

8961726 TEXAS INSTR (OPT0)

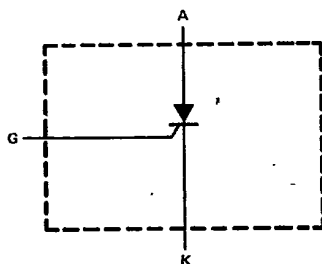
62C 36698 D

SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

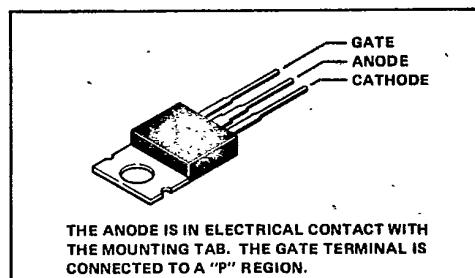
T-25-15
 APRIL 1971 - REVISED OCTOBER 1984

- Silicon Controlled Rectifiers
- 50 V to 600 V
- 8 A and 12 A DC
- 80 A and 100 A Surge Current
- Max I_{GT} of 20 mA

device schematic



TO-220AB PACKAGE



absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	SUFFIX	SERIES	
		TIC116	TIC126
Repetitive peak off-state voltage, V_{DRM} (see Note 1) Repetitive peak reverse voltage, V_{RRM}	F	50 V	50 V
	A	100 V	100 V
	B	200 V	200 V
	C	300 V	300 V
	D	400 V	400 V
	E	500 V	500 V
	M	600 V	600 V
Continuous on-state current at (or below) 70°C case temperature (see Note 2)		8 A	12 A
Average on-state current (180° conduction angle) at (or below) 70°C case temperature (see Note 3)		5 A	7.5 A
Surge on-state current (see Note 4)		80 A	100 A
Peak positive gate current (pulse duration $\leq 300 \mu s$)		3 A	
Peak gate power dissipation (pulse duration $\leq 300 \mu s$)		5 W	
Average gate power dissipation (see Note 5)		1 W	
Operating case temperature range		-40 °C to 110 °C	
Storage temperature range		-40 °C to 125 °C	
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds		230 °C	

- NOTES: 1. These values apply when the gate-cathode resistance $R_{GK} = 1 \text{ k}\Omega$.
 2. These values apply for continuous d-c operation with resistive load. Above 70°C derate according to Figure 3.
 3. This value may be applied continuously under single-phase 50-Hz half-sine-wave operation with resistive load. Above 70°C derate according to Figure 9.
 4. This value applies for one 50-Hz half-sine-wave when the device is operating at (or below) rated values of peak reverse voltage and on-state current. Surge may be repeated after the device has returned to original thermal equilibrium.
 5. This value applies for a maximum averaging time of 20 ms.

4

TIC Devices

8961726 TEXAS INSTR (OPTO)

62C 36699 D

T-25-15

SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_{DRM} Repetitive Peak Off-State Current	$V_D = \text{Rated } V_{DRM}, R_{GK} = 1 \text{ k}\Omega, T_C = 100^\circ\text{C}$			2	mA
I_{RRM} Repetitive Peak Reverse Current	$V_R = \text{Rated } V_{RRM}, I_G = 0, T_C = 110^\circ\text{C}$			2	
I_{GT} Gate Trigger Current	$V_{AA} = 6 \text{ V}, R_L = 100 \Omega, t_{w(g)} \geq 20 \mu\text{s}$		5	20	mA
V_{GT} Gate Trigger Voltage	$V_{AA} = 6 \text{ V}, R_L = 100 \Omega, R_{GK} = 1 \text{ k}\Omega, T_C = 40^\circ\text{C}$			2.5	
	$V_{AA} = 6 \text{ V}, R_L = 100 \Omega, R_{GK} = 1 \text{ k}\Omega, t_{w(g)} \geq 20 \mu\text{s}$		0.8	1.5	
	$V_{AA} = 6 \text{ V}, R_L = 100 \Omega, R_{GK} = 1 \text{ k}\Omega, T_C = 110^\circ\text{C}$		0.2		
I_H Holding Current	$V_{AA} = 6 \text{ V}, R_{GK} = 1 \text{ k}\Omega, \text{Initiating } I_T = 100 \text{ mA}, T_C = -40^\circ\text{C}$			70	mA
	$V_{AA} = 6 \text{ V}, R_{GK} = 1 \text{ k}\Omega, \text{Initiating } I_T = 100 \text{ mA}$			40	
V_{TM} Peak On-State Voltage	$I_{TM} = 8 \text{ A}, \text{See Note 6}, \text{SERIES TIC116}$			1.7	
	$I_{TM} = 12 \text{ A}, \text{See Note 6}, \text{SERIES TIC126}$			1.4	
dv/dt Critical Rate of Rise of Off-State Voltage	$V_D = \text{Rated } V_D, I_G = 0, T_C = 110^\circ\text{C}$		100		V/ μs

NOTE 6: These parameters must be measured using pulse techniques, $t_w = 300 \mu\text{s}$, duty cycle $\leq 2\%$. Voltage-sensing contacts, separate from the current-carrying contacts, are located within 3.2 mm (1/8 inch) from the device body.

thermal characteristics

PARAMETER	SERIES TIC116			SERIES TIC126			UNIT
	MIN	TYP	MAX	MIN	TYP	MAX	
$R_{\theta JC}$			3			2.4	$^\circ\text{C/W}$
$R_{\theta JA}$			62.5			62.5	

resistive-load switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{gt} Gate-Controlled Turn-On Time	$V_{AA} = 30 \text{ V}, R_L = 6 \Omega, R_{GK}(\text{off}) = 100 \Omega, V_{in} = 20 \text{ V}, \text{See Figure 1}$		0.8		μs
t_d Circuit-Commutated Turn-Off Time	$V_{AA} = 30 \text{ V}, R_L = 6 \Omega, I_{RM} = 10 \text{ A}, \text{See Figure 2}$		11		

TIC Devices

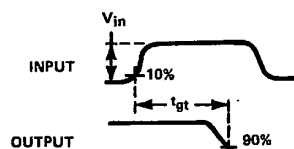
8961726 TEXAS INSTR (OPT0)

62C 36700 D

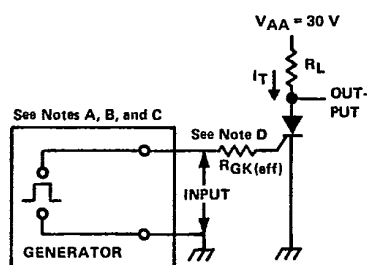
SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

T-2S-15

PARAMETER MEASUREMENT INFORMATION

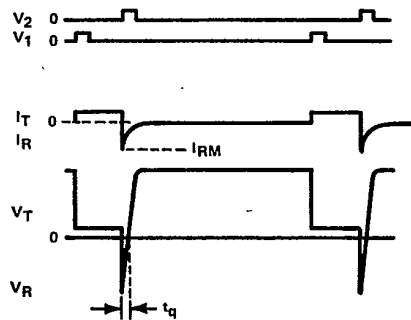


VOLTAGE WAVEFORMS

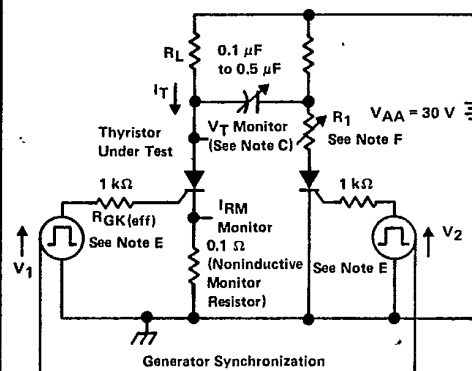


TEST CIRCUIT

FIGURE 1. GATE-CONTROLLED TURN-ON TIME



WAVEFORMS



TEST CIRCUIT

FIGURE 2. CIRCUIT-COMMUTATED TURN-OFF TIME

- NOTES: A. V_{in} is measured with gate and cathode terminals open.
 B. The input waveform of Figure 1 has the following characteristics: $t_r \leq 40$ ns, $t_w \geq 20$ μ s.
 C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 14$ ns, $R_{in} \geq 10$ M Ω , $C_{in} \leq 12$ pF.
 D. $R_{GK(eff)}$ includes the total resistance of the generator and the external resistor.
 E. Pulse generators for V_1 and V_2 are synchronized to provide an anode current waveform with the following characteristics: $t_w = 50$ to 300 μ s, duty cycle = 1%. The pulse duration of V_1 and V_2 are ≥ 10 μ s.
 F. Resistor R_1 is adjusted for $I_{RM} \approx 10$ A.

8961726 TEXAS INSTR (OPT0)

62C 36701 D

T-25-15

SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

THERMAL INFORMATION

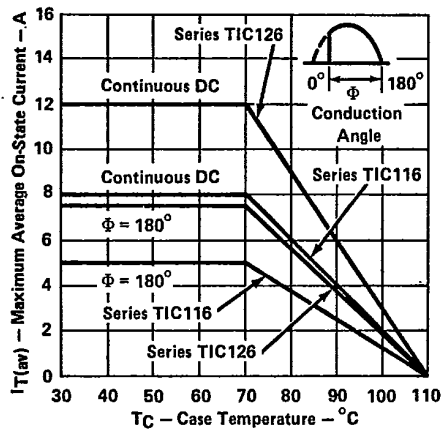
AVERAGE ON-STATE CURRENT
DERATING CURVE

FIGURE 3

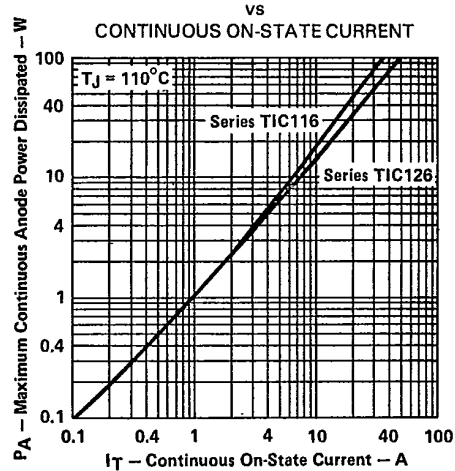
MAXIMUM CONTINUOUS ANODE POWER
DISSIPATED

FIGURE 4

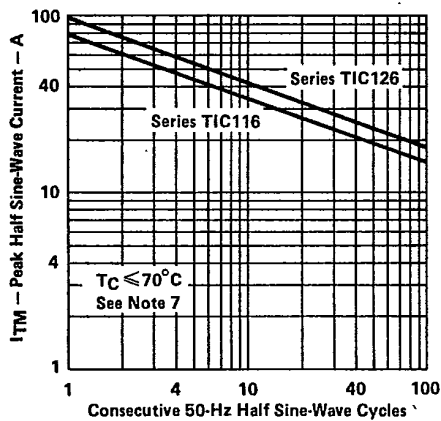
SURGE ON-STATE CURRENT
vs
CYCLES OF CURRENT DURATION

FIGURE 5

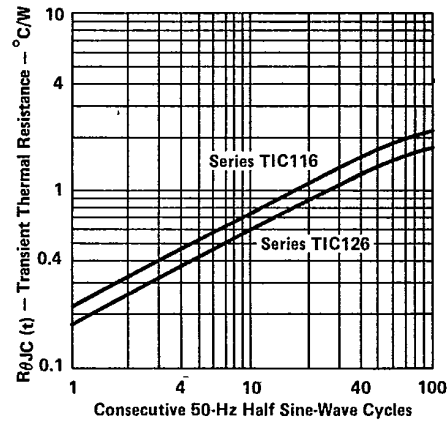
TRANSIENT THERMAL RESISTANCE
vs
CYCLES OF CURRENT DURATION

FIGURE 6

NOTE 7: This curve shows the maximum number of cycles of surge current for which gate control is guaranteed provided the device is initially at nonoperating thermal equilibrium.

TIC Devices

8961726 TEXAS INSTR (OPTO)

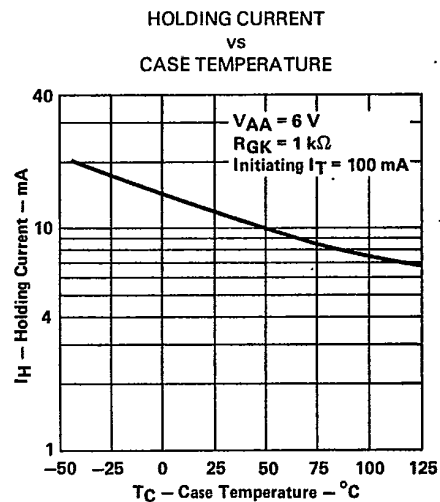
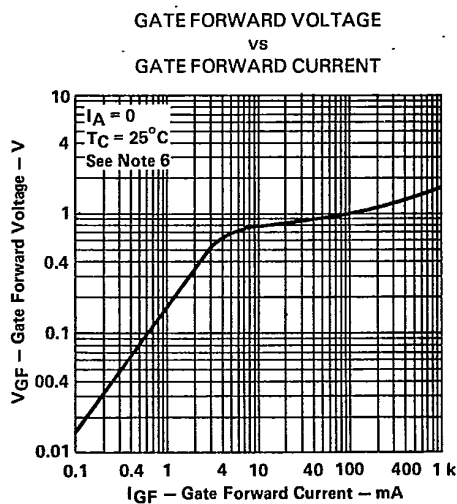
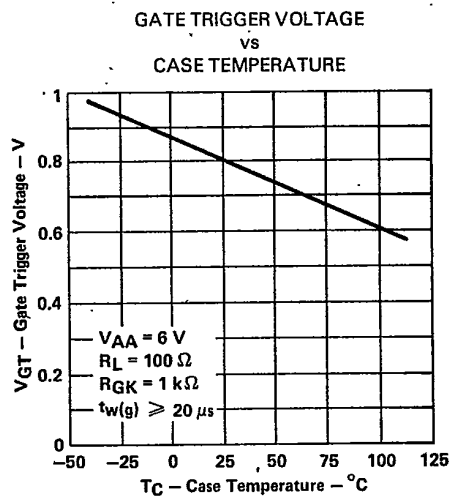
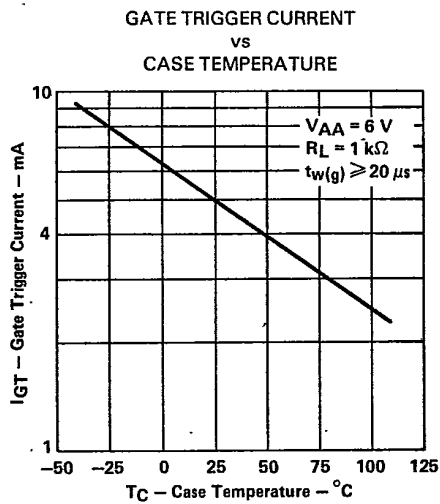
62C 36702

D

SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

T-25-15

TYPICAL CHARACTERISTICS



NOTE 6: These parameters must be measured using pulse techniques, $t_w = 300 \mu s$, duty cycle $\leq 2\%$. Voltage-sensing contacts, separate from the current-carrying contacts, are located within 3.2 mm (1/8 inch) from the device body.

TIC Devices

8961726 TEXAS INSTR (OPTO)

62C 36703 D

T-25-15

SERIES TIC116, TIC126
P-N-P-N SILICON REVERSE-BLOCKING TRIODE THYRISTORS

TYPICAL CHARACTERISTICS

PEAK ON-STATE VOLTAGE

vs

PEAK ON-STATE CURRENT

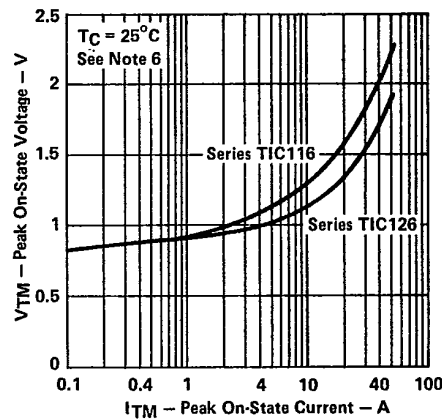


FIGURE 11

4

TIC Devices

GATE-CONTROLLED TURN-ON TIME

vs

GATE CURRENT

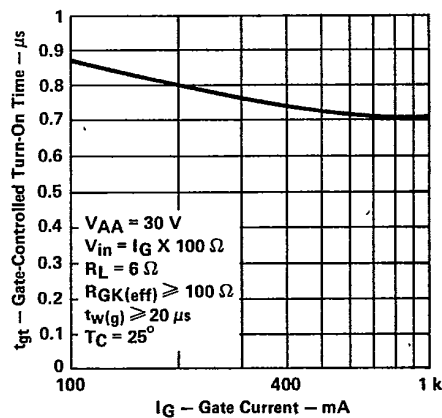


FIGURE 12

CIRCUIT-COMMUTATED TURN-OFF TIME

vs

CASE TEMPERATURE

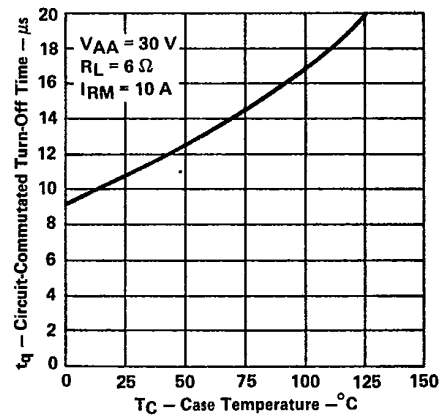


FIGURE 13

NOTE 6: These parameters must be measured using pulse techniques, $t_w = 300\ \mu\text{s}$, duty cycle $\leq 2\%$. Voltage-sensing contacts, separate from the current-carrying contacts, are located within 3.2 mm (1/8 inch) from the device body.