Transient Voltage Suppression Diodes: TPSMAJ Series

SMD Type 400 W

■ Features

1. RoHS compliant
2. Low leakage
3. Very fast response time
4. Excellent clamping capability
5. 400W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle): 0.01%
6. High reliability application and automotive grade AEC Q101 qualified
7. ESD protection of data lines in accordance with IEC 61000-4-2,30kV(Air),30kV(Contact)

■ Recommended Applications

1. Telecommunication
2. Computer
3. Industrial device
4. Consumer electronic device
5. Automotive

■ Mechanical Data

1. Case: DO-214AC (SMA), molded plastic
2. Epoxy：UL 94V-0 rate flame retardant
3. Polarity: Color band denotes cathode end

■ Part Number Code

T	P	S	M	A	J	5	.	0	C	A
1	2	3	4	5	6	7	8	9		

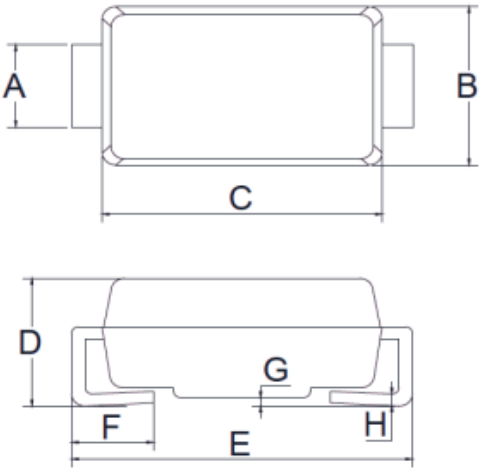
1
THINKING
Automotive
Transient Voltage
Suppression Diodes

3	
Product Series	
SMAJ	THINKING Transient Voltage Suppression Diodes SMAJ Series

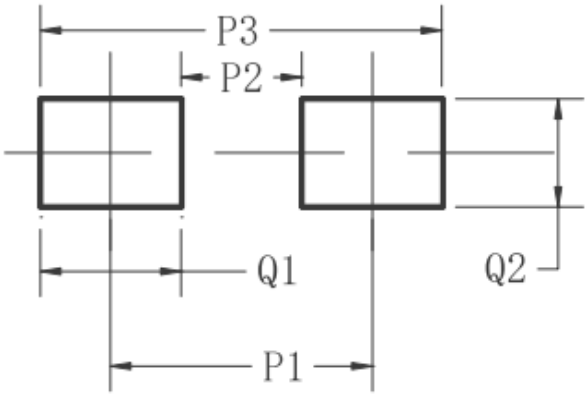
6	
Reverse Stand off Voltage (V_{RWM})	
5.0	5V
70	70V
120	120V

9	
Type Code	
A	Uni-directional, 5% V_{BR} Voltage Tolerance
CA	Bi-directional, 5% V_{BR} Voltage Tolerance

■ Structures and Dimensions



SMA / DO-214AC		
Dimensions	Millimeters	
	Min	Max
A	1.23	1.65
B	2.40	2.90
C	3.99	4.75
D	1.90	2.50
E	4.80	5.28
F	0.75	1.52
G	0.00	0.20
H	0.15	0.31



SMA / DO-214AC	
Dimensions	Millimeters
P1	4.0
P2	1.5
P3	6.5
Q1	2.5
Q2	1.7

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■ Maximum Rating (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation at T_A=25 ℃ by 10/1000μs waveform (Note1、2)	P_{PPM}	400	W
Peak forward surge current, 8.3ms single half sine wave on rated load (Note 3)	I_{FSM}	40	A
Power dissipation on infinite heatsink at T_L=75℃	P_D	1.0	W
Maximum instantaneous forward voltage at 25A for unidirectional only(Note 4)	VF	3.5/5	V
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	°C/W
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	°C/W
Operating junction and storage temperature range	T_J, T_{STG}	-65~+150	ºC

Notes : (1) Non-repetitive current pulse, per Fig. 3 and derated above TA=25℃ per Fig. 2

(2) Mounted on copper pad area of 0.2” x 0.2” (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) VF<3.5V for devices of VBR<200V and VF<5.0V for devices of VBR>201V

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

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current	Maximum Reverse Leakage IR @VRWM	Marking Code	
		VRWM (V)	Min(V)	Max(V)	IT(mA)	VC(V)	Ipp(A)	IR(μA)	Uni	Bi
TPSMAJ6.5A		6.5	7.22	7.98	10	11.2	35.71	500	AK	
TPSMAJ7.0A		7	7.78	8.6	10	12	33.33	200	AM	
TPSMAJ7.5A		7.5	8.33	9.21	1	12.9	31.01	100	AP	
TPSMAJ8.0A		8	8.89	9.83	1	13.6	29.41	50	AR	
TPSMAJ8.5A	TPSMAJ8.5CA	8.5	9.44	10.4	1	14.4	27.78	10	AT	WT
TPSMAJ9.0A	TPSMAJ9.0CA	9	10	11.1	1	15.4	25.97	5	AV	WV
TPSMAJ10A	TPSMAJ10CA	10	11.1	12.3	1	17	23.53	5	AX	WX
TPSMAJ11A	TPSMAJ11CA	11	12.2	13.5	1	18.2	21.98	1	AZ	WZ
TPSMAJ12A	TPSMAJ12CA	12	13.3	14.7	1	19.9	20.10	1	BE	XE
TPSMAJ13A	TPSMAJ13CA	13	14.4	15.9	1	21.5	18.60	1	BG	XG
TPSMAJ14A	TPSMAJ14CA	14	15.6	17.2	1	23.2	17.24	1	BK	XK

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Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current	Maximum Reverse Leakage IR @VRWM	Marking Code	
		VRWM (V)	Min(V)	Max(V)	IT(mA)	VC(V)	Ipp(A)	IR(μA)	Uni	Bi
TPSMAJ15A	TPSMAJ15CA	15	16.7	18.5	1	24.4	16.39	1	BM	XM
TPSMAJ16A	TPSMAJ16CA	16	17.8	19.7	1	26	15.38	1	BP	XP
TPSMAJ17A	TPSMAJ17CA	17	18.9	20.9	1	27.6	14.49	1	BR	XR
TPSMAJ18A	TPSMAJ18CA	18	20	22.1	1	29.2	13.70	1	BT	XT
TPSMAJ20A	TPSMAJ20CA	20	22.2	24.5	1	32.4	12.35	1	BV	XV
TPSMAJ22A	TPSMAJ22CA	22	24.4	26.9	1	35.5	11.27	1	BX	XX
TPSMAJ24A	TPSMAJ24CA	24	26.7	29.5	1	38.9	10.28	1	BZ	XZ
TPSMAJ26A	TPSMAJ26CA	26	28.9	31.9	1	42.1	9.50	1	CE	YE
TPSMAJ28A	TPSMAJ28CA	28	31.1	34.4	1	45.4	8.81	1	CG	YG
TPSMAJ30A	TPSMAJ30CA	30	33.3	36.8	1	48.4	8.26	1	CK	YK
TPSMAJ33A	TPSMAJ33CA	33	36.7	40.6	1	53.3	7.50	1	CM	YM
TPSMAJ36A	TPSMAJ36CA	36	40	44.2	1	58.1	6.88	1	CP	YP
TPSMAJ40A	TPSMAJ40CA	40	44.4	49.1	1	64.5	6.20	1	CR	YR
TPSMAJ43A	TPSMAJ43CA	43	47.8	52.8	1	69.4	5.76	1	CT	YT
TPSMAJ45A	TPSMAJ45CA	45	50	55.3	1	72.7	5.50	1	CV	YV
TPSMAJ48A	TPSMAJ48CA	48	53.3	58.9	1	77.4	5.17	1	CX	YX
TPSMAJ51A	TPSMAJ51CA	51	56.7	62.7	1	82.4	4.85	1	CZ	YZ
TPSMAJ54A	TPSMAJ54CA	54	60	66.3	1	87.1	4.59	1	RE	ZE
TPSMAJ58A	TPSMAJ58CA	58	64.4	71.2	1	93.6	4.27	1	RG	ZG
TPSMAJ60A	TPSMAJ60CA	60	66.7	73.7	1	96.8	4.13	1	RK	ZK
TPSMAJ64A	TPSMAJ64CA	64	71.1	78.6	1	103	3.88	1	RM	ZM
TPSMAJ70A	TPSMAJ70CA	70	77.8	86	1	113	3.54	1	RP	ZP
TPSMAJ75A	TPSMAJ75CA	75	83.3	92.1	1	121	3.31	1	RR	ZR
TPSMAJ78A	TPSMAJ78CA	78	86.7	95.8	1	126	3.17	1	RT	ZT
TPSMAJ85A	TPSMAJ85CA	85	94.4	104	1	137	2.92	1	RV	ZV
TPSMAJ90A	TPSMAJ90CA	90	100	111	1	146	2.74	1	RX	ZX
TPSMAJ100A	TPSMAJ100CA	100	111	123	1	162	2.47	1	RZ	ZZ

Transient Voltage Suppression Diodes: TPSMAJ Series

SMD Type 400 W

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current	Maximum Reverse Leakage IR @VRWM	Marking Code	
		VRWM (V)	Min(V)	Max(V)	IT(mA)	VC(V)	Ipp(A)	IR(μA)	Uni	Bi
TPSMAJ110A	TPSMAJ110CA	110	122	135	1	177	2.26	1	SE	VE
TPSMAJ120A	TPSMAJ120CA	120	133	147	1	193	2.07	1	SG	VG
TPSMAJ130A	TPSMAJ130CA	130	144	159	1	209	1.91	1	SK	VK
TPSMAJ150A	TPSMAJ150CA	150	167	185	1	243	1.65	1	SM	VM
TPSMAJ160A	TPSMAJ160CA	160	178	197	1	259	1.54	1	SP	VP
TPSMAJ170A	TPSMAJ170CA	170	189	209	1	275	1.45	1	SR	VR
TPSMAJ180A	TPSMAJ180CA	180	200	220	1	291.6	1.37	1	ST	VT
TPSMAJ200A	TPSMAJ200CA	200	224	247	1	324	1.23	1	SW	VW
TPSMAJ220A	TPSMAJ220CA	220	246	272	1	356	1.12	1	SX	VX
TPSMAJ250A	TPSMAJ250CA	250	279	309	1	405	0.99	1	SZ	VZ
TPSMAJ300A	TPSMAJ300CA	300	335	371	1	486	0.82	1	DE	HE
TPSMAJ350A	TPSMAJ350CA	350	391	432	1	567	0.71	1	DG	HG
TPSMAJ400A	TPSMAJ400CA	400	447	494	1	648	0.62	1	DK	HK
TPSMAJ440A	TPSMAJ440CA	440	492	543	1	713	0.56	1	DM	HM

■ Rate and Characteristic Curve (T_A=25℃ unless otherwise noted)

Fig.1 - Peak Pulse Power Rating Curve

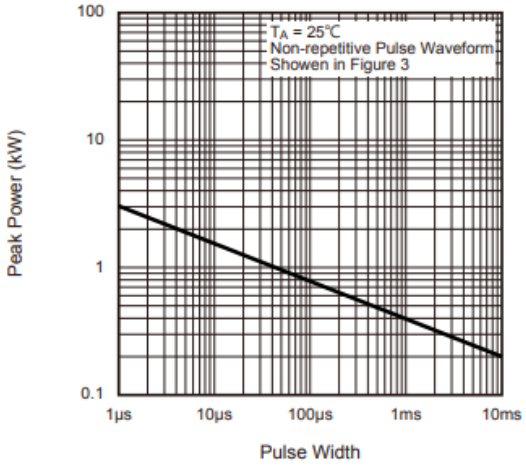


Fig.2 - Pulse Derating Curve

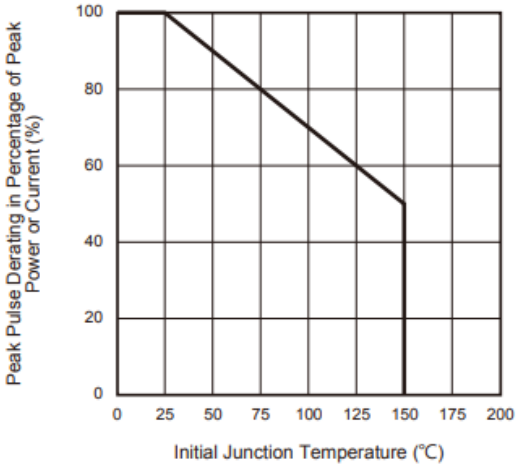


Fig.3 - Pulse Waveform

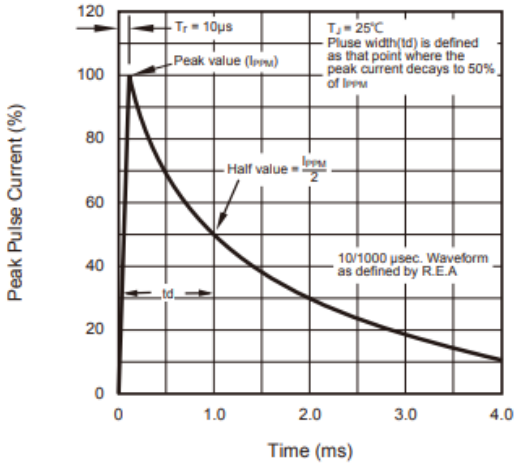


Fig.4 - Typical Junction Capacitance

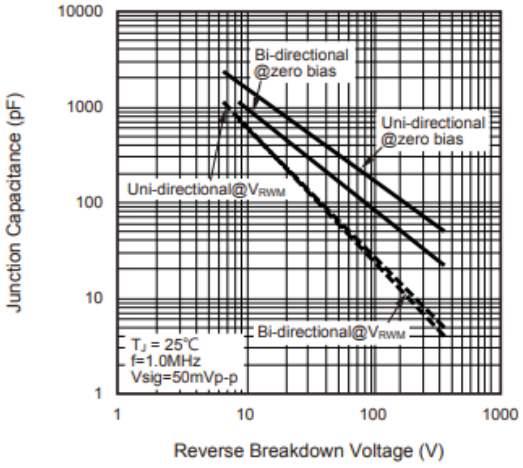


Fig.5 - Steady State Power Derating Curve

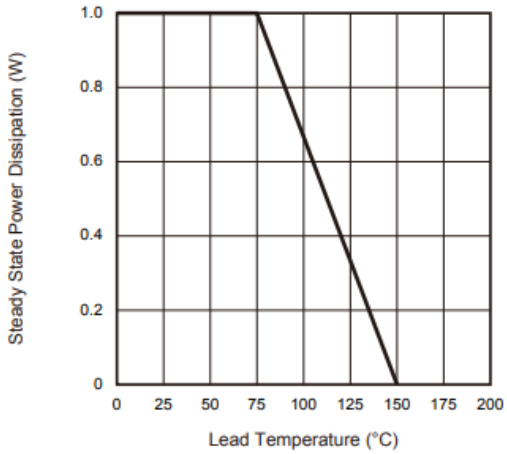
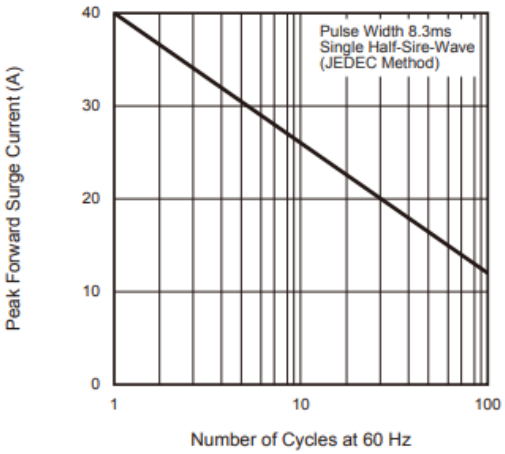
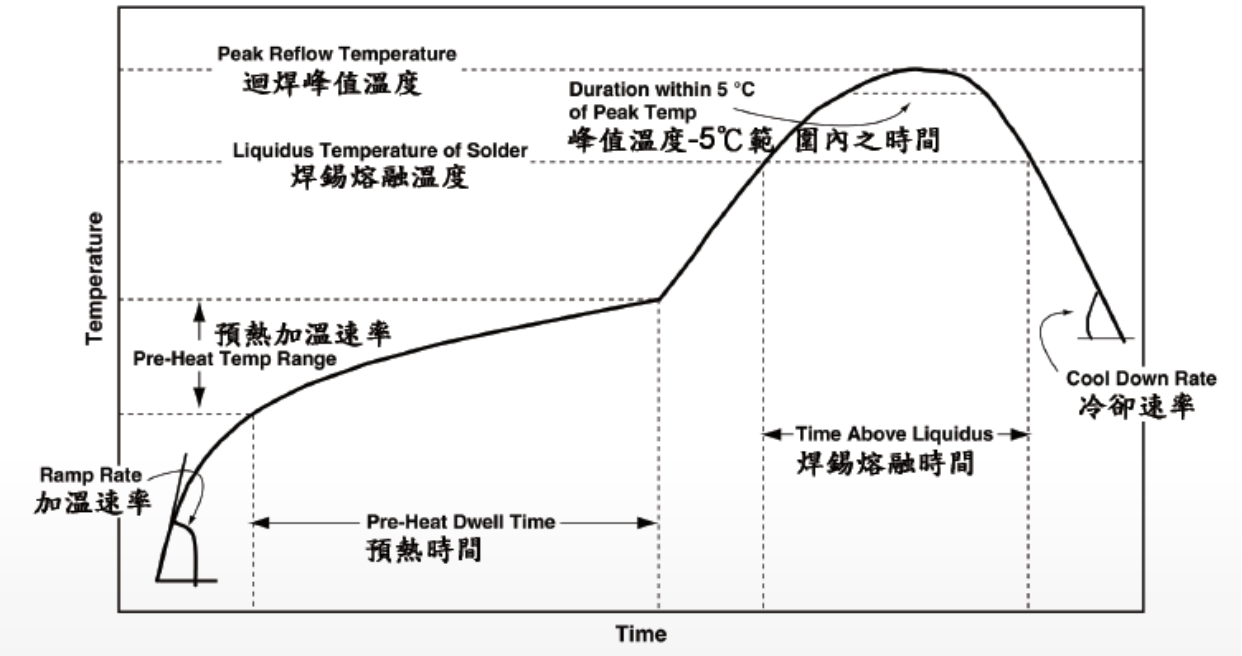


Fig.6 - Maximum Non-Repetitive Surge Current

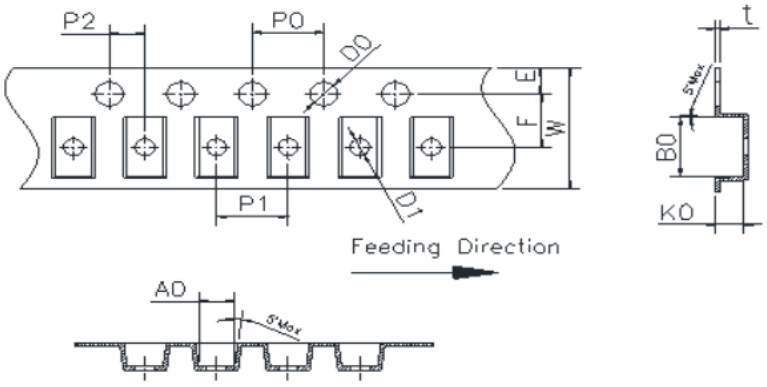


IR-reflow soldering profile



LEAD(Pb)-FREE SOLDER(SnAgCu) REFLOW PROFILE ATTRIBUTES	
PROFILE ATTRIBUTE	PROFILE ATTRIBUTE
Peak Reflow Temperature	260(+8/-8)℃
Time within 5℃ of Peak Temperature	30s max
Liquidus Temperatura of Solder	217℃
Cool Down Rate	6 ℃/s max
Time above Liquidus	60s to 150s
Pre-heat Temperature Range	150℃ to 200℃
Pre-heat Dwell Time	60s to 120s
Maximum Ramp Rate	3 ℃/s max

■ Packaging



Item	Symbol	DO-214AC (SMA)
		Unit: mm
Carrier width	A0	2.79±0.1
Carrier length	B0	5.33±0.1
Carrier depth	K0	2.36±0.05
Sprocket hole	D0/D1	1.55±0.05
Sprocket hole position	E	1.75±0.1
Punch hole position	F	5.5±0.05
Sprocket hole pinth	P0	4±0.1
Carrier pinth	P1	4±0.1
Embossment center	P2	2±0.05
Tape thickness	t	0.24±0.05
Tape width	W	12±0.15

■ Quantity

MPQ: 5,000pcs

PackageType	Reel Size（inch）	Quantity (pcs/reel)
DO-214AC	13	5,000

■ Warehouse Storage Conditions of product

● Storage Condition:

1. Storage Temperature: 15~30℃
2. Relative Humidity: ≦75%RH
3. Keep away from corrosive atmosphere and sunlight.

● Period of Storage: 1 year.