

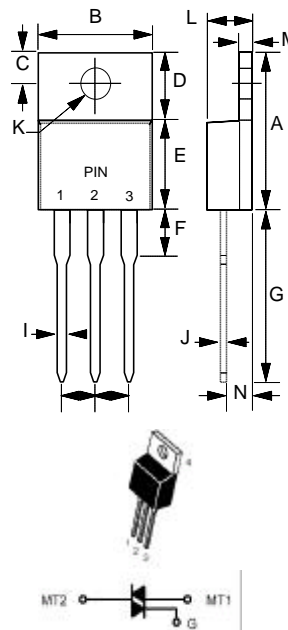
**Sensitive Gate Triacs  
Silicon Bidirectional Thyristors**

**TRIACS  
4 AMPERES RMS  
600 thru 800 VOLTS**

**FEATURES**

- Sensitive Gate Allows Triggering by Microcontrollers and other Logic Circuits
- High Immunity to  $dv/dt$  - 50 V/us Minimum at 125
- Commutating  $di/dt$  - 3.0 A/ms Minimum at 125
- Minimum and Maximum Values of IGT, VGT and IH Specified for Ease of Design
- On-State Current Rating of 4 Amperes RMS at 100
- High Surge Current Capability - 40 Amperes
- Blocking Voltage to 800 Volts
- Rugged, Economical TO220AB Package
- Operational in Three Quadrants: Q1, Q2, and Q3
- Pb-Free Package

**TO-220AB**



TO-220AB		
DIM.	MIN.	MAX.
A	14.22	15.88
B	9.65	10.67
C	2.54	3.43
D	5.84	6.86
E	8.26	9.28
F	-	6.35
G	12.70	14.73
H	2.29	2.79
I	0.51	1.14
J	0.30	0.64
K	3.53 $\varnothing$	4.09 $\varnothing$
L	3.56	4.83
M	1.14	1.40
N	2.03	2.92

All Dimensions in millimeter

PIN ASSIGNMENT	
1	Main Terminal 1
2	Main Terminal 2
3	Gate
4	Main Terminal 2

**MAXIMUM RATINGS** ( $T_J = 25$  unless otherwise noticed)

Rating	Symbol	Value	Unit
Peak Repetitive Off- State Voltage (1) ( $T_J = -40$ to $125$ , Sine Wave, 50 to 60 Hz; Gate Open)	$V_{DRM}$ , $V_{RRM}$	600 800	Volts
On-State RMS Current (Full Cycle Sine Wave 50 to 60 Hz, $T_c = 100$ )	$I_T(RMS)$	4.0	Amp
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, $T_J = 25$ )	$I_{TSM}$	40	Amps
Circuit Fusing Consideration ( $t = 8.3$ ms)	$I^2t$	6.6	$A^2s$
Peak Gate Power ( $T_c = 100$ , $T_p = 1.0$ us)	PGM	0.5	Watt
Average Gate Power ( $T_c = 100$ , $t = 8.3$ ms)	$P_{G(AV)}$	0.1	Watt
Operating Junction Temperature Range	$T_J$	-40 to +125	
Storage Temperature Range	$T_{stg}$	-40 to +150	

Notice: (1)  $V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

REV. 2, Jun-2005, KTXC05

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Value	Unit
Thermal Resistance - Junction to Case - Junction to Ambient	RthJC RthJA	2.2 62.5	$^{\circ}\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	TL	260	

**ELECTRICAL CHARACTERISTICS** ( $T_J=25$  unless otherwise noted; Electrical apply in both directions)

Characteristics	Symbol	Min	Typ	Max	Unit
-----------------	--------	-----	-----	-----	------

**OFF CHARACTERISTICS**

Peak Repetitive Forward or Reverse Blocking Current ( $V_D$ =Rated $V_{DRM}$ , $V_{RRM}$ ; Gate Open)	$T_J=25$	$I_{DRM}$	----	----	10	$\mu\text{A}$
	$T_J=125$	$I_{RRM}$	----	----	2.0	$\text{mA}$

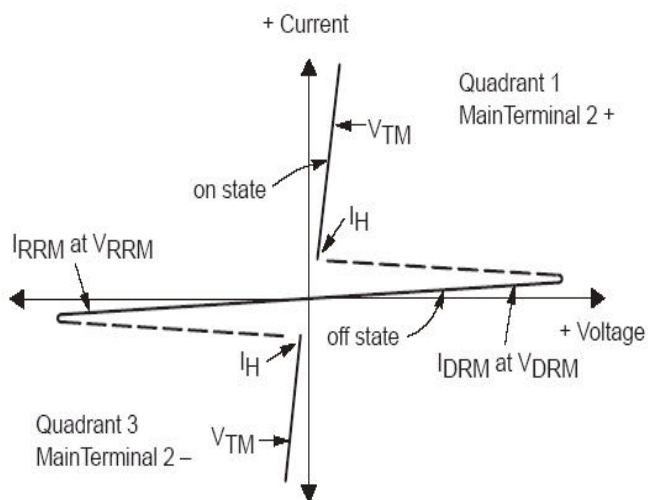
**ON CHARACTERISTICS**

Peak On-State Voltage ( $I_{TM}=\pm 6\text{A}$ Peak @ $T_p$ 2.0 ms, Duty Cycle 2%)	$V_{TM}$	----	1.3	1.6	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12\text{V}$ ; $R_L = 100\ \Omega$ )	$I_{GT1}$	2.9	4.0	10	$\text{mA}$
	$I_{GT2}$	2.9	4.7	10	
	$I_{GT3}$	2.9	6.0	10	
Gate Trigger Voltage (Continuous dc) ( $V_D = 12\text{V}$ ; $R_L = 100\ \Omega$ )	$V_{GT1}$	0.5	0.70	1.3	Volts
	$V_{GT2}$	0.5	0.65	1.3	
	$V_{GT3}$	0.5	0.70	1.3	
Latching Current ( $V_D = 12\text{V}$ , $I_G = 10\ \text{mA}$ )	$I_{L1}$	----	6.0	30	$\text{mA}$
	$I_{L2}$	----	15	30	
	$I_{L3}$	----	6.0	30	
Holding Current ( $V_D = 12\text{V}$ , Initiating Current = $\pm 200\ \text{mA}$ , Gate Open)	$I_H$	2.0	5.0	15	$\text{mA}$

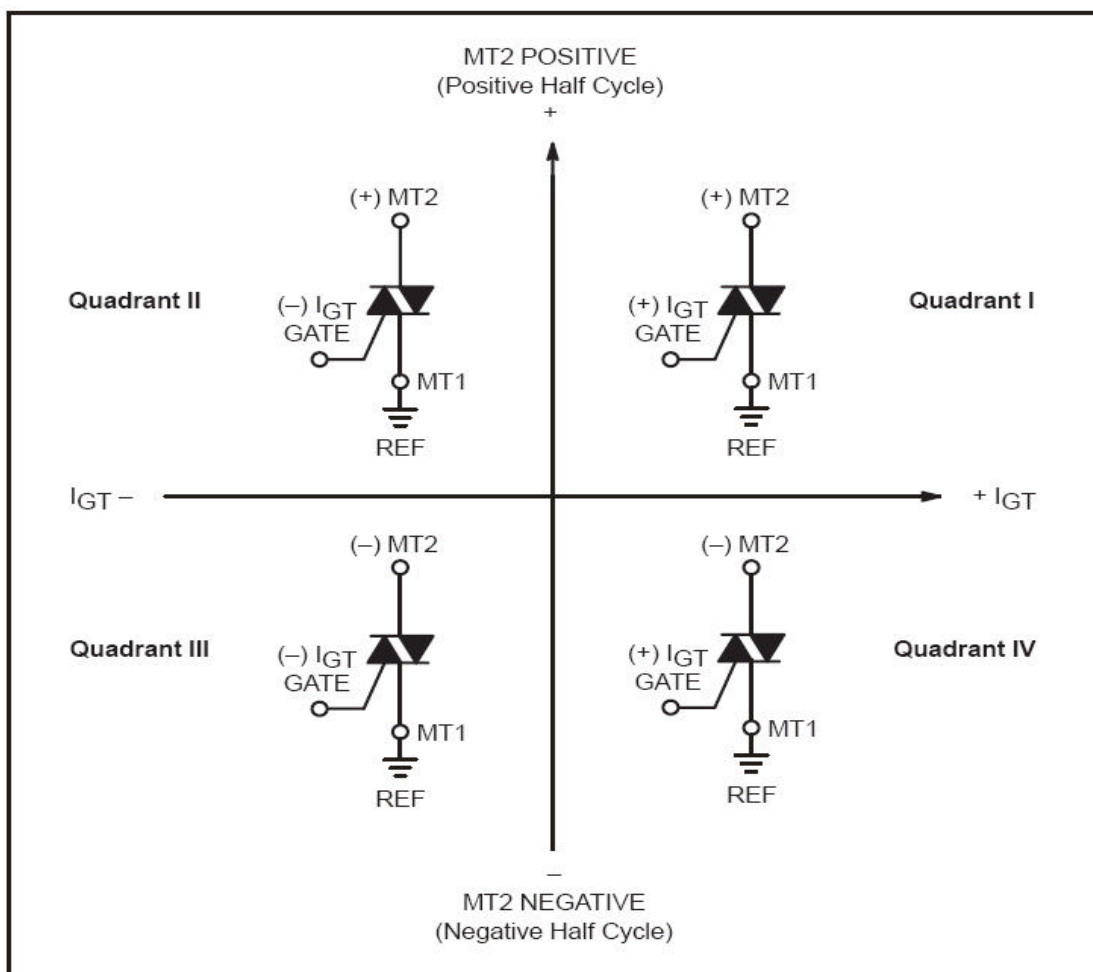
**DYNAMIC CHARACTERISTICS**

Critical Rate of Rise of Off-State Voltage ( $V_D=0.67 \times$ Rated $V_{DRM}$ , Exponential Waveform, Gate Open, $T_J=125$ )	$dv/dt$	50	150	----	$\text{V}/\mu\text{s}$
Repetitive Critical Rate of Rise of On-State Current $I_{PK} = 50\ \text{A}$ ; $PW = 40\ \mu\text{sec}$ ; $di_G/dt = 200\ \text{mA}/\mu\text{sec}$ ; $f = 60\ \text{Hz}$	$di/dt$	----	----	10	$\text{A}/\mu\text{s}$
Rate of Change of Commutating Current ( $V_D = 400\ \text{V}$ , $I_{TM} = 3.5\ \text{A}$ , Commutating $dv/dt = 10\ \text{V}/\mu\text{s}$ , Gate Open, $T_J = 125$ , $f = 500\ \text{Hz}$ , $C_L = 5.0\ \mu\text{F}$ , $L_L = 20\ \text{mH}$ , No Snubber)	$(di/dt)_c$	3.0	4.0	----	$\text{A}/\text{ms}$

Symbol	Parameter
$V_{DRM}$	Peak Repetitive Forward Off State Voltage
$I_{DRM}$	Peak Forward Blocking Current
$V_{RRM}$	Peak Repetitive Reverse Off State Voltage
$I_{RRM}$	Peak Reverse Blocking Current
$V_{TM}$	Maximum On State Voltage
$I_H$	Holding Current

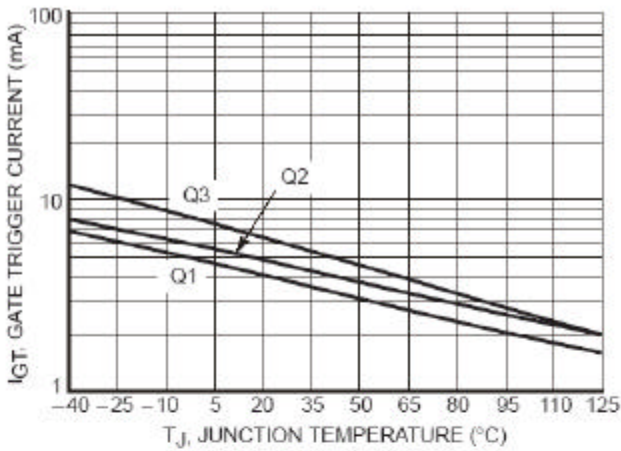


### Quadrant Definitions

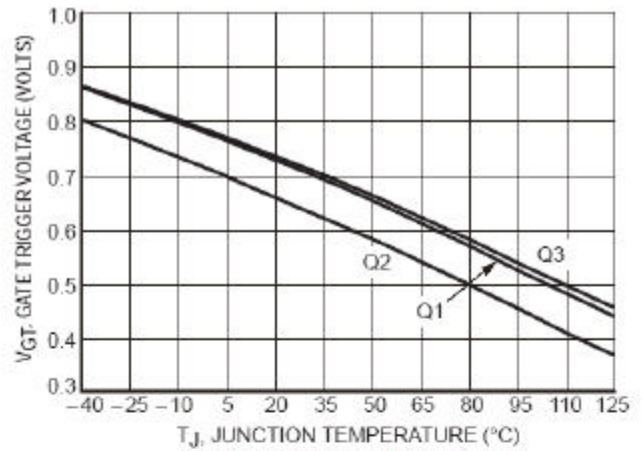


All polarities are referenced to MT1

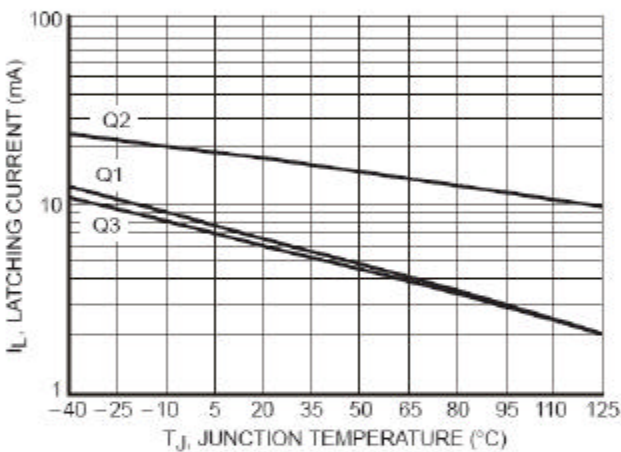
Whith in -phase signal (using standard AC lines) quadrants I and III are used



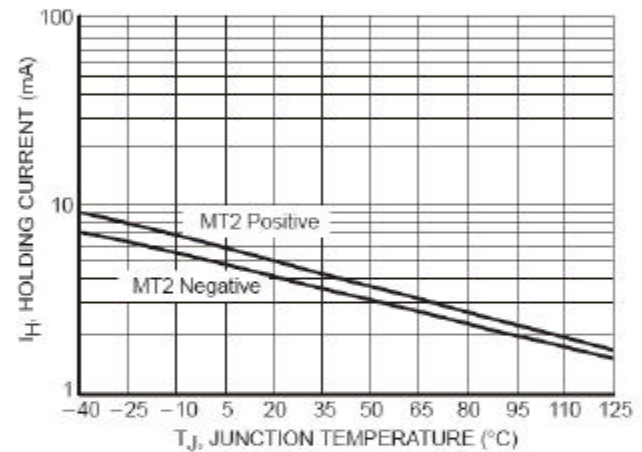
**Figure 1. Typical Gate Trigger Current versus Junction Temperature**



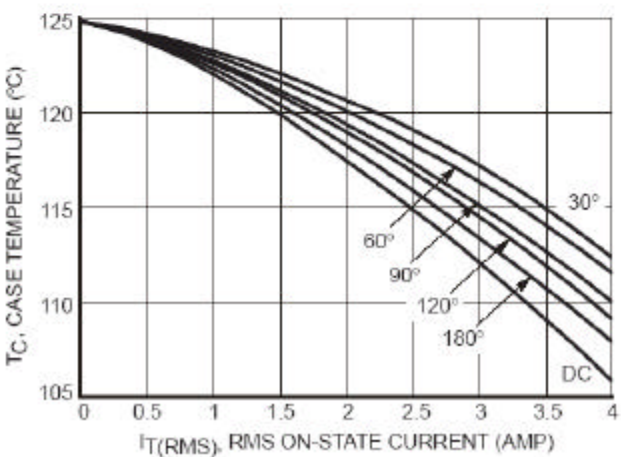
**Figure 2. Typical Gate Trigger Voltage versus Junction Temperature**



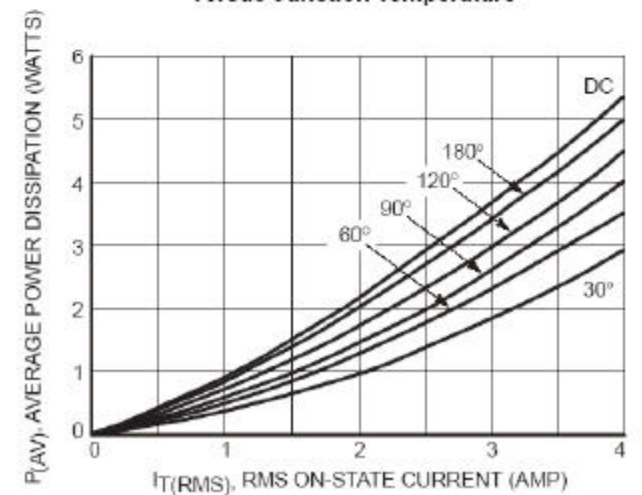
**Figure 3. Typical Latching Current versus Junction Temperature**



**Figure 4. Typical Holding Current versus Junction Temperature**



**Figure 5. Typical RMS Current Derating**



**Figure 6. On-State Power Dissipation**

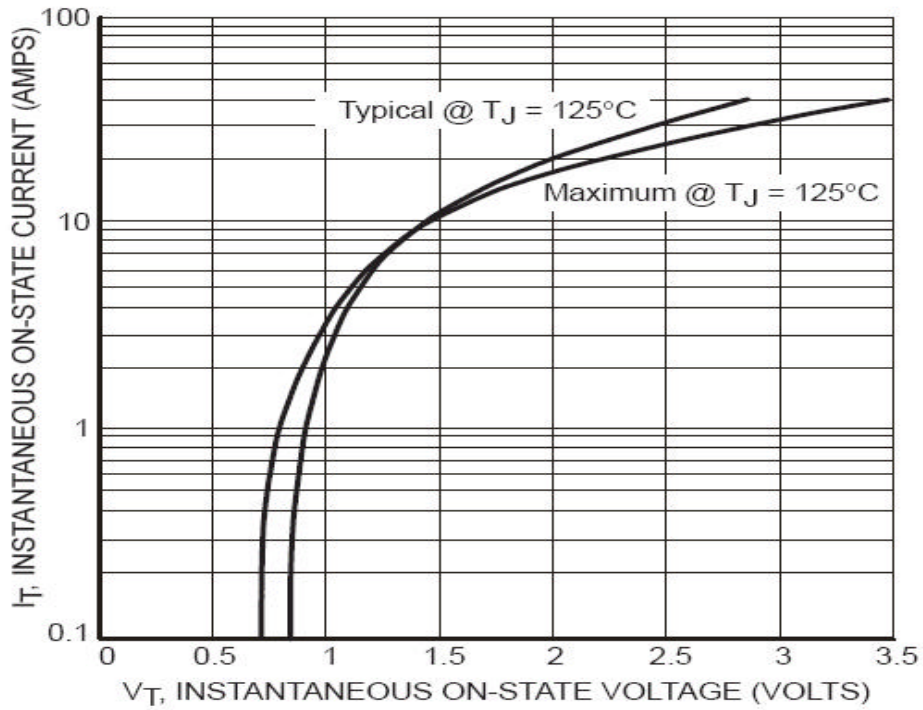


Figure 7. Typical On-State Characteristics

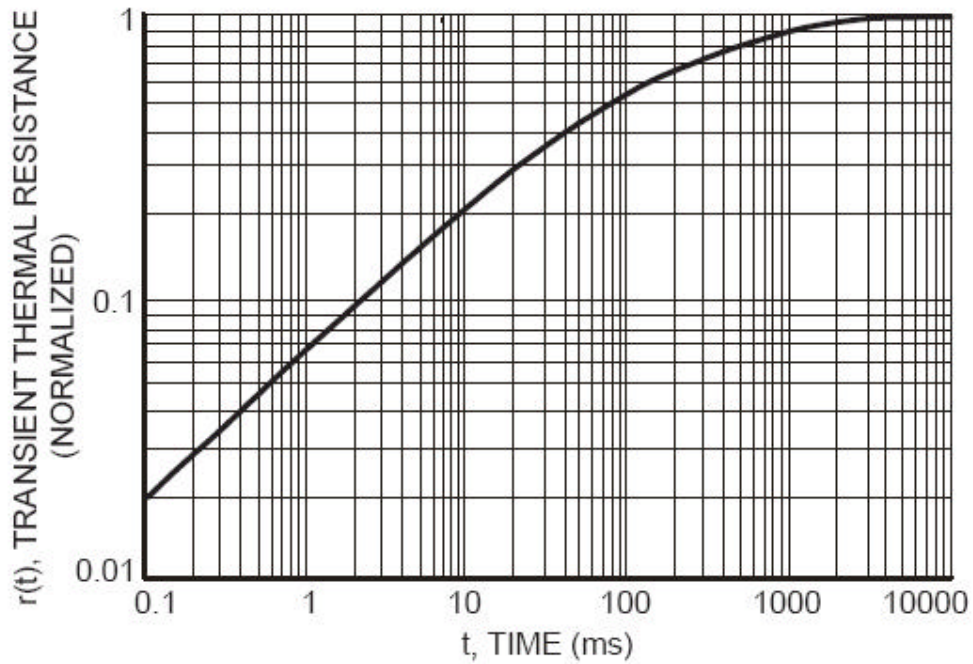


Figure 8. Typical Thermal Response