

**Triacs**  
**Silicon Bidirectional Thyristors**

**TRIACS**  
**12 AMPERES RMS**  
**600 VOLTS**

**FEATURES**

- Blocking Voltage to 600 Volts
- Uniform Gate Trigger Currents in Three Quadrants, Q1, Q2, and Q3
- High Immunity to  $dv/dt$  — 400 V/us Min. at 125°C
- High Surge Current Capability — 100 Amperes
- 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 $\varnothing$	4.09 $\varnothing$
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** (T<sub>J</sub>= 25°C unless otherwise noticed)

Rating	Symbol	Value	Unit
Peak Repetitive Off- State Voltage (1) (T <sub>J</sub> = -40 to 110°C, Sine Wave, 50 to 60 Hz; Gate Open)	V <sub>DRM</sub> , V <sub>RRM</sub>	600	Volts
On-State RMS Current (T <sub>C</sub> = +70°C) Full Cycle Sine Wave 50 to 60 Hz	I <sub>T(RMS)</sub>	12	Amp
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, T <sub>J</sub> = +25°C) Preceded and followed by rated current.	I <sub>TSM</sub>	100	Amps
Circuit Fusing Consideration (t = 8.3 ms)	I <sup>2</sup> t	41	A <sup>2</sup> s
Peak Gate Power (T <sub>C</sub> = +80°C, T <sub>p</sub> ≤ 1.0 us)	P <sub>GM</sub>	16	Watt
Average Gate Power (T <sub>C</sub> = +80°C, t=8.3 ms)	P <sub>G(AV)</sub>	0.35	Watt
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +125	°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. 5, Oct-2010,KTXC24

**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	IDRM	----	----	0.01	mA
	T <sub>J</sub> =125°C	IRRM	----	----	2.0	

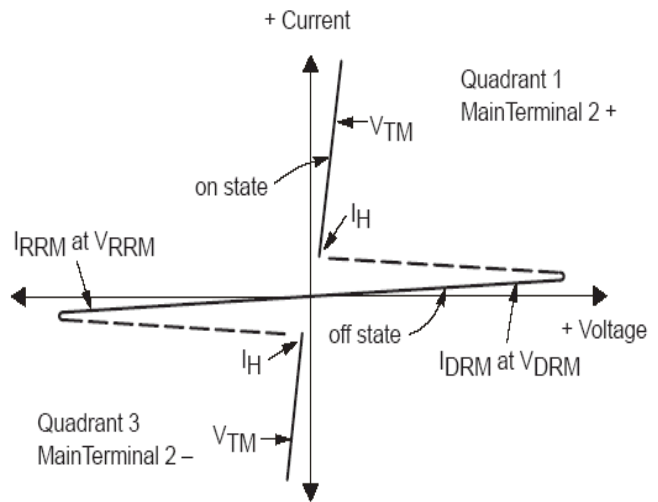
**ON CHARACTERISTICS**

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> = 12Vdc; R <sub>L</sub> = 100 Ohms)	I <sub>GT1</sub>	5.0	13	35	mA
	I <sub>GT2</sub>	5.0	13	35	
	I <sub>GT3</sub>	5.0	13	35	
Gate Trigger Voltage (V <sub>D</sub> = 12 Vdc; R <sub>L</sub> =100 Ohms)	V <sub>GT1</sub>	0.5	0.78	1.5	Volts
	V <sub>GT2</sub>	0.5	0.70	1.5	
	V <sub>GT3</sub>	0.5	0.71	1.5	
Holding Current (V <sub>D</sub> = 12 V, Initiating Current = ± 150 mA, Gate Open)	I <sub>H</sub>	----	20	40	mA
Latching Current (V <sub>D</sub> = 24 V, I <sub>G</sub> = 35 mA)	I <sub>L</sub>	----	20	50	mA
		----	30	80	
		----	20	50	

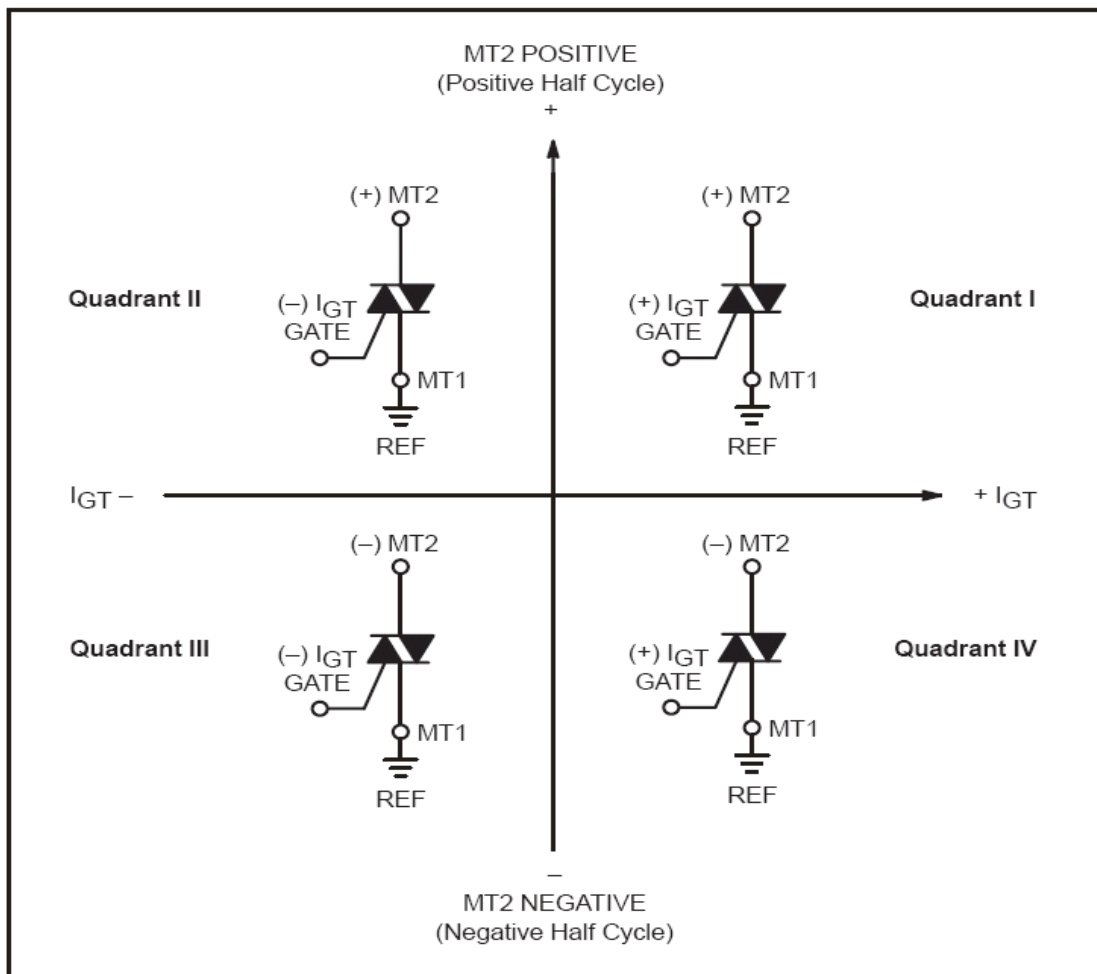
**DYNAMIC CHARACTERISTICS**

Critical Rate of Change of Commutation Current (V <sub>D</sub> = Rated V <sub>DRM</sub> , I <sub>TM</sub> = 4.4 A, Commutating dv/dt = 18 V/ms, Gate Unenergized, T <sub>J</sub> = 125°C, f = 250 Hz, No Snubber)	di/dt(c)	6.5	----	----	A/ms
Critical Rate of Rise of Commutation Voltage (V <sub>D</sub> = 67% V <sub>DRM</sub> , Exponential Waveform, Gate Open, T <sub>J</sub> = 125°C)	dv/dt	400	----	----	V/us
Repetitive Critical Rate of Rise of On-State Current (I <sub>PK</sub> = 50 A; P <sub>W</sub> = 40 usec; diG/dt = 0.2 A/usec; f = 60 Hz)	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

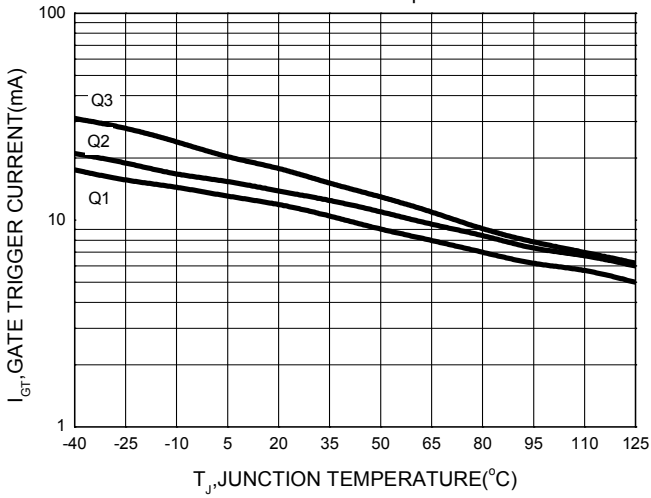


Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

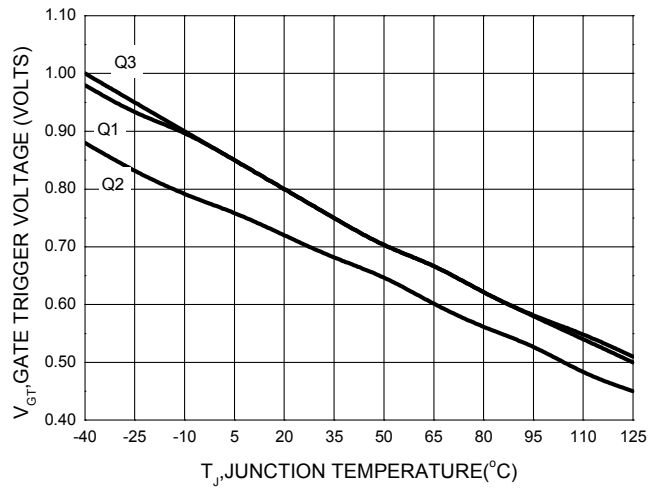


Figure 3. Typical Holding Current versus Junction Temperature

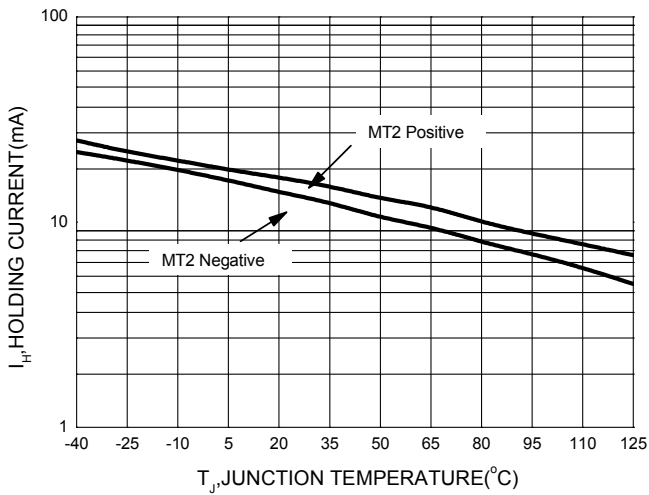


Figure 4. Typical Latching Current versus Junction Temperature

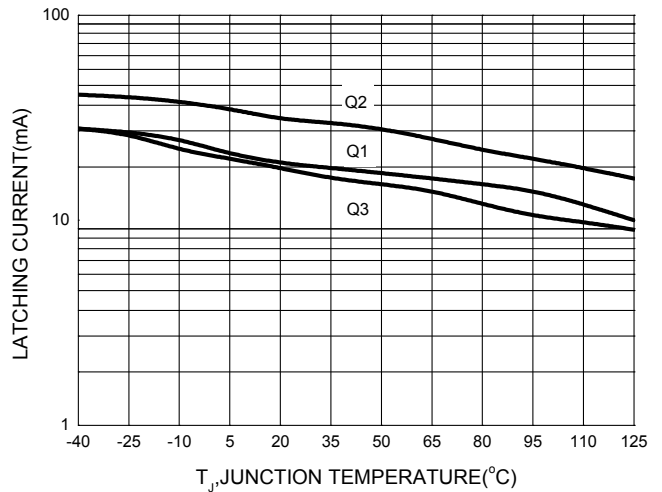


Figure 5. Typical RMS Current Derating

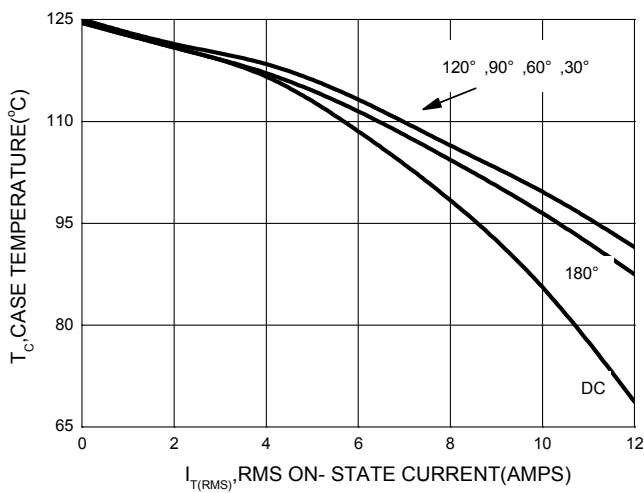


Figure 6. On-State Power Dissipation

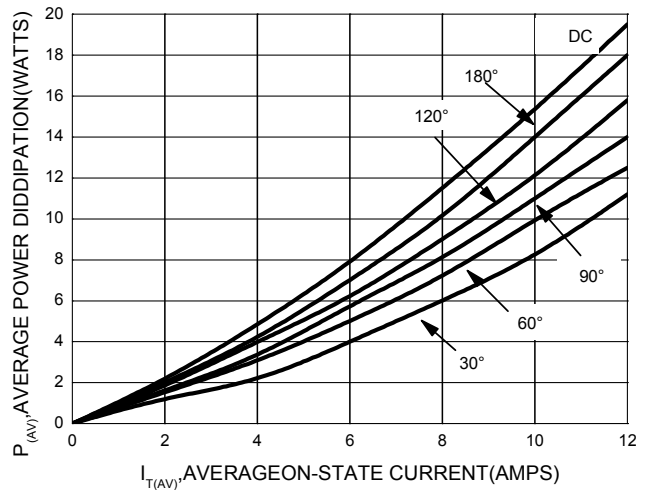


Figure 7. Typical On-State Characteristics

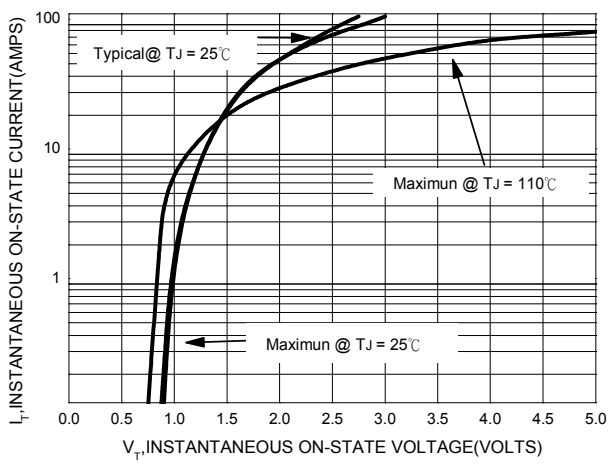
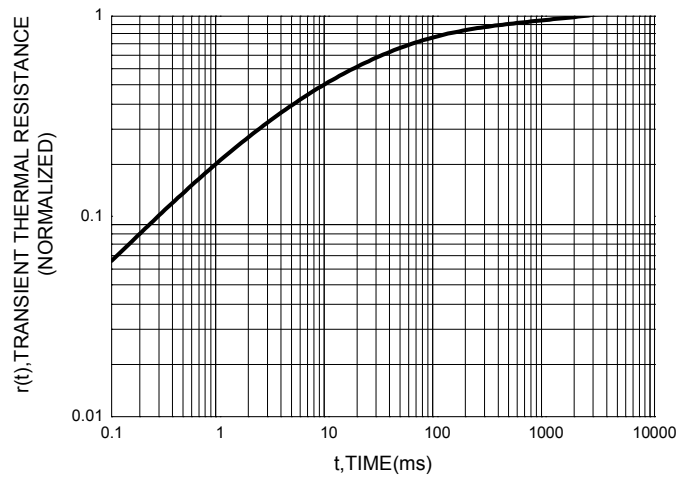


Figure 8. Typical Thermal Response



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