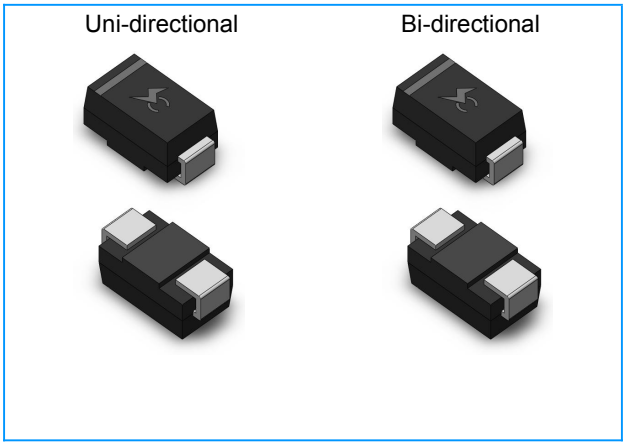
Surface Mount Transient Voltage Suppressors (TVS)

P6SMAJ Series | **5.0 to 120 V** | **600W** | **DO-214AC (SMA)**

Description

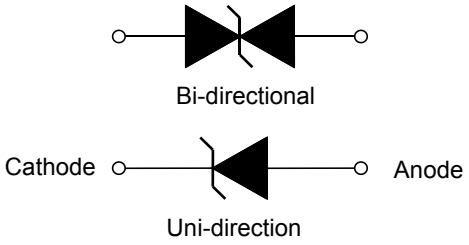
TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.



Features

- Low profile package.
- Low inductance.
- Excellent clamping capability.
- 600W peak pulse power capability at 10×1000μs waveform.
- Typical I_R less than 1μA above 10V.
- Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- High temperature to reflow soldering: 260℃/40s at terminals.
- Plastic package has Underwriters Laboratory Flammability 94V-0.
- Meets MSL level 1, per J-STD020, LF maximum peak of 260℃.
- For surface mounted applications in order to optimize board space.

Functional Diagram



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E341027

Absolute Maximum Ratings (T_A=25℃, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 10/1000μs waveform	P_{PP}	600	W
Steady state power dissipation at T_L=75℃	$P_{M(AV)}$	5.0	W
Maximum instantaneous forward voltage at 50A for unidirectional	V_F	5.0	V
Peak forward surge current, 8.3ms single half sine-wave（Note 1）	I_{FSM}	60	A
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	℃/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	℃/W
Storage and operating junction temperature range	T_J,T_{STG}	-55 to +150	℃

Note 1: Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Surface Mount Transient Voltage Suppressors (TVS)

P6SMAJ Series 5.0 to 120 V 600W DO-214AC (SMA)

Electrical Characteristics (T_A=25℃)

Part Number		Marking		Reverse Stand-Off Voltage V_{RWM} (V)	Maximum Reverse Leakage I_R @V_{RWM} (μA)	Breakdown Voltage V_{BR} @I_T (V)		Test Current I_T (mA)	Maximum Clamping Voltage V_C @I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)
Uni	Bi	Uni	Bi			MIN	MAX			
P6SMAJ5.0A	P6SMAJ5.0CA	KE	AE	5.0	120	6.40	7.00	10	9.2	65.2
P6SMAJ6.0A	P6SMAJ6.0CA	KG	AG	6.0	120	6.67	7.37	10	10.3	58.3
P6SMAJ6.5A	P6SMAJ6.5CA	KK	AK	6.5	120	7.22	7.98	10	11.2	53.6
P6SMAJ7.0A	P6SMAJ7.0CA	KM	AM	7.0	50	7.78	8.60	10	12.0	50.0
P6SMAJ7.5A	P6SMAJ7.5CA	KP	AP	7.5	50	8.33	9.21	1	12.9	46.5
P6SMAJ8.0A	P6SMAJ8.0CA	KR	AR	8.0	20	8.89	9.83	1	13.6	44.1
P6SMAJ8.5A	P6SMAJ8.5CA	KT	AT	8.5	10	9.44	10.40	1	14.4	41.7
P6SMAJ9.0A	P6SMAJ9.0CA	KV	AV	9.0	5	10.00	11.10	1	15.4	39.0
P6SMAJ10A	P6SMAJ10CA	KX	AX	10	2	11.10	12.30	1	17.0	35.3
P6SMAJ11A	P6SMAJ11CA	KZ	AZ	11	1	12.20	13.50	1	18.2	33.0
P6SMAJ12A	P6SMAJ12CA	LE	BE	12	1	13.30	14.70	1	19.9	30.2
P6SMAJ13A	P6SMAJ13CA	LG	BG	13	1	14.40	15.90	1	21.5	27.9
P6SMAJ14A	P6SMAJ14CA	LK	BK	14	1	15.60	17.20	1	23.2	25.9
P6SMAJ15A	P6SMAJ15CA	LM	BM	15	1	16.70	18.50	1	24.4	24.6
P6SMAJ16A	P6SMAJ16CA	LP	BP	16	1	17.80	19.70	1	26.0	23.1
P6SMAJ17A	P6SMAJ17CA	LR	BR	17	1	18.90	20.90	1	27.6	21.8
P6SMAJ18A	P6SMAJ18CA	LT	BT	18	1	20.00	22.10	1	29.2	20.6
P6SMAJ20A	P6SMAJ20CA	LV	BV	20	1	22.20	24.50	1	32.4	18.6
P6SMAJ22A	P6SMAJ22CA	LX	BX	22	1	24.40	26.90	1	35.5	16.9
P6SMAJ24A	P6SMAJ24CA	LZ	BZ	24	1	26.70	29.50	1	38.9	15.4
P6SMAJ26A	P6SMAJ26CA	ME	CE	26	1	28.90	31.90	1	42.1	14.3
P6SMAJ28A	P6SMAJ28CA	MG	CG	28	1	31.10	34.40	1	45.4	13.2
P6SMAJ30A	P6SMAJ30CA	MK	CK	30	1	33.30	36.80	1	48.4	12.4
P6SMAJ33A	P6SMAJ33CA	MM	CM	33	1	36.70	40.60	1	53.3	11.3
P6SMAJ36A	P6SMAJ36CA	MP	CP	36	1	40.00	44.20	1	58.1	10.4
P6SMAJ40A	P6SMAJ40CA	MR	CR	40	1	44.40	49.10	1	64.5	9.3
P6SMAJ43A	P6SMAJ43CA	MT	CT	43	1	47.80	52.80	1	69.4	8.7
P6SMAJ45A	P6SMAJ45CA	MV	CV	45	1	50.00	55.30	1	72.7	8.3
P6SMAJ48A	P6SMAJ48CA	MX	CX	48	1	53.30	58.90	1	77.4	7.8

Surface Mount Transient Voltage Suppressors (TVS)

P6SMAJ Series 5.0 to 120 V 600W DO-214AC (SMA)

Electrical Characteristics (T_A=25℃ unless otherwise noted) (Continue)

Part Number		Marking		Reverse Stand-Off Voltage V_{RWM} (V)	Maximum Reverse Leakage I_R @V_{RWM} (μA)	Breakdown Voltage V_{BR} @I_T (V)		Test Current I_T (mA)	Maximum Clamping Voltage V_C @I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A) ①
Uni	Bi	Uni	Bi			MIN	MAX			
P6SMAJ51A	P6SMAJ51CA	MZ	CZ	51	1	56.70	62.70	1	82.4	7.3
P6SMAJ54A	P6SMAJ54CA	NE	DE	54	1	60.00	66.30	1	87.1	6.9
P6SMAJ58A	P6SMAJ58CA	NG	DG	58	1	64.40	71.20	1	93.6	6.4
P6SMAJ60A	P6SMAJ60CA	NK	DK	60	1	66.70	73.70	1	96.8	6.2
P6SMAJ64A	P6SMAJ64CA	NM	DM	64	1	71.10	78.60	1	103.0	5.8
P6SMAJ70A	P6SMAJ70CA	NP	DP	70	1	77.80	86.00	1	113.0	5.3
P6SMAJ75A	P6SMAJ75CA	NR	DR	75	1	83.30	92.10	1	121.0	5.0
P6SMAJ78A	P6SMAJ78CA	NT	DT	78	1	86.70	95.80	1	126.0	4.8
P6SMAJ85A	P6SMAJ85CA	NV	DV	85	1	94.40	104.0	1	137.0	4.4
P6SMAJ100A	P6SMAJ100CA	NZ	DZ	100	1	111.0	123.0	1	162.0	3.7
P6SMAJ110A	P6SMAJ110CA	PE	EE	110	1	122.0	135.0	1	177.0	3.4
P6SMAJ120A	P6SMAJ120CA	PG	EG	120	1	133.0	147.0	1	193.0	3.1

Notes:
① Surge waveform:10/1000μs.
V_{RWM}: Stand-off Voltage -- Maximum voltage that can be applied.
V_{BR}: Breakdown Voltage.
V_C: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{PP}.
I_R: Reverse Leakage Current.

Surface Mount Transient Voltage Suppressors (TVS)

P6SMAJ Series | **5.0 to 120 V** | **600W** | **DO-214AC (SMA)**

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

Figure 1 - Peak Pulse Power Rating Curve

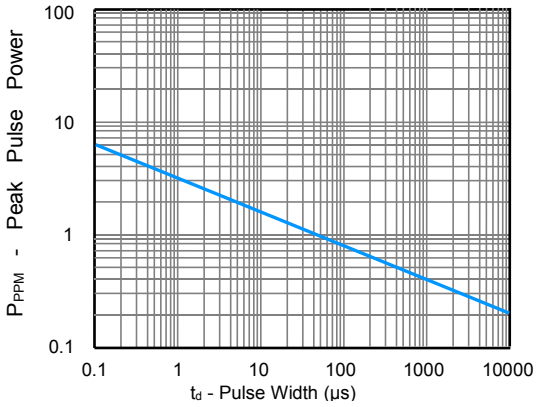


Figure 2 - Pulse Derating Curve

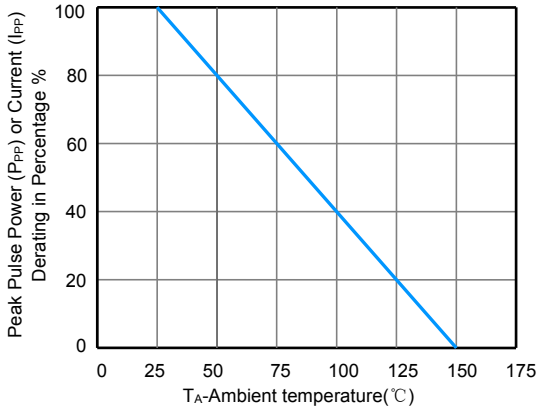


Figure 3 - Pulse Waveform

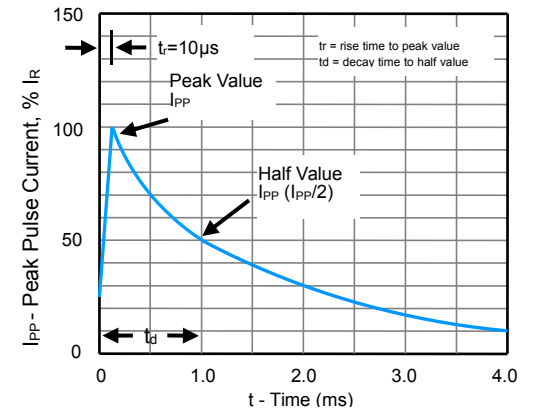


Figure 4 - Typical Junction Capacitance

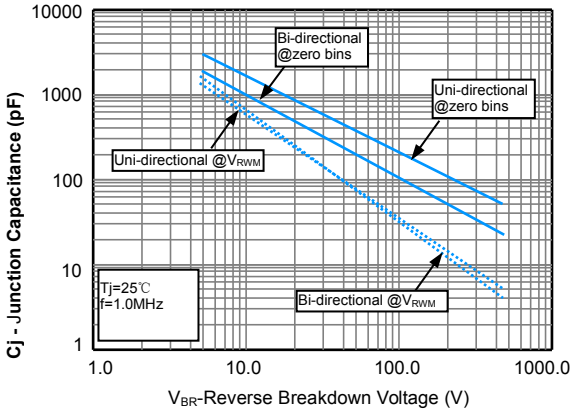


Figure 5 - Steady State Power Derating Curve

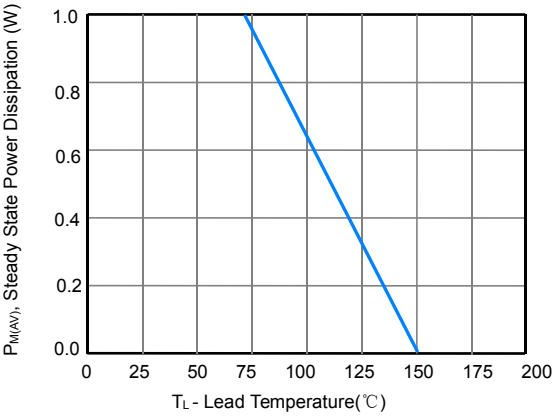
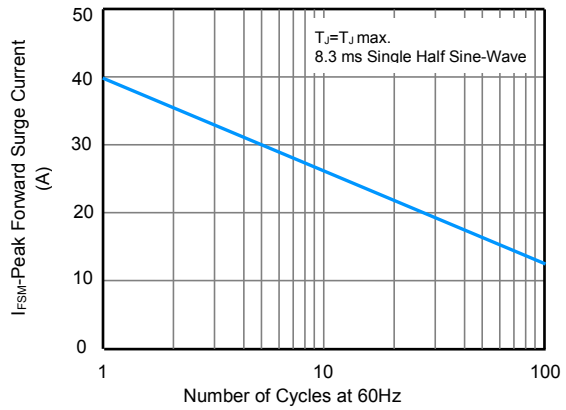


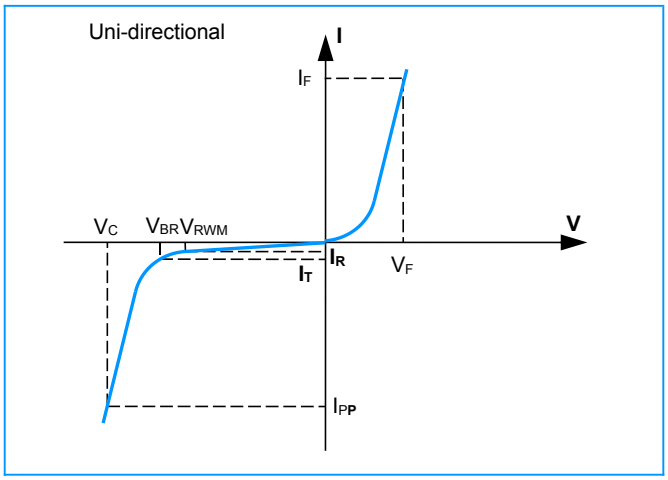
Figure 6 - Maximum Non-Repetitive Surge Current

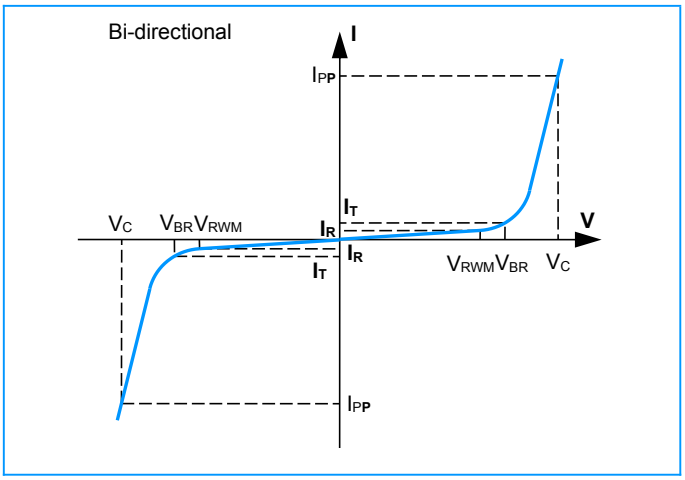


Surface Mount Transient Voltage Suppressors (TVS)

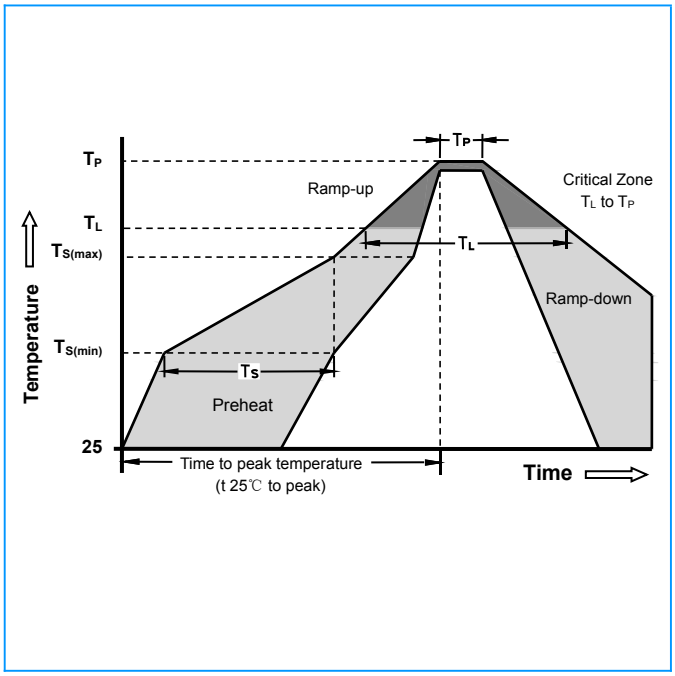
P6SMAJ Series | **5.0 to 120 V** | **600W** | **DO-214AC (SMA)**

V-I Curve Characteristics





Soldering Parameters



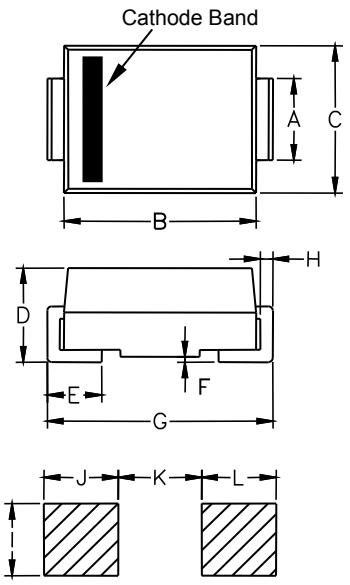
Reflow Condition		Lead–free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150℃
	-Temperature Max ($T_{s(max)}$)	200℃
	- Time (min to max) (T_s)	60 -180 seconds
Average ramp up rate (Liquidus Temp T_L) to peak		3℃/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3℃/second max
Reflow	- Temperature (T_L) (Liquidus)	217℃
	- Time (min to max) (T_L)	60-150 seconds
Peak Temperature (T_P)		260 +0/-5℃
Time within 5 ℃ of actual peak Temperature (t_p)		20-40 seconds
Ramp-down Rate		6℃/second max
Time 25℃ to peak Temperature (T_P)		8 minutes max
Do not exceed		260℃

Surface Mount Transient Voltage Suppressors (TVS)

P6SMAJ Series | **5.0 to 120 V** | **600W** | **DO-214AC (SMA)**

Dimensions

DO-214AC (SMA)

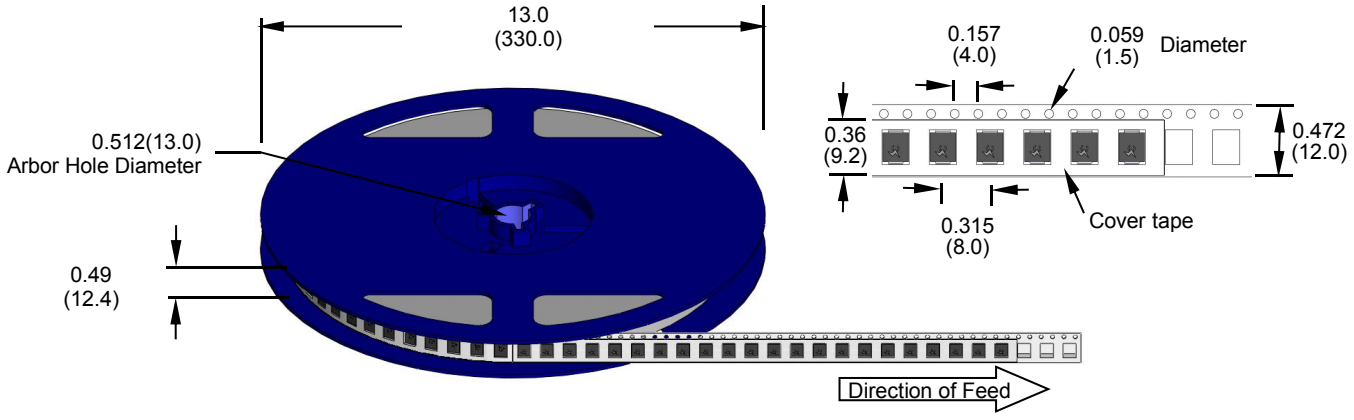


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.25	1.65
B	0.163	0.183	4.15	4.65
C	0.102	0.118	2.60	3.00
D	0.079	0.096	2.00	2.44
E	0.037	0.060	0.95	1.52
F	0.002	0.008	0.051	0.203
G	0.193	0.209	4.90	5.30
H	0.006	0.012	0.15	0.31
I	0.071	-	1.80	-
J	0.079	-	2.00	-
K	-	0.091	-	2.30
L	0.079	-	2.00	-

Packaging

Part Number	Component Package	Outline	Reel (pcs)	Per Carton (pcs)	Reel Diameters (mm)
P6SMAJ Series	DO-214AC (SMA)	Taping	5000	80000	330

Tape and Reel Specifications



Dimensions are in inches
(and millimeters)