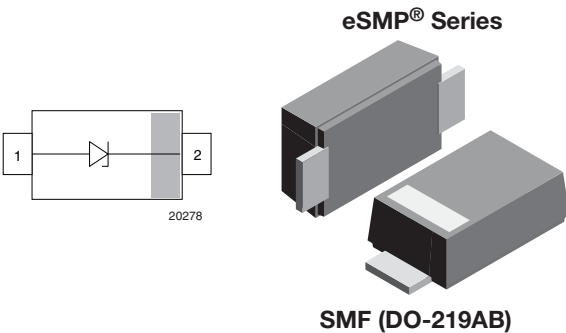
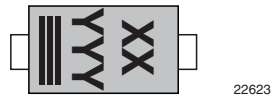


400 W TransZorb® Transient Voltage Suppressor (TVS) Diode in SMF-Package


MARKING (example only)


Bar = cathode marking
 YYY = type code (see table below)
 XX = date code

DESIGN SUPPORT TOOLS AVAILABLE

FEATURES

- 400 W peak pulse power capability with a 10/1000 μ s waveform
- Tolerance of the avalanche breakdown voltage
 $\pm 5\%$ VTVSxxxA...
 $\pm 2\%$ VTVSxxxG...
- Low-profile package
- Wave and reflow solderable
- ESD-protection acc. IEC 61000-4-2
 ± 30 kV contact discharge
 ± 30 kV air discharge
- Excellent clamping capability
- “Low-Noise” technology - very fast response time
- AEC-Q101 qualified available
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



PRIMARY CHARACTERISTICS	
V_{BR}	6.4 V to 78.2 V
V_{WM}	3.3 V to 63 V
P_{PPM}	400 W
T_J max.	175 °C
Polarity	Uni-directional
Package	SMF (DO-219AB)

ORDERING INFORMATION							
PART NUMBER (EXAMPLE)	TOLERANCE V_{BR}	ENVIRONMENTAL AND QUALITY CODE			PACKAGING CODE		ORDERING CODE (EXAMPLE)
		AEC-Q101 QUALIFIED	RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS	TIN PLATED	3K PER 7" REEL (8 mm TAPE), MOQ = 30K	10K PER 13" REEL (8 mm TAPE), MOQ = 50K	
			HALOGEN-FREE				
VTVS5V0ASMF-	$\pm 5\%$		M	3	-08		VTVS5V0ASMF-M3-08
VTVS5V0ASMF-	$\pm 5\%$	H	M	3	-08		VTVS5V0ASMF-HM3-08
VTVS5V0ASMF-	$\pm 5\%$		M	3		-18	VTVS5V0ASMF-M3-18
VTVS5V0ASMF-	$\pm 5\%$	H	M	3		-18	VTVS5V0ASMF-HM3-18
VTVS5V0GSMF-	$\pm 2\%$		M	3	-08		VTVS5V0GSMF-M3-08
VTVS5V0GSMF-	$\pm 2\%$	H	M	3	-08		VTVS5V0GSMF-HM3-08
VTVS5V0GSMF-	$\pm 2\%$		M	3		-18	VTVS5V0GSMF-M3-18
VTVS5V0GSMF-	$\pm 2\%$	H	M	3		-18	VTVS5V0GSMF-HM3-18

**PACKAGE DATA**

PACKAGE NAME	MOLDING COMPOUND	WEIGHT (mg)	HEIGHT MAX. (mm)	LENGTH MAX. (mm)	WIDTH MAX. (mm)	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	WHISKER TEST ACC. JESD 201	SOLDERING CONDITIONS
SMF (DO-219AB)	Halogen-free	15	1.08	3.9	1.9	UL 94 V-0	MSL level 1 (acc. J-STD-020)	class 2	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 10/1000\ \mu\text{s}$ waveform	I_{PPM}	see "Electrical Characteristics"	A
Peak pulse power	$t_p = 10/1000\ \mu\text{s}$ waveform	P_{PP}	400	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Thermal resistance	Mounted on infinite heat sink	R_{thJL}	20	K/W
Forward clamping voltage	$I_F = 50\text{ A}$, $t_p = 1\text{ ms}$	V_F	1.8	V
Operating temperature	Junction temperature	T_J	-55 to +175	°C
Storage temperature		T_{STG}	-55 to +175	°C

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

PART NUMBER	TYPE CODE	REVERSE BREAKDOWN VOLTAGE at $T_J = 25\text{ °C}$, $I_T = 1\text{ mA}$		STAND-OFF VOLTAGE	MAXIMUM REVERSE CURRENT at V_{RWM}	MAXIMUM PEAK PULSE CURRENT at $t_p = 10/1000\ \mu\text{s}$	MAXIMUM REVERSE CLAMPING VOLTAGE at I_{PPM}	TYPICAL CAP. at $V_R = 0\text{ V}$, $f = 1\text{ MHz}$	PROTECTION PATHS
		V_{BR} (V) MIN.	V_{BR} (V) MAX.						
VTVS3V3ASMF	9Z5	6.4	7.0	3.3	0.05	42.95	8.9	2095	1
VTVS5V0ASMF	905	6.4	7.0	5.00	5	42.95	8.9	2095	1
VTVS8V5ASMF	915	9.5	10.5	8.50	0.1	28.24	13.5	1270	1
VTVS9V4ASMF	925	10.5	11.6	9.40	0.1	25.48	14.9	1130	1
VTVS10ASMF	935	11.4	12.7	10.30	0.05	23.20	16.3	988	1
VTVS11ASMF	945	12.6	13.9	11.20	0.05	21.13	18.0	910	1
VTVS12ASMF	955	14.0	15.4	12.40	0.05	19.01	20.1	807	1
VTVS14ASMF	965	15.4	17.0	13.80	0.05	17.16	22.2	752	1
VTVS15ASMF	975	17.1	18.8	15.10	0.05	15.47	25	684	1
VTVS17ASMF	985	19.0	21.0	16.90	0.05	13.79	28	606	1
VTVS19ASMF	995	20.9	23.2	18.70	0.05	12.44	31	558	1
VTVS21ASMF	9A5	23.0	25.4	20.50	0.05	11.33	34	513	1
VTVS23ASMF	9B5	25.7	28.4	22.60	0.05	10.09	38	480	1
VTVS25ASMF	9C5	28.5	31.5	25.20	0.05	9.07	42	433	1
VTVS28ASMF	9D5	31.4	34.7	27.90	0.05	8.21	47	412	1
VTVS31ASMF	9E5	34.2	37.8	30.60	0.05	7.51	51	380	1
VTVS33ASMF	9F5	37.1	41.0	33.30	0.05	6.91	55	379	1
VTVS36ASMF	9G5	40.9	45.2	36.00	0.05	6.24	61	342	1
VTVS40ASMF	9H5	44.7	49.4	39.60	0.05	5.70	67	309	1
VTVS43ASMF	9J5	48.5	53.6	43.20	0.05	5.23	73	292	1
VTVS47ASMF	9K5	53.2	58.8	46.80	0.05	4.76	80	293	1
VTVS52ASMF	9L5	58.9	65.1	52.20	0.05	4.28	89	242	1
VTVS58ASMF	9M5	64.6	71.4	57.60	0.05	3.89	98	245	1
VTVS63ASMF	9N5	70.8	78.2	63.00	0.05	3.54	108	227	1



ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)									
PART NUMBER	TYPE CODE	REVERSE BREAKDOWN VOLTAGE at T _J = 25 °C, I _T = 1 mA		STAND-OFF VOLTAGE	MAXIMUM REVERSE CURRENT at V _{RWM}	MAXIMUM PEAK PULSE CURRENT at t _p = 10/1000 µs	MAXIMUM REVERSE CLAMPING VOLTAGE at I _{PPM}	TYPICAL CAP. at V _R = 0 V, f = 1 MHz	PROTECTION PATHS
	HALOGEN-FREE	V _{BR} (V) MIN.	V _{BR} (V) MAX.	V _{RWM} (V)	I _R (µA)	I _{PPM} (A)	V _C (V)	C _D (pF)	N _{CHANNEL}
VTVS3V3GSMF	9Z2	6.57	6.84	3.3	0.05	43.99	8.9	2095	1
VTVS5V0GSMF	902	6.57	6.84	5.00	5	43.99	8.9	2095	1
VTVS8V5GSMF	912	9.80	10.20	8.50	0.1	29.10	13.5	1270	1
VTVS9V4GSMF	922	10.83	11.28	9.40	0.1	26.23	14.9	1130	1
VTVS10GSMF	932	11.81	12.30	10.30	0.05	23.98	16.3	988	1
VTVS11GSMF	942	12.99	13.52	11.20	0.05	21.75	18.0	910	1
VTVS12GSMF	952	14.41	15.00	12.40	0.05	19.53	20.1	807	1
VTVS14GSMF	962	15.88	16.53	13.80	0.05	17.67	22.2	752	1
VTVS15GSMF	972	17.60	18.31	15.10	0.05	15.89	25	684	1
VTVS17GSMF	982	19.60	20.40	16.90	0.05	14.21	28	606	1
VTVS19GSMF	992	21.61	22.50	18.70	0.05	12.84	31	558	1
VTVS21GSMF	9A2	23.72	24.69	20.50	0.05	11.67	34	513	1
VTVS23GSMF	9B2	26.51	27.60	22.60	0.05	10.40	38	480	1
VTVS25GSMF	9C2	29.40	30.60	25.20	0.05	9.35	42	433	1
VTVS28GSMF	9D2	32.39	33.72	27.90	0.05	8.45	47	412	1
VTVS31GSMF	9E2	35.28	36.72	30.60	0.05	7.74	51	380	1
VTVS33GSMF	9F2	38.27	39.84	33.30	0.05	7.11	55	379	1
VTVS36GSMF	9G2	42.19	43.92	36.00	0.05	6.43	61	342	1
VTVS40GSMF	9H2	46.11	48.00	39.60	0.05	5.87	67	309	1
VTVS43GSMF	9J2	50.03	52.08	43.20	0.05	5.39	73	292	1
VTVS47GSMF	9K2	54.88	57.12	46.80	0.05	4.90	80	293	1
VTVS52GSMF	9L2	60.76	63.24	52.20	0.05	4.41	89	242	1
VTVS58GSMF	9M2	66.64	69.36	57.60	0.05	4.01	98	245	1
VTVS63GSMF	9N2	73.01	75.99	63.00	0.05	3.65	108	227	1

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

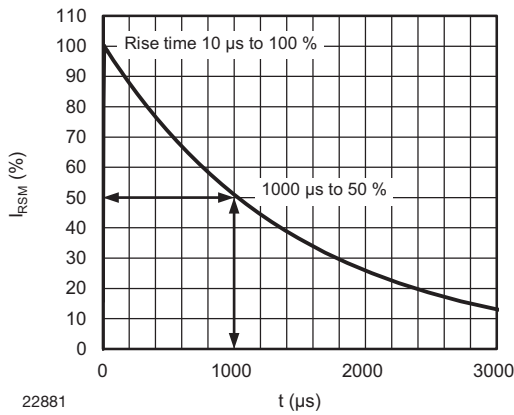


Fig. 1 - 10/1000 μs Peak Pulse Current Wave Form

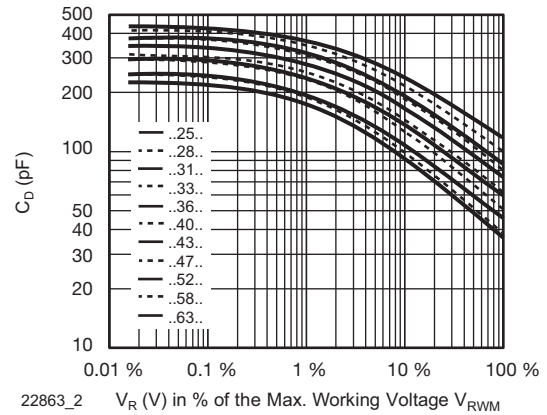


Fig. 4 - Typical Capacitance C_D vs. Reverse Voltage V_R

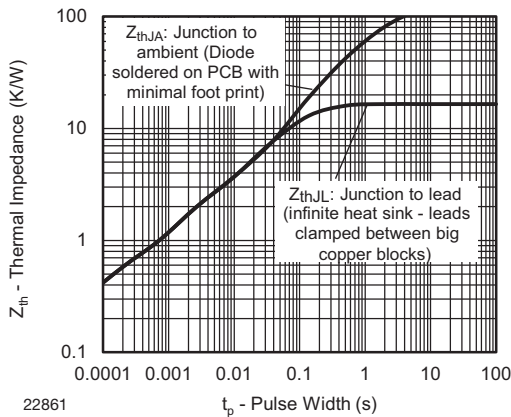


Fig. 2 - Thermal Impedance vs. Time

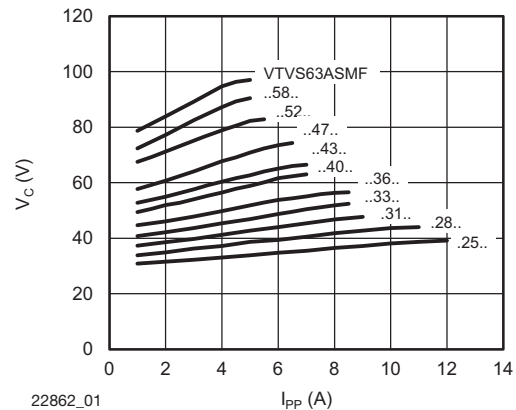


Fig. 5 - Typical Peak Clamping Voltage vs. Peak Pulse Current

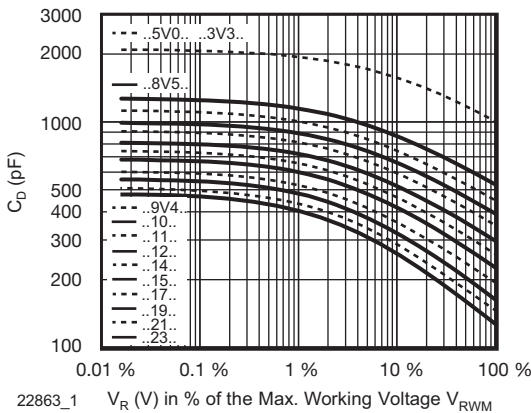


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

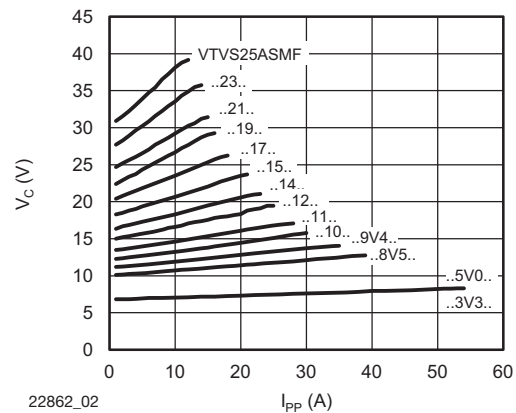
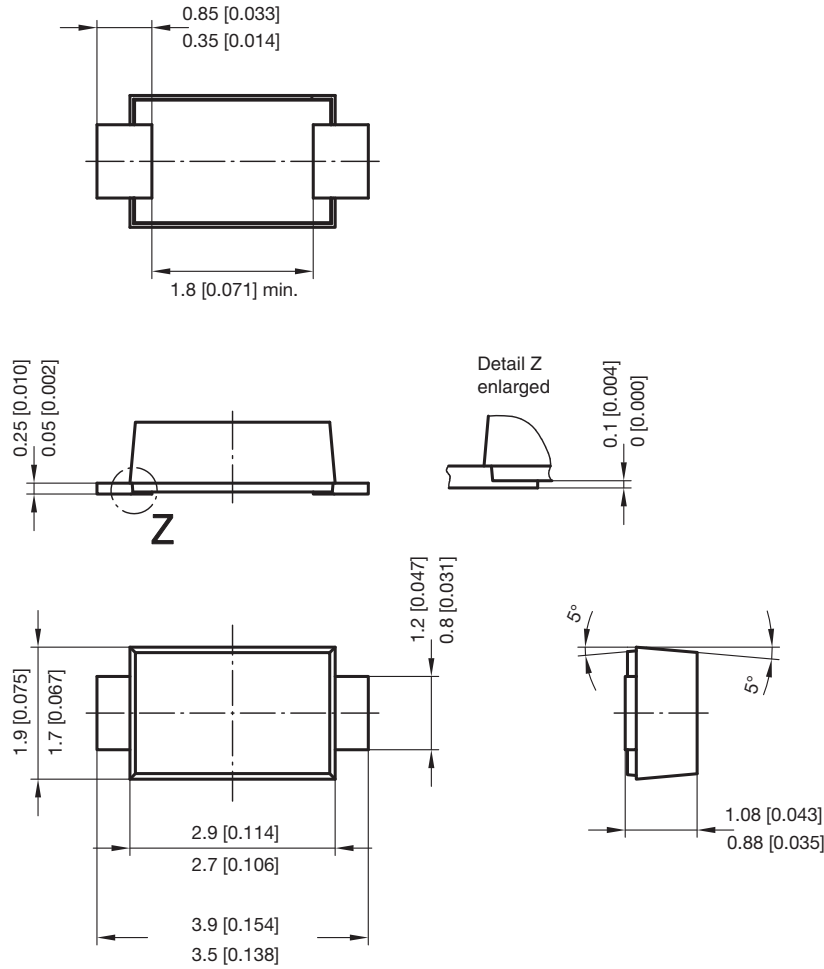


Fig. 6 - Typical Peak Clamping Voltage vs. Peak Pulse Current

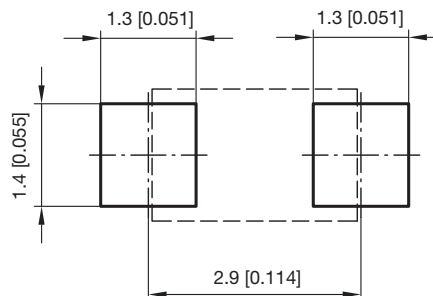


PACKAGE DIMENSIONS in millimeters (inches): SMF



foot print recommendation:

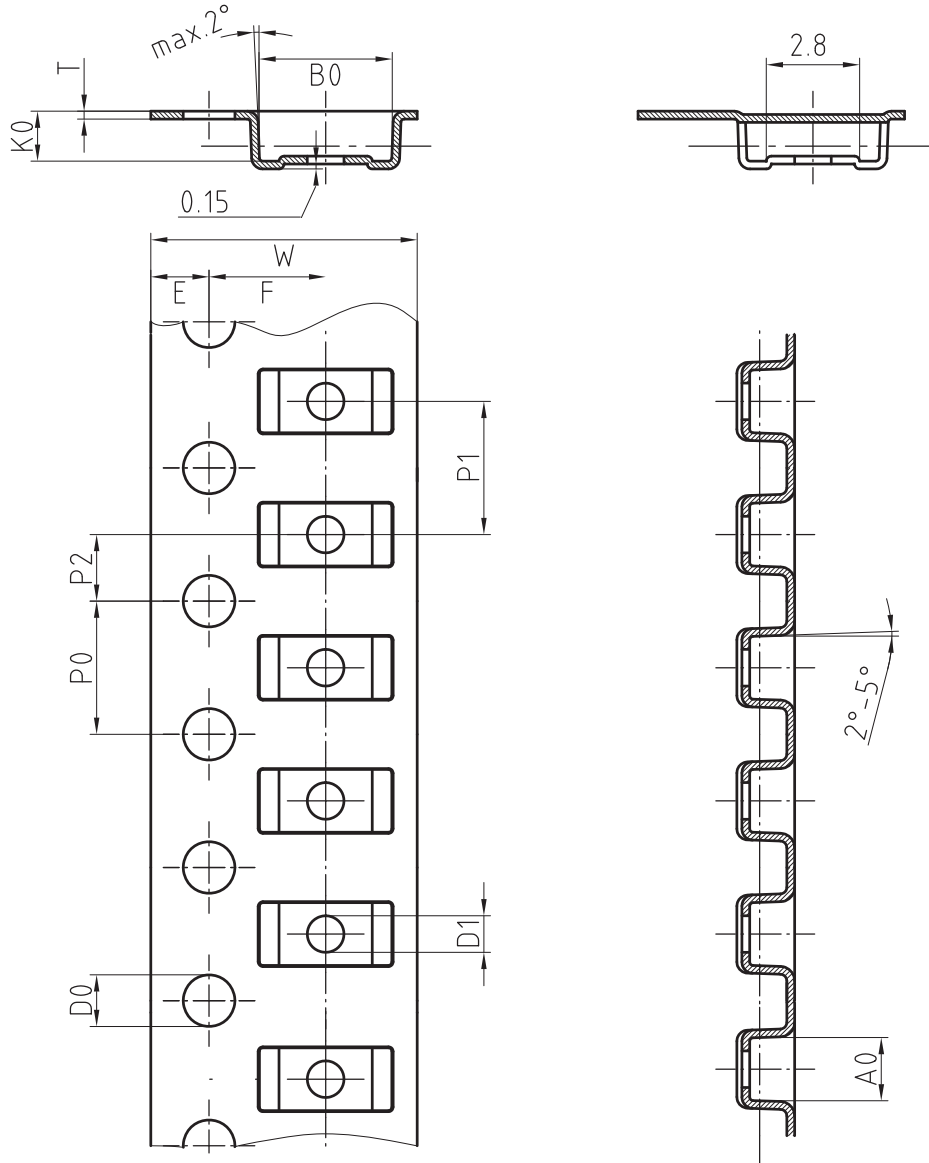
Reflow soldering



Created - Date: 15. February 2005
 Rev. 5 - Date: 09. Oct. 2017
 Document no.: S8-V-3915.01-001 (4)
 22989



BLISTER TAPE DIMENSIONS in millimeters (inches)



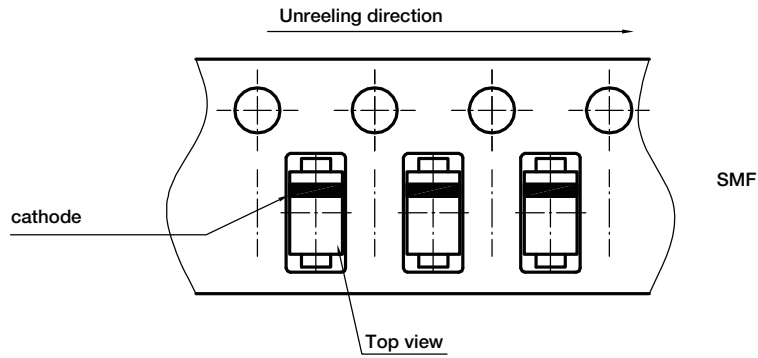
Mat:	A0	B0	K0	W	T	P0	P2	P1	D0	D1	E	F
PS	1.9	4.0	1.5	8.0	0.235	4.0	2.0	4.0	1.5	1	1.75	3.5

Document-No.: S8-V-3717.02-001 (3)

18513



ORIENTATION IN CARRIER TAPE - SMF



Document no.: S8-V-3717.02-003 (4)
Created - Date: 09. Feb. 2010
22670



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.

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.