

## GENERAL DESCRIPTION

Glass passivated high commutation triacs in a plastic envelope intended for use in circuits where high static and dynamic dV/dt and high dl/dt can occur. These devices will commutate the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

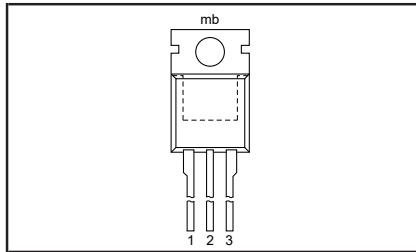
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{DRM}$	BTA216- Repetitive peak off-state voltages	500B 500	600B 600	800B 800	V
$I_{T(RMS)}$	RMS on-state current	16	16	16	A
$I_{TSM}$	Non-repetitive peak on-state current	140	140	140	A

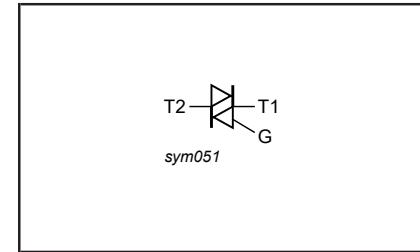
## PINNING - TO220

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

## PIN CONFIGURATION



## SYMBOL



## LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
$V_{DRM}$	Repetitive peak off-state voltages		-	-500 500 <sup>1</sup>	-600 600 <sup>1</sup>	-800 800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99^\circ C$	-	16			A
$I_{TSM}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ C$ prior to surge					
$I^2t$ $dl_T/dt$	$I^2t$ for fusing Repetitive rate of rise of on-state current after triggering	$t = 20$ ms $t = 16.7$ ms $t = 10$ ms $I_{TM} = 20$ A; $I_G = 0.2$ A; $dl_G/dt = 0.2$ A/ $\mu s$	- - - -	140 150 98 100			A A A <sup>2</sup> s A/ $\mu s$
$I_{GM}$ $V_{GM}$ $P_{GM}$ $P_{G(AV)}$	Peak gate current Peak gate voltage Peak gate power Average gate power	over any 20 ms period	- - - -	2 5 5 0.5			A V W W
$T_{stg}$ $T_j$	Storage temperature Operating junction temperature		-40	150 125			°C °C

<sup>1</sup> Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/ $\mu s$ .

## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle half cycle	-	-	1.2 1.7	K/W K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

## STATIC CHARACTERISTICS

$T_j = 25^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{GT}$	Gate trigger current <sup>2</sup>	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	2 2 2	18 21 34	50 50 50	mA mA mA
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	- - -	31 34 30	60 90 60	mA mA mA
$I_H$ $V_T$ $V_{GT}$	Holding current On-state voltage Gate trigger voltage	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ $I_T = 20\text{ A}$ $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 125^\circ\text{C}$	- - - 0.25	31 1.2 0.7 0.4	60 1.5 1.5 -	mA V V mA
$I_D$	Off-state leakage current	$V_D = V_{DRM(\max)}; T_j = 125^\circ\text{C}$	-	0.1	0.5	mA

## DYNAMIC CHARACTERISTICS

$T_j = 25^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(\max)}; T_j = 125^\circ\text{C}$ ; exponential waveform; gate open circuit	1000	4000	-	V/ $\mu\text{s}$
$dl_{com}/dt$	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}; I_{T(RMS)} = 16\text{ A}$ ; without snubber; gate open circuit	-	28	-	A/ms
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 20\text{ A}; V_D = V_{DRM(\max)}; I_G = 0.1\text{ A}; dl_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	$\mu\text{s}$

<sup>2</sup> Device does not trigger in the T2-, G+ quadrant.

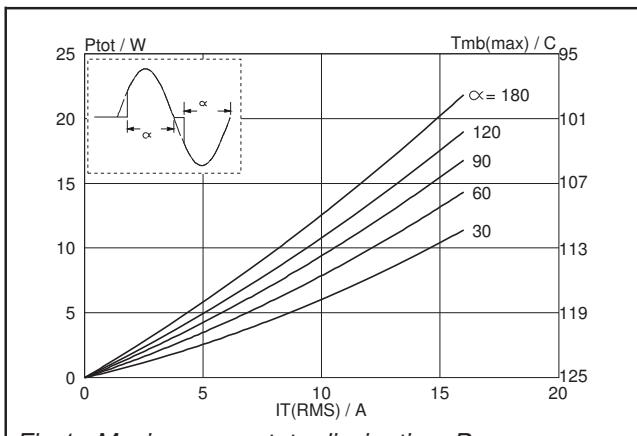


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.

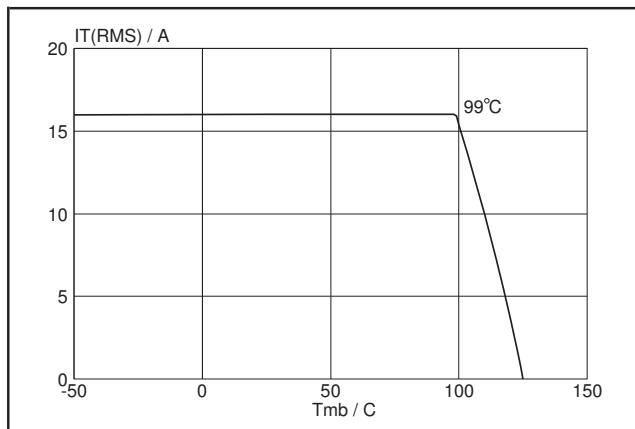


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

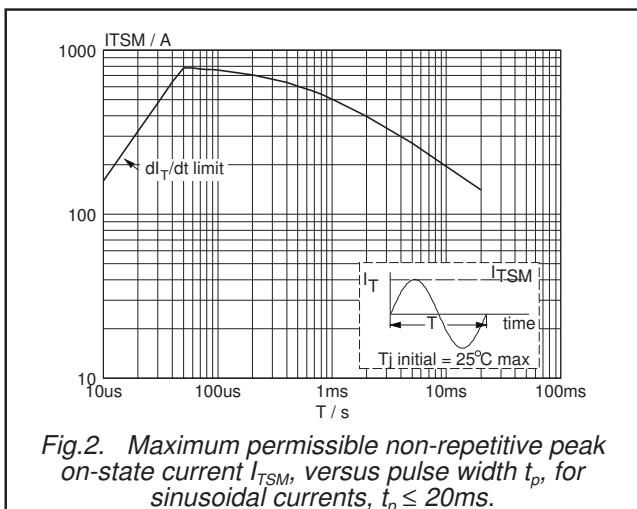


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20\text{ms}$ .

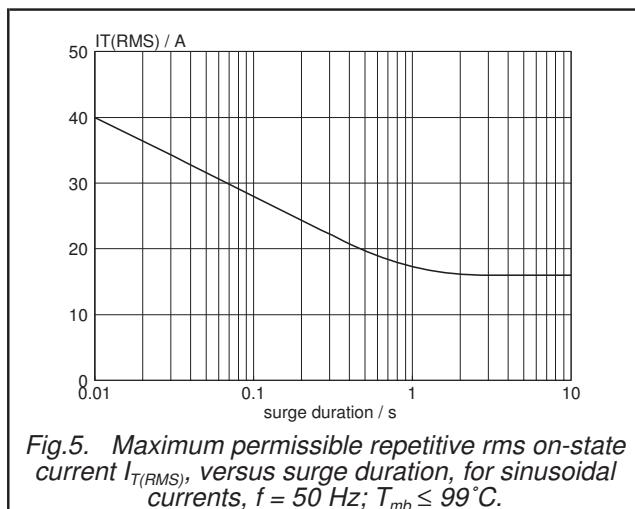


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{ Hz}$ ;  $T_{mb} \leq 99^\circ\text{C}$ .

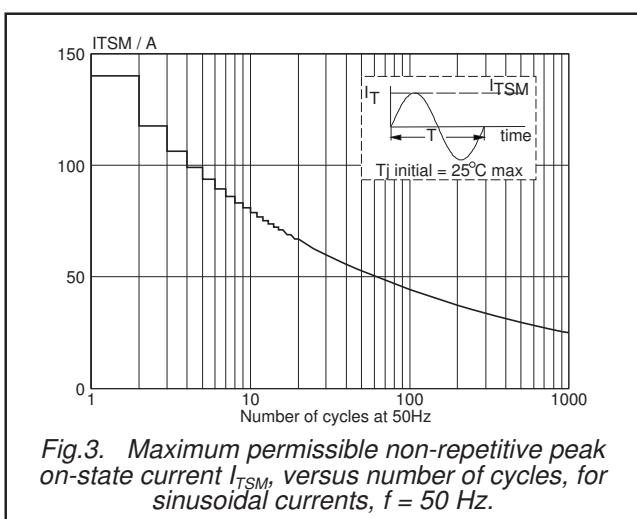


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50\text{ Hz}$ .

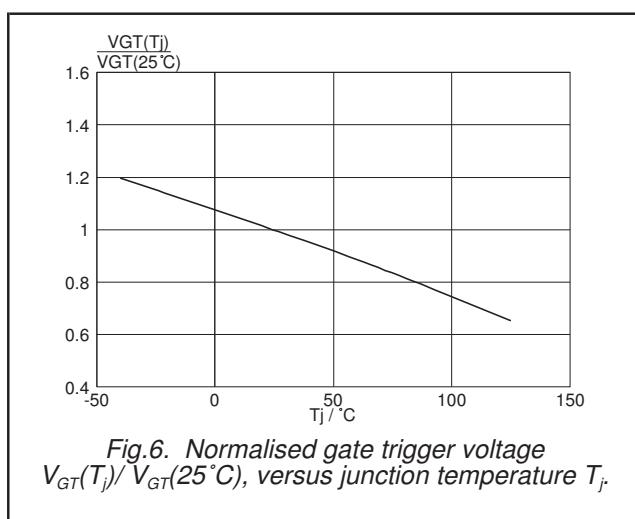


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

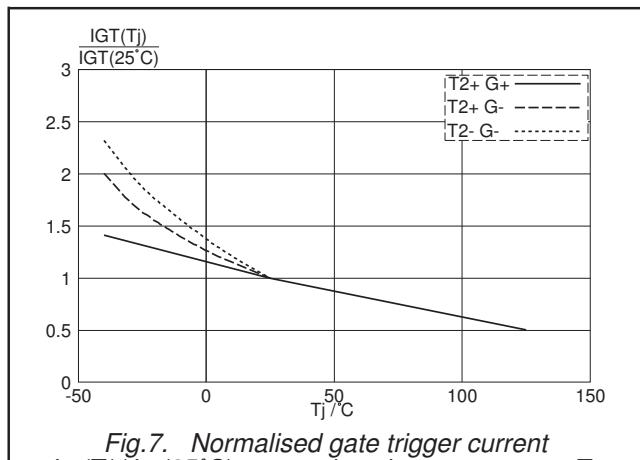


Fig.7. Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ C)$ , versus junction temperature  $T_j$ .

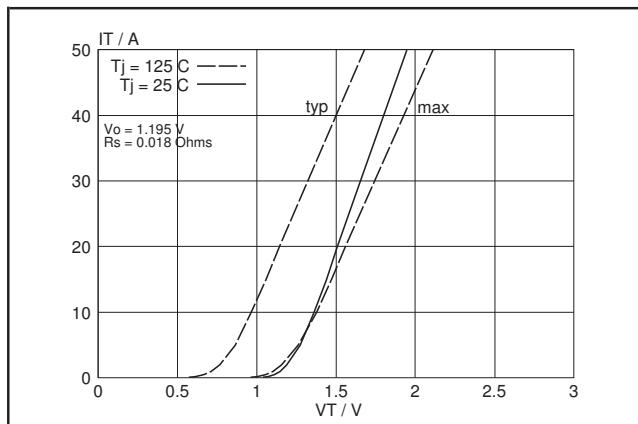


Fig.10. Typical and maximum on-state characteristic.

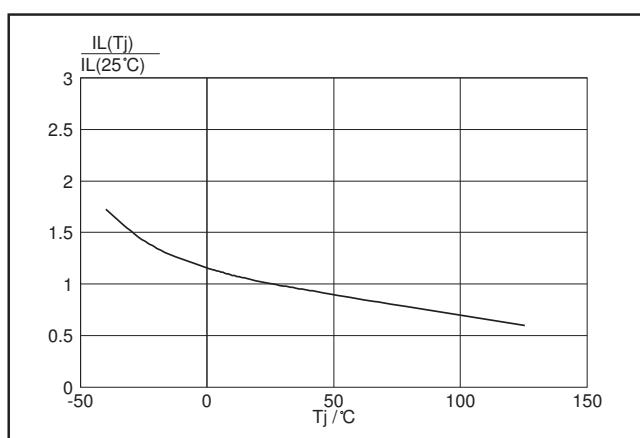


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ C)$ , versus junction temperature  $T_j$ .

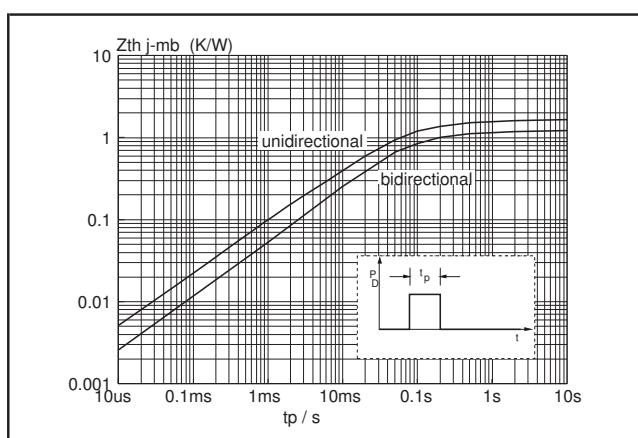


Fig.11. Transient thermal impedance  $Z_{th\ j\cdot mb}$ , versus pulse width  $t_p$ .

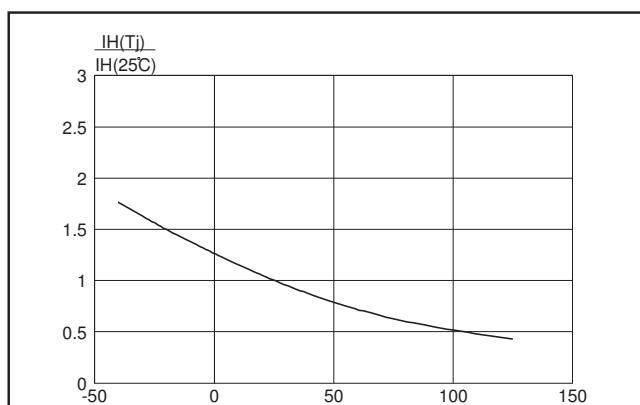


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ C)$ , versus junction temperature  $T_j$ .

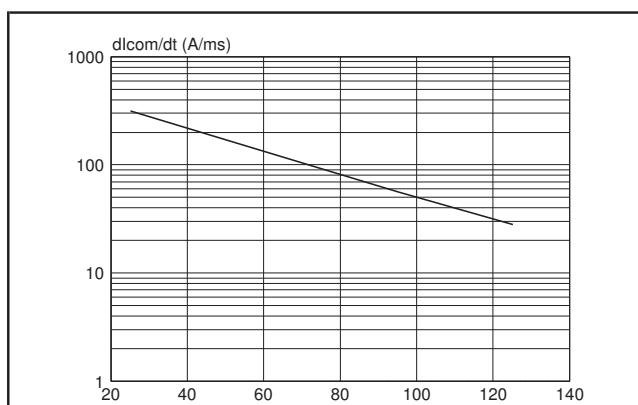
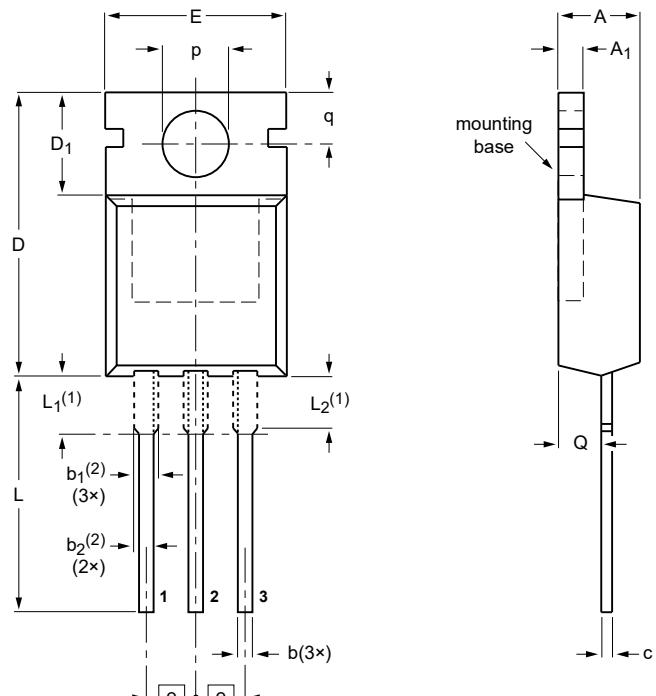


Fig.12. Typical, critical rate of change of commutating current  $dl_{com}/dt$  versus junction temperature.

## MECHANICAL DATA

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

TO220



0 5 10 mm  
scale

DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub> <sup>(2)</sup>	b <sub>2</sub> <sup>(2)</sup>	c	D	D <sub>1</sub>	E	e	L	L <sub>1</sub> <sup>(1)</sup>	L <sub>2</sub> <sup>(1)</sup> max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 0.4	0.7	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

### Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78		3-lead TO-220AB	SC-46			08-04-23 08-06-13