

Triacs

T2300, T2301, T2302 Series

File Number 911

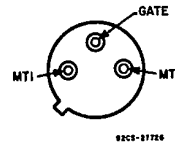
2.5-A Sensitive-Gate Silicon Triacs

Modified TO-205 Package for AC Power Switching

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
- Silicon Oxide Glass Multilayer Passivation System
- Advanced Unisurface Construction
- Precise Ion Implanted Diffusion Source

TERMINAL DESIGNATIONS



Modified TO-205

The RCA-T2300, T2301, T2302, series triacs are gate-controlled full-wave silicon ac switches that 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 gate sensitivity of these triacs permits the use of economical transistorized control circuits and enhances their use in low-power phase-control and load-switching applications.

MAXIMUM RATINGS, Absolute-Maximum Values:

	3 mA Gate	T2300F	T2300A	T2300B	T2300D	T2300M	T2300N	
4 mA Gate	T2301F	T2301A	T2301B	T2301D	T2301M	T2301N		
10 mA Gate	T2302F	T2302A	T2302B	T2302D	T2302M	T2302N		
V_{DRM}^{Δ} : $T_J = -40$ to $125^{\circ}C$	50	100	200	400	600	800		V
$I_{T(RMS)}$: $T_C = 95^{\circ}C$	2.5							A
For other conditions	See Figs. 3,4,5							
I_{TSM}^{Δ} : For one cycle of applied principal voltage								
60 Hz (sinusoidal)	25							A
50 Hz (sinusoidal)	21							A
More than one cycle of applied principal voltage	See Figs. 6,7							
di/dt : $V_D = V_{DRM}$, $I_G = 50$ mA, $t_r = 0.1 \mu s$	100							A/ μs
I^2t [At T_C shown for $I_{T(RMS)}$]:								
$t = 20$ ms	4.3							A ² s
$= 2.5$ ms	2							A ² s
$= 0.5$ ms	1							A ² s
I_{GTM}^{Δ} : For 1 μs max.	1							A
P_{GM}^{Δ} : Peak (For 1 μs max., $I_{GTM} \leq 1$ A(peak)	10							W
$P_{G(AV)}^{\Delta}$:								
$T_C = 60^{\circ}C$	0.15							W
$T_A = 25^{\circ}C$	0.05							W
T_{sig}^{Δ}	-40 to 150							$^{\circ}C$
T_C^{Δ}	-40 to 125							$^{\circ}C$
T_J^{Δ} :								
During soldering for 10 s maximum								
at distance $\geq 1/16$ in. (1.58 mm) from seating plane	225							$^{\circ}C$

Δ For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.
 Δ For either polarity of gate voltage (V_G) with reference to main terminal 1.
 Δ For temperature measurement reference point, see Dimensional Outlines.

T2300, T2301, T2302 Series

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

CHARACTERISTIC	LIMITS			UNITS
	FOR ALL TYPES Except as Specified			
	Min.	Typ.	Max.	
I_{DROM}^{Δ} : Gate open, $T_J = 125^{\circ}C$, $V_{DROM} = \text{Max. rated value}$	—	0.2	0.75	mA
V_{TM}^{Δ} : $i_T = 10 \text{ A (peak)}$, $T_C = 25^{\circ}C$	—	1.7	2.2	V
I_{HO}^{Δ} : Gate open, Initial principal current = 150 mA (dc), $v_D = 12 \text{ V}$, $T_C = 25^{\circ}C$ (T2300, T2301 series) (T2302 series) <i>(See Figs. 9 & 10)</i>	— —	2 7	5 15	mA
dv/dt (Commutating) $^{\Delta}$: $v_D = V_{DROM}$, $I_T(\text{RMS}) = 2.5 \text{ A}$, commutating $di/dt = 1.33 \text{ A/ms}$, gate unenergized, $T_C = 70^{\circ}C$ <i>(See Fig. 14)</i>	0.5	—	—	V/ μ s
dv/dt (Off-state) $^{\Delta}$: $v_D = V_{DROM}$, exponential voltage rise, gate open, $T_C = 115^{\circ}C$ (T2300, T2301 series) $T_C = 125^{\circ}C$ (T2302 series)	3 6	5 10	— —	V/ μ s
$I_{GT}^{\Delta \bullet}$: $v_D = 12 \text{ V dc}$, $R_L = 30 \Omega$, $T_C = 25^{\circ}C$ <i>(See Figs. 11 & 12)</i>				
Mode V_{MT2} V_G				
I ⁺ positive positive	—	1	3	mA
T2300 series	—	1	4	
T2301 series	—	3.5	10	
T2302 series	—	1	3	
III ⁻ negative negative	—	1	4	
T2300 series	—	1	4	
T2301 series	—	3.5	10	
T2302 series	—	2	3	
I ⁻ positive negative	—	2	4	
T2300 series	—	2	4	
T2301 series	—	7	10	
T2302 series	—	2	3	
III ⁺ negative positive	—	2	4	
T2300 series	—	2	4	
T2301 series	—	7	10	
T2302 series	—	—	—	
$V_{GT}^{\Delta \bullet}$: $v_D = 12 \text{ V dc}$, $R_L = 30 \Omega$, $T_C = 25^{\circ}C$ <i>(See Fig. 13)</i> $v_D = V_{DROM}$, $R_L = 125 \Omega$, $T_C = 125^{\circ}C$	— 0.15	1 —	2.2 —	V
t_{gt} : $v_D = V_{DROM}$, $I_{GT} = 60 \text{ mA}$, $t_r = 0.1 \mu$ s, $i_T = 10 \text{ A (peak)}$, $T_C = 25^{\circ}C$ <i>(See Fig. 16)</i>	—	1.8	2.5	μ s
$R_{\theta JC}$: Steady-state	—	—	8.5	$^{\circ}C/W$
$R_{\theta JA}$: (T2300 Series)	—	—	150	

Δ For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

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

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Triacs

01E 17793 DT-25-13

T2300, T2301, T2302 Series

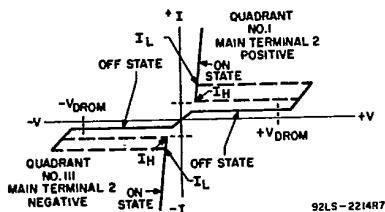


Fig. 1—Principal voltage-current characteristic.

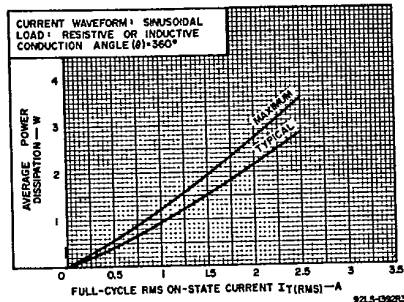


Fig. 2—Power dissipation vs. on-state current.

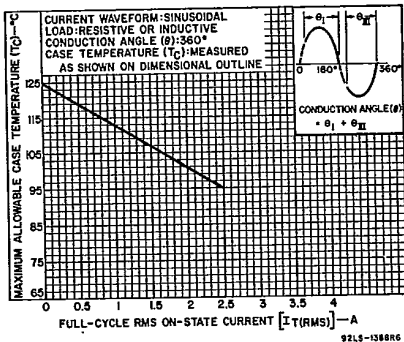


Fig. 3—Maximum allowable case temperature vs. on-state current.

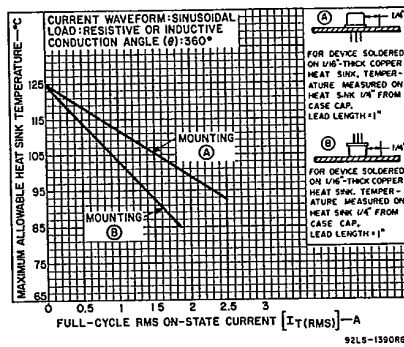


Fig. 4—Maximum allowable heat-sink temperature vs. on-state current for T2300, T2301, T2302 series.

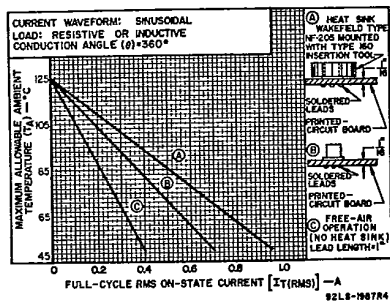


Fig. 5—Maximum allowable ambient temperature vs. on-state current for T2302 series.

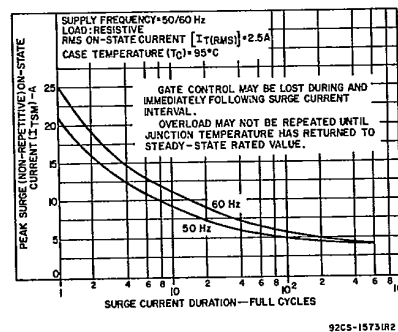


Fig. 6—Peak surge on-state current vs. surge-current duration.

T2300, T2301, T2302 Series

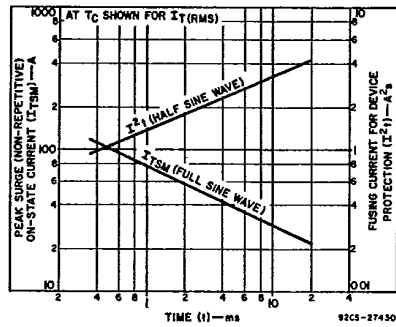


Fig. 7—Peak surge on-state current and fusing current vs. time.

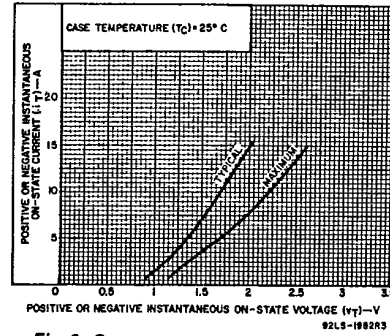


Fig. 8—On-state current vs. on-state voltage for all series.

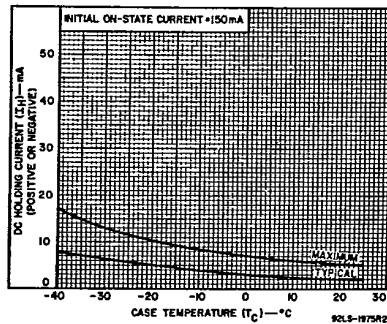


Fig. 9—DC holding current (positive or negative) vs. case temperature for T2300, T2301 series.

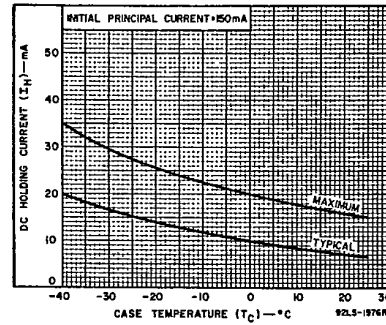


Fig. 10—DC holding current (positive or negative) vs. case temperature for T2302 series.

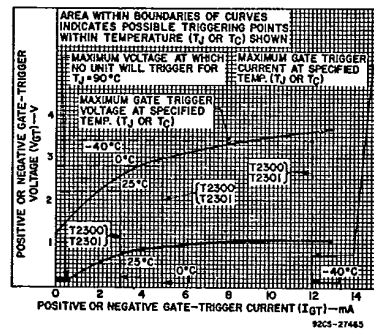


Fig. 11—Gate-trigger current vs. case temperature for T2300, T2301 Series.

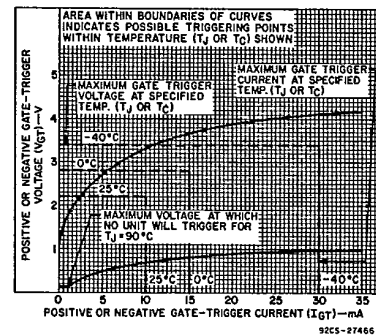


Fig. 12—Gate-trigger current vs. case temperature for T2302 series.

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01E 17795 D T-25-13

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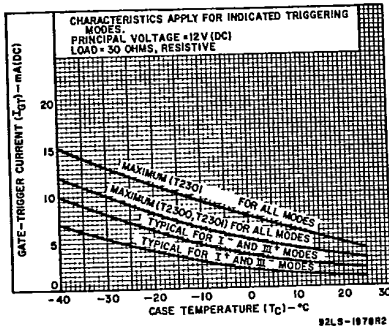


Fig. 13-Gate-trigger voltage vs. case temperature.

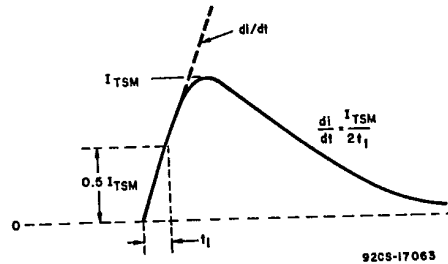
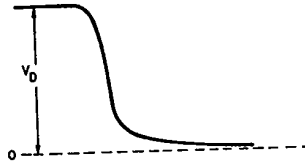


Fig. 14-Rate-of-change of on-state current with time (defining di/dt).

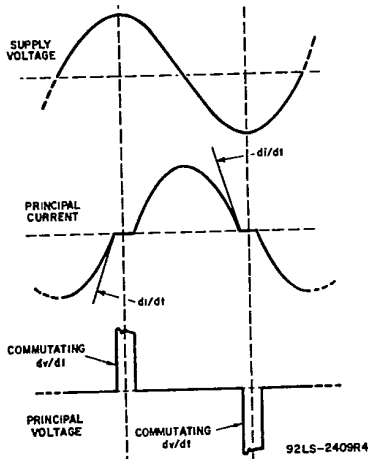


Fig. 15-Relationship between supply voltage and principal current (inductive load) showing reference points for definition of commutating voltage (dv/dt).

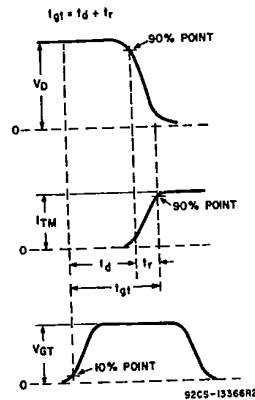


Fig. 16-Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).