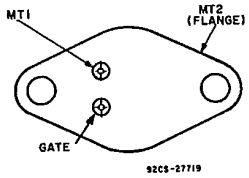
High Voltage, 6-A Silicon Triacs

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°C)	6				A
I_{TSM} (for 1 full cycle) 60 Hz	100				A
di/dt	100				A/μs
I^2T (at 1.25 to 10 ms)	50				A^2s
I_{GTM}■	4				A
P_{GM} (for 1 μs max.)	16				W
$P_{G(AV)}$ (Averaging time 10ms max.)	0.2				W
T Storage▲	-65 to 150				°C
T_C	-65 to 125				°C
T_T (During soldering): For 10 s max. (terminals and case)	225				°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.
▲For temperature measurement reference point, *see Dimensional Outline.*

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

CHARACTERISTIC	SYMBOL	LIMITS For All Types Unless Otherwise Specified Min.	Typ.	Max.	UNITS
Peak Off-State Current:* Gate open, T_J = 125°C, V_{DROM} = Max. rated value	I_{DROM}	—	0.1	4	mA
Maximum On-State Voltage:* For i_T = 30A (peak), T_C = 25°C	V_{TM}	—	1.8	2.25	V
DC Holding Current:* Gate open, Initial principal current = 150 mA (DC), v_D = 12V: T_C = 25°C	I_{HO}	—	15	30	mA
For other case temperatures			See Fig. 5		
Critical Rate-of-Rise of Commutation Voltage:* For $v_D = V_{DROM}$, $I_{T(RMS)}$ = 6 A, Commutating di/dt = 3.2 A/ms, and gate unenergized At T_C = +100°C	dv/dt	3	10	—	V/μs
Critical Rate of Rise of Off-State Voltage:* For $v_D = V_{DROM}$, exponential voltage rise, and gate open At T_C = 125°C					
T2500B	dv/dt	30	150	—	V/μs
T2500D		20	100	—	
T2500M		15	70	—	
T2500N		10	50	—	
DC Gate-Trigger Current:*† For v_D = 12 volts (dc), R_L = 30 Ω, T_C = +25°C, and Specified Triggering Mode:					
I^+ Mode: V_{MT2} positive, V_G positive	I_{GT}	—	15	25	mA
III^- Mode: V_{MT2} negative, V_G negative		—	20	30	
I^- Mode: V_{MT2} positive, V_G negative		—	25	40	
III^+ Mode: V_{MT2} negative, V_G positive		—	25	40	
For other case temperatures			See Figs. 7 & 8		
DC Gate-Trigger Voltage:*† For v_D = 12 V(DC), R_L = 30 Ω T_C = 25°C	V_{GT}	—	1	2.2	V
For other case temperatures			See Fig. 9		
For $v_D = V_{DROM}$, R_L = 125 Ω, T_C = 125°C		0.2	—	—	
Gate-Controlled Turn-On Time: (Delay Time + Rise Time) For $v_D = V_{DROM}$, I_G = 160 mA, t_r = 0.1 μs, i_T = 10 A (peak), T_C = 25°C (See Fig. 15)	t_{gt}	—	2.2	—	μs
Thermal Resistance: Junction-to-Case (Steady-State)	$R_{\theta JA}$	—	—	4	°C/W
Junction-to-Case (Transient)			See Fig. 10		

*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.

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T2700 Series

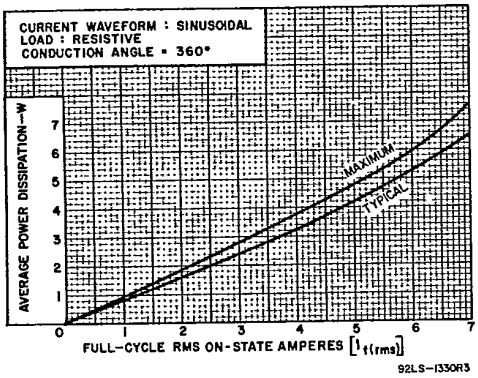

Fig. 1 — Power dissipation vs. on-state current.

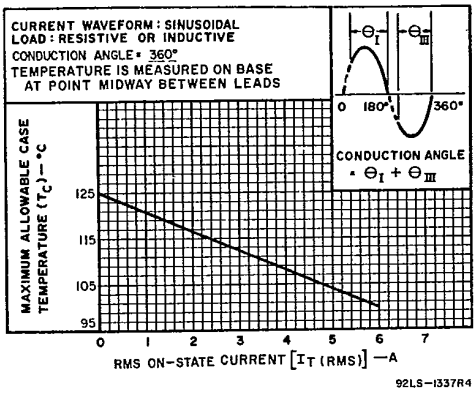

Fig. 2 — Allowable case temperature vs. on-state current.

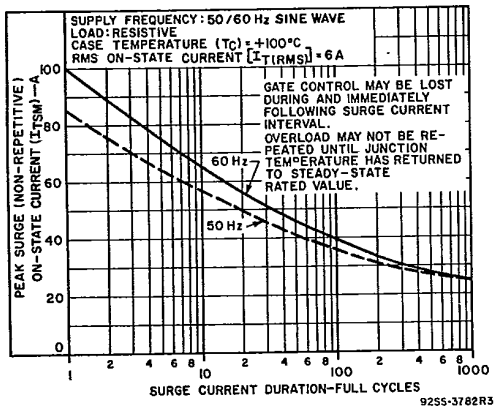

Fig. 3 — Peak surge on-state current vs. surge current duration.

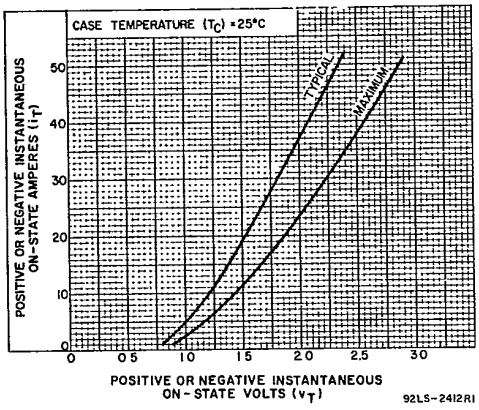

Fig. 4 — On-state current vs. on-state voltage.

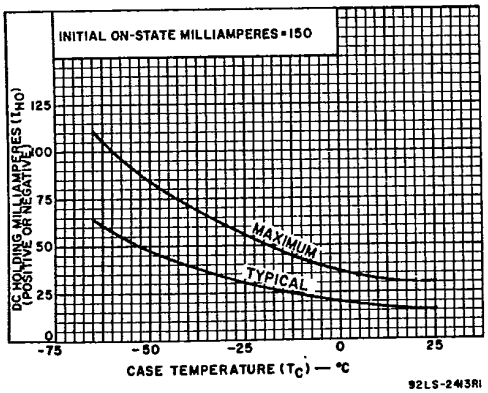

Fig. 5 — DC holding current for either direction of on-state current vs. case temperature.

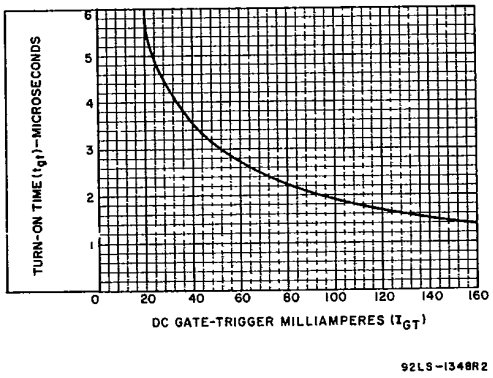

Fig. 6 — Typical turn-on time vs. gate-trigger current.

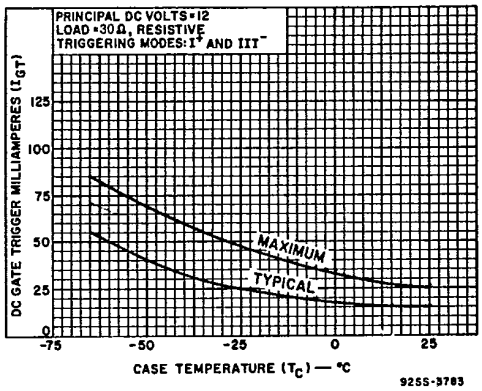

Fig. 7 — DC gate-trigger current (for I^+ and III^- triggering modes) vs. case temperature.

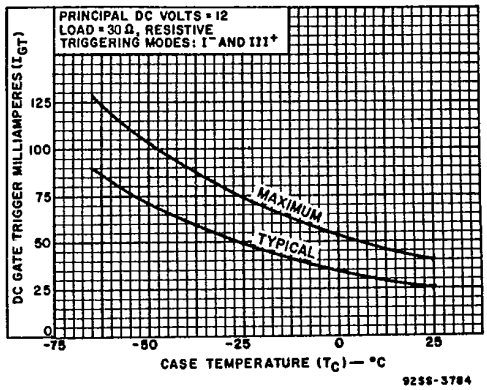

Fig. 8 — DC gate-trigger current (for I^- and III^+ triggering modes) vs. case temperature.

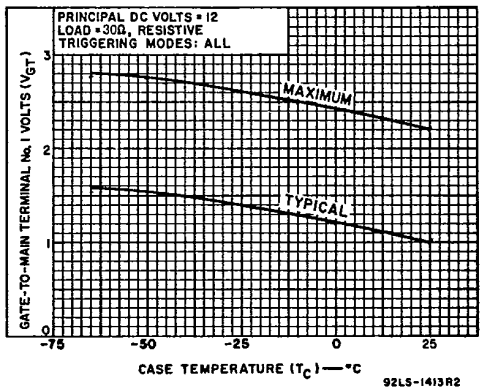

Fig. 9 — DC gate-trigger voltage vs. case temperature.

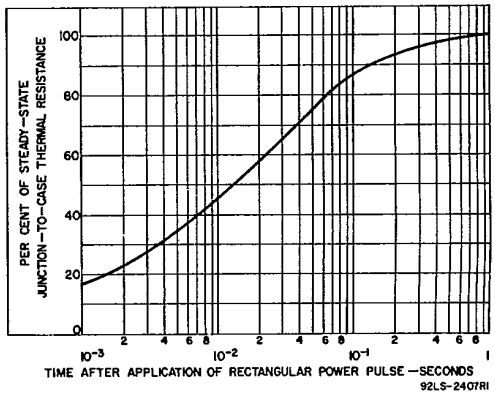

Fig. 10 — Transient thermal resistance (junction-to-case vs. time).

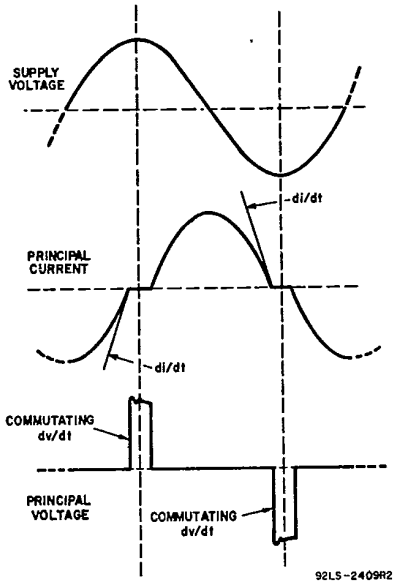

Fig. 11 — Oscilloscope display of commutating dv/dt.

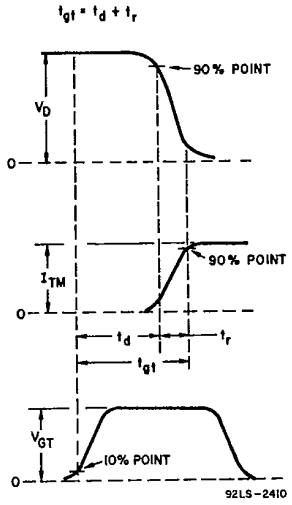

Fig. 12 — Oscilloscope display for measurement of gate-controlled turn-on time (t_{gt}).