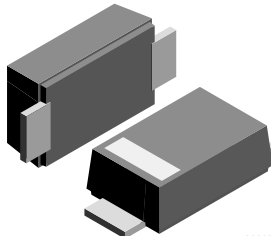
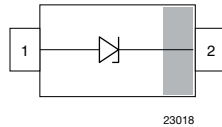


Zener Diodes with Surge Current Specification

eSMP® Series


SMF (DO-219AB)



23018

LINKS TO ADDITIONAL RESOURCES

FEATURES

- Silicon planar Zener diodes
- Voltage range includes 43 breakdown voltages from 3.6 V to 200 V with $\pm 2\%$ for BZD27B-M Series
- Low profile surface-mount package
- Zener and surge current specification
- Low leakage current
- Excellent stability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- ESD capability according to AEC-Q101: human body model: > 8 kV machine model: > 800 V
- Wave and reflow solderable
- AEC-Q101 qualified available
- Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
- Base P/N-HM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified (available on request)
- Compatible to SOD-123W package case outline or SOD-123F and SOD-123FL
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

PRIMARY CHARACTERISTICS

PARAMETER	VALUE	UNIT
V_Z range nom.	3.6 to 200	V
Test current I_{ZT}	5 to 100	mA
V_{BR}	7.35 to 196	V
V_{WM}	6.2 to 160	V
P_{PPM}	150	W
T_J max.	175	°C
V_Z specification	Pulse current	
Int. construction	Single	
Polarity	Uni-directional	

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZD27B-M Series	BZD27B3V6P-M3-08 to BZD27B200P-M3-08	3000 per 7" reel (8mm tape)	MOQ = 30K
	BZD27B3V6P-M3-18 to BZD27B200P-M3-18	10 000 per 13" reel (8 mm tape)	MOQ = 50K

PACKAGE

PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	WHISKER TEST ACC. JESD 201	SOLDERING CONDITIONS
SMF (DO-219AB)	15 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Class 2	Peak temperature max. 260 °C

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	$T_L = 105\text{ °C}$	P_{tot}	2300	mW
	$T_A = 30\text{ °C}$ ⁽¹⁾	P_{tot}	800	mW
Non repetitive peak surge power dissipation ⁽²⁾	100 μ s square pulse	P_{ZSM}	300	W
	10/1000 μ s waveform	P_{RSM}	150	W
Junction to lead		R_{thJL}	30	K/W
Junction to ambient air	Mounted on epoxy-glass PCB with 3 mm x 3 mm Cu pads ($\geq 40\text{ }\mu$ m thick)	R_{thJA}	180	K/W
Junction temperature		T_J	175	°C
Storage temperature range		T_{stg}	-65 to +175	°C
Operating temperature range		T_{op}	-65 to +175	°C

Notes

⁽¹⁾ Mounted on epoxy-glass PCB with 3 mm x 3 mm Cu pads ($\geq 40\text{ }\mu$ m thick)

⁽²⁾ $T_J = 25\text{ °C}$ prior to surge



ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)											
PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE ⁽¹⁾			TEST CURRENT	REVERSE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT	
		V_Z at I_{ZT1}			I_{ZT1}	I_R at V_R		Z_Z at I_{ZT1}		α_{VZ} at I_{ZT1}	
		V			mA	μA	V	Ω		%/ $^{\circ}\text{C}$	
		MIN.	NOM.	MAX.		MAX.		TYP.	MAX.	MIN.	MAX.
BZD27B3V6P-M	0N	3.53	3.6	3.67	100	100	1	4	8	-0.14	-0.04
BZD27B3V9P-M	1N	3.82	3.9	3.98	100	50	1	4	8	-0.14	-0.04
BZD27B4V3P-M	2N	4.21	4.3	4.39	100	25	1	4	7	-0.12	-0.02
BZD27B4V7P-M	3N	4.61	4.7	4.79	100	10	1	3	7	-0.1	0
BZD27B5V1P-M	4N	5.00	5.1	5.20	100	5	1	3	6	-0.08	0.02
BZD27B5V6P-M	5N	5.49	5.6	5.71	100	10	2	2	4	-0.04	0.04
BZD27B6V2P-M	6N	6.08	6.2	6.32	100	5	2	2	3	-0.01	0.06
BZD27B6V8P-M	7N	6.66	6.8	6.94	100	10	3	1	3	0	0.07
BZD27B7V5P-M	8N	7.35	7.5	7.65	100	50	3	1	2	0	0.07
BZD27B8V2P-M	9N	8.04	8.2	8.36	100	10	3	1	2	0.03	0.08
BZD27B9V1P-M	0O	8.92	9.1	9.28	50	10	5	2	4	0.03	0.08
BZD27B10P-M	1O	9.80	10	10.20	50	7	7.5	2	4	0.05	0.09
BZD27B11P-M	2O	10.78	11	11.22	50	4	8.2	4	7	0.05	0.1
BZD27B12P-M	3O	11.76	12	12.24	50	3	9.1	4	7	0.05	0.1
BZD27B13P-M	4O	12.74	13	13.26	50	2	10	5	10	0.05	0.1
BZD27B15P-M	5O	14.70	15	15.30	50	1	11	5	10	0.05	0.1
BZD27B16P-M	6O	15.68	16	16.32	25	1	12	6	15	0.06	0.11
BZD27B18P-M	7O	17.64	18	18.36	25	1	13	6	15	0.06	0.11
BZD27B20P-M	8O	19.60	20	20.40	25	1	15	6	15	0.06	0.11
BZD27B22P-M	9O	21.56	22	22.44	25	1	16	6	15	0.06	0.11
BZD27B24P-M	0P	23.52	24	24.48	25	1	18	7	15	0.06	0.11
BZD27B27P-M	1P	26.46	27	27.54	25	1	20	7	15	0.06	0.11
BZD27B30P-M	2P	29.40	30	30.60	25	1	22	8	15	0.06	0.11
BZD27B33P-M	3P	32.34	33	33.66	25	1	24	8	15	0.06	0.11
BZD27B36P-M	4P	35.28	36	36.72	10	1	27	21	40	0.06	0.11
BZD27B39P-M	5P	38.22	39	39.78	10	1	30	21	40	0.06	0.11
BZD27B43P-M	6P	42.14	43	43.86	10	1	33	24	45	0.07	0.12
BZD27B47P-M	7P	46.06	47	47.94	10	1	36	24	45	0.07	0.12
BZD27B51P-M	8P	49.98	51	52.02	10	1	39	25	60	0.07	0.12
BZD27B56P-M	9P	54.88	56	57.12	10	1	43	25	60	0.07	0.12
BZD27B62P-M	0Q	60.76	62	63.24	10	1	47	25	80	0.08	0.13
BZD27B68P-M	1Q	66.64	68	69.36	10	1	51	25	80	0.08	0.13
BZD27B75P-M	2Q	73.50	75	76.50	10	1	56	30	100	0.08	0.13
BZD27B82P-M	3Q	80.36	82	83.64	10	1	62	30	100	0.08	0.13
BZD27B91P-M	4Q	89.18	91	92.82	5	1	68	60	200	0.08	0.13
BZD27B100P-M	5Q	98.00	100	102.00	5	1	75	60	200	0.09	0.13
BZD27B110P-M	6Q	107.80	110	112.20	5	1	82	80	250	0.09	0.13
BZD27B120P-M	7Q	117.60	120	122.40	5	1	91	80	250	0.09	0.13
BZD27B130P-M	8Q	127.40	130	132.60	5	1	100	110	300	0.09	0.13
BZD27B150P-M	9Q	147.00	150	153.00	5	1	110	130	300	0.09	0.13
BZD27B160P-M	0R	156.80	160	163.20	5	1	120	150	350	0.09	0.13
BZD27B180P-M	1R	176.40	180	183.60	5	1	130	180	400	0.09	0.13
BZD27B200P-M	2R	196.00	200	204.00	5	1	150	200	500	0.09	0.13

Notes

- Electrical characteristics when used as regulator diodes
- Maximum $V_F = 1.2\text{ V}$, at $I_F = 0.2\text{ A}$
- ⁽¹⁾ Pulse test: $t_p \leq 5\text{ ms}$



ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)											
PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT	REVERSE CURRENT		CLAMPING VOLTAGE		TEMPERATURE COEFFICIENT	
		V_Z at I_{ZT1}			I_{ZT1}	I_R at V_R		V_C at $I_{RSM}^{(1)}$		α_{VZ} at I_{ZT1}	
		V			mA	μA	V	V	A	%/ $^{\circ}\text{C}$	
		MIN.	NOM.	MAX.		MAX.		MAX.		MIN.	MAX.
BZD27B7V5P-M	8N	7.35	7.5	7.65	100	1500	6.2	10.9	13.3	0	0.07
BZD27B8V2P-M	9N	8.04	8.2	8.36	100	1200	6.8	11.8	12.2	0.03	0.08
BZD27B9V1P-M	0O	8.92	9.1	9.28	50	100	7.5	12.9	11.3	0.03	0.08
BZD27B10P-M	1O	9.80	10	10.20	50	20	8.2	14.2	10.1	0.05	0.09
BZD27B11P-M	2O	10.78	11	11.22	50	5	9.1	15.2	9.6	0.05	0.1
BZD27B12P-M	3O	11.76	12	12.24	50	5	10	16	8.8	0.05	0.1
BZD27B13P-M	4O	12.74	13	13.26	50	5	11	17.8	7.9	0.05	0.1
BZD27B15P-M	5O	14.70	15	15.30	50	5	12	20.5	7.2	0.05	0.1
BZD27B16P-M	6O	15.68	16	16.32	25	5	13	21.9	6.6	0.06	0.11
BZD27B18P-M	7O	17.64	18	18.36	25	5	15	24.6	5.9	0.06	0.11
BZD27B20P-M	8O	19.60	20	20.40	25	5	16	27.3	5.3	0.06	0.11
BZD27B22P-M	9O	21.56	22	22.44	25	5	18	30	4.8	0.06	0.11
BZD27B24P-M	0P	23.52	24	24.48	25	5	20	32.3	4.4	0.06	0.11
BZD27B27P-M	1P	26.46	27	27.54	25	5	22	36.3	3.9	0.06	0.11
BZD27B30P-M	2P	29.40	30	30.60	25	5	24	40.4	3.6	0.06	0.11
BZD27B33P-M	3P	32.34	33	33.66	25	5	27	44.4	3.2	0.06	0.11
BZD27B36P-M	4P	35.28	36	36.72	10	5	30	48.4	3	0.06	0.11
BZD27B39P-M	5P	38.22	39	39.78	10	5	33	52.5	2.8	0.06	0.11
BZD27B43P-M	6P	42.14	43	43.86	10	5	36	57.9	2.5	0.07	0.12
BZD27B47P-M	7P	46.06	47	47.94	10	5	39	62.8	2.3	0.07	0.12
BZD27B51P-M	8P	49.98	51	52.02	10	5	43	68.2	2.1	0.07	0.12
BZD27B56P-M	9P	54.88	56	57.12	10	5	47	74.8	1.9	0.07	0.12
BZD27B62P-M	0Q	60.76	62	63.24	10	5	51	82.9	1.7	0.08	0.13
BZD27B68P-M	1Q	66.64	68	69.36	10	5	56	90.9	1.6	0.08	0.13
BZD27B75P-M	2Q	73.50	75	76.50	10	5	62	100.2	1.5	0.08	0.13
BZD27B82P-M	3Q	80.36	82	83.64	10	5	68	110	1.3	0.08	0.13
BZD27B91P-M	4Q	89.18	91	92.82	5	5	75	122	1.2	0.09	0.13
BZD27B100P-M	5Q	98.00	100	102.00	5	5	82	134	1.1	0.09	0.13
BZD27B110P-M	6Q	107.80	110	112.20	5	5	91	145	1	0.09	0.13
BZD27B120P-M	7Q	117.60	120	122.40	5	5	100	161	0.9	0.09	0.13
BZD27B130P-M	8Q	127.40	130	132.60	5	5	110	174	0.81	0.09	0.13
BZD27B150P-M	9Q	147.00	150	153.00	5	5	120	201	0.73	0.09	0.13
BZD27B160P-M	0R	156.80	160	163.20	5	5	130	214	0.67	0.09	0.13
BZD27B180P-M	1R	176.40	180	183.60	5	5	150	242	0.6	0.09	0.13
BZD27B200P-M	2R	196.00	200	204.00	5	5	160	268	0.54	0.09	0.13

Notes

- Electrical characteristics when used as protection diodes

(1) Non-repetitive peak reverse current in accordance with "IEC 60-1, section 8" (10/1000 μs pulse); see fig. 4

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

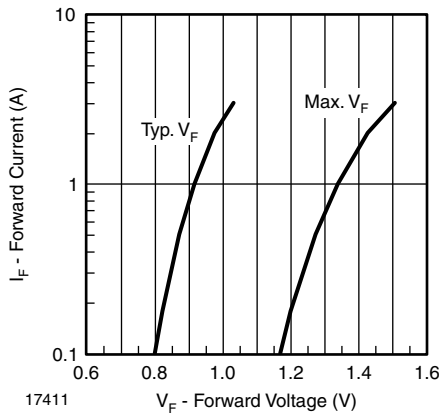


Fig. 1 - Forward Current vs. Forward Voltage

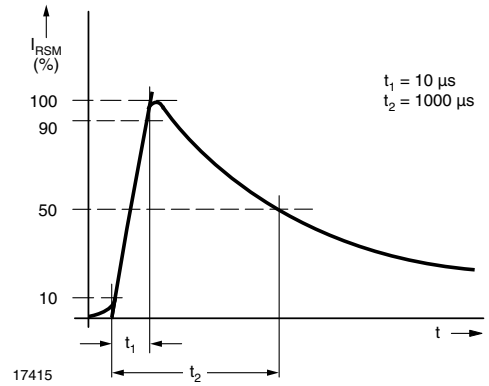


Fig. 4 - Non-Repetitive Peak Reverse Current Pulse Definition

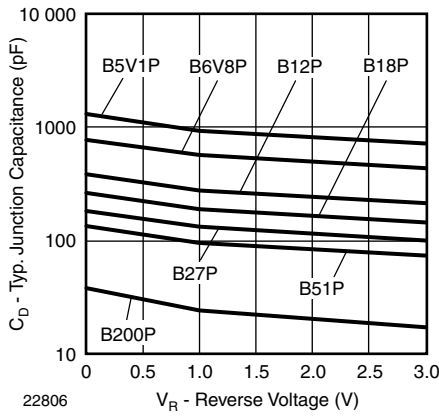


Fig. 2 - Typ. Diode Capacitance vs. Reverse Voltage

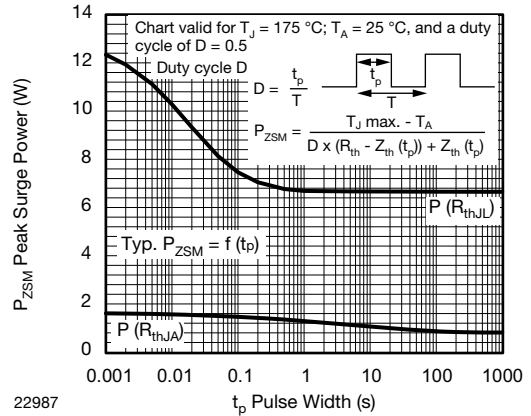


Fig. 5 - Typical Repetitive Peak Surge Power

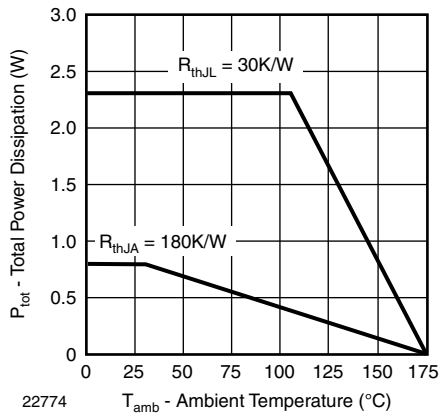


Fig. 3 - Power Dissipation vs. Ambient Temperature

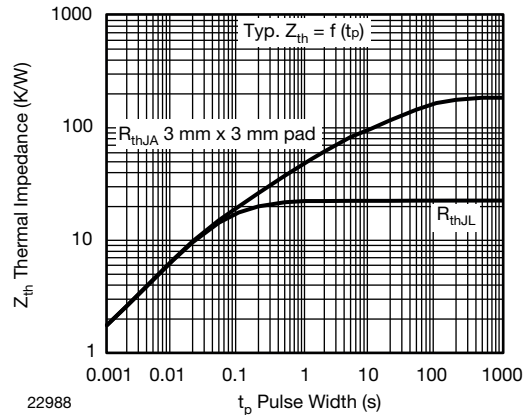
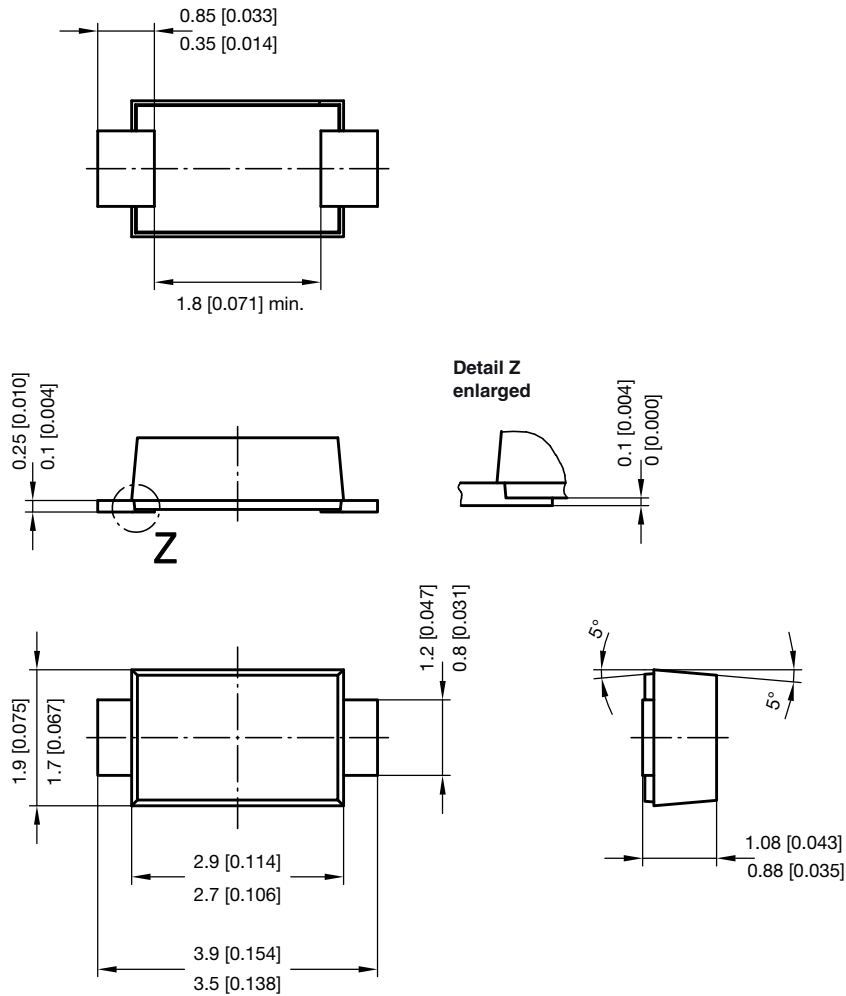


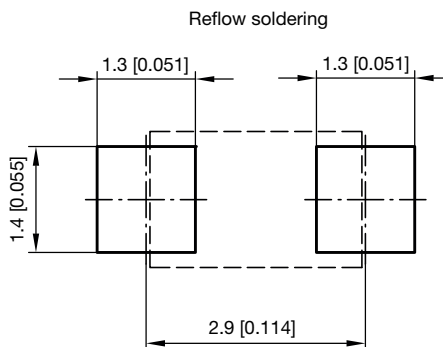
Fig. 6 - Typical Thermal Impedance vs. Time



PACKAGE DIMENSIONS in millimeters (inches): SMF (DO-219AB)



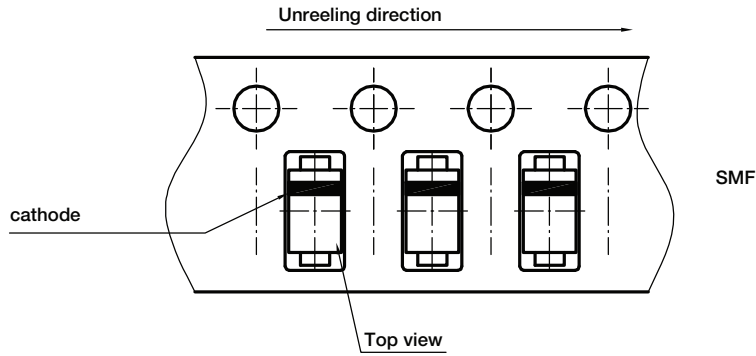
foot print recommendation:



Created - Date: 15. February 2005
Rev. 6 - Date: 24.Feb.2021
Document no.: S8-V-3915.01-001 (4)
22989



ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)



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.

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.