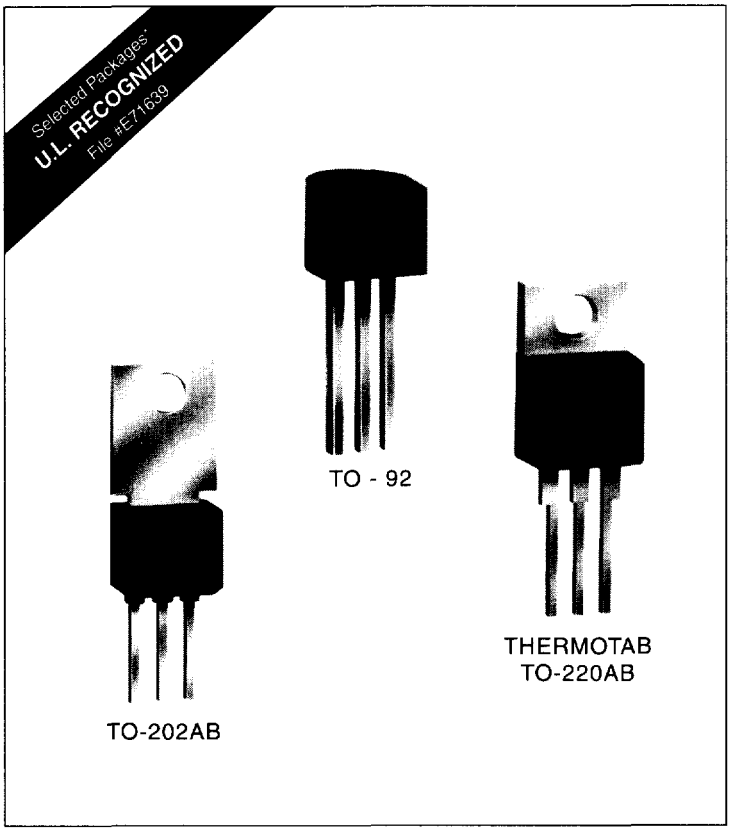
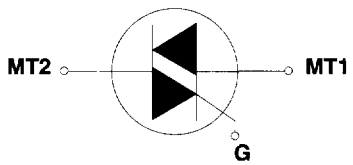




Sensitive Triacs

(0.8 – 8.0 Amps)

General Description

Teccor's line of sensitive gate 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 quadrants as well as control in the commonly used first and third quadrants. Four-quadrant control devices require sensitive gate triacs. They lend themselves to be controlled by digital circuitry where positive-only or negative-only pulses must control AC current in both directions through the device. It should be noted that triacs with low I_{GT} values in the second and fourth quadrants will have lower dv/dt characteristics.

The sensitive gate 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 mounting tab is internally isolated from the semiconductor chip and lead attachments. Non-isolated plastic TO-202 packages are available. Tape-and-reel capability and tube packing also are available. See "Packing Options" section of this catalog.

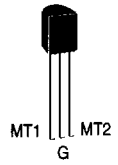
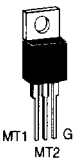
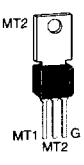
All Teccor triacs have glass passivated junctions. This glassing process prevents migration of contaminants and ensures long-term device reliability with parameter stability.

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

Features

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

Electrical Specifications

$I_{T(RMS)}$	Part No.			V_{DRM}	I_{GT}				I_{DRM}		V_{TM}	V_{GT}	
		Isolated	Non-Isolated		DC Gate Trigger Current in Specific Operating Quadrants V_D = 12VDC R_L = 60Ω (3) (6)				Peak Off-State Current Gate Open V_{DRM} = Max Rated Value (1) (13)		Peak On-State Voltage at Max Rated RMS Current T_C = 25°C (1) (4)	DC Gate Trigger Voltage V_D = 12VDC R_L = 60Ω (2) (5)	
RMS On-State Current Conduction Angle of 360° (11)	 TO-92	 THERMOTAB TO-220	 TO-202AB	Repetitive Peak Blocking Voltage (1)	mAmps				mAmps		Peak On-State Voltage at Max Rated RMS Current T_C = 25°C (1) (4)	Volts	
				Volts	QI	QII	QIII	QIV	T_C = 25°C	T_C = 110°C	Volts	T_C = 110°C	T_C = 25°C
MAX	See "Package Dimensions" section for variations.			MIN	MAX				MAX	MAX	MAX	MIN	MAX
0.8 Amp	L2X8E3			200	3	3	3	3	.01	0.1	1.6	0.2	3.0
	L4X8E3			400	3	3	3	3	.01	0.1	1.6	0.2	2.0
	L6X8E3			600	3	3	3	3	.01	0.1	1.6	0.2	2.0
	L2X8E5			200	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L4X8E5			400	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L6X8E5			600	5	5	5	5	.01	0.1	1.6	0.2	2.0
	L2X8E6			200	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L4X8E6			400	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L6X8E6			600	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L2X8E8			200	10	10	10	20	.01	0.1	1.6	0.2	2.0
	L4X8E8			400	10	10	10	20	.01	0.1	1.6	0.2	2.0
	L6X8E8			600	10	10	10	20	.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
	L201E6			200	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L401E6			400	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L601E6			600	5	5	5	10	.01	0.1	1.6	0.2	2.0
	L201E8			200	10	10	10	20	.01	0.1	1.6	0.2	2.0
	L401E8			400	10	10	10	20	.01	0.1	1.6	0.2	2.0
	L601E8			600	10	10	10	20	.01	0.1	1.6	0.2	2.0
4.0 Amps		L2004L3	L2004F31	200	3	3	3	3	.01	0.2	1.8	0.2	2.0
		L4004L3	L4004F31	400	3	3	3	3	.01	0.2	1.8	0.2	2.0
		L6004L3	L6004F31	600	3	3	3	3	.01	0.2	1.8	0.2	2.0
		L2004L5	L2004F51	200	5	5	5	5	.01	0.2	1.8	0.2	2.0
		L4004L5	L4004F51	400	5	5	5	5	.01	0.2	1.8	0.2	2.0
		L6004L5	L6004F51	600	5	5	5	5	.01	0.2	1.8	0.2	2.0
		L2004L6	L2004F61	200	5	5	5	10	.01	0.2	1.8	0.2	2.0
		L4004L6	L4004F61	400	5	5	5	10	.01	0.2	1.8	0.2	2.0
		L6004L6	L6004F61	600	5	5	5	10	.01	0.2	1.8	0.2	2.0
		L2004L8	L2004F81	200	10	10	10	20	.01	0.2	1.8	0.2	2.0
		L4004L8	L4004F81	400	10	10	10	20	.01	0.2	1.8	0.2	2.0
		L6004L8	L6004F81	600	10	10	10	20	.01	0.2	1.8	0.2	2.0
6.0 Amps		L2006L5		200	5	5	5	5	.02	0.5	1.6	0.2	2.0
		L4006L5		400	5	5	5	5	.02	0.5	1.6	0.2	2.0
		L6006L5		600	5	5	5	5	.02	0.5	1.6	0.2	2.0
		L2006L6		200	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L4006L6		400	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L6006L6		600	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L2006L8		200	10	10	10	20	.02	0.5	1.6	0.2	2.0
		L4006L8		400	10	10	10	20	.02	0.5	1.6	0.2	2.0
		L6006L8		600	10	10	10	20	.02	0.5	1.6	0.2	2.0
8.0 Amps		L2008L8		200	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L4008L8		400	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L6008L8		600	5	5	5	10	.02	0.5	1.6	0.2	2.0
		L2008L8		200	10	10	10	20	.02	0.5	1.6	0.2	2.0
		L4008L8		400	10	10	10	20	.02	0.5	1.6	0.2	2.0
		L6008L8		600	10	10	10	20	.02	0.5	1.6	0.2	2.0

See General Notes and Electrical Specification Notes on page 1-4.

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 = 200mADC (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) Amps		Critical Rate-of-Rise of Commutation Voltage at Rated V_{DRM} and $I_{T(RMS)}$ Commutating di/dt = 0.54 Rated $I_{T(RMS)}$/ms Gate Unenergized (1) (10)	Critical Rate-of-Rise of Off-State Voltage at Rated V_{DRM} Gate Open (1) Volts/µSec	Gate Controlled Turn-On Time I_{GT} = 50mA 0.1µs Rise Time	RMS Surge (Non-Repetitive) On-State Current for Period of 8.3ms for Fusing	Maximum Rate-of-Change of On-State Current I_{GT} = 50mA With 0.1µs Rise Time
mAmps	Amps	Watts	Watts	60Hz	50Hz	Volts/µSec	T_C = 100°C	µSec	$Amps^2Sec$	Amps/µSec
MAX						TYP	TYP	TYP		
5	1.0	10	0.2	10	8.3	0.5	20	2.8	0.41	20
5	1.0	10	0.2	10	8.3	0.5	15	2.8	0.41	20
5	1.0	10	0.2	10	8.3	0.5	10	2.8	0.41	20
10	1.0	10	0.2	10	8.3	1.0	20	3.0	0.41	20
10	1.0	10	0.2	10	8.3	1.0	15	3.0	0.41	20
10	1.0	10	0.2	10	8.3	1.0	10	3.0	0.41	20
10	1.0	10	0.2	10	8.3	1.0	30	3.0	0.41	20
10	1.0	10	0.2	10	8.3	1.0	25	3.0	0.41	20
10	1.0	10	0.2	10	8.3	1.0	20	3.0	0.41	20
15	1.0	10	0.2	10	8.3	2.0	35	3.2	0.41	20
15	1.0	10	0.2	10	8.3	2.0	30	3.2	0.41	20
15	1.0	10	0.2	10	8.3	2.0	25	3.2	0.41	20
5	1.0	10	0.2	20	16.7	0.5	20	2.8	1.6	20
5	1.0	10	0.2	20	16.7	0.5	20	2.8	1.6	20
5	1.0	10	0.2	20	16.7	0.5	10	2.8	1.6	20
10	1.0	10	0.2	20	16.7	1	20	3.0	1.6	20
10	1.0	10	0.2	20	16.7	1	20	3.0	1.6	20
10	1.0	10	0.2	20	16.7	1	10	3.0	1.6	20
10	1.0	10	0.2	20	16.7	1	30	3.0	1.6	20
10	1.0	10	0.2	20	16.7	1	30	3.0	1.6	20
10	1.0	10	0.2	20	16.7	1	20	3.0	1.6	20
15	1.0	10	0.2	20	16.7	1	35	3.2	1.6	20
15	1.0	10	0.2	20	16.7	1	35	3.2	1.6	20
15	1.0	10	0.2	20	16.7	1	25	3.2	1.6	20
5	1.2	15	0.3	40	33	0.5	25	2.8	6.6	50
5	1.2	15	0.3	40	33	0.5	25	2.8	6.6	50
5	1.2	15	0.3	40	33	0.5	15	2.8	6.6	50
10	1.2	15	0.3	40	33	1	25	3.0	6.6	50
10	1.2	15	0.3	40	33	1	25	3.0	6.6	50
10	1.2	15	0.3	40	33	1	10	3.0	6.6	50
10	1.2	15	0.3	40	33	1	30	3.0	6.6	50
10	1.2	15	0.3	40	33	1	30	3.0	6.6	50
10	1.2	15	0.3	40	33	1	20	3.0	6.6	50
15	1.2	15	0.3	40	33	2	35	3.2	6.6	50
15	1.2	15	0.3	40	33	2	35	3.2	6.6	50
15	1.2	15	0.3	40	33	2	25	3.2	6.6	50
10	1.6	18	0.4	60	50	1	40	3.0	15.0	70
10	1.6	18	0.4	60	50	1	30	3.0	15.0	70
10	1.6	18	0.4	60	50	1	20	3.0	15.0	70
10	1.6	18	0.4	60	50	2	40	3.0	15.0	70
10	1.6	18	0.4	60	50	2	30	3.0	15.0	70
10	1.6	18	0.4	60	50	2	25	3.0	15.0	70
15	1.6	18	0.4	60	50	2	45	3.2	15.0	70
15	1.6	18	0.4	60	50	2	40	3.2	15.0	70
15	1.6	18	0.4	60	50	2	30	3.2	15.0	70
10	1.6	18	0.4	80	66	2	40	3.0	26.5	70
10	1.6	18	0.4	80	66	2	30	3.0	26.5	70
10	1.6	18	0.4	80	66	2	20	3.0	26.5	70
15	1.6	18	0.4	80	66	2	45	3.2	26.5	70
15	1.6	18	0.4	80	66	2	40	3.2	26.5	70
15	1.6	18	0.4	80	66	2	30	3.2	26.5	70

See General Notes and Electrical Specification Notes on page 1-4.

Electrical Specifications

General Notes

- All measurements are made with 60Hz 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 devices; -40°C to 110°C for all other devices.
- Storage temperature range (T_S) is -65°C to +150°C for TO-92 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" (1.59mm) from case.
- The case temperature (T_C) is measured as shown on dimensional outline drawings. See "Package Dimensions" section of this catalog.

Electrical Specification Notes

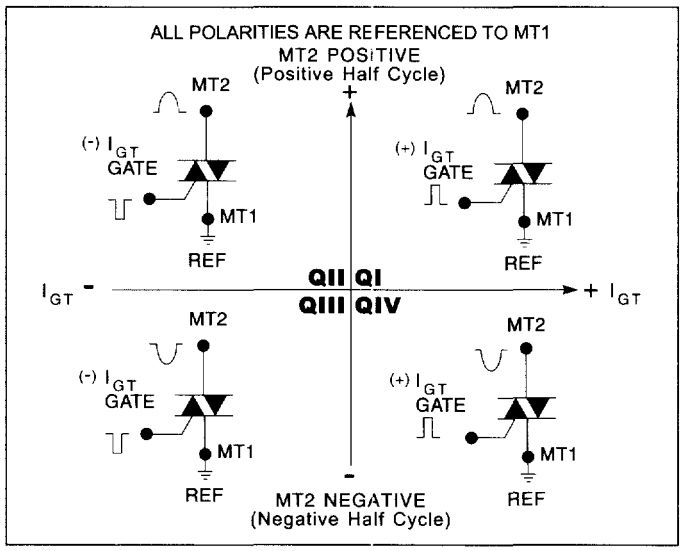
(1) For either polarity of MT2 with reference to MT1 terminal.
(2) For either polarity of gate voltage V_{GT} with reference to MT1 terminal.
(3) See definition of quadrants and gate characteristics.
(4) See Figure 1.4 for i_T vs v_T.
(5) See Figure 1.6 for V_{GT} vs T_C.
(6) See Figure 1.7 for I_{GT} vs T_C.
(7) See Figure 1.5 for I_H vs T_C.
(8) See Figure 1.9 for surge rating and specific duration.
(9) See Figure 1.8 for t_{gt} vs I_{GT}.
(10) See Figures 1.2 and 1.3 for maximum allowable case temperature at maximum rated current.
(11) See Figures 1.1, 1.2, and 1.3 for T_A or T_C vs I_T(RMS).
(12) Pulse width ≤ 10μs.
(13) $T_C = T_J$ for test conditions in off-state.

Gate Characteristics

Teccor triacs may be turned on between gate and MT1 terminals in the following ways:

- With in-phase signals (using standard AC line) Quadrants I and III are used.
- By applying unipolar pulses (gate always positive or negative) — with negative gate pulses Quadrants II and III are used and with positive gate pulses Quadrants I and IV are used.

When maximum surge capability is required, pulses should be a minimum of one magnitude above I_{GT} rating with a steep rising waveform (≤ 1μsec rise time).



Definition of Quadrants

Electrical Isolation

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

ELECTRICAL ISOLATION FROM LEADS TO MOUNTING TAB	
VAC(RMS)	TO-220AB THERMOTAB *
2500	Standard

* U.L. Recognized File #E71639

THERMAL RESISTANCE (STEADY STATE) JUNCTION TO MOUNTING TAB AND JUNCTION TO AMBIENT $R_{\theta JC}$ [$R_{\theta JA}$] °C/W (TYP)				
TYPE	Plastic TO-92	TO-202AB TYPE 1	TO-220AB THERMOTAB	TO-202AB TYPE 2
0.8 Amp	60 [135]			
1.0 Amp	50 [95]			
4.0 Amps		3.5 [45]	3.6 [50]	6.0 [70]
6.0 Amps			3.3	
8.0 Amps			2.8	

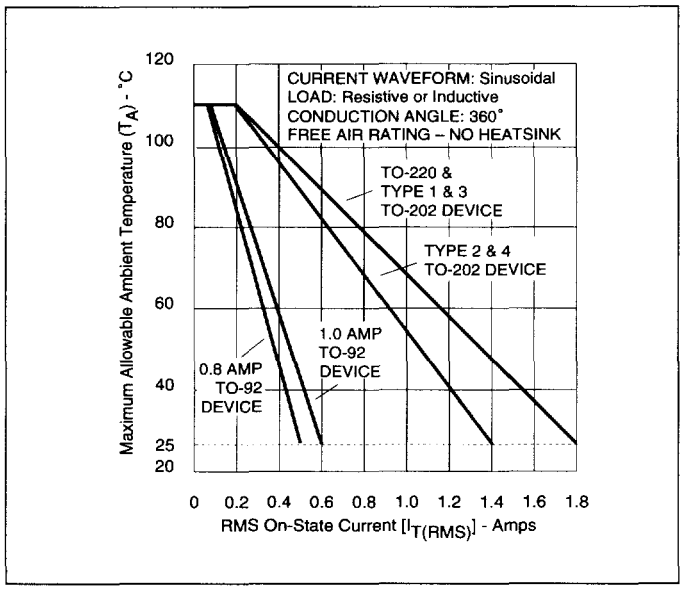


Figure 1.1 Maximum Allowable Ambient Temperature vs On-State Current

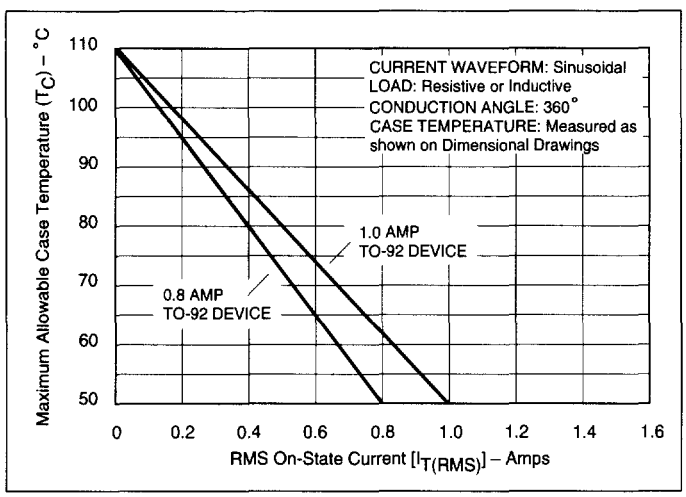


Figure 1.2 Maximum Allowable Case Temperature vs On-State Current (0.8 and 1.0 Amp)

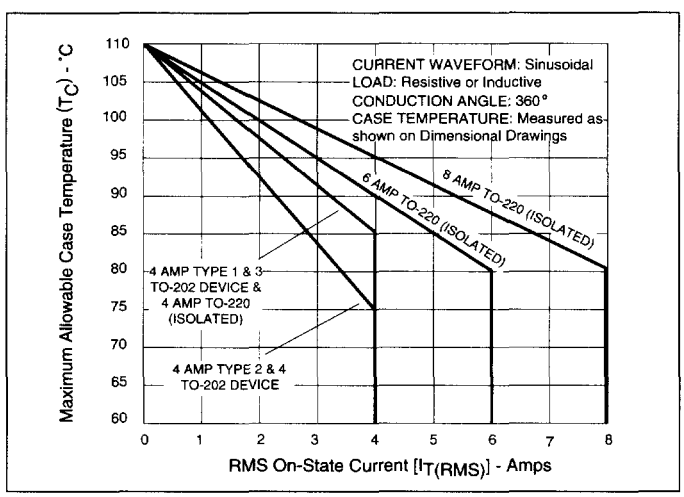


Figure 1.3 Maximum Allowable Case Temperature vs On-State Current (4, 6, and 8 Amp)

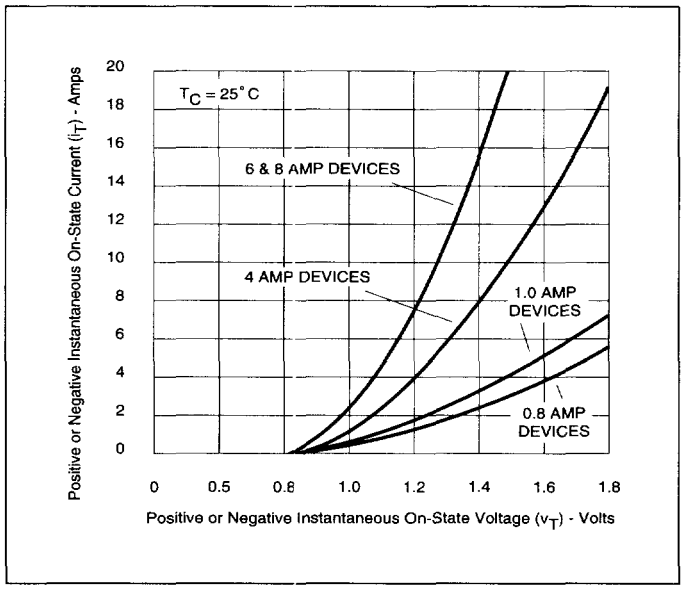


Figure 1.4 On-State Current vs On-State Voltage (Typical)

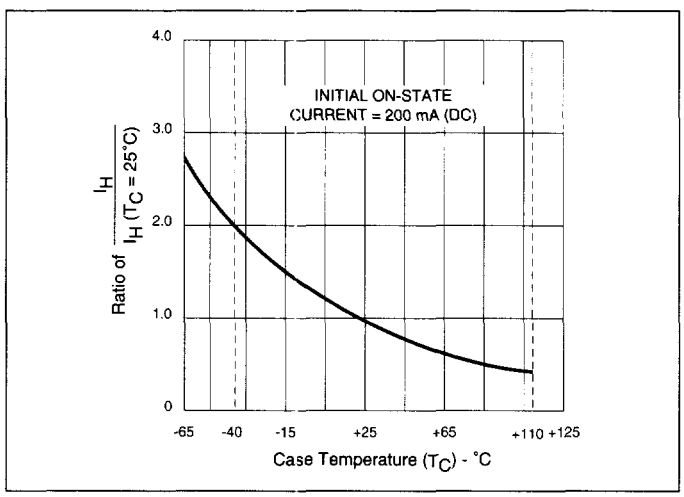


Figure 1.5 Normalized DC Holding Current vs Case Temperature

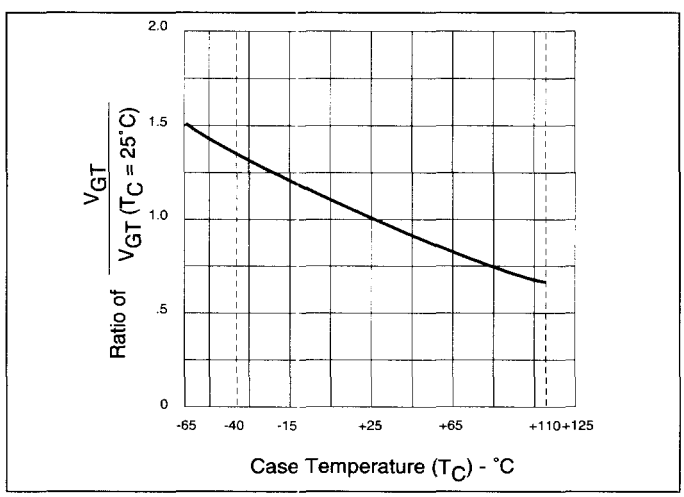


Figure 1.6 Normalized DC Gate Trigger Voltage for All Quadrants vs Case Temperature

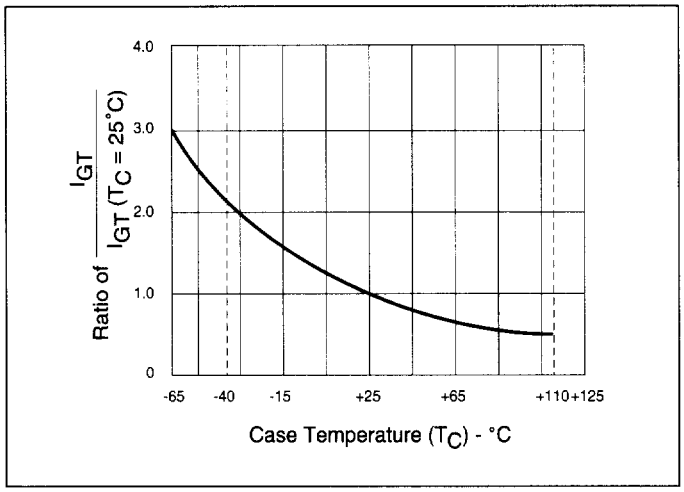


Figure 1.7 Normalized DC Gate Trigger Current for All Quadrants vs Case Temperature

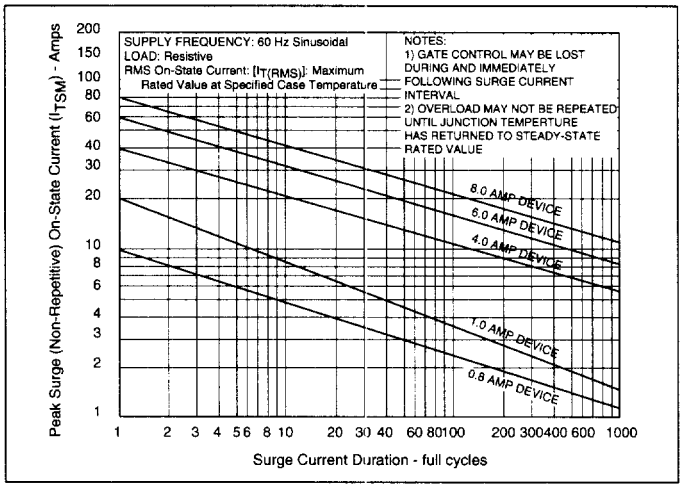


Figure 1.9 Peak Surge Current vs Surge Current Duration

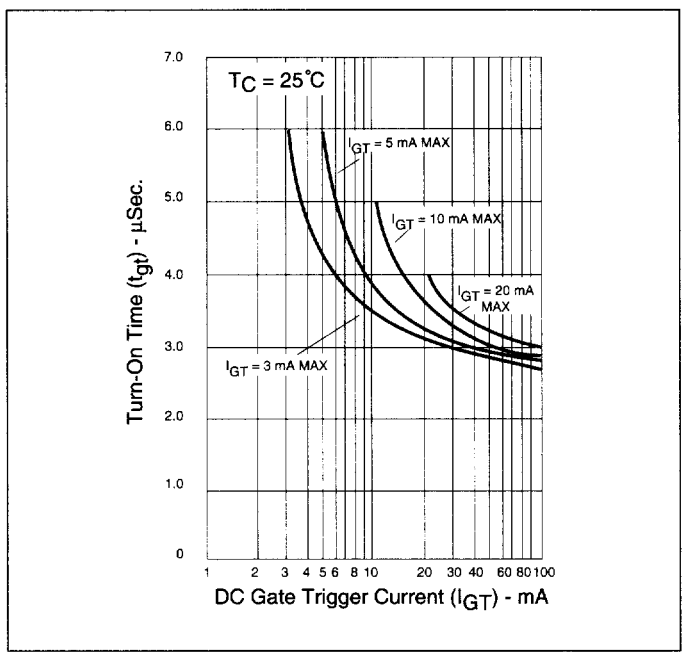


Figure 1.8 Turn-On Time vs Gate Trigger Current (Typical)

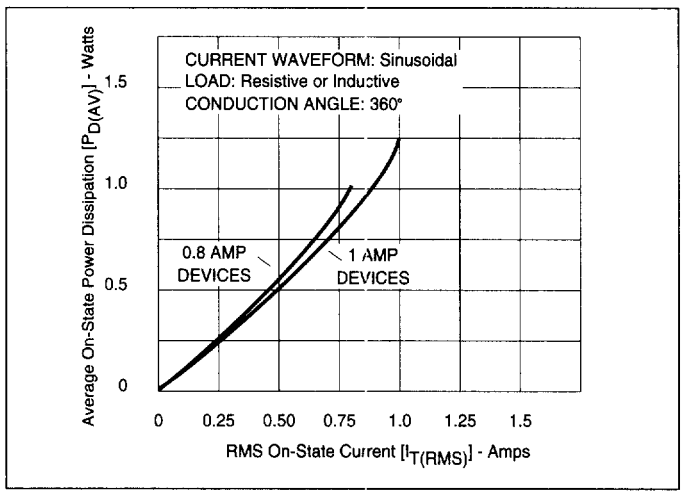


Figure 1.10 Power Dissipation (Typ.) vs RMS On-State Current (0.8 and 1 Amp)

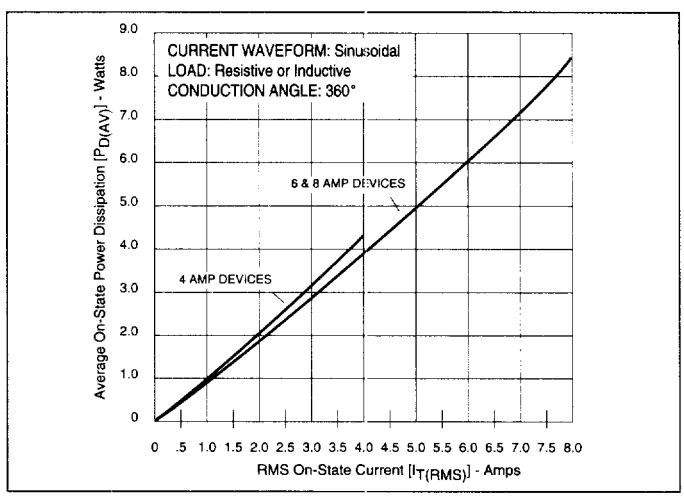


Figure 1.11 Power Dissipation (Typ.) vs RMS On-State Current (4, 6, and 8 Amp)