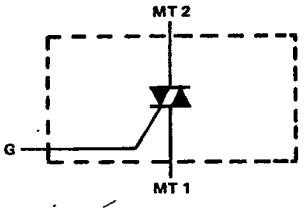
TIC226A, TIC226B, TIC226C, TIC226D, TIC216E, TIC226M, TIC226S, TIC226N SILICON TRIACS

REVISED OCTOBER 1984

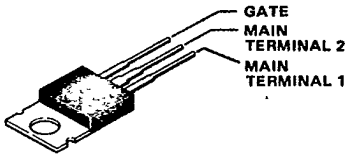
T-25-15

- Sensitive-Gate Triacs
- 100 V to 800 V
- 8 A RMS, 70 A Peak
- MAX I_{GT} of 5 mA (Quadrant 1-3)

device schematic



TO-220AB PACKAGE



MAIN TERMINAL 2 IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB

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

	TIC226A	TIC226B	TIC226C	TIC226D
Repetitive peak off-state voltage, V_{DRM} (see Note 1)	100 V	200 V	300 V	400 V
Full-cycle RMS on-state current at (or below) 85°C case temperature $I_{T(RMS)}$ (see Note 2)	8 A			
Peak on-state surge current, full-sine-wave, I_{TSM} (see Note 3)	70 A			
Peak on-state surge current half-sine-wave, I_{TSM} (see Note 4)	80 A			
Peak gate current, I_{GM}	1			
Peak gate power dissipation, P_{GM} at (or below) 85°C case temperature (pulse duration ≤ 200 μs)	2.2 W			
Average gate power dissipation, $P_{G(av)}$, at (or below) 85°C case temperature (see Note 5)	0.9 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 bidirectionally for any value of resistance between the gate and Main Terminal 1.
2. This value applies for 50-Hz full-sine-wave operation with resistive load. Above 85°C derate linearly to 110°C case temperature at the rate of 120 mA/°C.
3. This value applies for one 50-Hz full-sine-wave when the device is operating at (or below) the rated value of on-state current. Surge may be repeated after the device has returned to original thermal equilibrium. During the surge, gate control may be lost.
4. This value applies for one 50-Hz half-sine-wave when the device is operating at (or below) the rated value of on-state current. Surge may be repeated after the device has returned to original thermal equilibrium. During the surge gate control may be lost.
5. This value applies for a maximum averaging time of 20 ms.

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

	TIC226E	TIC226M	TIC226S	TIC226N
Repetitive peak off-state voltage, V_{DRM} (see Note 1)	500 V	600 V	700 V	800 V
Full-cycle RMS on-state current at (or below) 85°C case temperature ($I_{T(RMS)}$ (see Note 2)	8 A			
Peak on-state surge current, full-sine-wave, I_{TSM} (see Note 3)	70 A			
Peak on-state surge current half-sine-wave, I_{TSM} (see Note 4)	80 A			
Peak gate current, I_{GM}	1			
Peak gate power dissipation, P_{GM} at (or below) 85°C case temperature (pulse duration ≤ 200 μs)	2.2 W			
Average gate power dissipation, $P_{G(av)}$, at (or below) 85°C case temperature (see Note 5)	0.9 W			
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NOTES:
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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_{DRM} = Rated V_{DRM},	I_G = 0,	T_C = 110°C			±2	mA
I_{GTM}	Peak Gate Trigger Current	V_{supply} = +12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		2	50	mA
		V_{supply} = +12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		−12	−50	
		V_{supply} = −12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		−9	−50	
		V_{supply} = −12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		20		
V_{GTM}	Peak Gate Trigger Voltage	V_{supply} = +12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		0.7	2	V
		V_{supply} = +12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		−0.8	−2	
		V_{supply} = −12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		−0.8	−2	
		V_{supply} = −12 V†,	R_L = 10 Ω,	$t_{w(g)} \geq 20\ \mu s$		0.9	2	
V_{TM}	Peak On-State Voltage	I_{TM} = ±12 A,	I_G = 50 mA,	See Note 6		±1.6	±2.1	V
I_H	Holding Current	V_{supply} = +12 V†, Initiating I_{TM} = 100 mA	I_G = 0,			5	30	mA
		V_{supply} = −12 V†, Initiating I_{TM} = −100 mA	I_G = 0,			−9	−30	
I_L	Latching Current	V_{supply} = +12 V†,	See Note 7				50	mA
		V_{supply} = −12 V†,	See Note 7				−50	
dv/dt	Critical Rate of Rise of Off-State Voltage	V_{DRM} = Rated V_{DRM},	I_G = 0,	T_C = 110°C		100		V/μs
dv/dt(c)	Critical Rise of Commutation Voltage	V_{DRM} = Rated V_{DRM}, See Figure 9	I_{TRM} = ±4.2 A,	T_C = 85°C	5			V/μs

† All voltages are with respect to Main Terminal 1.

NOTES: 6. These parameters must be measured using pulse techniques, $t_w \leq 1$ ms, duty cycle ≤ 2 %. Voltage-sensing contacts, separate from the current-carrying contacts, are located within 3,2 mm (1/8 inch) from the device body.

7. The triacs are triggered by a 15-V (open-circuit amplitude) pulse supplied by a generator with the following characteristics: R_G = 100 Ω, t_w = 20 μs, $t_r \leq 15$ ns, $t_f \leq 15$ ns, f = 1 kHz.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$				1.8	°C/W
$R_{\theta JA}$				62.5	

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SILICON TRIACS**

TYPICAL CHARACTERISTICS

GATE TRIGGER CURRENT
vs
CASE TEMPERATURE

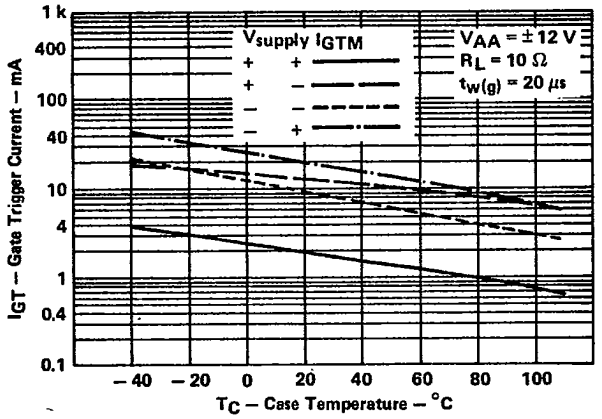

FIGURE 1

GATE TRIGGER VOLTAGE
vs
CASE TEMPERATURE

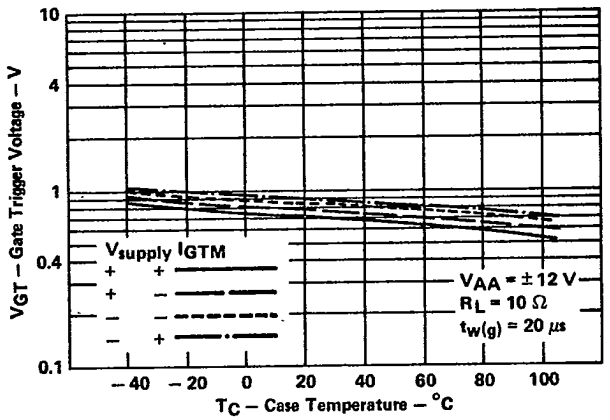

FIGURE 2

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TYPICAL CHARACTERISTICS

HOLDING CURRENT
vs
CASE TEMPERATURE

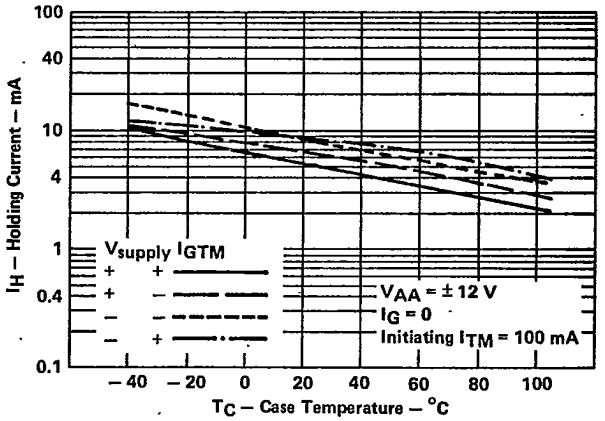

FIGURE 3

GATE FORWARD VOLTAGE
vs
GATE FORWARD CURRENT

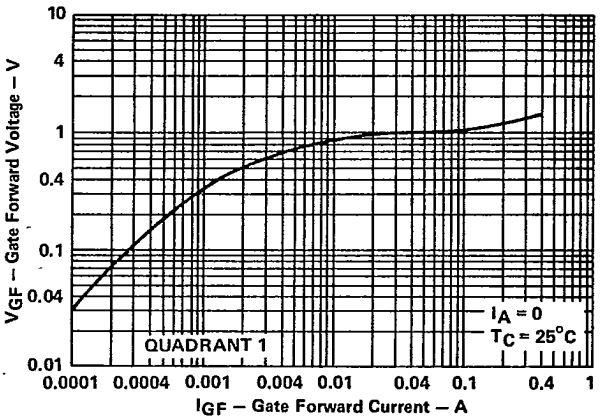

FIGURE 4

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TYPICAL CHARACTERISTICS

LATCHING CURRENT
vs
CASE TEMPERATURE

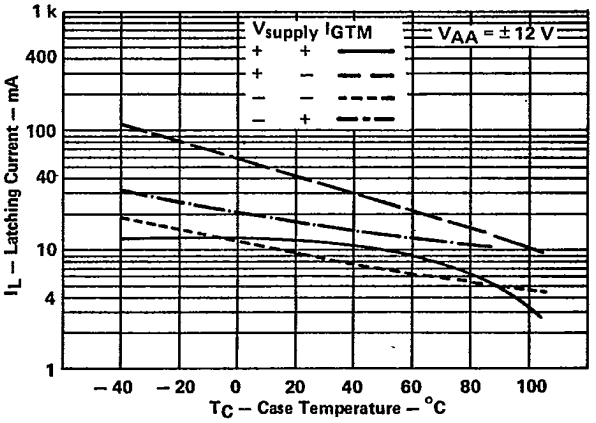

FIGURE 5

THERMAL INFORMATION

SURGE ON-STATE CURRENT
vs
CYCLES OF CURRENT DURATION

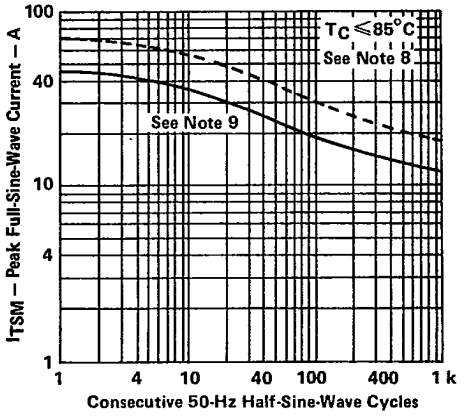

FIGURE 6

NOTES: 8. The dashed curve shows the maximum number of cycles of surge current recommended for safe operation provided the device is initially operating at, or below, the rated value of on-state current; however, during the surge period gate control of the device is initially at nonoperating thermal equilibrium.
9. The solid 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.

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THERMAL INFORMATION

MAXIMUM RMS ON-STATE CURRENT
vs
CASE TEMPERATURE

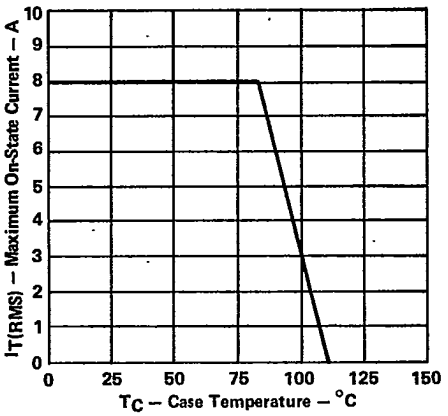

FIGURE 7

MAXIMUM AVERAGE POWER DISSIPATED
vs
RMS ON-STATE CURRENT

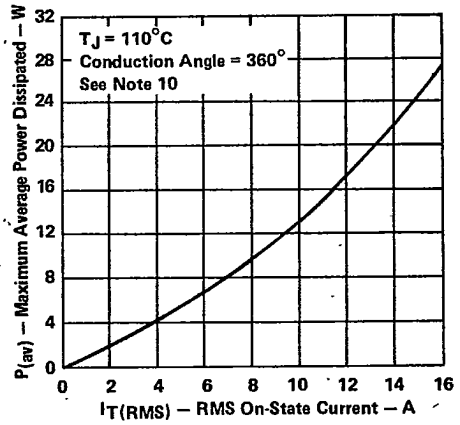

FIGURE 8

NOTE 10: For operation at current greater than 8 amps rms, see Figure 6.

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