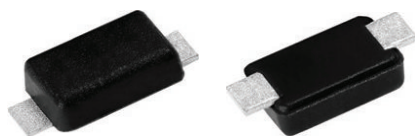


Surface Mount PAR[®] Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

eSMP[®] Series



Top view

Bottom view

SMF (DO-219AB)

Cathode  Anode

PRIMARY CHARACTERISTICS

V_{WM}	8.55 V to 43.6 V
V_{BR}	10 V to 51 V
P_{PPM}	400 W
P_D	1.0 W
T_J max.	185 °C
Polarity	Unidirectional
Package	SMF (DO-219AB)

FEATURES

- Low profile package
- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$ °C capability suitable for high reliability and automotive requirement
- Unidirectional only
- 400 W peak pulse power capability with a 10/1000 μ s waveform
- Excellent clamping capability
- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- Compatible to SOD-123W package case outline
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lightning on ICs, MOSFET, signal lines of sensor units for automotive.

MECHANICAL DATA

Case: SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating
Base P/NHM3 - halogen-free, RoHS-compliant, and 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: color band denotes cathode end

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation with a 10/1000 μ s waveform (fig. 3)	$P_{PPM}^{(1)}$	400	W
Peak power pulse current with a 10/1000 μ s waveform (fig. 1)	$I_{PPM}^{(1)}$	See next table	A
Operating junction and storage temperature range	T_J, T_{STG}	-65 to +185	°C

Notes

(1) Non-repetitive current pulse, per fig. 3 and derated above $T_A = 25$ °C per fig. 2

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

DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE $V_{BR}^{(1)}$ AT I_T (V)			TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA)	$T_J = 150\text{ }^{\circ}\text{C}$ MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA)	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	TYPICAL TEMP. COEFFICIENT OF $V_{BR}^{(3)}$ α_T ($\%/^{\circ}\text{C}$)
		MIN.	NOM.	MAX.							
T4F10A	APP	9.5	10.0	10.5	1.0	8.55	5.0	20	27.6	14.5	0.064
T4F11A	ARP	10.5	11.0	11.6	1.0	9.40	1.0	5.0	25.6	15.6	0.067
T4F12A	ATP	11.4	12.0	12.6	1.0	10.2	1.0	5.0	24.0	16.7	0.070
T4F13A	AVP	12.4	13.0	13.7	1.0	11.1	1.0	5.0	22.0	18.2	0.072
T4F15A	AXP	14.3	15.0	15.8	1.0	12.8	1.0	5.0	18.9	21.2	0.076
T4F16A	AZP	15.2	16.0	16.8	1.0	13.6	1.0	5.0	17.8	22.0	0.078
T4F18A	BEP	17.1	18.0	18.9	1.0	15.3	1.0	5.0	15.9	25.5	0.080
T4F20A	BGP	19.0	20.0	21.0	1.0	17.1	1.0	5.0	14.4	27.7	0.082
T4F22A	BKP	20.9	22.0	23.1	1.0	18.8	1.0	5.0	13.1	30.6	0.084
T4F24A	BMP	22.8	24.0	25.2	1.0	20.5	1.0	5.0	12.0	33.2	0.085
T4F27A	BPP	25.7	27.0	28.4	1.0	23.1	1.0	5.0	10.7	37.5	0.087
T4F30A	BRP	28.5	30.0	31.5	1.0	25.6	1.0	5.0	9.7	41.4	0.088
T4F33A	BTP	31.4	33.0	34.7	1.0	28.2	1.0	5.0	8.8	45.7	0.089
T4F36A	BVP	34.2	36.0	37.8	1.0	30.8	1.0	5.0	8.0	49.9	0.090
T4F39A	BXP	37.1	39.0	41.0	1.0	33.3	1.0	5.0	7.4	53.9	0.091
T4F43A	BZP	40.9	43.0	45.2	1.0	36.8	1.0	5.0	6.7	59.3	0.092
T4F47A	CEP	44.7	47.0	49.4	1.0	40.2	1.0	5.0	6.2	64.8	0.092
T4F51A	CGP	48.5	51.0	53.6	1.0	43.6	1.0	5.0	5.7	70.1	0.093

Notes

- (1) V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent
(2) Surge current waveform per fig. 3 and derated per fig. 2
(3) To calculate V_{BR} vs. junction temperature, use the following formula: $T_J = V_{BR}$ at $25\text{ }^{\circ}\text{C} \times (1 + \alpha_T \times (T_J - 25))$
(4) All terms and symbols are consistent with ANSI/IEEE C62.35

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

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{thJA}^{(1)}$	135	160	$^{\circ}\text{C/W}$
	$R_{thJM}^{(2)}$	15	18	$^{\circ}\text{C/W}$

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 (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
T4F10AHM3/H ⁽¹⁾	0.015	H	3000	7" diameter plastic tape and reel
T4F10AHM3/I ⁽¹⁾	0.015	I	10 000	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified



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

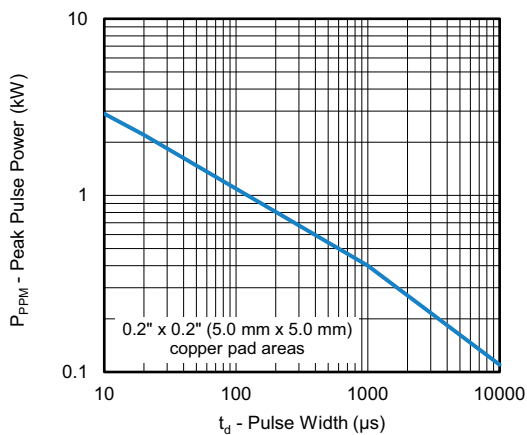


Fig. 1 - Peak Pulse Power Rating Curve

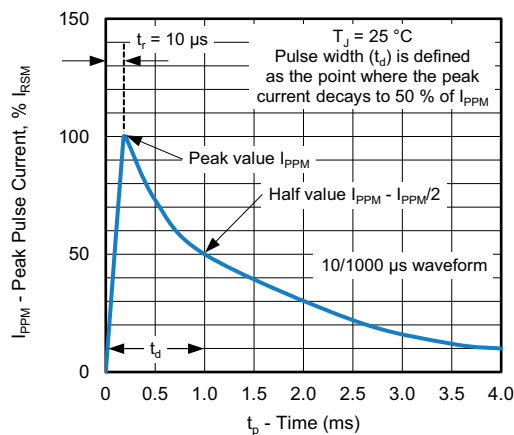


Fig. 3 - Pulse Waveform

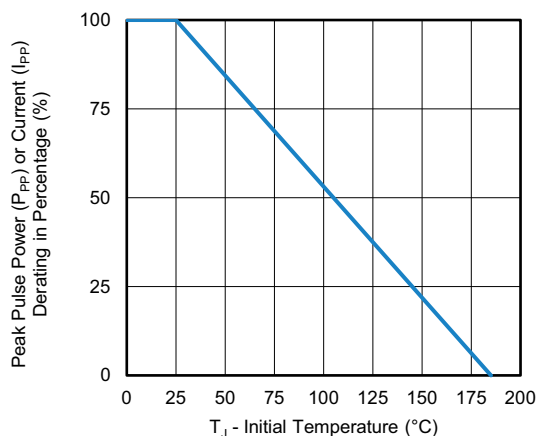


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

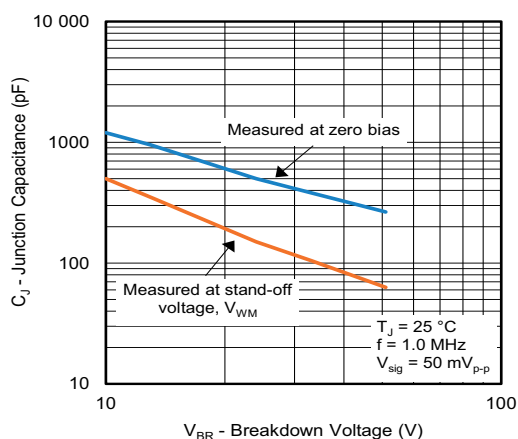


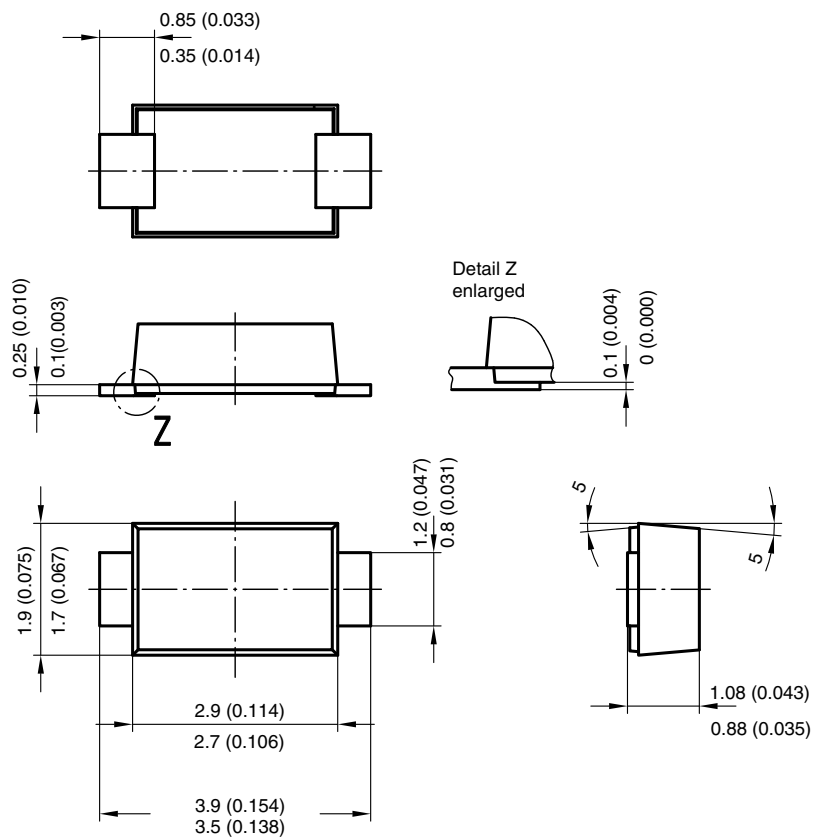
Fig. 4 - Typical Junction Capacitance

Note

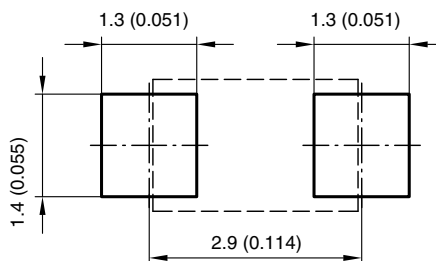
- Fig.1 power calculation is based on I_{PPM} times defined maximum clamping voltage by pulse width



PACKAGE OUTLINE DIMENSIONS in millimeters (inches)



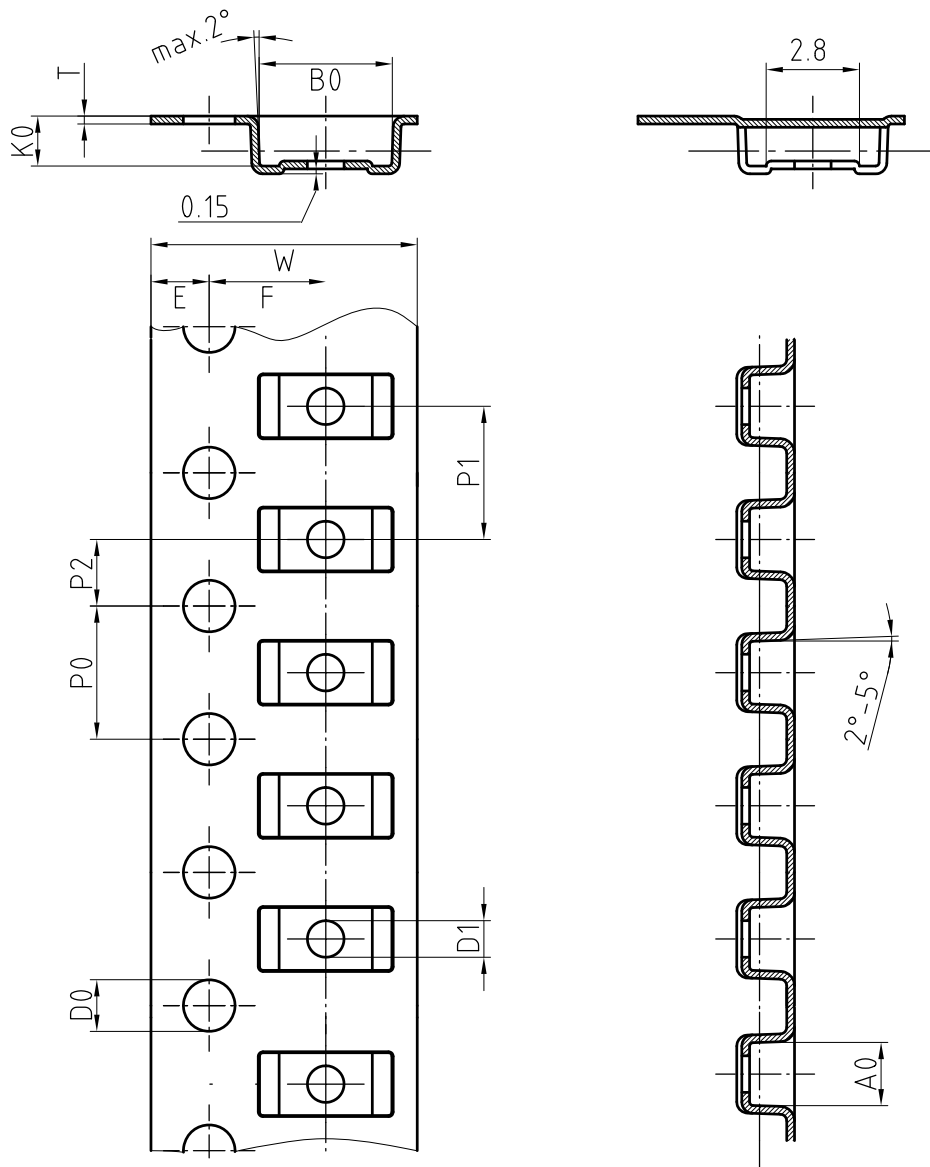
Foot print recommendation:



Created - Date: 15. February 2005
Rev. 3 - Date: 13. March 2007
Document no.: S8-V-3915.01-001 (4)
17247



BLISTERTAPE DIMENSIONS in millimeters: **SMF (DO-219AB)**



Mat:	A0	B0	K0	W	T	P0	P2	P1	D0	D1	E	F
PS	1.9	4.0	1.5	8.0	0.235	4.0	2.0	4.0	1.5	1	1.75	3.5

Document-No.: S8-V-3717.02-001 (3)

18513



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.