

## Surface-Mount TRANSZORB® Transient Voltage Suppressors



DFN3820A



### LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_{BR}$	12 V to 100 V
$V_{WM}$	10.2 V to 85.5 V
$P_{PPM}$ (10 x 1000 $\mu$ s)	600 W
$T_J$ max.	175 °C
Polarity	Bidirectional
Package	DFN3820A
Circuit configuration	Single

### FEATURES

- Low-profile package - typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Ideal for automated placement
- Junction passivation optimized design passivated anisotropic rectifier technology
- Bidirectional
- Excellent clamping capability
- Peak pulse power: 600 W (10/1000  $\mu$ s)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compatible to SMP (DO-220AA) package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?999912](http://www.vishay.com/doc?999912)



**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 consumer, computer, industrial, medical, and telecommunication.

### MECHANICAL DATA

**Case:** DFN3820A

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and industrial grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

**Polarity:** no cathode band for bidirectional types

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. 1) <sup>(1)</sup>	$P_{PPM}$	600	W
Peak pulse current with a 10/1000 $\mu$ s waveform (fig. 3) <sup>(1)</sup>	$I_{PPM}$	See table next page	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-65 to +175	°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 $V_{BR}^{(1)}$ AT $I_T$ (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 $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ $I_R$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)
		MIN.	NOM.	MAX.						
6DFN12CA	6AA	11.4	12.0	12.6	1.0	10.2	2.0	6.0	35.9	16.7
6DFN13CA	6AB	12.4	13.0	13.7	1.0	11.1	2.0	5.0	33.0	18.2
6DFN15CA	6AC	14.3	15.0	15.8	1.0	12.8	1.0	5.0	28.3	21.2
6DFN16CA	6AD	15.2	16.0	16.8	1.0	13.6	1.0	5.0	26.7	22.5
6DFN18CA	6AE	17.1	18.0	18.9	1.0	15.3	1.0	5.0	23.5	25.5
6DFN20CA	6AF	19.0	20.0	21.0	1.0	17.1	1.0	5.0	21.7	27.7
6DFN22CA	6AG	20.9	22.0	23.1	1.0	18.8	1.0	5.0	19.6	30.6
6DFN24CA	6AH	22.8	24.0	25.2	1.0	20.5	1.0	5.0	18.1	33.2
6DFN27CA	6AJ	25.7	27.0	28.4	1.0	23.1	1.0	5.0	16.0	37.5
6DFN30CA	6AK	28.5	30.0	31.5	1.0	25.6	1.0	5.0	14.5	41.4
6DFN33CA	6AL	31.4	33.0	34.7	1.0	28.2	1.0	5.0	13.1	45.7
6DFN36CA	6AM	34.2	36.0	37.8	1.0	30.8	1.0	5.0	12.0	49.9
6DFN39CA	6AN	37.1	39.0	41.0	1.0	33.3	1.0	5.0	11.1	53.9
6DFN43CA	6AP	40.9	43.0	45.2	1.0	36.8	1.0	5.0	10.1	59.3
6DFN47CA	6AQ	44.7	47.0	49.4	1.0	40.2	1.0	10.0	9.3	64.8
6DFN51CA	6AR	48.5	51.0	53.6	1.0	43.6	1.0	10.0	8.6	70.1
6DFN56CA	6AS	53.2	56.0	58.8	1.0	47.8	1.0	10.0	7.8	77.0
6DFN62CA	6AT	58.9	62.0	65.1	1.0	53.0	1.0	10.0	7.1	85.0
6DFN68CA	6AU	64.6	68.0	71.4	1.0	58.1	1.0	10.0	6.5	92.0
6DFN75CA	6AV	71.3	75.0	78.8	1.0	64.1	1.0	10.0	5.8	104
6DFN82CA	6AW	77.9	82.0	86.1	1.0	70.1	1.0	10.0	5.3	113
6DFN91CA	6AX	86.5	91.0	95.5	1.0	77.8	1.0	10.0	4.8	125
6DFN100CA	6AY	95.0	100	105	1.0	85.5	1.0	10.0	4.4	137

**Notes**

- (1) Pulse test:  $t_p \leq 50\text{ ms}$   
(2) Surge current waveform per fig. 3 and derated per fig. 2  
(3) 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	$R_{\theta JA}^{(1)}$	140	175	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(2)}$	5	6.5	$^{\circ}\text{C/W}$

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

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

## ORDERING INFORMATION TABLE

**Device code**

<b>6</b>	<b>DFN</b>	<b>xxx</b>	<b>CA</b>	<b>-</b>	<b>M3</b>
----------	------------	------------	-----------	----------	-----------

1 2 3 4 5 6

- 1** - Peak pulse power rating (6 = 600 W)
- 2** - DFN package
- 3** - Nominal breakdown voltage
- 4** - Breakdown voltage tolerance and polarity (CA  $\pm$  5 %, bidirectional)
- 5** - Quality grade (H = AEC-Q101 qualified, - = industry grade)
- 6** - 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
6DFN12CA-M3/H	0.023	H	3500	7" diameter plastic tape and reel
6DFN12CA-M3/I	0.023	I	14 000	13" diameter plastic tape and reel



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

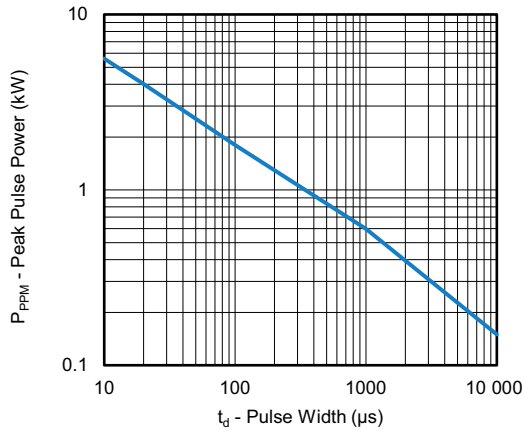


Fig. 1 - Peak Pulse Power Rating Curve

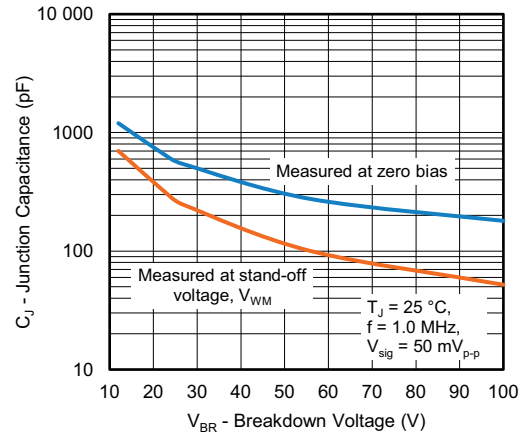


Fig. 4 - Typical Junction Capacitance

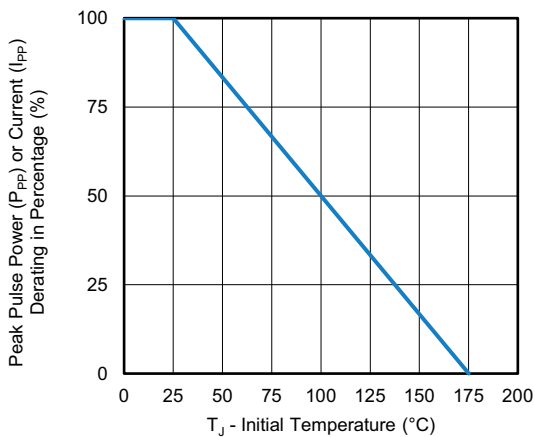


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

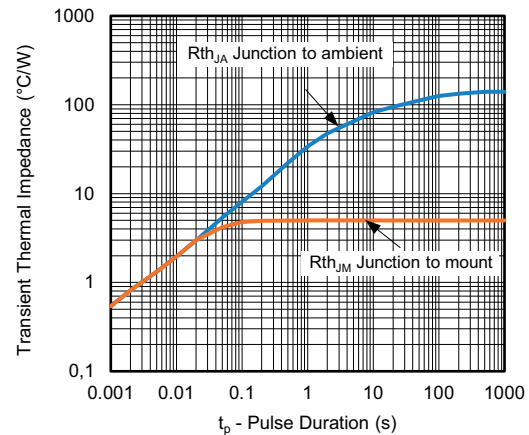


Fig. 5 - Typical Transient Thermal Impedance

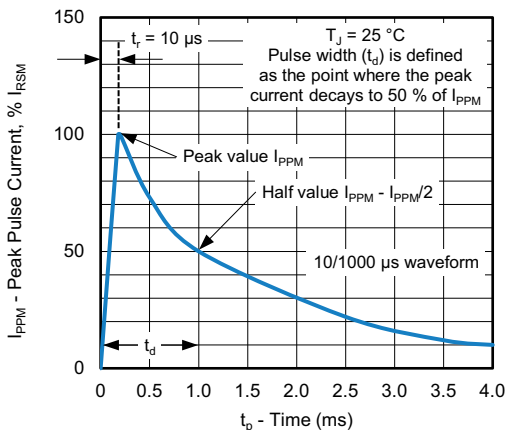


Fig. 3 - Pulse Waveform

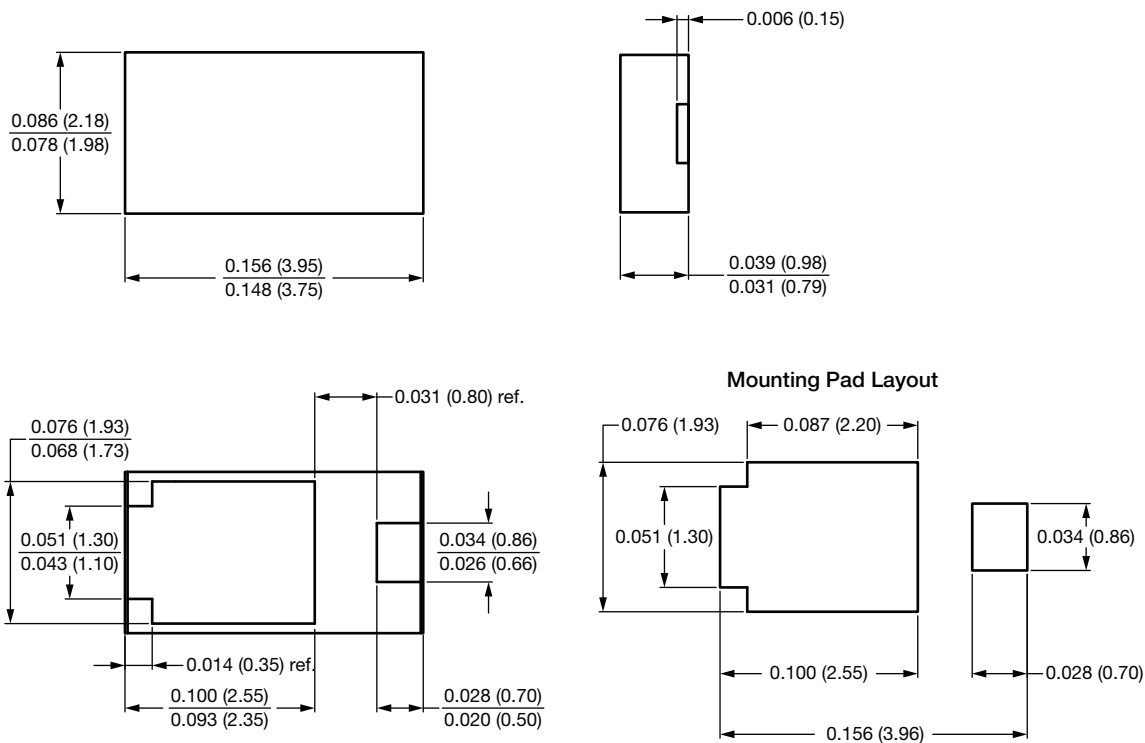
### Note

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



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DFN3820A





## 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.