

Formosa MS

TSS0080D-BF Thru TSS3800D-BF

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TSS0080D-BF Thru TSS3800D-BF

Thyristor Surge Suppressors
For 8KV (10 / 700 μ s)

Features

- Quick response to surge voltage (ns level).
- Excellent capability of absorbing transient surge.
- Eliminates over voltage caused by fast rising transients.
- UL 497B item recognized.
- Bidirectional protection.
- IEC61000-4-2(ESD) $\pm$ 30kV(air), $\pm$ 30kV(contact).
- Non degenerative.
- Meet MSL 1 Requirements.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. TSS0080D-BF-H.

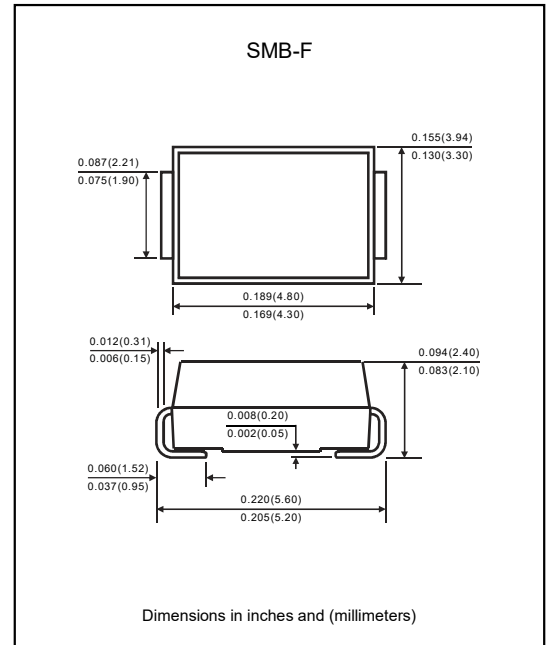
Applications

- Modems, telephones, line cards.
- Answering machines and FAX machines.
- T1/E1, xDSL and more.....

Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : Molded plastic, DO-214AA / SMB-F
- Terminals : Solder plated, solder able per J-STD-002.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.

Package outline



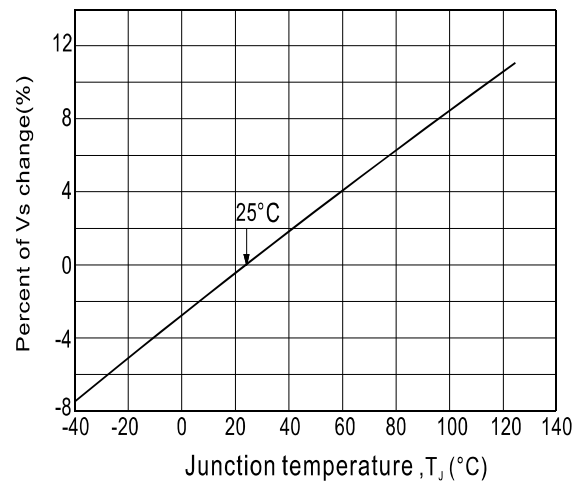
Maximum ratings and surge ratings (T_A=25°C, RH=45%~75%, Unless otherwise noted)

Parameter	Symbol	Value	Unit
Surge current (2/10 μ s)	I _{PP1} (Min.)	800	A
Surge current (8/20 μ s)	I _{PP2} (Min.)	700	A
Surge current (10/1000 μ s)	I _{PP3} (Min.)	200	A
Surge current (10/700 μ s)	I _{PP4} (Min.)	350	A
Surge voltage (10/700 μ s)	V _{PP}	8	kV
Operating junction temperature	T _J	+125	°C
Storage temperature range	T _{STG}	-60 to +150	°C

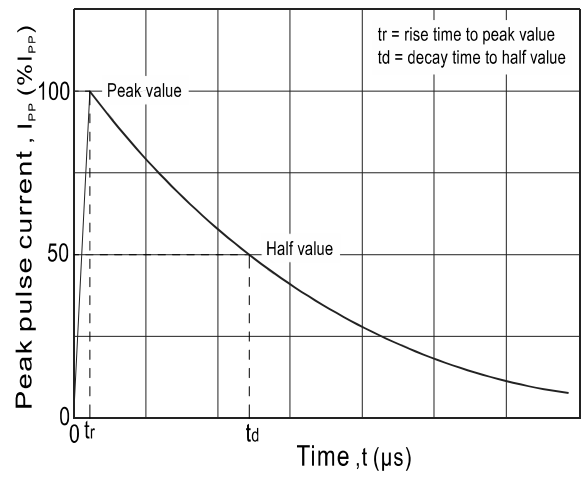
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Rating and characteristic curves

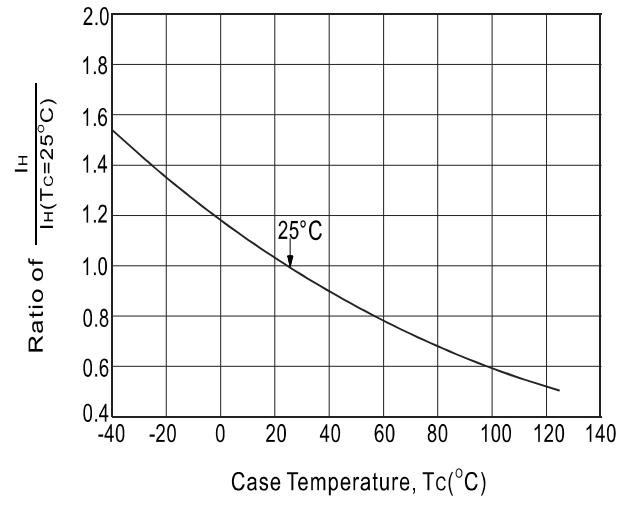
Normalized Vs change vs. Junction temperature



tr × td pulse waveform



Normalized DC holding current vs. Case temperature



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Electrical characteristics ($T_A=25^\circ\text{C}$, continued)

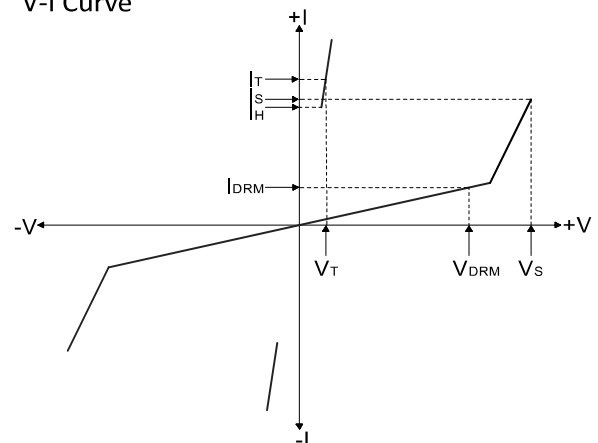
Part Number	Marking Code	$I_{\text{DRM}} @ V_{\text{DRM}}$		$V_s @ I_s$ (Note 1)		$V_T @ I_T$		I_H (mA) Min.	C_o (pF) Max. (Note 2)
		$I_{\text{DRM}} (\mu\text{A})$ Max.	$V_{\text{DRM}} (\text{V})$	$V_s (\text{V})$ Max.	$I_s (\text{mA})$ Max.	$V_T (\text{V})$ Max.	$I_T (\text{A})$ Max.		
TSS0080D-BF	P-8S	1	6	15	800	4	2.2	50	150
TSS0640D-BF	P06D	1	58	77	800	4	2.2	50	150
TSS0720D-BF	P07D	1	65	87	800	4	2.2	50	150
TSS0900D-BF	P09D	1	75	98	800	4	2.2	50	140
TSS1100D-BF	P11D	1	90	130	800	4	2.2	50	110
TSS1300D-BF	P13D	1	120	160	800	4	2.2	50	100
TSS1500D-BF	P15D	1	140	180	800	4	2.2	50	90
TSS1800D-BF	P18D	1	170	220	800	4	2.2	50	90
TSS2300D-BF	P23D	1	190	260	800	4	2.2	50	80
TSS2600D-BF	P26D	1	220	300	800	4	2.2	50	70
TSS3100D-BF	P31D	1	275	350	800	4	2.2	50	60
TSS3500D-BF	P35D	1	320	400	800	4	2.2	50	60
TSS3800D-BF	P38D	1	340	450	800	4	2.2	50	60

Note: 1. V_s is measured at 100kV/s.2. Off-state capacitance is measured in $V_{\text{DC}}=2\text{V}$, $V_{\text{RMS}}=1\text{V}$, $f=1.0\text{MHz}$.

V-I Characteristics

Parameter	Definition
V_{DRM}	Peak off-state voltage - Maximum voltage that can be applied while maintaining off state.
V_s	Switching voltage - Maximum voltage prior to switching to on state.
V_T	On-state voltage - Maximum voltage measured at rated on-state current.
I_{DRM}	Leakage current - Maximum peak off-state current measured at V_{DRM} .
I_s	Switching current - Maximum current required to switch to on state.
I_T	On-state current - Maximum rated continuous on state current.
I_H	Holding current - Typical current required to maintain on state.
C_o	Off-state capacitance - Typical capacitance measured in off state.

V-I Curve

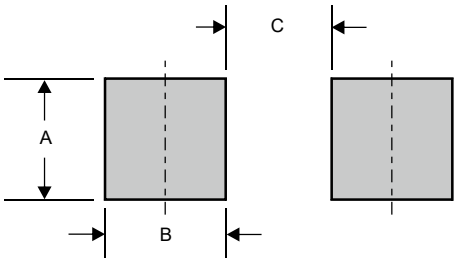


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Pinning information

Pin	Simplified outline	Symbol
Bi-Directional		

Suggested solder pad layout

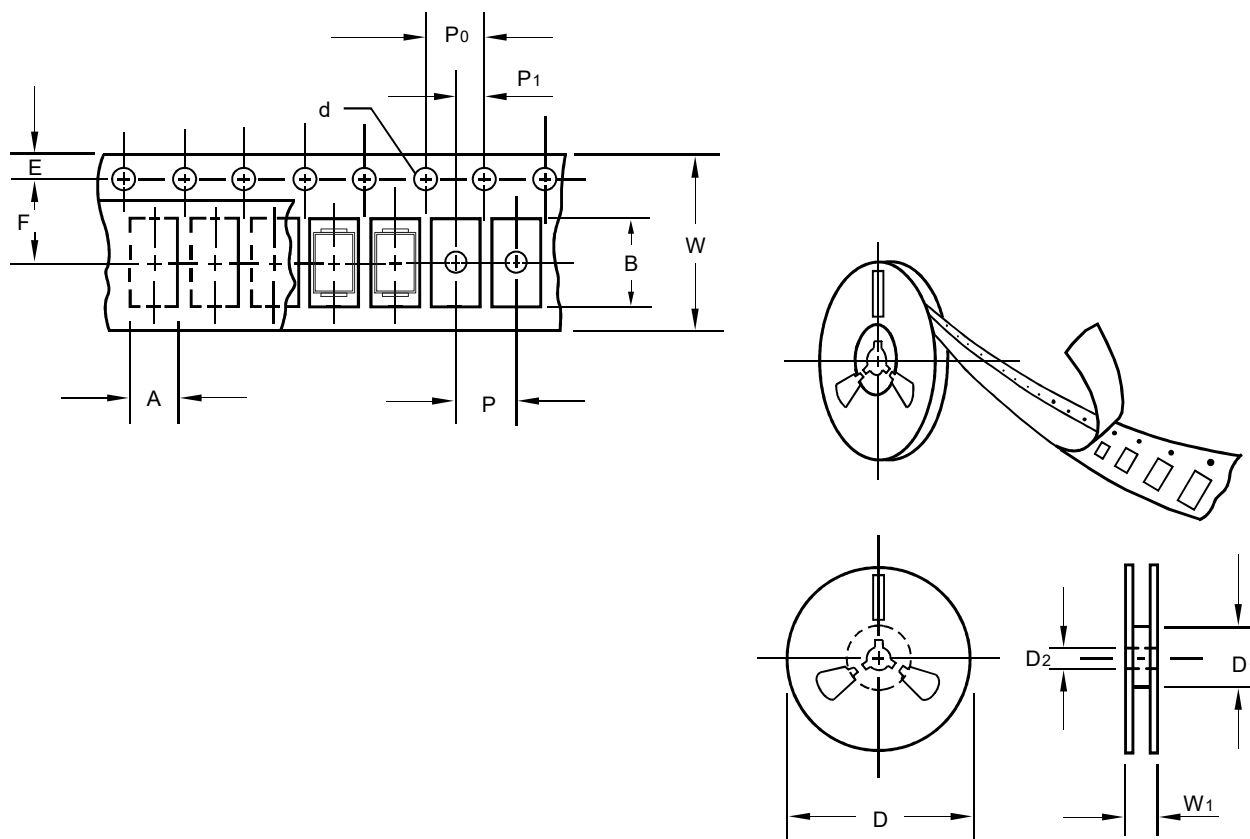


Dimensions in inches and (millimeters)

PACKAGE	A(Min.)	B(Max.)	C(Min.)
SMB-F	0.091 (2.30)	0.087 (2.20)	0.102(2.60)

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Packing information



unit:mm

Item	Symbol	Tolerance	SMB-F
Carrier width	A	0.3	3.76
Carrier length	B	0.3	5.69
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D ₁	min	50.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D ₁	min	-
Feed hole diameter	D ₂	0.5	13.30
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Tape width	W	0.3	12.00
Reel width	W ₁	2.0	15.70

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

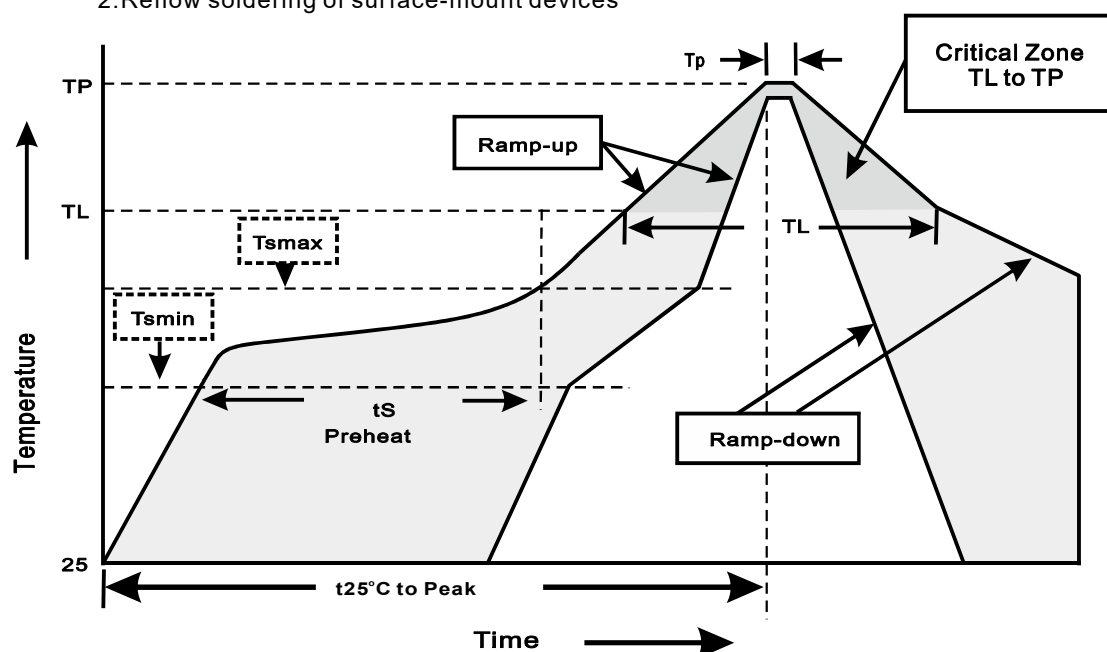
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Reel packing

PACKAGE	REEL SIZE	Q'TY/REEL (pcs)	BOX SIZE (m/m)	Q'TY/BOX (pcs)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
SMB-F	13"	3,000	335*335*38	6,000	330	350*330*360	48,000

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(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

TSS0080D-BF Thru TSS3800D-BF**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{BR}=V_{BR\text{Nom}}*80\%$ 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°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