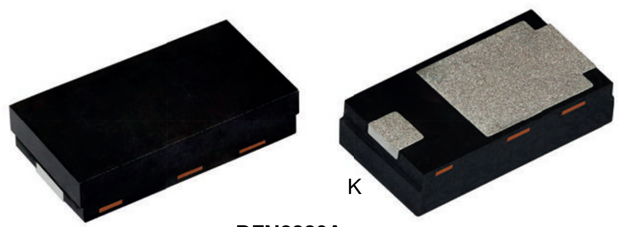
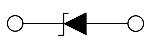
Surface-Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DFN3820A

Cathode  Anode

LINKS TO ADDITIONAL RESOURCES

Ultra Librarian EDA / CAD | Related Documents | Packages | Marking | Application Notes

PRIMARY CHARACTERISTICS	
V_{BR}	12 V to 51 V
V_{WM}	10.2 V to 43.6 V
P_{PPM} (10 x 1000 μs)	600 W
T_J max.	185 °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
- T_J = 185 °C capability suitable for high reliability and automotive requirement
- Unidirectional
- Excellent clamping capability
- Peak pulse power: 600 W (10/1000 μs)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
  - Automotive ordering code: base P/NHM3
- Compatible to SMP (DO-220AA) package case outline
- Material categorization: for definitions of compliance please see 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 lightning on ICs, MOSFET, signal lines of sensor units for automotive.

MECHANICAL DATA

Case: DFN3820A
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: 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 μs waveform (fig. 1) (1)	P_{PPM}	600	W
Peak pulse current with a 10/1000 μs waveform (fig. 3) (1)	I_{PPM}	See table next page	A
Operating junction and storage temperature range	T_J, T_{STG}	-65 to +185	°C

Note

(1) Non-repetitive current pulse, per fig. 3 and derated above T_A = 25 °C per fig. 2

ELECTRICAL CHARACTERISTICS (T_A = 25 °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 (μA)	MAXIMUM REVERSE LEAKAGE AT V_{WM} T_J = 150 °C I_D (μA)	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) αT (%/°C)
		MIN.	NOM.	MAX.							
T6N12A	ABP	11.4	12.0	12.6	1.0	10.2	2.0	6.0	35.9	16.7	0.070
T6N13A	ABQ	12.4	13.0	13.7	1.0	11.1	2.0	5.0	33.0	18.2	0.072
T6N15A	ABR	14.3	15.0	15.8	1.0	12.8	1.0	5.0	28.3	21.2	0.076
T6N16A	ABS	15.2	16.0	16.8	1.0	13.6	1.0	5.0	26.7	22.5	0.078
T6N18A	ABT	17.1	18.0	18.9	1.0	15.3	1.0	5.0	23.5	25.5	0.080
T6N20A	ABV	19.0	20.0	21.0	1.0	17.1	1.0	5.0	21.7	27.7	0.082
T6N22A	ABW	20.9	22.0	23.1	1.0	18.8	1.0	5.0	19.6	30.6	0.084
T6N24A	ABY	22.8	24.0	25.2	1.0	20.5	1.0	5.0	18.1	33.2	0.085
T6N27A	ABZ	25.7	27.0	28.4	1.0	23.1	1.0	5.0	16.0	37.5	0.087
T6N30A	ACF	28.5	30.0	31.5	1.0	25.6	1.0	5.0	14.5	41.4	0.088
T6N33A	ACG	31.4	33.0	34.7	1.0	28.2	1.0	5.0	13.1	45.7	0.089
T6N36A	ACH	34.2	36.0	37.8	1.0	30.8	1.0	5.0	12.0	49.9	0.090
T6N39A	ACL	37.1	39.0	41.0	1.0	33.3	1.0	5.0	11.1	53.9	0.091
T6N43A	ACM	40.9	43.0	45.2	1.0	36.8	1.0	5.0	10.1	59.3	0.092
T6N47A	ACN	44.7	47.0	49.4	1.0	40.2	1.0	10.0	9.3	64.8	0.092
T6N51A	ACP	48.5	51.0	53.6	1.0	43.6	1.0	10.0	8.6	70.1	0.093

Notes

(1) Pulse test: $t_p \leq 50$ 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 °C x (1 + αT x (T_J - 25))

(4) All terms and symbols are consistent with ANSI/IEEE C62.35

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

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{\theta JA}$ (1)	140	175	°C/W
	$R_{\theta JM}$ (2)	5	6.5	°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 °C unless otherwise noted)

STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	VALUE
IEC 61000-4-2	Contact discharge	C = 150 pF, R = 330 Ω	ESD	30 kV
	Air discharge			30 kV

ORDERING INFORMATION TABLE

Device code	T	6	N	xxx	A	H	M3
	1	2	3	4	5	6	7

1 - Vishay PAR® TVS product
2 - Peak pulse power rating (6 = 600 W)
3 - Package type (N = DFN package)
4 - Nominal breakdown voltage
5 - Breakdown voltage tolerance and polarity (A ± 5 %, unidirectional)
6 - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)
7 - 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
T6N12AHM3/H (1)	0.023	H	3500	7" diameter plastic tape and reel
T6N12AHM3/I (1)	0.023	I	14 000	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

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

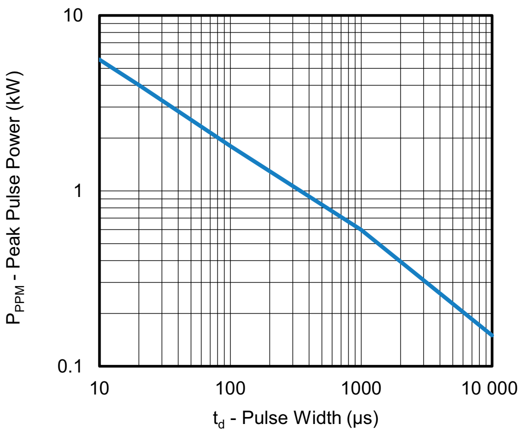


Fig. 1 - Peak Pulse Power Rating Curve

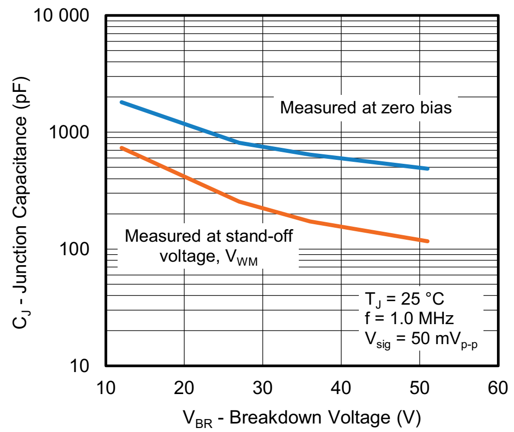


Fig. 4 - Typical Junction Capacitance

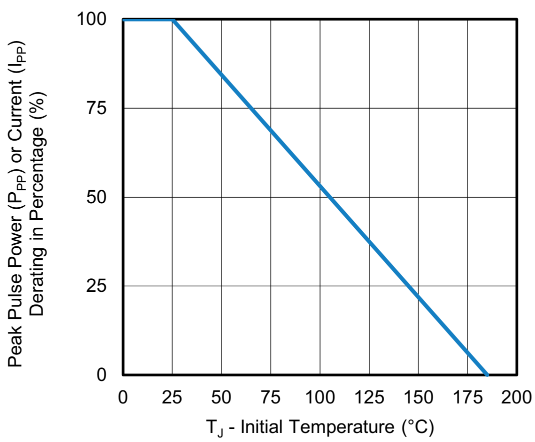


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

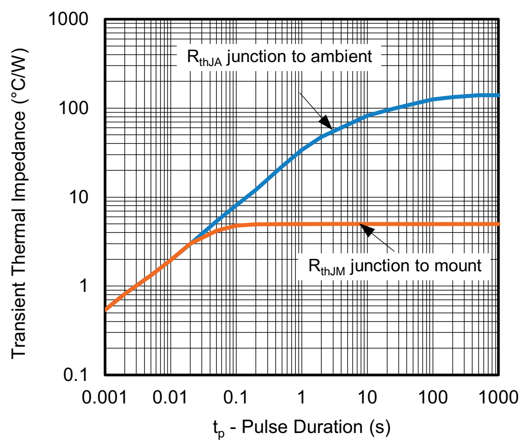


Fig. 5 - Typical Transient Thermal Impedance

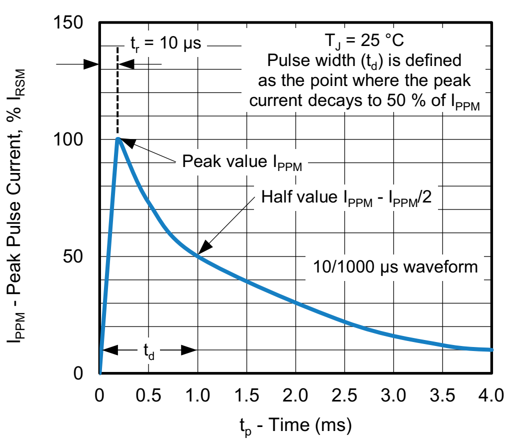


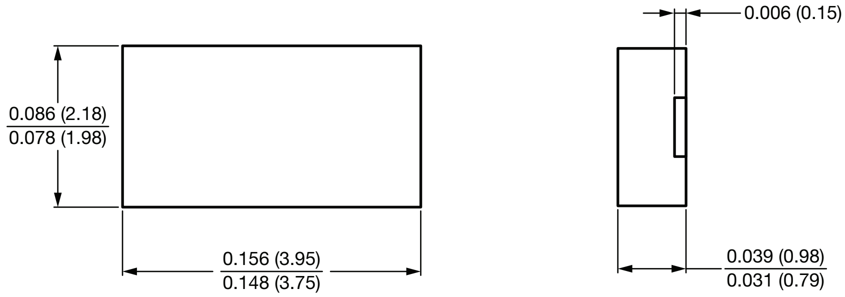
Fig. 3 - Pulse Waveform

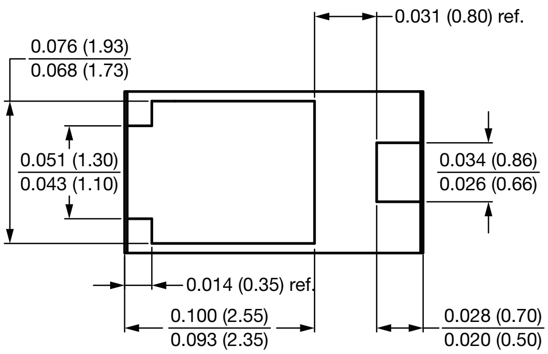
Note

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

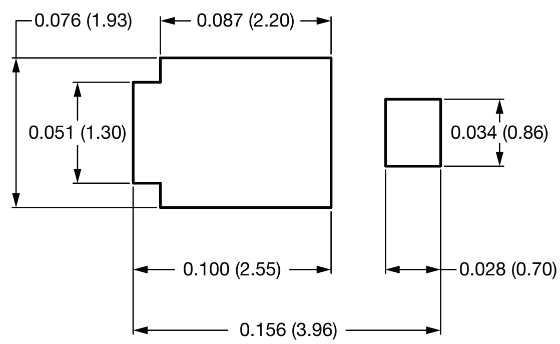
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN3820A





Mounting Pad Layout



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.