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Data Sheet July 1999 File Number 3603.3

Bidirectional Transient Surge Suppressors (TO-202 Surgector)

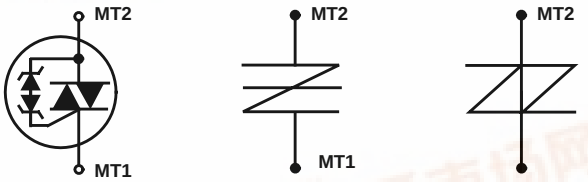
These surgector devices are designed to protect telecommunication equipment, data links, alarm systems, power supplies and other sensitive electrical circuits from damage by switching transients, lightning strikes, load changes, commutation spikes and line crosses.

Bidirectional surgector devices are constructed with a thyristor whose gate region contains a special diffused section which acts as a zener diode. This zener diode section permits anode voltage turn on of the structure.

Initial clamping by the zener diode section, and fast turn on by the thyristor, provide excellent voltage limiting even on very fast rise time transients. The thyristor also features high holding current, which allows the surgector to recover to its high impedance off state after a transient.

All these devices are supplied in a 2 lead, modified TO-202 package.

Equivalent Schematic Symbols



Features

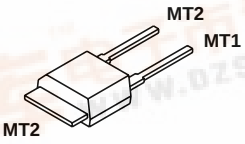
- Clamping Voltage . . . . . .230V or 270V
- Rated for Peak Transient Surge Current
- High Minimum Holding Current
- Low On-State Voltage
- UL Recognized File #E135010 to STD 497B

Applications

- Secondary Protectors for:
  - Telephone
  - FAX
  - Modem
  - Line Cards
  - SLIC
- Alarm Systems

Packaging

MODIFIED TO-202



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Absolute Maximum Ratings $T_C = 25^oC$

	SGT23B13	SGT27B13	SGT27B27	UNITS
Continuous Off State Voltage:				
V_{DM}	200	235	235	V
V_{RM}	200	235	235	V
Transient Peak Surge Current I_{TSM}				
1µs x 2µs (Note 1)	300	300	600	A
8µs x 20µs	200	200	400	A
10µs x 560µs	125	125	250	A
10µs x 1000µs	100	100	200	A
One Half Cycle 50Hz to 60Hz (Note 2)	60	60	60	A
One Second 50Hz to 60Hz, Halfwave	30	30	30	A
Operating Temperature (T_A)	-40 to 85	-40 to 85	-40 to 85	^oC
Storage Temperature Range (T_{STG})	-40 to 150	-40 to 150	-40 to 150	^oC

NOTES:

1. Unit designed not to fail open below: 900A.
2. One every 30s maximum.

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Specifications At Case Temperature, $T_C = 25^oC$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Off-State Current	I_{DM}, I_{RM}	Maximum Rated V_{DM}, V_{RM}				
		$T_A = 25^oC$	-	-	200	nA
		$T_A = 85^oC$	-	-	100	µA
Clamping Voltage	V_Z	$I_Z < 200µA$				
SGT27B27			270	-	325	V
SGT23B13			230	-	270	V
SGT27B13			270	-	325	V
Breakover Voltage	V_{BO}	dv/dt = 100V/µs				
SGT27B27			-	-	345	V
SGT23B13			-	-	240	V
SGT27B13			-	-	345	V
Holding Current	I_H					
SGT27B27			270	-	-	mA
SGT23B13			130	-	-	mA
SGT27B13			130	-	-	mA
On-State Voltage	V_T	$I_T = 10A$	-	-	2	V
Main Terminal Capacitance	C_O	$V_{DM} = V_{RM} = 50V$,				
SGT27B27		Frequency = 1MHz	-	80	-	pF
SGT23B13			-	50	-	pF
SGT27B13			-	50	-	pF

Performance Curves

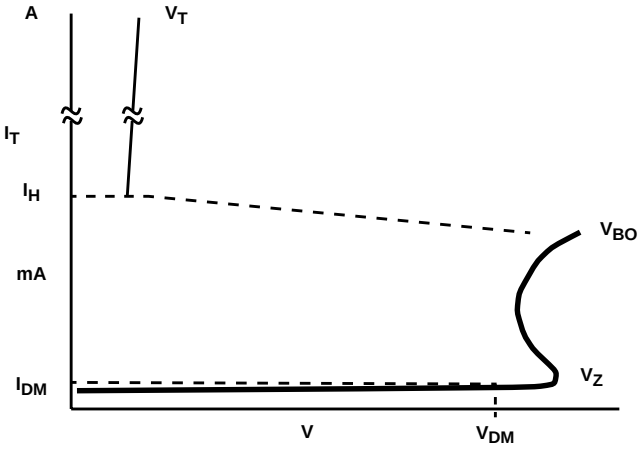


FIGURE 1. TYPICAL VOLT-AMPERE CHARACTERISTICS FOR ALL TYPES

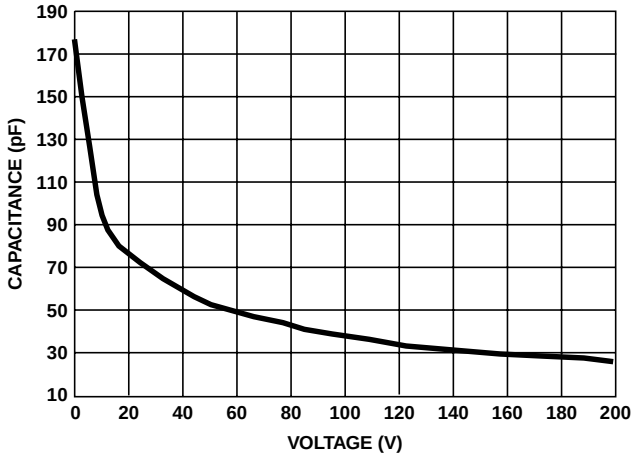


FIGURE 2. TYPICAL CAPACITANCE vs VOLTAGE FOR SGT23B13 AND SGT27B13

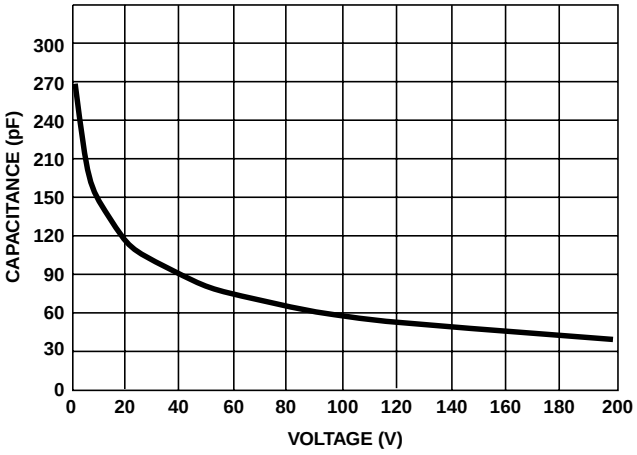


FIGURE 3. TYPICAL CAPACITANCE vs VOLTAGE FOR SGT27B27

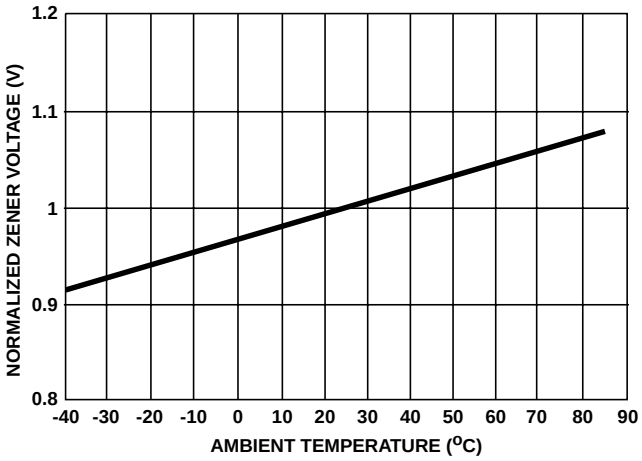


FIGURE 4. NORMALIZED ZENER VOLTAGE vs TEMPERATURE FOR ALL TYPES

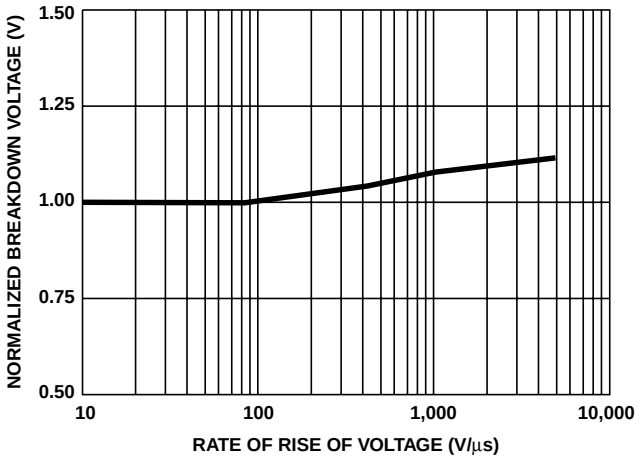


FIGURE 5. NORMALIZED V_{BO} vs dv/dt FOR ALL TYPES

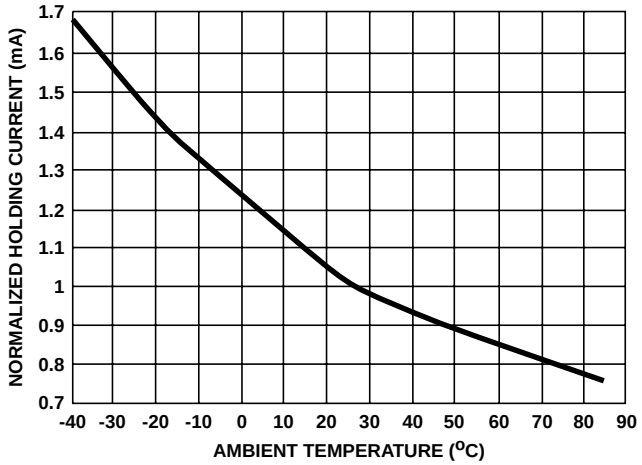
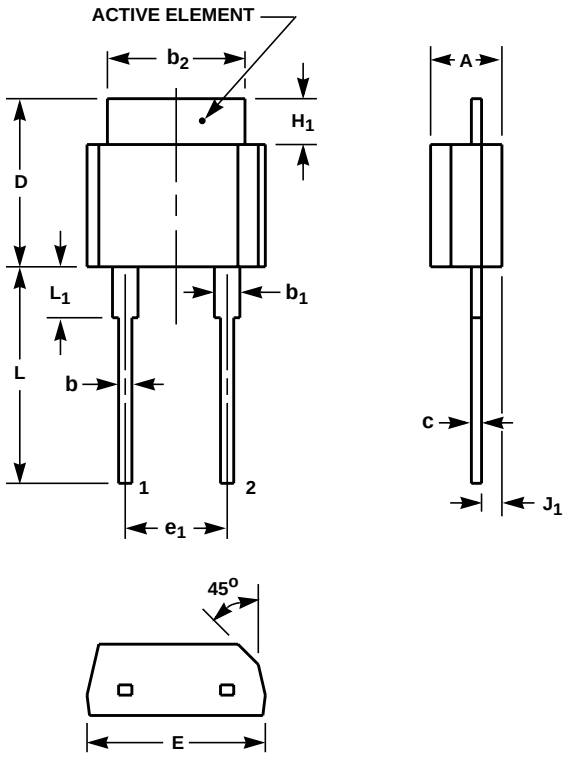


FIGURE 6. NORMALIZED HOLDING CURRENT vs TEMPERATURE FOR ALL TYPES

Mechanical Dimensions



TO-202 Modified

2 LEAD JEDEC STYLE TO-202 SHORT TAB PLASTIC PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.130	0.150	3.31	3.81	-
b	0.024	0.028	0.61	0.71	2, 3
b_1	0.045	0.055	1.15	1.39	1, 2, 3
b_2	0.270	0.280	6.86	7.11	-
c	0.018	0.022	0.46	0.55	1, 2, 3
D	0.320	0.340	8.13	8.63	-
E	0.340	0.360	8.64	9.14	-
e_1	0.200 BSC		5.08 BSC		4
H_1	0.080	0.100	2.04	2.54	-
J_1	0.039	0.049	1.00	1.24	5
L	0.410	0.440	10.42	11.17	-
L_1	0.080	0.100	2.04	2.54	1

NOTES:

1. Lead dimension and finish uncontrolled in L_1.
2. Lead dimension (without solder).
3. Add typically 0.002 inches (0.05mm) for solder coating.
4. Position of lead to be measured 0.250 inches (6.35mm) from bottom of dimension D.
5. Position of lead to be measured 0.100 inches (2.54mm) from bottom of dimension D.
6. Controlling dimension: Inch.
7. Revision 3 dated 10-94.

Ordering Information

SGT 27 B 27

- 27 — Holding Current in mA divided by 10
- B — **Type of Surgector**: U: Unidirectional S: SCR B: Bidirectional
- 27 — Off-State Voltage Rating Divided by 10
- SGT — Surgector

Terms and Symbols

V_{DM} (Maximum Off-State Voltage) - Maximum off-state voltage (DC or peak) which may be applied continuously.

V_{RM} (Maximum Reverse Voltage) - Maximum reverse-blocking voltage (DC or peak) which may be applied.

I_{TSM} (Maximum Peak Surge Current) - Maximum nonrepetitive current which may be allowed to flow for the time state.

T_A (Ambient Operating Temperature) - Ambient temperature range permitted during operation in a circuit.

T_{STG} (Storage Temperature) - Temperature range permitted during storage.

I_{DM} (Off-State Current) - Maximum value of off-state current that results from the application of the maximum off-state voltage (V_{DM}).

I_{RM} (Reverse Current) - Maximum value of reverse current that results from the application of the maximum reverse voltage (V_{RM}).

V_Z (Clamping Voltage) - Off-state voltage at a specified current.

V_{BO} (Breakdown Voltage) - Voltage at which the device switches from the off-state to the on-state.

I_H (Holding Current) - Minimum on-state current that will hold the device in the on-state after it has been latched on.

V_T (On-State Voltage) - Voltage across the main terminals for a specified on-state current.

C_O (Main Terminal Capacitance) - Capacitance between the main terminals at a specified off-state voltage.