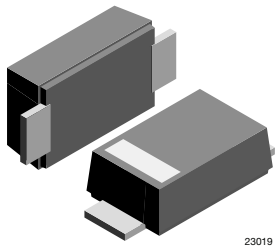
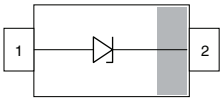
Zener Diodes with Surge Current Specification

eSMP® Series



23019

SMF (DO-219AB)



23018

LINKS TO ADDITIONAL RESOURCES

3D Models

FEATURES

- Sillicon planar Zener diodes
- Voltage range includes 43 breakdown voltages from 3.6 V to 200 V with ± 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

AUTOMOTIVE GRADE Available

RoHS COMPLIANT
HALOGEN FREE

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 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	T_L = 105 °C	P_{tot}	2300	mW
	T_A = 30 °C (1)	P_{tot}	800	mW
Non repetitive peak surge power dissipation (2)	100 µs square pulse	P_{ZSM}	300	W
	10/1000 µs 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 (≥ 40 µm 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 (≥ 40 µm thick)

(2) T_J = 25 °C prior to surge

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °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		%/°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 V, at I_F = 0.2 A

(1) Pulse test: $t_p \leq 5$ ms

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °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	%/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

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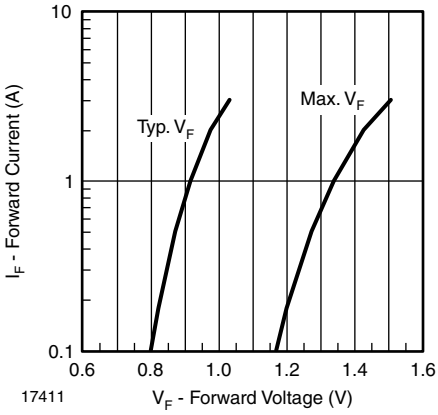

Fig. 1 - Forward Current vs. Forward Voltage

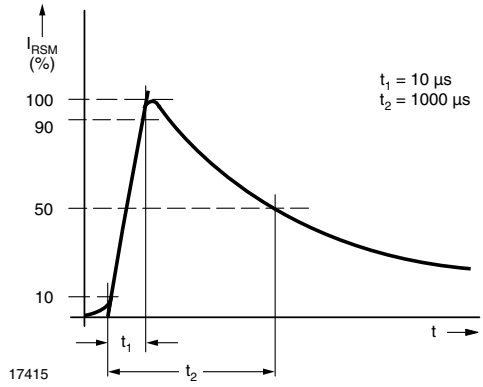

Fig. 4 - Non-Repetitive Peak Reverse Current Pulse Definition

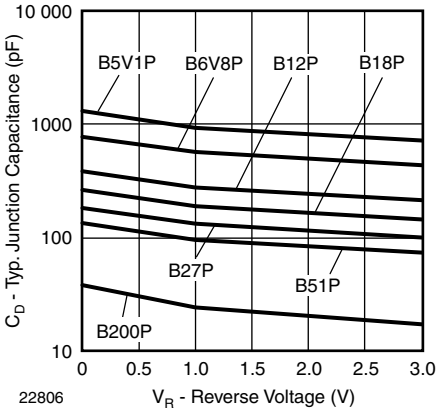

Fig. 2 - Typ. Diode Capacitance vs. Reverse Voltage

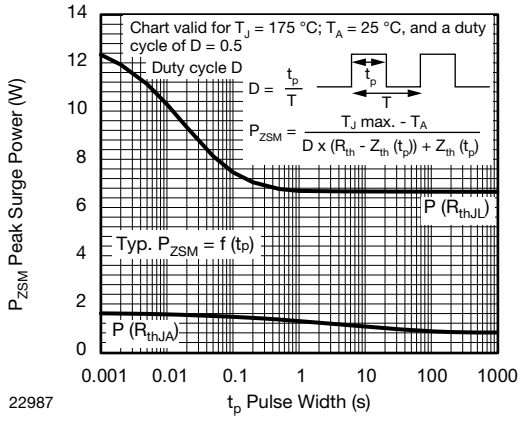

Fig. 5 - Typical Repetitive Peak Surge Power

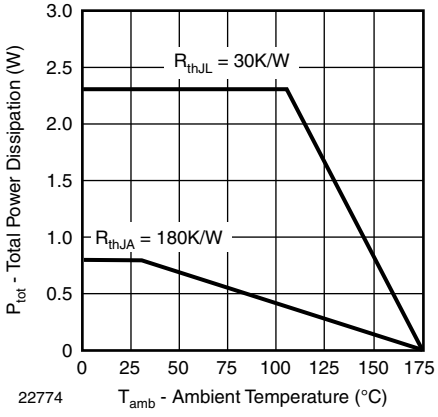

Fig. 3 - Power Dissipation vs. Ambient Temperature

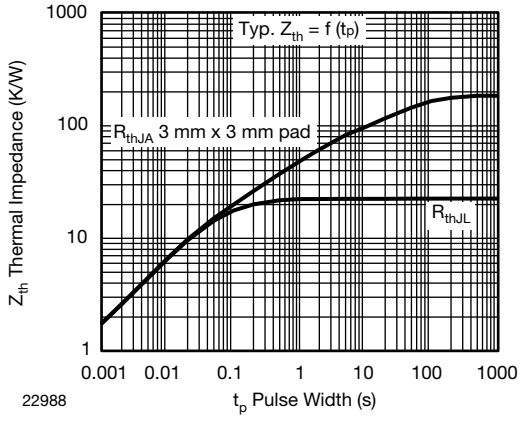

Fig. 6 - Typical Thermal Impedance vs. Time

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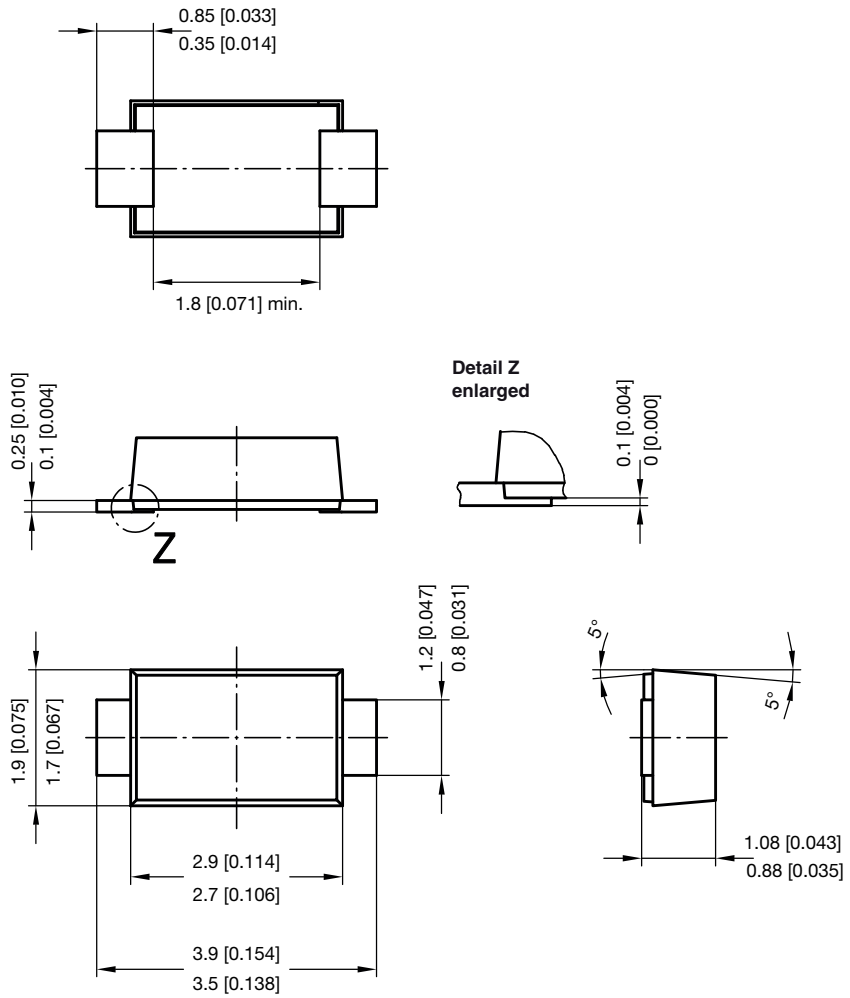
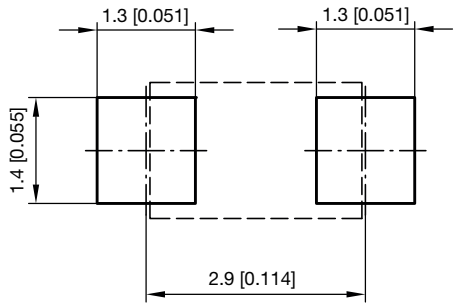
PACKAGE DIMENSIONS in millimeters (inches): **SMF (DO-219AB)**



foot print recommendation:

Reflow soldering



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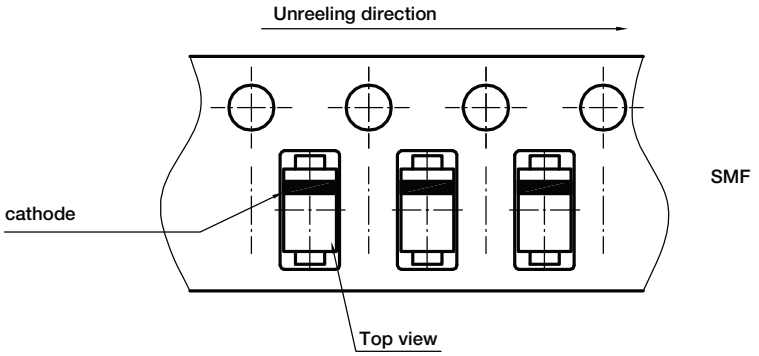
ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)



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