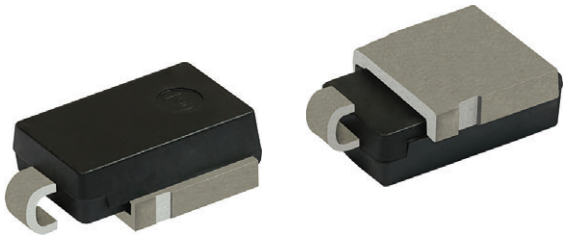
Surface-Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-218AB



LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
V_{BR}	11.1 V to 104 V
V_{WM}	10 V to 85 V
P_{PPM} (10 x 1000 µs)	3600 W
P_{PPM} (10 x 10 000 µs)	2200 W for 12CA to 20CA
	2400 W for 22CA to 85CA
P_D	5 W
T_J max.	175 °C
Polarity	Bidirectional
Package	DO-218AB

FEATURES

- RoHS compliant junction passivation
- T_J = 175 °C capability suitable for high reliability and automotive requirement
- Bidirectional
- Low leakage current
- High surge capability
- Meets ISO 7637-2 and ISO 16750-2 surge specification (varied by test condition)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- AEC-Q101 qualified
- 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, especially for automotive load dump protection application.

MECHANICAL DATA

Case: DO-218AB

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: bidirectional, no cathode band

MAXIMUM RATINGS (T_C = 25 °C unless otherwise noted)

PARAMETER		SYMBOL	VALUE		UNIT
Peak pulse power dissipation	with 10/1000 µs waveform (fig. 4)	P_{PPM} (1)(2)	3600		W
	with 10/10 000 µs waveform (fig. 5)		12CA to 20CA	2200	
			22CA to 85CA	2400	
Power dissipation on infinite heatsink at T_C = 25 °C (fig. 2)		P_D	5		W
Peak pulse current with 10/1000 µs waveform (fig. 4)		I_{PPM} (1)	See next table		A
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +175		°C

Notes

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

(2) Power calculation is based on I_{PPM} times defined maximum clamping voltage by pulse width

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ELECTRICAL CHARACTERISTICS (T_C = 25 °C unless otherwise noted)

DEVICE TYPE	BREAKDOWN VOLTAGE V_{BR} (V)			TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (µA)	MAXIMUM REVERSE LEAKAGE AT V_{WM} T_J = 175 °C I_D (µA)	MAX. PEAK PULSE CURRENT AT 10/1000 µs WAVEFORM I_{PPM} (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)
	MIN.	NOM.	MAX.						
SM5S10CA	11.1	11.7	12.3	5.0	10.0	15	250	212	17.0
SM5S11CA	12.2	12.9	13.5	5.0	11.0	10	150	198	18.2
SM5S12CA	13.3	14.0	14.7	5.0	12.0	10	150	181	19.9
SM5S13CA	14.4	15.2	15.9	5.0	13.0	10	150	167	21.5
SM5S14CA	15.6	16.4	17.2	5.0	14.0	10	150	155	23.2
SM5S15CA	16.7	17.6	18.5	5.0	15.0	10	150	148	24.4
SM5S16CA	17.8	18.8	19.7	5.0	16.0	10	150	138	26.0
SM5S17CA	18.9	19.9	20.9	5.0	17.0	10	150	130	27.6
SM5S18CA	20.0	21.1	22.1	5.0	18.0	10	150	123	29.2
SM5S20CA	22.2	23.4	24.5	5.0	20.0	10	150	111	32.4
SM5S22CA	24.4	25.7	26.9	5.0	22.0	10	150	101	35.5
SM5S24CA	26.7	28.1	29.5	5.0	24.0	10	150	92.5	38.9
SM5S26CA	28.9	30.4	31.9	5.0	26.0	10	150	85.5	42.1
SM5S28CA	31.1	32.8	34.4	5.0	28.0	10	150	79.3	45.4
SM5S30CA	33.3	35.1	36.8	5.0	30.0	10	150	74.4	48.4
SM5S33CA	36.7	38.7	40.6	5.0	33.0	10	150	67.5	53.3
SM5S36CA	40.0	42.1	44.2	5.0	36.0	10	150	62.0	58.1
SM5S40CA	44.4	46.8	49.1	5.0	40.0	10	150	55.8	64.5
SM5S43CA	47.8	50.3	52.8	5.0	43.0	10	150	51.9	69.4
SM5S45CA	50.0	52.7	55.3	5.0	45.0	10	150	49.5	72.7
SM5S48CA	53.3	56.1	58.9	5.0	48.0	10	150	46.5	77.4
SM5S51CA	56.7	59.7	62.7	5.0	51.0	10	150	43.7	82.4
SM5S54CA	60.0	63.2	66.3	5.0	54.0	10	150	41.3	87.1
SM5S58CA	64.4	67.8	71.2	5.0	58.0	10	150	38.5	93.6
SM5S60CA	66.7	70.2	73.7	5.0	60.0	10	150	37.2	96.8
SM5S64CA	71.1	74.9	78.6	5.0	64.0	10	150	35.0	103
SM5S70CA	77.8	81.9	86.0	5.0	70.0	10	150	31.9	113
SM5S75CA	83.3	87.7	92.1	5.0	75.0	10	150	29.8	121
SM5S78CA	86.7	91.3	95.8	5.0	78.0	10	150	28.6	126
SM5S85CA	94.4	99.2	104	5.0	85.0	10	150	26.3	137

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	TYP.	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	65	°C/W
	$R_{\theta JM}$ (2)	0.45	°C/W

Note

(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
SM5S10CAHM3/I (1)	2.505	I	750	13" diameter plastic tape and reel, anode towards the sprocket hole

Note

(1) AEC-Q101 qualified

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

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

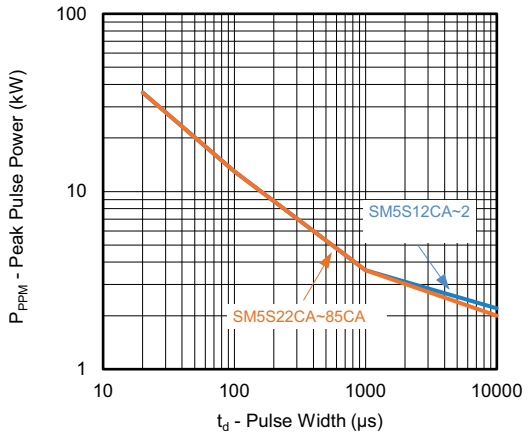


Fig. 1 - Peak Pulse Power Derating Curve

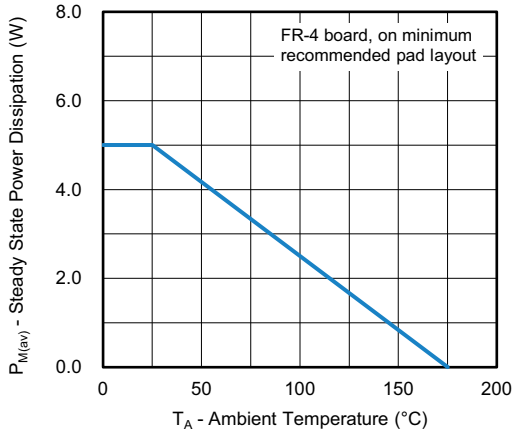


Fig. 2 - Power Derating Curve

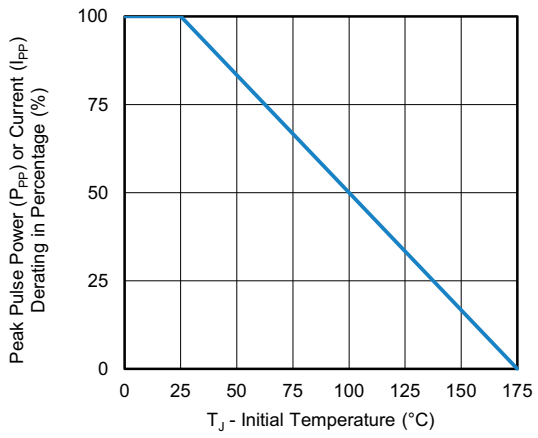


Fig. 3 - Peak Pulse Power or Current vs. Initial Junction Temperature

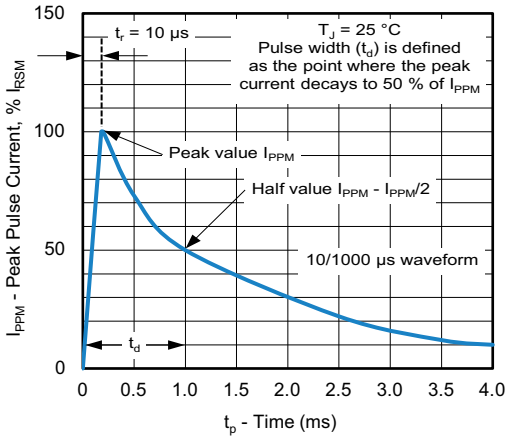


Fig. 4 - Pulse Waveform

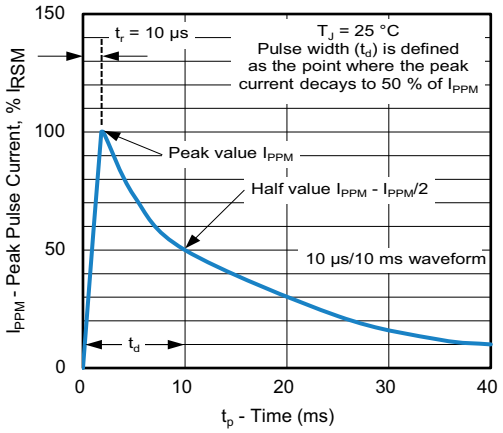


Fig. 5 - Pulse Waveform

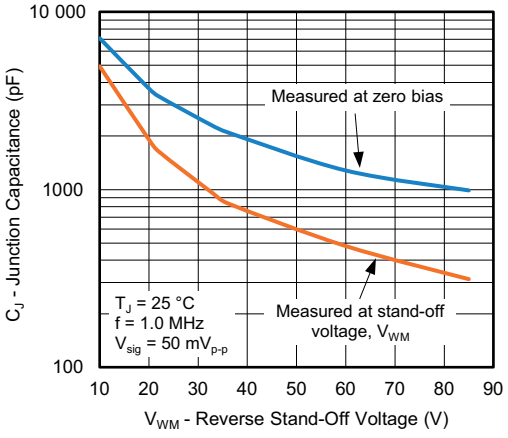


Fig. 6 - Typical Junction Capacitance (V_{WM})

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

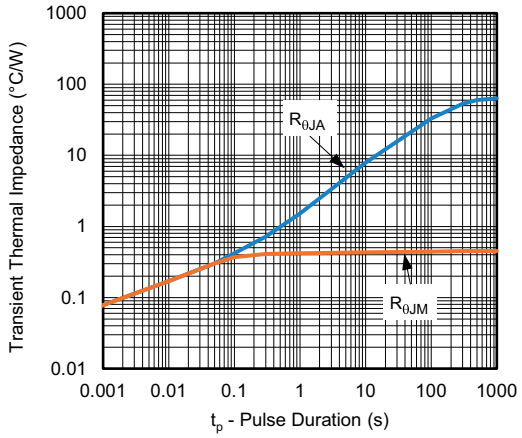
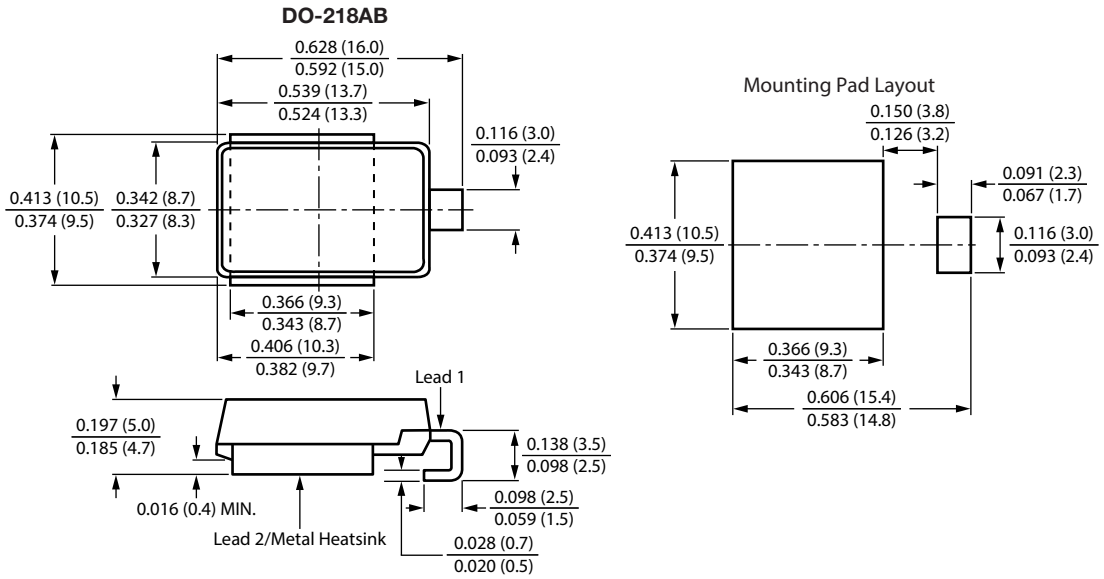


Fig. 7 - Typical Transient Thermal Impedance

Note

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

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.

© 2023 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED