T2300, T2301, T2302 Series

File Number **911**

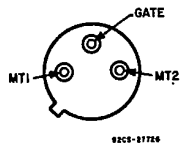
2.5-A Sensitive-Gate Silicon Triacs

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

TERMINAL DESIGNATIONS



92CS-37726

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 4 mA Gate 10 mA Gate	T2300F T2301F T2302F	T2300A T2301A T2302A	T2300B T2301B T2302B	T2300D T2301D T2302D	T2300M T2301M T2302M	T2300N T2301N T2302N	
V_{DROM}▲: T_J = -40 to 125°C		50	100	200	400	600	800	V
$I_{T(RMS)}$: T_C = 95°C				2.5				A
For other conditions				See Figs. 3,4,5				
I_{TSM}: 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: $V_D = V_{DROM}$, I_G = 50 mA, t_r = 0.1 μs				100				A/μs
I^2t [At T_C shown for $I_{T(RMS)}$]:								
t = 20 ms				4.3				A^2s
= 2.5 ms				2				A^2s
= 0.5 ms				1				A^2s
I_{GTM}•: For 1 μs max.				1				A
P_{GM}: Peak (For 1 μs max., $I_{GTM} \leq$ 1 A(peak)				10				W
$P_{G(AV)}$:								
T_C = 60°C				0.15				W
T_A = 25°C				0.05				W
T_{stg}■				-40 to 150				°C
T_C■				-40 to 125				°C
T_T■:								
During soldering for 10 s maximum at distance ≥ 1/16 in. (1.58 mm) from seating plane				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 Outlines.

T2300, T2301, T2302 Series

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

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

▲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.

T2300, T2301, T2302 Series

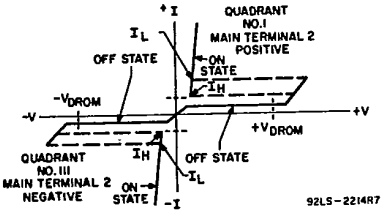


Fig. 1—Principal voltage-current characteristic.

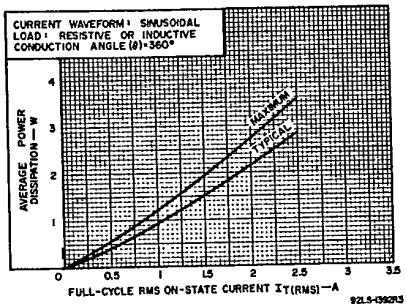


Fig. 2—Power dissipation vs. on-state current.

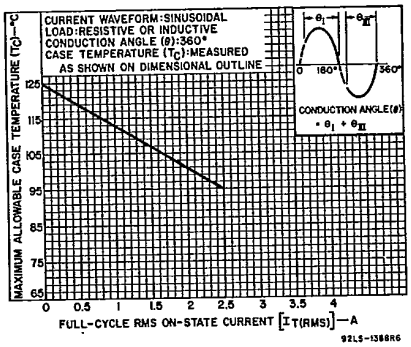


Fig. 3—Maximum allowable case temperature vs. on-state current.

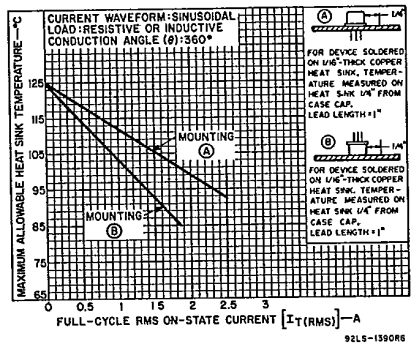


Fig. 4—Maximum allowable heat-sink temperature vs. on-state current for T2300, T2301, T2302 series.

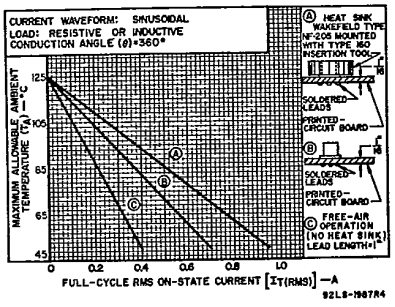


Fig. 5—Maximum allowable ambient temperature vs. on-state current for T2302 series.

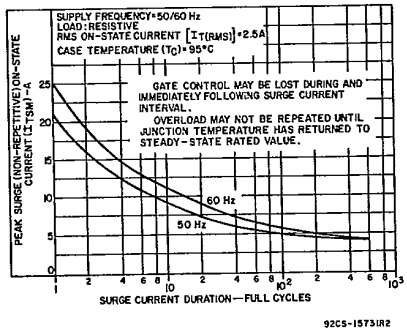


Fig. 6—Peak surge on-state current vs. surge-current duration.

T2300, T2301, T2302 Series

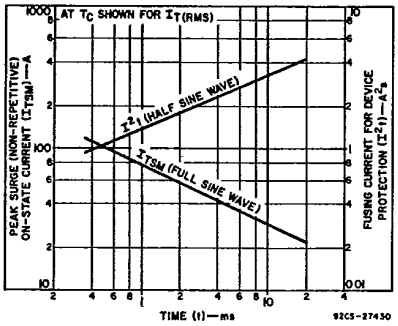


Fig. 7-Peak surge on-state current and fusing current vs. time.

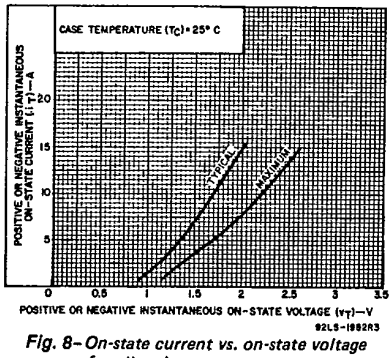


Fig. 8-On-state current vs. on-state voltage for all series.

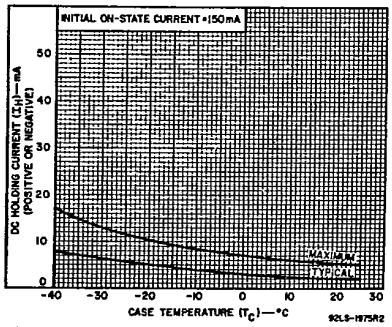


Fig. 9-DC holding current (positive or negative) vs. case temperature for T2300, T2301 series.

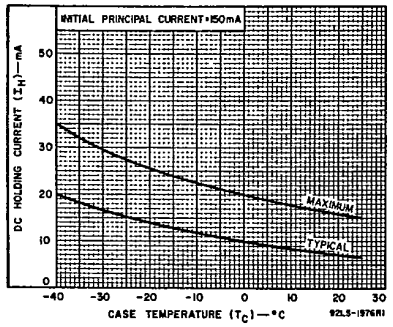


Fig. 10-DC holding current (positive or negative) vs. case temperature for T2302 series.

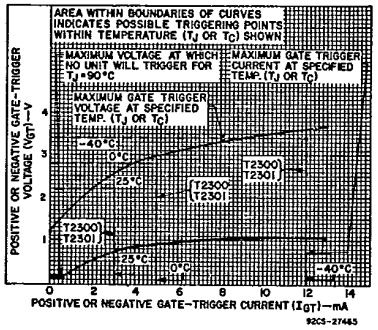


Fig. 11-Gate-trigger current vs. case temperature for T2300, T2301 Series.

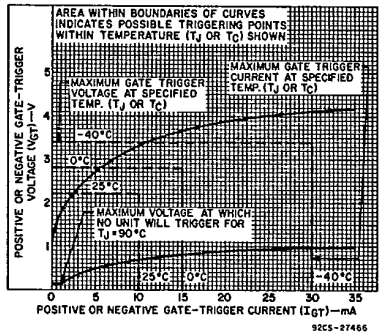


Fig. 12-Gate-trigger current vs. case temperature for T2302 series.

T2300, T2301, T2302 Series

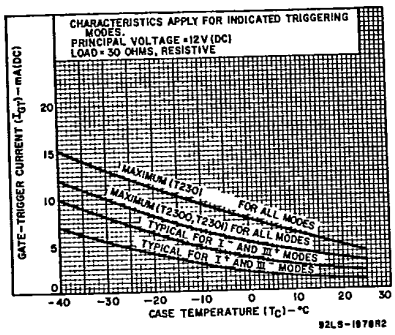
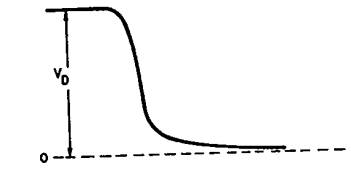


Fig. 13-Gate-trigger voltage vs. case temperature.



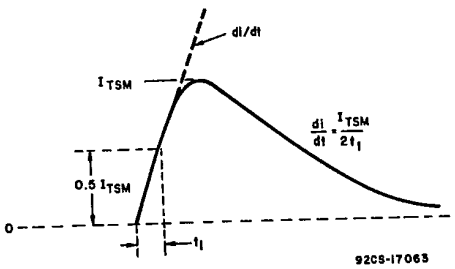


Fig. 14-Rate-of-change of on-state current with time (defining di/dt).

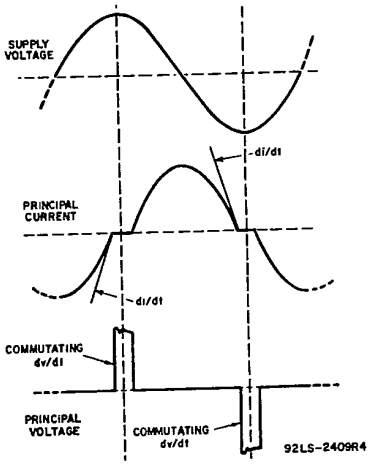


Fig. 15-Relationship between supply voltage and principal current (inductive load) showing reference points for definition of commutating voltage (dv/dt).

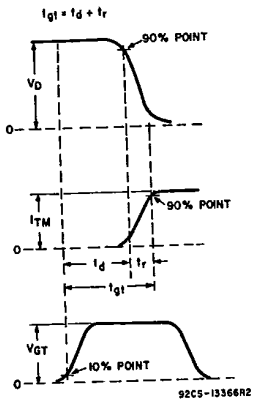


Fig. 16-Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).