



# IMPORTANT NOTICE

10 December 2015

## 1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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Thank you for your cooperation and understanding,

WeEn Semiconductors

# DATA SHEET

## **BTA216X series B** Three quadrant triacs high commutation

Product specification

October 1997



## Three quadrant triacs high commutation

## BTA216X 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 commute the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

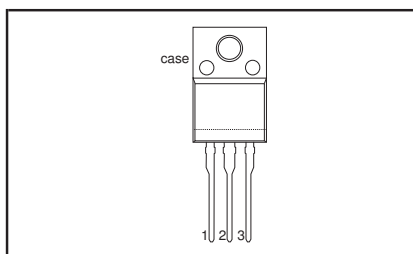
### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{\text{DRM}}$	<b>BTA216X-</b> Repetitive peak off-state voltages	<b>500B</b> 500	<b>600B</b> 600	<b>800B</b> 800	V
$I_{\text{T(RMS)}}$	RMS on-state current	16	16	16	A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	140	140	140	A

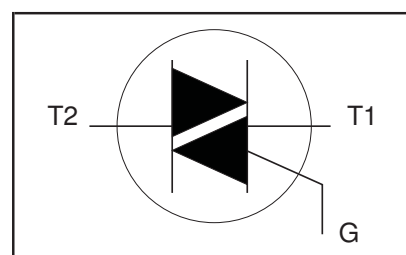
### PINNING - SOT186A

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
$V_{\text{DRM}}$	Repetitive peak off-state voltages		-	<b>-500</b> 500 <sup>1</sup>	<b>-600</b> 600 <sup>1</sup>	<b>-800</b> 800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{hs}} \leq 38^\circ\text{C}$	-	16			A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ prior to surge	-	140			A
		$t = 20\text{ ms}$	-	150			A
		$t = 16.7\text{ ms}$	-	98			A <sup>2</sup> s
$I^2t$	$I^2t$ for fusing	$t = 10\text{ ms}$	-	100			A/μs
$dI_{\text{T}}/dt$	Repetitive rate of rise of on-state current after triggering	$I_{\text{TM}} = 20\text{ A}; I_{\text{G}} = 0.2\text{ A};$ $dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-				
$I_{\text{GM}}$	Peak gate current		-	2			A
$V_{\text{GM}}$	Peak gate voltage		-	5			V
$P_{\text{GM}}$	Peak gate power		-	5			W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.5			W
$T_{\text{stg}}$	Storage temperature		-40	150			$^\circ\text{C}$
$T_j$	Operating junction temperature		-	125			$^\circ\text{C}$

<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/μs.

## Three quadrant triacs high commutation

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### ISOLATION LIMITING VALUE & CHARACTERISTIC

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	R.M.S. isolation voltage from all three terminals to external heatsink	$f = 50\text{--}60\text{ Hz}$ ; 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

$T_j = 25\text{ °C}$  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+	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	$V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$	-	31	60	mA
$V_T$	On-state voltage	$I_T = 20\text{ A}$	-	1.2	1.5	V
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$	-	0.7	1.5	V
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ °C}$	0.25	0.4	-	V
$I_D$	Off-state leakage current	$V_D = V_{DRM(max)}$ ; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

### DYNAMIC CHARACTERISTICS

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

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

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

# Three quadrant triacs high commutation

## BTA216X series B

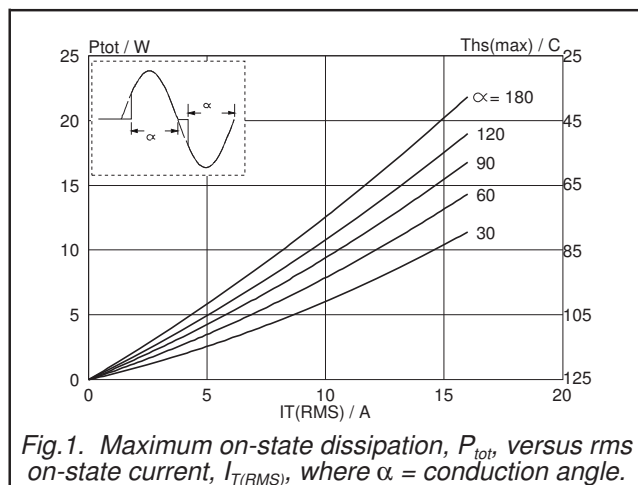


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.

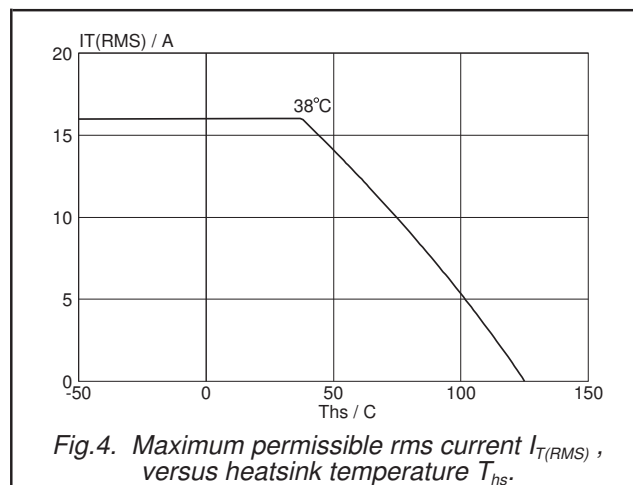


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus heatsink temperature  $T_{hs}$ .

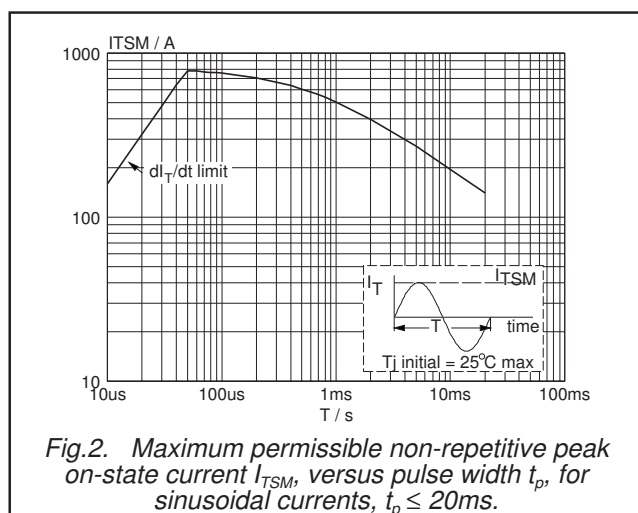


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20\text{ms}$ .

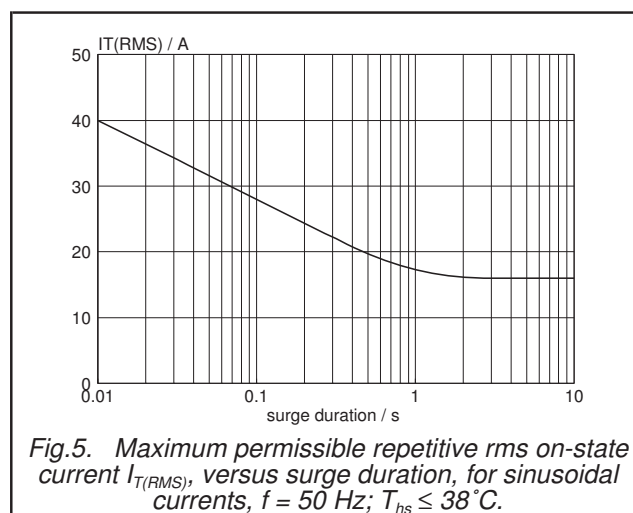


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{ Hz}$ ;  $T_{hs} \leq 38^\circ\text{C}$ .

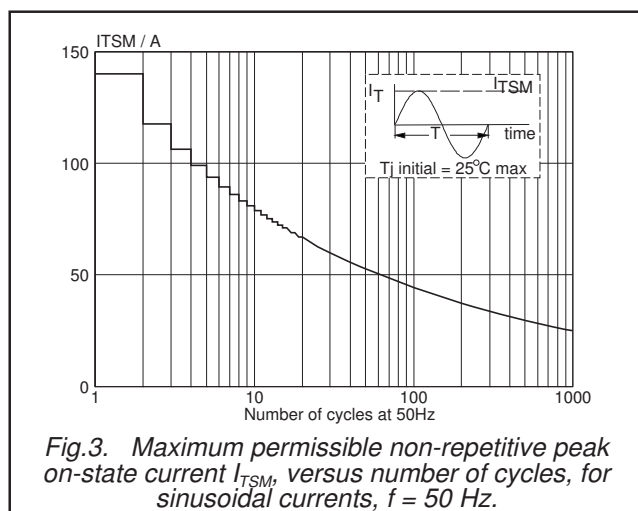


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50\text{ Hz}$ .

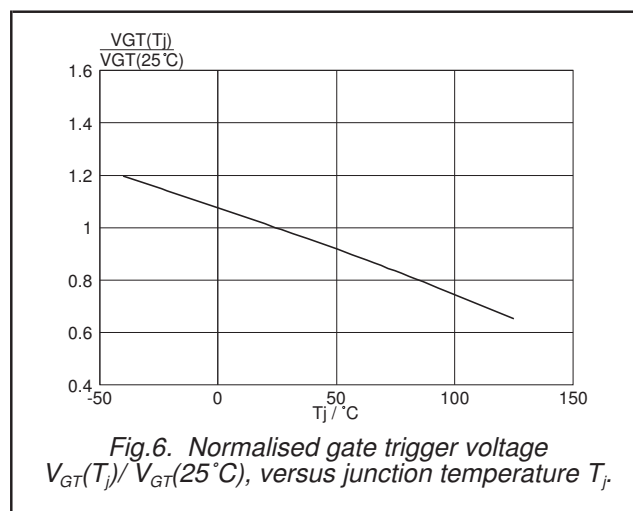
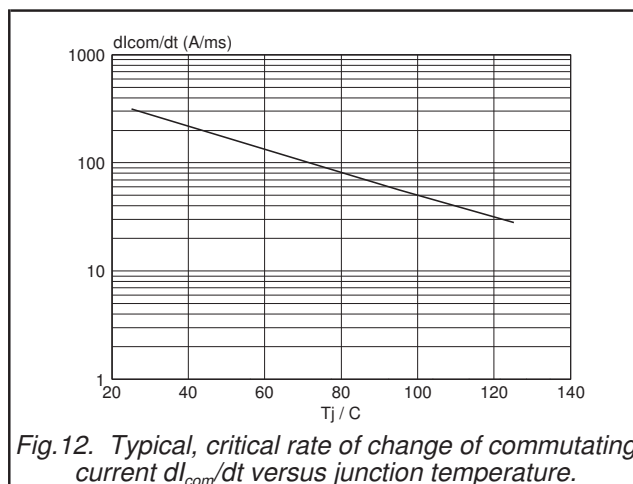
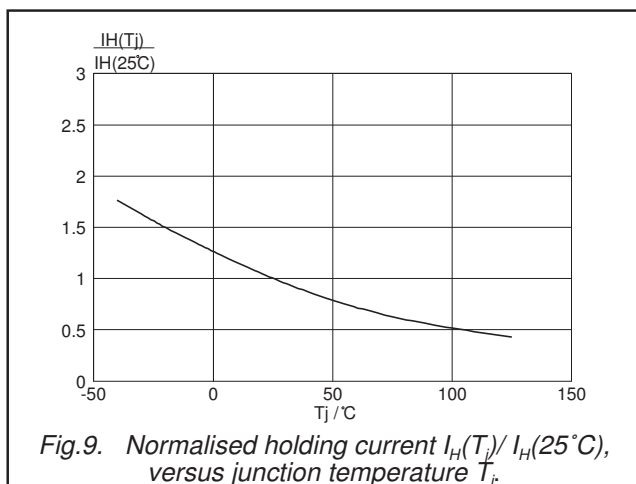
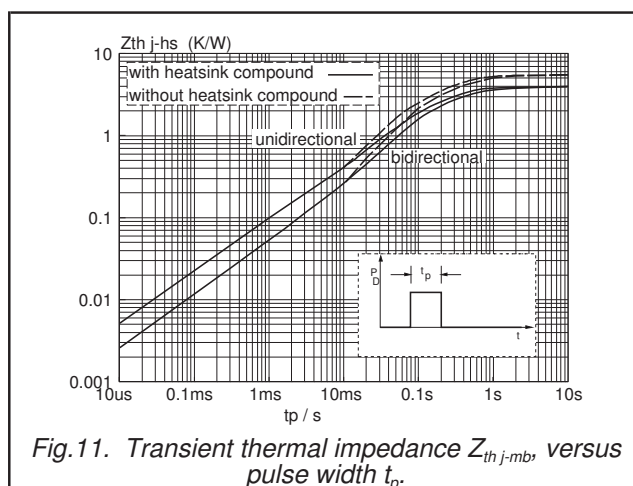
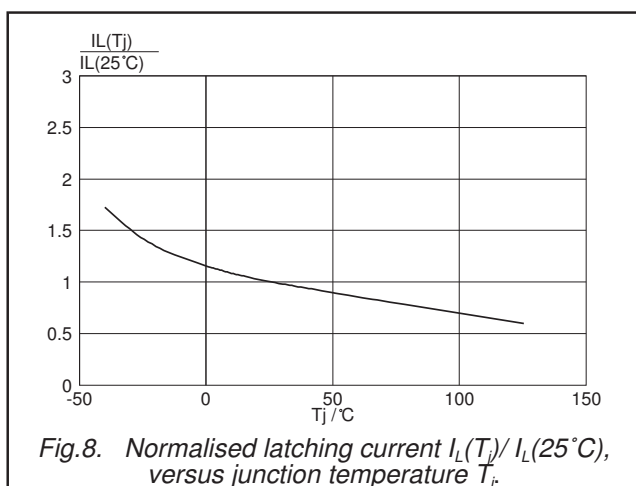
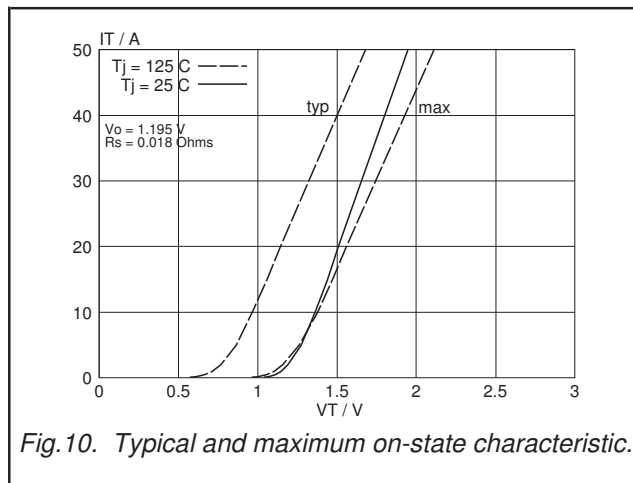
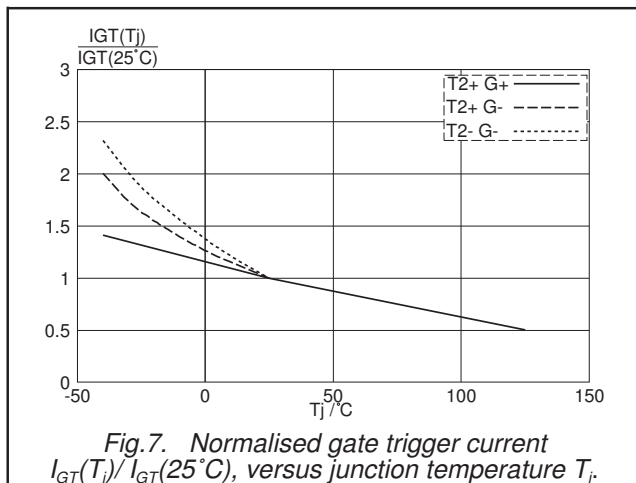


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

# Three quadrant triacs high commutation

## BTA216X series B



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## BTA216X series B

### MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

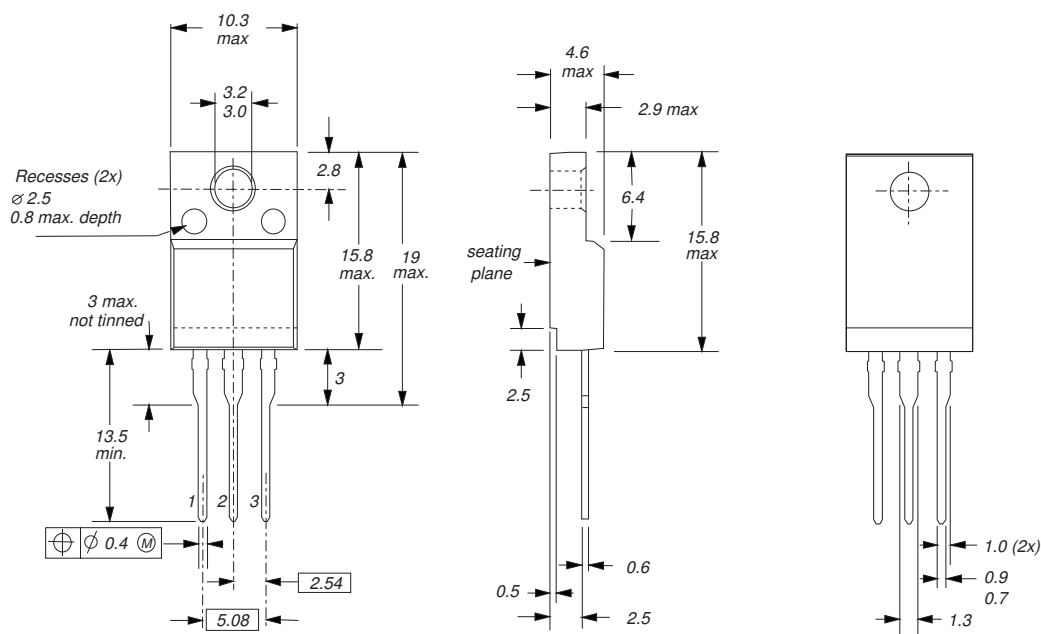


Fig. 13. SOT186A; The seating plane is electrically isolated from all terminals.

#### Notes

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy 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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1. Please consult the most recently issued document before initiating or completing a design.
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