

# Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



**SMC (DO-214AB)**

Cathode  Anode

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_{WM}$	10 V to 43 V
$V_{BR}$	11.1 V to 52.8
$P_{PPM}$ (10 x 1000 $\mu$ s)	5000 W
$P_D$	6.5 W
$T_J$ max.	185 °C
Polarity	Unidirectional
Package	SMC (DO-214AB)

## FEATURES

- Junction passivation optimized design  
passivated anisotropic rectifier technology
- $T_J = 185$  °C capability suitable for high reliability and automotive requirement
- Available in unidirectional polarity only
- 5000 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating

Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B, ....)

**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 pulse power dissipation with a 10/1000 $\mu$ s waveform (fig. 3)	$P_{PPM}^{(1)}$	5000	W
Peak power pulse current with a 10/1000 $\mu$ s waveform (fig. 1)	$I_{PPM}^{(1)}$	See next table	A
Power dissipation on infinite heatsink, $T_M = 50$ °C	$P_D$	6.5	W
Operating junction and storage temperature range	$T_J, T_{STG}$	-65 to +185	°C

### Note

<sup>(1)</sup> 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 $V_{BR}$ AT $I_T$ <sup>(1)</sup> (V)			TEST CURRENT $I_T$ (mA)	STAND-OFF VOLTAGE $V_{WM}$ (V)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_R$ ( $\mu\text{A}$ )	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)	TYPICAL TEMP. COEFFICIENT OF $V_{BR}$ $\alpha T$ ( $\%/^{\circ}\text{C}$ )
		MIN.	NOM.	MAX.							
5KASMC10A	5AX	11.1	11.7	12.3	1.0	10	20.0	500	294.1	17.0	0.069
5KASMC12A	5BE	13.3	14.0	14.7	1.0	12	10.0	300	251.3	19.9	0.074
5KASMC13A	5BG	14.4	15.2	15.9	1.0	13	10.0	300	232.6	21.5	0.076
5KASMC16A	5BP	17.8	18.8	19.7	1.0	16	2.0	50	192.3	26.0	0.081
5KASMC17A	5BR	18.9	19.9	20.9	1.0	17	2.0	50	181.2	27.6	0.082
5KASMC18A	5BT	20.0	21.1	22.1	1.0	18	2.0	50	171.2	29.2	0.083
5KASMC20A	5BV	22.2	23.4	24.5	1.0	20	2.0	50	154.3	32.4	0.085
5KASMC22A	5BX	24.4	25.7	26.9	1.0	22	2.0	50	140.8	35.5	0.086
5KASMC24A	5BZ	26.7	28.1	29.5	1.0	24	2.0	50	128.5	38.9	0.087
5KASMC26A	5CE	28.9	30.4	31.9	1.0	26	2.0	50	118.8	42.1	0.088
5KASMC28A	5CG	31.1	32.8	34.4	1.0	28	2.0	50	110.1	45.4	0.089
5KASMC30A	5CK	33.3	35.1	36.8	1.0	30	2.0	50	103.3	48.4	0.090
5KASMC33A	5CM	36.7	38.7	40.6	1.0	33	2.0	50	93.8	53.3	0.091
5KASMC36A	5CP	40.0	42.1	44.2	1.0	36	2.0	50	86.1	58.1	0.091
5KASMC40A	5CR	44.4	46.8	49.1	1.0	40	2.0	50	77.5	64.5	0.092
5KASMC43A	5CT	47.8	50.3	52.8	1.0	43	2.0	50	72.0	69.4	0.093

**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	VALUE	UNIT
Typical thermal resistance, junction to ambient	$R_{\theta JA}$ <sup>(1)</sup>	100	$^{\circ}\text{C/W}$
Typical thermal resistance, junction to mount	$R_{\theta JM}$ <sup>(2)</sup>	20.8	$^{\circ}\text{C/W}$

**Notes**

- (1) Mounted on minimum recommended pad layout  
 (2) Mounted on infinite heat sink

**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
5KASMC10AHM3_A/H <sup>(1)</sup>	0.257	H	850	7" diameter plastic tape and reel
5KASMC10AHM3_A/I <sup>(1)</sup>	0.257	I	3500	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified



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

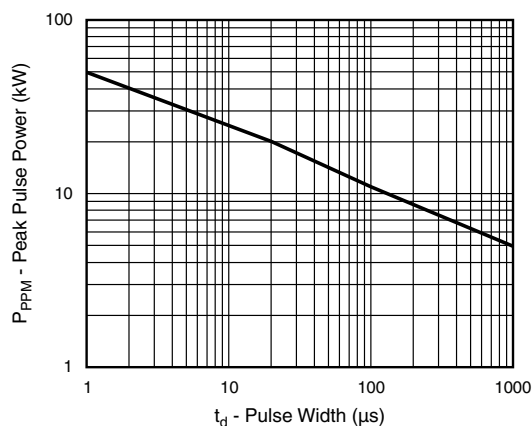


Fig. 1 - Peak Pulse Power Rating Curve

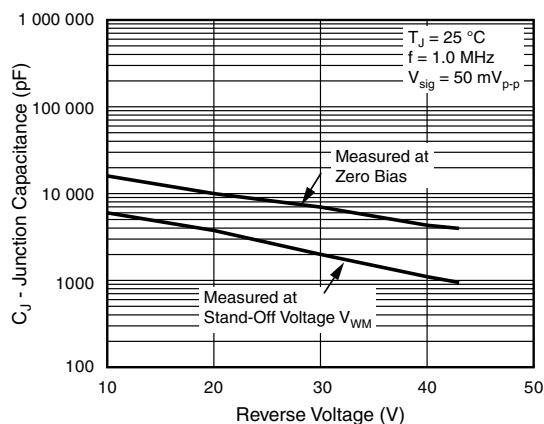


Fig. 4 - Typical Junction Capacitance

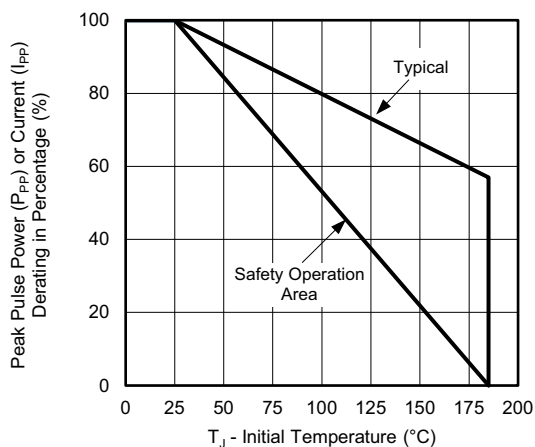


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

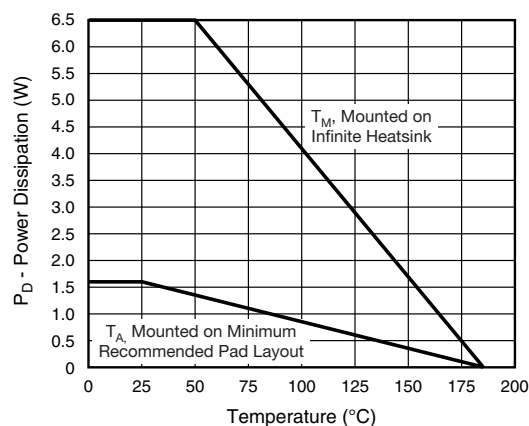


Fig. 5 - Power Derating Curve

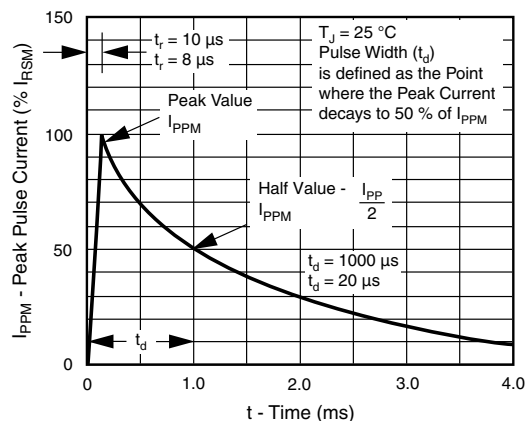


Fig. 3 - Pulse Waveform

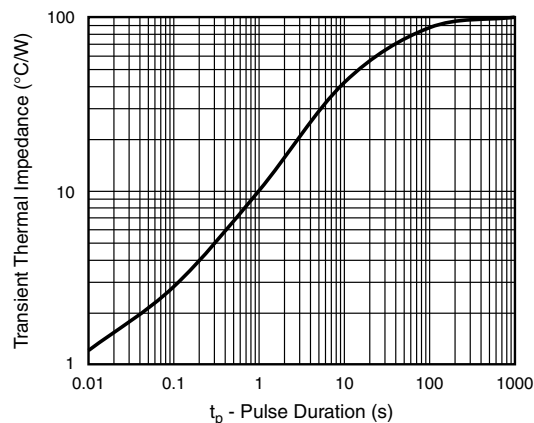
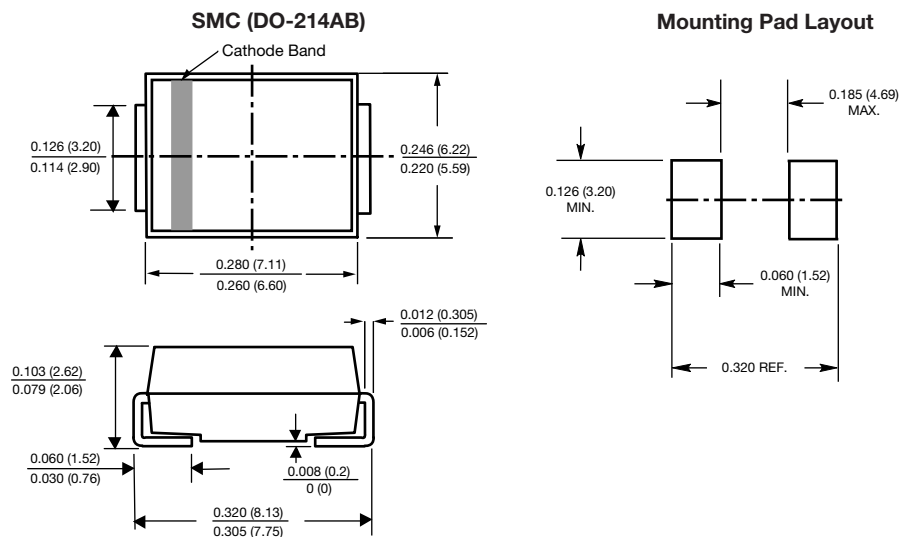


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





## 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.