

DATA SHEET

BTA212X series B
Three quadrant triacs
high commutation

Product specification

September 2018



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BTA212X series B

GENERAL DESCRIPTION

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

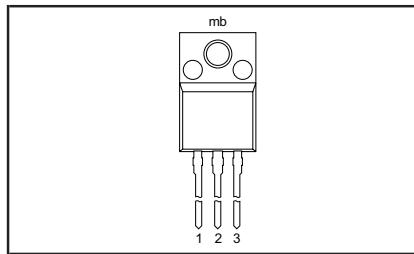
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
V_{DRM}	BTA212X- Repetitive peak off-state voltages	500B 500	600B 600	800B 800	V
$I_{T(RMS)}$	RMS on-state current	12	12	12	A
I_{TSM}	Non-repetitive peak on-state current	95	95	95	A

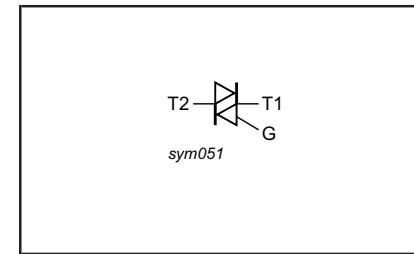
PINNING - SOT186A

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
case	isolated

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 ¹	-600 600 ¹	-800 800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{hs} \leq 56^\circ C$	-	12			A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ C$ prior to surge					
I^2t 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/ μ s	- - - -	95 105 45 100			A A A ² s A/ μ 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

¹ 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/ μ s.

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ISOLATION LIMITING VALUE & CHARACTERISTIC

 $T_{hs} = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	$f = 50-60\text{ Hz}$; sinusoidal waveform; $R.H. \leq 65\%$; clean and dustfree	-		2500	V
C_{isol}	Capacitance from T2 to external heatsink	$f = 1\text{ MHz}$	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th j-hs}$	Thermal resistance junction to heatsink	full or half cycle with heatsink compound	-	-	4.0	K/W
$R_{th j-a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	5.5	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 ²	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$				
		$T2+ G+$	2	18	50	mA
		$T2+ G-$	2	21	50	mA
		$T2- G-$	2	34	50	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$				
		$T2+ G+$	-	31	60	mA
		$T2+ G-$	-	34	90	mA
		$T2- G-$	-	30	60	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$				
V_T	On-state voltage	$I_T = 17\text{ A}$				
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$				
I_D	Off-state leakage current	$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125^\circ\text{C}$	0.25	0.4	-	V
		$V_D = V_{DRM(max)}$; $T_j = 125^\circ\text{C}$	-	0.1	0.5	V
						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/ μ s
dl_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125^\circ\text{C}$; $I_{T(RMS)} = 12\text{ A}$; without snubber; gate open circuit	-	24	-	A/ms
t_{gt}	Gate controlled turn-on time	$I_{TM} = 12\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dl_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s

² Device does not trigger in the T2-, G+ quadrant.

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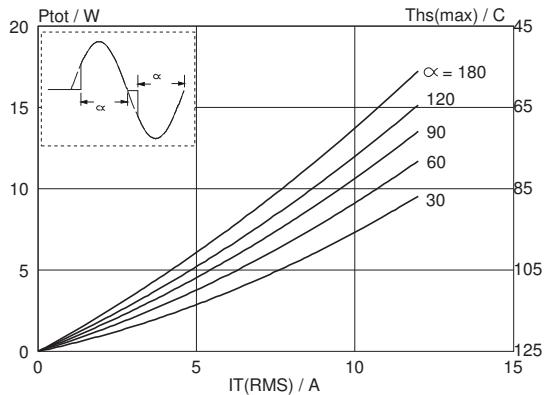


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

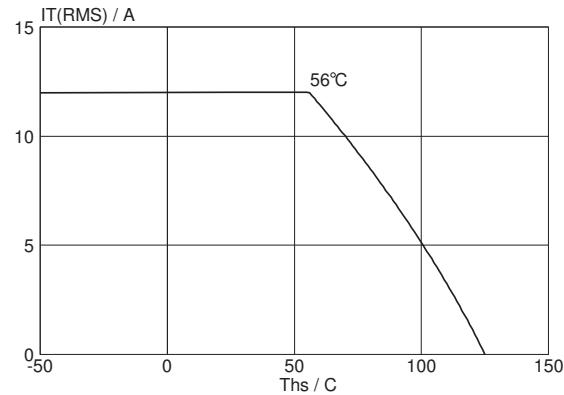


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus heatsink temperature T_{hs} .

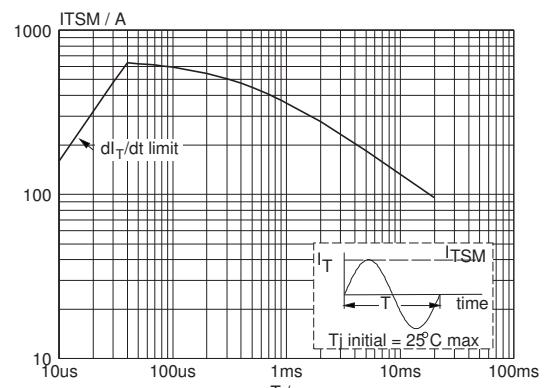


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20ms$.

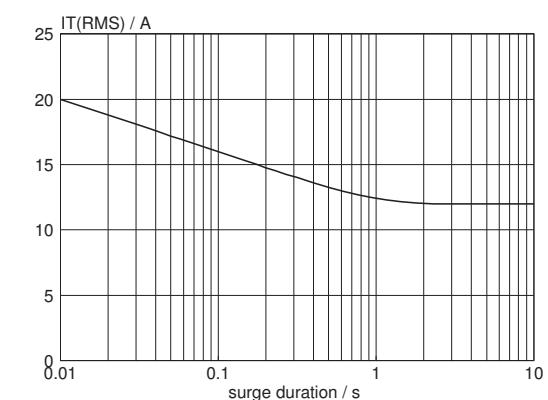


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{hs} \leq 56^\circ C$.

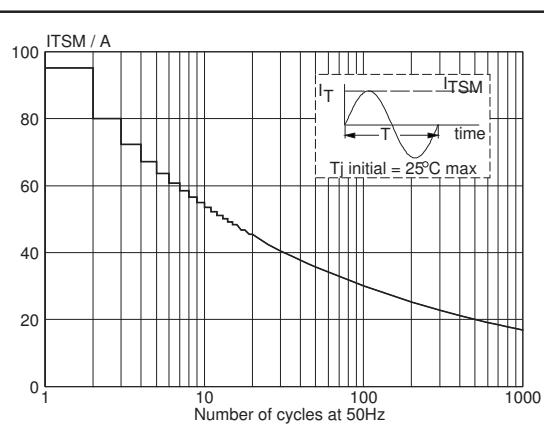


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

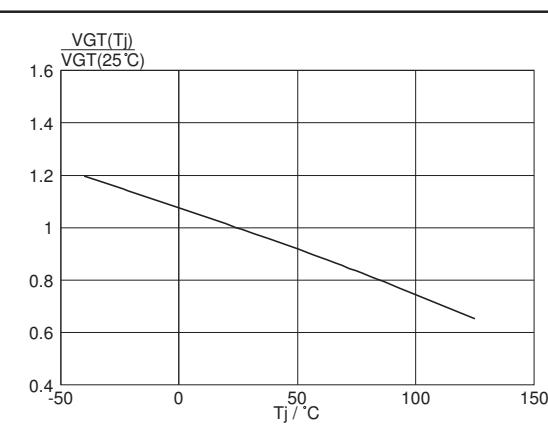


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ C)$, versus junction temperature T_j .

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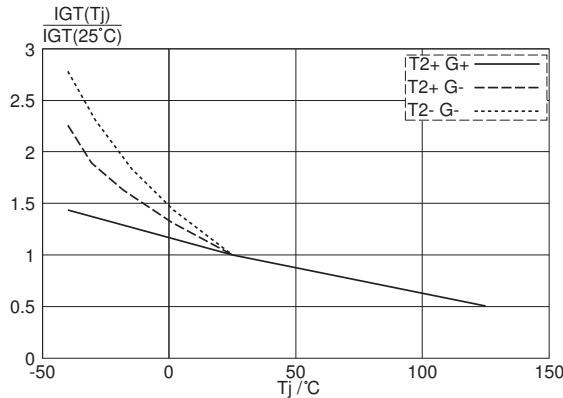


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ C)$, versus junction temperature T_j .

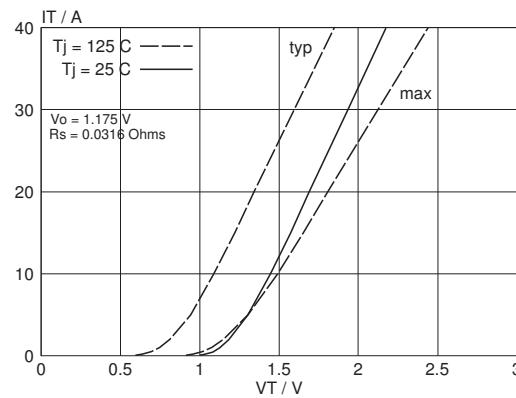


Fig.10. Typical and maximum on-state characteristic.

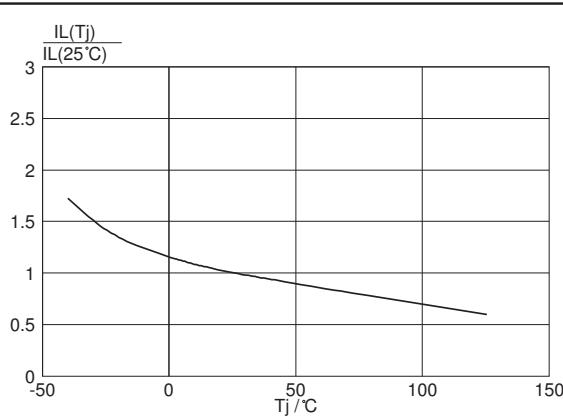


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ C)$, versus junction temperature T_j .

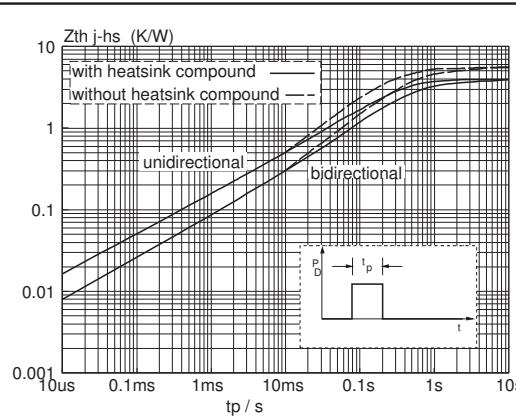


Fig.11. Transient thermal impedance $Z_{th\ j-hs}$, versus pulse width t_p .

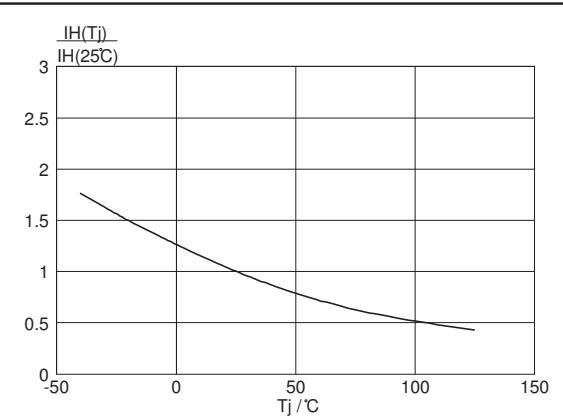


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ C)$, versus junction temperature T_j .

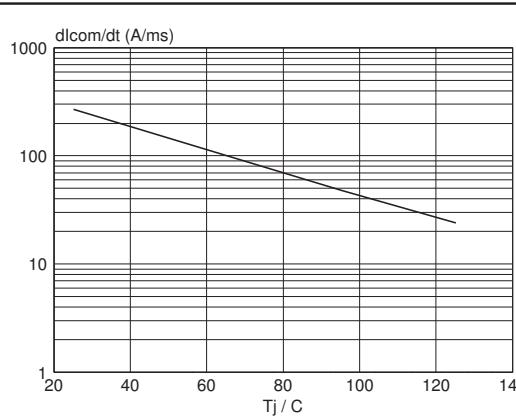


Fig.12. Typical critical rate of change of commutating current dl_{com}/dt versus junction temperature.

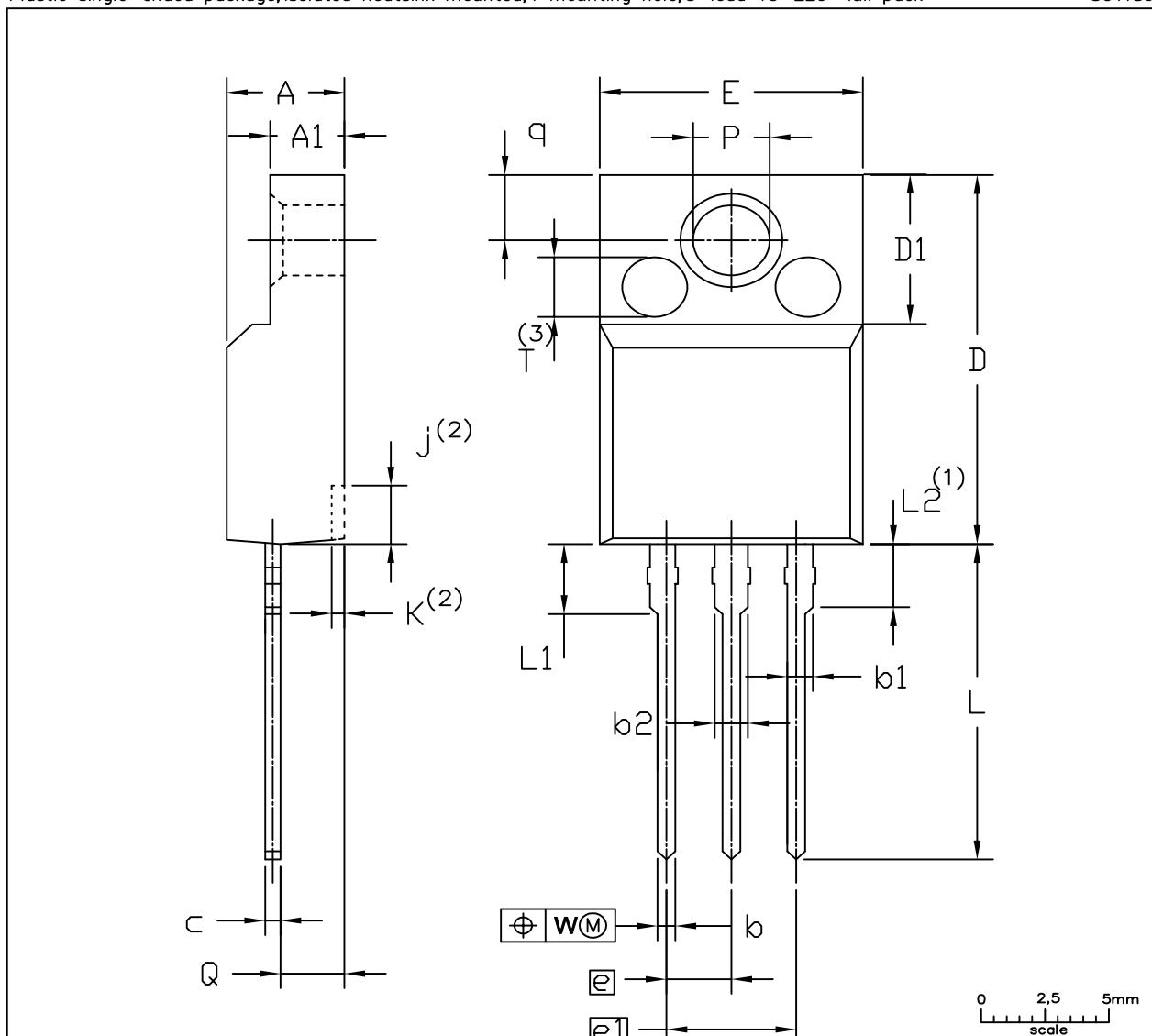
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MECHANICAL DATA

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"

SOT186A



UNIT	A	A ₁	b	b ₁	b ₂	c	D	D ₁	E	e	e ₁	j ⁽²⁾	K ⁽²⁾	L	L ₁	L ₂ max.	P	Q	q	W	T ⁽³⁾
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	3.2	2.6	3.0	0.4	2.5
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

Notes

1. Terminal dimensions within this zone are uncontrolled
2. Dot lines area designs may vary
3. Eject pin mark is for reference only

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT186A		3 LEADS TO220F				2013-11-14

Legal information

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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