

File Number **615**

**T2500 Series**

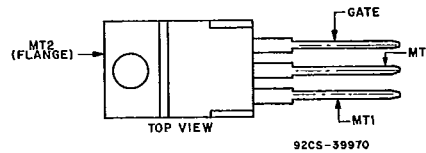
### High Voltage, 6-A Silicon Triacs

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 T2500-series are gate-controlled full-wave silicon triacs 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, heating controls, relay replacement, solenoid drivers, static switching, and power-switching systems.

These devices are designed to switch from an off-state to an on-state for either polarity of applied voltage and with positive or negative gate triggering voltages. They have an on-state current rating of 6 amperes at a  $T_C$  of 80°C.

All types utilize the JEDEC TO-220AB package.

**MAXIMUM RATINGS, Absolute-Maximum Values:**

	T2500B	T2500D	T2500M	T2500N	
$V_{DRM}^{\bullet}$ .....	200	400	600	800	V
$I_{T(RMS)}$ ( $T_C = 105^{\circ}C$ ) .....			6		A
$I_{TSM}$ (for 1 full cycle) 60 Hz .....			60		A
$di/dt$ .....			70		A/ $\mu s$
$I^2T$ (at 8.3 ms) .....			18		A <sup>2</sup> s
$I_{GTM}^{\blacksquare}$ .....			4		A
$P_{GM}$ (for 10 $\mu s$ max.) .....			16		W
$P_{G(AV)}$ (Averaging time 10ms max.) .....			0.2		W
T Storage $\blacktriangle$ .....			-65 to 150		$^{\circ}C$
$T_C$ .....			-65 to 125		$^{\circ}C$
$T_T$ (During soldering): For 10 s max. (terminals and case) .....			225		$^{\circ}C$

$\bullet$ For either polarity of main terminal 2 voltage ( $V_{MT2}$ ) with reference to main terminal 1.  
 $\blacksquare$ For either polarity of gate voltage ( $V_G$ ) with reference to main terminal 1.  
 $\blacktriangle$ For temperature measurement reference point, see *Dimensional Outline*.

Triacs

**T2500 Series**

**ELECTRICAL CHARACTERISTICS**

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

CHARACTERISTIC	SYMBOL	LIMITS			UNITS			
		For All Types Unless Otherwise Specified						
		Min.	Typ.	Max.				
Peak Off-State Current: <sup>*</sup> Gate open, $T_J = 125^\circ\text{C}$ , $V_{\text{DROM}} = \text{Max. rated value}$	$I_{\text{DROM}}$	—	0.1	2	mA			
Maximum On-State Voltage: <sup>*</sup> For $I_T = 30\text{ A (peak)}$ , $T_C = 25^\circ\text{C}$ .....	$V_{\text{TM}}$	—	1.7	2	V			
DC Holding Current: <sup>*</sup> Gate open, Initial principal current = 150 mA (DC), $v_D = 12\text{V}$ : $T_C = 25^\circ\text{C}$ .....	$I_{\text{HO}}$	—	15	—	mA			
For other case temperatures ..... See Fig. 5								
Critical Rate-of-Rise of Commutation Voltage: <sup>*</sup> For $v_D = V_{\text{DROM}}$ , $I_{\text{T(RMS)}} = 6\text{ A}$ , Commutating $di/dt = 3.2\text{ A/ms}$ , and gate unenergized At $T_C = 80^\circ\text{C}$ .....	$dv/dt$	—	10	—	V/ $\mu\text{s}$			
Critical Rate of Rise of Off-State Voltage: <sup>*</sup> For $v_D = V_{\text{DROM}}$ , exponential voltage rise, and gate open At $T_C = 125^\circ\text{C}$	$dv/dt$				V/ $\mu\text{s}$			
T2500B .....						100	300	—
T2500D .....						75	250	—
T2500M .....						60	200	—
T2500N .....						40	100	—
For other case temperatures ..... See Fig. 6								
DC Gate-Trigger Current: <sup>*</sup> † For $v_D = 12\text{ V (dc)}$ , $R_L = 30\ \Omega$ $T_C = 25^\circ\text{C}$ , and specified triggering mode:	$I_{\text{GT}}$				mA			
I <sup>+</sup> Mode: $V_{\text{MT2}}$ positive, $V_G$ positive .....						—	10	25
III <sup>-</sup> Mode: $V_{\text{MT2}}$ negative, $V_G$ negative .....						—	20	30
I <sup>-</sup> Mode: $V_{\text{MT2}}$ positive, $V_G$ negative .....						—	20	60
III <sup>+</sup> Mode: $V_{\text{MT2}}$ negative, $V_G$ positive .....						—	30	60
For other case temperatures ..... See Figs. 7 & 8								
DC Gate-Trigger Voltage: <sup>*</sup> † For $v_D = 12\text{ V (DC)}$ and $R_L = 30\ \Omega$ $T_C = 25^\circ\text{C}$ .....	$V_{\text{GT}}$				V			
For other case temperatures .....						—	1.25	2.5
For $v_D = V_{\text{DROM}}$ , $R_L = 125\ \Omega$ , $T_C = 125^\circ\text{C}$ ..... See Fig. 9								
Gate-Controlled Turn-On Time: (Delay Time + Rise Time) For $v_D = V_{\text{DROM}}$ , $I_G = 160\text{ mA}$ , $t_r = 0.1\ \mu\text{s}$ , $I_T = 10\text{ A (peak)}$ , $T_C = 25^\circ\text{C}$ (See Fig. 15) .....	$t_{\text{gt}}$	—	1.6	—	$\mu\text{s}$			
Thermal Resistance: Junction-to-Case .....	$R_{\text{jc}}$	—	—	2.7	$^\circ\text{C/W}$			
Thermal Resistance: Junction-to-Ambient .....	$R_{\text{ja}}$	—	—	60				

<sup>\*</sup>For either polarity of main terminal 2 voltage ( $V_{\text{MT2}}$ ) with reference to main terminal 1.  
<sup>†</sup>For either polarity of gate voltage ( $V_G$ ) with reference to main terminal 1.

T2500 Series

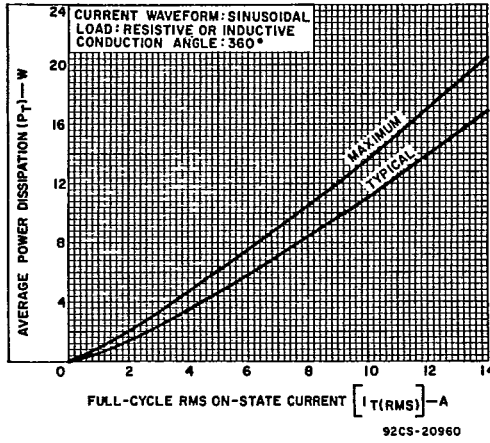


Fig. 1 — Power dissipation vs. on-state current.

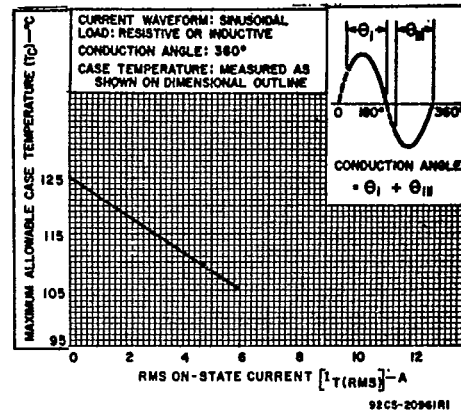


Fig. 2 — Allowable case temperature vs. on-state current.

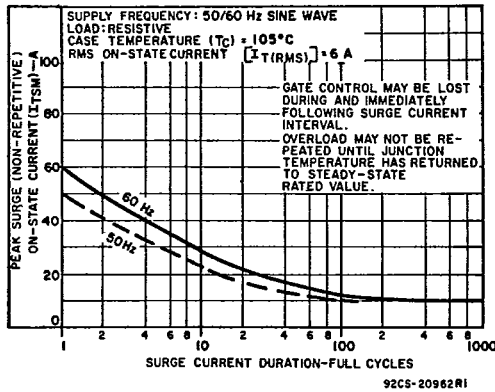


Fig. 3 — Peak surge on-state current vs. surge current duration.

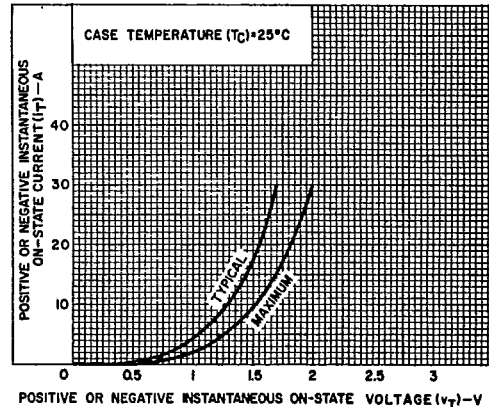


Fig. 4 — On-state current vs. on-state voltage.

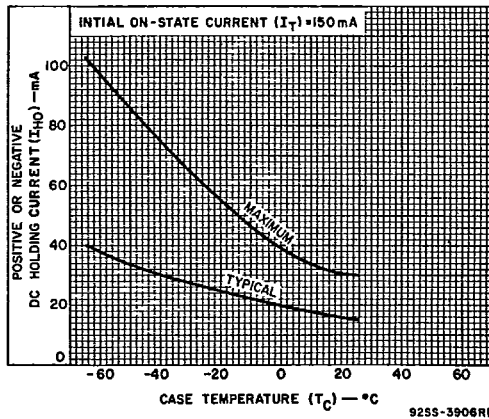


Fig. 5 — DC holding current for either direction of on-state current vs. case temperature.

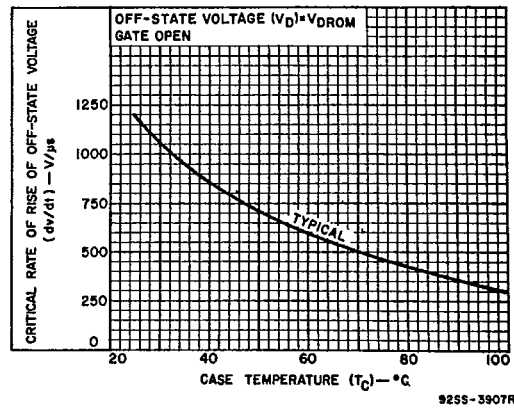


Fig. 6 — Critical rate of rise of off-state voltage vs. case temperature.

Triacs

T2500 Series

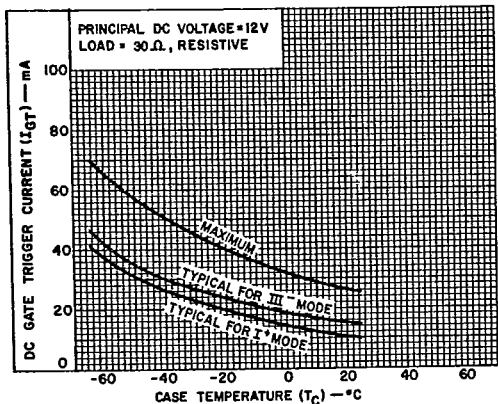


Fig. 7 — DC gate-trigger current (for I<sup>+</sup> and III<sup>-</sup> triggering modes) vs. case temperature.

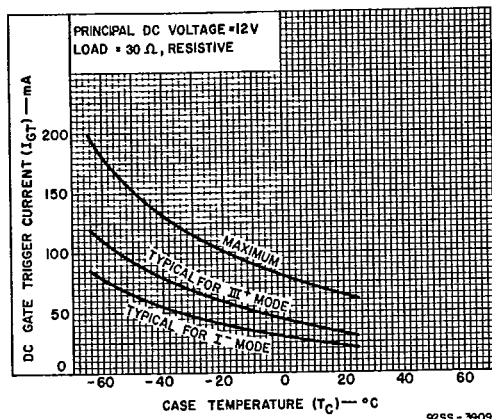


Fig. 8 — DC gate-trigger current (for I<sup>-</sup> and III<sup>+</sup> triggering modes) vs. temperature.

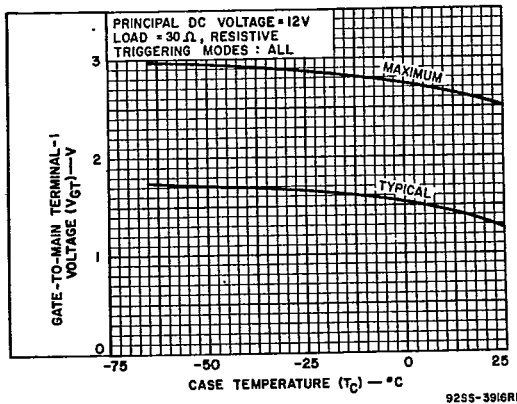


Fig. 9 — DC gate-trigger voltage vs. case temperature.

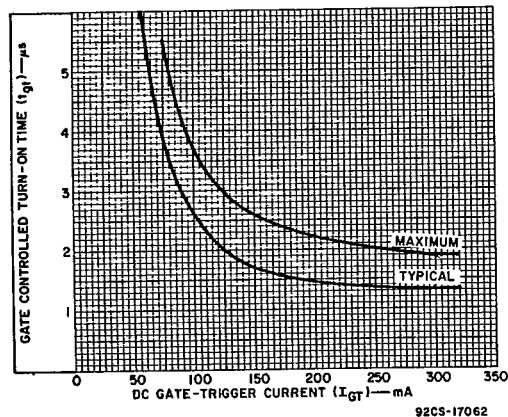


Fig. 10 — Typical turn-on time vs. gate-trigger current.

T2500 Series

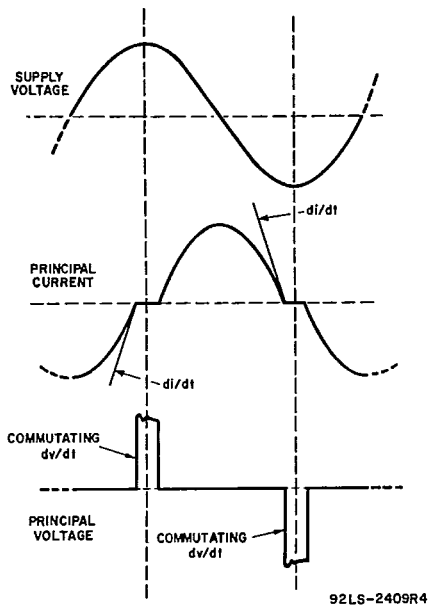


Fig. 11 — Oscilloscope display of commutating  $dv/dt$ .

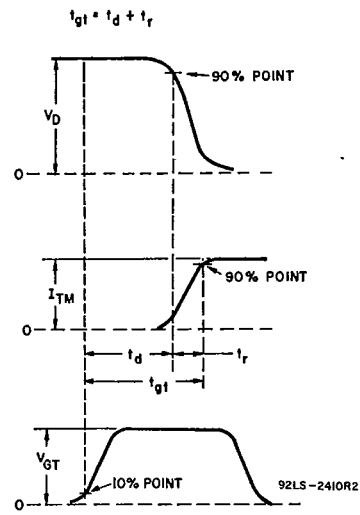


Fig. 12 — Oscilloscope display for measurement of gate-controlled turn-on time ( $t_{gt}$ ).