

Features

- 5000W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical failure mode is a short circuit condition for current events exceeding component rating
- Plastic package is flammability rated V-0 per UL-94
- Meet MSL level1, per J-STD-020, lead-frame maximum peak of 260°C
- High reliability application and automotive grade AEC-Q101 qualified

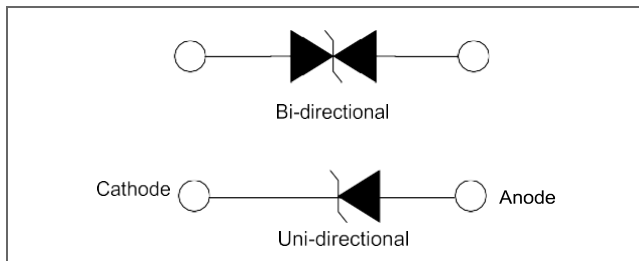
RoHS
Compliant



Applications

TVS devices are ideal for the transient voltage clamp protection of I/O Interfaces, DC power line bus and other circuits used in Telecom, Computer, Industrial and Automotive electronic applications.

Function Diagram



Maximum Ratings and 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 μ s Waveform (Fig.2)	P_{PPM}	5000	W
Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$	P_D	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only	V_F	3.5	V
Operating Temperature Range	T_J	-55 to 150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^{\circ}\text{C}$

AGENCY	AGENCY FILE NUMBER
	Pending

Notes:

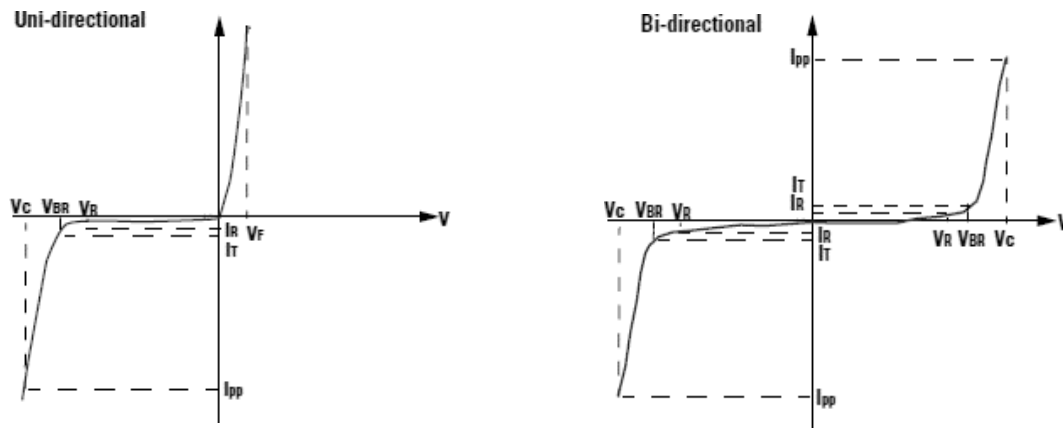
1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Characteristics (T = 25°C unless otherwise noted)

Part Number (Uni)	Part Number (Bi)	Key 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} (V)	Maximum Peak Pulse Current I_{pp} (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Agency Approval 
		UNI	BI		MIN	MAX					
TP5.0SMD12A	TP5.0SMD12CA	A5012	A5012	12.0	13.3	14.7	10	19.9	252.0	20	
TP5.0SMD13A	TP5.0SMD13CA	A5013	A5013	13.0	14.4	15.9	10	21.5	233.0	10	
TP5.0SMD14A	TP5.0SMD14CA	A5014	A5014	14.0	15.6	17.2	10	23.2	216.0	10	
TP5.0SMD15A	TP5.0SMD15CA	A5015	A5015	15.0	16.7	18.5	1	24.4	205.0	5	
TP5.0SMD16A	TP5.0SMD16CA	A5016	A5016	16.0	17.8	19.7	1	26.0	193.0	5	
TP5.0SMD17A	TP5.0SMD17CA	A5017	A5017	17.0	18.9	20.9	1	27.6	181.0	5	
TP5.0SMD18A	TP5.0SMD18CA	A5018	A5018	18.0	20.0	22.1	1	29.2	172.0	5	
TP5.0SMD20A	TP5.0SMD20CA	A5020	A5020	20.0	22.2	24.5	1	32.4	155.0	5	
TP5.0SMD22A	TP5.0SMD22CA	A5022	A5022	22.0	24.4	26.9	1	35.5	141.0	5	
TP5.0SMD24A	TP5.0SMD24CA	A5024	A5024	24.0	26.7	29.5	1	38.9	129.0	5	
TP5.0SMD26A	TP5.0SMD26CA	A5026	A5026	26.0	28.9	31.9	1	42.1	119.0	5	
TP5.0SMD28A	TP5.0SMD28CA	A5028	A5028	28.0	31.1	34.4	1	45.4	110.0	5	
TP5.0SMD30A	TP5.0SMD30CA	A5030	A5030	30.0	33.3	36.8	1	48.4	103.0	5	
TP5.0SMD33A	TP5.0SMD33CA	A5033	A5033	33.0	36.7	40.6	1	53.3	93.9	5	
TP5.0SMD36A	TP5.0SMD36CA	A5036	A5036	36.0	40.0	44.2	1	58.1	86.1	5	
TP5.0SMD40A	TP5.0SMD40CA	A5040	A5040	40.0	44.4	49.1	1	64.5	77.6	5	
TP5.0SMD43A	TP5.0SMD43CA	A5043	A5043	43.0	47.8	52.8	1	69.4	72.1	5	
TP5.0SMD45A	TP5.0SMD45CA	A5045	A5045	45.0	50.0	55.3	1	72.7	68.8	5	
TP5.0SMD48A	TP5.0SMD48CA	A5048	A5048	48.0	53.3	58.9	1	77.4	64.7	5	
TP5.0SMD51A	TP5.0SMD51CA	A5051	A5051	51.0	56.7	62.7	1	82.4	60.7	5	
TP5.0SMD54A	TP5.0SMD54CA	A5054	A5054	54.0	60.0	66.3	1	87.1	57.5	5	
TP5.0SMD58A	TP5.0SMD58CA	A5058	A5058	58.0	64.4	71.2	1	93.6	53.5	5	
TP5.0SMD60A	TP5.0SMDJ60CA	A5060	A5060	60.0	66.7	73.7	1	96.8	51.7	5	
TP5.0SMD64A	TP5.0SMD64CA	A5064	A5064	64.0	71.1	78.6	1	103.0	48.6	5	
TP5.0SMD70A	TP5.0SMD70CA	A5070	A5070	70.0	77.8	86.0	1	113.0	44.3	5	
TP5.0SMD75A	TP5.0SMD75CA	A5075	A5075	75.0	83.3	92.1	1	121.0	41.4	5	
TP5.0SMD78A	TP5.0SMD78CA	A5078	A5078	78.0	86.7	95.8	1	126.0	39.7	5	
TP5.0SMD85A	TP5.0SMD85CA	A5085	A5085	85.0	94.4	104.0	1	137.0	36.5	5	
TP5.0SMD90A	TP5.0SMD90CA	A5090	A5090	90.0	100.0	111.0	1	146.0	34.3	5	
TP5.0SMD100A	TP5.0SMD100CA	A5100	A5100	100.0	111.0	123.0	1	162.0	30.9	5	



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 through 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

Ratings and Characteristic Curves (T = 25°C unless otherwise noted)

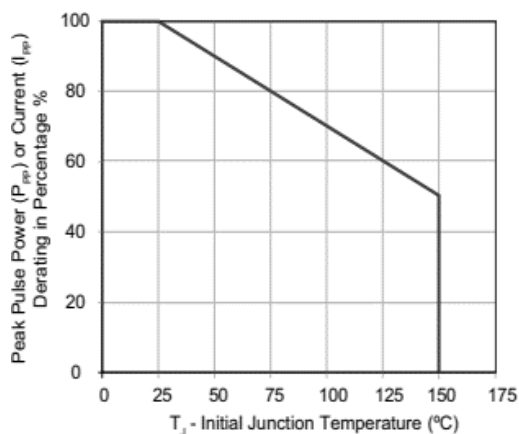


Figure 1. Peak pulse power derating curve

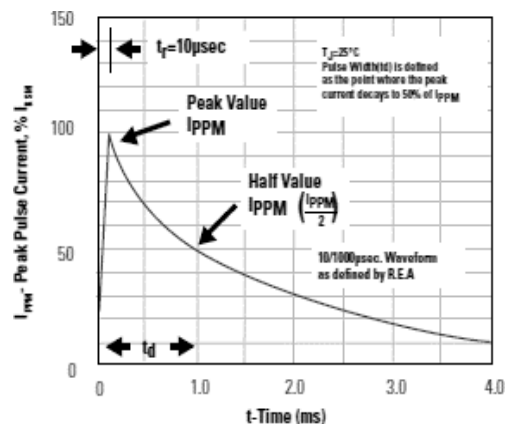


Figure2. Pulse waveform

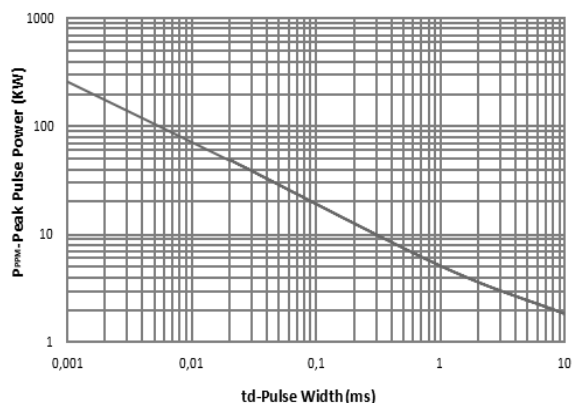


Figure 3. Peak pulse power rating curve

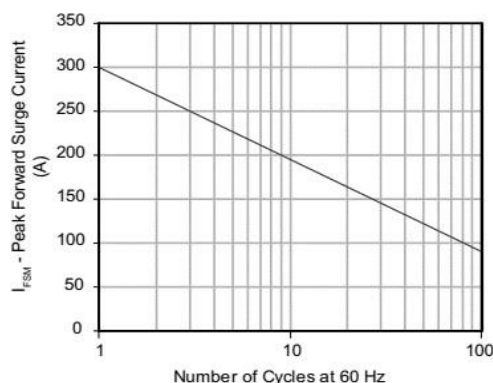
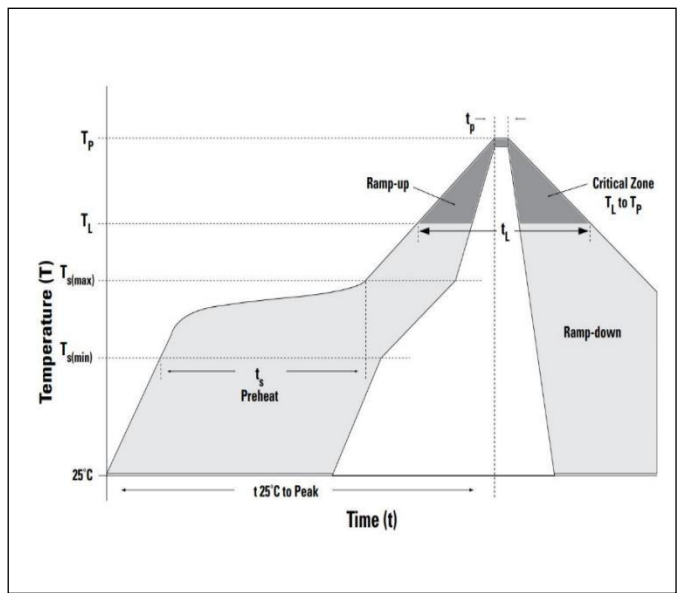


Figure 4. Maximum non-repetitive surge current

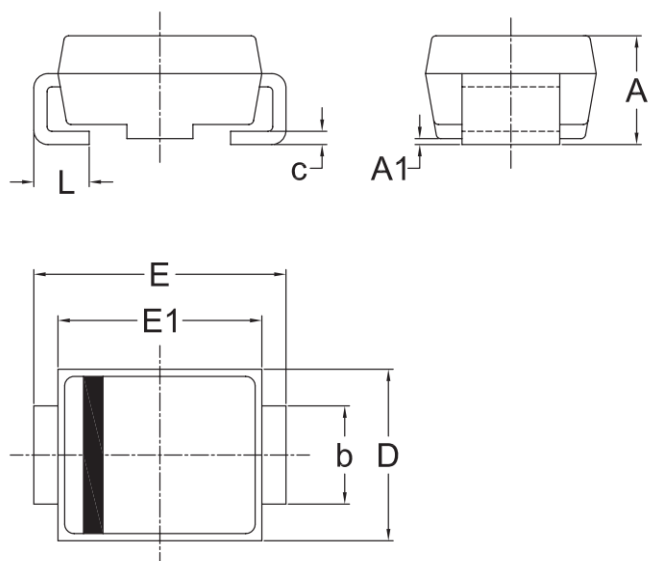
Soldering Parameters

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_A) to peak)		3°C/second max
$T_{s(max)}$ to T_A - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_A) (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		260°C

Soldering profile



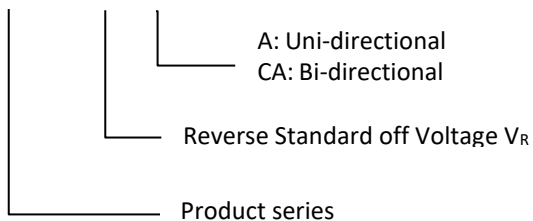
Dimensions



unit		A	A1	b	c	D	E	E1	L
max	mm	2.95	0.30	3.30	0.30	6.22	8.40	7.11	1.60
min		1.99	0.01	2.70	0.00	5.50	7.40	6.50	0.76

Part Numbering

TP5.0SMD xx xx



Part Marking

Product Type Marking Code
& Last Digit "X" is Traceability Code

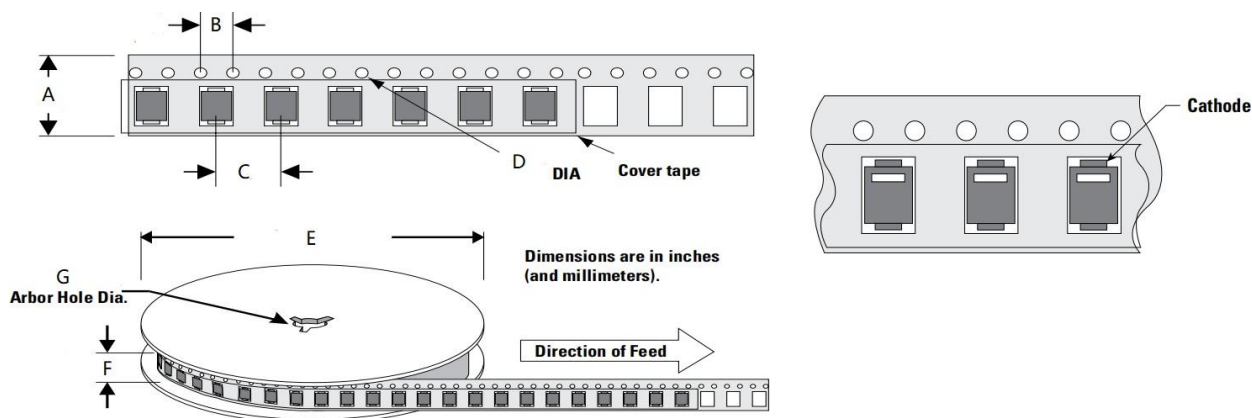


Cathode band
(for uni-directional products only)

Packing

Part number	Package name	Small packing quantity	Packing method
TP5.0SMDXXXX	DO-214AB	3000	Tape & Reel

Tape and Reel Specification



Symbol	Millimeter
A	16.00±0.10
B	4.00±0.10
C	8.00±0.10
D	1.55±0.05
E	330.20±2.00
F	19.70±2.00
G	13.30±0.30

Revision history of Specification

Version	Change Items	Effective Date
1.0	Preliminary release	13-Sep-2022
1.1	Upgrade I_R Characteristics	11-Oct-2023
1.2	Update Package Size	10-Dec-2023
1.3	Add Remark For Marking Last Digit	27-Mar-2024