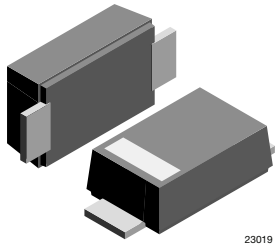
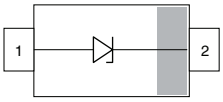
Zener Diodes with Surge Current Specification

eSMP® Series





SMF (DO-219AB)

LINKS TO ADDITIONAL RESOURCES

3D Models

FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

- Sillicon planar Zener diodes
- 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

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 to 188	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
BZD27C Series	BZD27C3V6P-E3-08 to BZD27C200P-E3-08	3000 per 7" reel (8 mm tape)	MOQ = 30K
	BZD27C3V6P-HE3-08 to BZD27C200P-HE3-08		
	BZD27C3V6P-E3-18 to BZD27C200P-E3-18	10 000 per 13" reel (8 mm tape)	MOQ = 50K
	BZD27C3V6P-HE3-18 to BZD27C200P-HE3-18		

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.
BZD27C3V6P	D0	3.4	3.6	3.8	100	100	1	4	8	-0.14	-0.04
BZD27C3V9P	D1	3.7	3.9	4.1	100	50	1	4	8	-0.14	-0.04
BZD27C4V3P	D2	4	4.3	4.6	100	25	1	4	7	-0.12	-0.02
BZD27C4V7P	D3	4.4	4.7	5	100	10	1	3	7	-0.1	0
BZD27C5V1P	D4	4.8	5.1	5.4	100	5	1	3	6	-0.08	0.02
BZD27C5V6P	D5	5.2	5.6	6	100	10	2	2	4	-0.04	0.04
BZD27C6V2P	D6	5.8	6.2	6.6	100	5	2	2	3	-0.01	0.06
BZD27C6V8P	D7	6.4	6.8	7.2	100	10	3	1	3	0	0.07
BZD27C7V5P	D8	7	7.5	7.9	100	50	3	1	2	0	0.07
BZD27C8V2P	D9	7.7	8.2	8.7	100	10	3	1	2	0.03	0.08
BZD27C9V1P	E0	8.5	9.1	9.6	50	10	5	2	4	0.03	0.08
BZD27C10P	E1	9.4	10	10.6	50	7	7.5	2	4	0.05	0.09
BZD27C11P	E2	10.4	11	11.6	50	4	8.2	4	7	0.05	0.1
BZD27C12P	E3	11.4	12	12.7	50	3	9.1	4	7	0.05	0.1
BZD27C13P	E4	12.4	13	14.1	50	2	10	5	10	0.05	0.1
BZD27C15P	E5	13.8	15	15.6	50	1	11	5	10	0.05	0.1
BZD27C16P	E6	15.3	16	17.1	25	1	12	6	15	0.06	0.11
BZD27C18P	E7	16.8	18	19.1	25	1	13	6	15	0.06	0.11
BZD27C20P	E8	18.8	20	21.2	25	1	15	6	15	0.06	0.11
BZD27C22P	E9	20.8	22	23.3	25	1	16	6	15	0.06	0.11
BZD27C24P	F0	22.8	24	25.6	25	1	18	7	15	0.06	0.11
BZD27C27P	F1	25.1	27	28.9	25	1	20	7	15	0.06	0.11
BZD27C30P	F2	28	30	32	25	1	22	8	15	0.06	0.11
BZD27C33P	F3	31	33	35	25	1	24	8	15	0.06	0.11
BZD27C36P	F4	34	36	38	10	1	27	21	40	0.06	0.11
BZD27C39P	F5	37	39	41	10	1	30	21	40	0.06	0.11
BZD27C43P	F6	40	43	46	10	1	33	24	45	0.07	0.12
BZD27C47P	F7	44	47	50	10	1	36	24	45	0.07	0.12
BZD27C51P	F8	48	51	54	10	1	39	25	60	0.07	0.12
BZD27C56P	F9	52	56	60	10	1	43	25	60	0.07	0.12
BZD27C62P	G0	58	62	66	10	1	47	25	80	0.08	0.13
BZD27C68P	G1	64	68	72	10	1	51	25	80	0.08	0.13
BZD27C75P	G2	70	75	79	10	1	56	30	100	0.08	0.13
BZD27C82P	G3	77	82	87	10	1	62	30	100	0.08	0.13
BZD27C91P	G4	85	91	96	5	1	68	60	200	0.08	0.13
BZD27C100P	G5	94	100	106	5	1	75	60	200	0.09	0.13
BZD27C110P	G6	104	110	116	5	1	82	80	250	0.09	0.13
BZD27C120P	G7	114	120	127	5	1	91	80	250	0.09	0.13
BZD27C130P	G8	124	130	141	5	1	100	110	300	0.09	0.13
BZD27C150P	G9	138	150	156	5	1	110	130	300	0.09	0.13
BZD27C160P	H0	153	160	171	5	1	120	150	350	0.09	0.13
BZD27C180P	H1	168	180	191	5	1	130	180	400	0.09	0.13
BZD27C200P	H2	188	200	212	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.
BZD27C7V5P	D8	7	7.5	7.9	100	1500	6.2	11.3	13.3	0	0.07
BZD27C8V2P	D9	7.7	8.2	8.7	100	1200	6.8	12.3	12.2	0.03	0.08
BZD27C9V1P	E0	8.5	9.1	9.6	50	100	7.5	13.3	11.3	0.03	0.08
BZD27C10P	E1	9.4	10	10.6	50	20	8.2	14.8	10.1	0.05	0.09
BZD27C11P	E2	10.4	11	11.6	50	5	9.1	15.7	9.6	0.05	0.1
BZD27C12P	E3	11.4	12	12.7	50	5	10	17	8.8	0.05	0.1
BZD27C13P	E4	12.4	13	14.1	50	5	11	18.9	7.9	0.05	0.1
BZD27C15P	E5	13.8	15	15.6	50	5	12	20.9	7.2	0.05	0.1
BZD27C16P	E6	15.3	16	17.1	25	5	13	22.9	6.6	0.06	0.11
BZD27C18P	E7	16.8	18	19.1	25	5	15	25.6	5.9	0.06	0.11
BZD27C20P	E8	18.8	20	21.2	25	5	16	28.4	5.3	0.06	0.11
BZD27C22P	E9	20.8	22	23.3	25	5	18	31	4.8	0.06	0.11
BZD27C24P	F0	22.8	24	25.6	25	5	20	33.8	4.4	0.06	0.11
BZD27C27P	F1	25.1	27	28.9	25	5	22	38.1	3.9	0.06	0.11
BZD27C30P	F2	28	30	32	25	5	24	42.2	3.6	0.06	0.11
BZD27C33P	F3	31	33	35	25	5	27	46.2	3.2	0.06	0.11
BZD27C36P	F4	34	36	38	10	5	30	50.1	3	0.06	0.11
BZD27C39P	F5	37	39	41	10	5	33	54.1	2.8	0.06	0.11
BZD27C43P	F6	40	43	46	10	5	36	60.7	2.5	0.07	0.12
BZD27C47P	F7	44	47	50	10	5	39	65.5	2.3	0.07	0.12
BZD27C51P	F8	48	51	54	10	5	43	70.8	2.1	0.07	0.12
BZD27C56P	F9	52	56	60	10	5	47	78.6	1.9	0.07	0.12
BZD27C62P	G0	58	62	66	10	5	51	86.5	1.7	0.08	0.13
BZD27C68P	G1	64	68	72	10	5	56	94.4	1.6	0.08	0.13
BZD27C75P	G2	70	75	79	10	5	62	103.5	1.5	0.08	0.13
BZD27C82P	G3	77	82	87	10	5	68	114	1.3	0.08	0.13
BZD27C91P	G4	85	91	96	5	5	75	126	1.2	0.09	0.13
BZD27C100P	G5	94	100	106	5	5	82	139	1.1	0.09	0.13
BZD27C110P	G6	104	110	116	5	5	91	150	1	0.09	0.13
BZD27C120P	G7	114	120	127	5	5	100	167	0.9	0.09	0.13
BZD27C130P	G8	124	130	141	5	5	110	185	0.81	0.09	0.13
BZD27C150P	G9	138	150	156	5	5	120	205	0.73	0.09	0.13
BZD27C160P	H0	153	160	171	5	5	130	224	0.67	0.09	0.13
BZD27C180P	H1	168	180	191	5	5	150	252	0.6	0.09	0.13
BZD27C200P	H2	188	200	212	5	5	160	278	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)

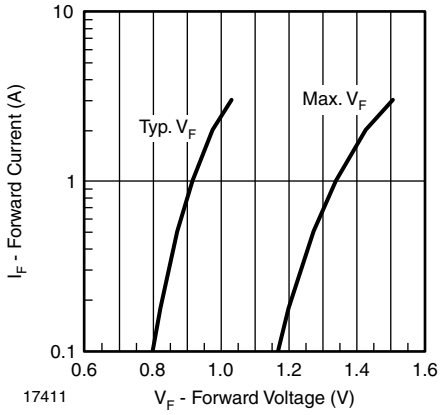

Fig. 1 - Forward Current vs. Forward Voltage

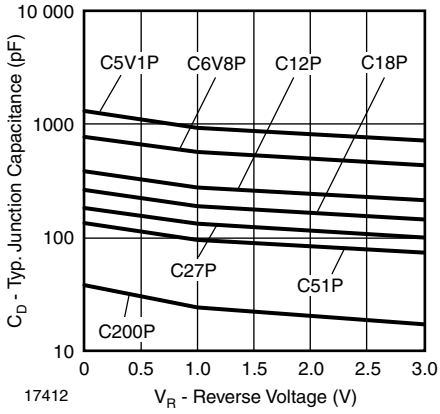

Fig. 2 - Typical Diode Capacitance vs. Reverse Voltage

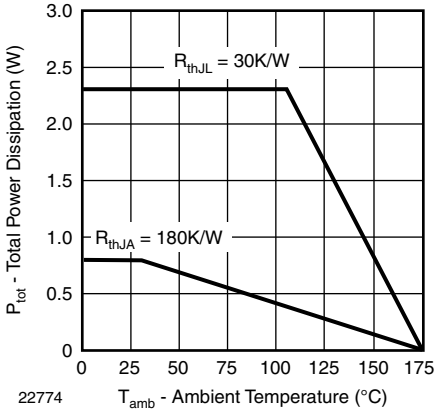

Fig. 3 - Power Dissipation vs. Ambient Temperature

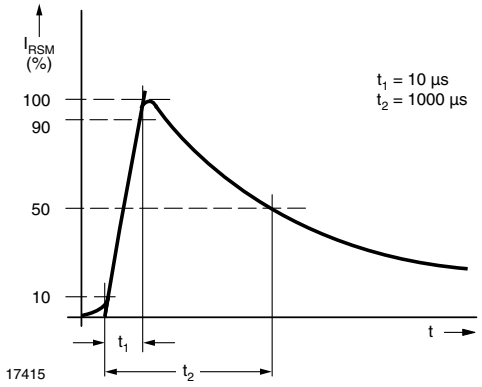

Fig. 4 - Non-Repetitive Peak Reverse Current Pulse Definition

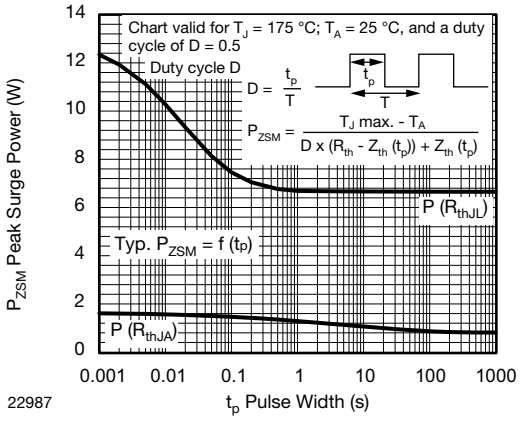

Fig. 5 - Typical Repetitive Peak Surge Power

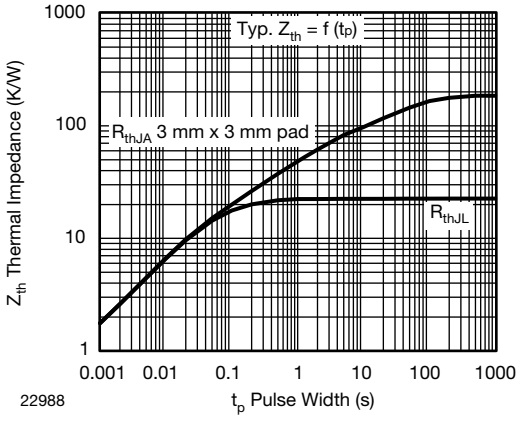

Fig. 6 - Typical Thermal Impedance vs. Time

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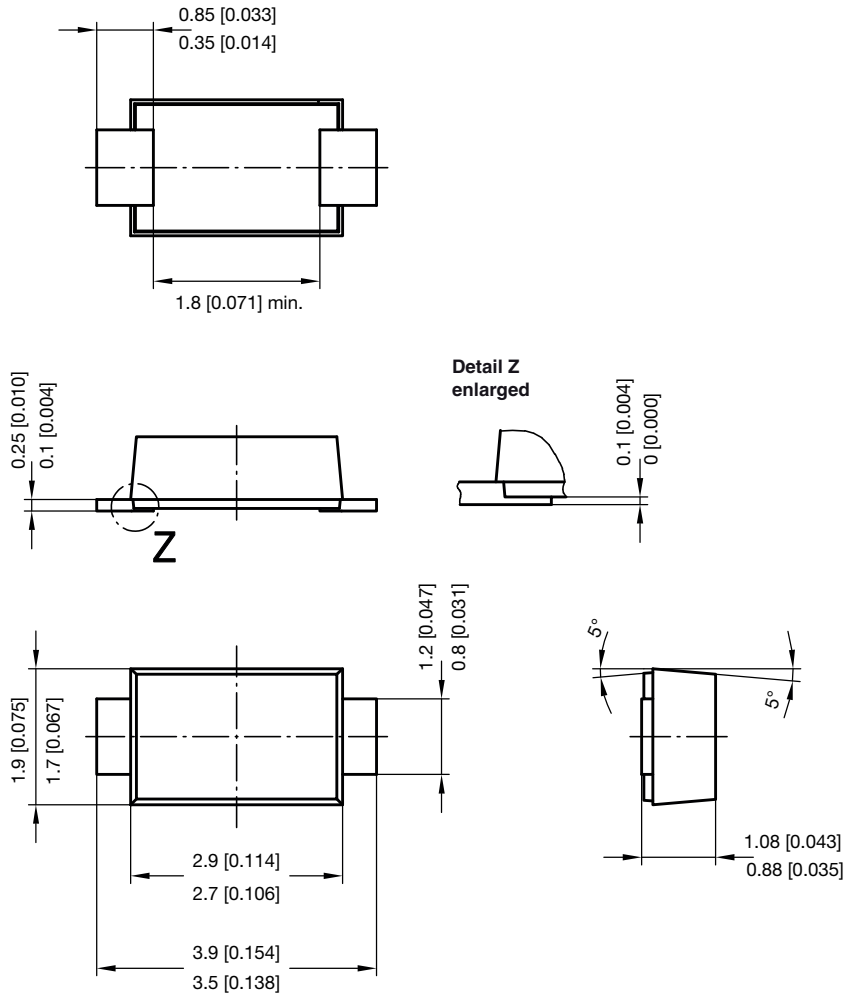
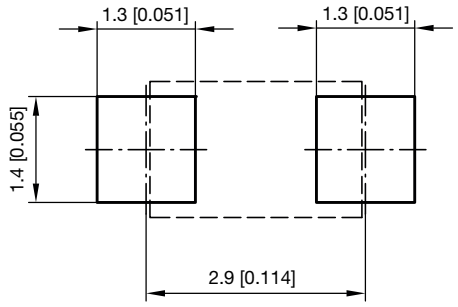
PACKAGE DIMENSIONS in millimeters (inches): **SMF (DO-219AB)**



foot print recommendation:

Reflow soldering



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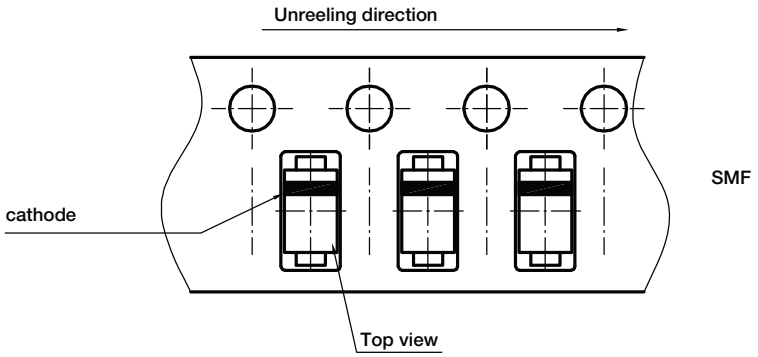
ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)



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