

Surface Mount PAR[®] Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

eSMP[®] Series



Top View

Bottom View

SlimSMAW (DO-221AD)

Cathode  Anode

LINKS TO ADDITIONAL RESOURCES



FEATURES

- Low-profile package
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185\text{ °C}$ capability suitable for high reliability and automotive requirement
- Excellent clamping capability
- Peak pulse power: 600 W (10 μ s/1000 μ s)
- AEC-Q101 qualified available, HM3 suffix meets JESD 201 class 2 whisker test
- ESD protection up to 30 kV per IEC 61000-4-2
- Compatible to SOD-128 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: SlimSMAW (DO-221AD)

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

Polarity: color band denotes cathode end

PRIMARY CHARACTERISTICS	
V_{BR}	6.8 V to 100 V
V_{WM}	5.8 V to 85.5 V
P_{PPM} (10 x 1000 μ s)	600 W
T_J max.	185 °C
Polarity	Unidirectional
Package	SlimSMAW (DO-221AD)
Circuit configuration	Single

MAXIMUM RATINGS ($T_A = 25\text{ °C}$, unless otherwise noted)				
PARAMETER		SYMBOL	VALUE	UNIT
Peak pulse power dissipation	with a 10/1000 μ s waveform	P_{PPM}	600	W
Peak pulse current	with a 10/1000 μ s waveform	I_{PPM}	See table next page	A
Power dissipation	$T_M = 65\text{ °C}$	$P_D^{(2)}$	8	W
	$T_A = 25\text{ °C}$	$P_D^{(3)}$	1.1	
Operating junction and storage temperature range		T_J, T_{STG}	-65 to +185	°C

Note

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

(2) Power dissipation mounted on infinite heat sink

(3) Power dissipation mounted on minimum recommended pad layout

**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_R (μA)	MAXIMUM REVERSE LEAKAGE AT V_{WM} $T_J = 150\text{ }^{\circ}\text{C}$ 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 $V_{BR}^{(3)}$ αT ($\%/^{\circ}\text{C}$)
		MIN.	NOM.	MAX.							
TA6L6.8A	AEL	6.45	6.80	7.14	10	5.80	500	1000	57.1	10.5	0.047
TA6L7.5A	AGL	7.13	7.50	7.88	10	6.40	250	500	53.1	11.3	0.052
TA6L8.2A	AKL	7.79	8.20	8.61	10	7.02	100	200	49.6	12.1	0.056
TA6L9.1A	AML	8.65	9.10	9.55	1.0	7.78	25	50	44.8	13.4	0.060
TA6L10A	APL	9.5	10.0	10.5	1.0	8.55	5.0	20	41.4	14.5	0.064
TA6L11A	ARL	10.5	11.0	11.6	1.0	9.40	2.0	5.0	38.5	15.6	0.067
TA6L12A	ATL	11.4	12.0	12.6	1.0	10.2	2.0	5.0	35.9	16.7	0.070
TA6L13A	AVL	12.4	13.0	13.7	1.0	11.1	2.0	5.0	33.0	18.2	0.072
TA6L15A	AXL	14.3	15.0	15.8	1.0	12.8	1.0	5.0	28.3	21.2	0.076
TA6L16A	AZL	15.2	16.0	16.8	1.0	13.6	1.0	5.0	26.7	22.5	0.078
TA6L18A	BEL	17.1	18.0	18.9	1.0	15.3	1.0	5.0	23.5	25.5	0.080
TA6L20A	BGL	19.0	20.0	21.0	1.0	17.1	1.0	5.0	21.7	27.7	0.082
TA6L22A	BKL	20.9	22.0	23.1	1.0	18.8	1.0	5.0	19.6	30.6	0.084
TA6L24A	BML	22.8	24.0	25.2	1.0	20.5	1.0	5.0	18.1	33.2	0.085
TA6L27A	BPL	25.7	27.0	28.4	1.0	23.1	1.0	5.0	16.0	37.5	0.087
TA6L30A	BRL	28.5	30.0	31.5	1.0	25.6	1.0	5.0	14.5	41.4	0.088
TA6L33A	BTL	31.4	33.0	34.7	1.0	28.2	1.0	5.0	13.1	45.7	0.089
TA6L36A	BVL	34.2	36.0	37.8	1.0	30.8	1.0	5.0	12.0	49.9	0.090
TA6L39A	BXL	37.1	39.0	41.0	1.0	33.3	1.0	5.0	11.1	53.9	0.091
TA6L43A	BZL	40.9	43.0	45.2	1.0	36.8	1.0	5.0	10.1	59.3	0.092
TA6L47A	CEL	44.7	47.0	49.4	1.0	40.2	1.0	5.0	9.3	64.8	0.092
TA6L51A	CGL	48.5	51.0	53.6	1.0	43.6	1.0	5.0	8.6	70.1	0.093
TA6L56A	CKL	53.2	56.0	58.8	1.0	47.8	1.0	10.0	7.8	77.0	0.096
TA6L62A	CML	58.9	62.0	65.1	1.0	53.0	1.0	10.0	7.1	85.0	0.096
TA6L68A	CPL	64.6	68.0	71.4	1.0	58.1	1.0	10.0	6.5	92.0	0.097
TA6L75A	CRL	71.3	75.0	78.8	1.0	64.1	1.0	10.0	5.8	104	0.097
TA6L82A	CTL	77.9	82.0	86.1	1.0	70.1	1.0	10.0	5.3	113	0.097
TA6L91A	CVL	86.5	91.0	95.6	1.0	77.8	1.0	15.0	4.8	125	0.098
TA6L100A	CXL	95.0	100	105	1.0	85.5	1.0	15.0	4.4	137	0.098

Notes(1) Pulse test: $t_p \leq 50\text{ ms}$

(2) Surge current waveform per fig. 3 and derated per fig. 2

(3) To calculate V_{BR} vs. junction temperature, use the following formula: V_{BR} at $T_J = V_{BR}$ 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	$R_{\theta JA}^{(1)}$	120	150	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(2)}$	12	15	$^{\circ}\text{C/W}$

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)



IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS

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

STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	VALUE
IEC 61000-4-2	Contact discharge	$C = 150\text{ pF}$, $R = 330\ \Omega$	ESD	30 kV
	Air discharge			30 kV

ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TA6L6.8AHM3/H ⁽¹⁾	0.033	H	3500	7" diameter plastic tape and reel
TA6L6.8AHM3/I ⁽¹⁾	0.033	I	14 000	13" diameter plastic tape and reel

Note

⁽¹⁾ AEC-Q101 qualified

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

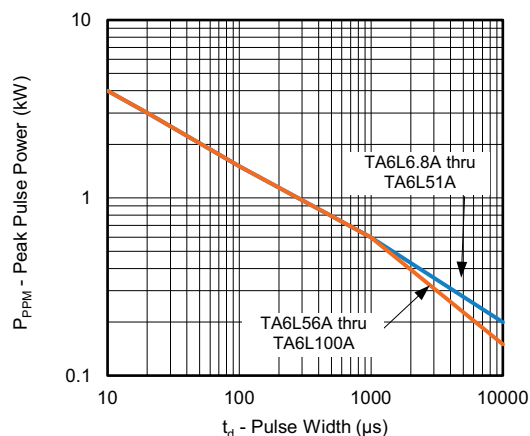


Fig. 1 - Peak Pulse Power Rating Curve

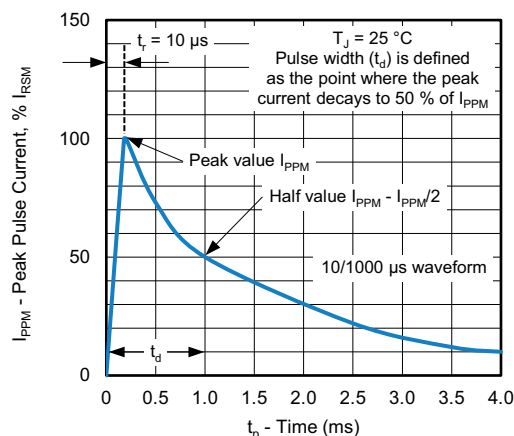


Fig. 3 - Pulse Waveform

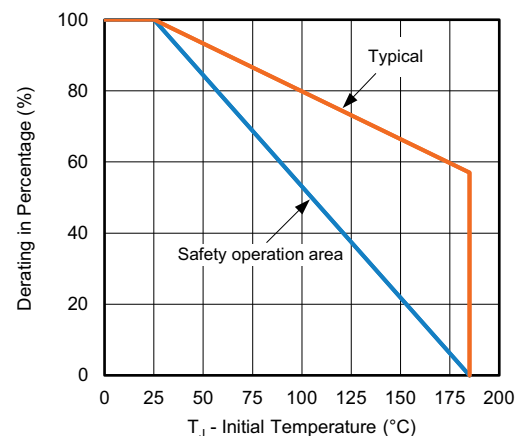


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

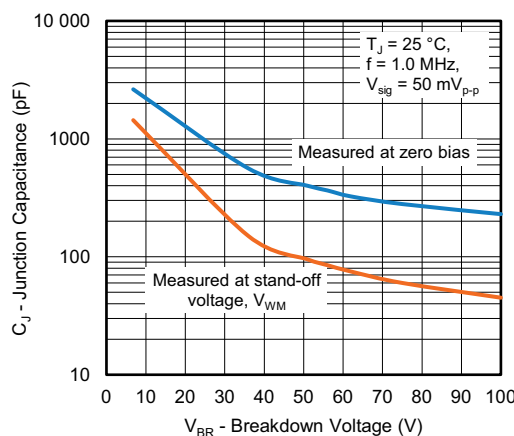


Fig. 4 - Typical Junction Capacitance

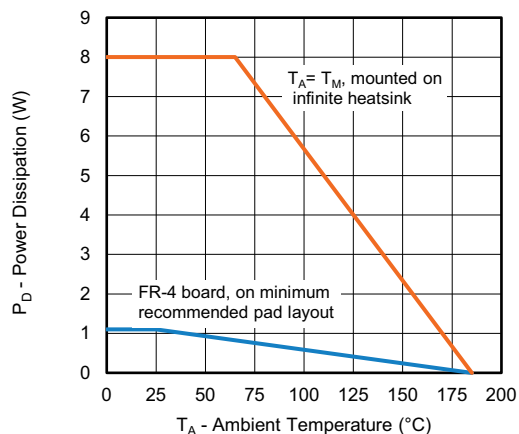


Fig. 5 - Power Dissipation Derating Curve

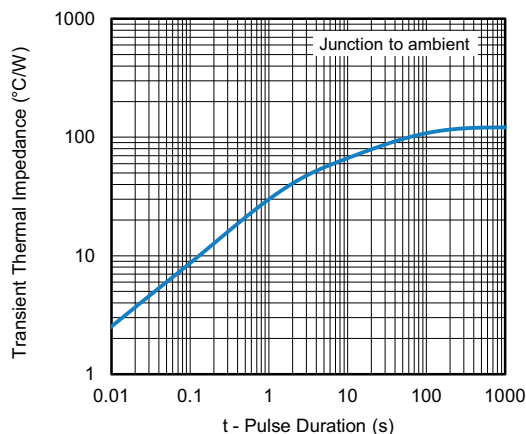


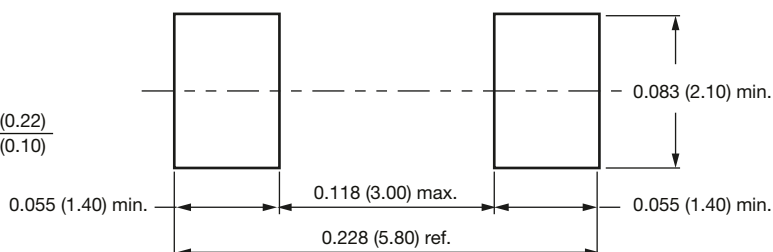
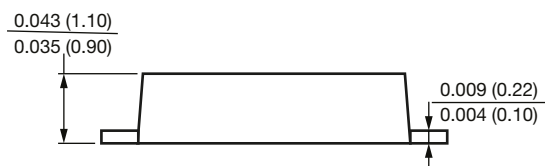
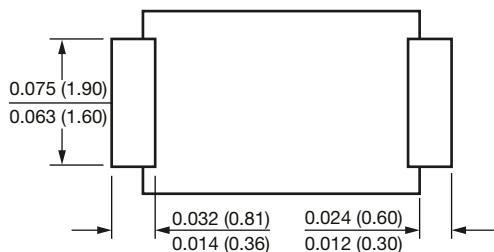
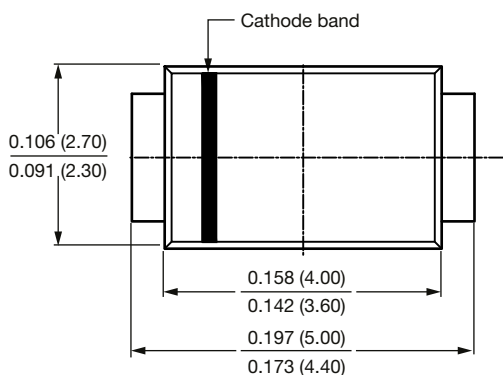
Fig. 6 - Typical Transient Thermal Impedance

Note

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

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMAW (DO-221AD)



Mounting pad layout



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.