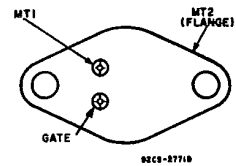
15-Ampere Silicon Triacs

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° C, conduction angle = 360°	$I_{T(RMS)}$	15				A
PEAK SURGE (NON-REPETITIVE) ON-STATE CURRENT:	I_{TSM}					
For one full cycle of applied principal voltage 60 Hz (sinusoidal)		100				A
For one full cycle of applied principal voltage (50-Hz, sinusoidal)		85				A
For more than one full cycle of applied voltage		See Fig. 3				
PEAK GATE-TRIGGER CURRENT:						
For 1 μs max.	I_{GTM}	4				A
FUSING CURRENT (for triac protection):						
T_J = -40 to 100° C, t = 1.25 to 10 ms	I^2t	50				A^2s
GATE POWER DISSIPATION:						
Peak• (for 1 μs max. and I_{GTM} = ≤ 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				°C
Operating (Case)	T_C	-40 to 125				°C
PIN TEMPERATURE (During soldering):						
At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.	T_P	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.*

T4700 Series

ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	LIMITS For All Types Unless Otherwise Specified			UNITS
		Min.	Typ.	Max.	
Peak Off-State Current♦ Gate open, T_J = 125°C, V_{DROM} = Max. rated value	I_{DROM}	—	0.2	4	mA
Instantaneous On-State Voltage♦ For i_T = 30A (peak), T_C 25°C	v_T	—	1.6	2.0	V
DC Holding Current♦ Gate open, Initial principal current = 150 mA (DC), v_D = 12V: T_C = 25°C ..... For other case temperatures	I_{HO}	—	15 See Fig. 5	60	mA
Critical Rate of Applied Commutating Voltage♦ For $v_D = V_{DROM}$, $I_{T(RMS)}$ = 15 A, commutating di/dt = 8 A/ms, and gate unenergized At T_C = +95°C	dv/dt	2	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 T4700B ..... T4700D ..... T4700M T4700N	dv/dt	 30 20 15 10	 150 100 75 50	 — — — —	V/μs
DC Gate-Trigger Current♦■ For v_D = 6 volts (dc), R_L = 12 ohms, T_C = +25°, and Specified Triggering Mode: I^+ Mode: V_{T2} is positive, V_G is positive ..... I^- Mode: V_{T2} is positive, V_G is negative ..... III^+ Mode: V_{T2} is negative, V_G is positive ..... III^- Mode: V_{T2} is negative, V_G is negative ..... For other case temperatures	I_{GT}	 — — — —	 15 35 35 15 See Figs. 7 & 9	 30 80 80 30	mA
DC Gate-Trigger Voltage♦■ For v_D = 6 volts (dc) and R_L = 12 ohms At T_C = +25° ..... For other case temperatures ..... For $v_D = V_{DROM}$, R_L = 125 Ω, T_C = 125°C	V_{GT}	 — 0.2	 1 See Fig. 11 —	 2.5 —	V
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 = 25 A (peak), T_C = 25°C	t_{gt}	—	1.6	2.5	μs
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	—	—	1.3	°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.

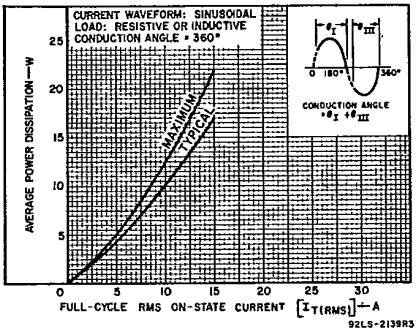


Fig. 1 — Power dissipation curve.

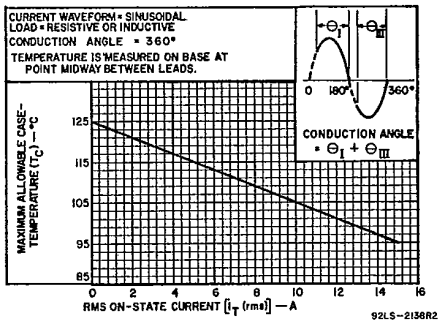


Fig. 2 — Conduction rating chart (case temperature).

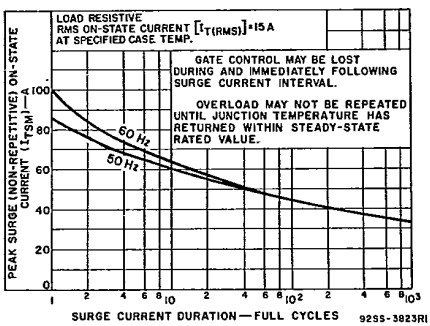


Fig. 3 — Surge current rating chart.

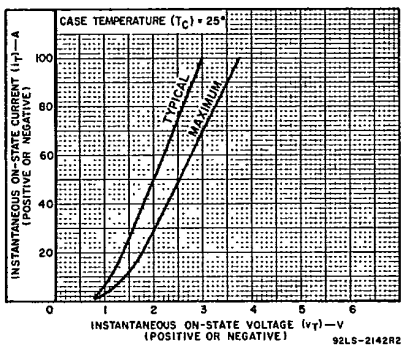


Fig. 4 — On-state characteristics for either direction of principal current.

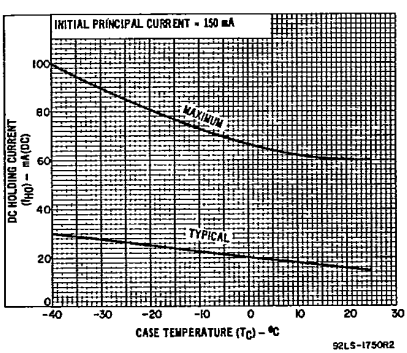


Fig. 5 — DC holding current characteristics for either direction of principal current.

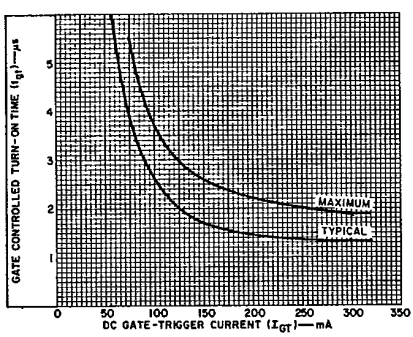


Fig. 6 — Turn-on time vs. gate trigger current.

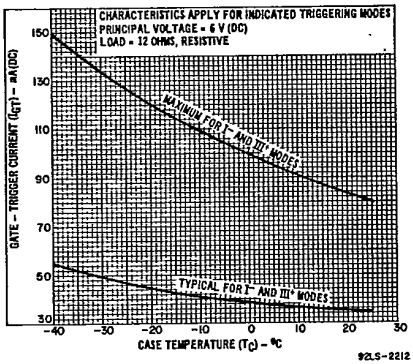


Fig. 7 — DC gate-trigger current characteristics for I- and III+ modes.

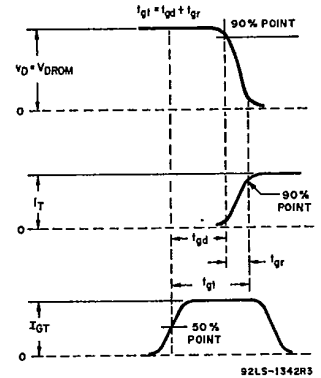


Fig. 8 — Waveshapes of t_{gt} characteristics test.

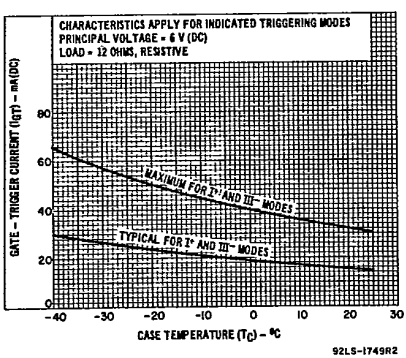


Fig. 9 — DC gate-trigger current characteristics for I^+ and III^- modes.

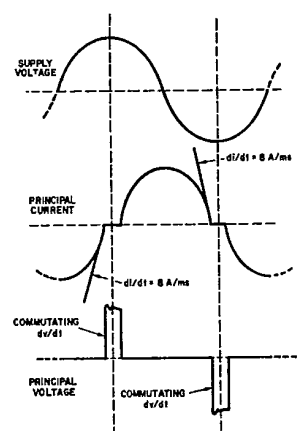


Fig. 10 — Waveshapes of commutating dv/dt characteristics.

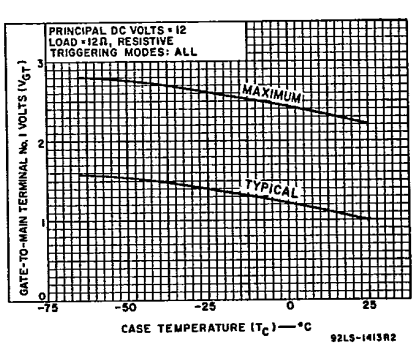


Fig. 11 — DC gate-trigger voltage characteristics.