File Number **1314**

T2800, T2802 Series

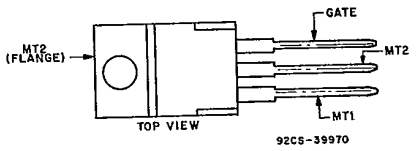
High Voltage, 8-A Silicon Triacs

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-220AB

These RCA triacs are gate-controlled full-wave silicon switches utilizing a plastic case with three leads to facilitate mounting on printed-circuit boards. They are intended for the control of ac loads in such applications as motor controls, light dimmers, heating controls, and power-switching systems.

These devices are designed to switch from an off-state to an on-state for either polarity of applied voltage with positive or negative gate-triggering voltages.

The T2802 series triacs are characterized for I^+, III^- gate-triggering modes only and should suit a wide range of applications that employ diac or anode on/off triggering.

All series employ the plastic JEDEC TO-220AB package. The plastic package design provides not only ease of mounting but also low thermal impedance, which allows operation at high case temperatures and permits reduced heat-sink size.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	T2800A T2802A	T2800B T2802B	T2800C T2802C	T2800D T2802D	T2800E T2802E	T2800M T2802M	T2800N T2802N	
V_{DROM}* (Gate Open, T_J = -65 to 125°C)	100	200	300	400	500	600	800	V
$I_{T(RMS)}$: T_C = 105°C	8							A
I_{TSM} (For one cycle of applied principal voltage):								
60 Hz (sinusoidal), T_c = 105°C	100							A
50 Hz (sinusoidal), T_c = 105°C	85							A
For more than one cycle	See Figs. 2							
di/dt: $V_D = V_{DROM}$, I_G = 200 mA, t_r = 0.1 μs	70							A/μs
I^2t (At T_C shown for $I_{T(RMS)}$):								
t = 20 ms	55							A^2s
= 2.5 ms	28							A^2s
= 0.5 ms	16							A^2s
I_{GTM}†	4							A
P_{GM}: (for 1 μs max., $I_{GTM} \leq 4$ A)	16							W
$P_{G(AV)}$	0.35							W
T_{stg}	-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.

T2800, T2802 Series

ELECTRICAL CHARACTERISTICS
At Maximum Ratings Unless Otherwise Specified, and at Indicated Temperature

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}	—	0.1	2	mA
Maximum On-State Voltage:* (See Fig. 4) For i_T = 30 A (peak), T_C = 25°C	v_{TM}	—	1.7	2	V
DC Holding Current:* Gate open, Initial principal current = 150 mA (dc), v_D = 12 V, T_C = 25°C, T2800 series	I_{HO}	—	15	30	mA
T2802 series		—	20	60	
For other case temperatures		See Fig. 5			
Critical Rate-of-Rise of Commutation Voltage:*† For V_D = V_{DROM}, $I_{T(RMS)}$ = 8 A, commutating di/dt = 4.3 A/ms, gate unenergized, T_C = 105°C	dv/dt	4	10	—	V/μs
Critical Rate-of-Rise of Off-State Voltage:* For v_D = V_{DROM}, exponential voltage rise, and gate open, T_C = 125°C					
T2800B, T2802B	dv/dt	100	300	—	V/μs
T2800C, T2802C		85	275	—	
T2800D, T2802D		75	250	—	
T2800E, T2802E		65	225	—	
T2800M, T2802M		60	200	—	
T2800N, T2802N		40	100	—	
DC Gate-Trigger Current:* ‡ For v_D = 12 V (dc), R_L = 30 Ω, T_C = 25°C					
Mode V_{MT2} V_G					
I+ positive positive T2800 series	I_{GT}	—	10	25	mA
T2802 series		—	25	50	
III⁻ negative negative T2800 series		—	15	25	
T2802 series		—	25	50	
I⁻ positive negative T2800 series only		—	20	60	
IIi+ negative positive T2800 series only		—	30	60	
For other case temperatures		See Figs. 6 & 7			
DC Gate-Trigger Voltage:* ‡ For v_D = 12 V (dc), R_L = 30 Ω, T_C = 25°C	V_{GT}	—	1.25	2.5	V
For other case temperatures		See Fig. 8 & 9			
For v_D = V_{DROM}, R_L = 125 Ω, T_C = 125°C		0.2	—	—	
Gate-Controlled Turn-On Time: For v_D = V_{DROM}, I_{GT} = 80 mA, t_r = 0.1 μs, i_T = 10 A (peak), T_C = 25°C	t_{gt}	—	1.6	2.5	μs
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	—	—	2.2	°C/W
Junction-to-Ambient	$R_{\theta JA}$	—	—	60	

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.
†Variants of these devices having dv/dt characteristics selected specifically for inductive leads are available on special order; for additional information, contact your RCA Representative or your RCA Distributor.
‡For either polarity of gate voltage (V_G) with reference to main terminal 1.

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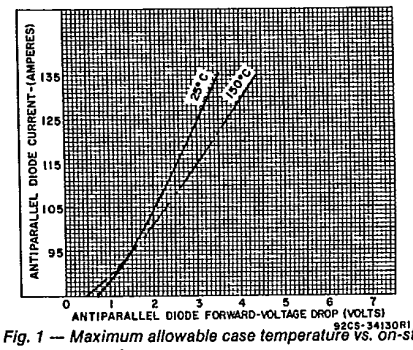

Fig. 1 — Maximum allowable case temperature vs. on-state current.

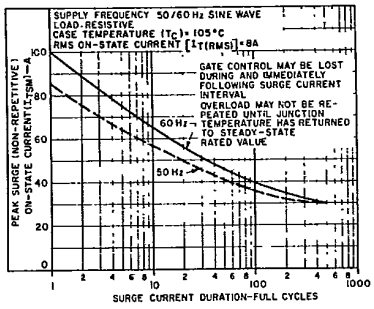

Fig. 2 — Peak surge on-state current vs. surge current duration for T2800, T2802 series.

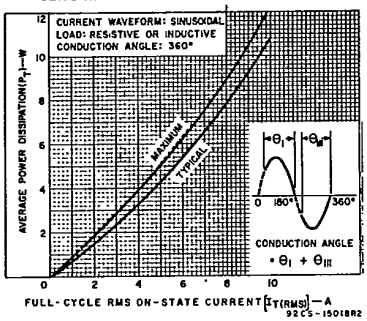

Fig. 3 — Power dissipation vs. on-state current for T2800, T2802 series.

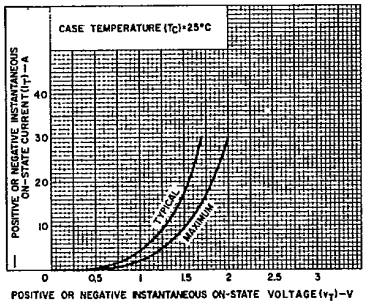

Fig. 4 — On-state current vs. on-state voltage for T2800, T2802 series.

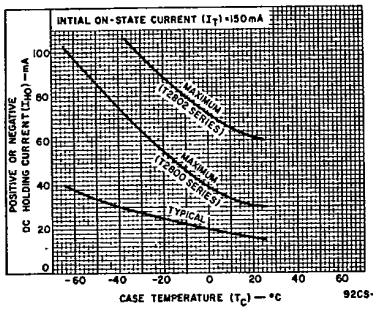

Fig. 5 — DC holding current vs. case temperature for T2800, T2802.

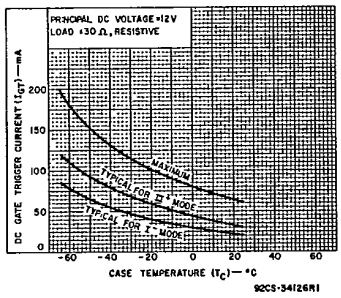

Fig. 6 — DC gate-trigger current (for I⁻ and III⁺ triggering modes) vs. case temperature for T2800, T2802 series.

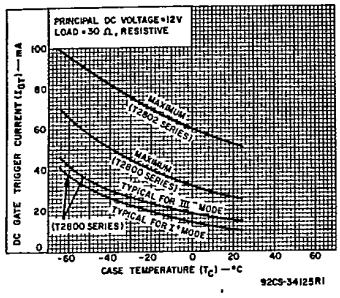

Fig. 7 — DC gate-trigger current (for I⁺ and III⁻ triggering modes) vs. case temperature for T2800, T2802 series.

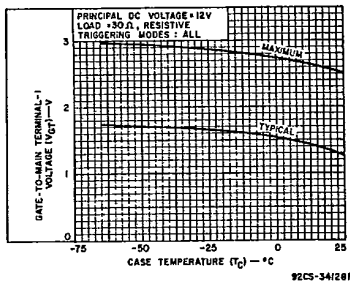

Fig. 8 — DC gate-trigger voltage vs. case temperature for T2800, T2802 series.

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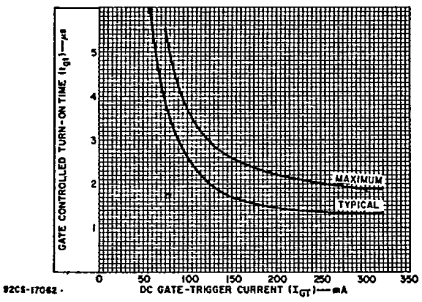


Fig. 9 — Turn-on time vs. gate-trigger current for T2800, T2802 series.

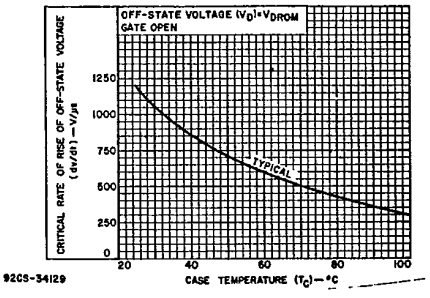


Fig. 10 — Typical critical rate-of-rise of off-state voltage vs. case temperature for all series.

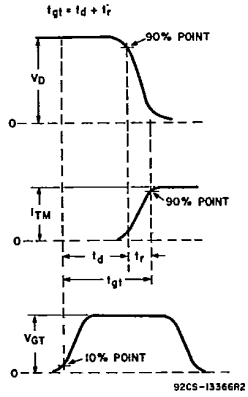


Fig. 11 — Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).

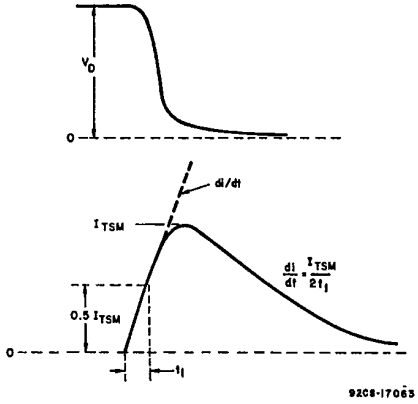
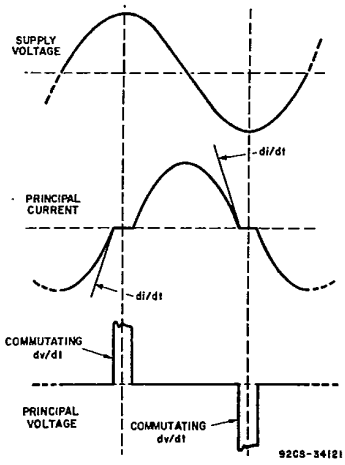


Fig. 12 — Rate-of-change of on-state current with time (defining di/dt.).



NOTES

1. Curve defines temperature rise of either junction above case temperature for equal-amplitude symmetrical sine wave current at 50 and 80 Hz.
2. Curve considers junction temperature measured immediately after the final cycle of current.
3. Gate will regain control if temperature is maintained below rated value and load current is reduced or maintained at RMS value.
4. For more than 100 cycles of current the case temperature rise must be observed and used in calculating the total junction temperature.
5. Junction temperature rise above case is defined as apparent transient thermal impedance times average conduction power dissipated during full cycle conduction.
6. Apparent steady-state value is not the same as JEDEC value listed as steady-state in characteristics table.

Fig. 13 — Relationship between supply voltage and principal current (inductive load) showing reference points for definition of commutating voltage [dv/dt].