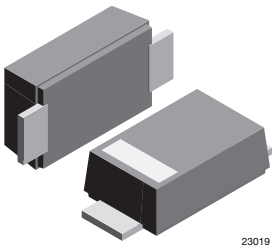
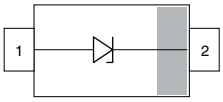
Zener Diodes with Surge Current Specification

eSMP® Series





SMF (DO-219AB)

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 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-E3 - RoHS-compliant, and commercial grade
- Base P/N-HE3 - RoHS-compliant, and AEC-Q101 qualified
- 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

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	
Circuit configuration	Single	
Polarity	Uni-directional	

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZD27B Series	BZD27B3V6P-E3-08 to BZD27B200P-E3-08	3000 per 7" reel (8 mm tape)	MOQ = 30K
	BZD27B3V6P-HE3_A08 to BZD27B200P-HE3_A08		
	BZD27B3V6P-E3-18 to BZD27B200P-E3-18	10 000 per 13" reel (8 mm tape)	MOQ = 50K
	BZD27B3V6P-HE3_A18 to BZD27B200P-HE3_A18		

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	0D	3.53	3.6	3.67	100	100	1	4	8	-0.14	-0.04
BZD27B3V9P	1D	3.82	3.9	3.98	100	50	1	4	8	-0.14	-0.04
BZD27B4V3P	2D	4.21	4.3	4.39	100	25	1	4	7	-0.12	-0.02
BZD27B4V7P	3D	4.61	4.7	4.79	100	10	1	3	7	-0.1	0
BZD27B5V1P	4D	5.00	5.1	5.20	100	5	1	3	6	-0.08	0.02
BZD27B5V6P	5D	5.49	5.6	5.71	100	10	2	2	4	-0.04	0.04
BZD27B6V2P	6D	6.08	6.2	6.32	100	5	2	2	3	-0.01	0.06
BZD27B6V8P	7D	6.66	6.8	6.94	100	10	3	1	3	0	0.07
BZD27B7V5P	8D	7.35	7.5	7.65	100	50	3	1	2	0	0.07
BZD27B8V2P	9D	8.04	8.2	8.36	100	10	3	1	2	0.03	0.08
BZD27B9V1P	0E	8.92	9.1	9.28	50	10	5	2	4	0.03	0.08
BZD27B10P	1E	9.80	10	10.20	50	7	7.5	2	4	0.05	0.09
BZD27B11P	2E	10.78	11	11.22	50	4	8.2	4	7	0.05	0.1
BZD27B12P	3E	11.76	12	12.24	50	3	9.1	4	7	0.05	0.1
BZD27B13P	4E	12.74	13	13.26	50	2	10	5	10	0.05	0.1
BZD27B15P	5E	14.70	15	15.30	50	1	11	5	10	0.05	0.1
BZD27B16P	6E	15.68	16	16.32	25	1	12	6	15	0.06	0.11
BZD27B18P	7E	17.64	18	18.36	25	1	13	6	15	0.06	0.11
BZD27B20P	8E	19.60	20	20.40	25	1	15	6	15	0.06	0.11
BZD27B22P	9E	21.56	22	22.44	25	1	16	6	15	0.06	0.11
BZD27B24P	0F	23.52	24	24.48	25	1	18	7	15	0.06	0.11
BZD27B27P	1F	26.46	27	27.54	25	1	20	7	15	0.06	0.11
BZD27B30P	2F	29.40	30	30.60	25	1	22	8	15	0.06	0.11
BZD27B33P	3F	32.34	33	33.66	25	1	24	8	15	0.06	0.11
BZD27B36P	4F	35.28	36	36.72	10	1	27	21	40	0.06	0.11
BZD27B39P	5F	38.22	39	39.78	10	1	30	21	40	0.06	0.11
BZD27B43P	6F	42.14	43	43.86	10	1	33	24	45	0.07	0.12
BZD27B47P	7F	46.06	47	47.94	10	1	36	24	45	0.07	0.12
BZD27B51P	8F	49.98	51	52.02	10	1	39	25	60	0.07	0.12
BZD27B56P	9F	54.88	56	57.12	10	1	43	25	60	0.07	0.12
BZD27B62P	0G	60.76	62	63.24	10	1	47	25	80	0.08	0.13
BZD27B68P	1G	66.64	68	69.36	10	1	51	25	80	0.08	0.13
BZD27B75P	2G	73.50	75	76.50	10	1	56	30	100	0.08	0.13
BZD27B82P	3G	80.36	82	83.64	10	1	62	30	100	0.08	0.13
BZD27B91P	4G	89.18	91	92.82	5	1	68	60	200	0.08	0.13
BZD27B100P	5G	98.00	100	102.00	5	1	75	60	200	0.09	0.13
BZD27B110P	6G	107.80	110	112.20	5	1	82	80	250	0.09	0.13
BZD27B120P	7G	117.60	120	122.40	5	1	91	80	250	0.09	0.13
BZD27B130P	8G	127.40	130	132.60	5	1	100	110	300	0.09	0.13
BZD27B150P	9G	147.00	150	153.00	5	1	110	130	300	0.09	0.13
BZD27B160P	0H	156.80	160	163.20	5	1	120	150	350	0.09	0.13
BZD27B180P	1H	176.40	180	183.60	5	1	130	180	400	0.09	0.13
BZD27B200P	2H	196.00	200	204.00	5	1	150	200	500	0.09	0.13

Notes

- Maximum V_F = 1.2 V, at I_F = 0.2 A
- Electrical characteristics when used as voltage regulator diodes

(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	8D	7.35	7.5	7.65	100	1500	6.2	10.9	13.3	0	0.07
BZD27B8V2P	9D	8.04	8.2	8.36	100	1200	6.8	11.8	12.2	0.03	0.08
BZD27B9V1P	0E	8.92	9.1	9.28	50	100	7.5	12.9	11.3	0.03	0.08
BZD27B10P	1E	9.80	10	10.20	50	20	8.2	14.2	10.1	0.05	0.09
BZD27B11P	2E	10.78	11	11.22	50	5	9.1	15.2	9.6	0.05	0.1
BZD27B12P	3E	11.76	12	12.24	50	5	10	16	8.8	0.05	0.1
BZD27B13P	4E	12.74	13	13.26	50	5	11	17.8	7.9	0.05	0.1
BZD27B15P	5E	14.70	15	15.30	50	5	12	20.5	7.2	0.05	0.1
BZD27B16P	6E	15.68	16	16.32	25	5	13	21.9	6.6	0.06	0.11
BZD27B18P	7E	17.64	18	18.36	25	5	15	24.6	5.9	0.06	0.11
BZD27B20P	8E	19.60	20	20.40	25	5	16	27.3	5.3	0.06	0.11
BZD27B22P	9E	21.56	22	22.44	25	5	18	30	4.8	0.06	0.11
BZD27B24P	0F	23.52	24	24.48	25	5	20	32.3	4.4	0.06	0.11
BZD27B27P	1F	26.46	27	27.54	25	5	22	36.3	3.9	0.06	0.11
BZD27B30P	2F	29.40	30	30.60	25	5	24	40.4	3.6	0.06	0.11
BZD27B33P	3F	32.34	33	33.66	25	5	27	44.4	3.2	0.06	0.11
BZD27B36P	4F	35.28	36	36.72	10	5	30	48.4	3	0.06	0.11
BZD27B39P	5F	38.22	39	39.78	10	5	33	52.5	2.8	0.06	0.11
BZD27B43P	6F	42.14	43	43.86	10	5	36	57.9	2.5	0.07	0.12
BZD27B47P	7F	46.06	47	47.94	10	5	39	62.8	2.3	0.07	0.12
BZD27B51P	8F	49.98	51	52.02	10	5	43	68.2	2.1	0.07	0.12
BZD27B56P	9F	54.88	56	57.12	10	5	47	74.8	1.9	0.07	0.12
BZD27B62P	0G	60.76	62	63.24	10	5	51	82.9	1.7	0.08	0.13
BZD27B68P	1G	66.64	68	69.36	10	5	56	90.9	1.6	0.08	0.13
BZD27B75P	2G	73.50	75	76.50	10	5	62	100.2	1.5	0.08	0.13
BZD27B82P	3G	80.36	82	83.64	10	5	68	110	1.3	0.08	0.13
BZD27B91P	4G	89.18	91	92.82	5	5	75	122	1.2	0.09	0.13
BZD27B100P	5G	98.00	100	102.00	5	5	82	134	1.1	0.09	0.13
BZD27B110P	6G	107.80	110	112.20	5	5	91	145	1	0.09	0.13
BZD27B120P	7G	117.60	120	122.40	5	5	100	161	0.9	0.09	0.13
BZD27B130P	8G	127.40	130	132.60	5	5	110	174	0.81	0.09	0.13
BZD27B150P	9G	147.00	150	153.00	5	5	120	201	0.73	0.09	0.13
BZD27B160P	0H	156.80	160	163.20	5	5	130	214	0.67	0.09	0.13
BZD27B180P	1H	176.40	180	183.60	5	5	150	242	0.6	0.09	0.13
BZD27B200P	2H	196.00	200	204.00	5	5	160	268	0.54	0.09	0.13

Notes

- Maximum V_F = 1.2 V, at I_F = 0.2 A
- 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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TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

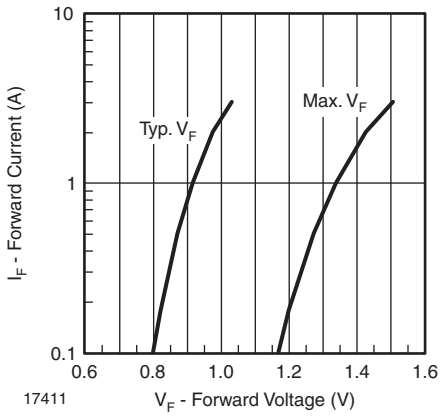

Fig. 1 - Forward Current vs. Forward Voltage

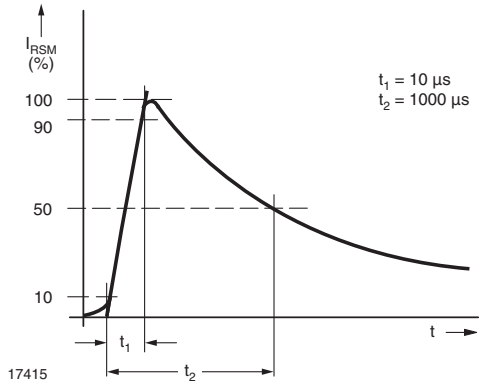

Fig. 4 - Non-Repetitive Peak Reverse Current Pulse Definition

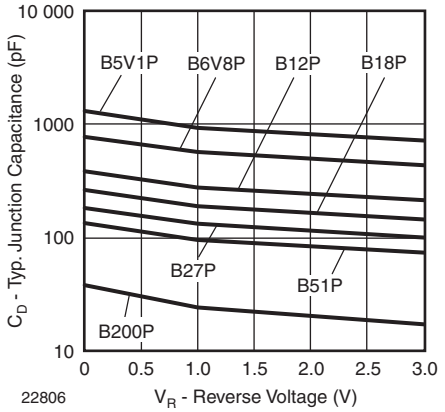

Fig. 2 - Typical Diode Capacitance vs. Reverse Voltage

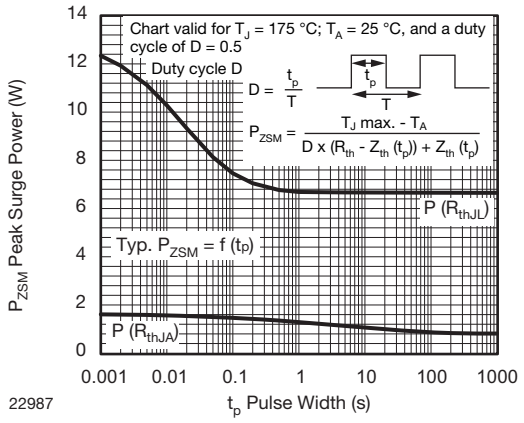

Fig. 5 - Typical Repetitive Peak Surge Power

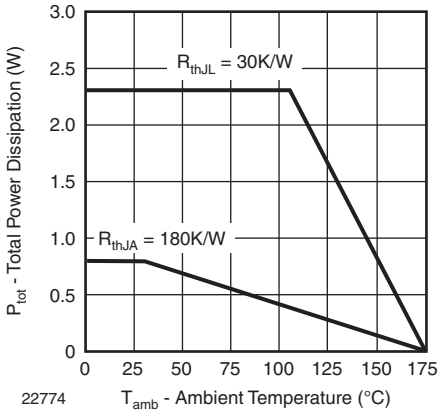

Fig. 3 - Power Dissipation vs. Ambient Temperature

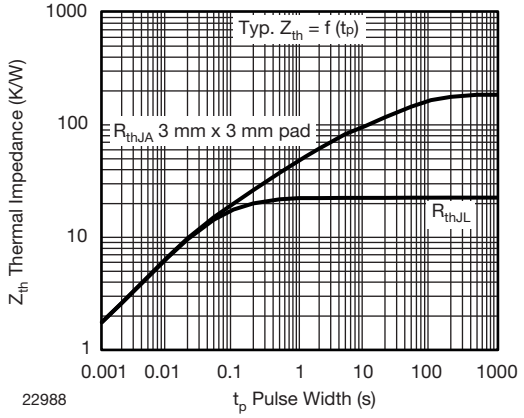

Fig. 6 - Typical Thermal Impedance vs. Time

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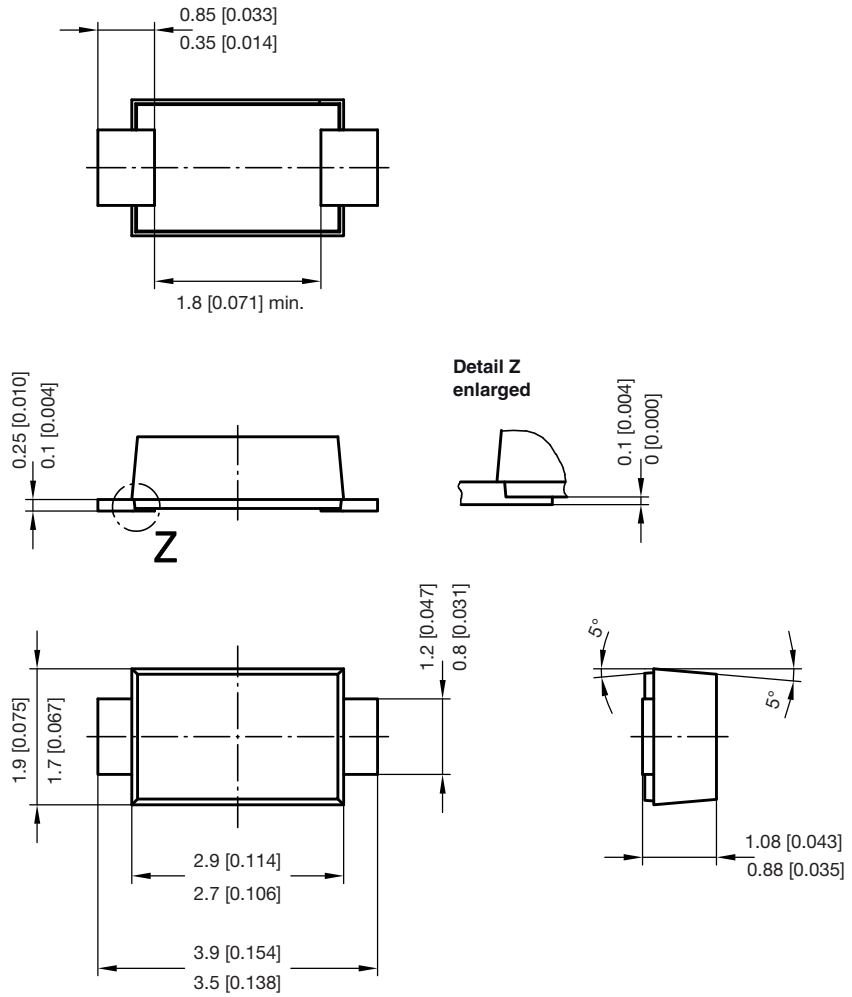
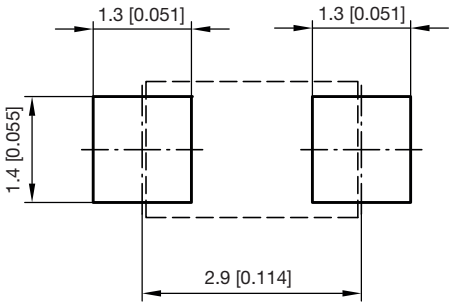
PACKAGE DIMENSIONS in millimeters (inches): **SMF (DO-219AB)**



foot print recommendation:

Reflow soldering



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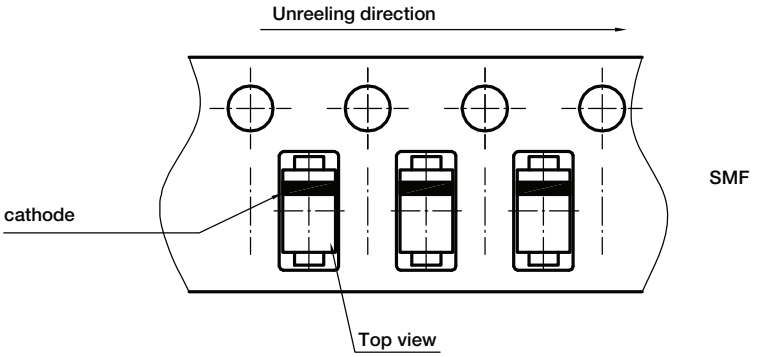
ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)



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