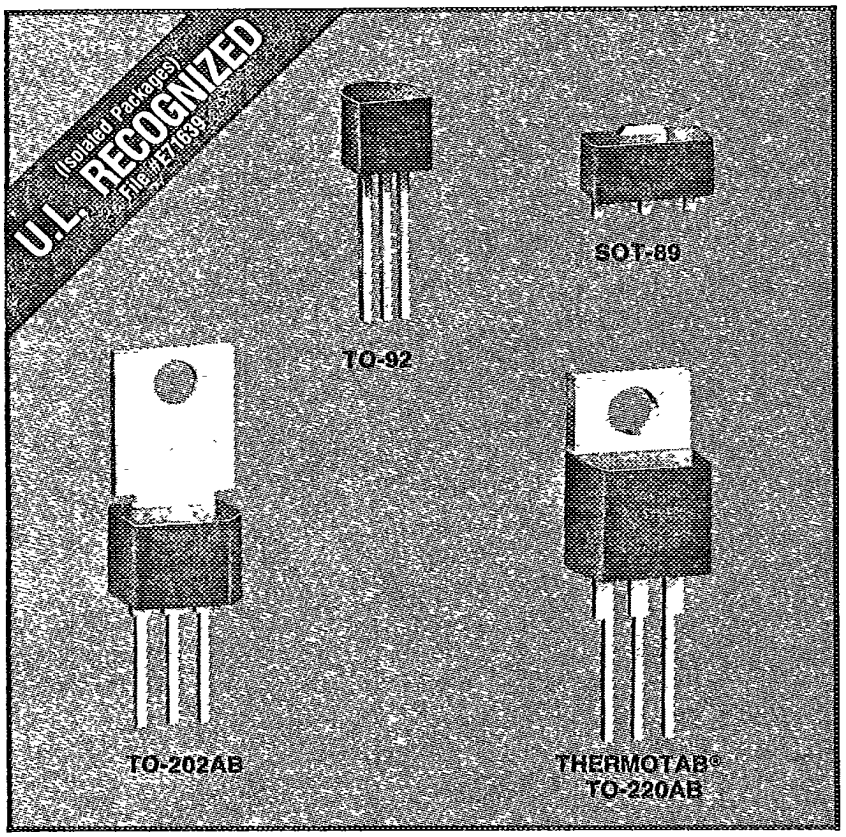
T-25-13



TECCOR
ELECTRONICS, INC.
1801 HURD DRIVE
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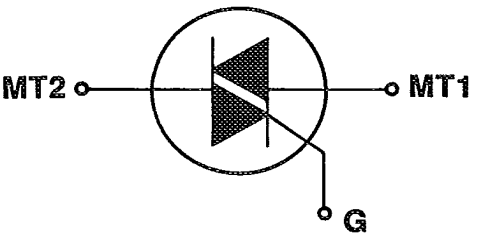


LOGIC TRIACS 0.8-8 AMPS

General Description

Teccor's line of logic triacs includes devices with current capabilities through 8 Amperes. Voltage ranges are available from 200 to 600 Volts. This line features devices with guaranteed gate control in the second and fourth quadrant as well as control in the commonly used first and third quadrants. Four quadrant control devices form a group termed "logic triacs". They lend themselves to be controlled by digital circuitry where positive pulses must control AC current in both directions through the device.

The logic triac is a bidirectional AC switch and is gate controlled for either polarity of main terminal voltage. Its primary purpose is for AC switching and phase control applications such as motor speed controls, temperature modulation controls, and lighting controls.

A wide range of package variations are available. The plastic TO-92 and THERMOTAB® configurations feature Teccor's electrically isolated construction where the case or tab is internally isolated. Tape and reel capability for the TO-92 and SOT-89 is available.

Non-isolated plastic TO-202 packages are also available.

All Teccor triacs have glass passivated junctions. This glassing process prevents migration of contaminants and insures long term device reliability with parameter stability.

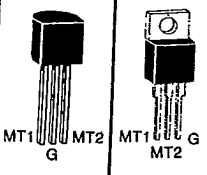
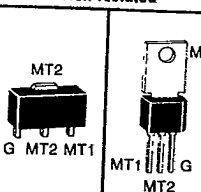
Variations of devices covered in this data sheet are available for custom design applications. Please consult factory for further information.

Features

- **Electrically isolated packages**
- **Glass passivated junctions insure long device reliability and parameter stability**
- **Voltage capability—up to 600 Volts**
- **Surge capability—up to 80 Amps**

LOGIC TRIACS 0.8-8 AMPS

T-25-13

I_T RMS	Part Number				V_{DRM}	I_{GT}				I_{DRM}		V_{TM}	V_{GT}	
	Isolated		Non-Isolated											
RMS On-State Current Conduction Angle of 360° (11)					Repetitive Peak Blocking Voltage (1)	DC Gate Trigger Current in Specific Operating Quadrants V_D = 12 VDC R_L = 60 Ω (3) (6)				Peak Off-State Current Gate Open V_{DRM} = Max Rated Value (1)		Peak On-State Voltage at Max Rated RMS Current T_C = 25°C (1) (4)	DC Gate Trigger Voltage V_D = 12VDC R_L = 60 Ω (2) (5)	
Amps	TO-92	THERMOTAB TO-220AB	SOT-89	TO-202AB	Volts	mA				mA		Volts	Volts	
MAX	FOR DIMENSIONAL OUTLINE & PACKAGE VARIATIONS SEE PAGE 81				MIN	QI MAX	QII MAX	QIII MAX	QIV MAX	T_C=25°C MAX	T_C=100°C MAX	MAX	T_C=100°C MIN	T_C=25°C MAX
0.8 Amp			L200U6		200	5	5	5	5	.01	0.1	1.6	0.2	2.0
			L400U5		400	5	5	5	5	.01	0.1	1.6	0.2	2.0
			L600U5		600	5	5	5	5	.01	0.1	1.6	0.2	2.0
			L200U7		200	10	10	10	10	.01	0.1	1.6	0.2	2.0
			L400U7		400	10	10	10	10	.01	0.1	1.6	0.2	2.0
			L600U7		600	10	10	10	10	.01	0.1	1.6	0.2	2.0
			L200U9		200	25	25	25	25	.01	0.1	1.6	0.2	2.0
			L400U9		400	25	25	25	25	.01	0.1	1.6	0.2	2.0
			L600U9		600	25	25	25	25	.01	0.1	1.6	0.2	2.0
1.0 Amp	L201E3				200	3	3	3	3	.01	0.1	1.6	0.2	2.0
	L401E3				400	3	3	3	3	.01	0.1	1.6	0.2	2.0
	L601E3				600	3	3	3	3	.01	0.1	1.6	0.2	2.0
	L201E5				200	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L401E5				400	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L601E5				600	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L201E7				200	10	10	10	10	.01	0.1	1.6	0.2	2.0
	L401E7				400	10	10	10	10	.01	0.1	1.6	0.2	2.0
	L601E7				600	10	10	10	10	.01	0.1	1.6	0.2	2.0
	L201E9				200	25	25	25	25	.01	0.1	1.6	0.2	2.0
	L401E9				400	25	25	25	25	.01	0.1	1.6	0.2	2.0
	L601E9				600	25	25	25	25	.01	0.1	1.6	0.2	2.0
4.0 Amps		L2004L3		L2004F31	200	3	3	3	3	.01	0.2	1.6	0.2	2.0
		L4004L3		L4004F31	400	3	3	3	3	.01	0.2	1.6	0.2	2.0
		L6004L3		L6004F31	600	3	3	3	3	.01	0.2	1.6	0.2	2.0
		L2004L5		L2004F51	200	5	5	5	5	.01	0.2	1.6	0.2	2.0
		L4004L5		L4004F51	400	5	5	5	5	.01	0.2	1.6	0.2	2.0
		L6004L5		L6004F51	600	5	5	5	5	.01	0.2	1.6	0.2	2.0
		L2004L7		L2004F71	200	10	10	10	10	.01	0.2	1.6	0.2	2.0
		L4004L7		L4004F71	400	10	10	10	10	.01	0.2	1.6	0.2	2.0
		L6004L7		L6004F71	600	10	10	10	10	.01	0.2	1.6	0.2	2.0
		L2004L9		L2004F91	200	25	25	25	25	.01	0.2	1.6	0.2	2.0
		L4004L9		L4004F91	400	25	25	25	25	.01	0.2	1.6	0.2	2.0
		L6004L9		L6004F91	600	25	25	25	25	.01	0.2	1.6	0.2	2.0
6.0 Amps		L2006L6			200	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L4006L6			400	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L6006L6			600	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L2006L7			200	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L4006L7			400	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L6006L7			600	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L2006L9			200	25	25	25	25	.02	0.5	1.6	0.2	2.0
		L4006L9			400	25	25	25	25	.02	0.5	1.6	0.2	2.0
		L6006L9			600	25	25	25	25	.02	0.5	1.6	0.2	2.0
8.0 Amps		L2008L6			200	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L4008L6			400	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L6008L6			600	5	5	5	25	.02	0.5	1.6	0.2	2.0
		L2008L7			200	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L4008L7			400	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L6008L7			600	10	10	10	10	.02	0.5	1.6	0.2	2.0
		L2008L9			200	25	25	25	25	.02	0.5	1.6	0.2	2.0
		L4008L9			400	25	25	25	25	.02	0.5	1.6	0.2	2.0
		L6008L9			600	25	25	25	25	.02	0.5	1.6	0.2	2.0

GENERAL NOTES

- All measurements are made with 60 Hz resistive load and at an ambient temperature of +25°C unless otherwise specified.
- Operating temperature range (T_J) is −65°C to +110°C for TO-92 and SOT-89 devices; −40°C to +110°C for all other devices.
- 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 TO-220 devices.
- Lead solder temperature is a maximum of 230°C for 10 seconds maximum at a minimum of 1/16" from case.
- The case temperature (T_C) is measured as shown on dimensional outline drawings. See "package dimensions" section of this catalog on page 81.

Electrical Specifications

I_H	I_{GTM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		dv/dt(c)	dv/dt	t_{gt}	I^2t	di/dt
Holding Current Gate Open Initial On-State Current = 200mA DC (1) (7)	Peak Gate Trigger Current (12)	Peak Gate Power Dissipation $I_{GT} \leq I_{GTM}$ (12)	Average Gate Power Dissipation	Peak One Cycle Surge (8) (10)		Critical Rate of Rise of Commutation Voltage at Rated V_{DRM} and I_T (RMS) Commutating di/dt = .54 Rated $I_{T(RMS)}$/msec. Gate Unenergized (1) (10)	Critical Rate of Rise of Off-State Voltage at Rated V_{DRM} Gate Open (1)	Gate Controlled Turn-On Time I_{GT} = 100mA 0.1 μs Rise Time	RMS Surge (Non-Repetitive) On-State Current For period of 8.3 msec for Fusing	Maximum Rate of Change of On-State Current I_{GT} = 50 mA With 0.1 μs Rise Time
mA	Amps	Watts	Watts	Amps		Volts/μs	Volts/μs $T_C = 100°C$	μs	$Amps^2sec.$	Amps/μs
MAX				60Hz	50Hz	MIN	MIN	MAX		
10	1.0	10	0.2	10	8.3	1	10	2.5	0.41	20
10	1.0	10	0.2	10	8.3	1	10	2.5	0.41	20
10	1.0	10	0.2	10	8.3	1	5	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1	20	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1	20	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1	10	2.5	0.41	20
25	1.0	10	0.2	10	8.3	1	25	3.0	0.41	20
25	1.0	10	0.2	10	8.3	1	25	3.0	0.41	20
25	1.0	10	0.2	10	8.3	1	15	3.0	0.41	20
5	1.0	10	0.2	20	16.7	1	10	2.5	1.6	20
5	1.0	10	0.2	20	16.7	1	10	2.5	1.6	20
5	1.0	10	0.2	20	16.7	1	5	2.5	1.6	20
10	1.0	10	0.2	20	16.7	1	10	2.5	1.6	20
10	1.0	10	0.2	20	16.7	1	10	2.5	1.6	20
10	1.0	10	0.2	20	16.7	1	5	2.5	1.6	20
15	1.0	10	0.2	20	16.7	1	20	2.5	1.6	20
15	1.0	10	0.2	20	16.7	1	20	2.5	1.6	20
15	1.0	10	0.2	20	16.7	1	10	2.5	1.6	20
25	1.0	10	0.2	20	16.7	1	25	3.0	1.6	20
25	1.0	10	0.2	20	16.7	1	25	3.0	1.6	20
25	1.0	10	0.2	20	16.7	1	15	3.0	1.6	20
5	1.2	15	0.3	40	33	1	10	2.5	6.6	50
5	1.2	15	0.3	40	33	1	10	2.5	6.6	50
5	1.2	15	0.3	40	33	1	5	2.5	6.6	50
10	1.2	15	0.3	40	33	1	10	2.5	6.6	50
10	1.2	15	0.3	40	33	1	10	2.5	6.6	50
10	1.2	15	0.3	40	33	1	5	2.5	6.6	50
15	1.2	15	0.3	40	33	1	20	2.5	6.6	50
15	1.2	15	0.3	40	33	1	20	2.5	6.6	50
15	1.2	15	0.3	40	33	1	10	2.5	6.6	50
25	1.2	15	0.3	40	33	1	25	3.0	6.6	50
25	1.2	15	0.3	40	33	1	25	3.0	6.6	50
25	1.2	15	0.3	40	33	1	15	3.0	6.6	50
15	1.6	18	0.4	60	50	2	30	2.5	15.0	70
15	1.6	18	0.4	60	50	2	25	2.5	15.0	70
15	1.6	18	0.4	60	50	2	10	2.5	15.0	70
15	1.6	18	0.4	60	50	2	30	2.5	15.0	70
15	1.6	18	0.4	60	50	2	25	2.5	15.0	70
15	1.6	18	0.4	60	50	2	15	2.5	15.0	70
30	1.6	18	0.4	60	50	2	40	3.0	15.0	70
30	1.6	18	0.4	60	50	2	30	3.0	15.0	70
30	1.6	18	0.4	60	50	2	20	3.0	15.0	70
15	1.6	18	0.4	80	65	2	30	2.5	26.5	70
15	1.6	18	0.4	80	65	2	25	2.5	26.5	70
15	1.6	18	0.4	80	65	2	10	2.5	26.5	70
15	1.6	18	0.4	80	65	2	30	2.5	26.5	70
15	1.6	18	0.4	80	65	2	25	2.5	26.5	70
15	1.6	18	0.4	80	65	2	15	2.5	26.5	70
30	1.6	18	0.4	80	65	2	40	3.0	26.5	70
30	1.6	18	0.4	80	65	2	30	3.0	26.5	70
30	1.6	18	0.4	80	65	2	20	3.0	26.5	70

NOTES TO ELECTRICAL SPECIFICATIONS

1. For either polarity of MT2 with reference to MT1 terminal
2. For either polarity of gate voltage V_{GT} with reference to MT1 terminal.
3. See definition of quadrants and gate characteristics.
4. See Figure 3 for I_T vs V_T
5. See Figure 5 for V_{GT} vs T_C
6. See Figure 6 for I_{GT} vs T_C
7. See Figure 4 for I_H vs T_C
8. See Figure 8 for surge rating with specific durations
9. See Figure 7 for t_{gt} vs I_{GT}
10. See Figures 2A & 2B for maximum allowable case temperature @ maximum rated current
11. See Figure 1. 2A & 2B for T_A or T_C vs I_T (RMS)
12. Pulse width ≤ 3μsec

LOGIC TRIACS 0.8-8 AMPS

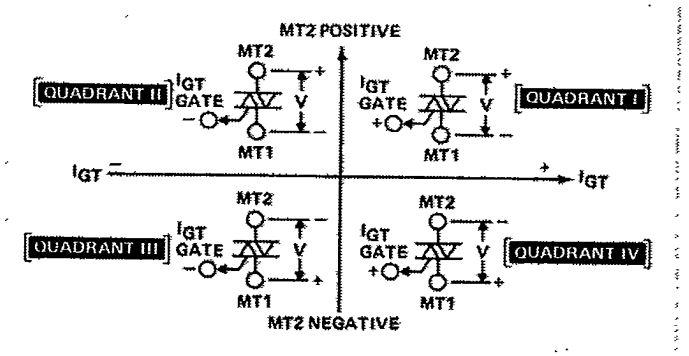
GATE CHARACTERISTICS

Teccor triacs may be gated with in-phase signals (using standard AC line) in which quadrants I & III are used, or by applying unipolar pulses (gate always positive or negative) where if a negative pulse is applied quadrants II and III are used, and quadrants I & IV are used when a positive pulse is applied.

ELECTRICAL ISOLATION

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

DEFINITION OF QUADRANTS



THERMAL RESISTANCE (STEADY STATE) JUNCTION TO CASE & JUNCTION TO AMBIENT

$R_{\theta JC}$ / $R_{\theta JA}$ °C/W (TYP)

TYPE	PLASTIC TO-92	SOT-89	TO-202AB TYPE 1	TO-220AB THERMOTAB	TO-202AB TYPE 2
0.8 Amp		30			
1.0 Amp	50/105				
4.0 Amp			3.5/45	3.5/50	5.0/70
6.0 Amp				3.3	
8.0 Amp				2.8	

ELECTRICAL ISOLATION FROM LEADS TO CASE

U.L. RECOGNIZED FILE #E71639

VAC (RMS) \ TYPE	TO-92	TO-220AB THERMOTAB
1600	Standard	—
2500	No	Standard
4000	No	Optional*

*For 4000V Isolation Use V Suffix

LOGIC TRIACS 0.8-8 AMPS

FIGURE 1 — Maximum Allowable Ambient Temperature vs On-State Current

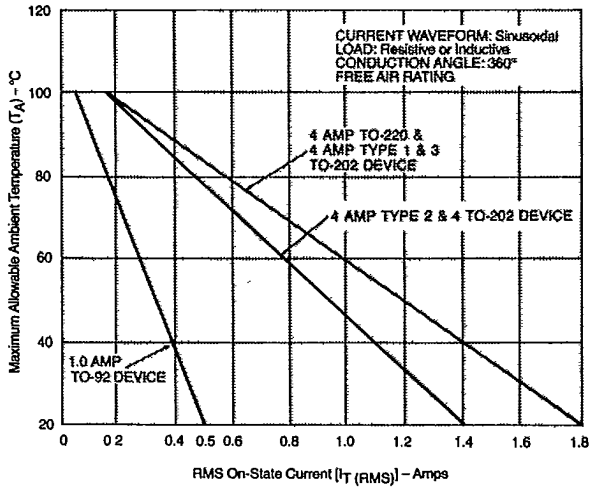


FIGURE 2A — Maximum Allowable Case Temperature vs On-State Current

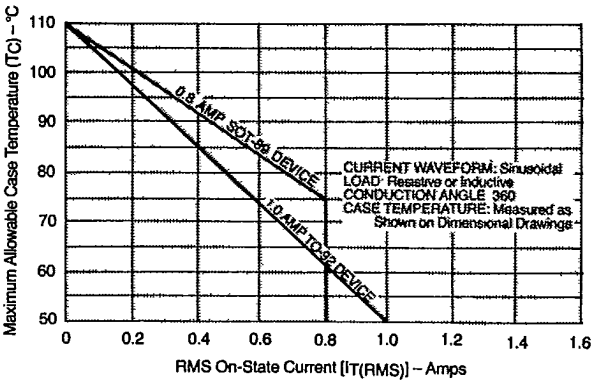


FIGURE 2B — Maximum Allowable Case Temperature vs On-State Current

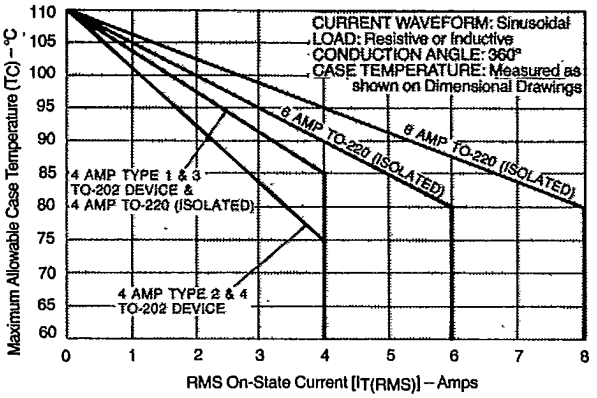


FIGURE 3 — On-State Current vs On-State Voltage (Typical)

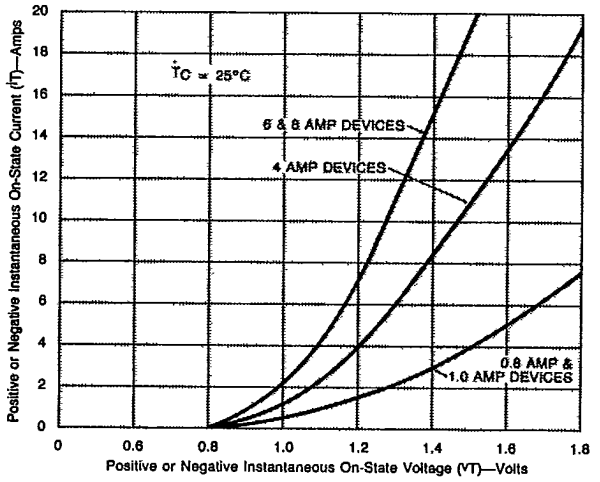


FIGURE 4 — Normalized DC Holding Current vs Case Temperature

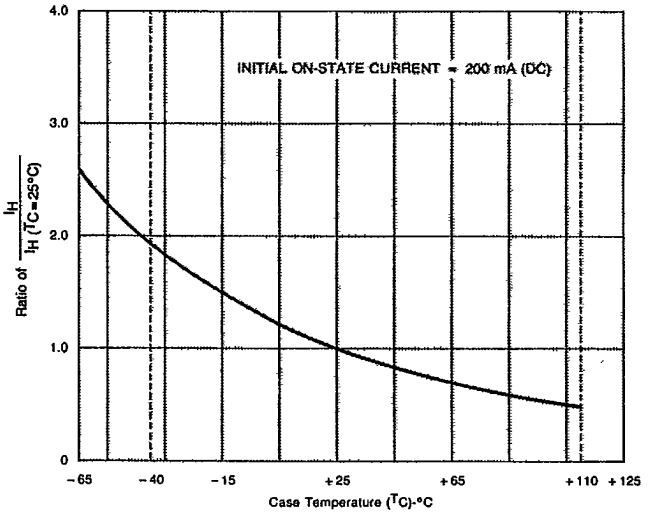
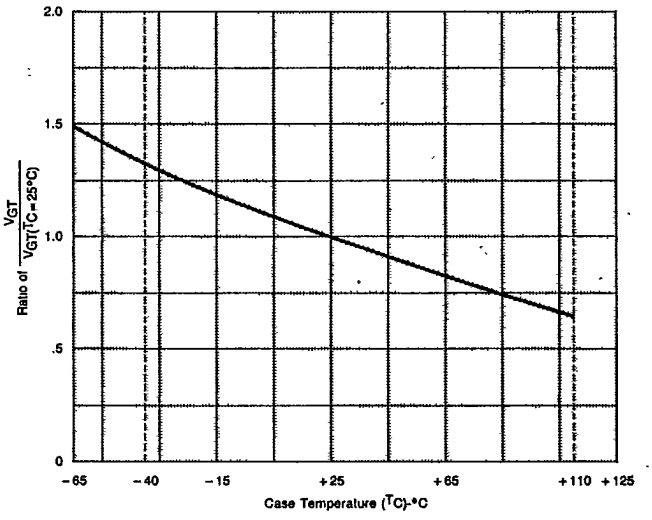


FIGURE 5 — Normalized DC Gate Trigger Voltage for All Quadrants vs Case Temperature



LOGIC TRIACS 0.8-8 AMPS

FIGURE 6 — Normalized DC Gate Trigger Current for All Quadrants vs Case Temperature

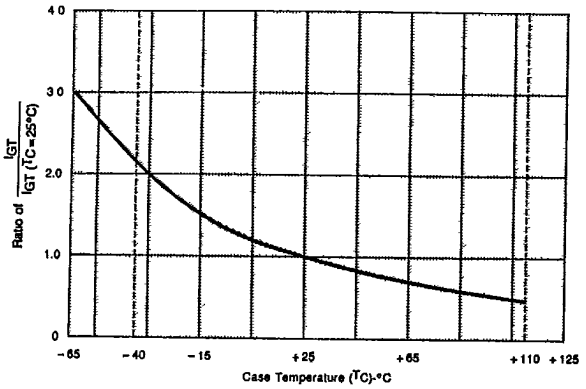


FIGURE 7—Turn-On Time vs Gate Trigger Current (Typical)

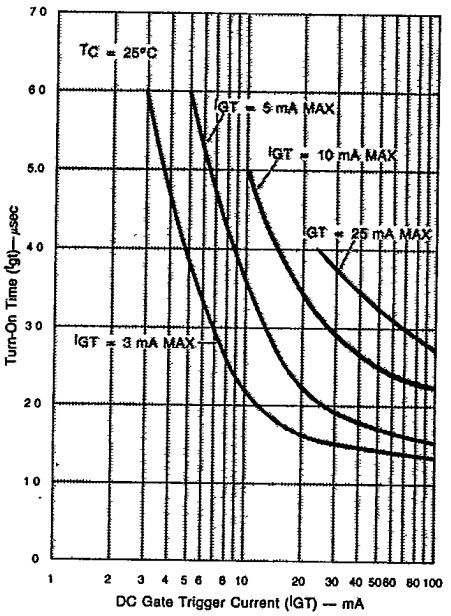


FIGURE 8—Peak Surge Current vs Surge Current Duration

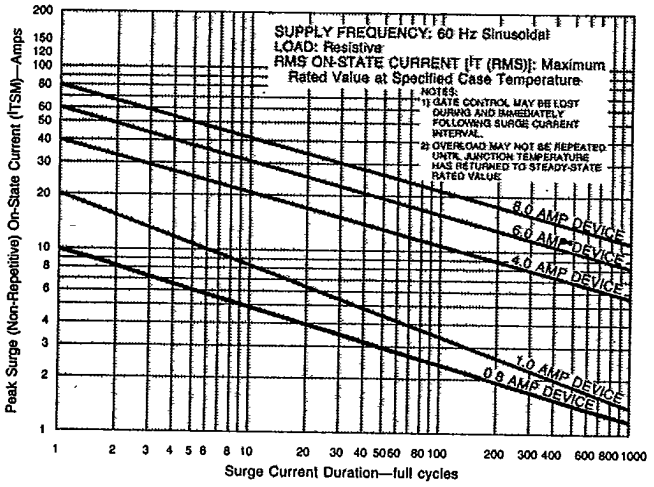


FIGURE 9A — Power Dissipation (Typ.) vs RMS On-State Current

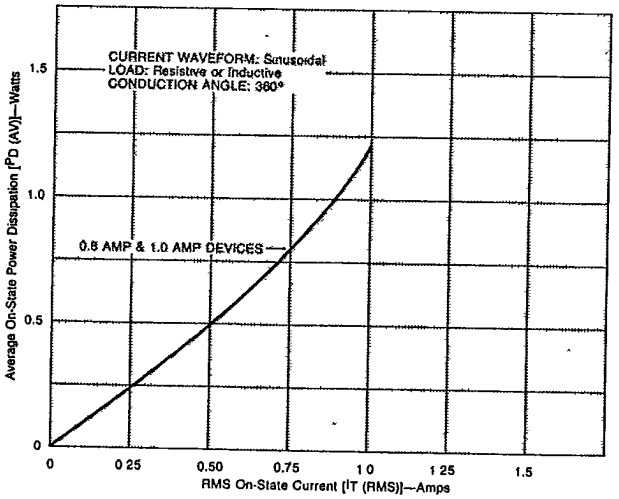


FIGURE 9B — Power Dissipation (Typ.) vs RMS On-State Current