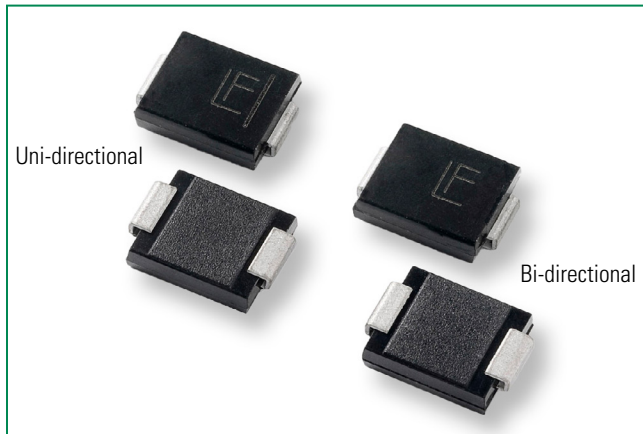


TP5.0SMDJ Series

Surface Mount - 5000W



Maximum Ratings & Thermal Characteristics

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_A = 25^\circ\text{C}$ by 10/1000 μs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	5000	W
Power Dissipation on Infinite Heat Sink at $T_A = 50^\circ\text{C}$	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only	V_F	5.0	V
Operating Temperature Range	T_J	-65 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to 175	$^\circ\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

Notes:

1. Non-repetitive current pulse per Fig. 4 and derated above $T_A = 25^\circ\text{C}$ per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) 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.

Agency Approvals

Agency	Agency File Number
	E230531

Description

The TP5.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

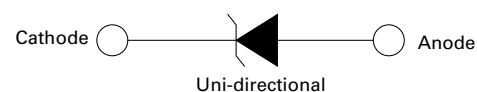
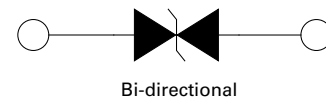
Features & Benefits

- High reliability application and automotive grade AEC-Q101 qualified
- 5000W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01 %
- SMD low profile surface mount package minimizing PCB footprint
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- Fast response time: typically less than 1.0ps from 0V to V_{BR} min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 5 μA when $V_{BR \min} > 22\text{V}$
- High temperature reflow soldering guaranteed: 260 $^\circ\text{C}$ /40sec
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature Coefficient)
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^\circ\text{C}$
- 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)
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Applications

TVS Components 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



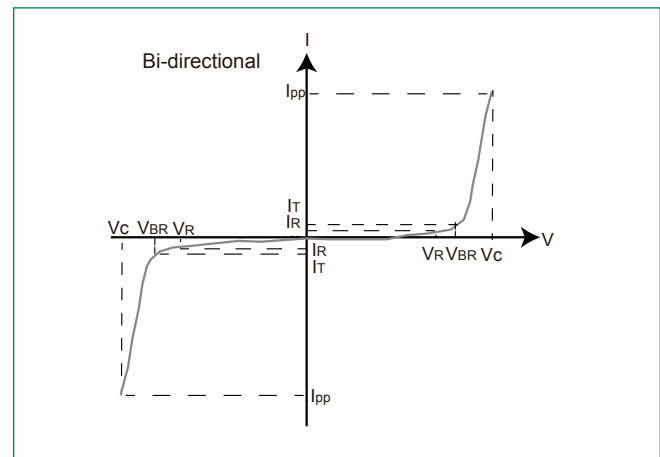
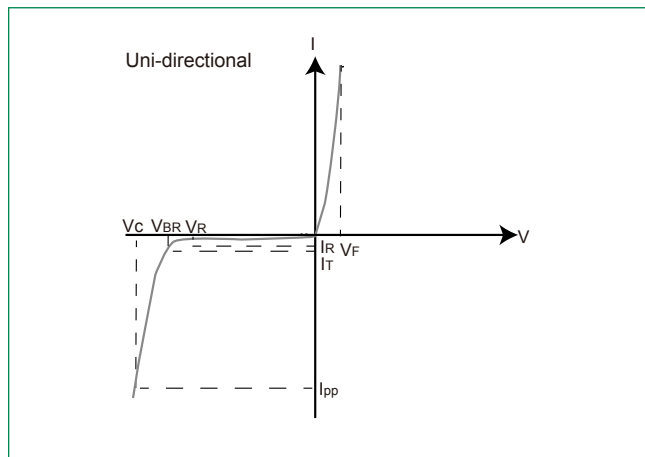
TP5.0SMDJ Series

Surface Mount - 5000W

Electrical Characteristics

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (10/1000 μ s) (V)	Maximum Peak Pulse Current I_{PP} (10/1000 μ s) (A)	Maximum Clamping Voltage V_C @ I_{PP} (8/20 μ s) (V)	Maximum Peak Pulse Current I_{PP} (8/20 μ s) (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Maximum Temperature coefficient of V_{BR} (%/C)	
		UNI	BI		MIN	MAX								
TP5.0SMDJ100A	TP5.0SMDJ100CA	T5PGZ	T5BGZ	100	111	123	1	162	30.9	209.3	231.8	5	0.107	X
TP5.0SMDJ110A	TP5.0SMDJ110CA	T5PHE	T5BHE	110	122	135	1	177	28.3	228.7	212.3	5	0.107	X
TP5.0SMDJ120A	TP5.0SMDJ120CA	T5PHG	T5BHG	120	133	147	1	193	26	249.4	195	5	0.108	X
TP5.0SMDJ130A	TP5.0SMDJ130CA	T5PHK	T5BHK	130	144	159	1	209	24	270	180	5	0.108	X
TP5.0SMDJ140A	TP5.0SMDJ140CA	T5PHL	T5BHL	140	156	172	1	226.1	22.2	292.1	166.5	5	0.108	X
TP5.0SMDJ150A	TP5.0SMDJ150CA	T5PHM	T5BHM	150	167	185	1	243	20.6	314	154.5	5	0.108	X
TP5.0SMDJ160A	TP5.0SMDJ160CA	T5PHP	T5BHB	160	178	197	1	259	19.3	334.6	144.8	5	0.108	X
TP5.0SMDJ170A	TP5.0SMDJ170CA	T5PHR	T5BHR	170	189	209	1	275	18.2	355.3	136.5	5	0.108	X

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation -- Max power dissipation
 V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation
 V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)
 V_C Clamping Voltage -- Peak voltage measured across the TVS at a specified I_{ppm} (peak impulse current)
 I_R Reverse Leakage Current -- Current measured at V_R
 V_F Forward Voltage Drop for Uni-directional

TP5.0SMDJ Series

Surface Mount - 5000W

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

Figure 1 - TVS Transients Clamping Waveform

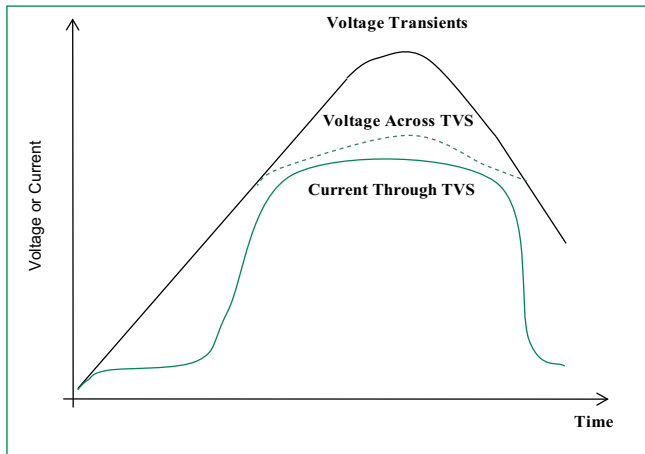


Figure 2 - Peak Pulse Power Rating

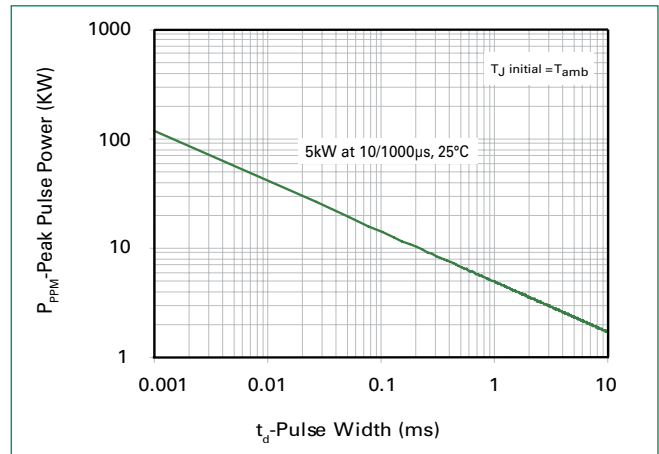


Figure 3 - Peak Pulse Power Derating Curve

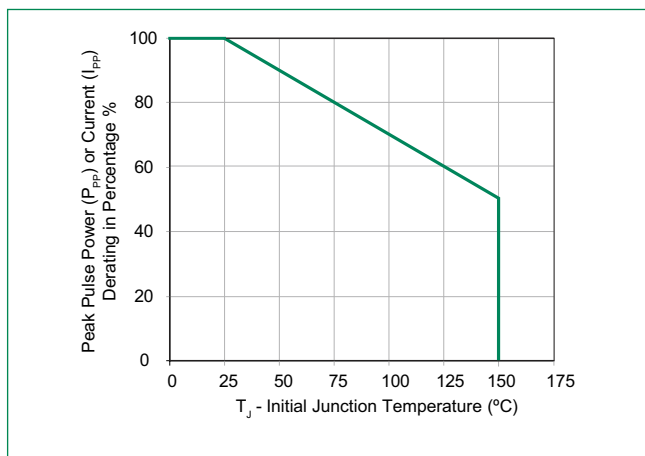


Figure 4 - Pulse Waveform

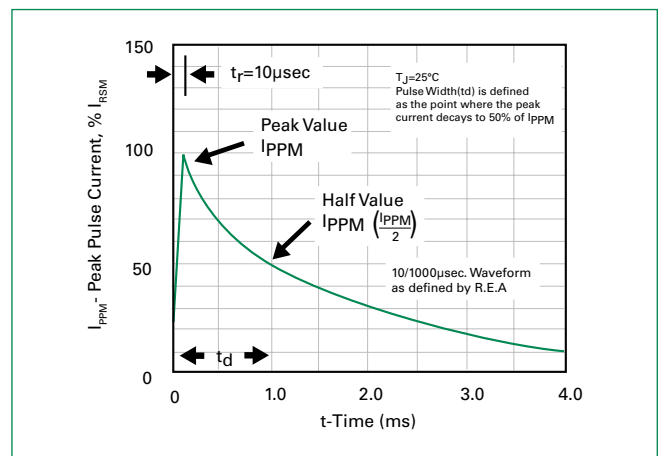


Figure 5 - Typical Junction Capacitance

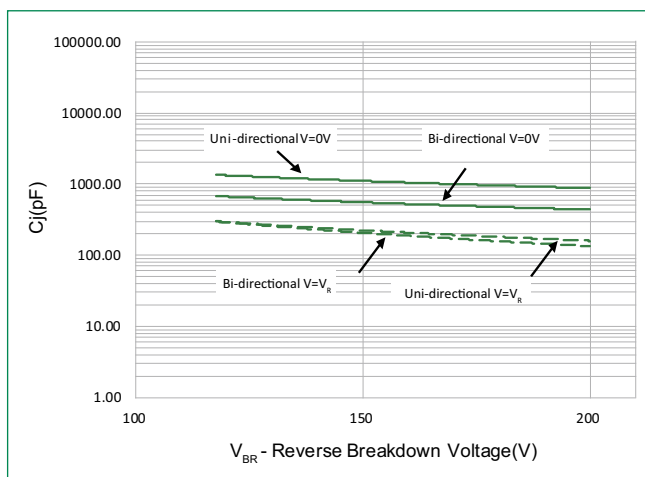
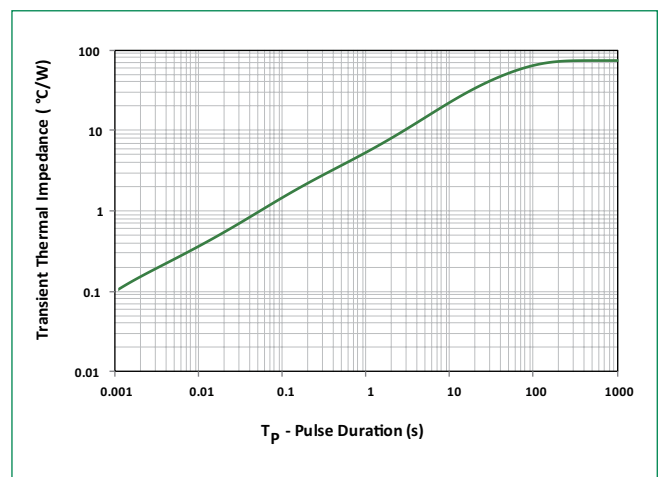


Figure 6 - Typical Transient Thermal Impedance



TP5.0SMDJ Series

Surface Mount - 5000W

Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

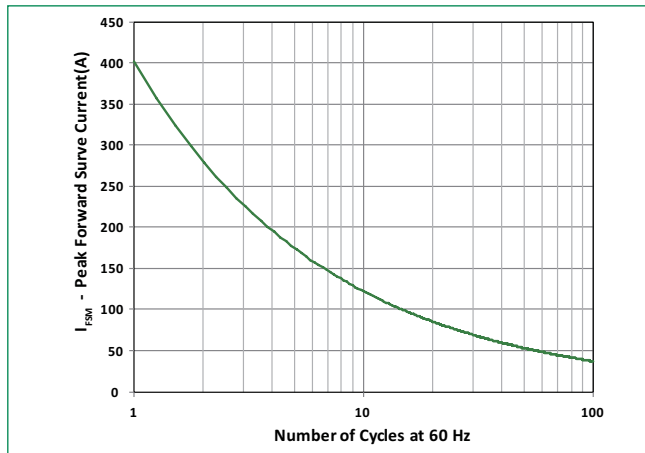
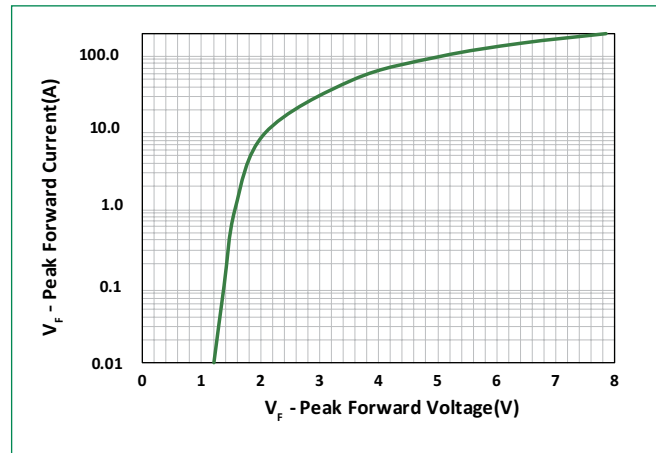
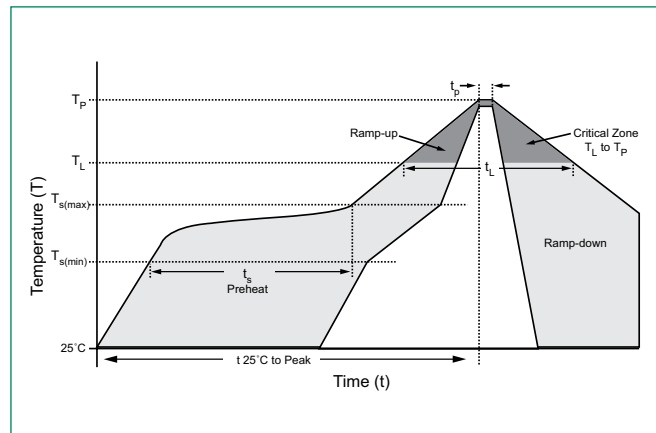


Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



Soldering Parameters

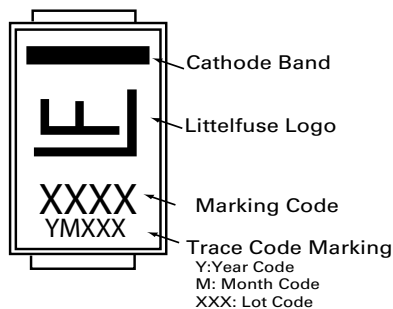
Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (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)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C



Physical Specifications

Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

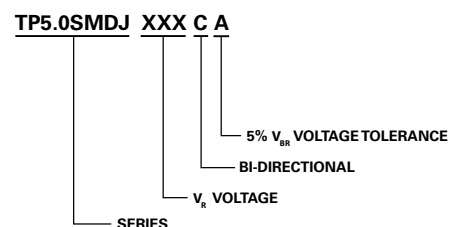
Part Marking System



Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-A111

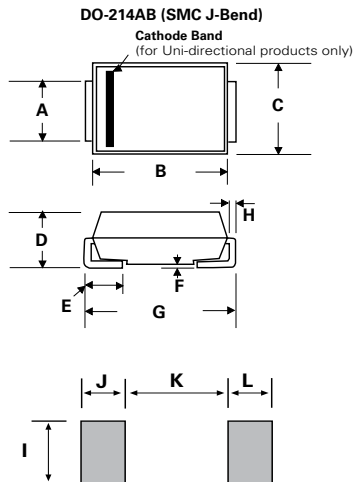
Part Numbering System



TP5.0SMDJ Series

Surface Mount - 5000W

Dimensions

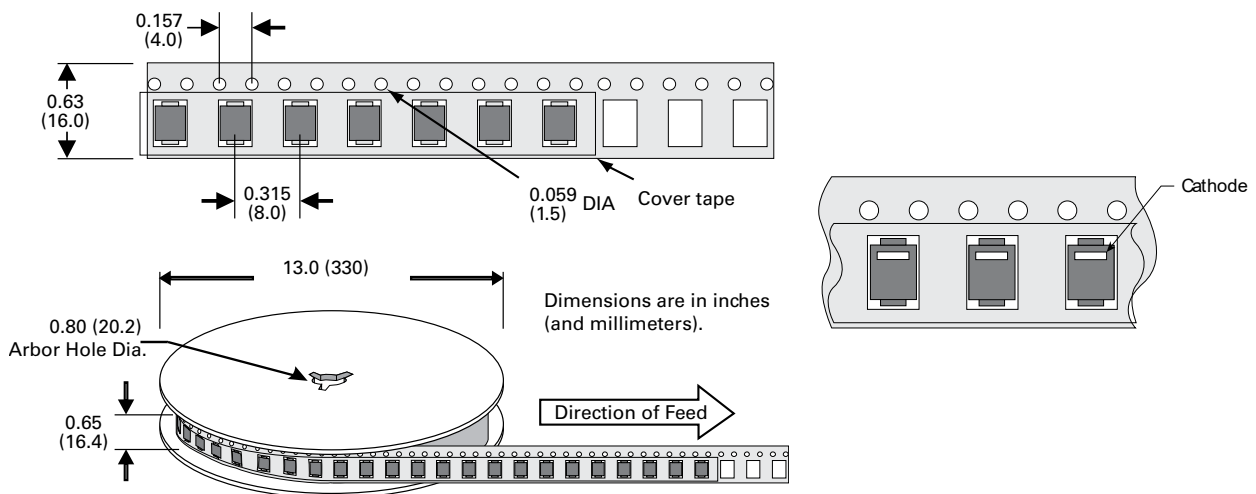


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TP5.0SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification



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