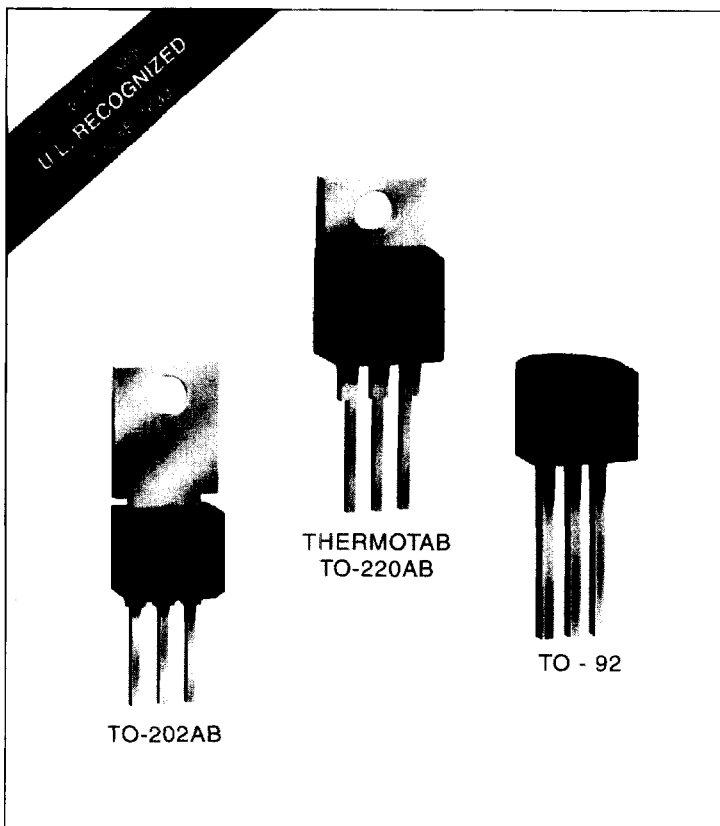


Triacs

(0.8 – 25 Amps)

General Description

These gated triacs from Teccor Electronics are part of a broad line of bidirectional semiconductors. The devices range in current ratings from 0.8 to 25 amperes and in voltages from 200 to 800 volts.

The triac may be gate triggered from a blocking to conduction state for either polarity of applied voltage and is designed for AC switching and phase control applications such as speed and temperature modulation controls, lighting controls and static switching relays. The triggering signal is normally applied between the gate and MT1.

Teccor's gated triacs are available in a choice of different packages as shown above. Isolated packages are offered with internal construction, having the case or mounting tab electrically isolated from the semiconductor chip. This feature facilitates the use of low-cost assembly and convenient packaging techniques. Tape-and-reel capability is available. See "Packing Options" section of this catalog.

All Teccor triacs have glass-passivated junctions to ensure long term device reliability and parameter stability. Teccor's glass offers a rugged, reliable barrier against junction contamination.

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

Features

- **Electrically-isolated packages**
- **Glass-passivated junctions**
- **Voltage capability — up to 800 Volts**
- **Surge capability — up to 200 Amps**

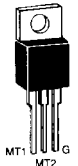
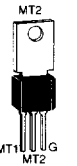
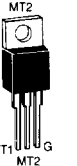
See General Notes and Electrical Specification Notes on page 2-4.

Teccor Electronics, Inc.
(972) 580-7777

I_H	$I_{GT(M)}$	P_{GM}	$P_{G(AV)}$	I_{TSM}		$dv/dt (c)$	dv/dt		t_{gt}	I^2t	di/dt
Holding Current (DC) Gate Open (1) (8) (12)	Peak Gate Trigger Current (14)	Peak Gate Power Dissipation (14) $I_{GT} \leq I_{GT(M)}$	Average Gate Power Dissipation	Peak One Cycle Surge (9) (13)		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) (4) (13)	Critical Rate-of-Rise of Off-State Voltage at Rated V_{DRM} Gate Open (1) Volts/ μ Sec $T_C = 100^\circ C$ $T_C = 125^\circ C$		Gate Controlled Turn-On Time $I_{GT} = 200mA$ 0.1 μ s Rise Time (10)	RMS Surge (Non-Repetitive) On-State Current for Period of 8.3ms for Fusing	Maximum Rate-of-Change of On-State Current $I_{GT} = 200mA$ with 0.1 μ s Rise Time
mAmps				Amps		Volts/ μ Sec			μ Sec		
MAX	Amps	Watts	Watts	60Hz	50Hz	TYP	MIN		TYP	Amp ² Sec	Amps/ μ Sec
15	1.0	10	0.2	10	8.3	1.0	40	30	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1.0	35	25	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1.0	30	20	2.5	0.41	20
15	1.0	10	0.2	10	8.3	1.0	25	15	2.5	0.41	20
25	1.0	10	0.2	10	8.3	2.0	50	40	3	0.41	20
25	1.0	10	0.2	10	8.3	2.0	45	35	3	0.41	20
25	1.0	10	0.2	10	8.3	2.0	40	30	3	0.41	20
25	1.0	10	0.2	10	8.3	2.0	35	25	3	0.41	20
15	1.0	10	0.2	20	16.7	1.0	40	30	2.5	1.6	30
15	1.0	10	0.2	20	16.7	1.0	40	30	2.5	1.6	30
15	1.0	10	0.2	20	16.7	1.0	30	20	2.5	1.6	30
15	1.0	10	0.2	20	16.7	1.0	30	20	2.5	1.6	30
25	1.0	10	0.2	20	16.7	1.0	50	40	3	1.6	30
25	1.0	10	0.2	20	16.7	1.0	50	40	3	1.6	30
25	1.0	10	0.2	20	16.7	1.0	40	30	3	1.6	30
25	1.0	10	0.2	20	16.7	1.0	40	30	3	1.6	30
20	1.2	15	0.3	55	46	2.0	50	40	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	50	40	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	30	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	30	2.5	12.5	50
30	1.2	15	0.3	55	46	2.0	100	75	3	12.5	50
30	1.2	15	0.3	55	46	2.0	100	75	3	12.5	50
30	1.2	15	0.3	55	46	2.0	75	50	3	12.5	50
30	1.2	15	0.3	55	46	2.0	75	50	3	12.5	50
30	1.2	15	0.3	55	46	2.0	60	40	3	12.5	50
30	1.2	15	0.3	55	46	2.0	60	40	3	12.5	50
50	1.6	18	0.5	80	65	4.0	200	120	3	26.5	70
50	1.6	18	0.5	80	65	4.0	200	120	3	26.5	70
50	1.6	18	0.5	80	65	4.0	150	100	3	26.5	70
50	1.6	18	0.5	80	65	4.0	150	100	3	26.5	70
50	1.6	18	0.5	80	65	4.0	125	85	3	26.5	70
50	1.6	18	0.5	80	65	4.0	125	85	3	26.5	70
50	1.8	20	0.5	100	83	4.0	250	150	3	41	70
50	1.8	20	0.5	100	83	4.0	250	150	3	41	70
50	1.8	20	0.5	100	83	4.0	220	125	3	41	70
50	1.8	20	0.5	100	83	4.0	220	125	3	41	70
50	1.8	20	0.5	100	83	4.0	150	100	3	41	70
50	1.8	20	0.5	100	83	4.0	150	100	3	41	70

See General Notes and Electrical Specification Notes on page 2-4.

Electrical Specifications

$I_T(RMS)$	Part Number			V_{DRM}	I_{GT}					I_{DRM}			V_{GT}		
	Isolated	Non-Isolated			DC Gate Trigger Current In Specific Operating Quadrants $V_D = 12VDC$ (3) (7) (15)					Peak Off-State Current Gate Open $V_{DRM} = \text{Max}$ Rated Value (1) (16)			DC Gate Trigg- er Voltage $V_D = 12VDC$ (2) (6) (15) (18)		
	 THERMOTAB TO-220AB	 TO-202AB	 TO-220AB		mAmps					mAmps			Volts		
RMS On-State Current Conduction Angle of 360° (4) (16)				Repeti- tive Peak Blocking Voltage (1)	QI	QII	QIII	QIV	QIV	$T_C = 25^\circ C$	$T_C = 100^\circ C$	$T_C = 125^\circ C$	$T_C = 125^\circ C$	$T_C = 25^\circ C$	
				Volts	MAX					TYP	MAX			MIN	MAX
10.0 Amps	Q2010L5	Q2010F51	Q2010R5	200	50	50	50		75	.05	0.5	2.0	0.2	2.5	
	Q4010L5	Q4010F51	Q4010R5	400	50	50	50		75	.05	0.5	2.0	0.2	2.5	
	Q6010L5	Q6010F51	Q6010R5	600	50	50	50		75	.05	0.5	2.0	0.2	2.5	
	Q8010L5	Q8010F51	Q8010R5	800	50	50	50		75	.05	0.5	2.0	0.2	2.5	
	Q7010L5		Q7010R5	700	50	50	50		75	.05	0.5	2.0	0.2	2.5	
	Q8010L5		Q8010R5	800	50	50	50		75	0.1	0.5	2.0	0.2	2.5	
15.0 Amps	Q2015L5		Q2015R5	200	50	50	50			.05	0.5	2.0	0.2	2.5	
	Q4015L5		Q4015R5	400	50	50	50			.05	0.5	2.0	0.2	2.5	
	Q5015L5		Q5015R5	500	50	50	50			.05	0.5	2.0	0.2	2.5	
	Q6015L5		Q6015R5	600	50	50	50			.05	0.5	2.0	0.2	2.5	
	Q7015L5		Q7015R5	700	50	50	50			0.1	1.0	3.0	0.2	2.5	
	Q8015L5		Q8015R5	800	50	50	50			0.1	1.0	3.0	0.2	2.5	
25.0 Amps			Q2025R5	200	50	50	50			0.1	1.0	3.0	0.2	2.5	
			Q4025R5	400	50	50	50			0.1	1.0	3.0	0.2	2.5	
			Q5025R5	500	50	50	50			0.1	1.0	3.0	0.2	2.5	
			Q6025R5	600	50	50	50			0.1	1.0	3.0	0.2	2.5	
			Q7025R5	700	50	50	50			0.1	1.0	3.0	0.2	2.5	
			Q8025R5	800	50	50	50			0.1	1.0	3.0	0.2	2.5	

General Notes

- All measurements are made at 60 Hz with a resistive load at an ambient temperature of +25°C unless specified otherwise.
- Operating temperature range (T_J) is -65°C to +125°C for TO-92, and -40°C to +125°C for all other devices
- Storage temperature range (T_S) is -65°C to +150°C for TO-92, and -40°C to +150°C for TO-202 devices, and -40°C to +125°C for all other devices.
- Lead solder temperature is a maximum of 230°C for 10 seconds, maximum; $\geq 1/16"$ (1.59mm) from case
- The case temperature (T_C) is measured as shown on the dimensional outline drawings. See "Package Dimensions" section of this catalog.

Electrical Specification Notes

- For either polarity of MT2 with reference to MT1 terminal.
- For either polarity of gate voltage (V_{GT}) with reference to MT1 terminal.
- See Definition of Quadrants.
- See Figures 2.1 through 2.7 for current rating at specific operating temperature.
- See Figures 2.8 through 2.10 for I_T vs V_T .
- See Figure 2.12 for V_{GT} vs T_C .
- See Figure 2.11 for I_{GT} vs T_C .
- See Figure 2.14 for I_H vs T_C .
- See Figure 2.13 for surge rating with specific durations.
- See Figure 2.15 for t_{gt} vs I_{GT} .
- See package outlines for lead form configurations. When ordering special lead forming, add type number as suffix to part number.
- Initial on-state current = 200mA(DC) for 1-10 amp devices, 400 mA(DC) for 15 amp to 25 amp devices.
- See Figures 2.1 through 2.6 for maximum allowable case temperature at maximum rated current.
- Pulse width $\leq 10\mu s$.
- $R_L = 60\Omega$ for 0.8-10 amp triacs; $R_L = 30\Omega$ for 15-25 amp triacs.
- $T_C = T_J$ for test conditions in off-state.
- $I_{GT} = 500$ mA for 25 amp devices.
- Quadrants I, II, and III only.

V_{TM}	I_H	I_{GTM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		$dv/dt(c)$	dv/dt		t_{gt}	I^2t	di/dt
Peak On-State Voltage at Maximum Rated RMS Current $T_C = 25^\circ C$ (1) (5)	Holding Current (DC) Gate Open (1) (8) (12)	Peak Gate Trigger Current (14)	Peak Gate Power Dissipation (14) $I_{GT} \leq I_{GTM}$	Average Gate Power Dissipation	Peak One-Cycle Surge (9) (13)		Critical Rate-of-Rise of Commutation Voltage at Rated V_{DRM} & $I_{T(RMS)}$ Commutating $di/dt = 0.54$ Rated $I_{T(RMS)}$ /ms Gate Unenergized (1) (4) (13)	Critical Rate-of-Rise of Off-State Voltage at Rated V_{DRM} Gate Open (1)		Gate Controlled Turn-On Time $I_{GT} = 200mA$ $0.1\mu s$ Rise Time (10) (17)	RMS Surge (Non-Repetitive) On-State for Period of 8.3ms For Fusing	Maximum Rate-of-Change of On-State Current $I_{GT} = 200mA$ with $0.1\mu s$ Rise Time
Volts	mAmps	Amps	Watts	Watts	Amps		Volts/ μ Sec	Volts/ μ Sec		μ Sec	Amps ² Sec	Amps/ μ Sec
MAX	MAX				60Hz	50Hz	TYP	MIN		TYP		
1.6	50	1.8	20	0.5	120	100	4	350	225	3	60	70
1.6	50	1.8	20	0.5	120	100	4	350	225	3	60	70
1.6	50	1.8	20	0.5	120	100	4	300	200	3	60	70
1.6	50	1.8	20	0.5	120	100	4	300	200	3	60	70
1.6	50	1.8	20	0.5	120	100	4	250	175	3	60	70
1.6	50	1.8	20	0.5	120	100	4	250	175	3	60	70
1.6	70	2.0	20	0.5	200	167	4	400	275	4	166	100
1.6	70	2.0	20	0.5	200	167	4	400	275	4	166	100
1.6	70	2.0	20	0.5	200	167	4	350	225	4	166	100
1.6	70	2.0	20	0.5	200	167	4	350	225	4	166	100
1.6	70	2.0	20	0.5	200	167	4	300	200	4	166	100
1.6	70	2.0	20	0.5	200	167	4	300	200	4	166	100
1.8	100	2.0	20	0.5	200	167	5	400	275	4	220	100
1.8	100	2.0	20	0.5	200	167	5	400	275	4	220	100
1.8	100	2.0	20	0.5	200	167	5	350	225	4	220	100
1.8	100	2.0	20	0.5	200	167	5	350	225	4	220	100
1.8	100	2.0	20	0.5	200	167	5	300	200	4	220	100
1.8	100	2.0	20	0.5	200	167	5	300	200	4	220	100

Electrical Specifications

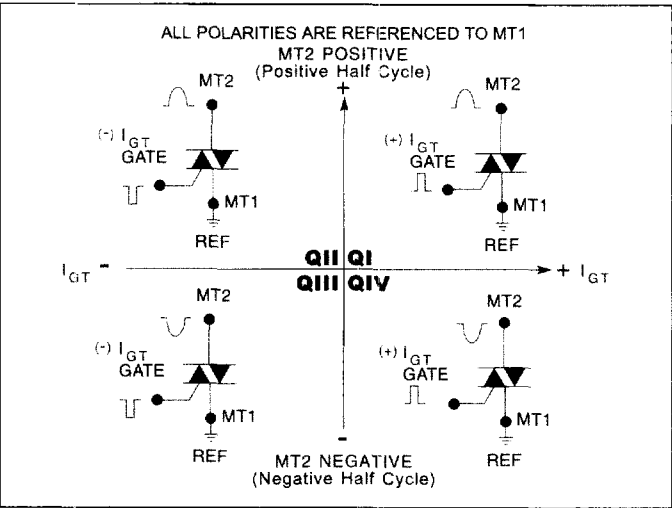
Gate Characteristics

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.

However, due to higher gate requirements for Quadrant IV, it is recommended that only negative pulses be applied. If positive pulses are required, see sensitive triac sections of catalog or contact factory.

In all cases, if maximum surge capability is required, pulses should be a minimum of one magnitude above I_{GT} rating with a steep rising waveform ($\leq 1 \mu\text{sec}$ rise time).



Definition of Quadrants

Electrical Isolation

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

ELECTRICAL ISOLATION FROM LEADS TO MOUNTING TAB	
VAC (RMS)	Isolated ** TO-220AB
2500	Standard
4000	Optional *

* For 4000V isolation, use V suffix in part number.

** UL Recognized File E71639

THERMAL RESISTANCE (STEADY STATE) $R_{\theta JA}$ ($R_{\theta JA}$) (TYP) °C/W					
Type	 TO-92	 TYPE 1 TO-202AB	 TYPE 2 TO-202AB	 THERMOTAB TO-220AB	 NON-ISOLATED TO-220AB
0.8 Amp	66 [135]				
1.0 Amp	50 [95]				
4.0 Amps		3.5 [45]	6 [70]	3.6 [50]	
6.0 Amps		3.8		3.3	2.1 [45]
8.0 Amps		3.3		2.8	1.8
10.0 Amps		3.5		2.6	1.5
15.0 Amps				2.1	1.3
25.0 Amps					1.1

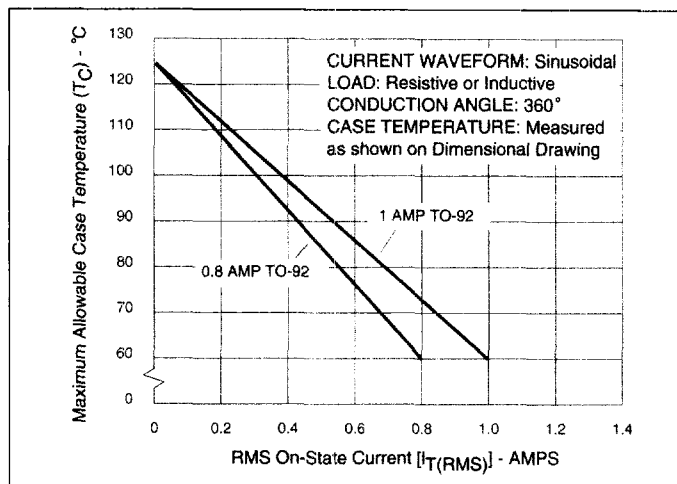


Figure 2.1 Maximum Allowable Case Temperature vs On-State Current (0.8 and 1.0 Amp)

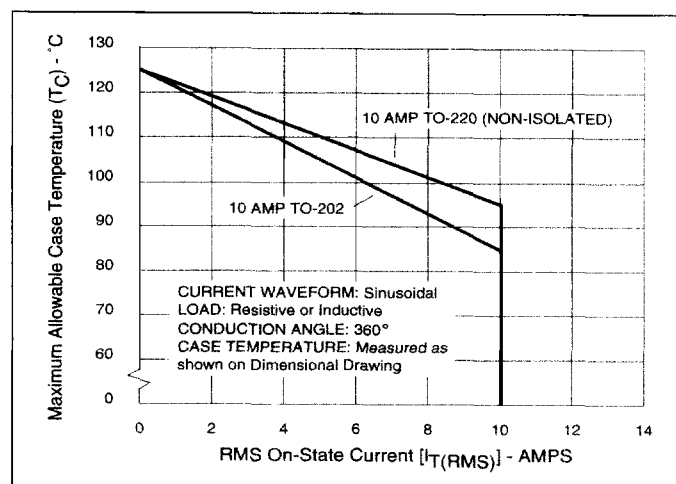


Figure 2.4 Maximum Allowable Case Temperature vs On-State Current (10 Amp)

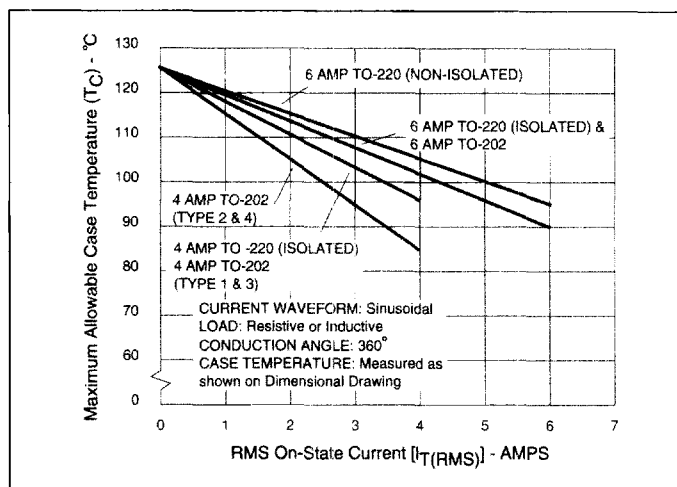


Figure 2.2 Maximum Allowable Case Temperature vs On-State Current (4 and 6 Amp)

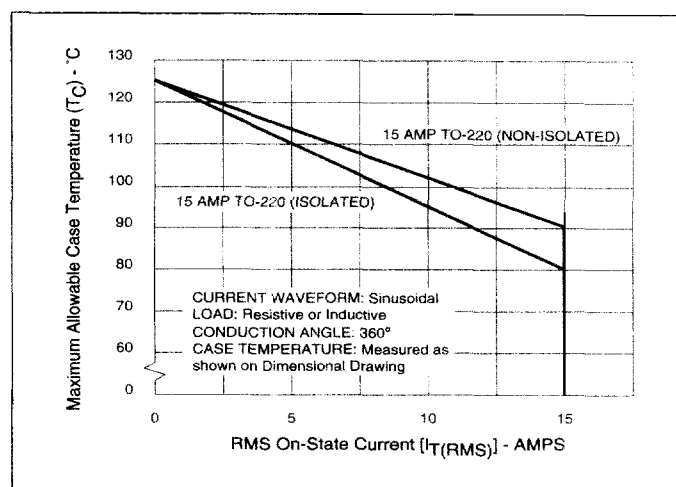


Figure 2.5 Maximum Allowable Case Temperature vs On-State Current (15 Amp)

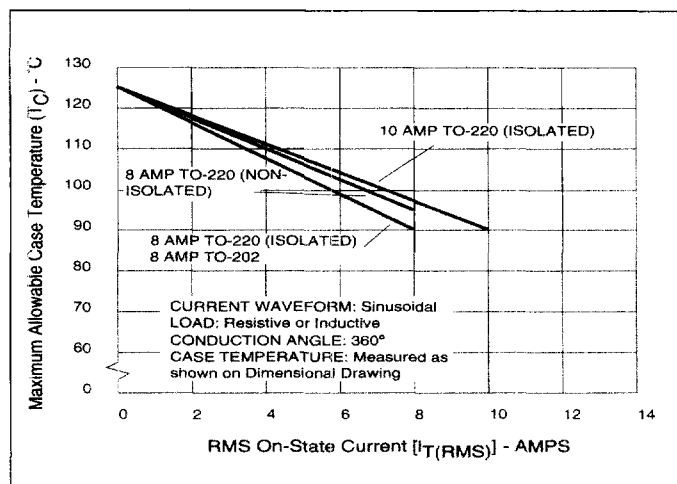


Figure 2.3 Maximum Allowable Case Temperature vs On-State Current (8 and 10 Amp)

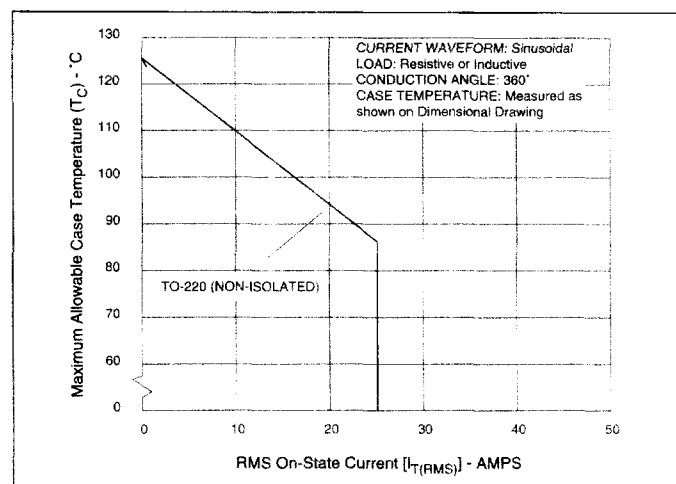


Figure 2.6 Maximum Allowable Case Temperature vs On-State Current (25 Amp)

Electrical Specifications

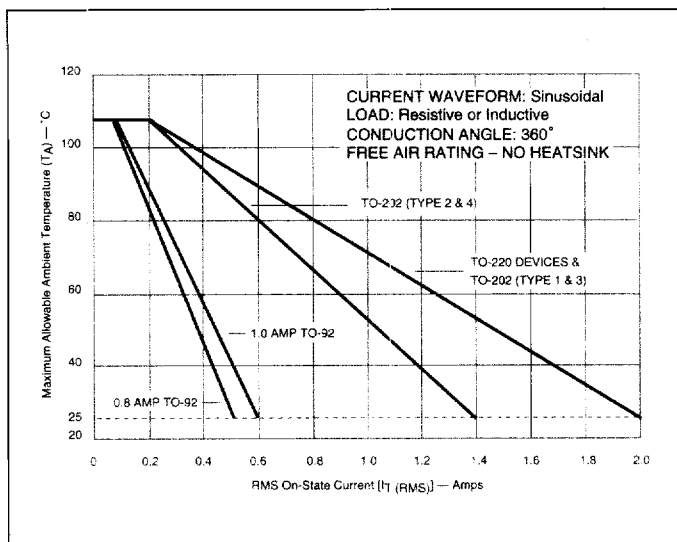


Figure 2.7 Maximum Allowable Ambient Temperature vs On-State Current

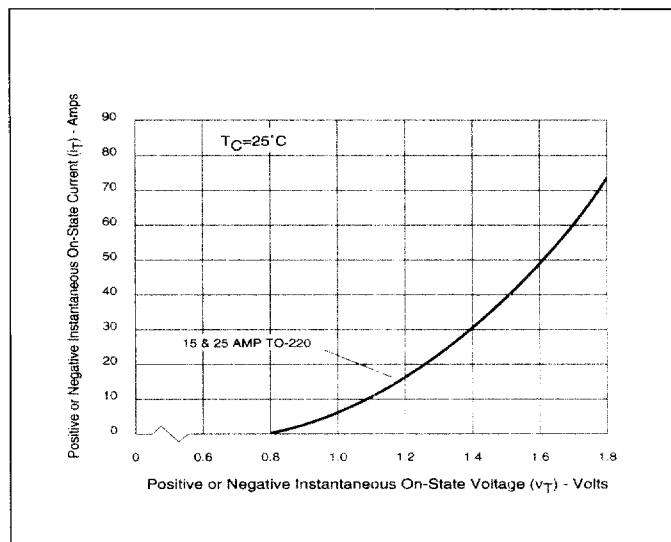


Figure 2.10 On-State Current vs On-State Voltage (Typical) (15 and 25 Amp)

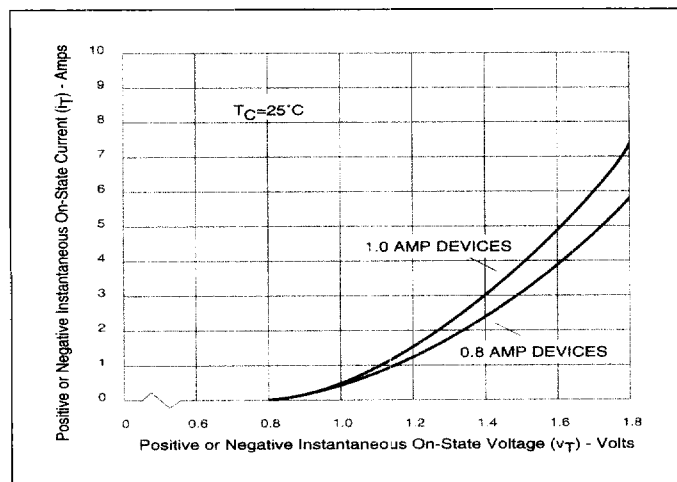


Figure 2.8 On-State Current vs On-State Voltage (Typical) (0.8 and 1.0 Amp)

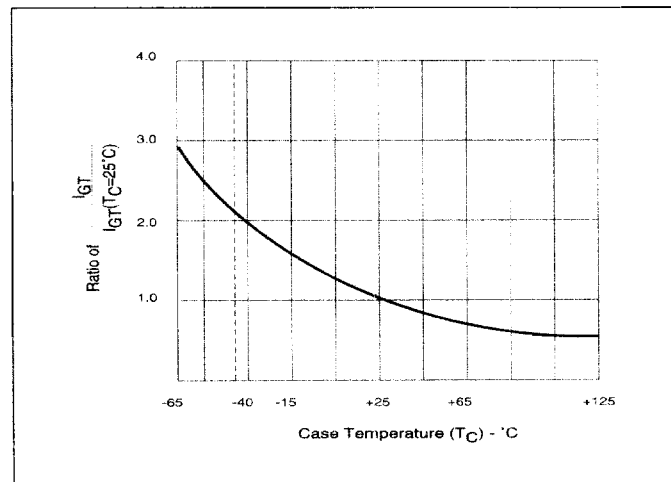


Figure 2.11 Normalized DC Gate Trigger Current for All Quadrants vs Case Temperature

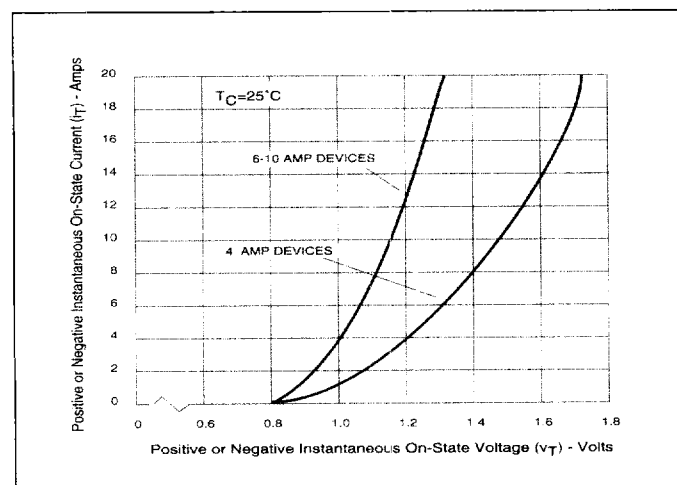


Figure 2.9 On-State Current vs On-State Voltage (Typical) (4, 6, 8, and 10 Amp)

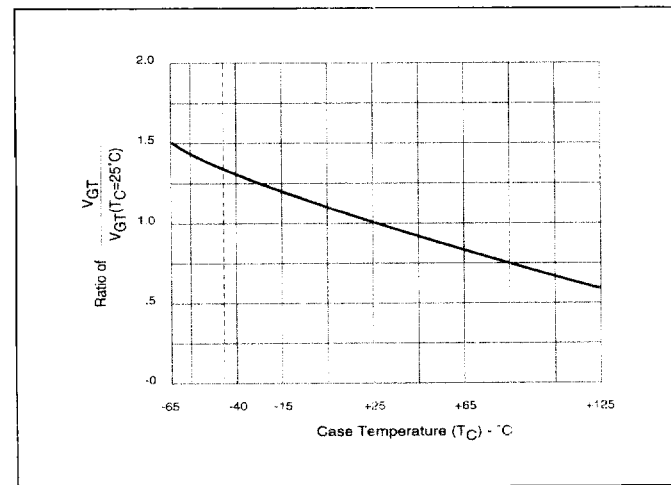


Figure 2.12 Normalized DC Gate Trigger Voltage for All Quadrants vs Case Temperature

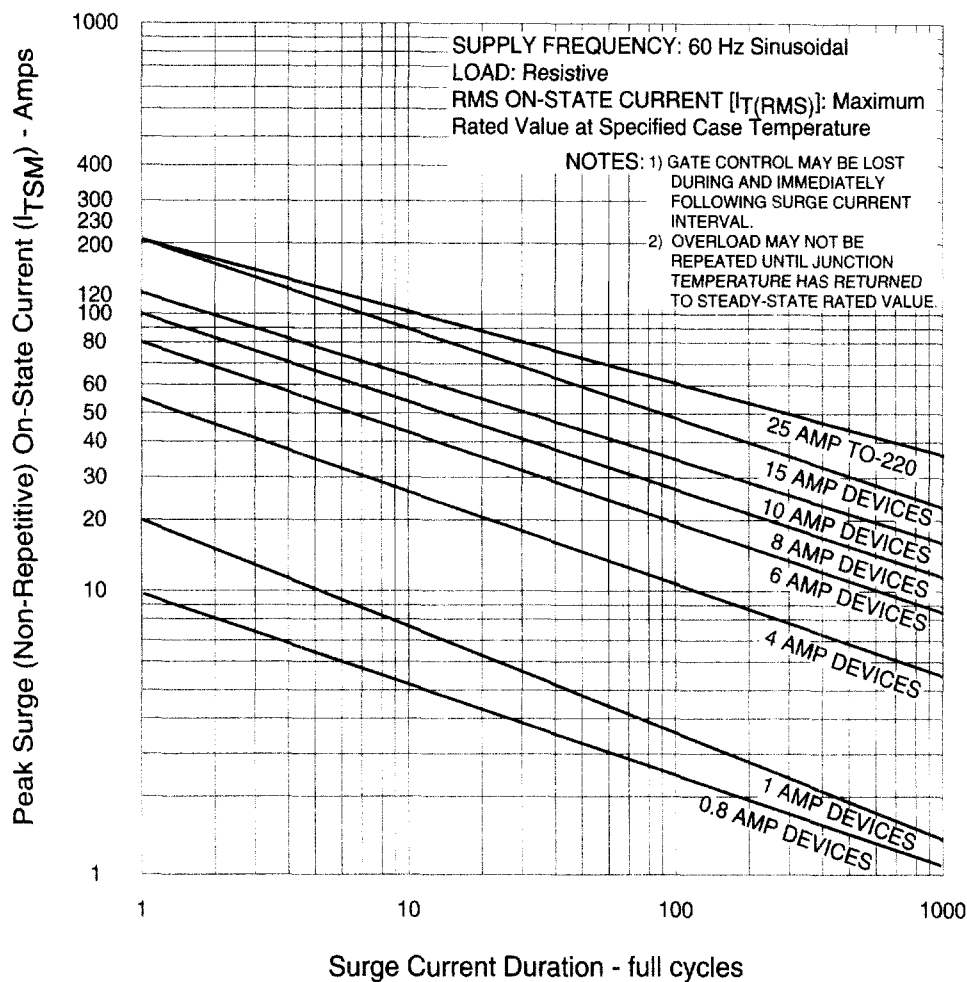


Figure 2.13 Peak Surge Current vs Surge Current Duration

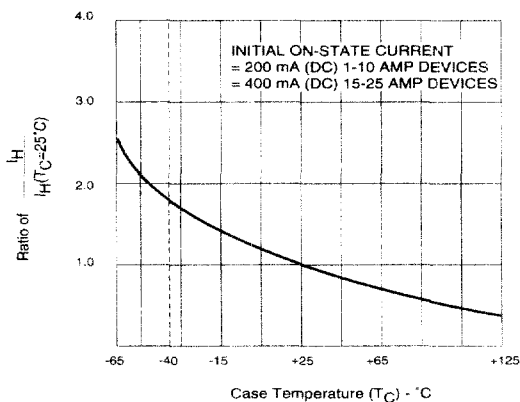


Figure 2.14 Normalized DC Holding Current vs Case Temperature

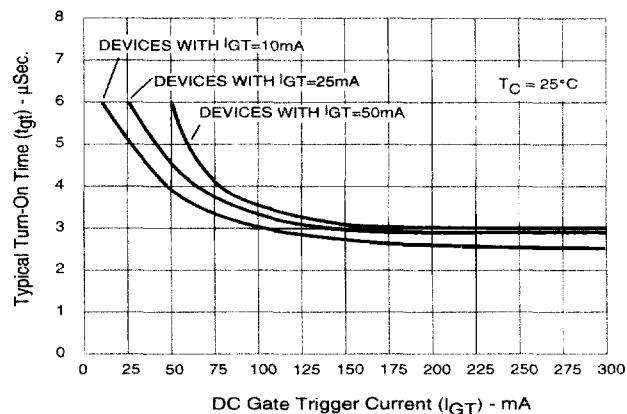


Figure 2.15 Turn-On Time vs Gate Trigger Current (Typical)

Electrical Specifications

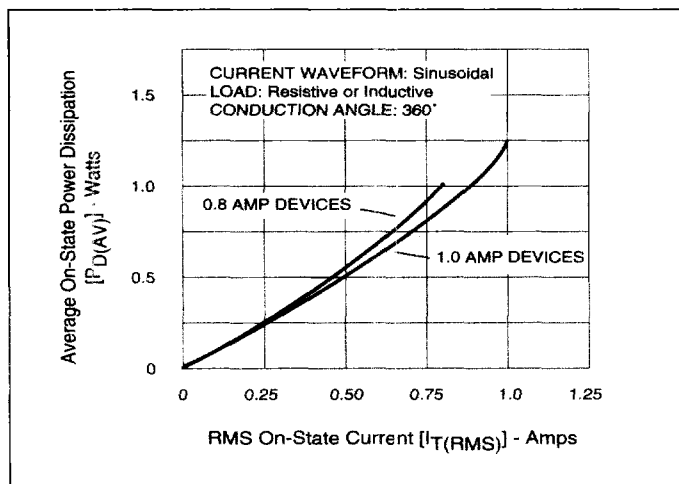


Figure 2.16 Power Dissipation (Typical) vs On-State Current (0.8 and 1.0 Amp)

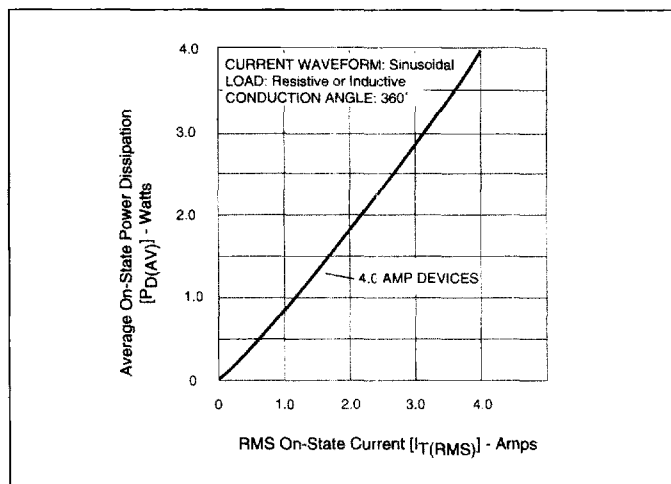


Figure 2.19 Power Dissipation (Typical) vs RMS On-State Current (4 Amp)

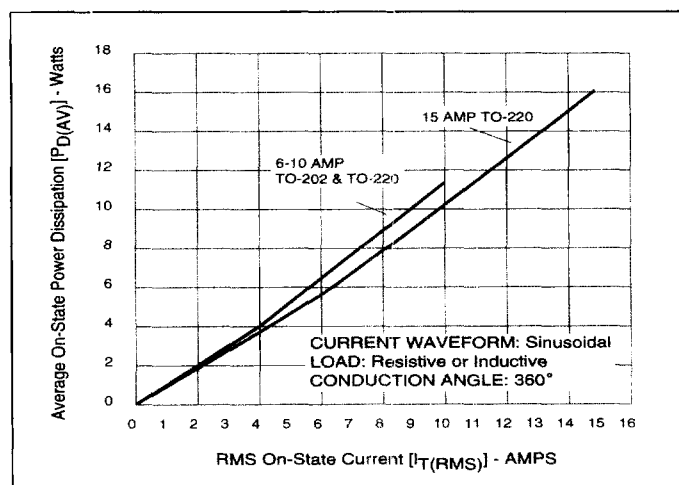


Figure 2.17 Power Dissipation (Typical) vs On-State Current (6-10 and 15 Amp)

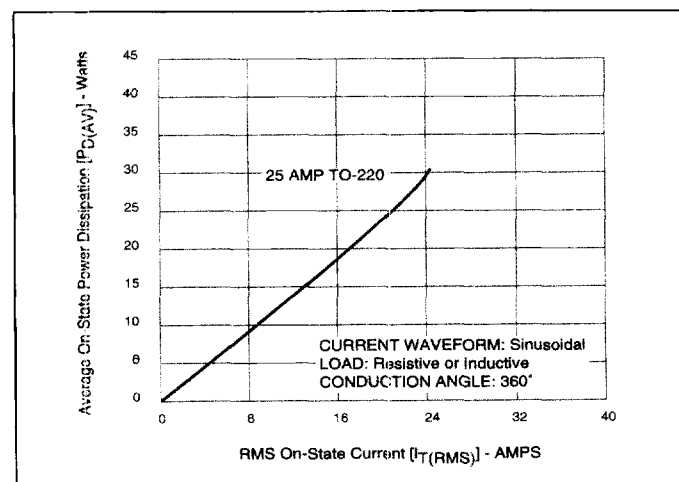


Figure 2.18 Power Dissipation (Typical) vs On-State Current (25 Amp)