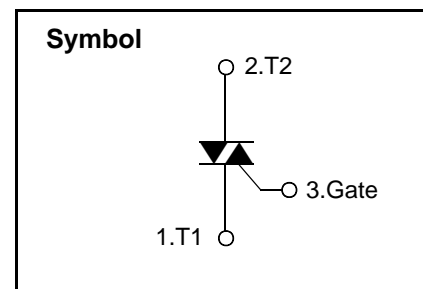
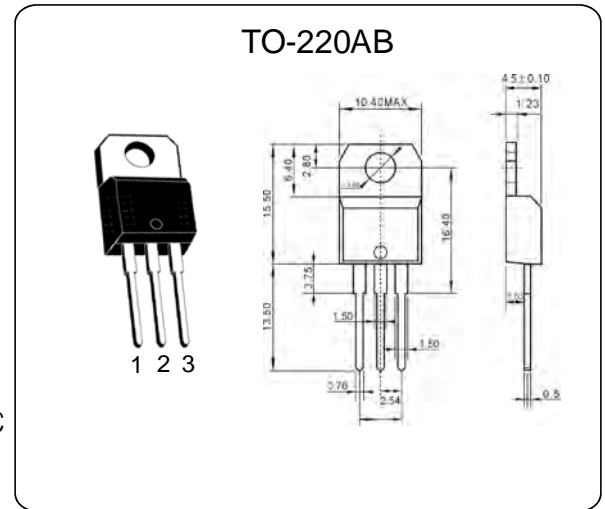


Bi-Directional Triode Thyristor

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 12A 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



Absolute Maximum Ratings

Symbol	Parameter		Value	Unit	
I _{T(RMS)}	RMS on-state current(full sine wave)	TO-220AB	12	A	
		TC=100°C			
I _{TSM}	Non repetitive surge peak on-state current(full cycle, T _j initial=25°C)	TO-220AB Ins.	126	A	
		TC=85°C			
I _{TSM}	Non repetitive surge peak on-state current(full cycle, T _j initial=25°C)	F=50Hz	t=20ms	120	A
		F=60Hz	t=16.7ms	126	
I ² t	I ² t Value for fusing	tp=10ms	78	A ² s	
DI/DT	Critical rate of rise of on-state current IG=2X _{IGT} ,tr≤100ns	F=120Hz	T _j =125°C	50	A/us
V _{DSM/V} RSM	Non repetitive surge peak off-state voltage	tp=10ms	T _j =25°C	V _{drm} / v _{rrm} + 100V	V
IGM	Peak gate current	tp=20us	T _j =125°C	4	A
P _{G(AV)}	Average gate power dissipation		T _j =125°C	1	W
T _{stg}	Storage junction temperature range			-40 to +150	°C
T _j	Operating junction temperature range			-40 to +125	

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

Snubberless™ and Logic Level(3 quadrants)

Symbol	Test conditions	Quadrant	BTA12		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 =100mA		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			12	

Standard (4 Quadrants)

Symbol	Test conditions	Quadrant	BTA12		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} =11A 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	35	mΩ
I _{DRM} I _{RRM}	V _{DRM} =V _{RRM}	T _J =25°C		5	uA
		T _J =125°C	MAX	2	mA
V _{DRM} /V _{RRM}	Voltage	T _J =25°C	MIN	600 and 800	V

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

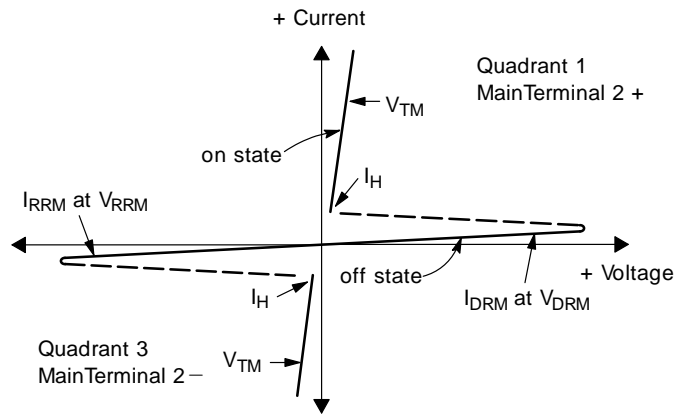
Note 2: for both polarities of A2 referenced to A1

Thermal Resistances

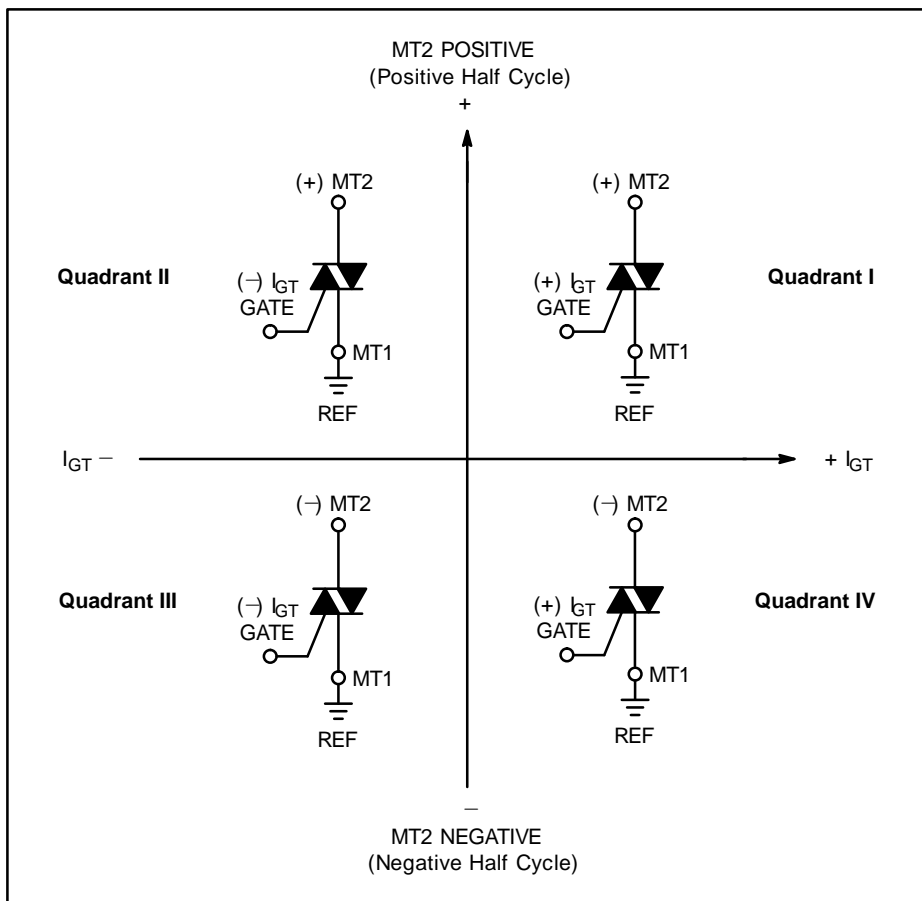
Symbol	Parameter		Value	Unit
R _{th(j-c)}	Junction to case(AC)	TO-220AB	1.4	°C/W
		TO-220AB(Insulated)	2.3	
R _{th(j-a)}	Junction to ambient	TO-220AB/ TO-220AB(Insulated)	60	°C/W

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.

Fig. 1: Maximum power dissipation versus RMS on-state current (full cycle).

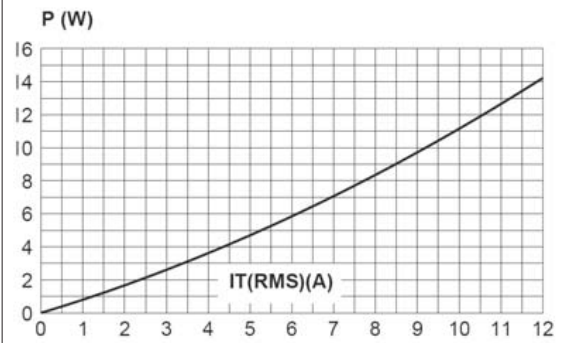


Fig. 2-1: RMS on-state current versus case temperature (full cycle).

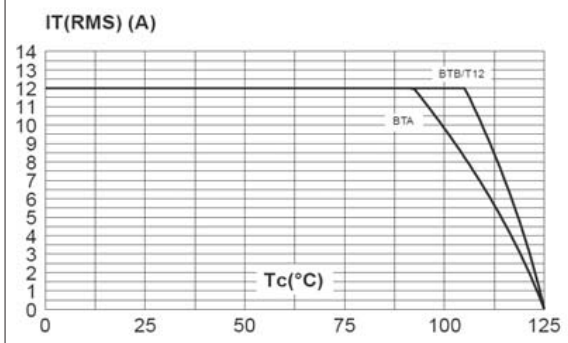


Fig. 2-2: RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35µm), full cycle.

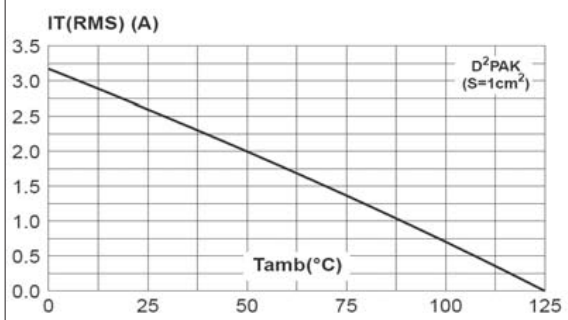


Fig. 3: Relative variation of thermal impedance versus pulse duration.

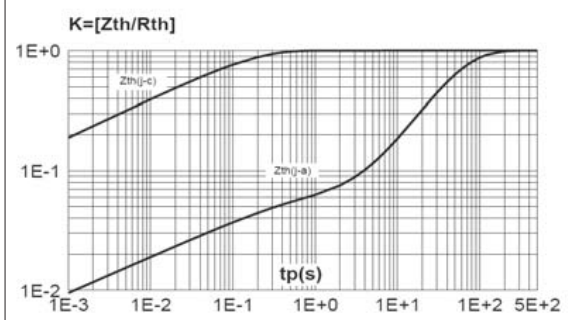


Fig. 4: On-state characteristics (maximum values).

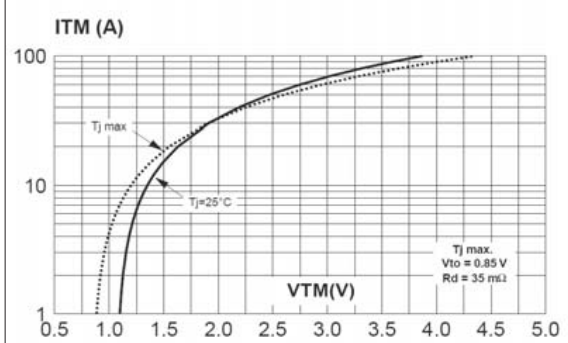


Fig. 5: Surge peak on-state current versus number of cycles.

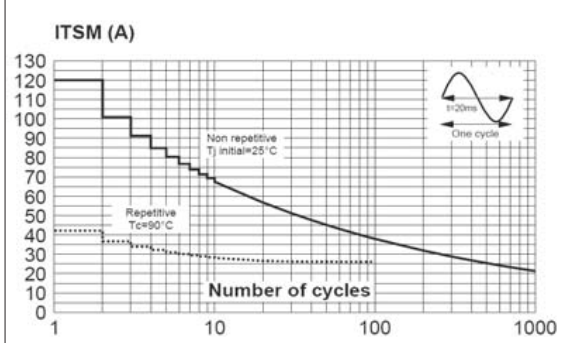


Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of I^2t .

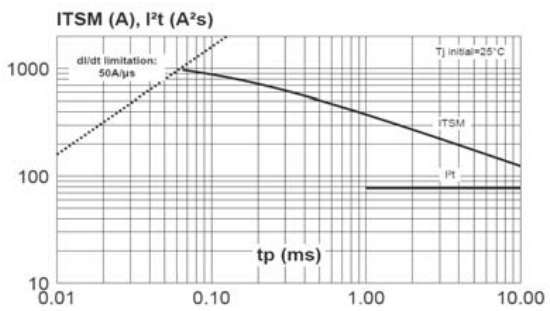


Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

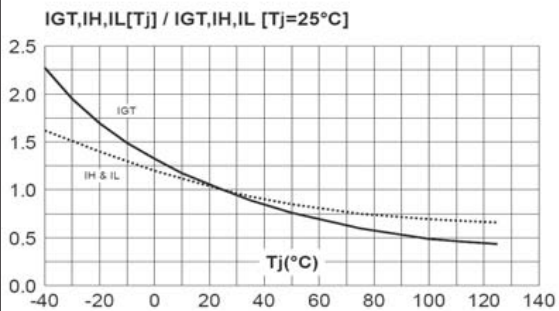


Fig. 8-1: Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values) (BW/CW/T1235).

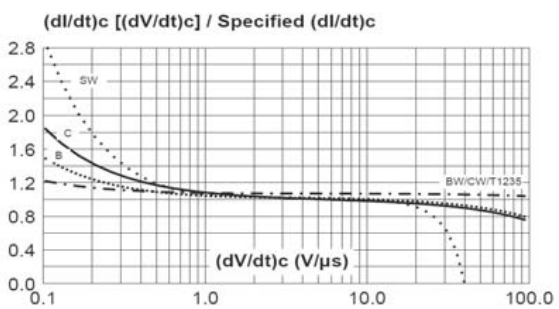


Fig. 8-2: Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values) (TW).

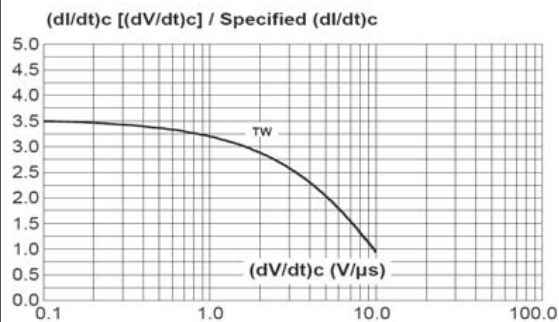


Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.

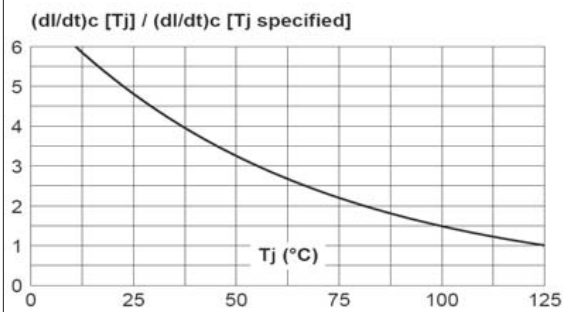


Fig. 10: D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 μm).

