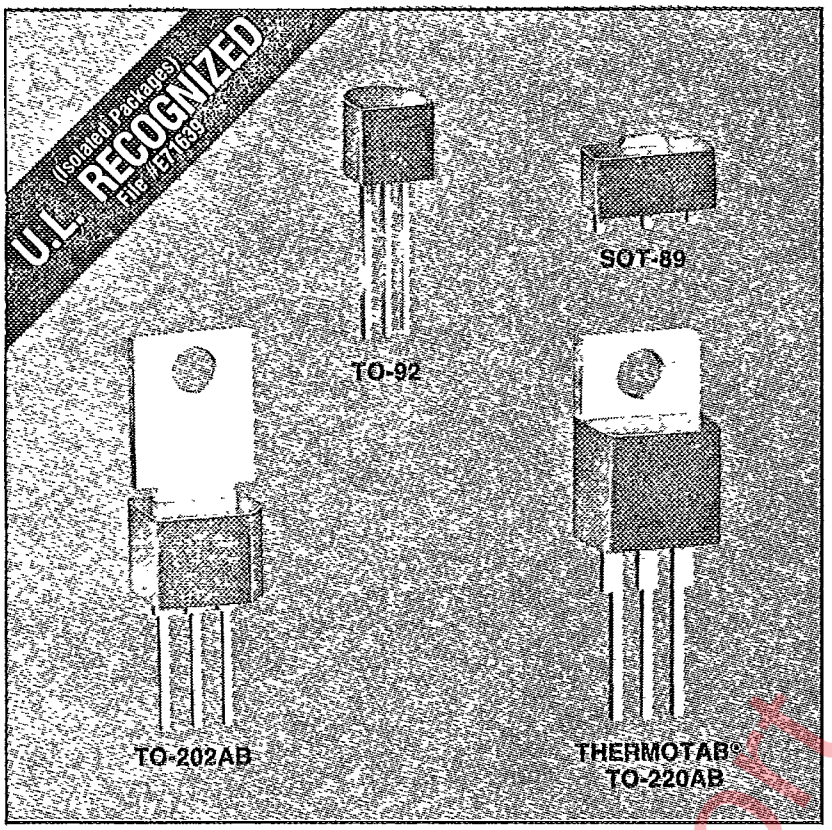
T-25-13



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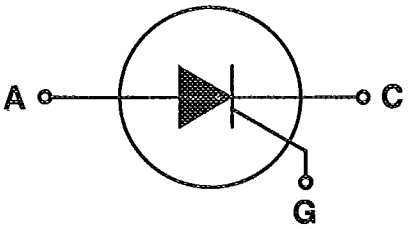


SCR's 0.8-10 AMPS
SENSITIVE GATE

General Description

The Teccor Electronics, Inc. line of sensitive SCR semiconductors are half-wave unidirectional gate-controlled rectifiers (SCR-thyristor) which complement Teccor's line of power SCR's. This group of packages offers current ratings from 0.8-10 Amps and voltage ratings from 50-600 Volts with gate sensitivities from 1.0-500 microamps. If gate currents in the 1-50 milliamp ranges are required, please consult Teccor's non-sensitive gate SCR technical data sheets.

Electrically Isolated Packages

This group of Teccor sensitive SCR's are available in a choice of four different product packages. The TO-220AB and TO-92 are electrically isolated where the case or tab is internally isolated to allow the use of low cost assembly and convenient packaging techniques. The SOT-89 package is designed for soldering directly to a metallized substrate or the copper side of printed circuit boards.

Glass Passivation

Teccor's line of SCR's features glass-passivated junctions to insure long term device reliability and parameter stability. Teccor's glass offers a rugged, reliable barrier against junction contamination.

Tape-and-reel packaging is available for the TO-92 and SOT-89 packages.

Variations of devices covered in this data sheet are available for custom design applications. Please consult factory for further information.

Features

- **Electrically Isolated Packages**
- **High Voltage Capability up to 600 Volts**
- **High Surge Capability - up to 100 Amps**
- **Glass Chip Passivation**

SCR's—SENSITIVE GATE

TYPE	Part Number Isolated	Part Number Non-Isolated	I_T	V_{DRM} & V_{RRM}	I_{GT}	I_{DRM} & I_{RRM}			V_{TM}	V_{GT}			I_H
			Maximum On-State Current (1)	Repetitive Peak Off-State Forward & Reverse Voltage	DC Gate Trigger Current (2) (11) (17)	Peak Off-State Current @ V_{DRM} & V_{RRM}			Peak On-State Voltage T_C = 25°C (3) (10)	DC Gate Trigger Voltage (4) (11)			DC Holding Current Initial On-State Current = 20mA (5) (14) (18)
			Amps			μAmps				Volts			
	TO-92	SOT-89	$I_{T(RMS)}$	$I_{T(AV)}$		T_C = 25°C	T_C = 100°C	T_C = 125°C		T_C = -65°C	T_C = 25°C	T_C = 100°C	
	Volts				μAmps				Volts				mA
	FOR DIMENSIONAL OUTLINE & PACKAGE VAIRATIONS SEE PG. 81		MAX	MAX	MINIMUM	MAXIMUM	MAX	MAX		MAXIMUM	MAX	MAX	MIN	MAXIMUM
	EC103A		0.8	0.51	100	200	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103B		0.8	0.51	200	200	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103C		0.8	0.51	300	200	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103D		0.8	0.51	400	200	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103E		0.8	0.51	500	200	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103M		0.8	0.51	600	200	2.0	100		1.7	1.2	0.8	.25	5.0
	EC103A1		0.8	0.51	100	12	1.0	50		1.7	1.2	0.8	0.2	5.0
	EC103B1		0.8	0.51	200	12	1.0	50		1.7	1.2	0.8	0.2	5.0
	EC103C1		0.8	0.51	300	12	1.0	50		1.7	1.2	0.8	0.2	5.0
	EC103D1		0.8	0.51	400	12	1.0	50		1.7	1.2	0.8	0.2	5.0
	EC103E1		0.8	0.51	500	12	1.0	50		1.7	1.2	0.8	0.2	5.0
	EC103M1		0.8	0.51	600	12	2.0	100		1.7	1.2	0.8	0.2	5.0
	EC103A2		0.8	0.51	100	50	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103B2		0.8	0.51	200	50	1.0	50		1.7	1.2	0.8	.25	5.0
0.8 Amp	EC103C2		0.8	0.51	300	50	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103D2		0.8	0.51	400	50	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103E2		0.8	0.51	500	50	1.0	50		1.7	1.2	0.8	.25	5.0
	EC103M2		0.8	0.51	600	50	2.0	100		1.7	1.2	0.8	.25	5.0
	EC103A3		0.8	0.51	100	500	1.0	50		1.7	1.2	0.8	.25	8.0
	EC103B3		0.8	0.51	200	500	1.0	50		1.7	1.2	0.8	.25	8.0
	EC103C3		0.8	0.51	300	500	1.0	50		1.7	1.2	0.8	.25	8.0
	EC103D3		0.8	0.51	400	500	1.0	50		1.7	1.2	0.8	.25	8.0
	EC103E3		0.8	0.51	500	500	1.0	50		1.7	1.2	0.8	.25	8.0
	EC103M3		0.8	0.51	600	500	2.0	100		1.7	1.2	0.8	.25	8.0
	2N5060		0.8	0.51	30	200	1.0		50	1.7	1.2	0.8	.25	5.0
	2N5061		0.8	0.51	60	200	1.0		50	1.7	1.2	0.8	.25	5.0
	2N5062		0.8	0.51	100	200	1.0		50	1.7	1.2	0.8	.25	5.0
	2N5063		0.8	0.51	150	200	1.0		50	1.7	1.2	0.8	.25	5.0
	2N5064		0.8	0.51	200	200	1.0		50	1.7	1.2	0.8	.25	5.0
	2N6564		0.8	0.51	300	200	1.0		100	1.7	1.2	0.8	.25	5.0
	2N6565		0.8	0.51	400	200	1.0		100	1.7	1.2	0.8	.25	5.0
		S100US1	1.2	0.76	100	50	1.0	50		1.6	1.2	0.8	.25	6.0
		S200US1	1.2	0.76	200	50	1.0	50		1.6	1.2	0.8	.25	6.0
		S300US1	1.2	0.76	300	50	1.0	50		1.6	1.2	0.8	.25	6.0
		S400US1	1.2	0.76	400	50	1.0	50		1.6	1.2	0.8	.25	6.0
1.2 Amps		S500US1	1.2	0.76	500	50	1.0	50		1.6	1.2	0.8	.25	6.0
		S600US1	1.2	0.76	600	50	2.0	100		1.6	1.2	0.8	.25	6.0
		S100US2	1.2	0.76	100	200	1.0	50		1.6	1.2	0.8	.25	6.0
		S200US2	1.2	0.76	200	200	1.0	50		1.6	1.2	0.8	.25	6.0
		S300US2	1.2	0.76	300	200	1.0	50		1.6	1.2	0.8	.25	6.0
		S400US2	1.2	0.76	400	200	1.0	50		1.6	1.2	0.8	.25	6.0
		S500US2	1.2	0.76	500	200	1.0	50		1.6	1.2	0.8	.25	6.0
		S600US2	1.2	0.76	600	200	2.0	100		1.6	1.2	0.8	.25	6.0

GENERAL NOTES

- Teccor 2N5060 & 2N6564 Series devices conform to all JEDEC registered data.
- The case temperature (T_C) is measured as shown on dimensional outline drawings. See package dimensions section of this catalog.
- All measurements (except I_{GT}) are made with an external resistor R_{GK} = 1kΩ unless otherwise noted.
- All measurements are made at 60Hz with a resistive load at an ambient temperature of +25°C unless otherwise specified.
- Operating temperature (T_J) is −65°C to +110°C for "EC" Series devices and SOT-89 devices; −65°C to +125°C for "2N" Series devices; and −40°C to +110°C for all others.
- Storage temperature range (T_S) is −65°C to +150°C for TO-92 and SOT-89 devices; −40°C to +150°C for TO-202 devices; and −40°C to +125°C for all others.
- Lead solder temperature is a maximum of +230°C for 10 seconds maximum ≥ 1/16" from case. (For SOT-89 devices see soldering notes on page 121).

Electrical Specifications

I_{GM}	V_{GRM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		dv/dt	di/dt	t_{gt}	t_q	I^2t
Peak Gate Current (16)	Peak Reverse Gate Voltage	Peak Gate Power Dissipation (16)	Average Gate Power Dissipation	Peak One Cycle Surge Forward Current (6) (12) Amps		Critical Rate Of Rise Of Forward Off-State Voltage Volts/μs	Maximum Rate Of Change Of On-State Current I_{GT} = 50mA With 0.1 μs Rise Time	Gate Controlled Turn-On Time Gate Pulse = 10mA Min. Width = 5μs With Rise Time ≤ 0.1μs (8)	Circuit Commutated Turn-Off Time (9)	RMS Surge (Non-Repetitive) On-State Current For A Period Of 8.3 msec For Fusing
				60Hz	50Hz	T_C = 25°C				
Amp	Volts	Watts	Watts				Amps/μs	μs	μs	Amps²sec
	MAXIMUM					MINIMUM		MAXIMUM	MAXIMUM	
1.0	5.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	15	50	2.2	50	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	15	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	10	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	10	50	2.0	60	1.6
1.0	5.0	1.0	0.1	20	16	40	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	40	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	40	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	40	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	30	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	20	50	2.5	45	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	5.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.2	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	25	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	20	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	10	50	2.0	60	1.6
1.0	6.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	30	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	20	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	15	50	2.2	50	1.6

NOTES TO ELECTRICAL SPECIFICATIONS

1. See Figures 1 thru 5 for current ratings at specified operating case temperatures.
2. See Figure 6 for I_{GT} vs T_C.
3. See Figure 7 for instantaneous on-state current (I_T) vs on-state voltage (V_T) - (typical).
4. See Figure 8 for V_{GT} vs T_C.
5. See Figure 9 for I_H vs T_C.
6. For more than one full cycle see Figure 10.
7. T106 & T107 devices also have a pulse peak forward current on-state rating (repetitive) of 75 amperes. This rating applies for operation at 60Hz, 75°C maximum tab (or anode) lead temperature, switching from 80 volts peak, sinusoidal current pulse width of 10μsec minimum, 15μsec maximum.
8. See Figure 11 for t_{gt} vs I_{GT}.
9. Test Conditions as Follows:
   T_C ≤ 80°C, rectangular current waveform; rate of rise of current ≤ 10 amps/μsec. Rate of reversal of current ≤ 5 amps/μsec. I_{TM} = 1 amp (50μsee Pulse) Repitition Rate = 60pps. V_{RRM} = Rated. V_R = 15 volts minimum, V_{DRM} = Rated rate of rise reapplied forward blocking voltage = 5 volts/μsec. Gate Bias = 0 volts, 100 OHMS (during turn-off time interval).
10. Test condition is maximum rated RMS current except TO-92 devices are 1.2 APK; T106/T107 devices are 4 APK.
11. V_D = 6 VDC, R_L = 100Ω. See Figure 14 for simple test circuit for measuring gate trigger voltage and gate trigger current.
12. See Figure 1 thru 5 for maximum allowable case temperature @ maximum rated current.
13. I_{GT} = 500μA maximum for T_C = −40°C for T106 devices.
14. I_H = 10mA maximum for T_C = −65°C for 2N5060 Series and 2N6564 Series devices.
15. I_H = 6mA maximum for T_C = −40°C for T106 devices.
16. Pulse Width ≤ 3μs
17. I_{GT} = 350μA maximum @ T_C = −65°C for 2N5060 Series and 2N6564 Series devices.
18. Latching current can be higher than 20mA for higher IGT types. Also latching current can be much higher at −40°C. See Figure 14

SCR's—SENSITIVE GATE

TYPE	Part Number: Isolated	Part Number: Isolated	Part Number: Non-Isolated	I_T		V_{DRM} & V_{RRM}	I_{GT}	I_{DRM} & I_{RRM}			V_{TM}	V_{GT}			I_H
				Maximum On-State Current (1)		Repetitive Peak Off-State Forward & Reverse Voltage	DC Gate Trigger Current (2) (11) (13)	Peak Off-State Current @ V_{DRM} & V_{RRM}			Peak On-State Voltage T_C = 25°C (3) (10)	DC Gate Trigger Voltage (4) (11) (19)			DC Holding Current Initial On-State Current = 20mA (5) (15) (18)
				Amps				μAmps				Volts			mA
	TO-92	TO-220AB	TO-202AB	$I_{T(RMS)}$	$I_{T(AV)}$	Volts	μAmps	T_C = 25°C	T_C = 100°C	T_C = 110°C	Volts	T_C = -40°C	T_C = 25°C	T_C = 100°C	T_C = 25°C
	FOR DIMENSIONAL OUTLINE & PACKAGE VARIATIONS SEE PG. 81			MAX	MAX	MINIMUM	MAXIMUM	MAX	MAX		MAXIMUM	MAX	MAX	MIN	MAXIMUM
1.5 Amps	TCR22-2			1.5	.95	50	200	1.0	50		1.5	1.0	0.8	.25	5.0
	TCR22-3			1.5	.95	100	200	1.0	50		1.5	1.0	0.8	.25	5.0
	TCR22-4			1.5	.95	200	200	1.0	50		1.5	1.0	0.8	.25	5.0
	TCR22-6			1.5	.95	400	200	1.0	50		1.5	1.0	0.8	.25	5.0
	TCR22-8			1.5	.95	600	200	2.0	100		1.5	1.0	0.8	.25	5.0
3.0 Amps		S0503LS1		3.0	1.9	50	50	2.0	100		1.6	1.0	0.8	.25	6.0
		S0503LS2		3.0	1.9	50	200	2.0	100		1.6	1.0	0.8	.25	6.0
		S0503LS3		3.0	1.9	50	500	2.0	100		1.6	1.0	0.8	.25	8.0
		S1003LS1		3.0	1.9	100	50	2.0	100		1.6	1.0	0.8	.25	6.0
		S1003LS2		3.0	1.9	100	200	2.0	100		1.6	1.0	0.8	.25	6.0
		S1003LS3		3.0	1.9	100	500	2.0	100		1.6	1.0	0.8	.25	8.0
		S2003LS1		3.0	1.9	200	50	2.0	100		1.6	1.0	0.8	.25	6.0
		S2003LS2		3.0	1.9	200	200	2.0	100		1.6	1.0	0.8	.25	6.0
		S2003LS3		3.0	1.9	200	500	2.0	100		1.6	1.0	0.8	.25	8.0
		S4003LS1		3.0	1.9	400	50	2.0	100		1.6	1.0	0.8	.25	6.0
		S4003LS2		3.0	1.9	400	200	2.0	100		1.6	1.0	0.8	.25	6.0
		S4003LS3		3.0	1.9	400	500	2.0	100		1.6	1.0	0.8	.25	8.0
		S6003LS1		3.0	1.9	600	50	2.0	100		1.6	1.0	0.8	.25	6.0
		S6003LS2		3.0	1.9	600	200	2.0	100		1.6	1.0	0.8	.25	6.0
		S6003LS3		3.0	1.9	600	500	2.0	100		1.6	1.0	0.8	.25	8.0
4.0 Amps			T106F1	4.0	2.5	50	200	2.0		100	2.2	1.0	0.8		5.0
			T106A1	4.0	2.5	100	200	2.0		100	2.2	1.0	0.8		5.0
			T106B1	4.0	2.5	200	200	2.0		100	2.2	1.0	0.8		5.0
			T106C1	4.0	2.5	300	200	2.0		100	2.2	1.0	0.8		5.0
			T106D1	4.0	2.5	400	200	2.0		100	2.2	1.0	0.8		5.0
			T106E1	4.0	2.5	500	200	2.0		100	2.2	1.0	0.8		5.0
			T106M1	4.0	2.5	600	200	2.0		100	2.2	1.0	0.8		5.0
			T107F1	4.0	2.5	50	500	2.0		100	2.5	1.0	0.8		6.0
			T107A1	4.0	2.5	100	500	2.0		100	2.5	1.0	0.8		6.0
			T107B1	4.0	2.5	200	500	2.0		100	2.5	1.0	0.8		6.0
			T107C1	4.0	2.5	300	500	2.0		100	2.5	1.0	0.8		6.0
			T107D1	4.0	2.5	400	500	2.0		100	2.5	1.0	0.8		6.0
			T107E1	4.0	2.5	500	500	2.0		100	2.5	1.0	0.8		6.0
			T107M1	4.0	2.5	600	500	2.0		100	2.5	1.0	0.8		6.0

GENERAL NOTES

- The case temperature (T_C) is measured as shown on dimensional outline drawings. See package dimensions section of this catalog.
- All measurements (except I_{GT}) are made with an external resistor R_{GK} = 1kΩ unless otherwise noted.
- All measurements are made at 60Hz with a resistive load at an ambient temperature of +25°C unless otherwise specified.
- Operating temperature (T_J) is −65°C to +110°C for "EC" Series devices and SOT-89 devices; −65°C to +125°C for "2N" Series devices; and −40°C to +110°C for all others.
- Storage temperature range (T_S) is −65°C to +150°C for TO-92 and SOT-89 devices; −40°C to +150°C for TO-202 devices; and −40°C to +125°C for all others.
- Lead solder temperature is a maximum of +230°C for 10 seconds maximum ≥ 1/16" from case. (For SOT-89 devices see soldering notes on page 121).

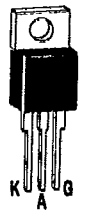
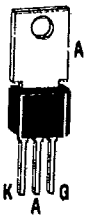
Electrical Specifications

I_{GM}	V_{GRM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		dv/dt	di/dt	t_{gt}	t_q	I^2t
Peak Gate Current (16)	Peak Reverse Gate Voltage	Peak Gate Power Dissipation (16)	Average Gate Power Dissipation	Peak One Cycle Surge Forward Current (6) (7) (12) Amps		Critical Rate Of Rise Of Forward Off-State Voltage Volts/µs	Maximum Rate Of Change Of On-State Current I_{GT} = 50mA With 0.1 µs Rise Time	Gate Controlled Turn-On Time Gate Pulse = 10mA Min. Width = 5µs With Rise Time ≤ 0.1µs (8)	Circuit Commutated Turn-Off Time (9)	RMS Surge (Non-Repetitive) On-State Current For A Period Of 8.3 msec For Fusing
Amps	Volts	Watts	Watts	60Hz	50Hz	T_C = 100°C	Amps/µs	µs	µs	Amps²sec
	MINIMUM					TYP		MAXIMUM	MAXIMUM	
1.0	6.0	1.0	0.1	20	16	20	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	10	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	10	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	5	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	5	50	2.2	50	1.6
1.0	6.0	1.0	0.1	30	25	15	50	2.0	60	3.7
1.0	6.0	1.0	0.1	30	25	20	50	2.2	50	3.7
1.0	6.0	1.0	0.1	30	25	20	50	2.5	45	3.7
1.0	6.0	1.0	0.1	30	25	7	50	2.0	60	3.7
1.0	6.0	1.0	0.1	30	25	10	50	2.2	50	3.7
1.0	6.0	1.0	0.1	30	25	10	50	2.5	45	3.7
1.0	6.0	1.0	0.1	30	25	7	50	2.0	60	3.7
1.0	6.0	1.0	0.1	30	25	10	50	2.2	50	3.7
1.0	6.0	1.0	0.1	30	25	10	50	2.5	45	3.7
1.0	6.0	1.0	0.1	30	25	4	50	2.0	60	3.7
1.0	6.0	1.0	0.1	30	25	5	50	2.2	50	3.7
1.0	6.0	1.0	0.1	30	25	5	50	2.5	45	3.7
1.0	6.0	1.0	0.1	30	25	4	50	2.0	60	3.7
1.0	6.0	1.0	0.1	30	25	5	50	2.2	50	3.7
1.0	6.0	1.0	0.1	30	25	5	50	2.5	45	3.7
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.2	50	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6
1.0	6.0	1.0	0.1	20	16	8	50	2.5	45	1.6

NOTES TO ELECTRICAL SPECIFICATIONS

1. See Figures 1 thru 5 for current ratings at specified operating case temperatures.
2. See Figure 6 for I_{GT} vs T_C.
3. See Figure 7 for instantaneous on-state current (i_T) vs on-state voltage (V_T) - (typical).
4. See Figure 8 for V_{GT} vs T_C.
5. See Figure 9 for I_H vs T_C.
6. For more than one full cycle see Figure 10.
7. T106 & T107 devices also have a pulse peak forward current on-state rating (repetitive) of 75 amperes. This rating applies for operation at 60Hz, 75°C maximum tab (or anode) lead temperature, switching from 80 volts peak, sinusoidal current pulse width of 10µsec minimum, 15µsec maximum.
8. See Figure 11 for t_{gt} vs I_{GT}.
9. Test Conditions as Follows:
   T_C ≤ 80°C, rectangular current waveform; rate of rise of current ≤ 10 amps/µsec. Rate of reversal of current ≤ 5 amps/µsec. I_{TM} = 1 amp (50µsec Pulse) Repetition Rate = 60pps. V_{RRM} = Rated. V_R = 15 volts minimum, V_{DRM} = Rated rate of rise reapplied forward blocking voltage = 5 volts/µsec. Gate Bias = 0 volts, 100 OHMS (during turn-off time interval).
10. Test condition is maximum rated RMS current except TO-92 devices are 1.2 APK; T106/T107 devices are 4 APK.
11. V_D = 6 VDC, R_L = 100Ω. See Figure 14 for simple test circuit for measuring gate trigger voltage and gate trigger current.
12. See Figure 1 thru 5 for maximum allowable case temperature @ maximum rated current.
13. I_{GT} = 500µA maximum for T_C = −40°C for T106 devices.
14. I_H = 10mA maximum for T_C = −65°C for 2N5060 Series and 2N6564 Series devices.
15. I_H = 6mA maximum for T_C = −40°C for T106 devices.
16. Pulse Width ≤ 3µs.
17. I_{GT} = 350µA maximum @ T_C = −65°C for 2N5060 Series and 2N6564 Series.
18. Latching current can be higher than 20mA for higher IGT types. Also latching current can be much higher at −40°C. See Figure 14.
19. V_{GT} = 0.2 minimum @ T_C = 110°C for T106 and T107 devices.

SCR's—SENSITIVE GATE

TYPE	Part Number Isolated	Part Number Non-Isolated	I_T Maximum On-State Current (1) Amps $I_{T(RMS)}$	I_T Maximum On-State Current (1) Amps $I_{T(AV)}$	V_{DRM} & V_{RRM} Repetitive Peak Off-State Forward & Reverse Voltage Volts	I_{GT} DC Gate Trigger Current (2) (11) µAmps	I_{DRM} & I_{RRM} Peak Off-State Current @ V_{DRM} & V_{RRM} mA T_C = 25°C	I_{DRM} & I_{RRM} Peak Off-State Current @ V_{DRM} & V_{RRM} mA T_C = 100°C	V_{TM} Peak On-State Voltage T_C = 25°C (3) (10) Volts	V_{GT} DC Gate Trigger Voltage (4) (11) Volts T_C = -40°C	V_{GT} DC Gate Trigger Voltage (4) (11) Volts T_C = 25°C	V_{GT} DC Gate Trigger Voltage (4) (11) Volts T_C = 100°C	I_H DC Holding Current Initial On-State Current = 20mA (5) (17) mA
	 TO-220AB	 TO-202AB											
	FOR PACKAGE VARIATIONS & DIMENSIONS SEE PAGE 81		MAX	MAX	MINIMUM	MAXIMUM	MAX	MAX	MAXIMUM	MAX	MAX	MIN	MAXIMUM
6.0 Amps	S0506LS2	S0506FS21	6.0	3.8	50	200	.005	0.2	1.6	1.0	0.8	.25	8.0
	S0506LS3	S0506FS31	6.0	3.8	50	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S1006LS2	S1006FS21	6.0	3.8	100	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S1006LS3	S1006FS31	6.0	3.8	100	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S2006LS2	S2006FS21	6.0	3.8	200	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S2006LS3	S2006FS31	6.0	3.8	200	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S4006LS2	S4006FS21	6.0	3.8	400	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S4006LS3	S4006FS31	6.0	3.8	400	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S6006LS2	S6006FS21	6.0	3.8	600	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S6006LS3	S6006FS31	6.0	3.8	600	500	.005	0.2	1.6	1.0	0.8	.25	8.0
8.0 Amps	S0508LS2	S0508FS21	8.0	5.1	50	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S0508LS3	S0508FS31	8.0	5.1	50	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S1008LS2	S1008FS21	8.0	5.1	100	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S1008LS3	S1008FS31	8.0	5.1	100	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S2008LS2	S2008FS21	8.0	5.1	200	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S2008LS3	S2008FS31	8.0	5.1	200	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S4008LS2	S4008FS21	8.0	5.1	400	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S4008LS3	S4008FS31	8.0	5.1	400	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S6008LS2	S6008FS21	8.0	5.1	600	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S6008LS3	S6008FS31	8.0	5.1	600	500	.005	0.2	1.6	1.0	0.8	.25	8.0
10.0 Amps	S0510LS2	S0510FS21	10.0	6.4	50	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S0510LS3	S0510FS31	10.0	6.4	50	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S1010LS2	S1010FS21	10.0	6.4	100	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S1010LS3	S1010FS31	10.0	6.4	100	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S2010LS2	S2010FS21	10.0	6.4	200	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S2010LS3	S2010FS31	10.0	6.4	200	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S4010LS2	S4010FS21	10.0	6.4	400	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S4010LS3	S4010FS31	10.0	6.4	400	500	.005	0.2	1.6	1.0	0.8	.25	8.0
	S6010LS2	S6010FS21	10.0	6.4	600	200	.005	0.2	1.6	1.0	0.8	.25	6.0
	S6010LS3	S6010FS31	10.0	6.4	600	500	.005	0.2	1.6	1.0	0.8	.25	8.0

GENERAL NOTES

- The case temperature (T_C) is measured as shown on dimensional outline drawings. See package dimensions section of this catalog.
- All measurements (except I_{GT}) are made with an external resistor R_{GK} = 1kΩ unless otherwise noted
- All measurements are made at 60Hz with a resistive load at an ambient temperature of +25°C unless otherwise specified.
- Operating temperature (T_J) is −65°C to +110°C for "EC" Series devices and SOT-89 devices; −65°C to +125°C for "2N" Series devices; and −40°C to +110°C for all others.
- Storage temperature range (T_S) is −65°C to +150°C for TO-92 and SOT-89 devices; −40°C to +150°C for TO-202 devices; and −40°C to +125°C for all others.
- Lead solder temperature is a maximum of +230°C for 10 seconds maximum ≥ 1/16" from case. (For SOT-89 devices see soldering notes on page 121).

Electrical Specifications

I_{GM}	V_{GRM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		dv/dt	di/dt	t_{gt}	t_q	I^2t
Peak Gate Current (16)	Peak Reverse Gate Voltage	Peak Gate Power Dissipation (16)	Average Gate Power Dissipation	Peak One Cycle Surge Forward Current (6) (7) (12) Amps		Critical Rate Of Rise Of Forward Off-State Voltage Volts/μs	Maximum Rate Of Change Of On-State Current I_{GT} = 50mA With 0.1 μs Rise Time	Gate Controlled Turn-On Time Gate Pulse = 10mA Min. Width = 5μs With Rise Time ≤ 0.1μs (8)	Circuit Commutated Turn-Off Time (9)	RMS Surge (Non-Repetitive) On-State Current For A Period Of 8.3 msec For Fusing
Amps	Volts	Watts	Watts	60Hz	50Hz	T_C = 100°C	Amps/μs	μs	μs	Amps²sec
	MINIMUM					TYP		MAXIMUM	MAXIMUM	
1.0	6.0	1.0	0.1	100	83	20	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	20	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	20	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	20	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	20	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	20	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	10	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	10	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41
1.0	6.0	1.0	0.1	100	83	5	100	2.2	50	41
1.0	6.0	1.0	0.1	100	83	5	100	2.5	45	41

NOTES TO ELECTRICAL SPECIFICATIONS

1. See Figures 1 thru 5 for current ratings at specified operating case temperatures.
2. See Figure 6 for I_{GT} vs T_C.
3. See Figure 7 for instantaneous on-state current (i_T) vs on-state voltage (V_T) - (typical).
4. See Figure 8 for V_{GT} vs T_C.
5. See Figure 9 for I_H vs T_C.
6. For more than one full cycle see Figure 10.
7. T106 & T107 devices also have a pulse peak forward current on-state rating (repetitive) of 75 amperes. This rating applies for operation at 60Hz, 75°C maximum tab (or anode) lead temperature, switching from 80 volts peak, sinusoidal current pulse width of 10μsec minimum, 15μsec maximum.
8. See Figure 11 for t_{gt} vs I_{GT}.
9. Test Conditions as Follows: T_C ≤ 80°C, rectangular current waveform; rate of rise of current ≤ 10 amps/μsec. Rate of reversal of current ≤ 5 amps/μsec. I_{TM} = 1 amp (50μsec Pulse) Repetition Rate = 60pps. V_{RRM} = Rated. V_R = 15 volts minimum, V_{DRM} = Rated rate of rise reapplied forward blocking voltage = 5 volts/μsec. Gate Bias = 0 volts, 100 OHMS (during turn-off time interval).
10. Test condition is maximum rated RMS current except TO-92 devices are 1.2 APK; T106/T107 devices are 4 APK.
11. V_D = 6 VDC, R_L = 100Ω. See Figure 14 for simple test circuit for measuring gate trigger voltage and gate trigger current.
12. See Figure 1 thru 5 for maximum allowable case temperature @ maximum rated current.
13. I_{GT} = 500μA maximum for T_C = −40°C for T106 devices.
14. I_H = 10mA maximum for T_C = −65°C for 2N5060 Series and 2N6564 Series devices.
15. I_H = 6mA maximum for T_C = −40°C for T106 devices.
16. Pulse Width ≤ 3μs.
17. Latching current can be higher than 20mA for higher IGT types. Also latching current can be much higher at −40°C. See Figure 14.

SCR'S—SENSITIVE GATE

THERMAL RESISTANCE (STEADY STATE) $R_{\theta JC}/R_{\theta JA}$ °C/W (TYPICAL)					
Type	TO-92	SURFACE MOUNT SOT-89	THERMOTAB TO-220AB	TYPE 2 TO-202AB	TYPE 1 & 3 TO-202AB
0.8 Amp	75/160				
1.2 Amps		50			
1.5 Amps	50/160				
3.0 Amps			6.0/65		
4.0 Amps				10/100	6.2/80
6.0 Amps			4.0		4.3
8.0 Amps			3.4		3.9
10.0 Amps			3.0		3.4

ELECTRICAL ISOLATION FROM LEADS TO CASE (U.L. RECOGNIZED FILE #E71639)		
TYPE / VAC(RMS)	TO-92	THERMOTAB TO-220AB
1600	STANDARD	—
2500	NO	STANDARD
4000	NO	OPTIONAL*

*For 4000V Isolation use "V" Suffix

ELECTRICAL ISOLATION

Most Teccor isolated sensitive SCR's will withstand a minimum high potential test of 2500 VAC RMS from leads to case over the device's operating temperature range. See table for other standard and optional isolation ratings.

FIGURE 1A — Maximum Allowable Case Temperature vs RMS On-State Current

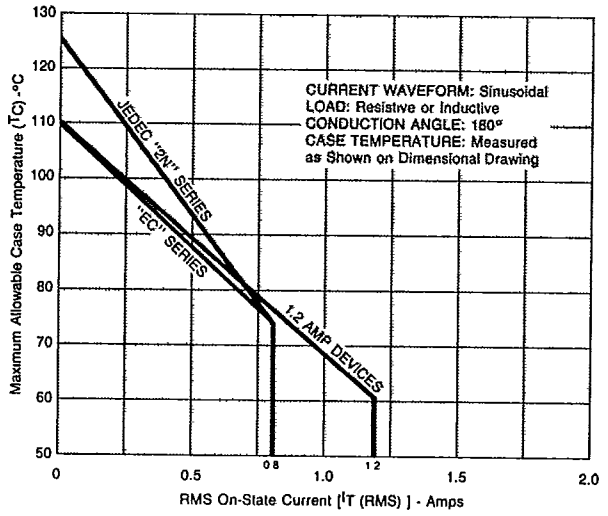
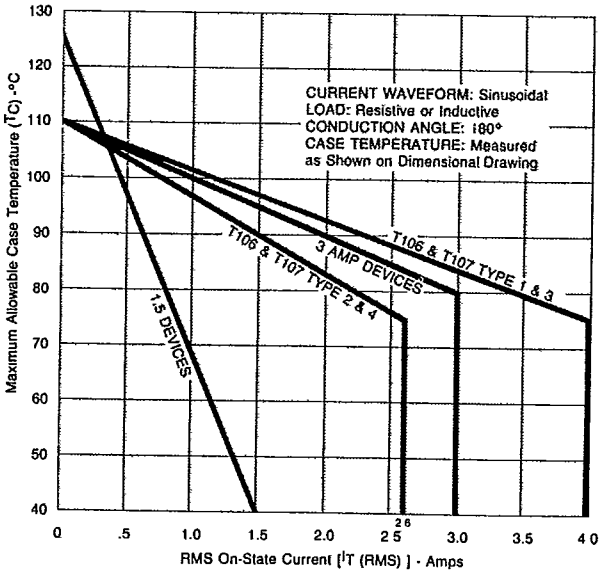


FIGURE 1B — Maximum Allowable Case Temperature vs RMS On-State Current



SCR's—SENSITIVE GATE

FIGURE 2A — Maximum Allowable Case Temperature vs Average On-State Current

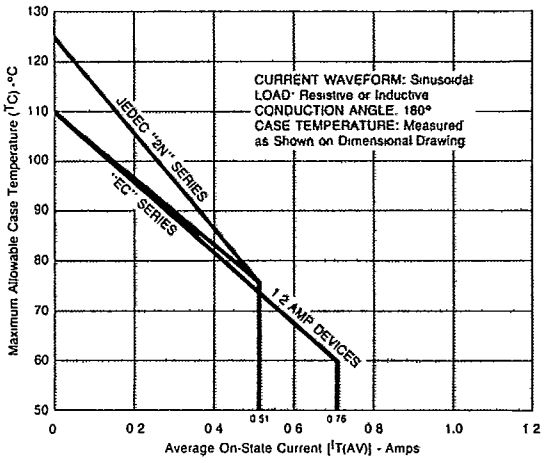


FIGURE 2B — Maximum Allowable Case Temperature vs Average On-State Current

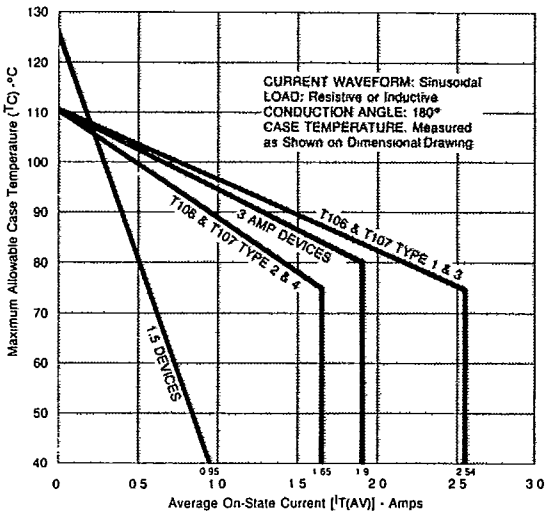


FIGURE 3A — Maximum Allowable Ambient Temperature vs On-State Current

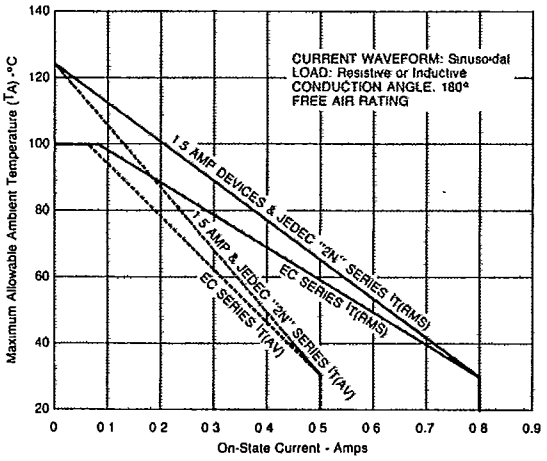


FIGURE 3B — Maximum Allowable Ambient Temperature vs On-State Current

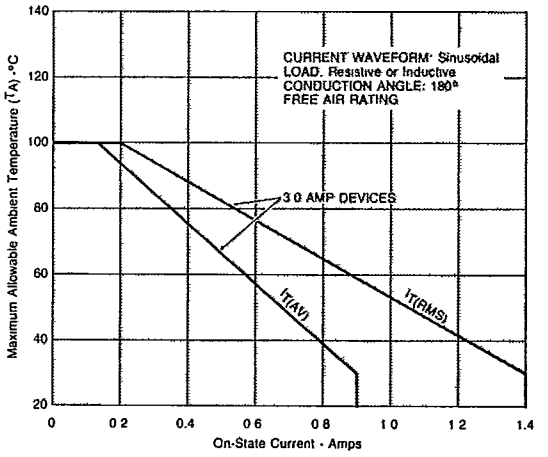


FIGURE 3C — Maximum Allowable Ambient Temperature vs RMS On-State Current

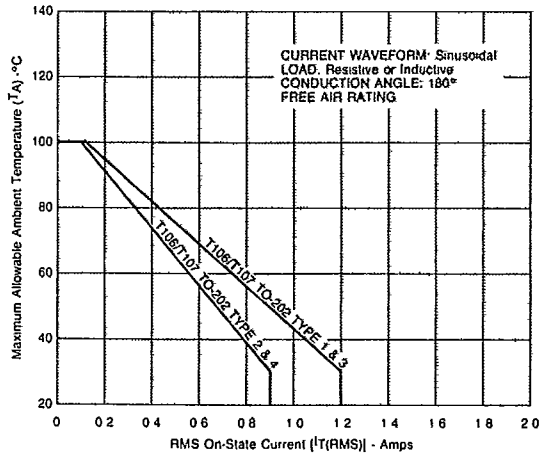
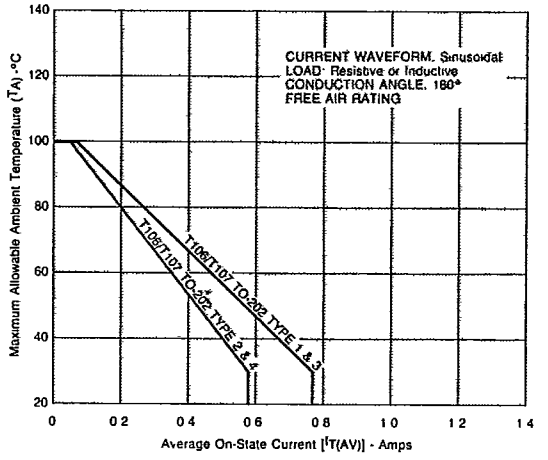


FIGURE 3D — Maximum Allowable Ambient Temperature vs Average On-State Current



SCR's—SENSITIVE GATE

FIGURE 4 — Maximum Allowable Case Temperature vs RMS On-State Current

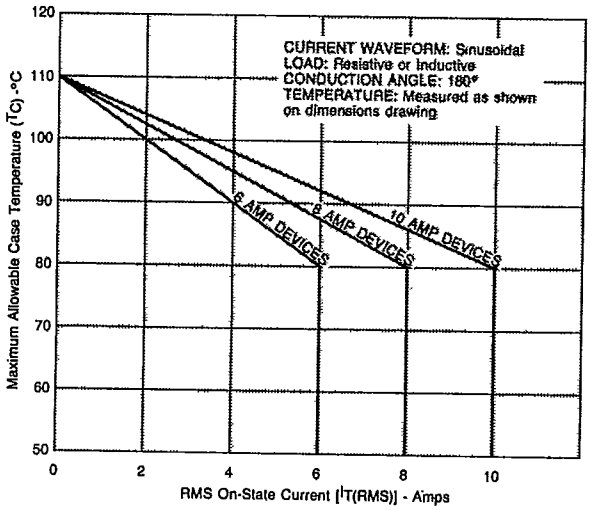


FIGURE 5 — Maximum Allowable Case Temperature vs Average On-State Current

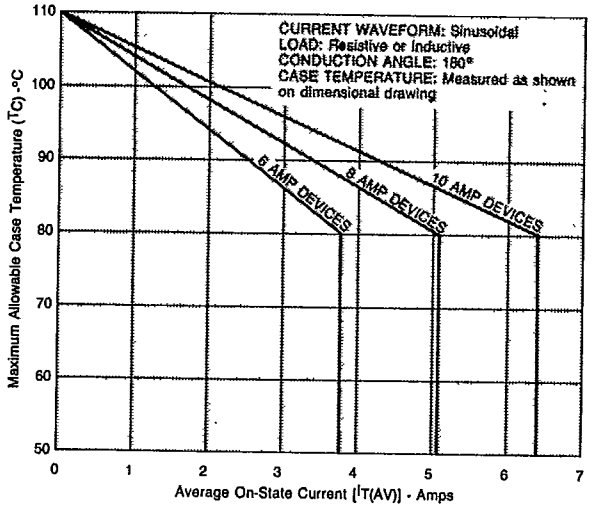


FIGURE 6 — Normalized DC Gate-Trigger Current vs Case Temperature

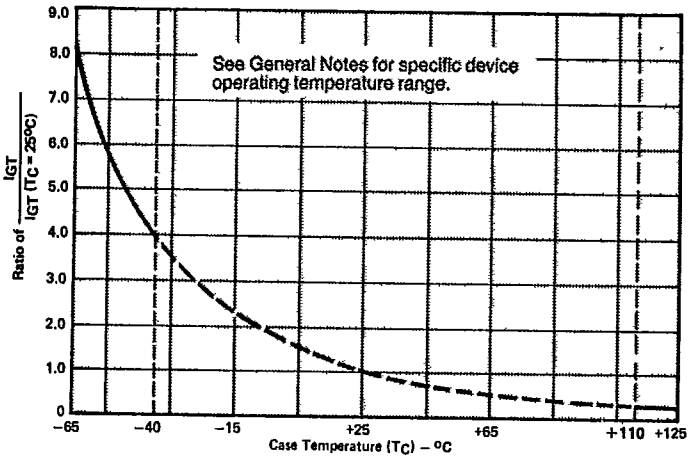
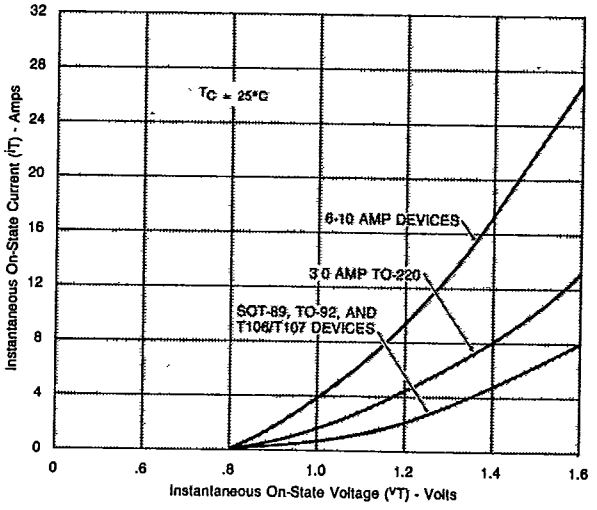


FIGURE 7 — Instantaneous On-State Current vs On-State Voltage (Typical)



SCR's—SENSITIVE GATE

FIGURE 8 — Normalized DC Gate-Trigger Voltage vs Case Temperature

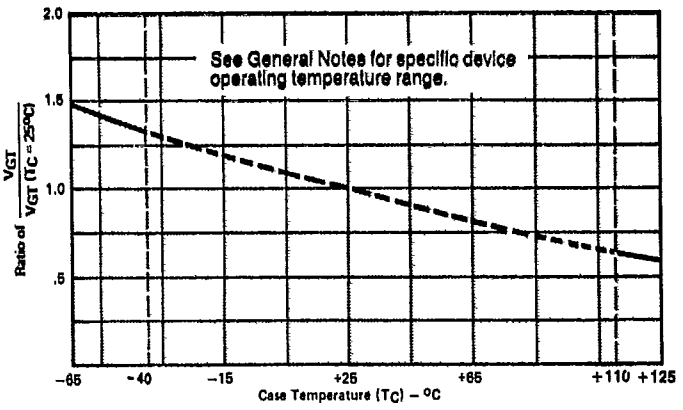


FIGURE 9 — Normalized DC Holding Current vs Case Temperature

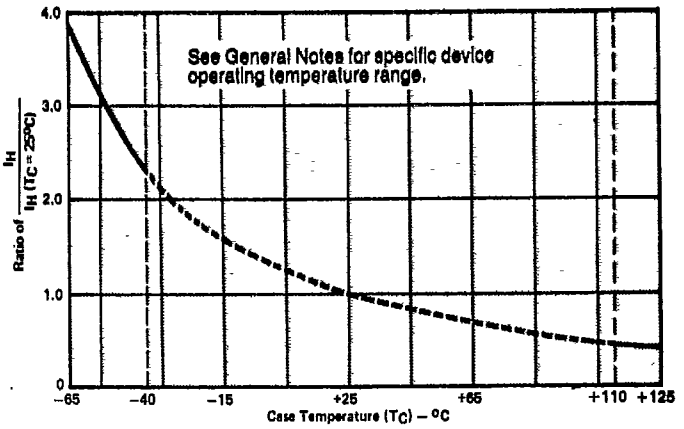
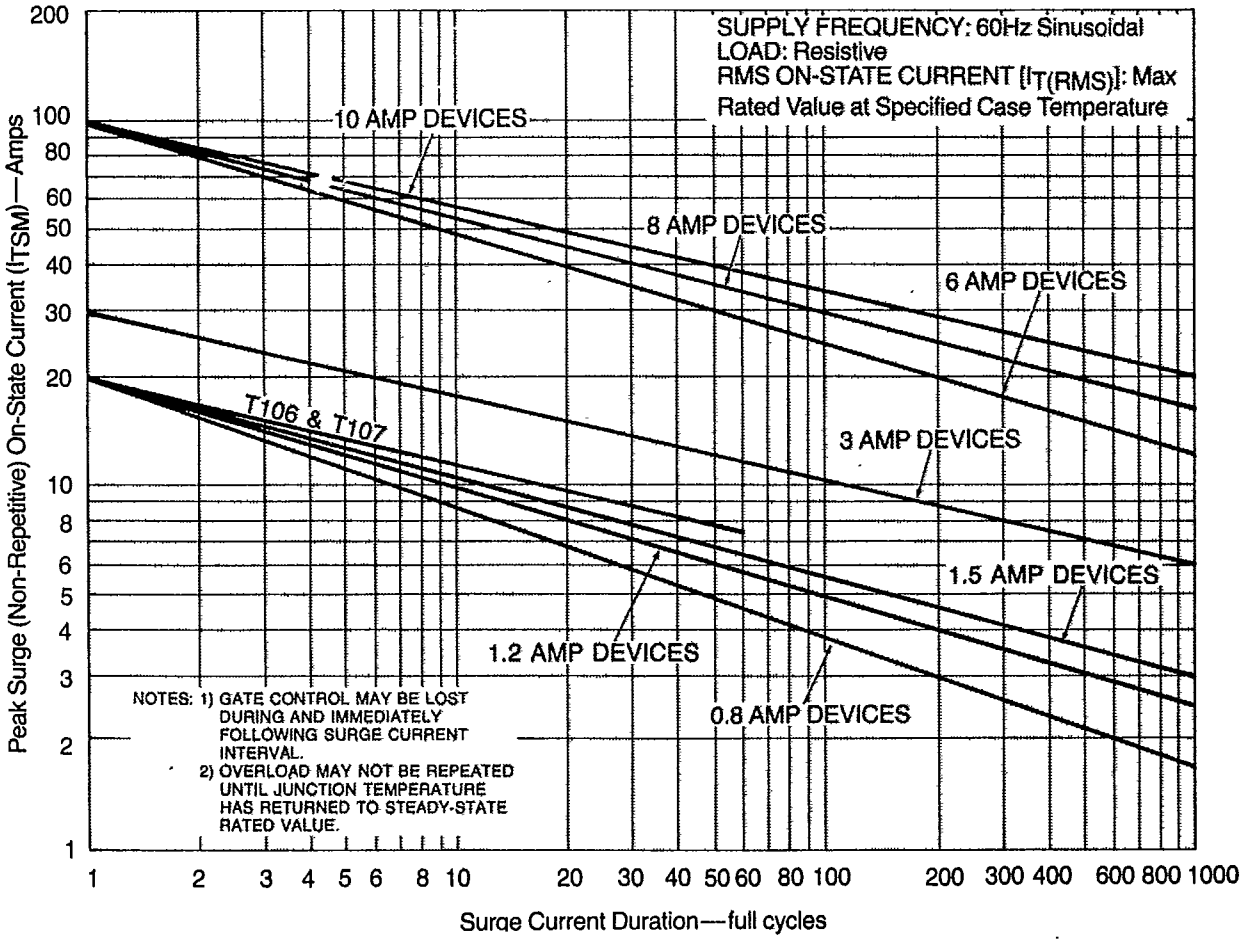


FIGURE 10 — Peak Surge On-State Current vs Surge Current Duration



SCR's—SENSITIVE GATE

FIGURE 11 — Typical Turn-On Time vs Gate Trigger Current

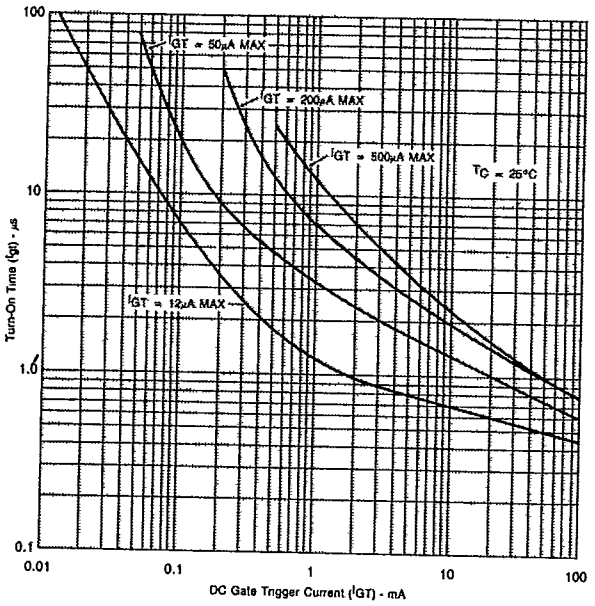


FIGURE 12 — Power Dissipation (Typical) vs RMS On-State Current

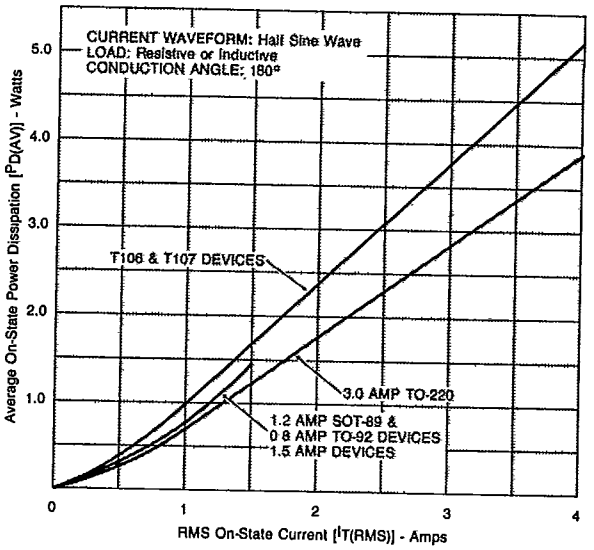


FIGURE 13 — Power Dissipation (Typical) vs RMS On-State Current

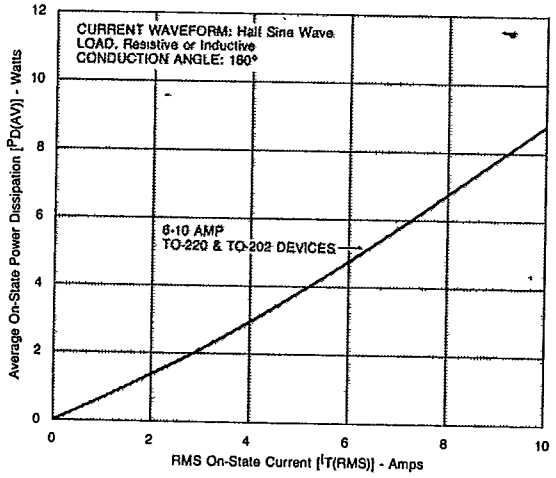


FIGURE 14 — Normalized DC Latching Current vs Case Temperature

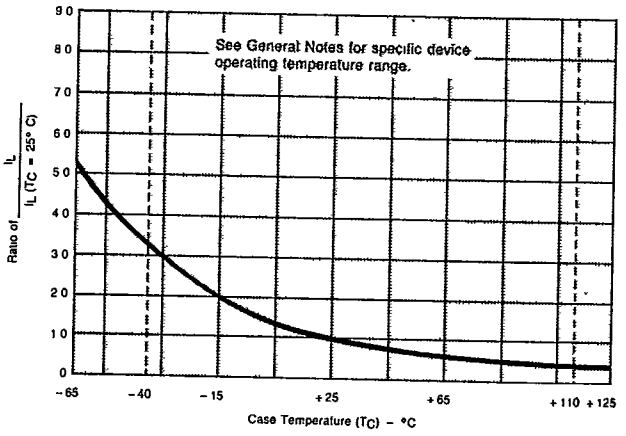
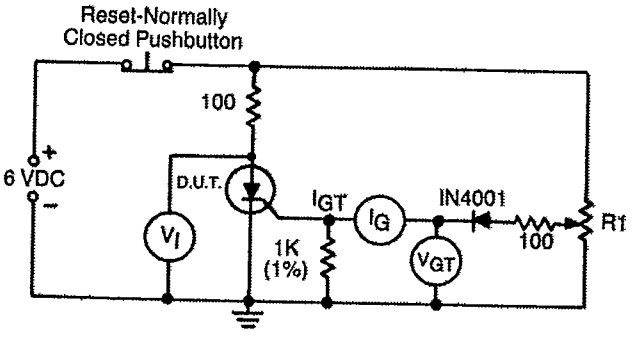


FIGURE 14 — Simple Test Circuit For Gate Trigger Voltage and Current Measurement



NOTE:

V_I —0-10 Volt DC meter
V_{GT} —0-1 Volt DC meter
I_G —0-1 mA DC milliameter
R1 —1K potentiometer

To measure gate trigger voltage and current, raise gate voltage (V_{GT}) until meter reading V_1 drops from 6 Volts to 1 Volt. Gate trigger voltage is the reading on V_{GT} just prior to V_1 dropping. Gate trigger current I_{GT} can be computed from the relationship:

$$I_{GT} = I_G - \frac{V_{GT}}{1000} \text{ Amps}$$

where I_G is reading (in Amps) on meter just prior to V_1 dropping. NOTE: I_{GT} may turn out to be a negative quantity (trigger current flows out from gate lead).