

8961726 TEXAS INSTR (OPTO)

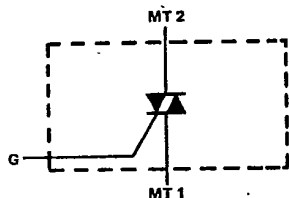
62C 36718 D

TIC225A, TIC225B, TIC225C, TIC225D,
TIC225E, TIC225M, TIC225N
SILICON TRIACS
REVISED OCTOBER 1984

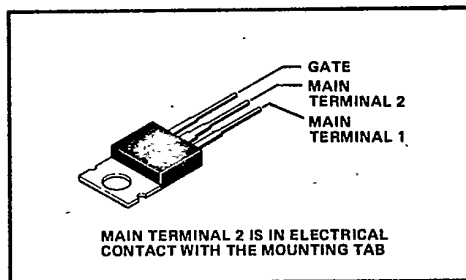
T-25-15

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

device schematic



TO-220AB PACKAGE



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

	TIC225A	TIC225B	TIC225C	TIC225D
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) 70°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 A			
Peak gate power dissipation, P _{GM} , at (or below) 70°C case temperature (pulse duration ≤ 200 μs)	2.2 W			
Average gate power dissipation, P _{G(av)} , at (or below) 70°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 70°C derate linearly to 110°C case temperature at the rate of 200 mA/°C. Figure 7.
 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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TIC Devices

8961726 TEXAS INSTR (OPTO)

62C 36719 D

TIC225A, TIC225B, TIC225C, TIC225D,
TIC225E, TIC225M, TIC225S, TIC225N
SILICON TRIACS

7-25-15

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

	TIC225E	TIC225M	TIC225S	TIC225N
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) 70°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 A			
Peak gate power dissipation, P_{GM} , at (or below) 70°C case temperature (pulse duration $\leq 200 \mu s$)	2.2 W			
Average gate power dissipation, $P_{G(av.)}$, at (or below) 70°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			

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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.



TIC Devices

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62C 36720 D

TIC225A, TIC225B, TIC225C, TIC225D,
TIC225E, TIC225M, TIC225S, TIC225N
SILICON TRIACS

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

7-25-15

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_{DRM} Repetitive Peak Off-State Current	$V_{DRM} = \text{Rated } V_{DRM}, I_G = 0, T_C = 110^\circ\text{C}$			± 2	mA
I_{GTM} Peak Gate Trigger Current	$V_{supply} = +12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		0.8	5	mA
	$V_{supply} = +12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		-4.5	-20	
	$V_{supply} = -12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		-3.5	-10	
	$V_{supply} = -12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		11.7	30	
V_{GTM} Peak Gate Trigger Voltage	$V_{supply} = +12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		0.7	2	V
	$V_{supply} = +12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		-0.7	-2	
	$V_{supply} = -12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		-0.8	-2	
	$V_{supply} = -12V^\dagger, R_L = 10\Omega, t_{w(g)} \geq 20\mu\text{s}$		0.9	2	
V_{TM} Peak On-State Voltage	$I_{TM} = \pm 12A, I_G = 50mA, \text{ See Note 6}$		± 1.6	± 2.1	V
I_H Holding Current	$V_{supply} = +12V^\dagger, I_G = 0, \text{ Initiating } I_{TM} = 100mA$		3	20	mA
	$V_{supply} = -12V^\dagger, I_G = 0, \text{ Initiating } I_{TM} = -100mA$		-4.7	-20	
I_L Latching Current	$V_{supply} = +12V^\dagger, \text{ See Note 7}$			30	mA
	$V_{supply} = -12V^\dagger, \text{ See Note 7}$			-30	
dv/dt Critical Rate of Rise of Off-State Voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_G = 0, T_C = 110^\circ\text{C}$		50		V/ μs
dv/dt(c) Critical Rise of Commutation Voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_{TRM} = \pm 12A, T_C = 70^\circ\text{C}$	1	1.5	4.5	V/ μs

† All voltages are with respect to Main Terminal 1.

NOTES: 6. This parameter must be measured using pulse techniques, $t_w \leq 1\text{ ms}$, 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.

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

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$			2.5	$^\circ\text{C/W}$
$R_{\theta JA}$			62.5	

TIC Devices

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62C 36721 D

T-25-15

TIC225A, TIC225B, TIC225C, TIC225D,
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SILICON TRIACS

TYPICAL CHARACTERISTICS

GATE TRIGGER CURRENT
vs
CASE TEMPERATURE

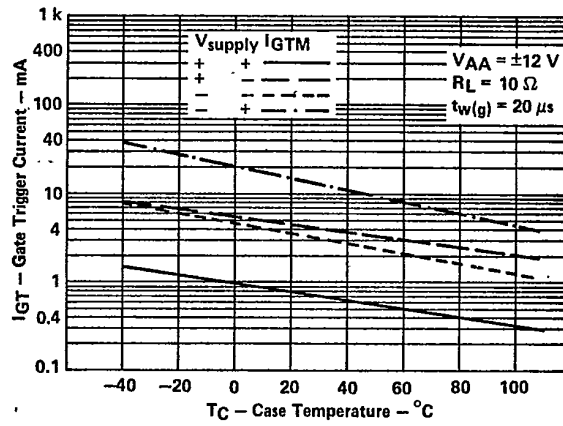


FIGURE 1

GATE TRIGGER VOLTAGE
vs
CASE TEMPERATURE

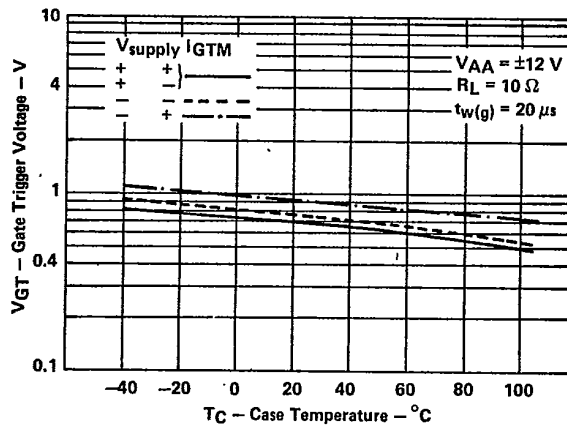


FIGURE 2

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TIC Devices

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62C 36722 D

TIC225A, TIC225B, TIC225C, TIC225D,
TIC225E, TIC225M, TIC225S, TIC225N
SILICON TRIACS

TYPICAL CHARACTERISTICS

T-25-15

HOLDING CURRENT
VS
CASE TEMPERATURE

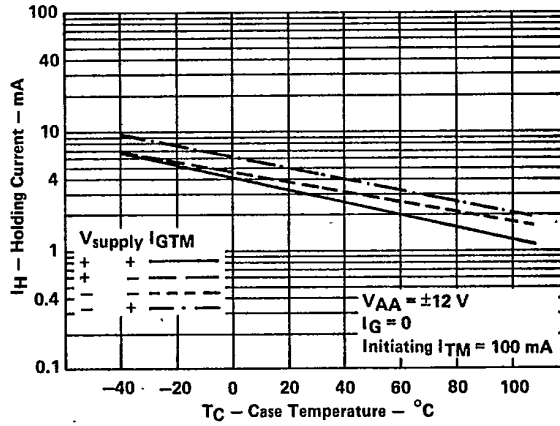


FIGURE 3

GATE FORWARD VOLTAGE
VS
GATE FORWARD CURRENT

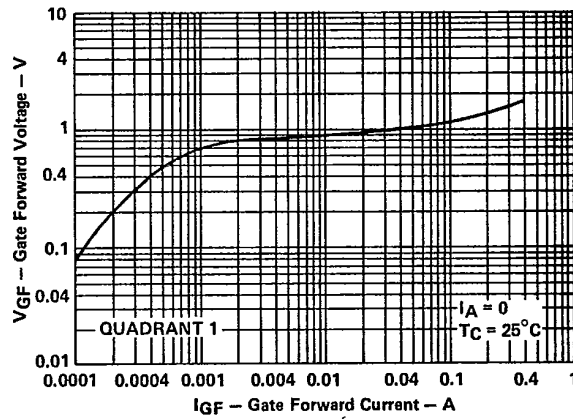


FIGURE 4



TIC Devices

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T-25-15

TIC225A, TIC225B, TIC225C, TIC225D,
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SILICON TRIACS

TYPICAL CHARACTERISTICS

LATCHING CURRENT
vs
CASE TEMPERATURE

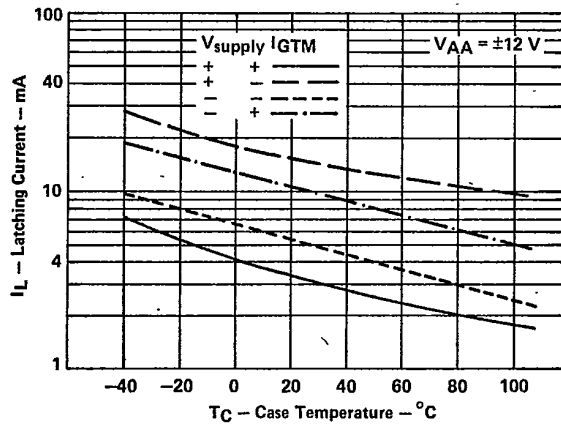


FIGURE 5

THERMAL INFORMATION

SURGE ON-STATE CURRENT
vs
CYCLES OF CURRENT DURATION

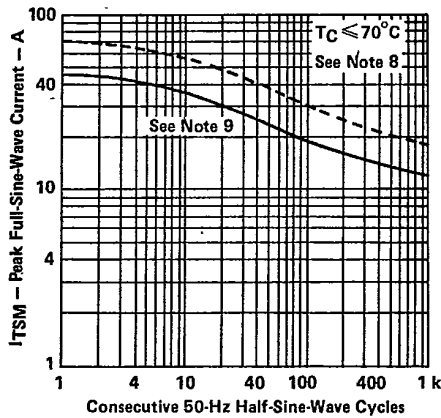


FIGURE 6

MAXIMUM RMS ON-STATE CURRENT
vs
CASE TEMPERATURE

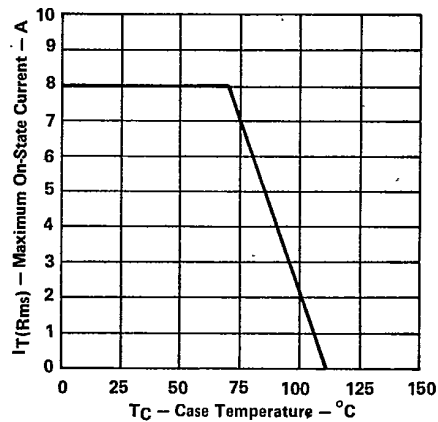


FIGURE 7

- 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 may be lost.
 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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TIC Devices