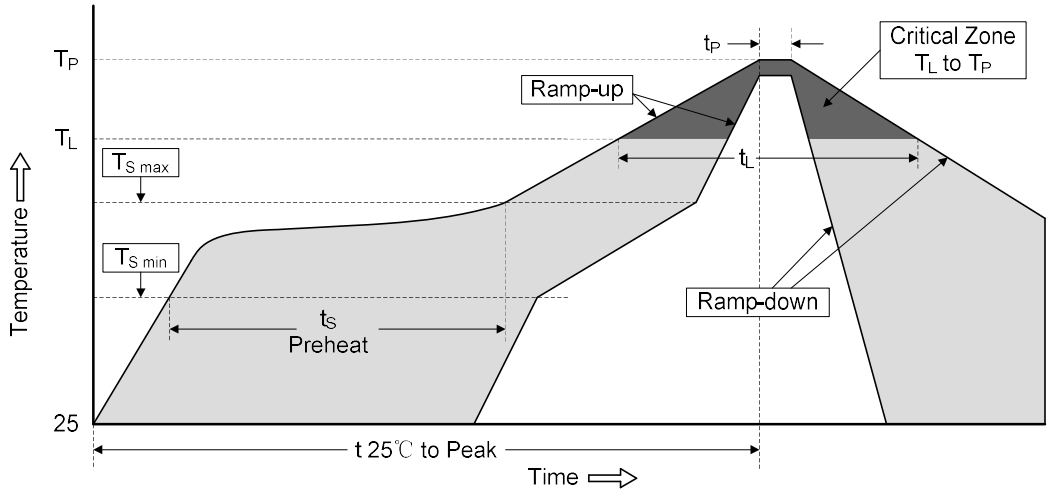


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



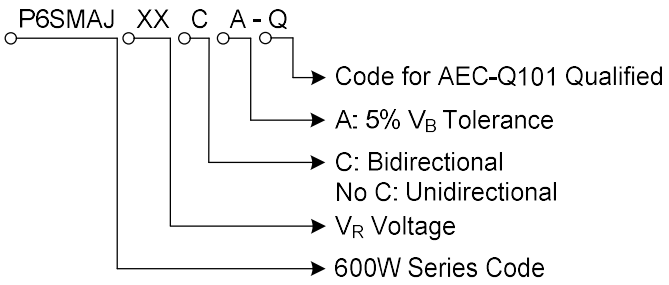
Soldering Parameters

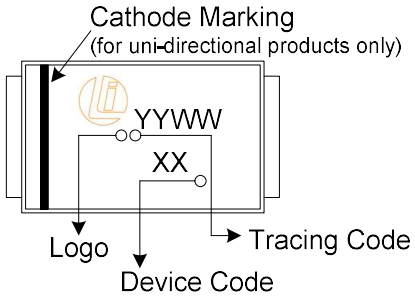
Reflow Soldering



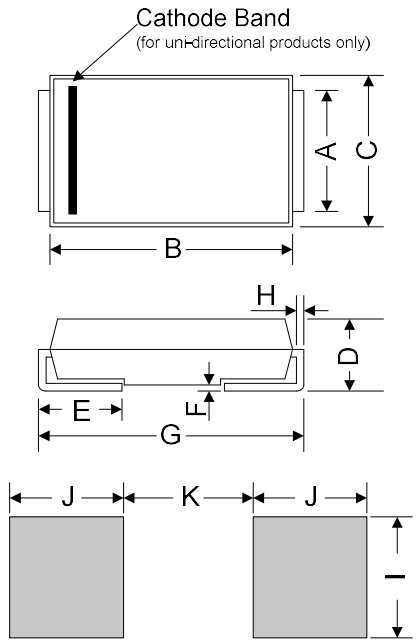
Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3℃/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_S)	 150℃ 200℃ 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	 3℃/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217℃ 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.

Part Number Code and Marking Code





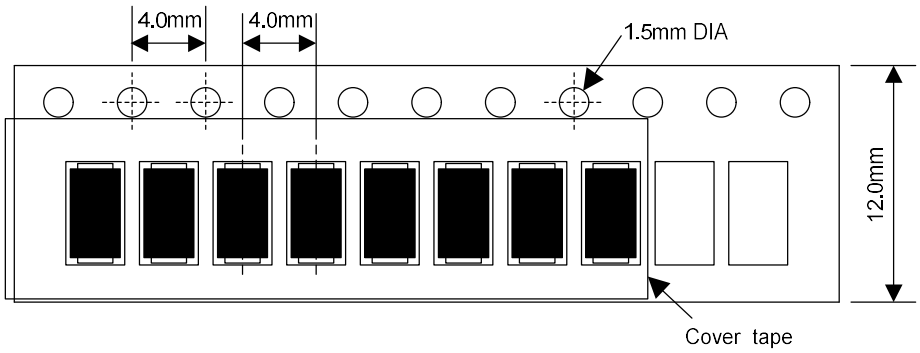
Dimensions (SMA/DO-214AC)



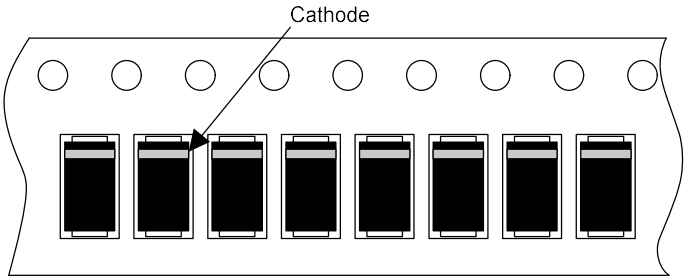
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.250	1.650	0.049	0.065
B	3.990	4.600	0.157	0.181
C	2.400	2.790	0.095	0.110
D	1.900	2.290	0.075	0.090
E	0.780	1.520	0.030	0.060
F	-	0.203	-	0.008
G	4.800	5.280	0.189	0.208
H	0.152	0.305	0.006	0.012
I	1.800	-	0.070	-
J	2.100	-	0.082	-
K	-	2.300	-	0.090

Packaging Specification

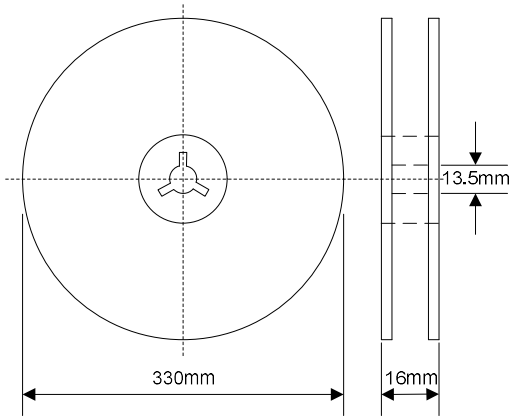
Tape



For Uni-Devices



13 Inches Reel



Quantity：5000pcs/reel