

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

BTA216 series D, E and F
Three quadrant triacs
guaranteed commutation

Product specification

April 2002



Three quadrant triacs guaranteed commutation

BTA216 series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a 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.

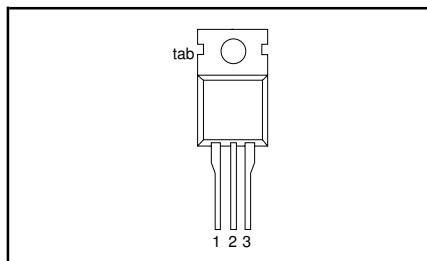
QUICK REFERENCE DATA

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

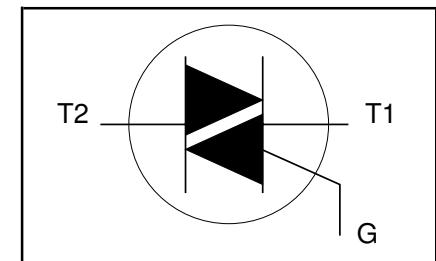
PINNING - TO220AB

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		-	600 ¹	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99^\circ\text{C}$	-	16	A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ prior to surge			
I^2t dI_T/dt	I^2t for fusing Repetitive rate of rise of on-state current after triggering	$t = 20\text{ ms}$ $t = 16.7\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 20\text{ A}$; $I_G = 0.2\text{ A}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	- - - -	140 150 98 100	A A A ² A/ μs
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

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

BTA216 series D, E and F

THERMAL RESISTANCES

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

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
I_{GT}	Gate trigger current ²	BTA216- $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	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-	-	5	10	25	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	15	25	30	mA
V_T	On-state voltage	$I_T = 20\text{ A}$	-	25	30	40	mA
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A}$ $T_j = 125^\circ\text{C}$	-	25	30	40	mA
I_D	Off-state leakage current	$V_D = V_{DRM(\text{max})}; T_j = 125^\circ\text{C}$	-	15	25	30	mA
				...D, E, F			
V_T	On-state voltage	$I_T = 20\text{ A}$	-	1.5	1.5	-	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A}$ $T_j = 125^\circ\text{C}$	0.25	-	-	-	V
I_D	Off-state leakage current	$V_D = V_{DRM(\text{max})}; T_j = 125^\circ\text{C}$	-	0.5	0.5	-	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	BTA216- $V_{DM} = 67\% V_{DRM(\text{max})}$ $T_j = 110^\circ\text{C}$; exponential waveform; gate open circuit	30	60	70	-	V/μs
dl_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}$ $I_{T(\text{RMS})} = 16\text{ A}$ $dV_{\text{com}}/dt = 10\text{ V/}\mu\text{s}$; gate open circuit	2.5	6.2	18	-	A/ms
dl_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}$ $I_{T(\text{RMS})} = 16\text{ A}$ $dV_{\text{com}}/dt = 0.1\text{ V/}\mu\text{s}$; gate open circuit	12	20	50	-	A/ms

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

Three quadrant triacs guaranteed commutation

BTA216 series D, E and F

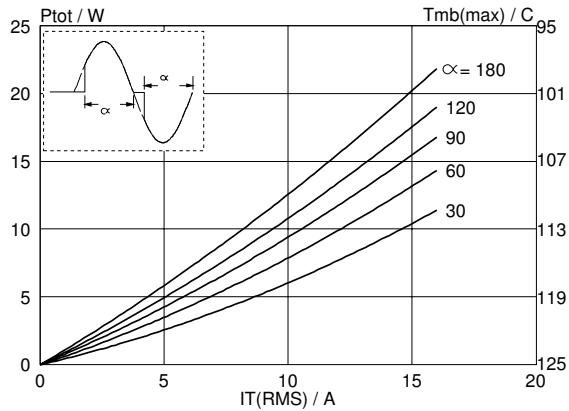


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

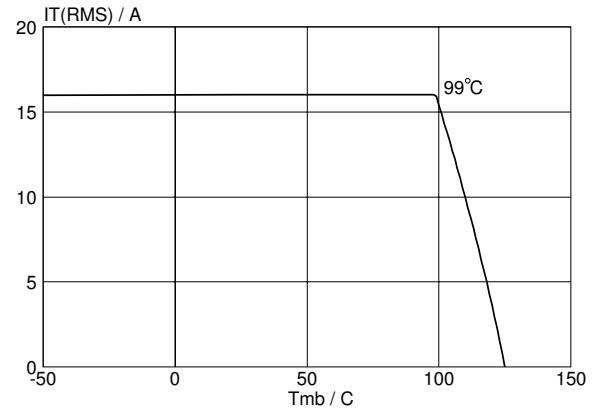


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

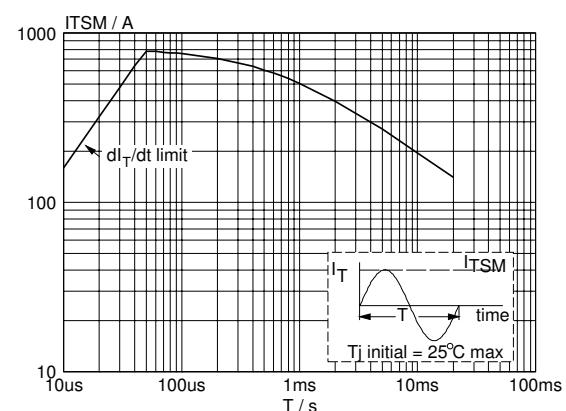


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20ms$.

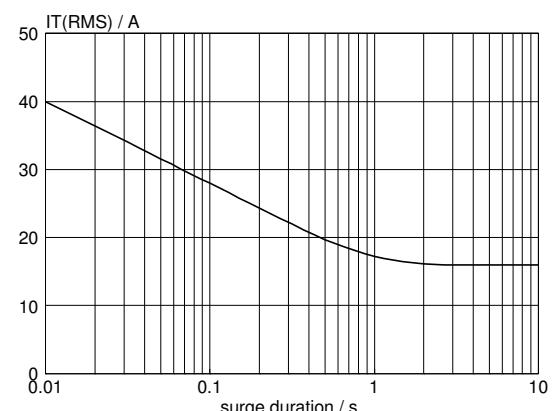


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 99^\circ C$.

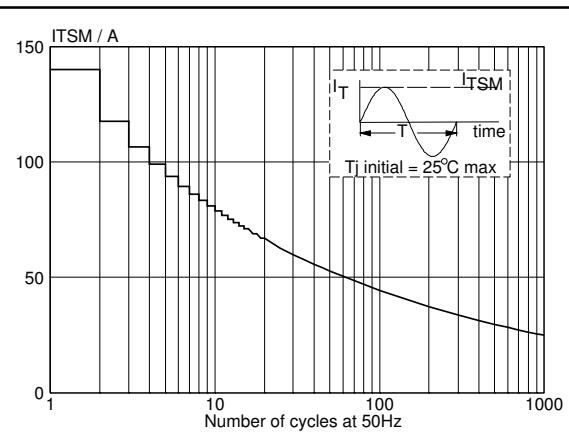


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

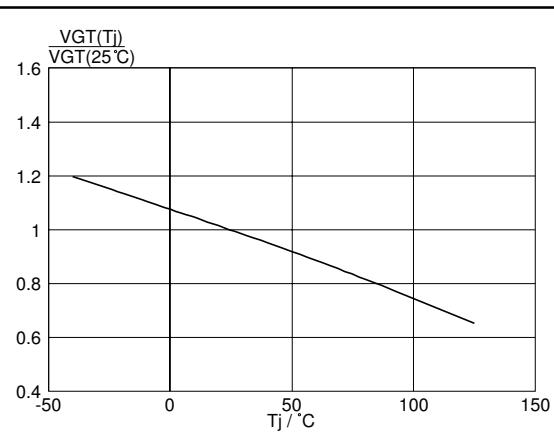


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ C)$, versus junction temperature T_j .

Three quadrant triacs guaranteed commutation

BTA216 series D, E and F

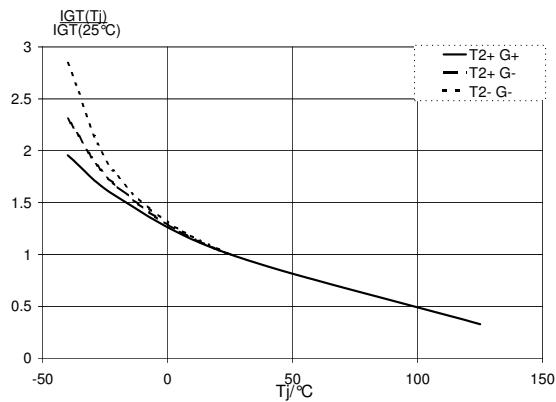


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

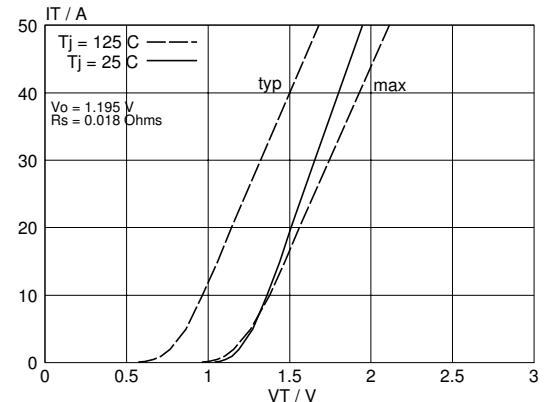


Fig.10. Typical and maximum on-state characteristic.

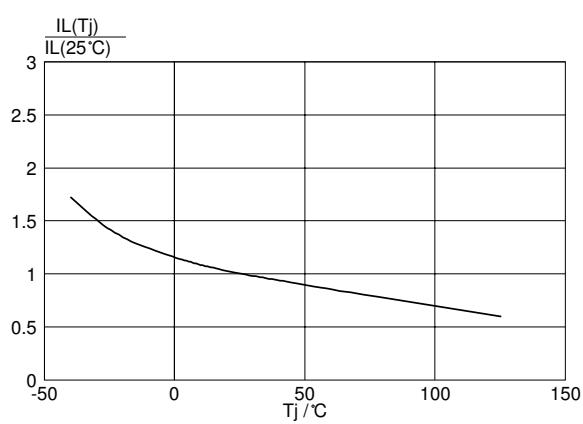


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ\text{C})$, versus junction temperature T_j .

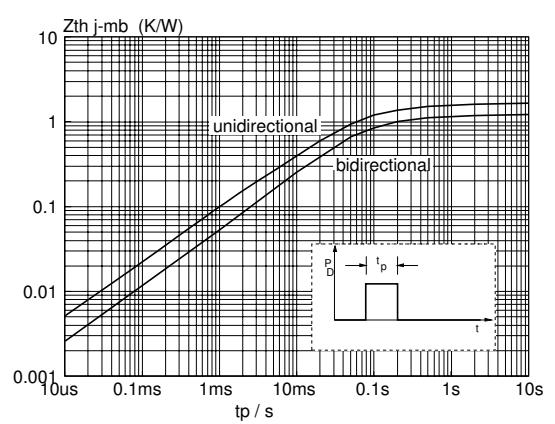


Fig.11. Transient thermal impedance $Z_{th,j\text{-mb}}$, versus pulse width t_p .

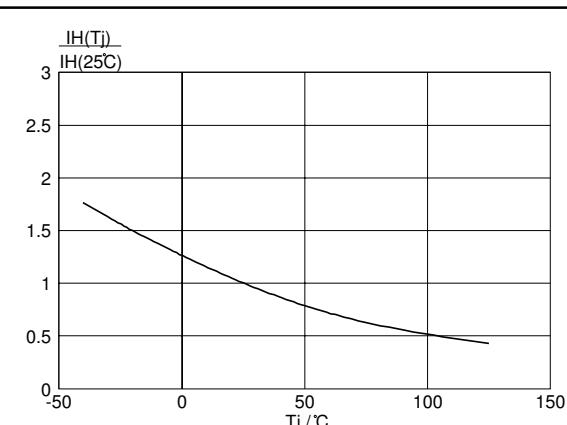


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ\text{C})$, versus junction temperature T_j .

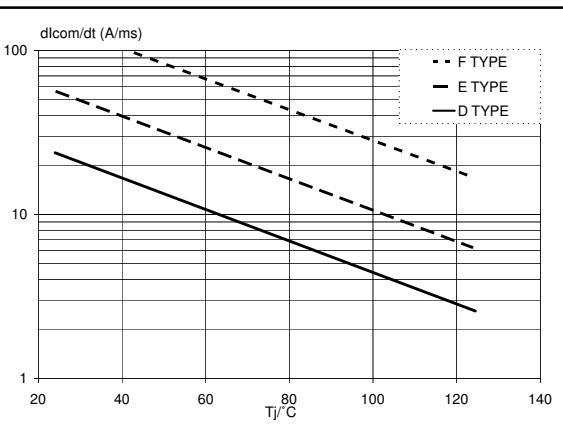


Fig.12. Minimum, critical rate of change of commutating current dl_{com}/dt versus junction temperature, $dV_{com}/dt = 10\text{V}/\mu\text{s}$.

Three quadrant triacs
guaranteed commutation

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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

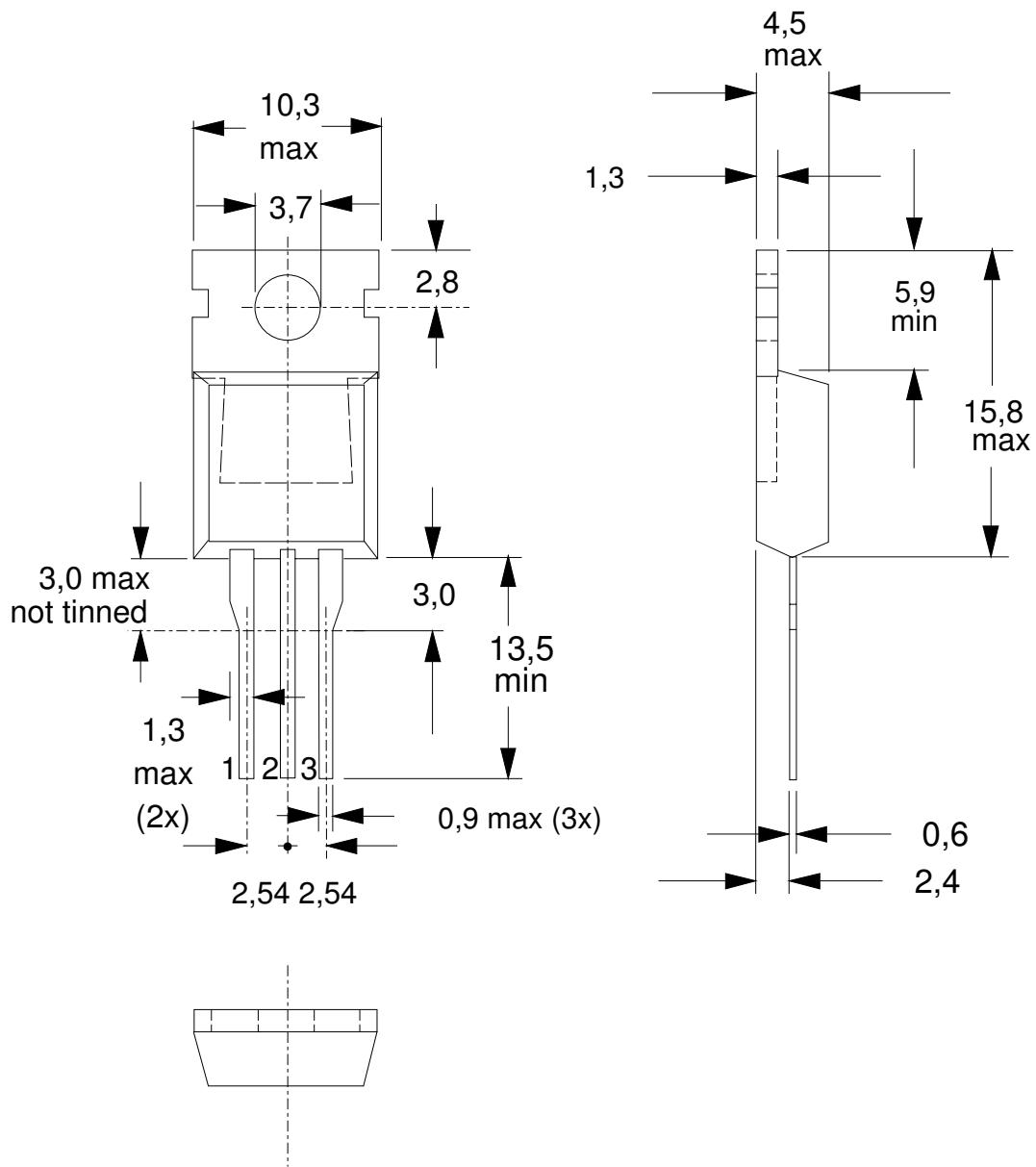


Fig.13. SOT78 (TO220AB). pin 2 connected to mounting base.

Notes

1. Refer to mounting instructions for SOT78 (TO220) 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.

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Contact information

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