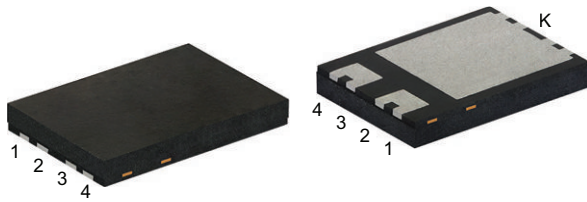
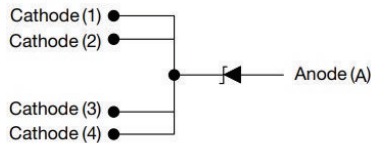


# Surface Mount TRANSZORB<sup>®</sup> Transient Voltage Suppressors


**DFN6546A**

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

## 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: 3000 W (10/1000  $\mu$ s)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compatible to SMPC (TO-277A) package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_{BR}$	12 V to 24 V
$V_{WM}$	10.2 V to 20.5 V
$P_{PPM}$ (10 x 1000 $\mu$ s)	3000 W
$T_J$ max.	175 °C
Polarity	Unidirectional
Package	DFN6546A
Circuit configuration	Single

## 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:** DFN6546A

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>	$P_{PPM}$	3000	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 $V_{WM}$ $T_J = 150\text{ }^\circ\text{C}$ $I_D$ ( $\mu\text{A}$ )	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.							
3KDFN12A	3KNA	11.4	12.0	12.6	1.0	10.2	5.0	50	180	16.7	0.070
3KDFN13A	3KNB	12.4	13.0	13.7	1.0	11.1	5.0	50	165	18.2	0.072
3KDFN15A	3KNC	14.3	15.0	15.8	1.0	12.8	2.0	20	142	21.2	0.076
3KDFN16A	3KND	15.2	16.0	16.8	1.0	13.6	2.0	20	133	22.5	0.078
3KDFN18A	3KNE	17.1	18.0	18.9	1.0	15.3	1.0	10	118	25.5	0.080
3KDFN20A	3KNF	19.0	20.0	21.0	1.0	17.1	1.0	10	108	27.7	0.082
3KDFN22A	3KNG	20.9	22.0	23.1	1.0	18.8	1.0	10	98.0	30.6	0.084
3KDFN24A	3KNH	22.8	24.0	25.2	1.0	20.5	1.0	10	90.4	33.2	0.085

**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	$R_{\theta JA}^{(1)}$	76	95	$^\circ\text{C}/\text{W}$
	$R_{\theta JM}^{(2)}$	0.95	1.19	$^\circ\text{C}/\text{W}$

**Notes**

- (5) Thermal resistance junction-to-ambient to follow JEDEC<sup>®</sup> 51-2A, device mounted on FR4 PCB, 2 oz., 4.8 mm x 4.72 mm
- (6) Thermal resistance junction-to-mount to follow JEDEC<sup>®</sup> 51-14 using Transient Dual Interface Test Method (TDIM)

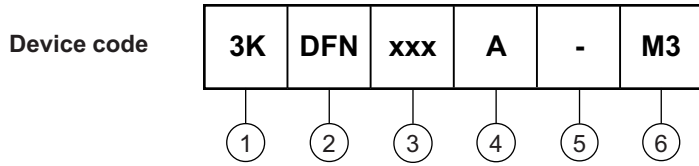
**IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS**

( $T_A = 25\text{ }^\circ\text{C}$  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



- 1** - Peak pulse power rating (3K = 3000 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
3KDFN12A-M3/H	0.094	H	1500	7" diameter plastic tape and reel
3KDFN12A-M3/I	0.094	I	6000	13" diameter plastic tape and reel

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

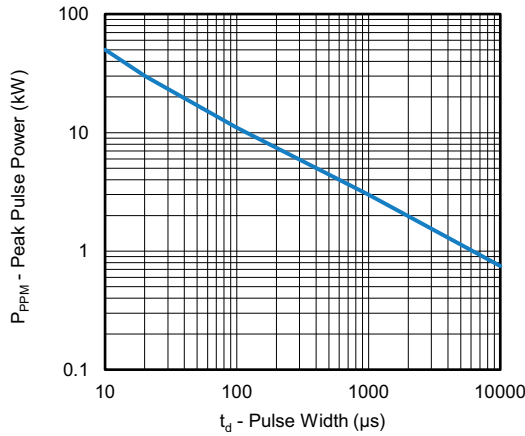


Fig. 1 - Peak Pulse Power Rating Curve

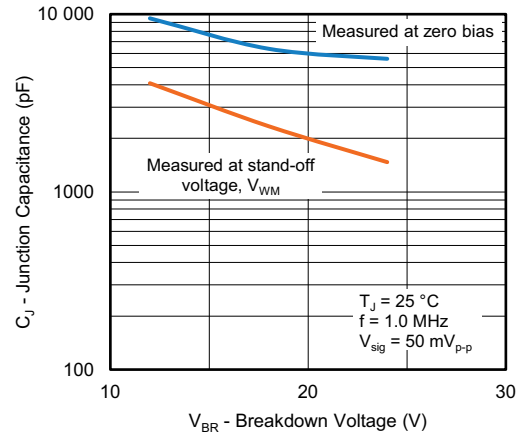


Fig. 4 - Typical Junction Capacitance

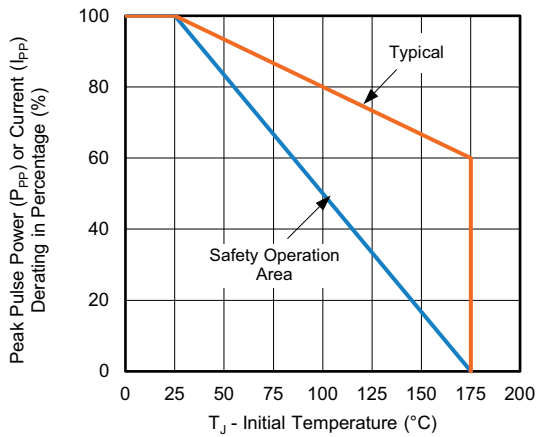


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

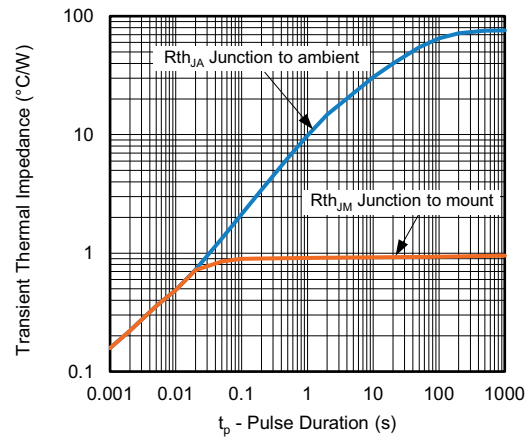


Fig. 5 - Typical Transient Thermal Impedance

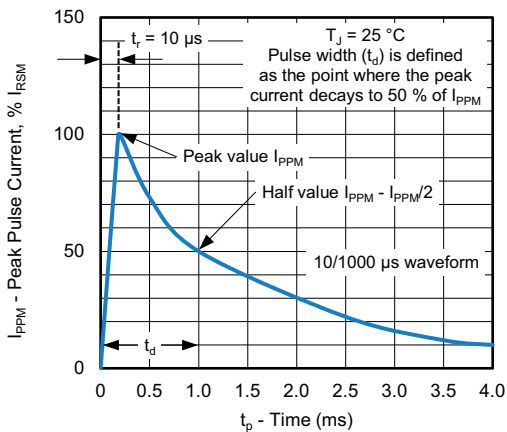


Fig. 3 - Pulse Waveform

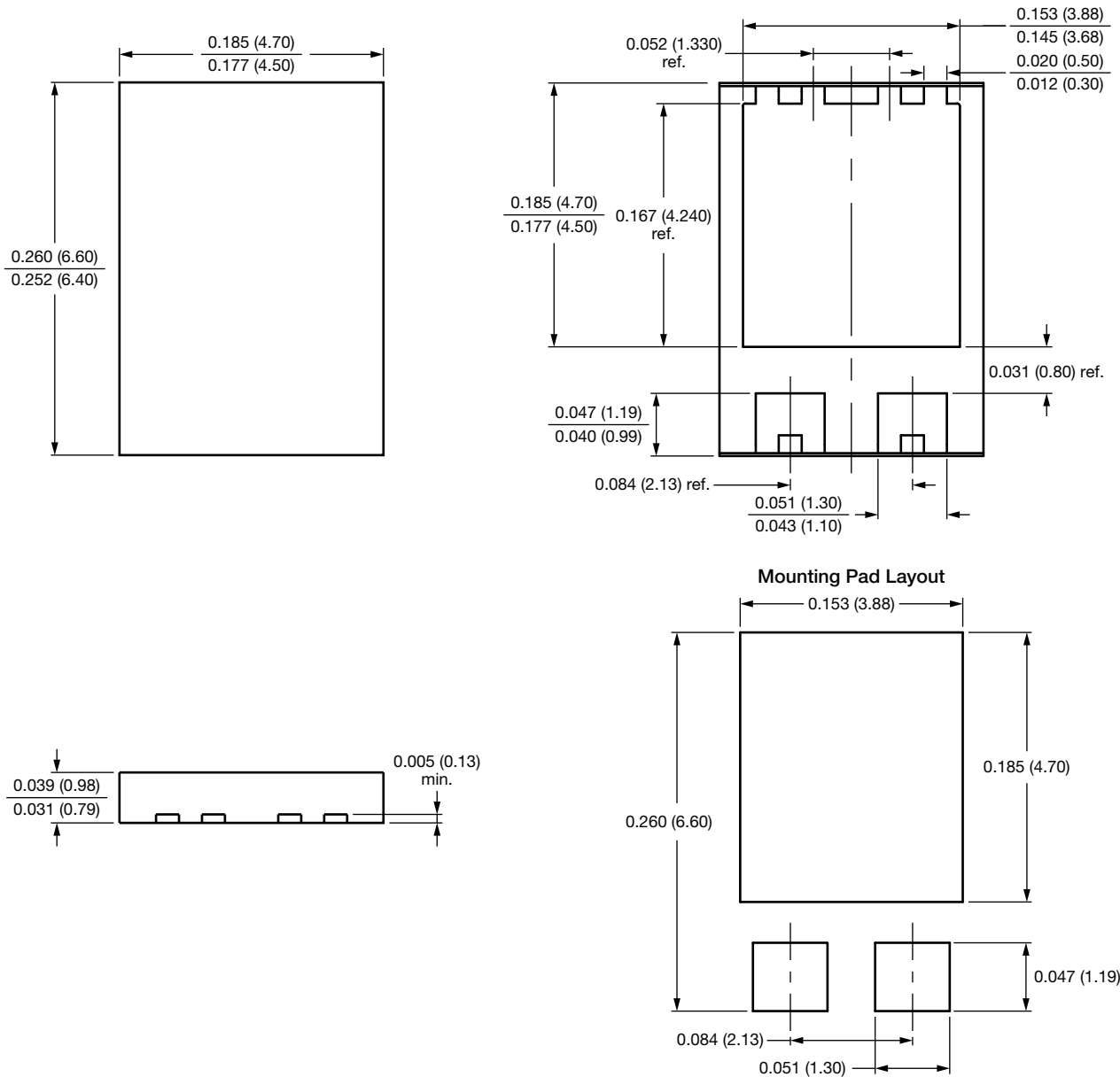
**Note**

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



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### DFN6546A





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