HARRIS SEMICONDUCTOR

SGT10S10, SGT27S10

Gate Controlled Unidirectional Transient Surge Suppressors

January 1998

Features

- **Blocking Voltage 100V and 270V**
- **Peak Transient Surge Current 300A**
- **Minimum Holding Current 100mA**
- **Subnanosecond Clamping Action**
- **Low On-State Voltage**
- **UL Recognized File # E135010 to STD 497B**

Applications

- **Telecommunications Equipment**
- **Data and Voice Lines**
- **Computer Modems**
- **Alarm Systems**

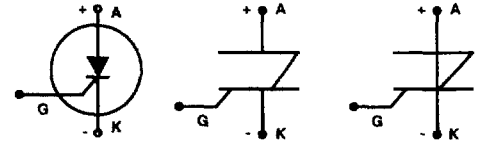
Description

Surgector transient surge protectors are designed to protect telecommunication equipment, data links, alarm systems, power supplies, and other sensitive electrical circuits from damage that could be caused by switching transients, lightning strikes, load changes, commutation spikes, and line crosses.

These devices are fast turn-on, high holding current thyristors. When coupled with a user supplied voltage level detector, they provide excellent voltage limiting even on very fast rise time transients. The high holding current allows this surgector to return to its high impedance off state after a transient.

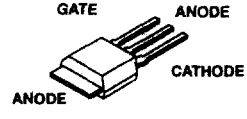
The surgector device's normal off-state condition in the forward blocking mode is a high impedance, low leakage state that prevents loading of the line.

Equivalent Schematic Symbols



Packaging

MODIFIED TO-202



8 SURGECTOR PRODUCTS

CAUTION: These devices are sensitive to electrostatic discharge. Users should follow proper IC Handling Procedures.

File Number **1691.2**

Absolute Maximum Ratings $T_C = 25^oC$

	SGT10S10	SGT27S10	UNITS
Continuous Off State Voltage:			
V_{DM}	100	270	V
V_{RM}	1	1	V
Transient Peak Surge Current: I_{TSM}			
1µs x 2µs (Note 1)	300	300	A
8µs x 20µs	200	200	A
10µs x 560µs	125	125	A
10µs x 1000µs	100	100	A
One Half Cycle, 1 every 30s, 50Hz to 60Hz	60	60	A
One Second, Halfwave, 50Hz to 60Hz	30	30	A
Operating Temperature (T_A)	-40 to 85		^oC
Storage Temperature Range (T_{STG})	-40 to 150		^oC

NOTE:

1. Unit designed not to fail open below 450A.

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	SGT10S10			SGT27S10			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Off-State Current	I_{DM}	V_{DM} = 100V							
		$T_A = 25^oC$	-	-	50	-	-	-	nA
		$T_A = 85^oC$	-	-	10	-	-	-	µA
	I_{DM}	V_{DM} = 270V							
		$T_A = 25^oC$	-	-	-	-	-	100	nA
		$T_A = 85^oC$	-	-	-	-	-	50	µA
Off-State Current	I_{RM}	V_{RM} = 1V							
		$T_A = 25^oC$	-	-	1	-	-	1	mA
		$T_A = 85^oC$	-	-	10	-	-	10	mA
Breakover Voltage	V_{BO}	dv/dt = 100V/µs (Note 2)	-	-	100	-	-	285	V
Holding Current	I_H		100	-	-	100	-	-	mA
On-State Voltage	V_T	I_T = 10A	-	-	2	-	-	2	V
Gate-Trigger Current	I_{GT}		-	-	150	-	-	150	mA
Main Terminal Capacitance	C_O	V_{DM} = 0V	-	90	-	-	-	-	pF
		V_{DM} = 50V at 1MHz	-	-	-	-	50	-	pF

NOTE:

2. External zener diode from anode to gate: 60V (SGT10S10); 270V (SGT27S10).

Performance Curves

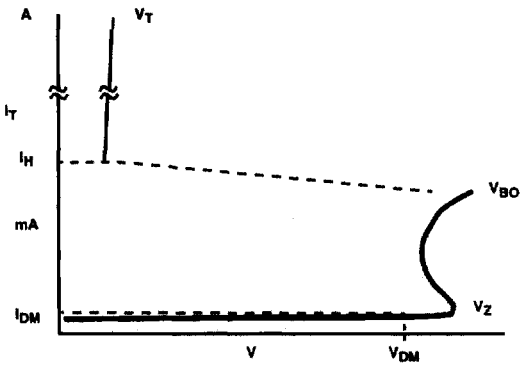


FIGURE 1. TYPICAL VOLT-AMPERE CHARACTERISTICS

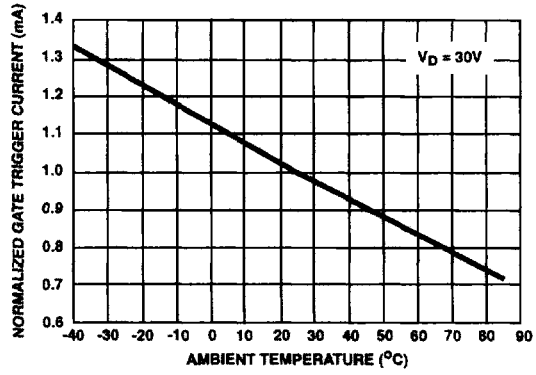


FIGURE 2. NORMALIZED GATE-TRIGGER CURRENT vs TEMPERATURE

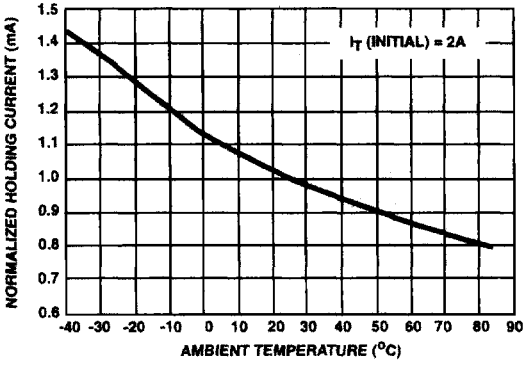


FIGURE 3. NORMALIZED HOLDING CURRENT vs TEMPERATURE

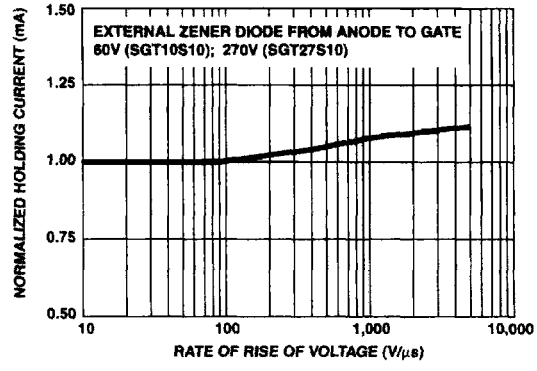


FIGURE 4. NORMALIZED V_{BO} vs dv/dt

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}).

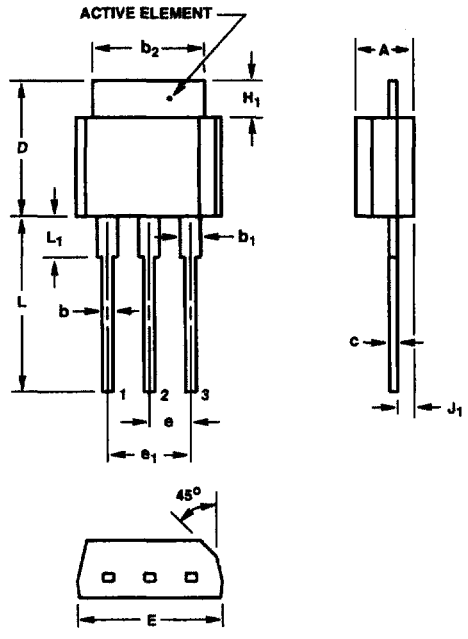
I_H (Holding Current) - Minimum on-state current that will hold the device in the on-state after it has been latched on.

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

I_{GT} (Gate-Trigger Current) - Minimum gate current which will cause the device to switch from the off-state to the on-state.

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

Mechanical Dimensions



TO-202 Modified

3 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	0.100 TYP		2.54 TYP		4
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.

Nomenclature