File Number **1004**

T6000, T6001, T6006 Series

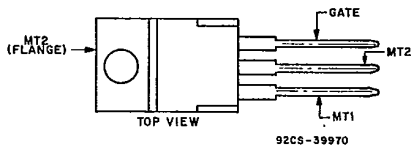
16-A Silicon Triacs

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

The RCA-T6000, T6001 and T6006 series 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. They have an on-state current rating of 16 amperes at a T_C of 95°C.

The T6001-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. The T6006-series triacs are characterized for I^+ and III^+ gate-triggering modes only. They are intended for power-control applications in which integrated-circuit zero-crossing switches, such as the RCA-CA3059 series, are used as the triac-triggering circuits. The T6006-series triacs have gate characteristics which assure tht a CA3059-series integrated circuit can supply sufficient gate current to trigger them over their full operating temperature range.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	T6000B T6001B T6006B	T6000D T6001D T6006D	T6000M T6001M T6006M	T6000N T6001N T6006N	
V_{DROM}*: T_J = -65 to 125°C	200	400	600	800	V
$I_{T(RMS)}$: T_C = 95°C, ϕ 360°	16				A
I_{TSM}: For one cycle of applied principal voltage					
60 Hz (sinusoidal), T_C = 80°C	150				A
50 Hz (sinusoidal), T_C = 80°C	140				A
di/dt: $v_D = V_{DROM}$, I_{GT} = 200 mA, t_r = 0.1 μs	100				A/μs
I^2t [At T_C shown for $I_{T(RMS)}$]:					
t = 10 ms	100				A^2s
= 4.25 ms	49				A^2s
I_{GTM}■					
For 1 μs max.	4				A
P_{GM} (For 1 μs max., $I_{GTM} \leq 4$ A	16				W
$P_{G(AV)}$:	0.5				W
T_{stg}	-65 to 150				°C
T_C	-65 to 125				°C
T_T (During soldering for 10 s max.)	225				°C

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.
■For either polarity to gate voltge (V_G) with reference to main terminal 1.

T6000, T6001, T6006 Series

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

CHARACTERISTIC		LIMITS For All Types Except as Specified			UNITS
		Min.	Typ.	Max.	
I_{DROM}● T_J=125°C, V_{DROM} = Max. rated value		—	0.1	1.2	mA
v_{TM}● i_T = 30 A (peak), T_C = 25°C	T6000, T6006 Series	—	1.4	1.75	V
	T6001 Series	—	1.8	2.0	
I_{HO}● v_D = 12 V, T_C = 25°C	T6000 Series	—	15	35	mA
	T6001 Series	—	20	—	
For other case temperatures			See Fig. 6		
dv/dt● $v_D = V_{DROM}$, $I_{T(RMS)}$ = 16 A, di/dt = 8.5A/ms, T_C = 95°C		4	10	—	V/μs
dv/dt● $v_D = V_{DROM}$, T_C = 125°C					
T6000B, T6001B, T6006B		100	300	—	V/μs
T6000D, T6001D, T6006D		75	250	—	
T6000M, T6001M, T6006M		60	200	—	
T6000N, T6001M, T6006M		30	70	—	
I_{GT}●■ v_D = 12 V (dc), R_L = 30 Ω, T_C = 25°C	Mode 1+ positive V_{MT2}, positive V_G, T6000 series	—	25	50	mA
	T6001 series	—	—	80	
	T6006 series	—	—	45	
	Mode III- negative V_{MT2}, negative V_G, T6000 series	—	25	50	
	T6001 series	—	—	80	
	I- positive V_{MT2}, negative V_G, T6000 series only	—	45	80	mA
	III+ negative V_{MT2}, positive V_G, T6000 series only	—	45	80	
	T6006	—	—	45	
For other case temperatures			See Figs. 7 & 8		
V_{GT}● v_D = 12 v (dc), R_L = 30 Ω, T_C = 25°C	T6001 I+ III-	—	1.25	3.0	V
	T6006 I+ III+	—	1.25	1.5	
	T6000 all models	—	1.25	2.5	
$v_D = V_{DROM}$, R_L 125 Ω, T_C = 125°C		0.2	—	—	
For other case temperatures			See Fig. 9		
t_{gt} $v_D = V_{DROM}$, I_{GT} = 80 mA, t_r = 0.1 μs, i_T = 25 A (peak), T_C = 25°C		—	1.6	—	μs
$R_{\theta JC}$		—	—	1.5	°C/W
$R_{\theta JA}$		—	—	50	°C/W

●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.

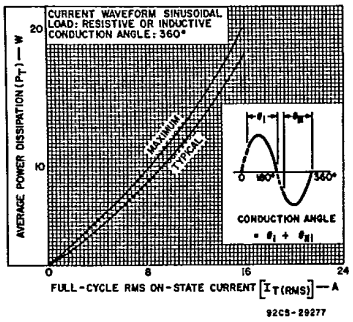


Fig. 1 — Power dissipation vs. on-state current.

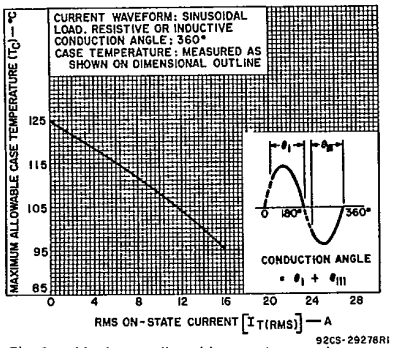


Fig. 2 — Maximum allowable case-temperature vs. on-state current.

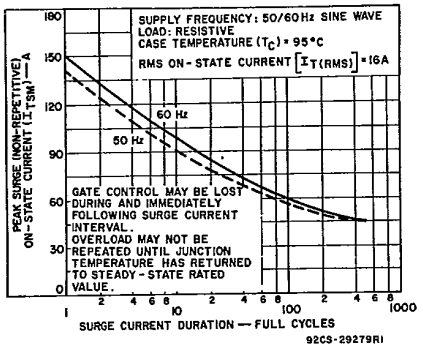


Fig. 3 — Peak surge on-state current vs. surge current duration.

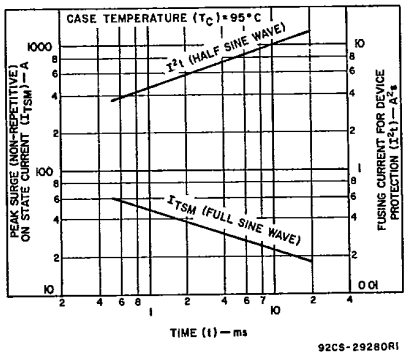


Fig. 4 — Peak surge on-state current and fusing-current vs. time.

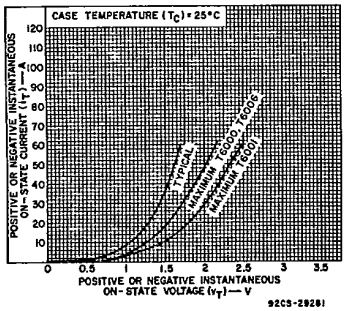


Fig. 5 — On-state current vs. on-state voltage.

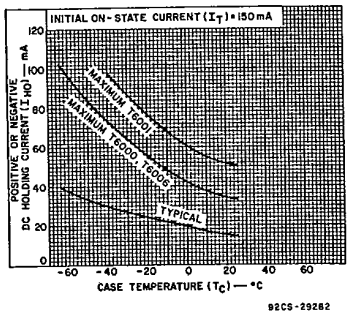


Fig. 6 — DC holding current vs. case temperature.

T6000, T6001, T6006 Series

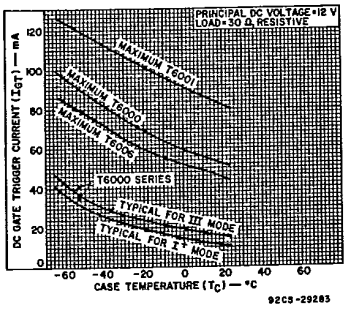


Fig. 7 — DC gate-trigger current (for I^+ and III^- triggering modes) vs. case temperature.

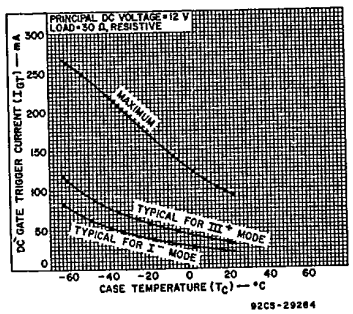


Fig. 8 — DC gate-trigger current (for I^- and III^+ triggering modes) vs. case temperature for T6000-series only.

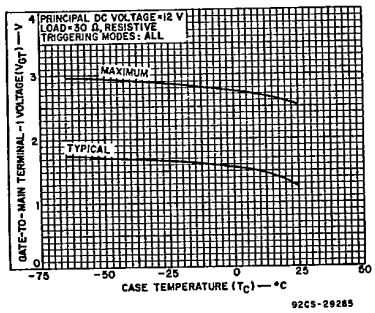


Fig. 9 — DC gate-trigger voltage vs. case temperature for T6000 series only.

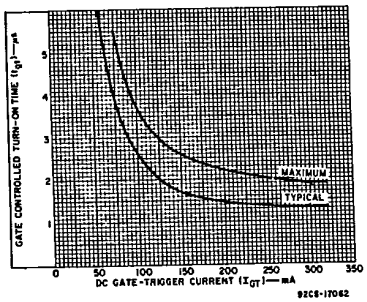


Fig. 10 — Turn-on time vs. gate-trigger current.

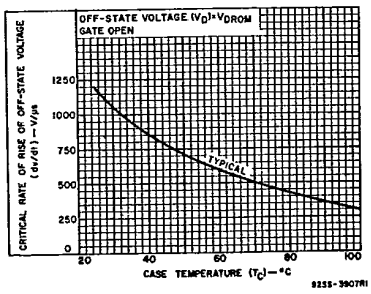


Fig. 11 — Typical critical rate-of-rise of off-state voltage vs. case temperature.

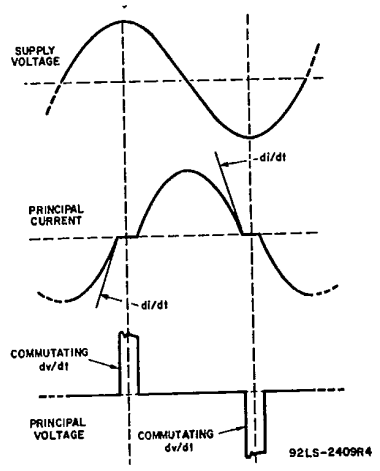


Fig. 12 — Relationship between supply voltage and principal current (inductive load) showing reference points for definition of commutating voltage (dv/dt).

T6000, T6001, T6006 Series

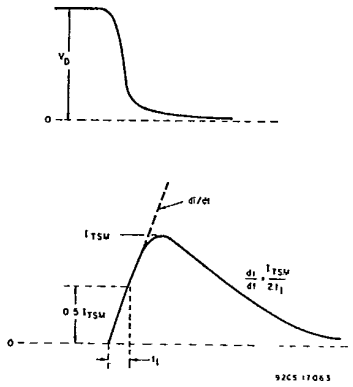


Fig. 13 — Rate-of-change of on-state current with time (defining di/dt).

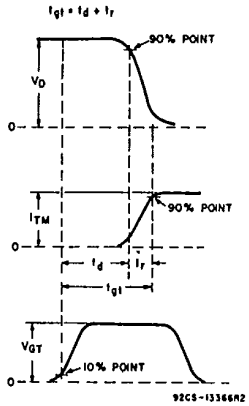


Fig. 14 — Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).