

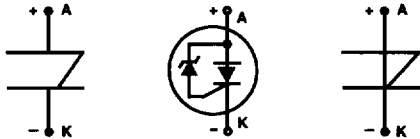
### Unidirectional Transient Surge Suppressors (TO-202 Surgector)

These surgector devices offer unidirectional clamping action and 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 power line crosses.

These surgector devices are monolithic compound structures consisting of 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 very high holding current allowing the surgector to recover to its high impedance off state after a transient. The surgector device's normal off-state condition in the forward blocking mode is a high impedance, low leakage state that prevents loading of the line.

These surgector types are supplied in the modified TO-202 package.

### Equivalent Schematic Symbols



### Features

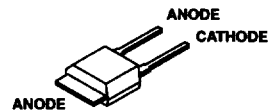
- Clamping Voltages: 33V, 60V, or 230V
- High Peak Transient Surge Current
- Minimum Holding Current: 130mA
- Low On-State Voltage
- UL Recognized File #E135010 to STD 497B

### Applications

- Telecommunications Equipment
- Data and Communication Links
- Modems
- Alarm Systems

### Packaging

MODIFIED TO-202



## SGT03U13, SGT06U13, SGT23U13

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

	SGT03U13	SGT06U13	SGT23U13	UNITS
Continuous Off State Voltage:				
$V_{DM}$ .....	30	58	225	V
$V_{RM}$ .....	1	1	1	V
Transient Peak Surge Current: .....	$I_{TSM}$			
1 $\mu\text{s}$ x 2 $\mu\text{s}$ (Note 1) .....	300	300	300	A
8 $\mu\text{s}$ x 20 $\mu\text{s}$ .....	200	200	200	A
10 $\mu\text{s}$ x 560 $\mu\text{s}$ .....	125	125	125	A
10 $\mu\text{s}$ x 1000 $\mu\text{s}$ .....	100	100	100	A
One Half Cycle .....	50Hz to 60Hz (Note 2)	60	60	A
One Second .....	50Hz to 60Hz, Halfwave	30	30	A
Operating Temperature ( $T_A$ ) .....		-40 to 85		$^\circ\text{C}$
Storage Temperature Range ( $T_{STG}$ ) .....		-40 to 150		$^\circ\text{C}$

#### NOTES:

- Unit designed not to fail open below: 450A.
- 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, $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	SGT10S10			UNITS
			MIN	TYP	MAX	
Off-State Current	$I_{DM}$	Maximum Rated $V_{DM}$ $T_A = 25^\circ\text{C}$ $T_A = 85^\circ\text{C}$	- -	- -	50 10	nA $\mu\text{A}$
Reverse Current	$I_{RM}$	$V_{RM} = 1\text{V}$ $T_A = 25^\circ\text{C}$ $T_A = 85^\circ\text{C}$	- -	- -	1 10	mA mA
Clamping Voltage SGT03U13 SGT06U13 SGT23U13	$V_Z$	$I_Z = 100\mu\text{A}$	33 60 230	- - -	- - -	V V V
Breakover Voltage SGT03U13 SGT06U13 SGT23U13	$V_{BO}$	$dv/dt = 100\text{V}/\mu\text{s}$	- - -	- - -	50 85 275	V V V
Holding Current	$I_H$		130	-	-	mA
On-State Voltage	$V_T$	$I_T = 10\text{A}$	-	-	2	V
Main Terminal Capacitance	$C_O$		-	90	-	pF

Performance Curves

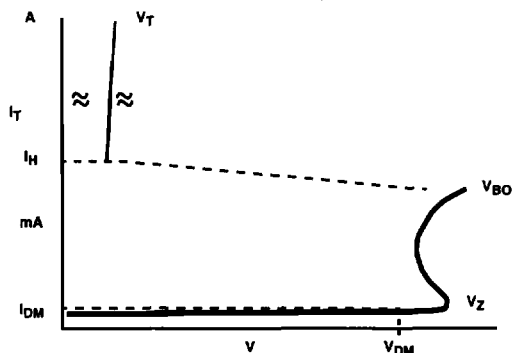


FIGURE 1. TYPICAL VOLT-AMPERE CHARACTERISTICS

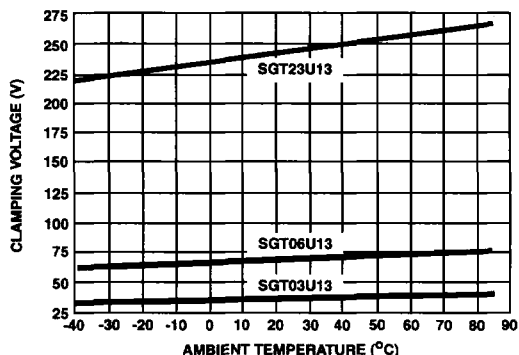


FIGURE 2. TYPICAL CLAMPING VOLTAGE vs TEMPERATURE

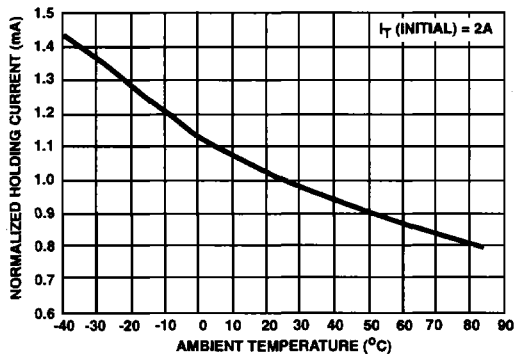


FIGURE 3. TYPICAL HOLDING CURRENT vs TEMPERATURE

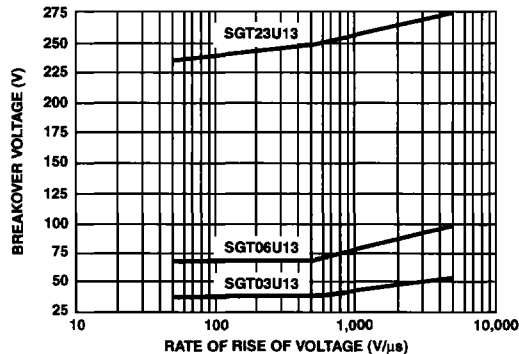


FIGURE 4. TYPICAL  $V_{BO}$  vs  $dv/dt$

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.

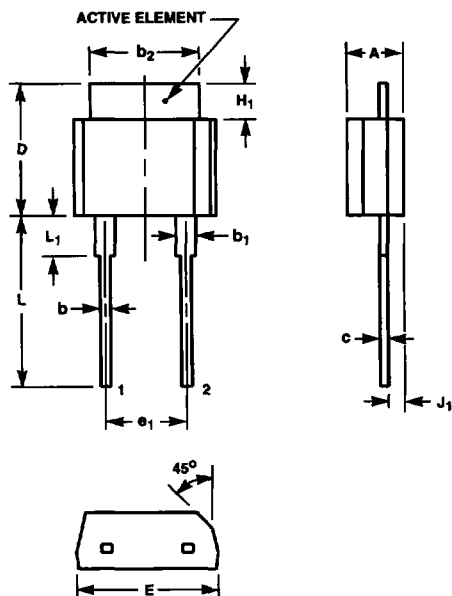
**$V_{BO}$  (Breakdown Voltage)** - Voltage at which the device switches from the off-state to the on-state.

**$I_H$  (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.

**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 <sub>1</sub>	0.045	0.055	1.15	1.39	1, 2, 3
b <sub>2</sub>	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 <sub>1</sub>	0.200 BSC		5.08 BSC		4
H <sub>1</sub>	0.080	0.100	2.04	2.54	-
J <sub>1</sub>	0.039	0.049	1.00	1.24	5
L	0.410	0.440	10.42	11.17	-
L <sub>1</sub>	0.080	0.100	2.04	2.54	1

**NOTES:**

1. Lead dimension and finish uncontrolled in L<sub>1</sub>.
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**

