

**Sensitive Gate Triacs  
Silicon Bidirectional Thyristors**

**TRIACS  
12 AMPERES RMS  
600 VOLTS**

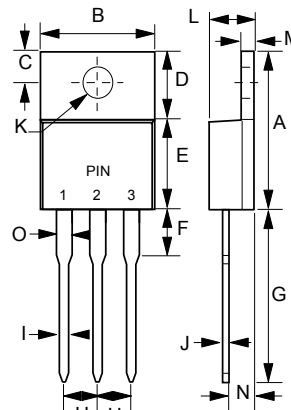
**FEATURES**

- Sensitive Gate Allows Triggering by Microcontrollers and other
- Blocking Voltage to 600 Volts
- High Surge Current Capability - 90 Amperes
- Glass Passivated Junctions for Reliability and Uniformity
- Maximum Values of IGT, VGT and IH Specified for Ease of Design
- Operational in Three Quadrants: Q1, Q2, and Q3
- Pb Free Package

**MECHANICAL DATA**

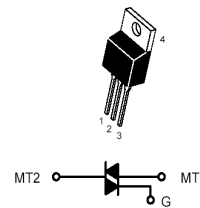
- Case: Molded plastic
- Weight: 0.07 ounces, 2.0 grams

**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	0.40	0.67
K	3.53 Ø	4.09 Ø
L	3.56	4.83
M	1.14	1.40
N	2.03	2.92
O	1.17	1.37

All Dimensions in millimeter



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

**MAXIMUM RATINGS** (Tj= 25°C unless otherwise noticed)

Rating	Symbol	Value	Unit
Peak Repetitive Off- State Voltage (1) (Tj= -40 to 110°C, Sine Wave, 50 to 60 Hz; Gate Open)	V <sub>DRM</sub> , V <sub>RRM</sub>	600	Volts
T12M5T600B			
On-State RMS Current (Full Cycle Sine Wave 50 to 60 Hz, Tc =70°C)	I <sub>T(RMS)</sub>	12	Amp
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, Tj= 25°C)	I <sub>TSM</sub>	90	Amps
Circuit Fusing Consideration (t = 8.3 ms)	I <sup>2</sup> t	33	A <sup>2</sup> s
Peak Gate Power (Tc = 70°C, Tp ≤1.0 us)	P <sub>GM</sub>	16	Watt
Average Gate Power (Tc = 70°C, t = 8.3 ms)	P <sub>G(AV)</sub>	0.35	Watt
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +110	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

Notice: (1) V<sub>DRM</sub> and V<sub>RRM</sub> 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. 4, Oct-2010,KTXC23

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Value	Unit
Thermal Resistance - Junction to Case - Junction to Ambient	R <sub>thJC</sub> R <sub>thJA</sub>	2.2 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	TL	260	°C

**ELECTRICAL CHARACTERISTICS** (T<sub>J</sub>=25°C unless otherwise noted; Electrical apply in both directions)

Characteristics	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Peak Repetitive Forward or Reverse Blocking Current (V <sub>D</sub> =Rated V <sub>DRM</sub> , V <sub>RRM</sub> ; Gate Open)	T <sub>J</sub> =25°C T <sub>J</sub> =110°C	I <sub>DRM</sub> I <sub>RRM</sub>	----	----	10 2.0	uA mA
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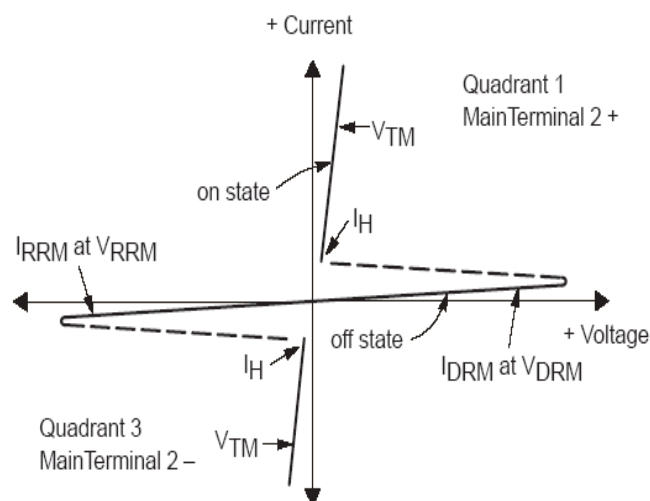
**ON CHARACTERISTICS**

Peak On-State Voltage (I <sub>TM</sub> =± 17A Peak @T <sub>p</sub> ≤ 2.0 ms, Duty Cycle ≤ 2%)	V <sub>TM</sub>	----	----	1.85	Volts
Gate Trigger Current (V <sub>D</sub> = 12V; R <sub>L</sub> = 100 Ohms)	I <sub>GT1</sub> I <sub>GT2</sub> I <sub>GT3</sub>	----	1.5 2.5 2.7	5.0 5.0 5.0	mA
Gate Trigger Voltage (V <sub>D</sub> = 12 V; R <sub>L</sub> =100 Ohms)	V <sub>GT1</sub> V <sub>GT2</sub> V <sub>GT3</sub>	0.45 0.45 0.45	0.68 0.62 0.67	1.5 1.5 1.5	Volts
Holding Current (V <sub>D</sub> = 12 V, Initiating Current = ± 200 mA, Gate Open)	I <sub>H</sub>	----	2.5	10	mA
Latching Current (V <sub>D</sub> = 12 V, I <sub>G</sub> = 5 mA)	I <sub>L1</sub> I <sub>L2</sub> I <sub>L3</sub>	----	3.0 5.0 3.0	15 20 15	mA

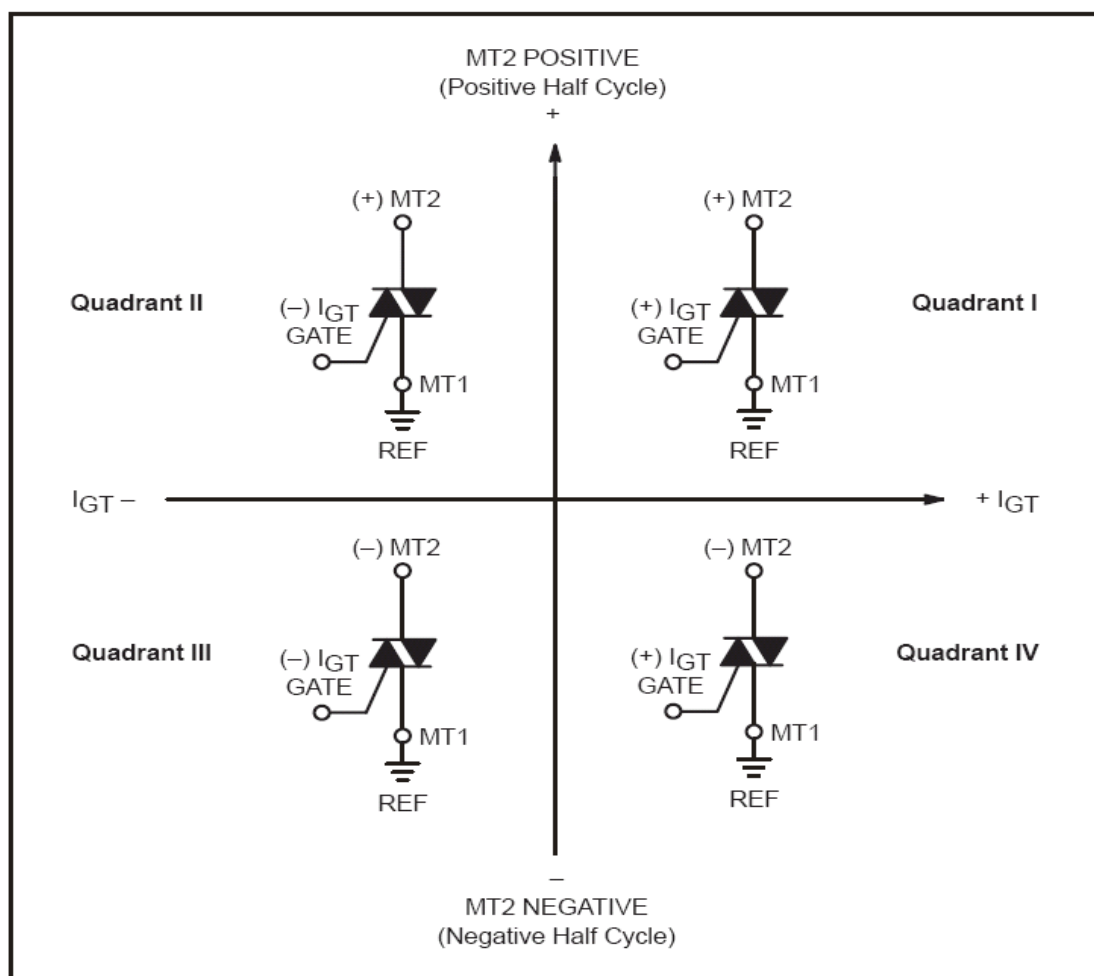
**DYNAMIC CHARACTERISTICS**

Rate of Change of Commutating Current (V <sub>D</sub> = 400 V, I <sub>TM</sub> = 3.5A, Commutating dv/dt = 10 V/us, Gate Open, T <sub>J</sub> = 110°C, f = 500 Hz, C <sub>s</sub> = 0.01 uF, R <sub>s</sub> = 15 Ohms)	di/dt(c)	8.0	10	----	A/ms
Critical Rate of Rise of Off-State Voltage (V <sub>D</sub> = 67% Rated V <sub>DRM</sub> , Exponential Waveform, R <sub>GK</sub> =1K Ohms, T <sub>J</sub> =110°C)	dv/dt	15	40	----	V/us
Repetitive Critical Reat of Rise of On-State Current (I <sub>PK</sub> = 50A; PW = 40 usec; diG/dt = 1A/usec; Igt = 100mA; f= 60Hz)	di/dt	----	----	10	A/us

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



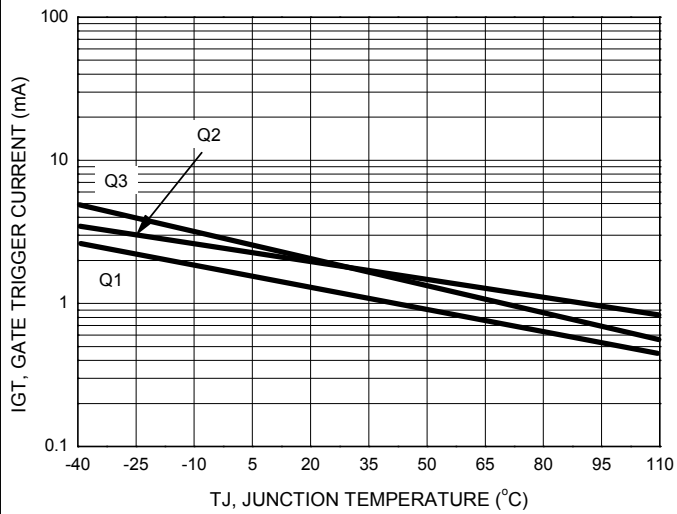
## Quadrant Definitions



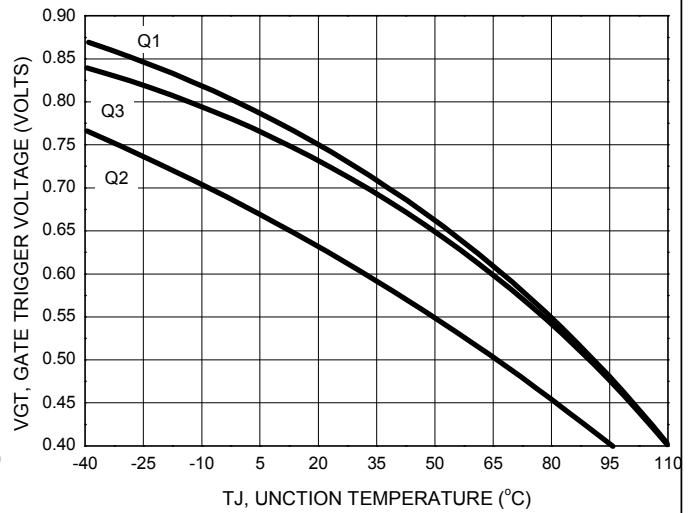
All polarities are referenced to MT1

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

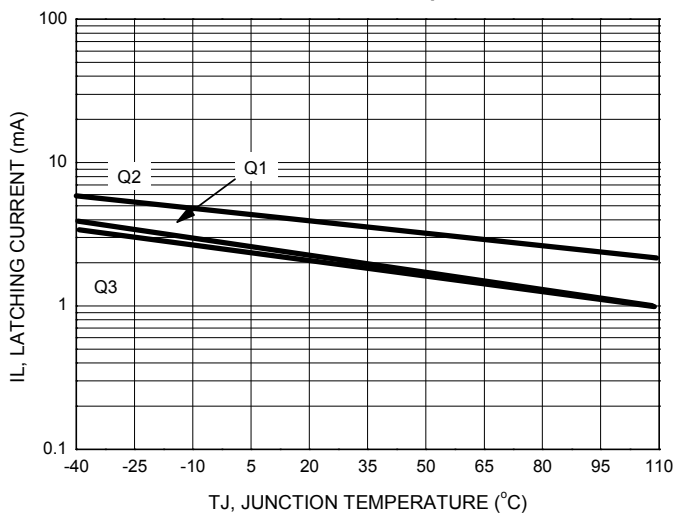
**Figure 1. Typical Gate Trigger Current versus Junction Temperature**



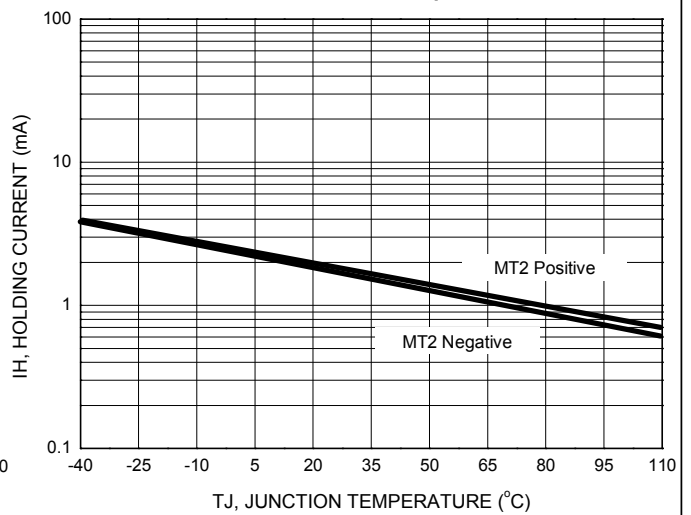
**Figure 2. Typical Gate Trigger Voltage versus Junction Temperature**



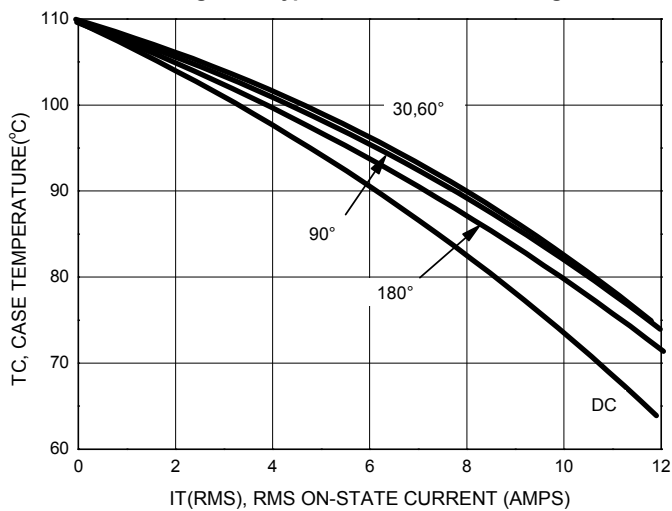
**Figure 3. Typical Latching Current versus Junction Temperature**



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



**Figure 5. Typical RMS Current Derating**



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

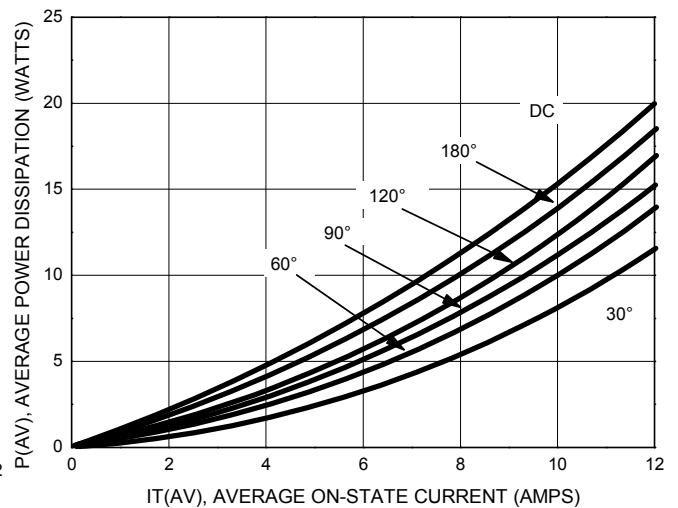


Figure 7. Typical On-State Characteristics

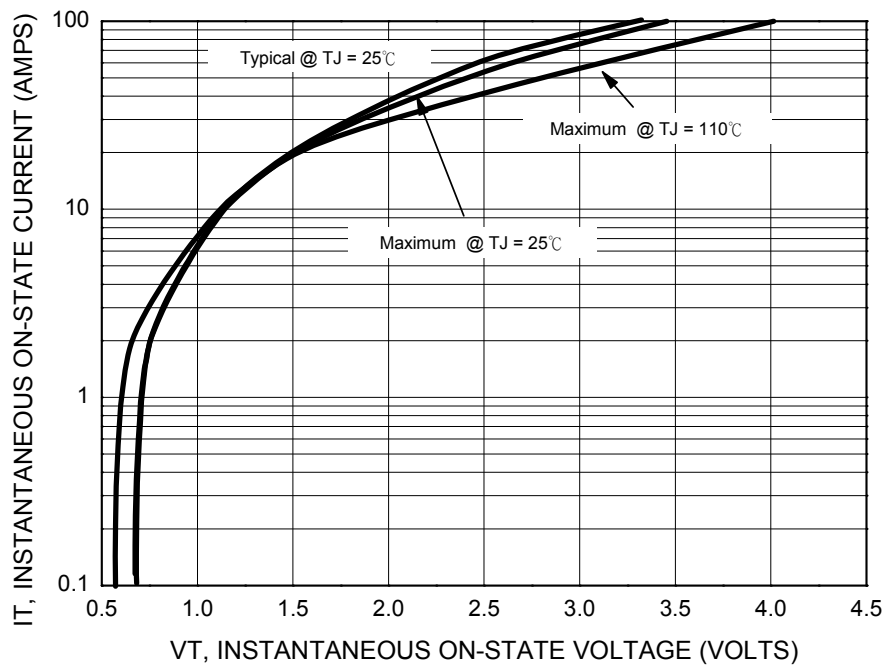
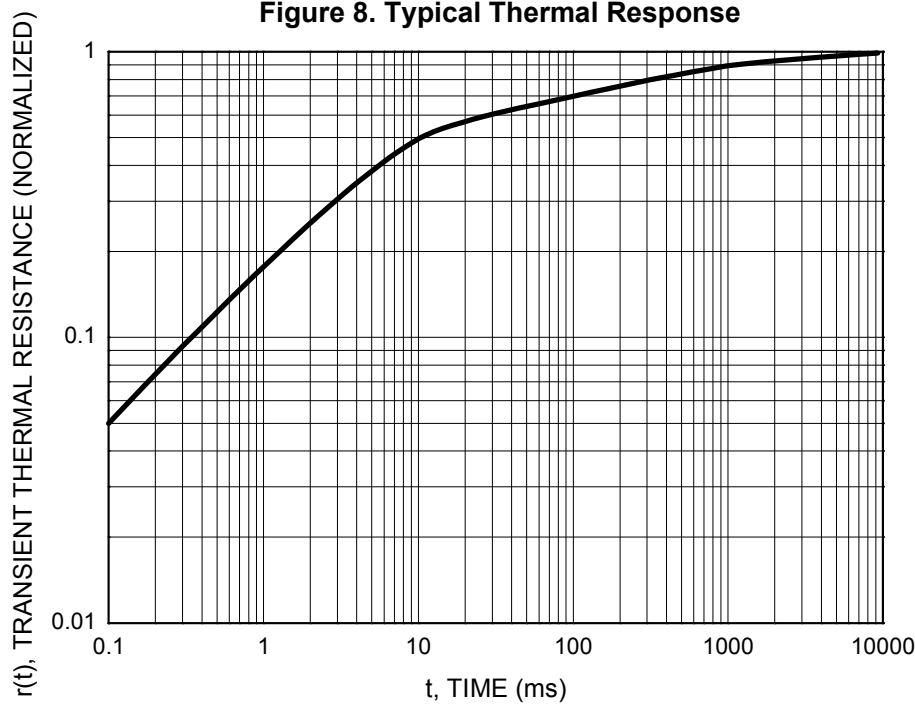


Figure 8. Typical Thermal Response



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