

T2700 Series

File Number 351

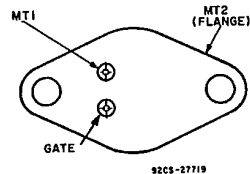
High Voltage, 6-A Silicon Triacs

For Power-Control and Power-Switching Applications

Features:

- 800V, 125 Deg. C  $T_J$  Operating
- High  $dv/dt$  and  $di/dt$  Capability
- Low Switching Losses
- High Pulse Current Capability
- Low Forward and Reverse Leakage
- Sipos Oxide Glass Multilayer Passivation System
- Advanced Unisurface Construction
- Precise Ion Implanted Diffusion Source

TERMINAL DESIGNATIONS



JEDEC TO-213AA

RCA T2700-series devices are gate controlled full-wave silicon triacs. They are intended for the control of ac loads in applications such as heating controls, motor controls, light dimmers, and power-switching systems.

These triacs are designed to switch from an off-state to an on-state condition for either polarity of applied voltage with

positive or negative triggering voltages to the gate.

The T2700B, D, M, and N are hermetically sealed types having an on-state current rating of 6 amperes at a case temperature of +75°C and repetitive off-state voltage ratings of 200, 400, 600, and 800 volts, respectively.

MAXIMUM RATINGS, Absolute-Maximum Values:

	T2700B	T2700D	T2700M	T2700N	
$V_{DRM}$ .....	200	400	600	800	V
$I_{T(RMS)}$ ( $T_C = 100^\circ C$ ) .....			6		A
$I_{TSM}$ (for 1 full cycle) 60 Hz .....			100		A
$di/dt$ .....			100		A/ $\mu s$
$I^2T$ (at 1.25 to 10 ms) .....			50		A $^2s$
$I_{GTM}$ .....			4		A
$P_{GM}$ (for 1 $\mu s$ max.) .....			16		W
$P_{G(AV)}$ (Averaging time 10ms max.) .....			0.2		W
T Storage $\blacktriangle$ .....			-65 to 150		$^\circ C$
$T_C$ .....			-65 to 125		$^\circ C$
$T_T$ (During soldering): For 10 s max. (terminals and case) .....			225		$^\circ C$

\*For either polarity of main terminal 2 voltage ( $V_{MT2}$ ) with reference to main terminal 1.  
 ■For either polarity of gate voltage ( $V_G$ ) with reference to main terminal 1.  
 $\blacktriangle$ For temperature measurement reference point, see *Dimensional Outline*.

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**ELECTRICAL CHARACTERISTICS**

At Maximum Ratings and at Indicated Case Temperature ( $T_C$ ) Unless Otherwise Specified

CHARACTERISTIC	SYMBOL	LIMITS			UNITS
		For All Types Unless Otherwise Specified			
		Min.	Typ.	Max.	
Peak Off-State Current: Gate open, $T_J = 125^\circ\text{C}$ , $V_{\text{DROM}} = \text{Max. rated value}$	$I_{\text{DROM}}$	—	0.1	4	mA
Maximum On-State Voltage: For $i_T = 30\text{A}$ (peak), $T_C = 25^\circ\text{C}$	$V_{\text{TM}}$	—	1.8	2.25	V
DC Holding Current: Gate open, initial principal current = 150 mA (DC), $v_D = 12\text{V}$ : $T_C = 25^\circ\text{C}$ For other case temperatures	$I_{\text{HO}}$	—	15 See Fig. 5	30	mA
Critical Rate-of-Rise of Commutation Voltage: For $v_D = V_{\text{DROM}}$ , $i_{\text{T(RMS)}} = 6\text{A}$ , Commutating $di/dt = 3.2\text{A/ms}$ , and gate unenergized At $T_C = +100^\circ\text{C}$	$dv/dt$	3	10	—	V/ $\mu\text{s}$
Critical Rate of Rise of Off-State Voltage: For $v_D = V_{\text{DROM}}$ , exponential voltage rise, and gate open At $T_C = 125^\circ\text{C}$	$dv/dt$				
T2500B		30	150	—	V/ $\mu\text{s}$
T2500D		20	100	—	
T2500M		15	70	—	
T2500N		10	50	—	
DC Gate-Trigger Current: † For $v_D = 12\text{V}$ (dc), $R_L = 30\ \Omega$ , $T_C = +25^\circ\text{C}$ , and Specified Triggering Mode:	$I_{\text{GT}}$				mA
I <sup>+</sup> Mode: $V_{\text{MT2}}$ positive, $V_G$ positive		—	15	25	
III <sup>-</sup> Mode: $V_{\text{MT2}}$ negative, $V_G$ negative		—	20	30	
I <sup>-</sup> Mode: $V_{\text{MT2}}$ positive, $V_G$ negative		—	25	40	
III <sup>+</sup> Mode: $V_{\text{MT2}}$ negative, $V_G$ positive		—	25	40	
For other case temperatures		See Figs. 7 & 8			
DC Gate-Trigger Voltage: † For $v_D = 12\text{V}$ (DC), $R_L = 30\ \Omega$ $T_C = 25^\circ\text{C}$ For other case temperatures For $v_D = V_{\text{DROM}}$ , $R_L = 125\ \Omega$ , $T_C = 125^\circ\text{C}$	$V_{\text{GT}}$				V
		—	1	2.2	
Gate-Controlled Turn-On Time: (Delay Time + Rise Time) For $v_D = V_{\text{DROM}}$ , $I_G = 160\text{mA}$ , $t_r = 0.1\ \mu\text{s}$ , $i_T = 10\text{A}$ (peak), $T_C = 25^\circ\text{C}$ (See Fig. 15)	$t_{\text{GT}}$	—	2.2	—	$\mu\text{s}$
Thermal Resistance: Junction-to-Case (Steady-State) Junction-to-Case (Transient)	$R_{\theta\text{JA}}$	—	—	4	$^\circ\text{C/W}$
		See Fig. 10			

\*For either polarity of main terminal 2 voltage ( $V_{\text{MT2}}$ ) with reference to main terminal 1.

†For either polarity of gate voltage ( $V_G$ ) with reference to main terminal 1.

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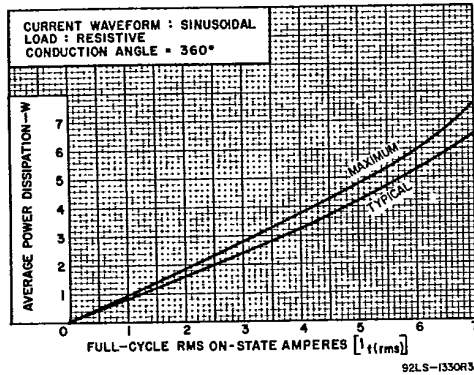


Fig. 1 — Power dissipation vs. on-state current.

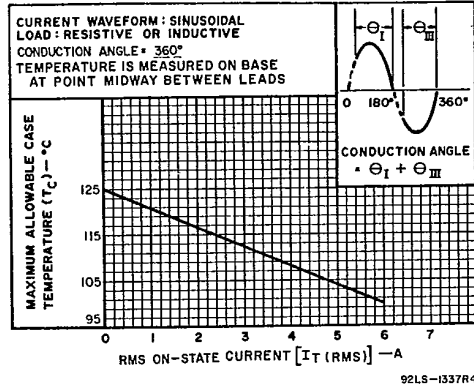


Fig. 2 — Allowable case temperature vs. on-state current.

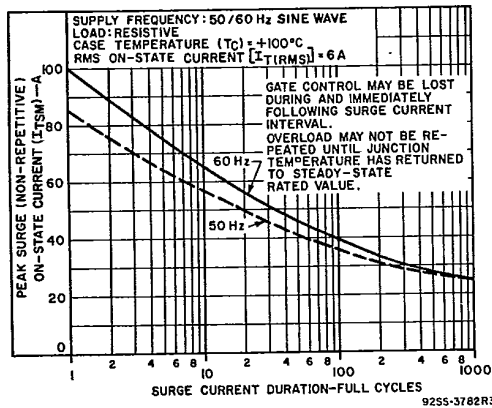


Fig. 3 — Peak surge on-state current vs. surge current duration.

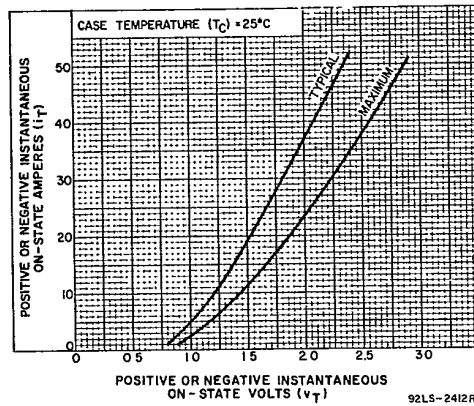


Fig. 4 — On-state current vs. on-state voltage.

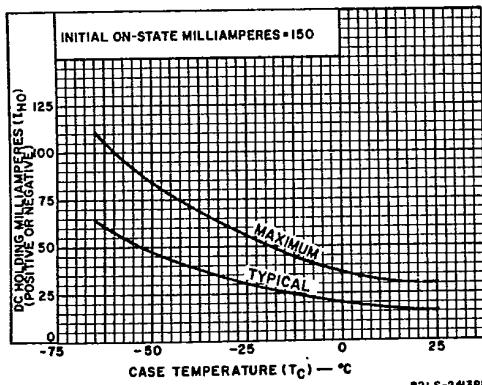


Fig. 5 — DC holding current for either direction of on-state current vs. case temperature.

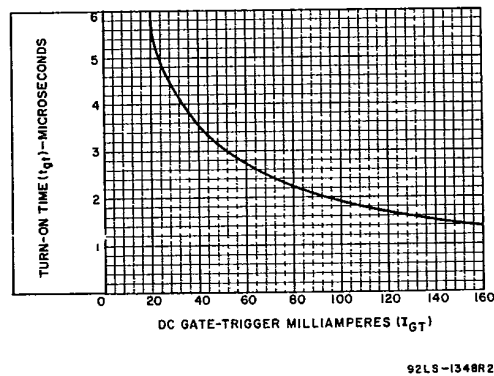


Fig. 6 — Typical turn-on time vs. gate-trigger current.

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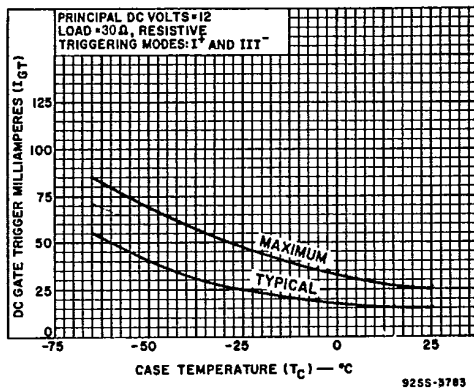


Fig. 7 — DC gate-trigger current (for I<sup>+</sup> and III<sup>-</sup> triggering modes) vs. case temperature.

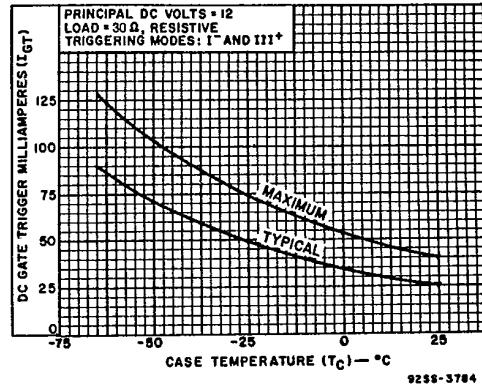


Fig. 8 — DC gate-trigger current (for I<sup>-</sup> and III<sup>+</sup> triggering modes) vs. case temperature.

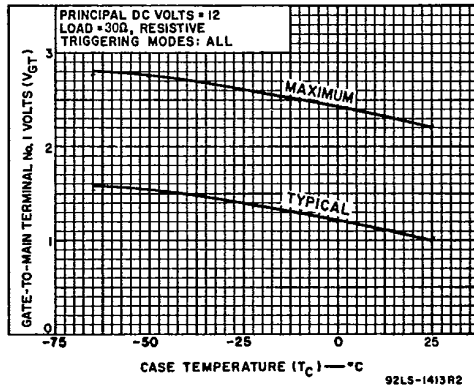


Fig. 9 — DC gate-trigger voltage vs. case temperature.

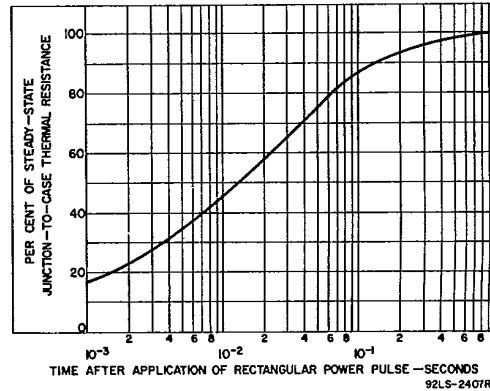


Fig. 10 — Transient thermal resistance (junction-to-case vs. time).

Triacs

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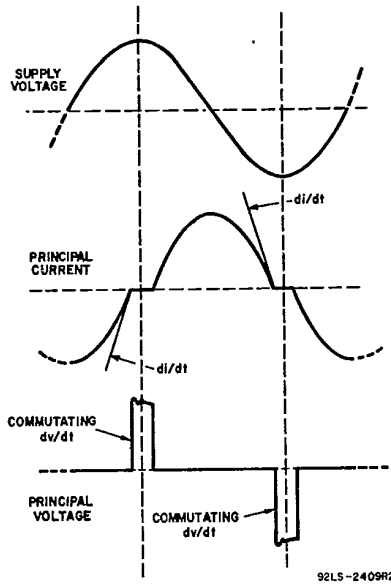


Fig. 11 — Oscilloscope display of commutating dv/dt.

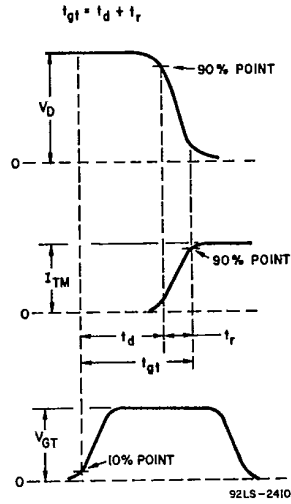


Fig. 12 — Oscilloscope display for measurement of gate-controlled turn-on time ( $t_{gt}$ ).