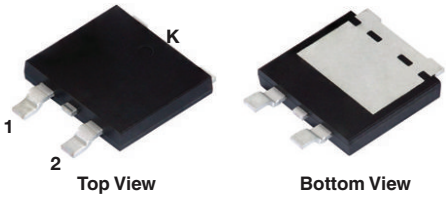
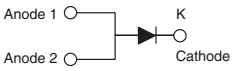
Surface Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

eSMP® Series
SMPD (TO-263AC)



Top View Bottom View



LINKS TO ADDITIONAL RESOURCES

Related Documents | Packages | Marking

PRIMARY CHARACTERISTICS	
V_{WM}	10 V to 43 V
V_{BR}	11.1 V to 52.8 V
P_{PPM} (10 x 1000 µs)	7000 W
P_D	2.7 W
I_{FSM}	600 A
T_J max.	175 °C
Polarity	Unidirectional
Package	SMPD (TO-263AC)

FEATURES

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

- Junction passivation optimized design passivated anisotropic rectifier technology
- T_J = 175 °C capability suitable for high reliability and automotive requirement
- Unidirectional
- Low leakage current
- Low forward voltage drop
- High surge capability
- Meets ISO16750-2 surge specification (varied by test condition)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lightning, especially for automotive load dump protection application.

MECHANICAL DATA

Case: SMPD (TO-263AC)
Molding compound meets UL 94 V-0 flammability rating
Base P/NHM3 - RoHS-compliant, AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
HM3 suffix meets JESD 201 class 2 whisker test

Polarity: heatsink is cathode

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)				
PARAMETER		**SYMBOL**	**VALUE**	**UNIT**
Peak pulse power dissipation	with 10/1000 µs waveform	P_{PPM}	7000	W
	with 10/10 000 µs waveform		2200	
Power dissipation on infinite heatsink at T_A = 25 °C		P_D	2.7	W
Peak pulse current with 10/1000 µs waveform		I_{PPM} (1)	See next table	A
Peak forward surge current 8.3 ms single half sine-wave		I_{FSM}	600	A
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +175	°C

Note

(1) Non-repetitive current pulse at T_A = 25 °C

ELECTRICAL CHARACTERISTICS (T_C = 25 °C unless otherwise noted)											
DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE V_{BR} (V)			TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_R (µA)	MAXIMUM REVERSE LEAKAGE AT V_{WM} T_J = 175 °C I_R (µA)	MAX. PEAK PULSE CURRENT AT 10/1000 µs WAVEFORM I_{PPM} (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	TYPICAL TEMP. COEFFICIENT OF V_{BR} (1) αT (%/°C)
		MIN.	NOM.	MAX.							
T7KD10A	T7KD10A	11.1	11.7	12.3	5.0	10.0	10	250	412	17.0	0.069
T7KD11A	T7KD11A	12.2	12.9	13.5	5.0	11.0	10	150	385	18.2	0.072
T7KD12A	T7KD12A	13.3	14.0	14.7	5.0	12.0	10	150	352	19.9	0.074
T7KD13A	T7KD13A	14.4	15.2	15.9	5.0	13.0	5	150	326	21.5	0.076
T7KD14A	T7KD14A	15.6	16.4	17.2	5.0	14.0	5	150	302	23.2	0.078
T7KD15A	T7KD15A	16.7	17.6	18.5	5.0	15.0	5	150	287	24.4	0.080
T7KD16A	T7KD16A	17.8	18.8	19.7	5.0	16.0	5	150	269	26.0	0.081
T7KD17A	T7KD17A	18.9	19.9	20.9	5.0	17.0	5	150	254	27.6	0.082
T7KD18A	T7KD18A	20.0	21.1	22.1	5.0	18.0	5	150	240	29.2	0.083
T7KD20A	T7KD20A	22.2	23.4	24.5	5.0	20.0	5	150	216	32.4	0.085
T7KD22A	T7KD22A	24.4	25.7	26.9	5.0	22.0	5	150	197	35.5	0.086
T7KD24A	T7KD24A	26.7	28.1	29.5	5.0	24.0	5	150	180	38.9	0.087
T7KD26A	T7KD26A	28.9	30.4	31.9	5.0	26.0	5	150	166	42.1	0.088
T7KD28A	T7KD28A	31.1	32.8	34.4	5.0	28.0	5	150	154	45.4	0.089
T7KD30A	T7KD30A	33.3	35.1	36.8	5.0	30.0	5	150	145	48.4	0.090
T7KD33A	T7KD33A	36.7	38.7	40.6	5.0	33.0	5	150	131	53.3	0.091
T7KD36A	T7KD36A	40.0	42.1	44.2	5.0	36.0	5	150	120	58.1	0.091
T7KD40A	T7KD40A	44.4	46.8	49.1	5.0	40.0	5	150	109	64.5	0.092
T7KD43A	T7KD43A	47.8	50.3	52.8	5.0	43.0	5	150	101	69.4	0.093

Notes

- For all types maximum V_F = 1.9 V at I_F = 100 A measured on 300 µs square pulse width

(1) To calculate V_{BR} vs. junction temperature, use the following formula: V_{BR} at T_J = V_{BR} at 25 °C x (1 + αT x (T_J - 25))

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	55	°C/W
	$R_{\theta JM}$ (2)	1.1	°C/W

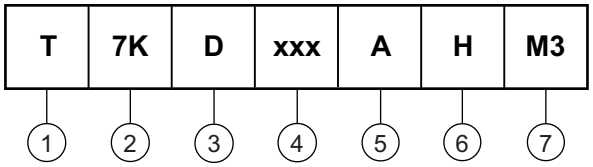
Notes

(1) Thermal resistance junction-to-ambient to follow JEDEC®51-2A, device mounted on FR4 PCB, 2 oz. standard footprint

(2) Thermal resistance junction-to-mount to follow JEDEC®51-14 using Transient Dual Interface Test Method (TDIM)

ORDERING INFORMATION TABLE

Device code



1 - Vishay PAR® TVS product

2 - Peak pulse power rating (7K = 7000 W)

3 - Package type (D = SMPD package)

4 - Stand-off voltage

5 - Breakdown voltage tolerance and polarity (A ± 5 %, unidirectional)

6 - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)

7 - Material / environment category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
T7KD10AHM3/I [1]	0.645	I	2000	13" diameter plastic tape and reel, anode towards the sprocket hole

Note

[1] AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

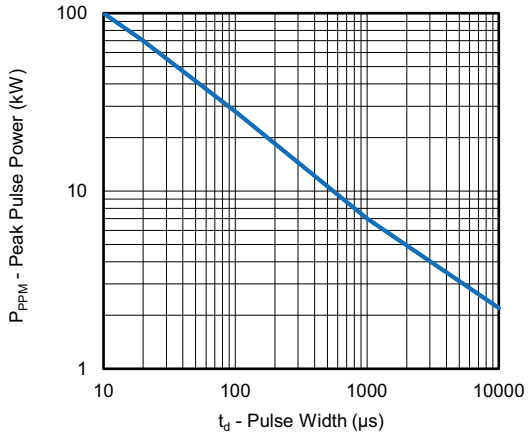


Fig. 1 - Peak Pulse Power Derating Curve

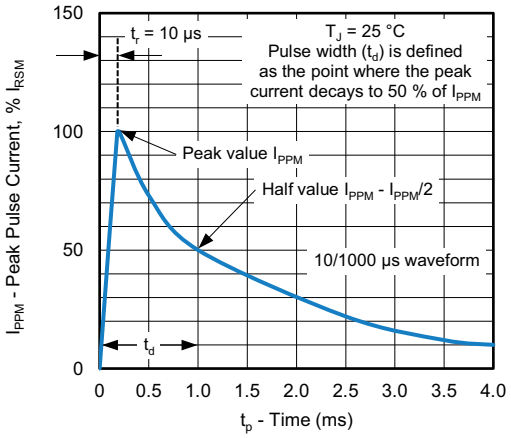


Fig. 4 - Pulse Waveform

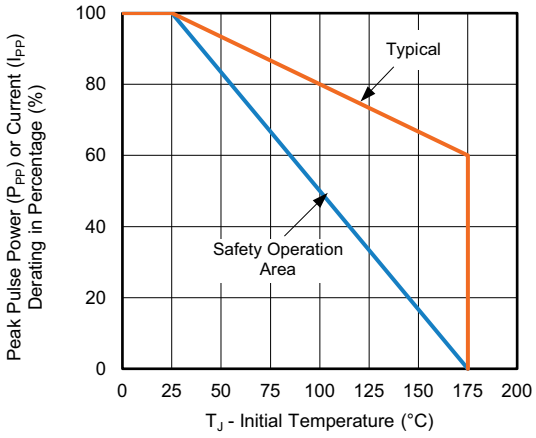


Fig. 2 - Power Derating Curve

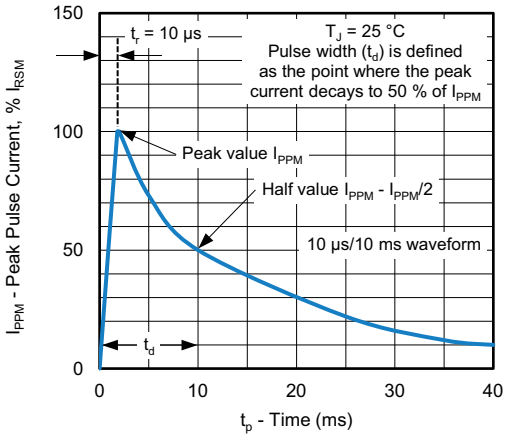


Fig. 5 - Pulse Waveform

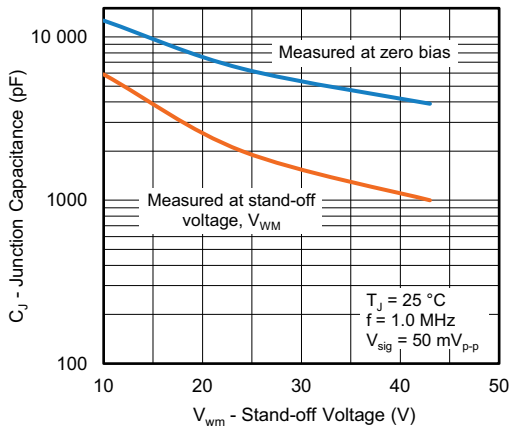


Fig. 3 - Typical Junction Capacitance

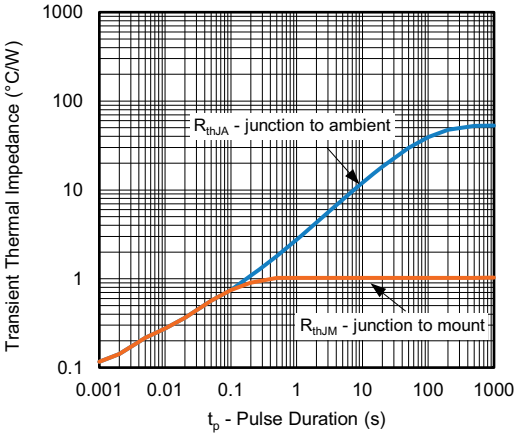
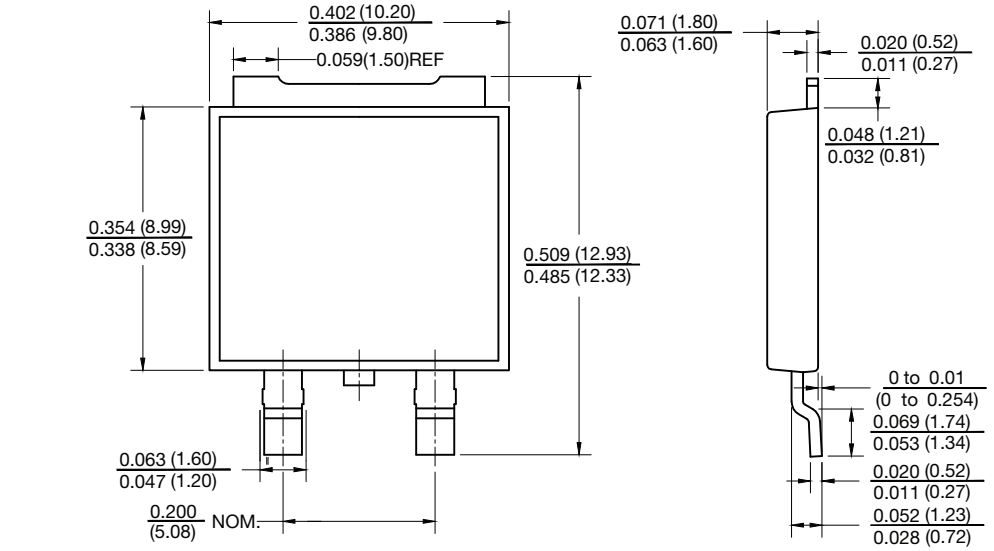


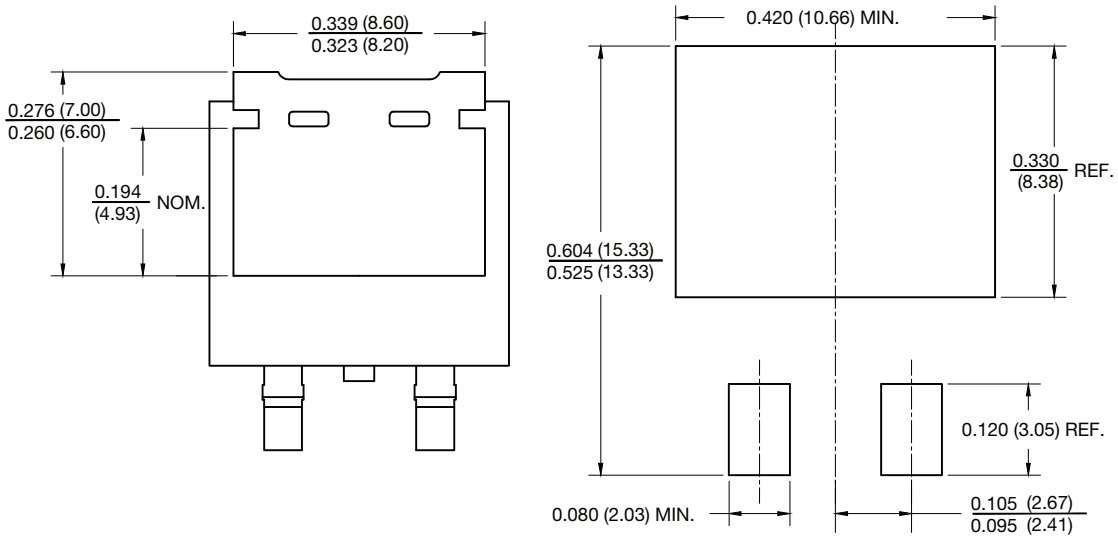
Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout



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