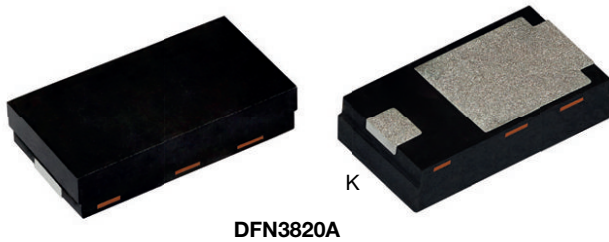


# Surface Mount TRANSZORB<sup>®</sup> Transient Voltage Suppressors



## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_{BR}$	12 V to 51 V
$V_{WM}$	10.2 V to 43.6 V
$P_{PPM}$ (10 x 1000 $\mu$ s)	600 W
$T_J$ max.	175 °C
Polarity	Unidirectional
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
- Unidirectional
- 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?99912](http://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 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:** color band denotes cathode end, heatsink is anode

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



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ , 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 $V_{WM}$ $T_J = 150\text{ }^\circ\text{C}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)	TYPICAL TEMP. COEFFICIENT OF $V_{BR}^{(3)}$ $\alpha_T$ ( $\%/^\circ\text{C}$ )
		MIN.	NOM.	MAX.							
6DFN12A	6AA	11.4	12.0	12.6	1.0	10.2	2.0	6.0	35.9	16.7	0.070
6DFN13A	6AB	12.4	13.0	13.7	1.0	11.1	2.0	5.0	33.0	18.2	0.072
6DFN15A	6AC	14.3	15.0	15.8	1.0	12.8	1.0	5.0	28.3	21.2	0.076
6DFN16A	6AD	15.2	16.0	16.8	1.0	13.6	1.0	5.0	26.7	22.5	0.078
6DFN18A	6AE	17.1	18.0	18.9	1.0	15.3	1.0	5.0	23.5	25.5	0.080
6DFN20A	6AF	19.0	20.0	21.0	1.0	17.1	1.0	5.0	21.7	27.7	0.082
6DFN22A	6AG	20.9	22.0	23.1	1.0	18.8	1.0	5.0	19.6	30.6	0.084
6DFN24A	6AH	22.8	24.0	25.2	1.0	20.5	1.0	5.0	18.1	33.2	0.085
6DFN27A	6AJ	25.7	27.0	28.4	1.0	23.1	1.0	5.0	16.0	37.5	0.087
6DFN30A	6AK	28.5	30.0	31.5	1.0	25.6	1.0	5.0	14.5	41.4	0.088
6DFN33A	6AL	31.4	33.0	34.7	1.0	28.2	1.0	5.0	13.1	45.7	0.089
6DFN36A	6AM	34.2	36.0	37.8	1.0	30.8	1.0	5.0	12.0	49.9	0.090
6DFN39A	6AN	37.1	39.0	41.0	1.0	33.3	1.0	5.0	11.1	53.9	0.091
6DFN43A	6AP	40.9	43.0	45.2	1.0	36.8	1.0	5.0	10.1	59.3	0.092
6DFN47A	6AQ	44.7	47.0	49.4	1.0	40.2	1.0	10.0	9.3	64.8	0.092
6DFN51A	6AR	48.5	51.0	53.6	1.0	43.6	1.0	10.0	8.6	70.1	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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ 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	$^\circ\text{C/W}$

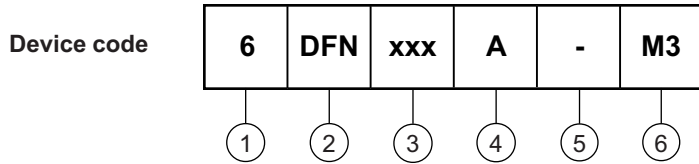
**Notes**

- (1) Thermal resistance junction-to-ambient to follow JEDEC<sup>®</sup> 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint
- (2) Thermal resistance junction-to-mount to follow JEDEC<sup>®</sup> 51-14 using Transient Dual Interface Test Method (TDIM)

<b>IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS</b> ( $T_A = 25\text{ }^\circ\text{C}$ 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



- 1** - Peak pulse power rating (6 = 600 W)
- 2** - DFN package
- 3** - Nominal breakdown voltage
- 4** - Breakdown voltage tolerance and polarity (A ± 5 %, unidirectional)
- 5** - Quality grade (H = AEC-Q101 qualified, otherwise = 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
6DFN12A-M3/H	0.023	H	3500	7" diameter plastic tape and reel
6DFN12A-M3/I	0.023	I	14 000	13" diameter plastic tape and reel



### RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C, unless otherwise noted)

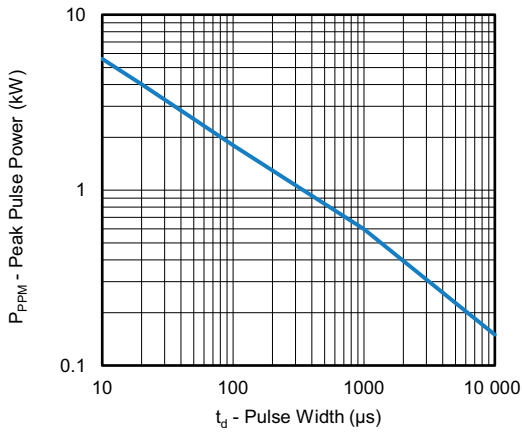


Fig. 1 - Peak Pulse Power Rating Curve

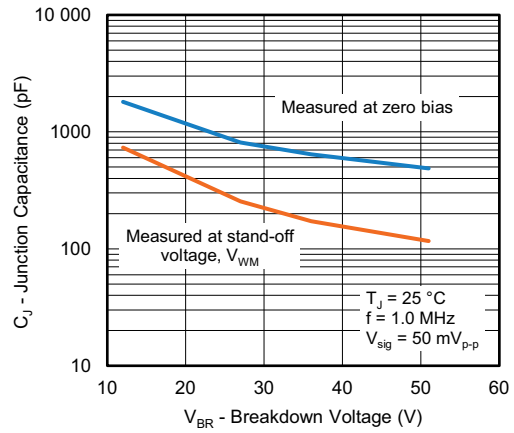


Fig. 4 - Typical Junction Capacitance

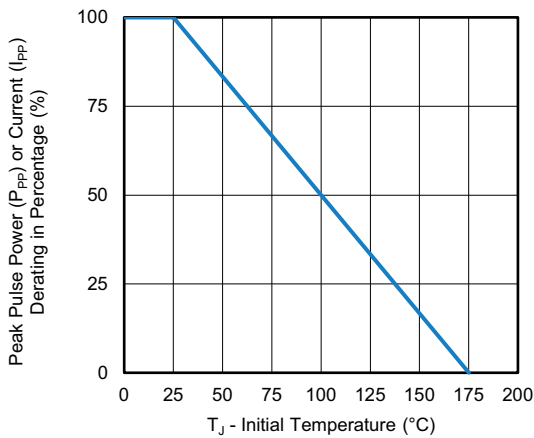


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

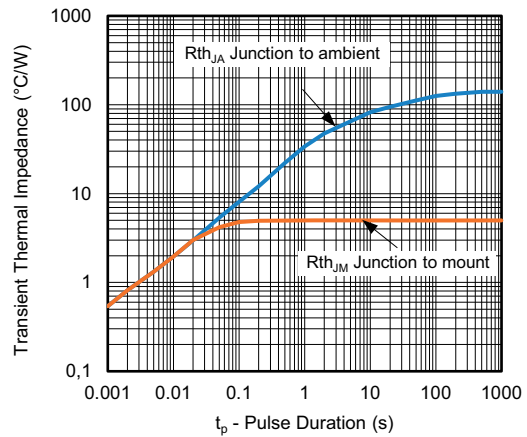


Fig. 5 - Typical Transient Thermal Impedance

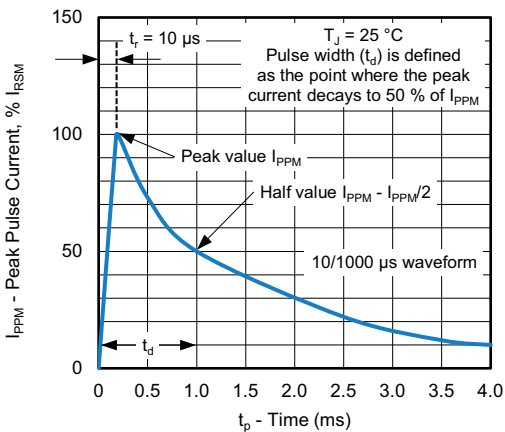


Fig. 3 - Pulse Waveform

#### Note

- Fig. 1, power calculations is based on I<sub>PPM</sub> times defined maximum clamping voltage by pulse width





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