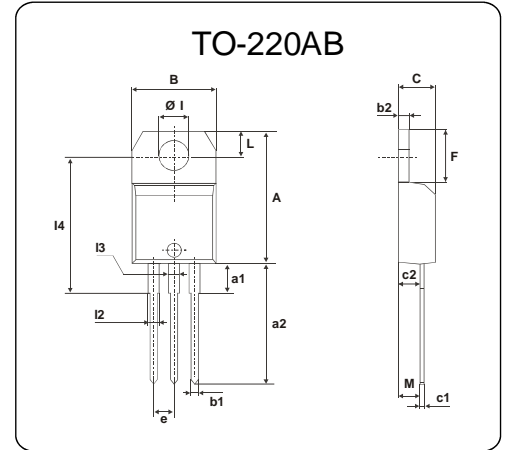


Bi-Directional Triode Thyristor

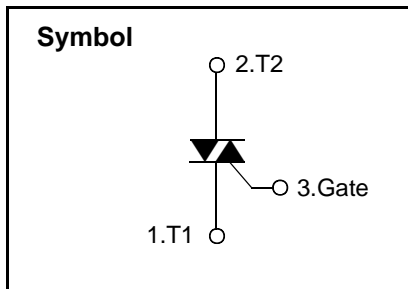
Designed for high performance full-wave ac control applications where high noise immunity and high commutating di/dt are required.

Features

- Blocking Voltage to 800 V
- On- State Current Rating of 16A RMS at 80 °C
- Uniform Gate Trigger Currents in Three Quadrants
- High Immunity to dV/dt- 1500V/us minimum at 125 °C
- Minimizes Snubber Networks for Protection
- Industry Standard TO- 220AB Package
- High Commutating dI/dt- 4.0A/ms minimum at 125 °C
- Internally Isolated (2500VRMS)
- These are Pb- Free Devices



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
I _{T(RMS)}	RMS on-state current(full sine wave)	TO-220AB TC=100°C	16 A
		TO-220AB Ins. TC=85°C	
I _{TSM}	Non repetitive surge peak on-state current(full cycle, T _j initial=25°C)	F=50Hz t=20ms	160 A
		F=60Hz t=16.7ms	
I ² t	I ² t Value for fusing	tp=10ms	144 A ² s
DI/DT	Critical rate of rise of on-state current IG=2XIGT, trs<100ns	F=120Hz Tj=125°C	50 A/us
VDSM/V RSM	Non repetitive surge peak off-state voltage	tp=10ms Tj=25°C	Vdrm / vrrm + 100V V
IGM	Peak gate current	tp=20us Tj=125°C	4 A
P _{G(AV)}	Average gate power dissipation	Tj=125°C	1 W
T _{stg}	Storage junction temperature range		-40 to +150 °C
T _j	Operating junction temperature range		-40 to +125 °C

Electrical Characteristics (T_j=25°C, unless otherwise specified)

Snubberless™ and Logic Level(3 quadrants)

Symbol	Test conditions	Quadrant	BTA16		Unit
I _{GT} (1)	V _D =12V R _L =33Ω	I - II - III	MAX	50	mA
V _{GT}		I - II - III	MAX	1.3	V
V _{GD}	V _D =V _{DRM} R _L =3.3KΩT _j =125°C	I - II - III	MIN	0.2	V
I _H (2)	I _T =500mA		MAX	50	mA
I _L	I _G =1.2I _{GT}	I - III	MAX	70	mA
		II		80	
Dv / Dt(2)	V _D =67%V _{DRM} Gate open T _j =125°C		MIN	1000	V/us
(DI/dt)c(2)	(Dv/dt) _c =0.1 V/us T _j =125°C		MIN	-	A/ms
	(Dv/dt) _c =10V/us T _j =125°C			-	
	Without snubber T _j =125°C			14	

Standard (4 Quadrants)

Symbol	Test conditions	Quadrant	BTA16		Unit
I _{GT} (1)	V _D =12V R _L =33Ω	I - II - III	MAX	50	mA
		IV		100	
V _{GT}		ALL	MAX	1.3	V
V _{GD}	V _D =V _{DRM} R _L =3.3KΩT _j =125°C	ALL	MIN	0.2	V
I _H (2)	I _T =500mA		MAX	50	mA
I _L	I _G =1.2I _{GT}	I - III - IV	MAX	60	mA
		II		120	
(DI/dt)(2)	V _D =67%V _{DRM} Gate open T _j =125°C		MIN	400	V/us
(DI/dt)c(2)	(Dv/dt) _c =7 A/ms T _j =125°C		MIN	10	V/us

Static Characteristics

Symbol	Test conditions			Value	Unit
V _{TM} (2)	I _{TM} =22A t _p =380us	T _J =25°C	MAX	1.55	V
V _{to} (2)	Threshold voltage	T _J =125°C	MAX	0.85	V
R _d (2)	Dynamic resistance	T _J =125°C	MAX	25	mΩ
I _{DRM}	V _{DRM} =V _{R_{RM}}	T _J =25°C		5	uA
I _{R_{RM}}		T _J =125°C	MAX	2	mA
V _{DRM} /V _{R_{RM}}	Voltage	T _J =25°C	MIN	600 and 800	V

Note 1: minimum I_{GT} is guaranteed at 5% of I_{GT} max

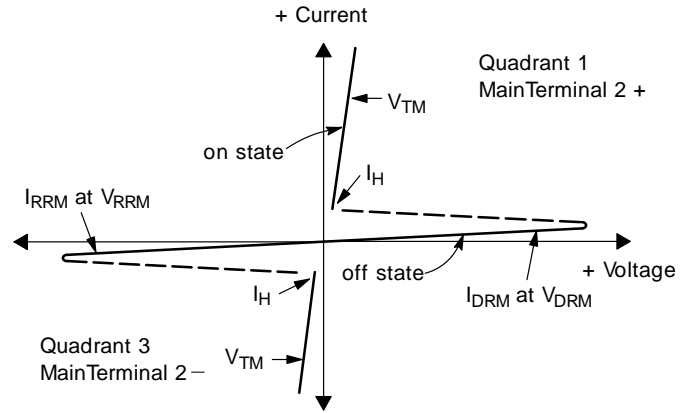
Note 2: for both polarities of A2 referenced to A1

Thermal Resistances

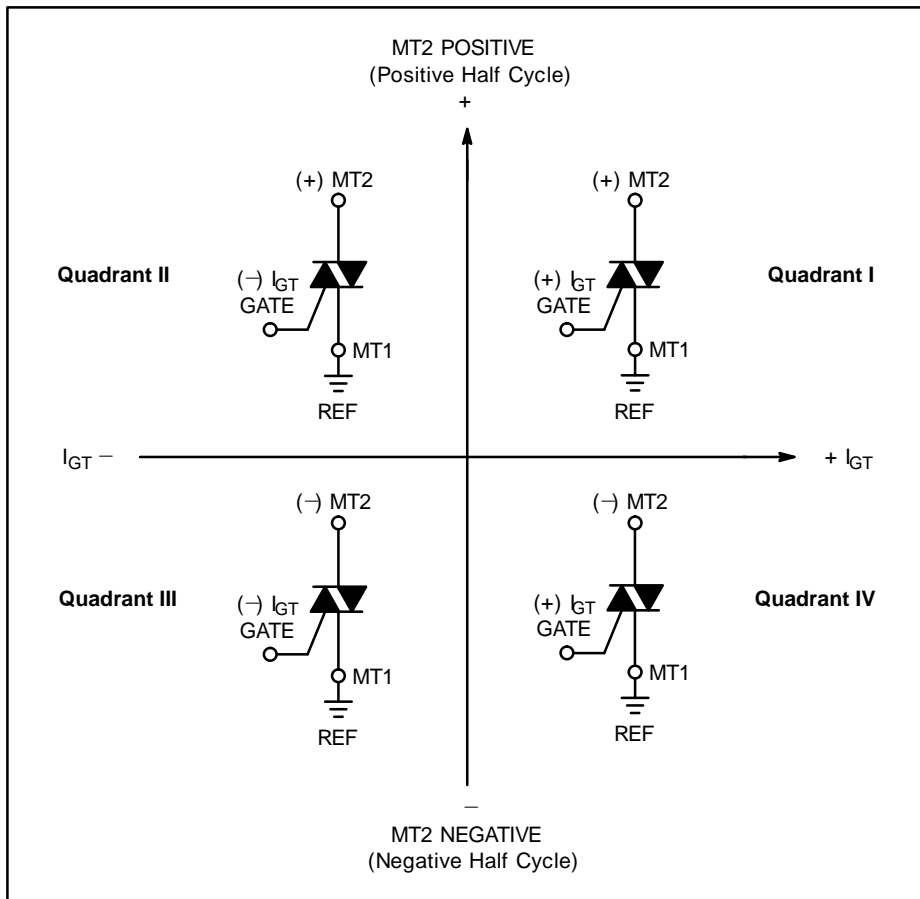
Symbol	Parameter		Value	Unit
R _{th(j-c)}	Junction to case(AC)	TO-220AB	1.2	°C/W
		TO-220AB(Insulated)	2.1	
R _{th(j-a)}	Junction to ambient	TO-220AB/ TO-220AB(Insulated)	60	°C/W

Voltage Current Characteristic of Triacs (Bidirectional Device)

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 for a Triac



All polarities are referenced to MT1.
With in-phase signals (using standard AC lines) quadrants I and III are used.

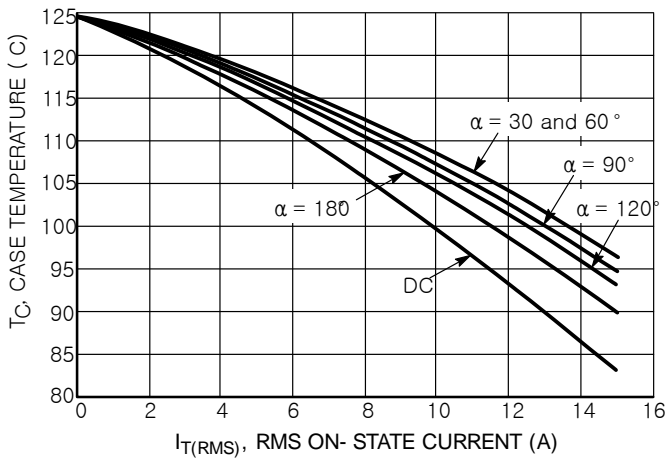


Figure 1. RMS Current Derating

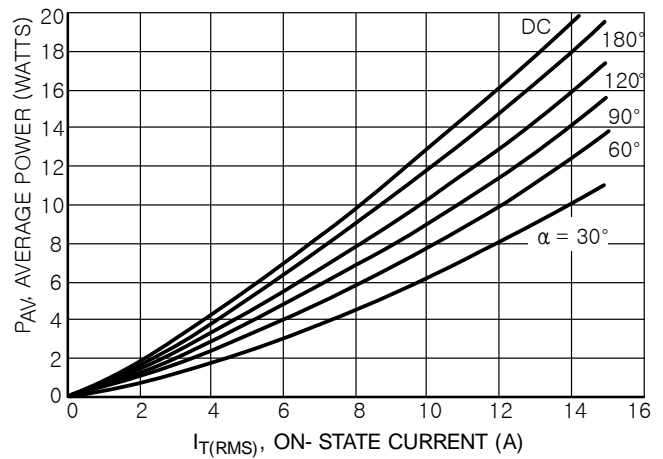


Figure 2. On-State Power Dissipation

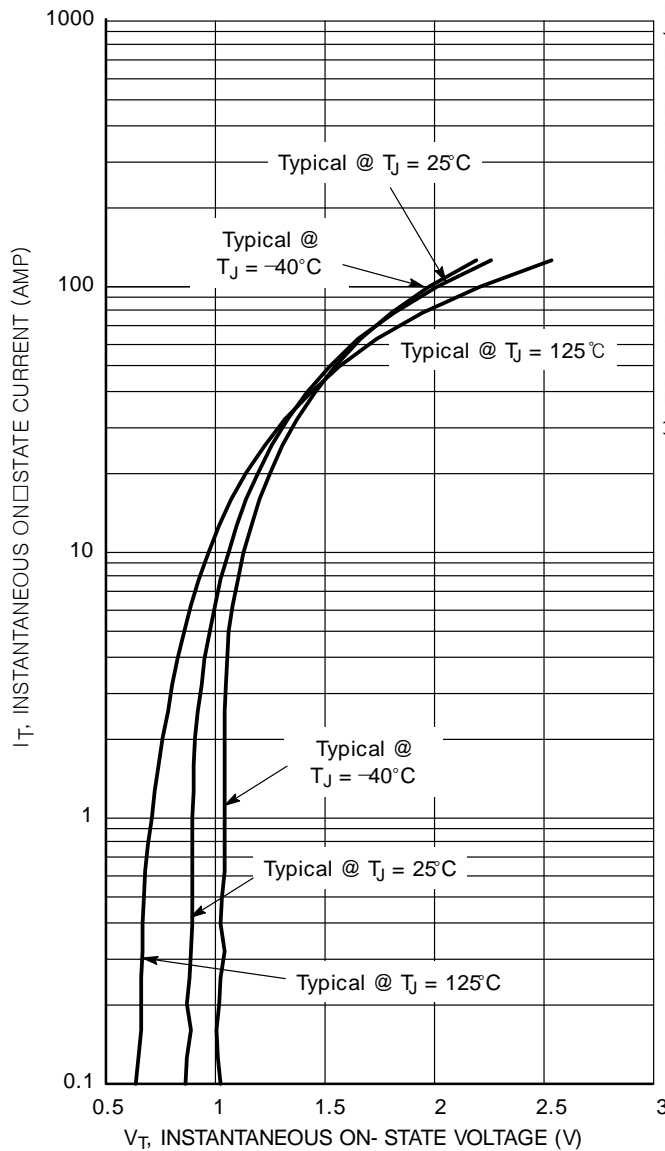


Figure 3. On-State Characteristics

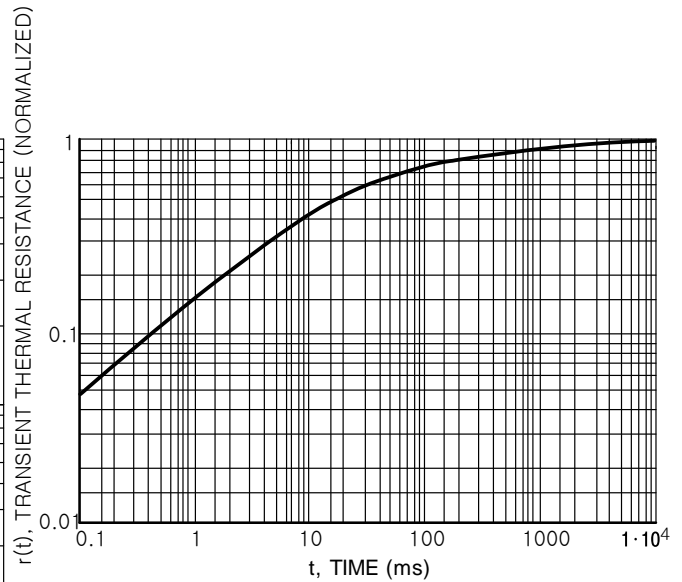


Figure 4. Thermal Response

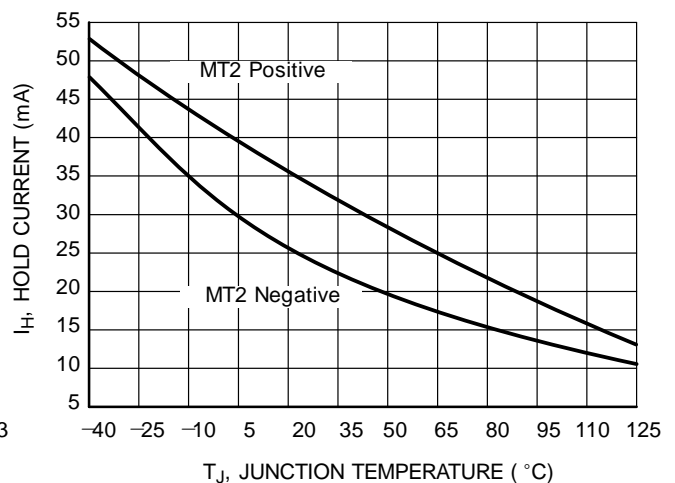


Figure 5. Hold Current Variation

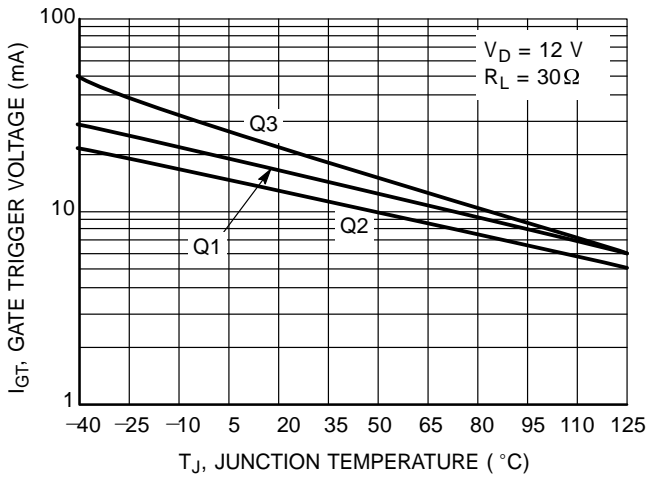


Figure 6. Gate Trigger Current Variation

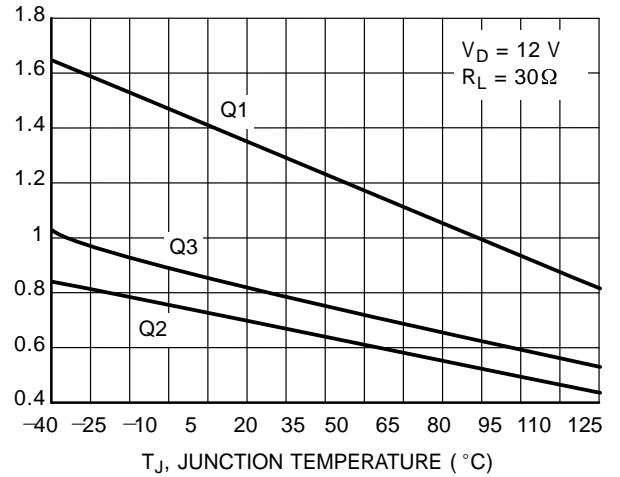


Figure 7. Gate Trigger Voltage Variation

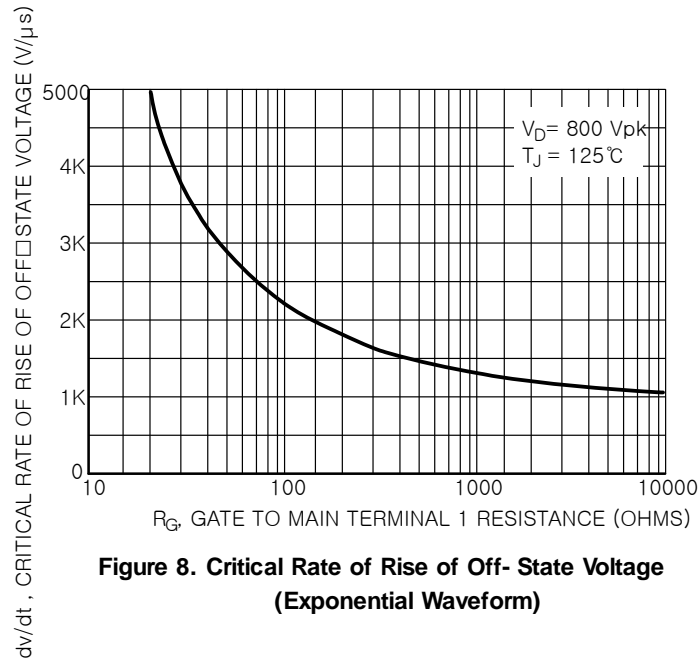
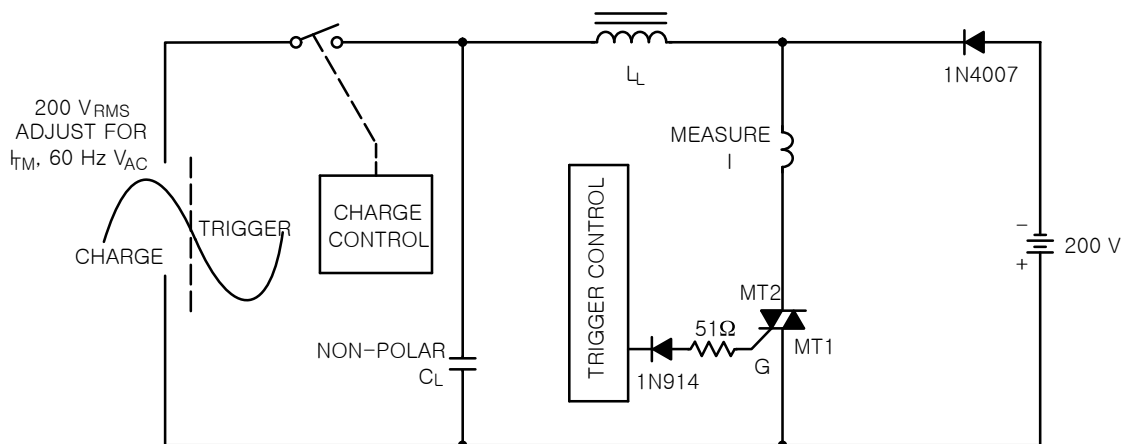


Figure 8. Critical Rate of Rise of Off- State Voltage (Exponential Waveform)



Note: Component values are for verification of rated $(di/dt)_c$. See AN1048 for additional information.

Figure 9. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Current $(di/dt)_c$