

BZT52-FL Series

500mW Surface Mount
Zener Diodes 2.4V- 75V

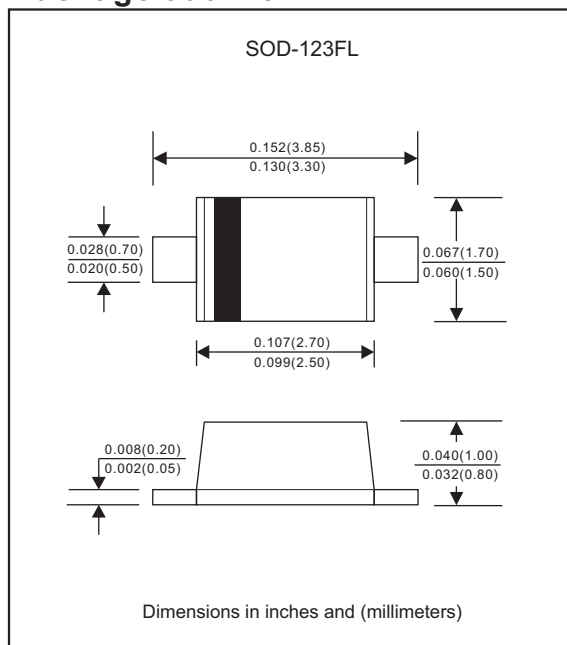
Features

- Wide Zener Voltage Range Selection, 2.4V to 75V
- Flat Lead SOD-123FL Plastic Package
- Surface Device Type Mounting
- 5% tolerance of Zener voltage for suffix "C" ex: BZT52C2V4-FL
- 2% tolerance of Zener voltage for suffix "B" ex: BZT52B2V4-FL
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen free parts, ex. BZT52C2V4-FL-H.

Mechanical data

- Epoxy:UL94-VO rated flame retardant
- Case : Molded plastic, SOD-123FL
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.009 gram

Package outline



Maximum ratings (at $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 10 \text{ mA}$	V_F			0.9	V
Power Dissipation	$T_A = 25^{\circ}\text{C}$	P_D			500	mW
Thermal resistance	Junction to ambient Junction to case	$R_{\theta JA}$ $R_{\theta JC}$		250 200		$^{\circ}\text{C/W}$
Operating junction temperature range		T_J	-65		+150	$^{\circ}\text{C}$
Storage temperature range		T_{STG}	-65		+150	$^{\circ}\text{C}$

Notes:1. Valid provided that electrodes are kept at ambient temperature

BZT52-FL Series

Electrical characteristics (at $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part No.	Marking code	Zener voltage			Test current	Zener impedance			Leakage current	
		V _Z @ I _{ZT}				I _{ZT}	Z _{ZT} @ I _{ZT}	Z _{ZK} @ I _{ZK}	I _{ZK}	I _R
		Min.(V)	Nom.(V)	Max.(V)	mA	Max.(Ω)	Max.(Ω)	mA	Max.(uA)	Volts
BZT52C2V4-FL	2V4Z,MH	2.28	2.4	2.52	5	100	564	1.0	45	1.0
BZT52C2V7-FL	2V7Z,MJ	2.57	2.7	2.84	5	100	564	1.0	18	1.0
BZT52C3V0-FL	3V0Z,MK	2.85	3.0	3.15	5	100	564	1.0	9	1.0
BZT52C3V3-FL	3V3Z,MM	3.14	3.3	3.47	5	95	564	1.0	4.5	1.0
BZT52C3V6-FL	3V6Z,MN	3.42	3.6	3.78	5	90	564	1.0	4.5	1.0
BZT52C3V9-FL	3V9Z,MP	3.71	3.9	4.10	5	90	564	1.0	2.7	1.0
BZT52C4V3-FL	4V3Z,MR	4.09	4.3	4.52	5	90	564	1.0	2.7	1.0
BZT52C4V7-FL	4V7Z,MX	4.47	4.7	4.94	5	80	470	1.0	2.7	2.0
BZT52C5V1-FL	5V1Z,MY	4.85	5.1	5.36	5	60	451	1.0	1.8	2.0
BZT52C5V6-FL	5V6Z,MZ	5.32	5.6	5.88	5	40	376	1.0	0.9	2.0
BZT52C6V2-FL	6V2Z,NA	5.89	6.2	6.51	5	10	141	1.0	2.7	4.0
BZT52C6V8-FL	6V8Z,NB	6.46	6.8	7.14	5	15	75	1.0	1.8	4.0
BZT52C7V5-FL	7V5Z,NC	7.11	7.5	7.86	5	15	75	1.0	0.9	5.0
BZT52C8V2-FL	8V2Z,ND	7.79	8.2	8.61	5	15	75	1.0	0.63	5.0
BZT52C9V1-FL	9V1Z,NE	8.65	9.1	9.56	5	15	94	1.0	0.45	6.0
BZT52C10-FL	10VZ,NF	9.50	10	10.50	5	20	141	1.0	0.18	7.0
BZT52C11-FL	11VZ,NH	10.45	11	11.55	5	20	141	1.0	0.09	8.0
BZT52C12-FL	12VZ,NJ	11.40	12	12.60	5	25	141	1.0	0.09	8.0
BZT52C13-FL	13VZ,NK	12.35	13	13.65	5	30	160	1.0	0.09	8.0
BZT52C15-FL	15VZ,NM	14.25	15	15.57	5	30	188	1.0	0.045	10.5
BZT52C16-FL	16VZ,NN	15.20	16	16.80	5	40	188	1.0	0.045	11.2
BZT52C18-FL	18VZ,NP	17.10	18	18.90	5	45	212	1.0	0.045	12.6
BZT52C20-FL	20VZ,NR	19.00	20	21.00	5	55	212	1.0	0.045	14.0
BZT52C22-FL	22VZ,NX	20.90	22	23.10	5	55	235	1.0	0.045	15.4
BZT52C24-FL	24VZ,NY	22.80	24	25.20	5	70	235	1.0	0.045	16.8
BZT52C27-FL	27VZ,NZ	25.65	27	28.35	2	80	282	0.5	0.045	18.9
BZT52C30-FL	30VZ,PA	28.50	30	31.50	2	80	282	0.5	0.045	21.0
BZT52C33-FL	33VZ,PB	31.35	33	34.65	2	80	306	0.5	0.045	23.0
BZT52C36-FL	36VZ,PC	34.20	36	37.80	2	90	329	0.5	0.045	25.2
BZT52C39-FL	39VZ,PD	37.05	39	40.95	2	130	329	0.5	0.045	27.3
BZT52C43-FL	43VZ,6A	40.85	43	45.15	2	150	353	0.5	0.045	30.1
BZT52C47-FL	47VZ,6B	44.65	47	49.35	2	170	353	0.5	0.045	33.0
BZT52C51-FL	51VZ,6C	48.45	51	53.55	2	180	376	0.5	0.045	35.7
BZT52C56-FL	56VZ,6D	53.20	56	58.80	2	200	400	0.5	0.045	39.2
BZT52C62-FL	62VZ,6E	58.90	62	65.10	2	215	423	0.5	0.045	43.4
BZT52C68-FL	68VZ,6F	64.60	68	71.40	2	240	447	0.5	0.045	47.6
BZT52C75-FL	75VZ,6H	71.25	75	78.75	2	255	470	0.5	0.045	52.5

Notes:

1. The Zener Voltage (V_Z) is tested under pulse condition of 10ms.
2. The device numbers listed have a standard tolerance on the nominal zener voltage of $\pm 5\%$.
3. The zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current (I_{ZT} or I_{ZK}) is superimposed to I_{ZT} or I_{ZK} .

BZT52-FL Series

Electrical characteristics (at $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part No.	Marking code	Zener voltage			Test current	Zener impedance			Leakage current	
		V _Z @ I _{ZT}				I _{ZT}	Z _{ZT} @ I _{ZT}	Z _{ZK} @ I _{ZK}	I _{ZK}	I _R
		Min.(V)	Nom.(V)	Max.(V)	mA	Max.(Ω)	Max.(Ω)	mA	Max.(uA)	Volts
BZT52B2V4-FL	2V4B,2WX	2.35	2.4	2.45	5	100	564	1.0	45	1.0
BZT52B2V7-FL	2V7B,2W1	2.65	2.7	2.75	5	100	564	1.0	18	1.0
BZT52B3V0-FL	3V0B,2W2	2.94	3.0	3.06	5	100	564	1.0	9	1.0
BZT52B3V3-FL	3V3B,2W3	3.23	3.3	3.37	5	95	564	1.0	4.5	1.0
BZT52B3V6-FL	3V6B,2W4	3.53	3.6	3.67	5	90	564	1.0	4.5	1.0
BZT52B3V9-FL	3V9B,2W5	3.82	3.9	3.98	5	90	564	1.0	2.7	1.0
BZT52B4V3-FL	4V3B,2W6	4.21	4.3	4.39	5	90	564	1.0	2.7	1.0
BZT52B4V7-FL	4V7B,2W7	4.61	4.7	4.79	5	80	470	1.0	2.7	2.0
BZT52B5V1-FL	5V1B,2W8	5.00	5.1	5.20	5	60	451	1.0	1.8	2.0
BZT52B5V6-FL	5V6B,2W9	5.49	5.6	5.71	5	40	376	1.0	0.9	2.0
BZT52B6V2-FL	6V2B,2WA	6.08	6.2	6.32	5	10	141	1.0	2.7	4.0
BZT52B6V8-FL	6V8B,2WB	6.66	6.8	6.94	5	15	75	1.0	1.8	4.0
BZT52B7V5-FL	7V5B,2WC	7.35	7.5	7.65	5	15	75	1.0	0.9	5.0
BZT52B8V2-FL	8V2B,2WD	8.04	8.2	8.36	5	15	75	1.0	0.63	5.0
BZT52B9V1-FL	9V1B,2WE	8.92	9.1	9.28	5	15	94	1.0	0.45	6.0
BZT52B10-FL	10VB,2WF	9.80	10	10.20	5	20	141	1.0	0.18	7.0
BZT52B11-FL	11VB,2WG	10.78	11	11.22	5	20	141	1.0	0.09	8.0
BZT52B12-FL	12VB,2WH	11.76	12	12.24	5	25	141	1.0	0.09	8.0
BZT52B13-FL	13VB,2WI	12.74	13	13.26	5	30	160	1.0	0.09	8.0
BZT52B15-FL	15VB,2WJ	14.70	15	15.30	5	30	188	1.0	0.045	10.5
BZT52B16-FL	16VB,2WK	15.68	16	16.32	5	40	188	1.0	0.045	11.2
BZT52B18-FL	18VB,2WL	17.64	18	18.36	5	45	212	1.0	0.045	12.6
BZT52B20-FL	20VB,2WM	19.60	20	20.40	5	55	212	1.0	0.045	14.0
BZT52B22-FL	22VB,2WN	21.56	22	22.44	5	55	235	1.0	0.045	15.4
BZT52B24-FL	24VB,2WO	23.52	24	24.48	5	70	235	1.0	0.045	16.8
BZT52B27-FL	27VB,2WP	26.46	27	27.54	2	80	282	0.5	0.045	18.9
BZT52B30-FL	30VB,2WQ	29.40	30	30.60	2	80	282	0.5	0.045	21.0
BZT52B33-FL	33VB,2WR	32.34	33	33.66	2	80	306	0.5	0.045	23.0
BZT52B36-FL	36VB,2WS	35.28	36	36.72	2	90	329	0.5	0.045	25.2
BZT52B39-FL	39VB,2WT	38.22	39	39.78	2	130	329	0.5	0.045	27.3
BZT52B43-FL	43VB,2WU	42.14	43	43.86	2	150	353	0.5	0.045	30.1
BZT52B47-FL	47VB,2WV	46.06	47	47.94	2	170	353	0.5	0.045	33.0
BZT52B51-FL	51VB,2X1	49.98	51	52.02	2	180	376	0.5	0.045	35.7
BZT52B56-FL	56VB,2X2	54.88	56	57.12	2	200	400	0.5	0.045	39.2
BZT52B62-FL	62VB,2X3	60.76	62	63.24	2	215	423	0.5	0.045	43.4
BZT52B68-FL	68VB,2X4	66.64	68	69.36	2	240	447	0.5	0.045	47.6
BZT52B75-FL	75VB,2X5	73.50	75	76.50	2	255	470	0.5	0.045	52.5

Notes:

1. The Zener Voltage (V_Z) is tested under pulse condition of 10ms.
2. The device numbers listed have a standard tolerance on the nominal zener voltage of $\pm 2\%$.
3. The zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current (I_{ZT} or I_{ZK}) is superimposed to I_{ZT} or I_{ZK} .

Rating and characteristic curves (BZT52-FL Series)

FIG. 1-POWER DISSIPATION VS. AMBIENT TEMP.

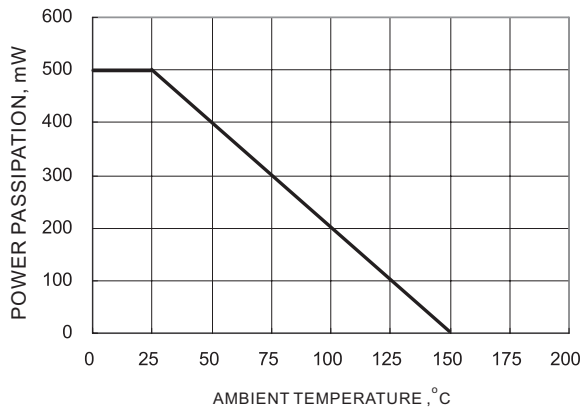


FIG. 2-EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

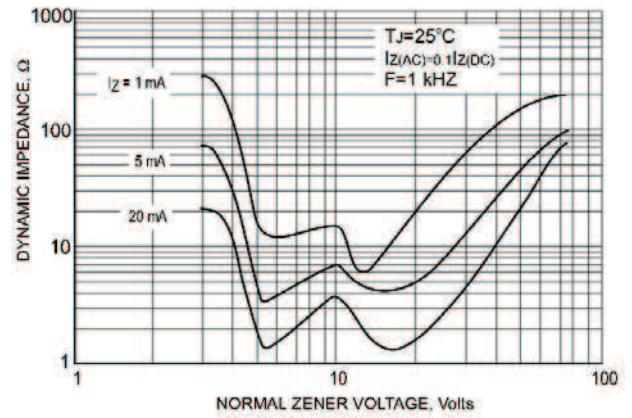


FIG. 3-TYPICAL FORWARD VOLTAGE

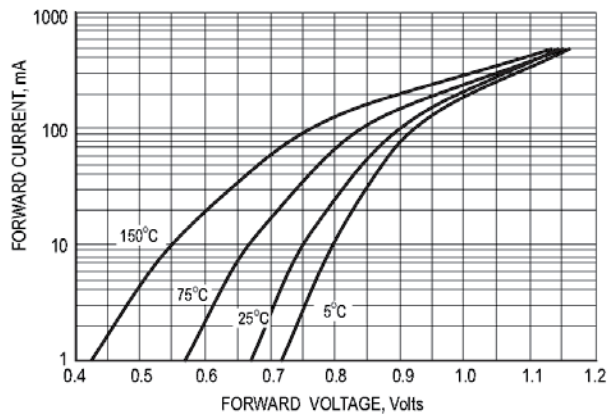


FIG. 4-TYPICAL CAPACITANCE

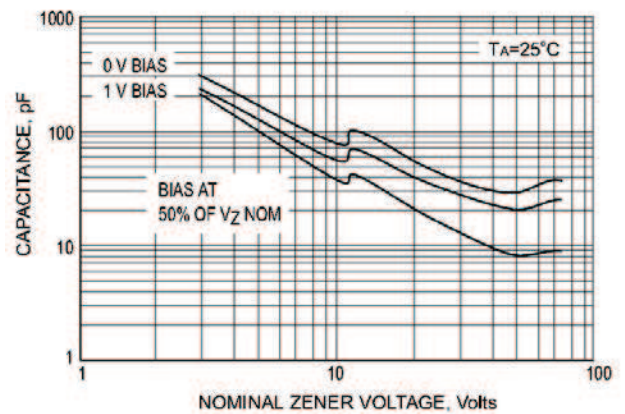


FIG. 5-ZENER BREAKDOWN CHARACTERISTICS

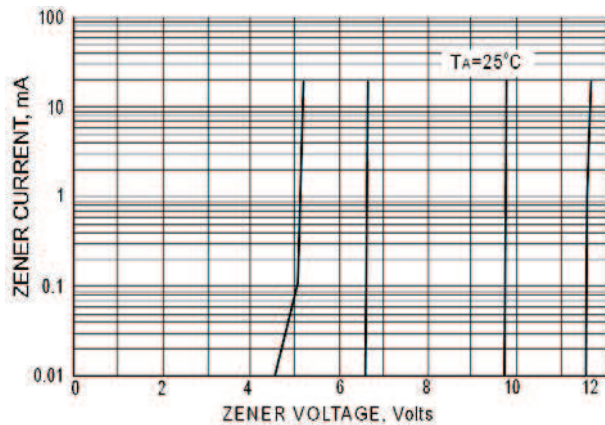
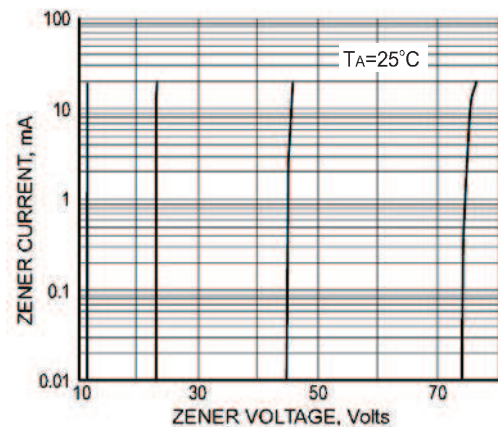
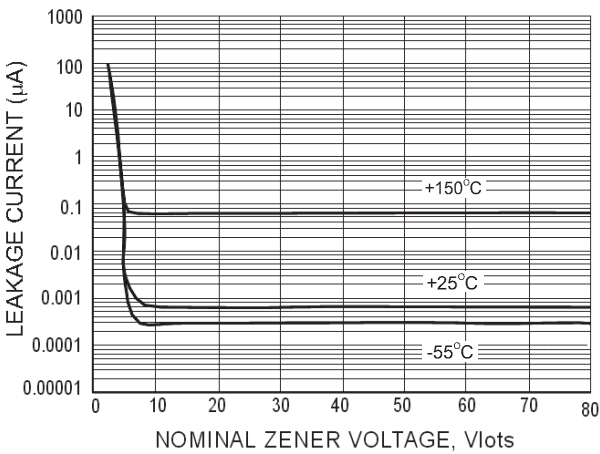


FIG. 6-ZENER BREAKDOWN CHARACTERISTICS



Rating and characteristic curves (BZT52-FL Series)

FIG. 7-TYPICAL LEAKGE CURRENT

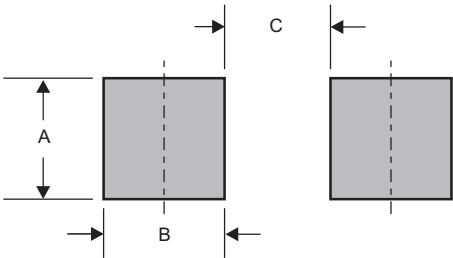


BZT52-FL Series

Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

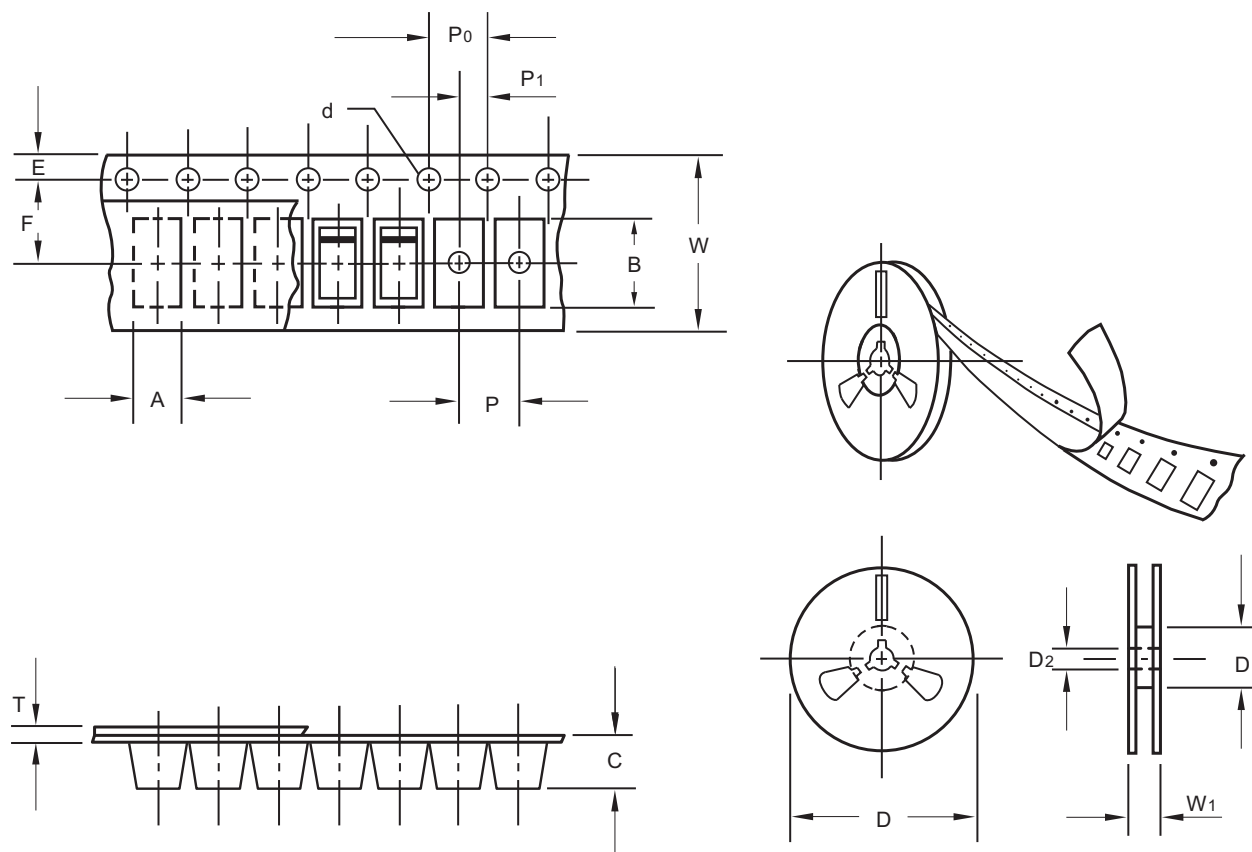


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-123FL	0.028 (0.70)	0.028 (0.70)	0.091 (2.30)

BZT52-FL Series

Packing information



unit:mm

Item	Symbol	Tolerance	SOD-123FL
Carrier width	A	0.1	2.00
Carrier length	B	0.1	3.85
Carrier depth	C	0.1	1.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

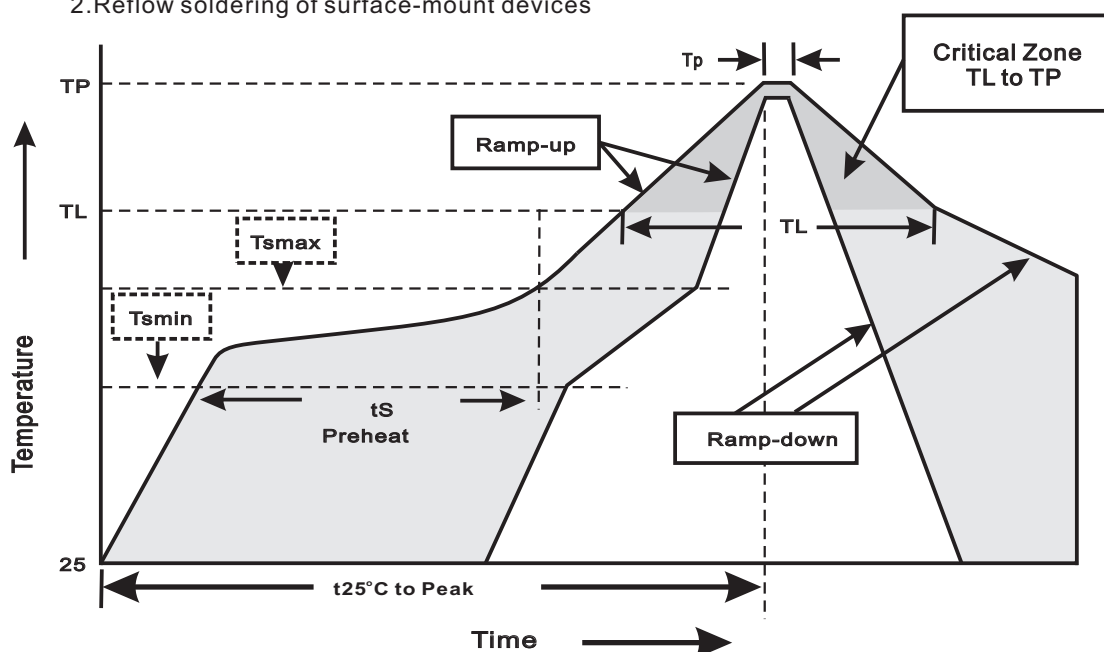
BZT52-FL Series

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOD-123FL	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	9.5

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

BZT52-FL Series

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm 5^{\circ}\text{C}$ for $10\pm 2\text{sec.}$ immerse body into solder $1/16''\pm 1/32''$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R=80\%$ rate at $T_J=150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ at $T_A=121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A=85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031