

TSS0060SB-BF Thru TSS4200SB-BF

List

List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Applications.....	2
Description.....	2
Maximum rating and electrical characteristics.....	2
Part number & Electrical parameter.....	3
V-I Characteristics.....	3
Typical device characteristics.....	4
Pinning information.....	5
Suggested solder pad layout.....	5
Packing information.....	6
Reel packing.....	7
Suggested thermal profiles for soldering processes.....	7
High reliability test capabilities.....	8

TSS0060SB-BF Thru TSS4200SB-BF

Thyristor Surge Suppressors For 4KV (10/700 μ s)

Features

- Quick response to surge voltage.
- Excellent capability of absorbing transient surge.
- Solid-state silicon technology, non degenerative.
- Eliminates over voltage caused by fast rising transients.
- For surface mounted applications to optimize board space.
- Cannot be damaged by voltage.
- Low leakage current : $I = 5\mu A$ Max.
- Low on-state voltage.
- Low capacitance.
- Bidirectional crowbar protection.
- Response time is $< 1\mu s$.
- GR 1089 intra-building.
- YD/T 950 IEC 61000-4-5.
- YD/T 993 ITU K.20/21.
- YD/T 1082 TIA-968-A
- Meet MSL 1 Requirements.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. TSS0060SB-BF-H.

Mechanical data

- Epoxy : Plastic package has underwriters laboratory flamm ability 94V-0.
- Meets MSL level 1, per J-STD-020, LF Maximum peak 260°C.
- Case : Molded plastic, DO-214AA / SMB-F
- Terminals : Solder plated, solder able per J-STD-002.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.
- Weight : Approximated 0.109 gram.

Description

DO-214AA/SMB-F Thyristor solid state protection thyristor protect telecommunications equipment such as modems, line cards, fax machines, and other CPE. This Series devices are used to enable equipment to meet various regulatory requirements including GR1089, ITUK.20, K.21 and K.45, IEC 60950, and TIA-968 (formerly known as FCC Part 68).

Maximum ratings and electrical characteristics ($T_A=25^\circ C$, Unless otherwise noted)

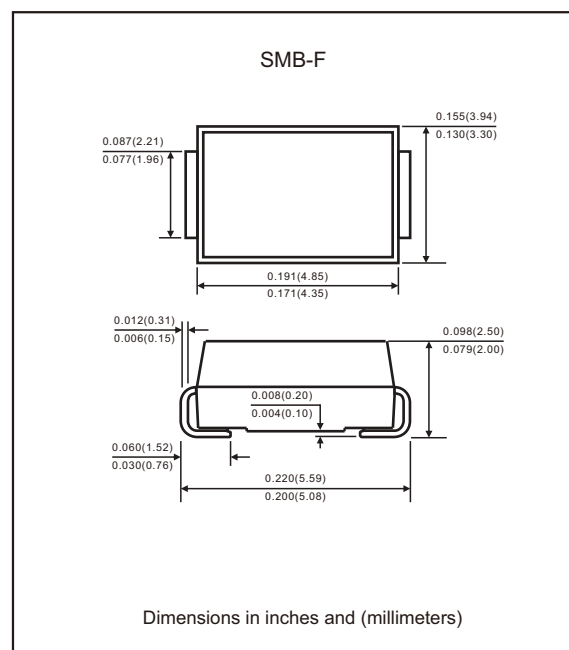
Parameter	Symbol	Value	Unit
Surge current (10/1000 μ s)	I_{PP1}	80	A
Surge current (10/560 μ s)	I_{PP2}	100	A
Surge current (8/20 μ s)	I_{PP3}	250	A
Surge current (2/10 μ s)	I_{PP4}	250	A
Surge current (10/700 μ s)	I_{PP5}	100	A
Surge voltage (10 / 700 μ s)	V_{PP}	4	KV
Operating junction temperature	T_J	125	°C
Storage temperature range	T_S	-55 to 125	°C
junction to ambient on printed circuit	$R_{\theta JA}$	90	°C

Note : 1.Maximum rating are those values beyond which device damage can occur.

2.Maximum rating applied to the device are individual stress limit values (Not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

3.Other voltages may be available upon request.

Package outline



Applications

- Serial ports.
- Data lines and security system .
- Network and telecom.
- Audio / Video line.

TSS0060SB-BF Thru TSS4200SB-BF

Part number & Electrical parameter ($T_A=25^{\circ}\text{C}$, RH=45% ~75%)

Part Number	Marking Code	V_{DRM} (V) Min.	I_{DRM} (μA) Max.	V_s (V) Max.	I_s (mA)	V_T (V) Max.	I_T (A)	I_H (mA) Min.	C_o (pF) Typ.
TSS0060SB-BF	P006B	6	5	15	800	4	2.2	40	80
TSS0080SB-BF	P008B	6	5	25	800	4	2.2	40	80
TSS0150SB-BF	P01B	15	5	25	800	4	2.2	40	80
TSS0300SB-BF	P03B	25	5	40	800	4	2.2	40	80
TSS0640SB-BF	P06B	58	5	77	800	4	2.2	120	60
TSS0720SB-BF	P07B	65	5	88	800	4	2.2	120	60
TSS0900SB-BF	P09B	75	5	98	800	4	2.2	120	55
TSS1100SB-BF	P11B	90	5	130	800	4	2.2	120	55
TSS1300SB-BF	P13B	120	5	160	800	4	2.2	120	55
TSS1500SB-BF	P15B	140	5	180	800	4	2.2	120	60
TSS1800SB-BF	P18B	170	5	220	800	4	2.2	120	60
TSS2300SB-BF	P23B	190	5	260	800	4	2.2	120	55
TSS2600SB-BF	P26B	220	5	300	800	4	2.2	120	50
TSS3100SB-BF	P31B,W31SB	275	5	350	800	4	2.2	120	45
TSS3500SB-BF	P35B	320	5	400	800	4	2.2	120	40
TSS4200SB-BF	P42B	400	5	520	800	4	2.2	≤ 50	40

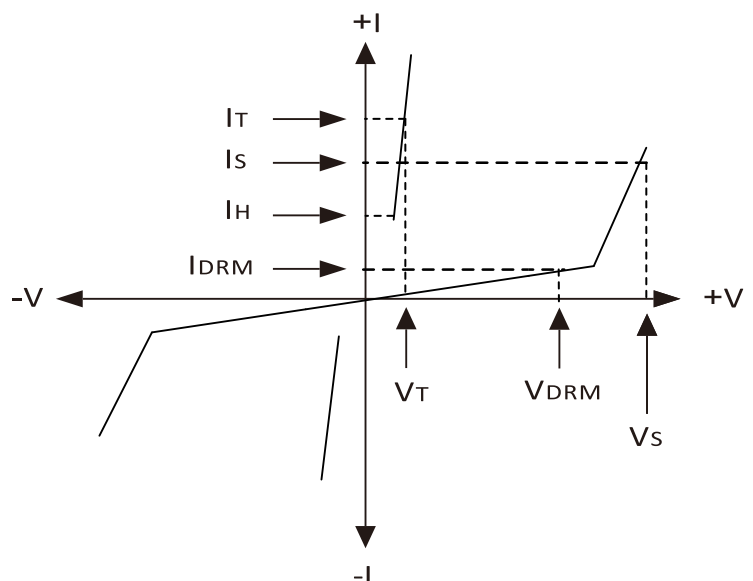
Note : 1. V_s is measured at 100KV/s.

2. Off-state capacitance is measured in $V_{\text{DC}}=2\text{V}$, $V_{\text{RMS}}=1\text{V}$, $f=1\text{MHz}$.

3. All measurements are made at an ambient temperature of 25°C .

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.
I_{PP}	Peak pulse current - Maximum rated peak impulse current.



TSS0060SB-BF Thru TSS4200SB-BF

Typical device characteristics

Fig.1- Normalized Vs Change vs. Junction Temperature

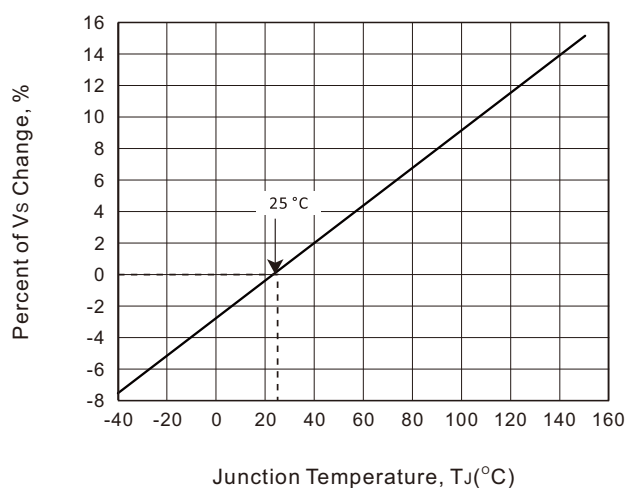
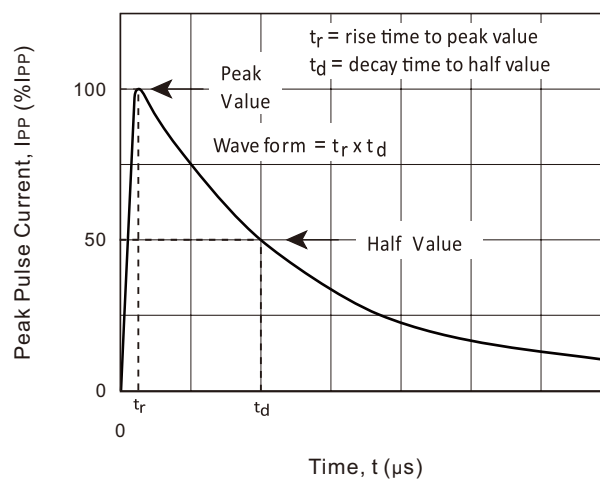
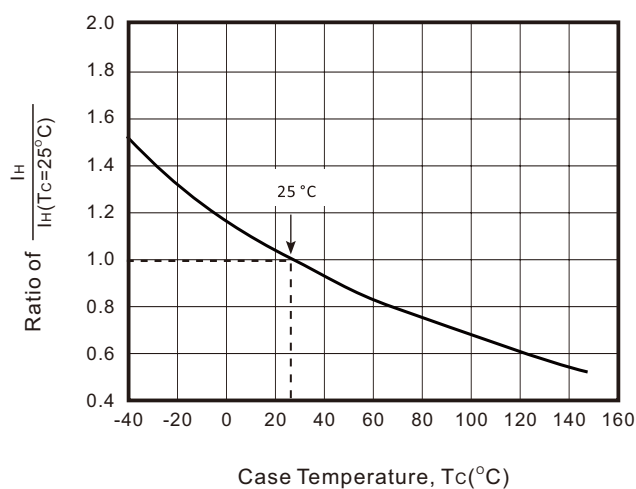
Fig.2- $t_r \times t_d$ Pulse Waveform

Fig.3- Normalized DC Holding current vs. Case Temperature

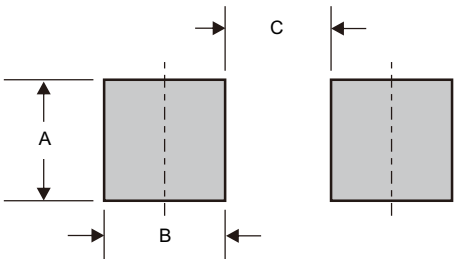


TSS0060SB-BF Thru TSS4200SB-BF

Pinning information

Pin	Simplified outline	Symbol
Bi-Directional		

Suggested solder pad layout

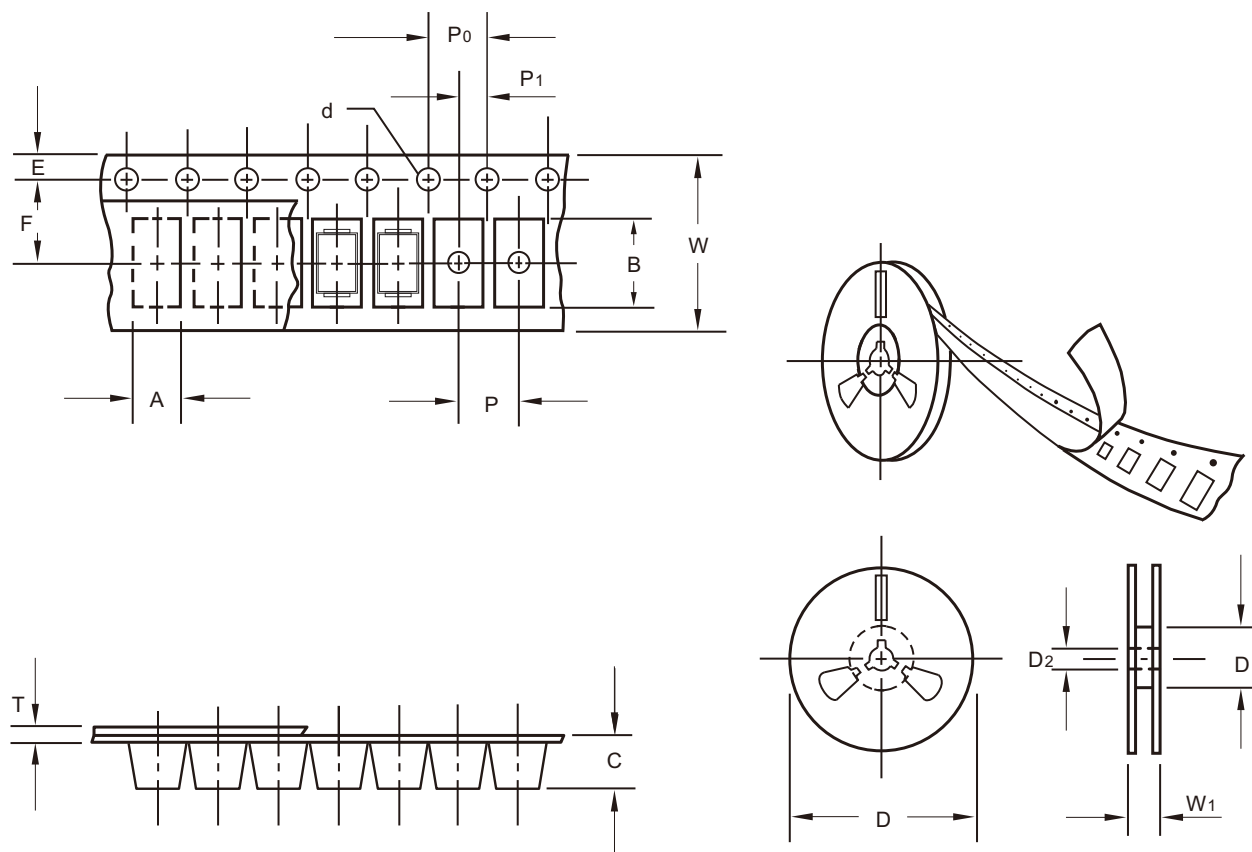


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMB-F	0.091 (2.30)	0.079 (2.00)	0.126(3.20)

TSS0060SB-BF Thru TSS4200SB-BF

Packing information



unit:mm

Item	Symbol	Tolerance	SMB-F
Carrier width	A	0.1	3.80
Carrier length	B	0.1	5.40
Carrier depth	C	0.1	2.45
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	13.00
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
Overall tape thickness	T	0.1	0.25
Tape width	W	0.3	12.00
Reel width	W ₁	2.0	16.80

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

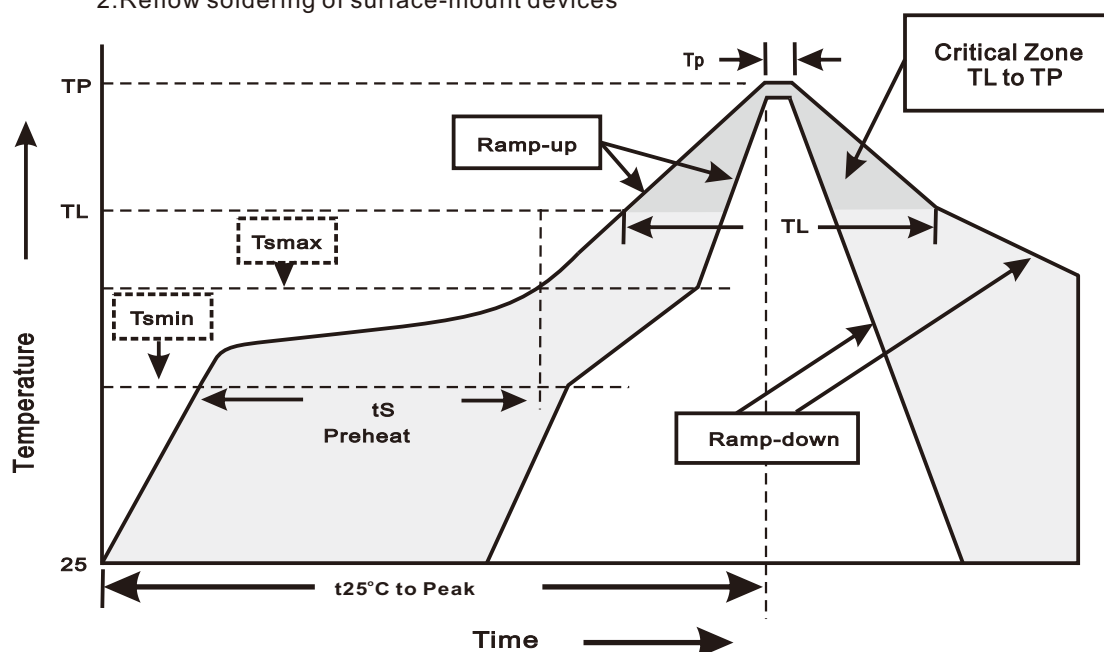
TSS0060SB-BF Thru TSS4200SB-BF

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)
SMB-F	13"	2,500	8.0	5,000	337*337*37	330	350*330*360	40,000	12.40

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

TSS0060SB-BF Thru TSS4200SB-BF**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm 5^{\circ}\text{C}$ for $10\pm 2\text{sec.}$	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	$V_{BR}=V_{BR\text{Nom}}*80\%$ 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 $+125^{\circ}\text{C}$ 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