

# DATA SHEET

**BTA212B series D, E and F**  
Three quadrant triacs  
guaranteed commutation

Product specification

October 2003



## Three quadrant triacs guaranteed commutation

## BTA212B series D, E and F

### GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope suitable for surface mounting intended for use in motor control circuits or with other highly inductive loads. These devices balance the requirements of commutation performance and gate sensitivity. The "sensitive gate" E series and "logic level" D series are intended for interfacing with low power drivers, including micro controllers.

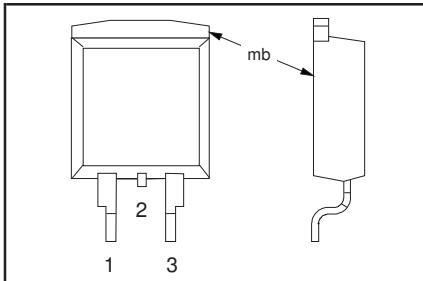
### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
$V_{DRM}$	BTA212B- BTA212B- BTA212B-	600D	800E	V
$I_{T(RMS)}$	Repetitive peak off-state voltages	600E	800E	
$I_{TSM}$	RMS on-state current	600F	800	A
	Non-repetitive peak on-state current	600	800	A
		12	12	
		95	95	A

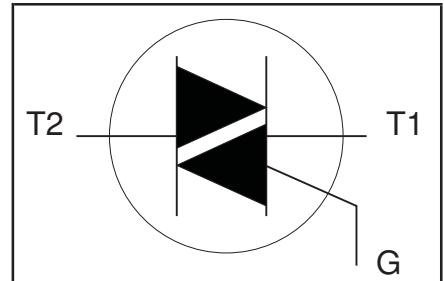
### PINNING - SOT404

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
mb	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		-	-600 600 <sup>1</sup>	-800 800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99^\circ C$	-	12		A
$I_{TSM}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ C$ prior to surge				
$I^2t$ $dI_T/dt$	$I^2t$ 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; $dI_G/dt = 0.2$ A/ $\mu$ s	- - - -	95 105 45 100		A A $A^2s$ $A/\mu s$
$I_{GM}$ $P_{GM}$ $P_{G(AV)}$	Peak gate current Peak gate power Average gate power	over any 20 ms period	- - -	2 5 0.5		A 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.

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## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\-\text{mb}}$	Thermal resistance junction to mounting base	full cycle	-	-	1.5	K/W
$R_{th\ j\-\text{a}}$	Thermal resistance junction to ambient	half cycle in free air	-	55	2.0	K/W

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
$I_{GT}$	Gate trigger current <sup>2</sup>	<b>BTA212B-</b> $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	...D	5	10	25	mA
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	15	25	30	mA
$I_H$	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	25	30	40	mA
$V_T$ $V_{GT}$	On-state voltage Gate trigger voltage	$I_T = 17\text{ A}$ $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A}$ $T_j = 125^\circ\text{C}$	0.25	...D, E, F			V
$I_D$	Off-state leakage current	$V_D = V_{DRM(\text{max})}; T_j = 125^\circ\text{C}$	-	1.6 1.5 -			mA

## DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	<b>BTA212B-</b> $V_{DM} = 67\% V_{DRM(\text{max})}$ $T_j = 110^\circ\text{C}$ ; exponential waveform; gate open circuit	20	60	70	-
$dl_{com}/dt$	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}$ $I_{T(\text{RMS})} = 12\text{ A}$ $dV_{com}/dt = 10\text{ V}/\mu\text{s}$ ; gate open circuit	1.0	8	21	-
$dl_{com}/dt$	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}$ $I_{T(\text{RMS})} = 12\text{ A}$ $dV_{com}/dt = 0.1\text{ V}/\mu\text{s}$ ; gate open circuit	3.5	16	32	-

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

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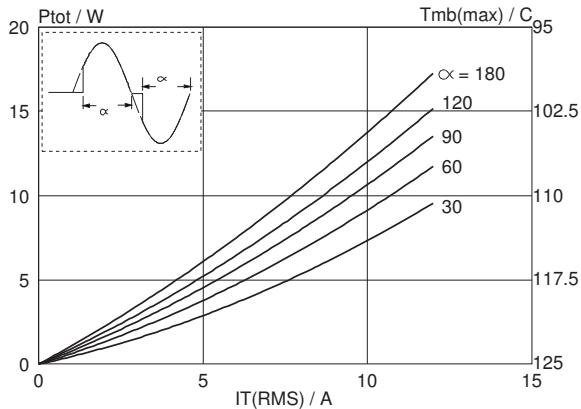


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.

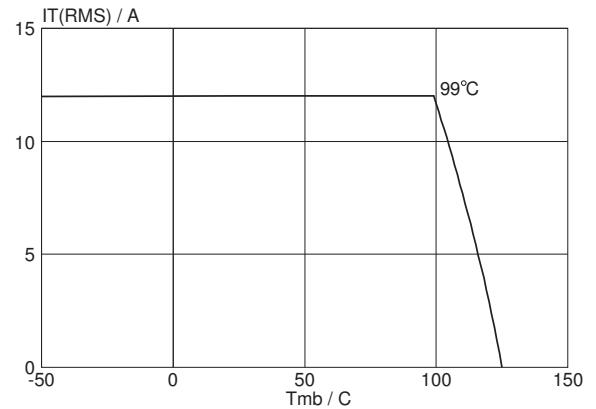


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

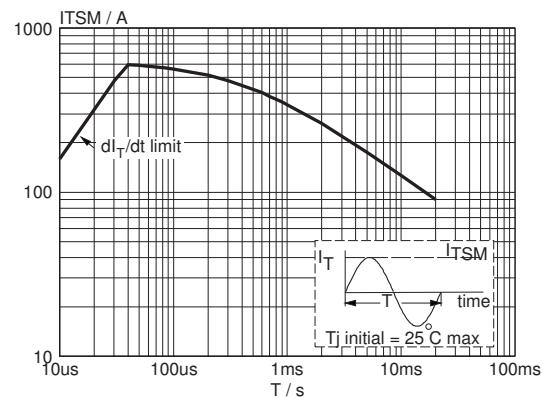


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20\text{ms}$ .

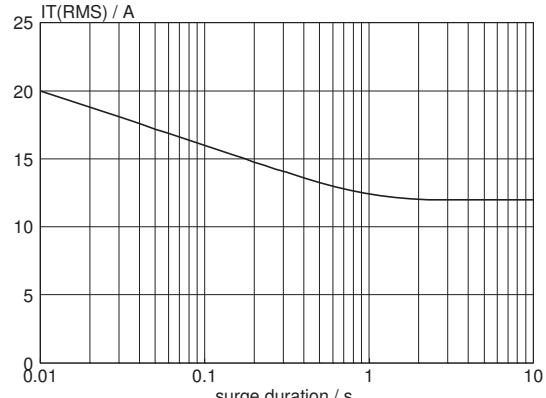


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{Hz}$ ;  $T_{mb} \leq 99^\circ\text{C}$ .

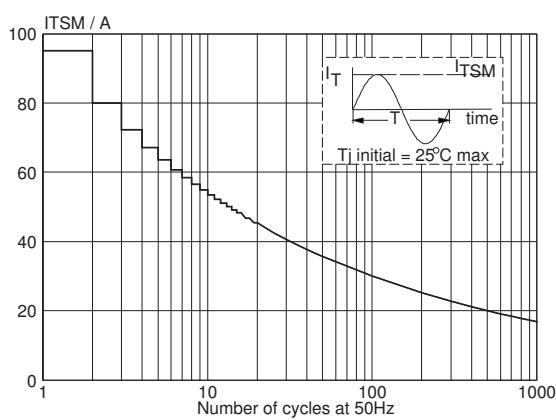


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50\text{Hz}$ .

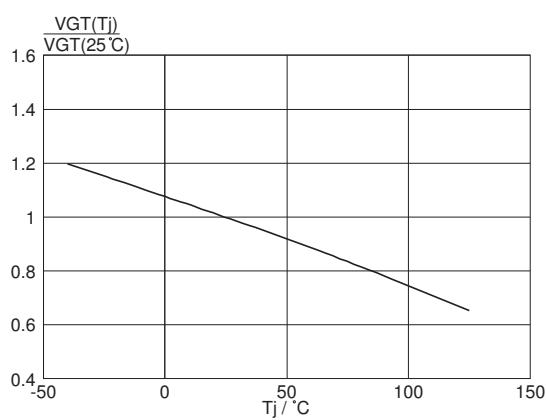


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

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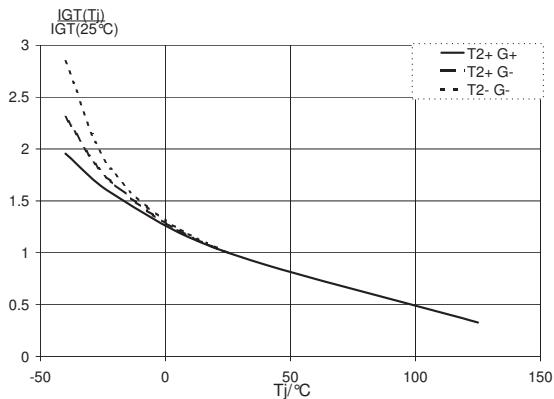


Fig.7. Normalised gate trigger current  
 $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

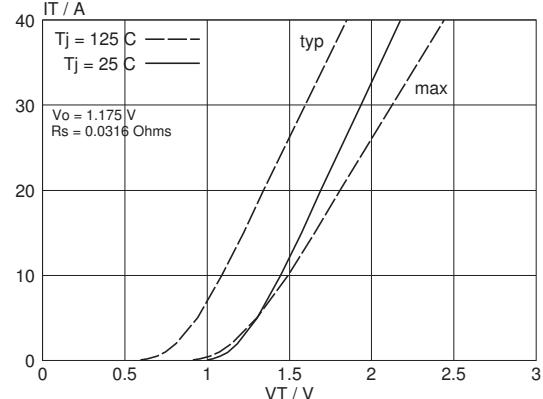


Fig.10. Typical and maximum on-state characteristic.

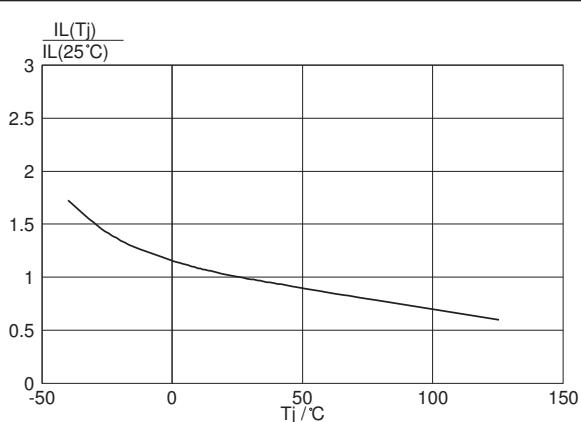


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

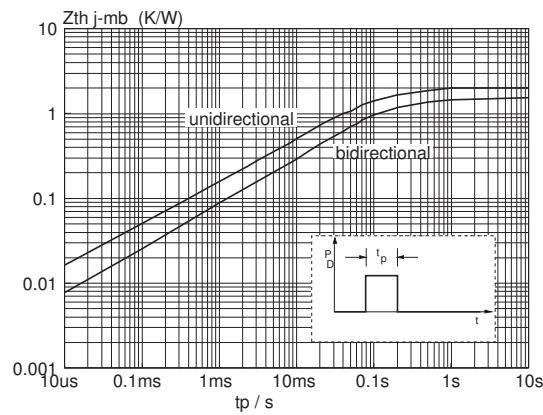


Fig.11. Transient thermal impedance  $Z_{th,j-mb}$ , versus pulse width  $t_p$ .

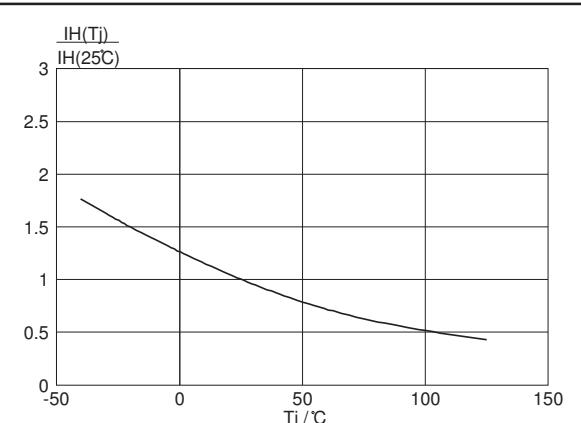


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

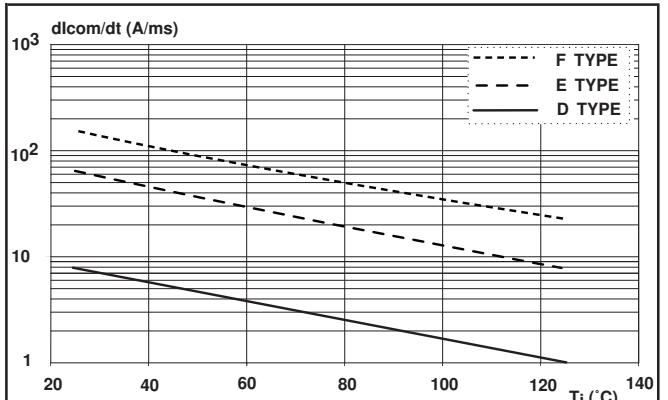


Fig.12. Minimum, critical rate of change of commutating current  $dI_{com}/dt$  versus junction temperature,  $dV_{com}/dt = 10V/\mu\text{s}$ .

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### MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

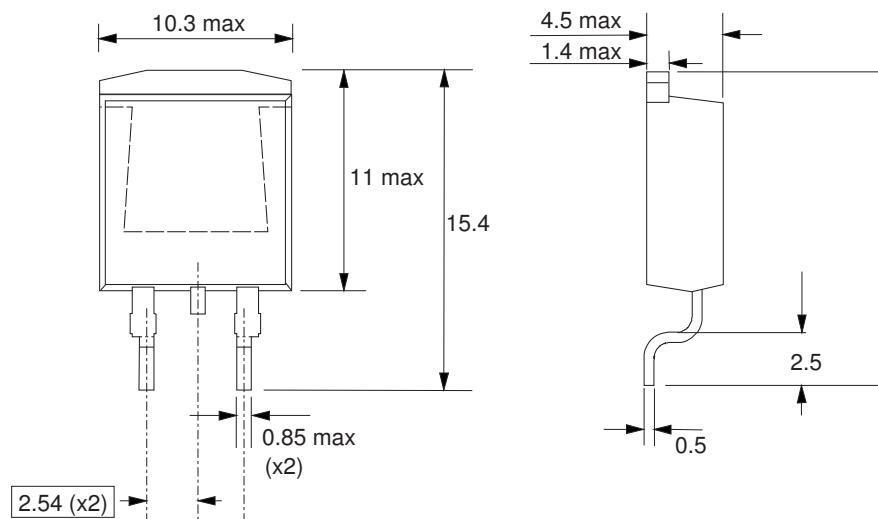


Fig.13. SOT404 : centre pin connected to mounting base.

### MOUNTING INSTRUCTIONS

Dimensions in mm

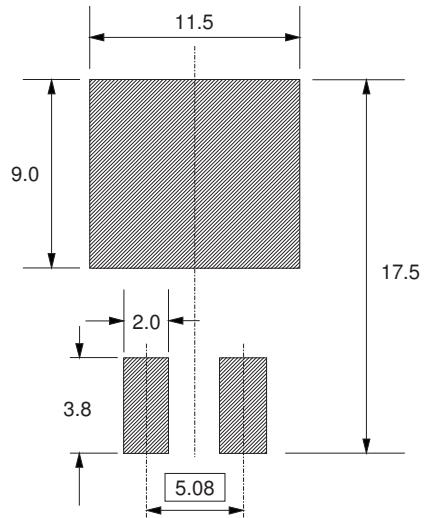


Fig.14. SOT404 : minimum pad sizes for surface mounting.

#### Notes

1. Plastic meets UL94 V0 at 1/8".

## Legal information

### DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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