

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.

WWW - For www.nxp.com use www.ween-semi.com

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If you have any questions related to this document, please contact our nearest sales office via e-mail or phone (details via salesaddresses@ween-semi.com).

Thank you for your cooperation and understanding,

WeEn Semiconductors

DATA SHEET

BTA216X series D, E and F

Three quadrant triacs
guaranteed commutation

Product specification

April 2002



Three quadrant triacs guaranteed commutation

BTA216X series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a full pack, plastic envelope 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.

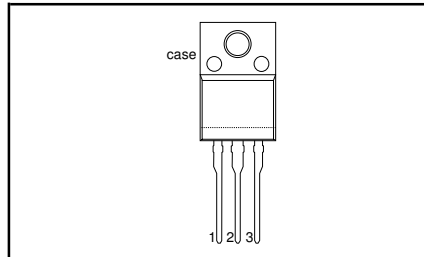
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages	BTA216X- BTA216X- BTA216X- 600D 600E 600F 600	V
$I_{\text{T(RMS)}}$	RMS on-state current	16	A
I_{TSM}	Non-repetitive peak on-state current	140	A

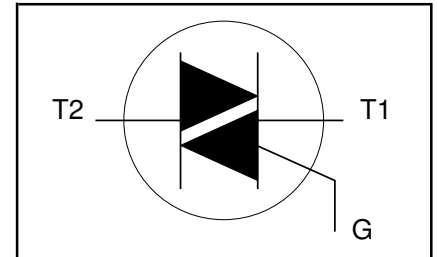
PINNING - SOT186A

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

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/ μs .

Three quadrant triacs guaranteed commutation

BTA216X series D, E and F

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
			-		-	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BTA216X-		...D	...E	...F	
I_{GT}	Gate trigger current ²	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	5	10	25	mA
		T2+ G+	-	5	10	25	mA
		T2- G-	-	5	10	25	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	15	25	30	mA
		T2+ G+	-	25	30	40	mA
		T2- G-	-	25	30	40	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	15	25	30	mA
			...D, E, F				
V_T	On-state voltage	$I_T = 20\text{ A}$	-	1.5			V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	1.5			V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$	0.25	-			V
I_D	Off-state leakage current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$	-	0.5			mA

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

Three quadrant triacs guaranteed commutation

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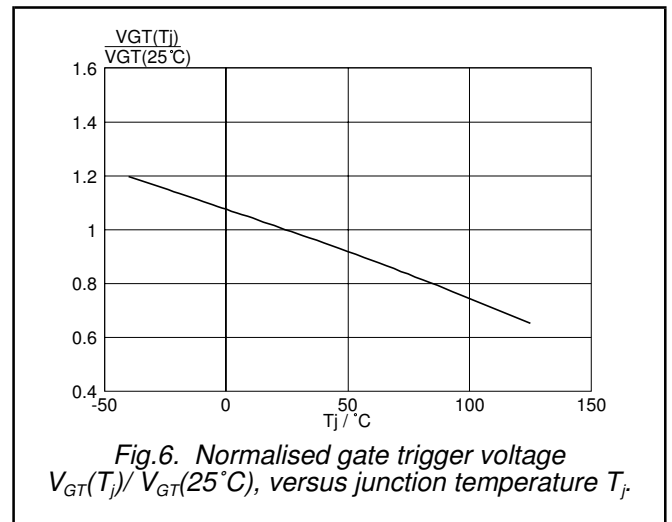
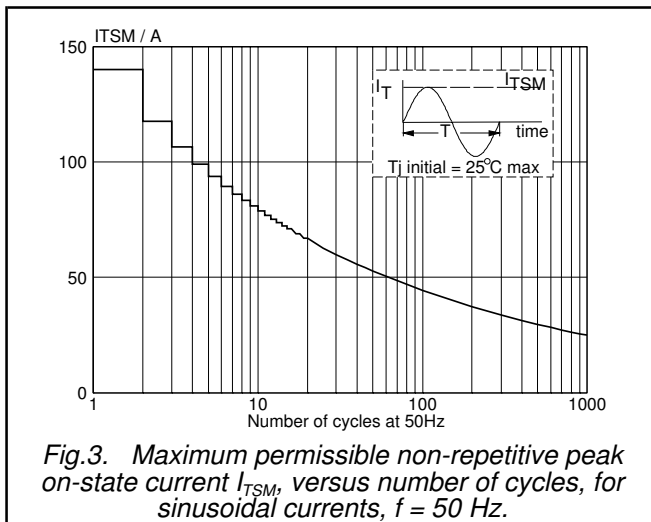
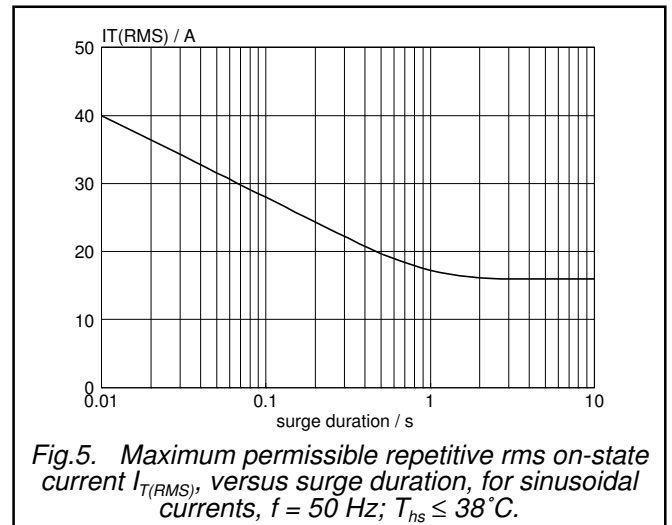
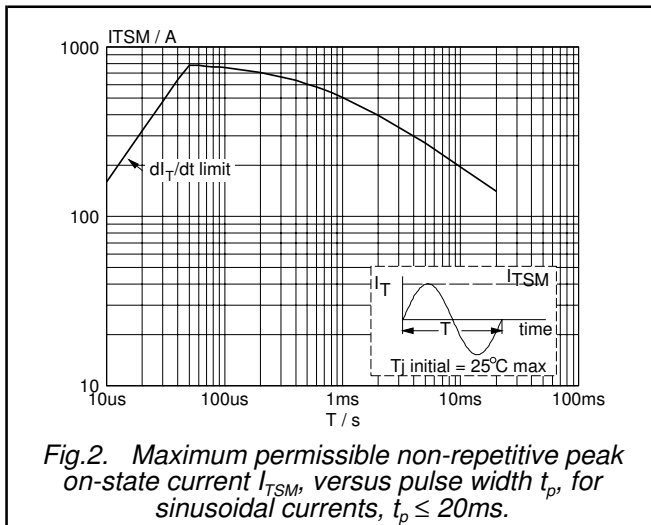
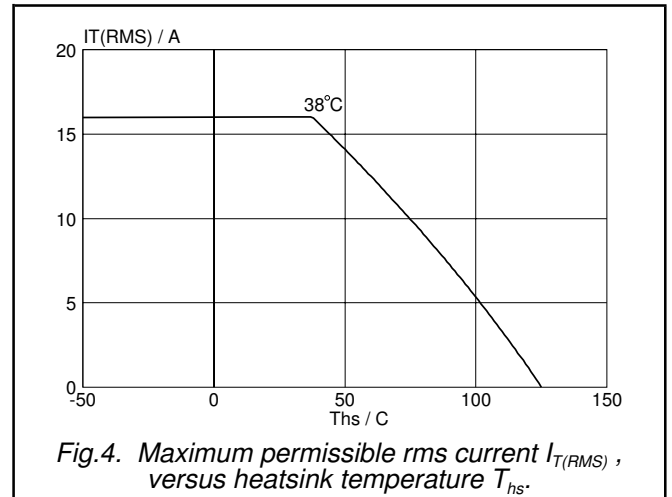
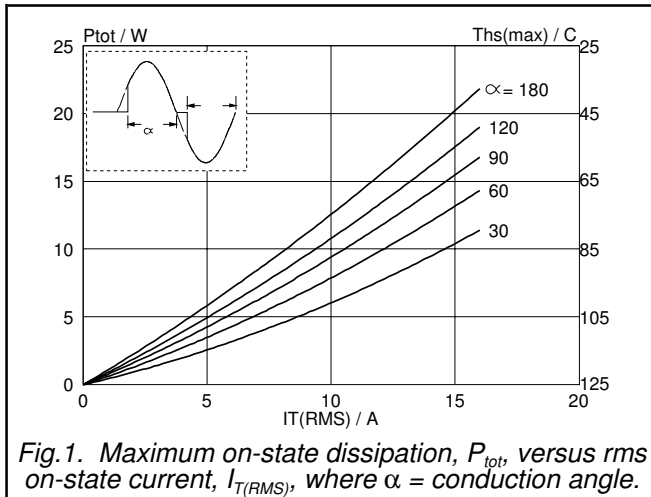
DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.			MAX.	UNIT
		BTA216X-	...D	...E	...F		
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$; $T_j = 110\text{ °C}$; exponential waveform; gate open circuit	30	60	70	-	V/ μ s
dI_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ °C}$; $I_{T(RMS)} = 16\text{ A}$; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$; gate open circuit	2.5	6.2	18	-	A/ms
dI_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ °C}$; $I_{T(RMS)} = 16\text{ A}$; $dV_{com}/dt = 0.1\text{ V}/\mu\text{s}$; gate open circuit	12	20	50	-	A/ms

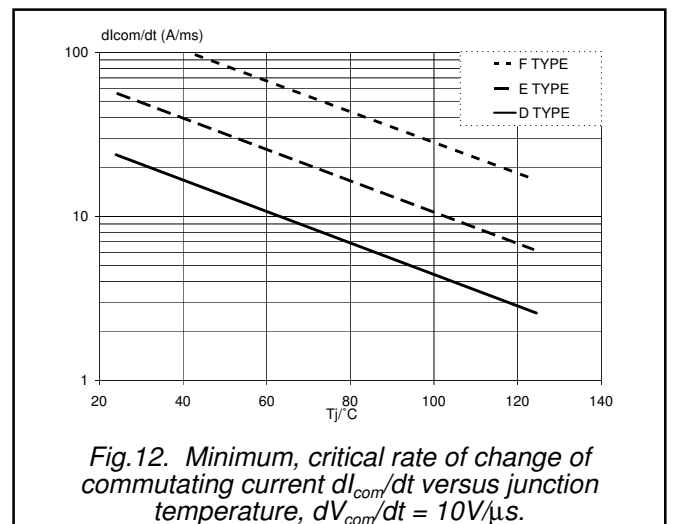
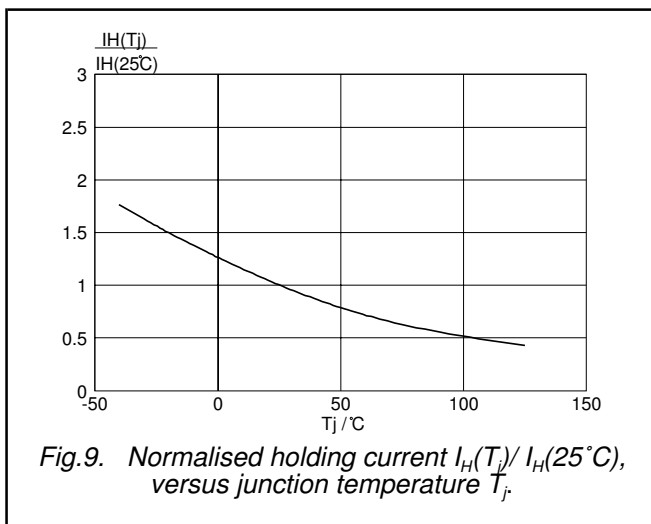
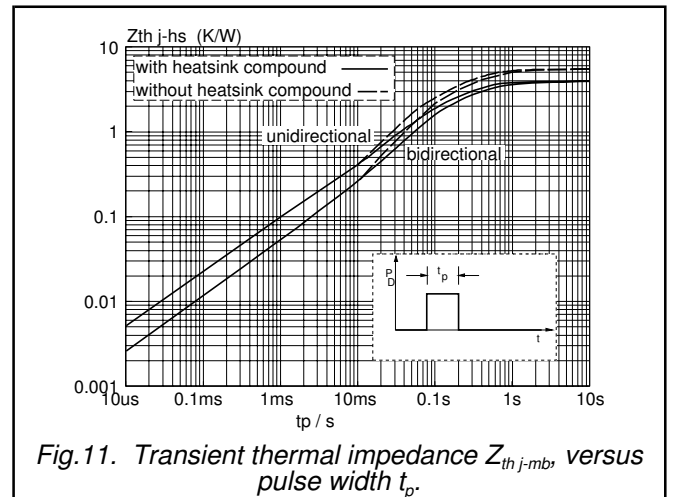
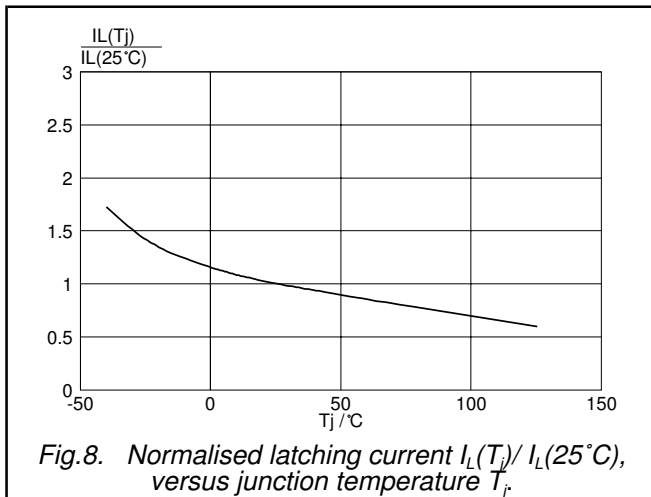
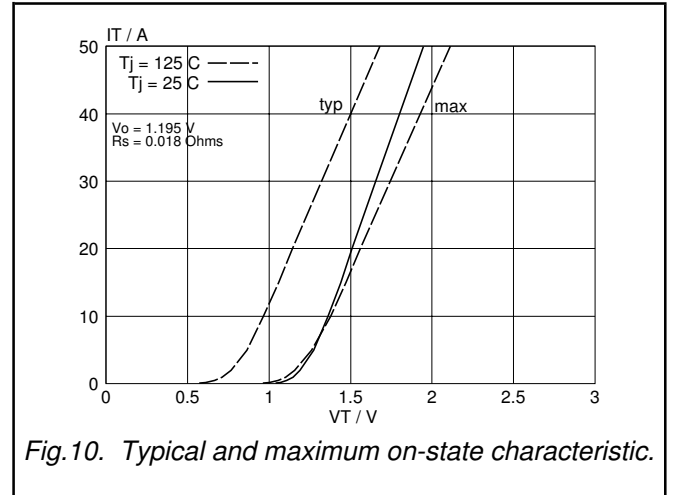
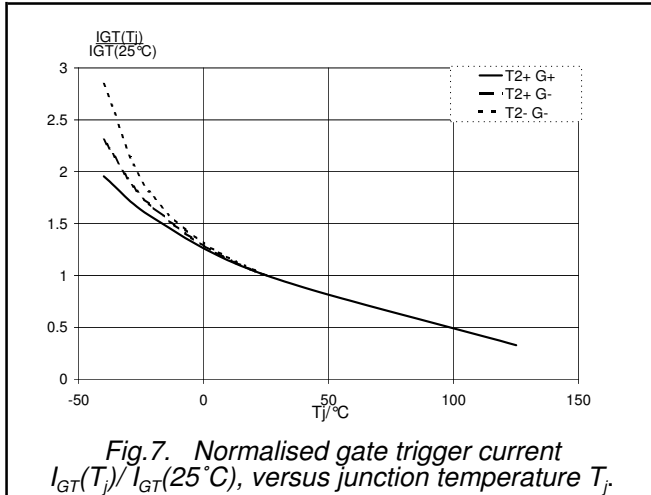
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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

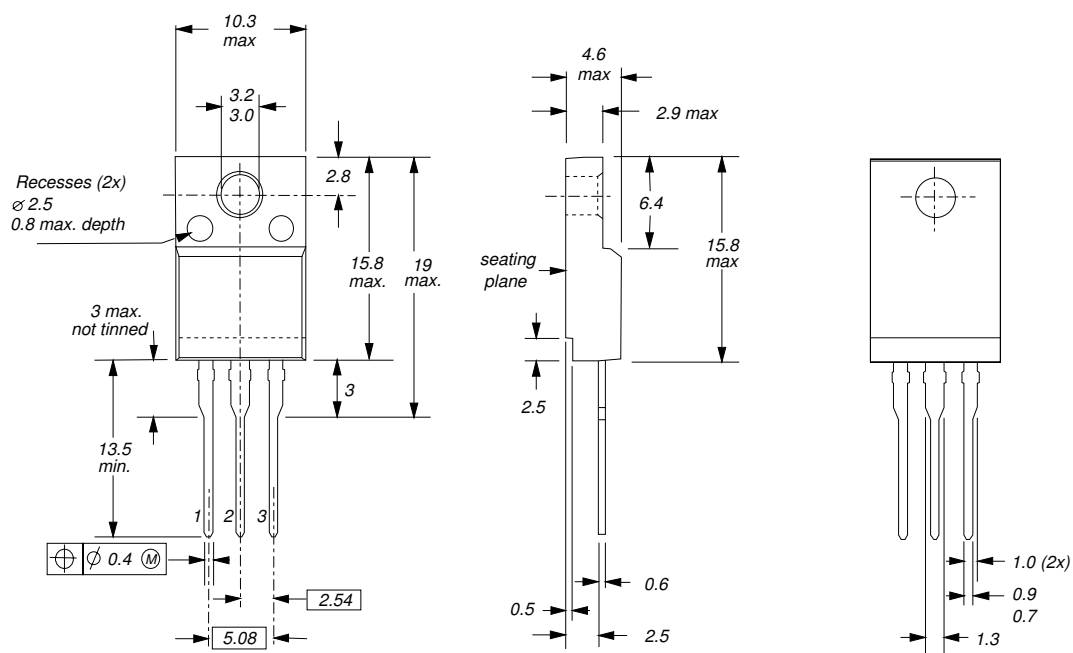


Fig.13. SOT186A; The seating plane is electrically isolated from all terminals.

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 ⁽¹⁾	PRODUCT STATUS ⁽²⁾	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.

Notes

1. Please consult the most recently issued document before initiating or completing a design.
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This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the content, except for the legal definitions and disclaimers.

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