

File Number **300**

**T4700 Series**

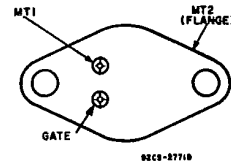
## 15-Ampere Silicon Triacs

For Phase-Control and Load-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

The RCA T4700 Series are gate-controlled full-wave ac silicon switches. They are designed to switch from an off-state to a conducting state for either polarity of applied voltage with positive or negative gate triggering.

These devices are intended for the control of ac loads in applications such as space heater, oven and furnace controls, motor controls, and lamp loads.

**MAXIMUM RATINGS, Absolute-Maximum Values:**

		T4700B	T4700D	T4700M	T4700N	
REPETITIVE PEAK OFF-STATE VOLTAGE: ■						
Gate Open	$V_{DROM}$	200	400	600	800	V
RMS ON-STATE CURRENT:						
$T_C = 95^\circ\text{C}$ , conduction angle = $360^\circ$	$I_{T(RMS)}$			15		A
PEAK SURGE (NON-REPETITIVE) ON-STATE CURRENT:	$I_{TSM}$					
For one full cycle of applied principal voltage				100		A
60 Hz (sinusoidal)						
For one full cycle of applied principal voltage				85		A
(50-Hz, sinusoidal)						
For more than one full cycle of applied voltage				See Fig. 3		
PEAK GATE-TRIGGER CURRENT:						
For 1 $\mu\text{s}$ max.	$I_{GTM}$			4		A
FUSING CURRENT (for triac protection):						
$T_J = -40$ to $100^\circ\text{C}$ , $t = 1.25$ to $10$ ms	$ i^2t $			50		A <sup>2</sup> s
GATE POWER DISSIPATION:						
Peak* (for 1 $\mu\text{s}$ max. and $I_{GTM} \leq 4$ A)	$P_{GM}$			16		W
Average (averaging time = 10 ms max.)	$P_{G(AV)}$			0.45		W
TEMPERATURE RANGE: ▲						
Storage	$T_{stg}$			-40 to 150		$^\circ\text{C}$
Operating (Case)	$T_C$			-40 to 125		$^\circ\text{C}$
PIN TEMPERATURE (During soldering):						
At distances $\geq 1/32$ in. (0.8 mm) from seating plane for 10 s max.	$T_P$			225		$^\circ\text{C}$

■ 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*.

Triacs

**T4700 Series**

**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 <sup>♣</sup> Gate open, $T_J = 125^\circ\text{C}$ , $V_{\text{DROM}} = \text{Max. rated value}$	$I_{\text{DROM}}$	—	0.2	4	mA
Instantaneous On-State Voltage <sup>♣</sup> For $i_T = 30\text{A (peak)}$ , $T_C = 25^\circ\text{C}$ .....	$v_T$	—	1.6	2.0	V
DC Holding Current <sup>♣</sup> Gate open, Initial principal current = 150 mA (DC), $v_D = 12\text{V}$ : $T_C = 25^\circ\text{C}$ .....	$I_{\text{HO}}$	—	15	60	mA
For other case temperatures ..... See Fig. 5					
Critical Rate of Applied Commutating Voltage <sup>♣</sup> For $v_D = V_{\text{DROM}}$ , $I_{\text{T(RMS)}} = 15\text{A}$ , commutating $di/dt = 8\text{A/ms}$ , and gate unenergized At $T_C = +95^\circ\text{C}$ .....	$dv/dt$	2	10	—	V/ $\mu\text{s}$
Critical Rate of Rise of Off-State Voltage <sup>♣</sup> For $v_D = V_{\text{DROM}}$ , exponential voltage rise, and gate open At $T_C = 125^\circ\text{C}$					
T4700B .....		30	150	—	
T4700D .....	$dv/dt$	20	100	—	V/ $\mu\text{s}$
T4700M .....		15	75	—	
T4700N .....		10	50	—	
DC Gate-Trigger Current <sup>♣</sup> ■ For $v_D = 6\text{ volts (dc)}$ , $R_L = 12\text{ ohms}$ , $T_C = +25^\circ$ , and Specified Triggering Mode:					
I <sup>+</sup> Mode: $V_{T2}$ is positive, $V_G$ is positive .....	$I_{\text{GT}}$	—	15	30	mA
I <sup>-</sup> Mode: $V_{T2}$ is positive, $V_G$ is negative .....		—	35	80	
III <sup>+</sup> Mode: $V_{T2}$ is negative, $V_G$ is positive .....		—	35	80	
III <sup>-</sup> Mode: $V_{T2}$ is negative, $V_G$ is negative .....		—	15	30	
For other case temperatures .....		See Figs. 7 & 9			
DC Gate-Trigger Voltage <sup>♣</sup> ■ For $v_D = 6\text{ volts (dc)}$ and $R_L = 12\text{ ohms}$ At $T_C = +25^\circ$ .....	$V_{\text{GT}}$	—	1	2.5	V
For other case temperatures .....		0.2	—	—	
For $v_D = V_{\text{DROM}}$ , $R_L = 125\ \Omega$ , $T_C = 125^\circ\text{C}$					
Gate-Controlled Turn-On Time (Delay Time + Rise Time) For $v_D = V_{\text{DROM}}$ , $I_G = 160\text{ mA}$ , $t_r = 0.1\ \mu\text{s}$ , $i_T = 25\text{ A (peak)}$ , $T_C = 25^\circ\text{C}$ .....	$t_{\text{gt}}$	—	1.6	2.5	$\mu\text{s}$
Thermal Resistance: Junction-to-Case .....	$R_{\theta\text{JC}}$	—	—	1.3	$^\circ\text{C/W}$

♣For either polarity of main terminal 2 voltage ( $V_{T2}$ ) with reference to main terminal 1.

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

T4700 Series

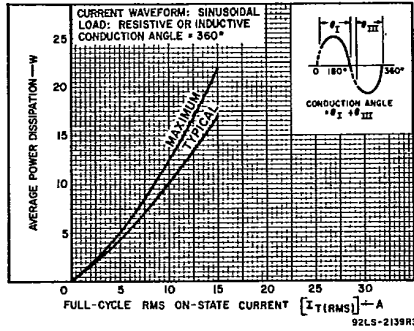


Fig. 1 — Power dissipation curve.

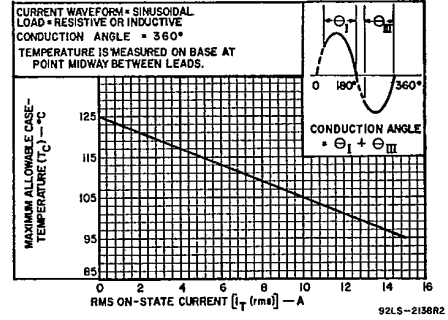


Fig. 2 — Conduction rating chart (case temperature).

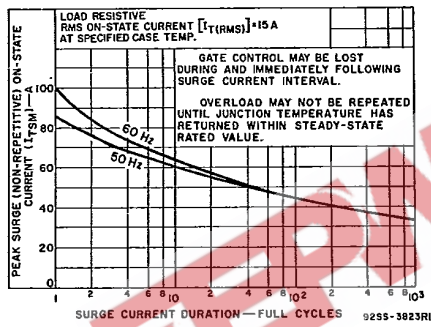


Fig. 3 — Surge current rating chart.

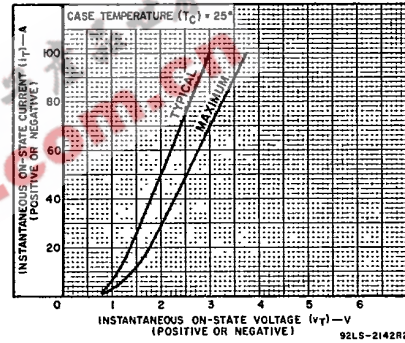


Fig. 4 — On-state characteristics for either direction of principal current.

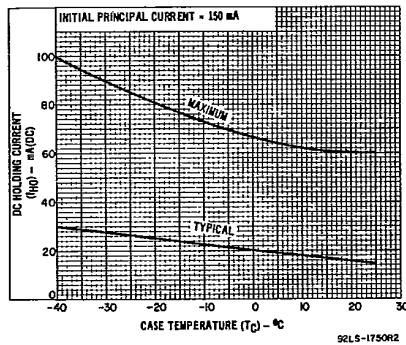


Fig. 5 — DC holding current characteristics for either direction of principal current.

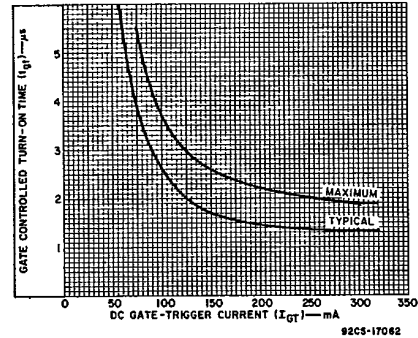


Fig. 6 — Turn-on time vs. gate trigger current.

Triacs

T4700 Series

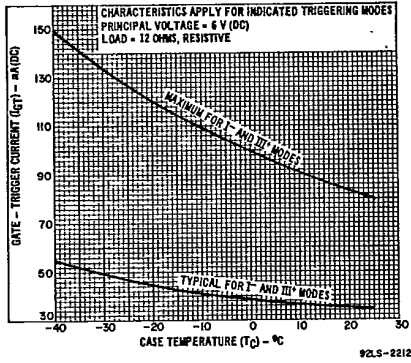


Fig. 7 — DC gate-trigger current characteristics for I- and III+ modes.

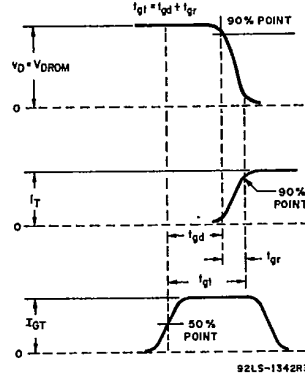


Fig. 8 — Waveshapes of  $I_{gt}$  characteristics test.

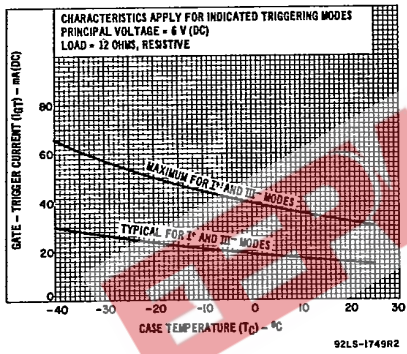


Fig. 9 — DC gate-trigger current characteristics for I+ and III- modes.

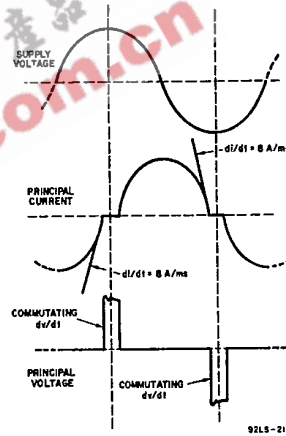


Fig. 10 — Waveshapes of commutating  $dv/dt$  characteristics.

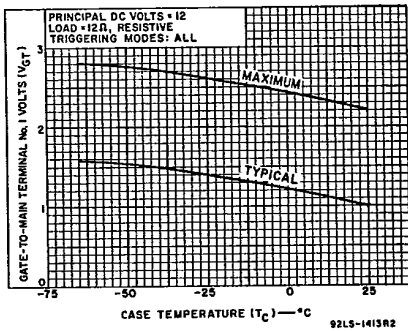


Fig. 11 — DC gate-trigger voltage characteristics.