

Surface Mount Transient Voltage Suppressors

TP5.0SMDJ Series 10 To 58V 5000W

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.

Working Voltage: 10 to 58 V

Peak Pulse Power: 5000 W

Features

- ◆ Glass passivated chip
- ◆ 5000W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle):0.01 %
- ◆ High reliability application and automotive grade AEC Q101 qualified
- ◆ Meet ISO 7637-2 load dump test (varied by test condition)
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ RoHS compliant

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.



Mechanical Data

- ◆ Case: Molded plastic
- ◆ Epoxy: UL 94V-0 rate flame retardant
- ◆ Lead: Solderable per MIL-STD-750, method 2026
- ◆ Polarity: Color band denotes cathode end except Bipolar
- ◆ Mounting position: Any

Maximum Ratings and Thermal Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Units
Peak power dissipation with a 10/1000 μ s waveform ⁽¹⁾	P_{PPM}	5000	W
Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$	P_D	6.5	W
Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾	I_{PP}	See Next Table	A
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Maximum Instantaneous Forward Voltage at 50A for Unidirectional	V_F	3.5	V
Peak forward surge current, 8.3 ms single half sine-wave unidirectional only ⁽²⁾	I_{FSM}	300	A

Note:

(1)Non-repetitive current pulse per Fig.5 and derated above $T_A=25^\circ\text{C}$ per Fig.1

(2)Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

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Electrical Characteristics (@ 25°C Unless Otherwise Specified)

Part Number		Marking		Reverse Stand-Off Voltage $V_{RWM}(V)$	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_{RWM}
Uni	Bi	Uni	Bi		MIN	MAX				
TP5.0SMDJ10A	TP5.0SMDJ10CA	5SAE	5DAE	10.0	11.10	12.30	1	17.0	294.12	5
TP5.0SMDJ11A	TP5.0SMDJ11CA	5SAF	5DAF	11.0	12.20	13.50	1	18.2	275.0	2
TP5.0SMDJ12A	TP5.0SMDJ12CA	5SAG	5DAG	12.0	13.30	14.70	1	19.9	252.0	2
TP5.0SMDJ13A	TP5.0SMDJ13CA	5SAK	5DAK	13.0	14.40	15.90	1	21.5	233.0	2
TP5.0SMDJ14A	TP5.0SMDJ14CA	5SAM	5DAM	14.0	15.60	17.20	1	23.2	216.0	2
TP5.0SMDJ15A	TP5.0SMDJ15CA	5SAP	5DAP	15.0	16.70	18.50	1	24.4	205.0	2
TP5.0SMDJ16A	TP5.0SMDJ16CA	5SAR	5DAR	16.0	17.80	19.70	1	26.0	193.0	2
TP5.0SMDJ17A	TP5.0SMDJ17CA	5SAT	5DAT	17.0	18.90	20.90	1	27.6	181.0	2
TP5.0SMDJ18A	TP5.0SMDJ18CA	5SAV	5DAV	18.0	20.00	22.10	1	29.2	172.0	2
TP5.0SMDJ19A	TP5.0SMDJ19CA	5SAX	5DAX	19.0	21.10	23.30	1	29.2	162.4	2
TP5.0SMDJ20A	TP5.0SMDJ20CA	5SAZ	5DAZ	20.0	22.20	24.50	1	32.4	155.0	2
TP5.0SMDJ22A	TP5.0SMDJ22CA	5SBE	5DBE	22.0	24.40	26.90	1	35.5	141.0	2
TP5.0SMDJ24A	TP5.0SMDJ24CA	5SBF	5DBF	24.0	26.70	29.50	1	38.9	129.0	2
TP5.0SMDJ26A	TP5.0SMDJ26CA	5SBG	5DBG	26.0	28.90	31.90	1	42.1	119.0	2
TP5.0SMDJ28A	TP5.0SMDJ28CA	5SBK	5DBK	28.0	31.10	34.40	1	45.4	110.0	2
TP5.0SMDJ30A	TP5.0SMDJ30CA	5SBM	5DBM	30.0	33.30	36.80	1	48.4	103.0	2
TP5.0SMDJ33A	TP5.0SMDJ33CA	5SBP	5DBP	33.0	36.70	40.60	1	53.3	93.9	2
TP5.0SMDJ36A	TP5.0SMDJ36CA	5SBR	5DBR	36.0	40.00	44.20	1	58.1	86.1	2
TP5.0SMDJ40A	TP5.0SMDJ40CA	5SBT	5DBT	40.0	44.40	49.10	1	64.5	77.6	2
TP5.0SMDJ43A	TP5.0SMDJ43CA	5SBV	5DBV	43.0	47.80	52.80	1	69.4	72.1	2
TP5.0SMDJ45A	TP5.0SMDJ45CA	5SBX	5DBX	45.0	50.00	55.30	1	72.7	68.8	2
TP5.0SMDJ48A	TP5.0SMDJ48CA	5SBZ	5DBZ	48.0	53.30	58.90	1	77.4	64.7	2
TP5.0SMDJ51A	TP5.0SMDJ51CA	5SCE	5DCE	51.0	56.70	62.70	1	82.4	60.7	2
TP5.0SMDJ54A	TP5.0SMDJ54CA	5SCF	5DCF	54.0	60.00	66.30	1	87.1	57.5	2
TP5.0SMDJ58A	TP5.0SMDJ58CA	5SCG	5DCG	58.0	64.40	71.20	1	93.6	53.5	2

Note:

- (1) Add suffix 'C 'or ' CA ' after part number to specify Bi-directional devices
- (2) For Bi-Directional devices having VR of 10 volts and under, the IR limit is double

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Ratings and Characteristics Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Pulse Waveform

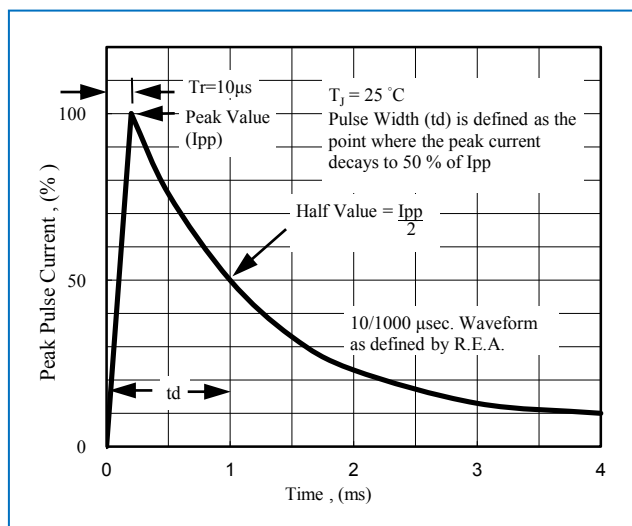


Figure 2 - Pulse Derating Curve

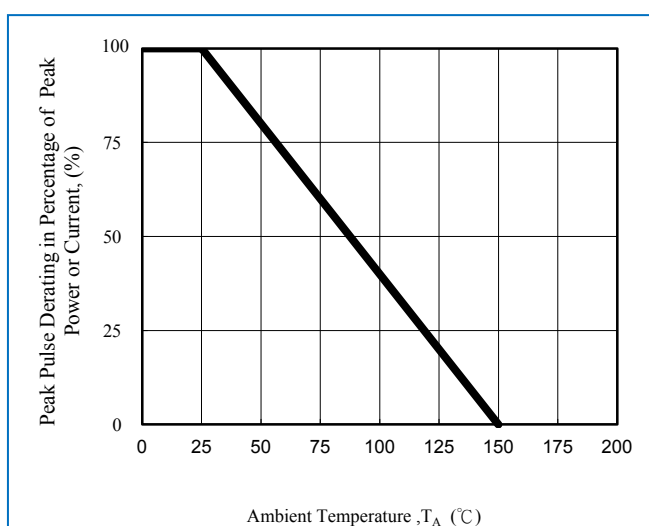


Figure 3 - Peak Pulse Power Rating Curve

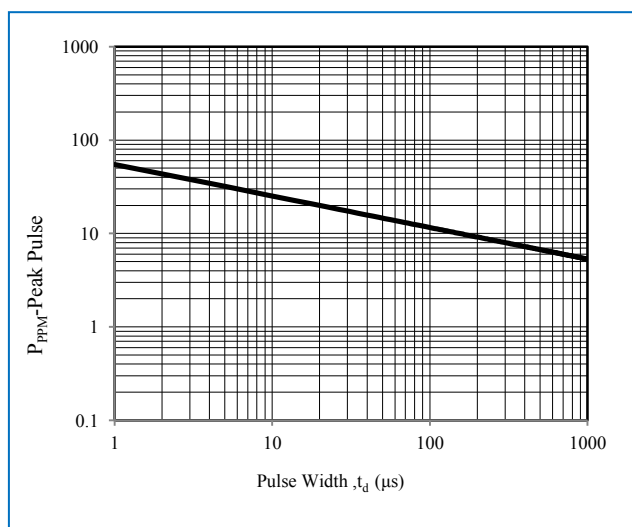
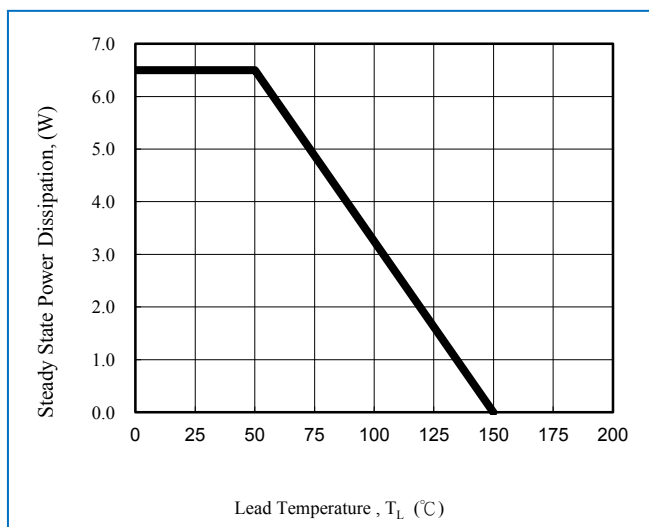


Figure 4 - Steady State Power Derating Curve



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Figure 5 - Maximum Non-Repetitive Surge Current

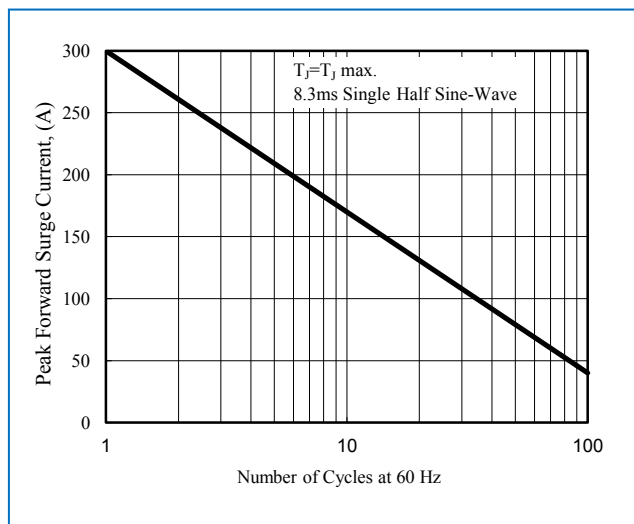
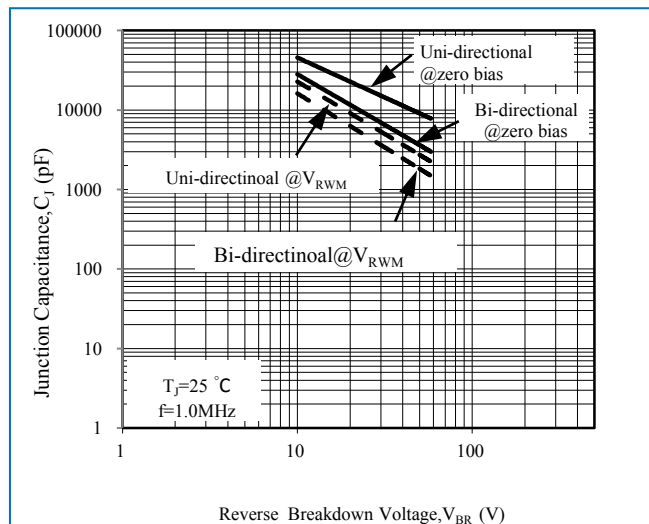
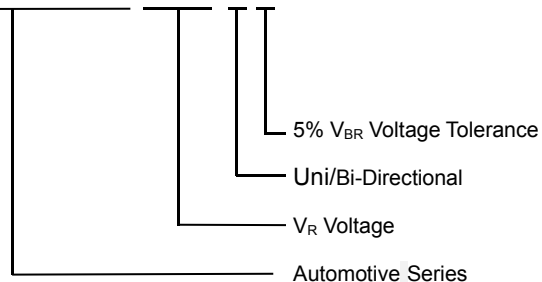


Figure 6 - Typical Junction Capacitance



Part Numbering

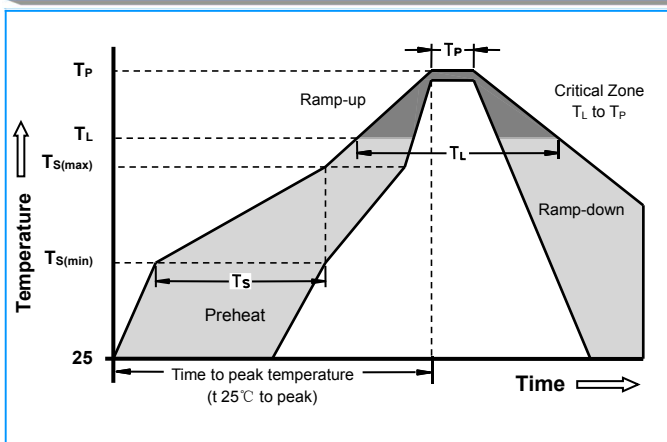
TP5.0SMDJxxCA



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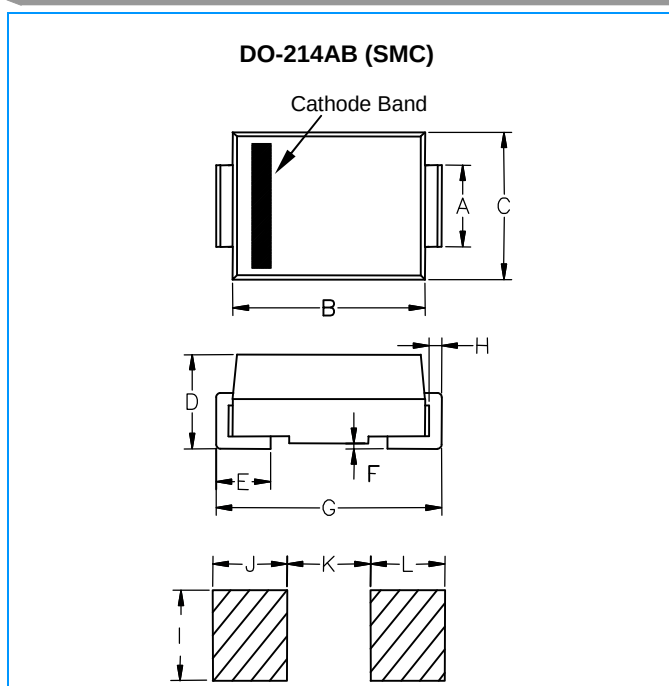
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Soldering Parameters



Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 -180 Seconds
Average ramp up rate (Liquidus Temp T_L to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 -150 Seconds
Peak Temperature (T_P)		260 +0/-5°C
Time within 5°C of actual peak Temperature (t_p)		20 -40 Seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max
Do not exceed		280°C

Dimensions



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.86	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-