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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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

founded by NXP

DATA SHEET

BTA212X series D, E and F

Three quadrant triacs
guaranteed commutation

Product specification

June 2003

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.

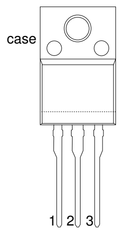
QUICK REFERENCE DATA

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

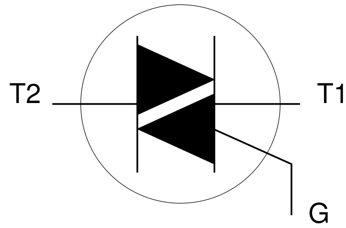
PINNING - SOT186A

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
				-600	**-800**	
V_{DRM}	Repetitive peak off-state voltages		-	600[1]	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{hs} \leq 56$ ˚C	-	12		A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25$ ˚C prior to surge				
		t = 20 ms	-	95		A
		t = 16.7 ms	-	105		A
I^2t	I^2t for fusing	t = 10 ms	-	45		A^2s
dI_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 20$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/µs		100		A/µs
I_{GM}	Peak gate current		-	2		A
P_{GM}	Peak gate power		-	5		W
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	0.5		W
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	125		˚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.

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚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 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 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
		without heatsink compound	-	-	5.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BTA212X-		**...D**	**...E**	**...F**	
I_{GT}	Gate trigger current[2]	V_D = 12 V; I_T = 0.1 A					
		T2+ G+	-	5	10	25	mA
		T2+ G-	-	5	10	25	mA
		T2- G-	-	5	10	25	mA
I_L	Latching current	V_D = 12 V; I_{GT} = 0.1 A					
		T2+ G+	-	15	25	30	mA
		T2+ G-	-	25	30	40	mA
		T2- G-	-	25	30	40	mA
I_H	Holding current	V_D = 12 V; I_{GT} = 0.1 A	-	15	25	30	mA
V_T	On-state voltage	I_T = 17 A	-	1.6			V
V_{GT}	Gate trigger voltage	V_D = 12 V; I_T = 0.1 A	-	1.5			V
		V_D = 400 V; I_T = 0.1 A; T_j = 125 ˚C	0.25	-			V
I_D	Off-state leakage current	V_D = $V_{DRM(max)}$; T_j = 125 ˚C	-	0.5			mA

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

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.			MAX.	UNIT
		BTA212X-	**...D**	**...E**	**...F**		
dV_D/dt	Critical rate of rise of off-state voltage	V_{DM} = 67% $V_{DRM(max)}$; T_j = 110 ˚C; exponential waveform; gate open circuit	30	60	70	-	V/μs
dI_{com}/dt	Critical rate of change of commutating current	V_{DM} = 400 V; T_j = 125 ˚C; $I_{T(RMS)}$ = 12 A; dV_{com}/dt = 10 V/μs; gate open circuit	1.0	8.0	21	-	A/ms
dI_{com}/dt	Critical rate of change of commutating current	V_{DM} = 400 V; T_j = 125 ˚C; $I_{T(RMS)}$ = 12 A; dV_{com}/dt = 0.1 V/μs; gate open circuit	3.5	16	32	-	A/ms

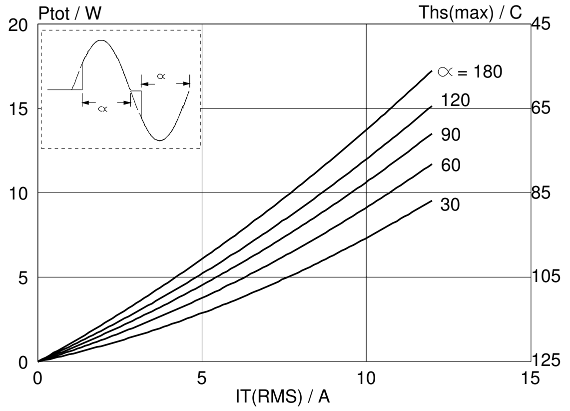


Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

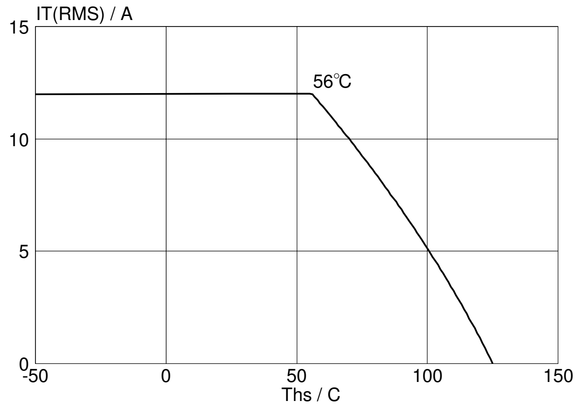


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus heatsink temperature T_{hs}.

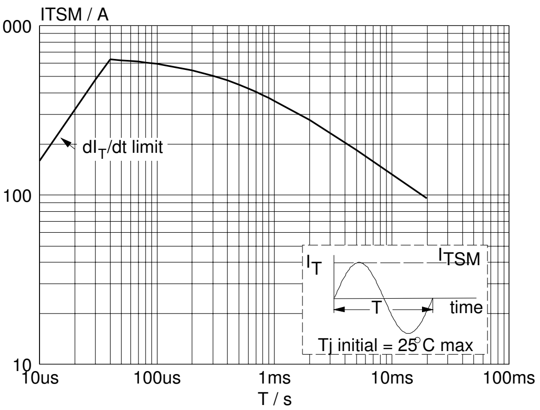


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width t_p, for sinusoidal currents, $t_p \leq 20ms$.

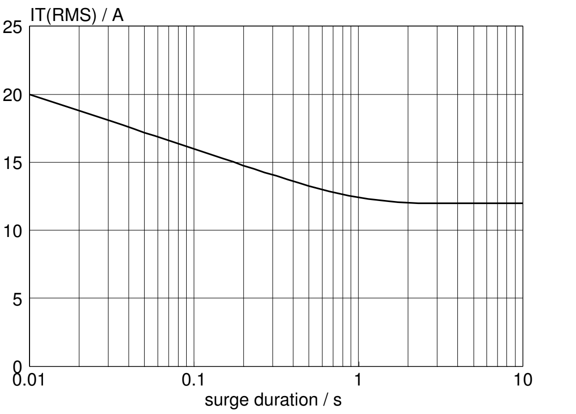


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{hs} \leq 56^{\circ}C$.

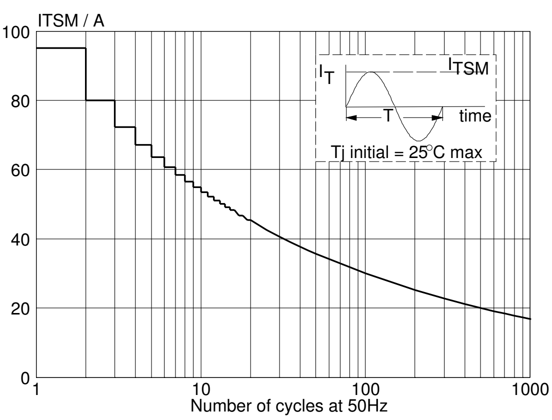


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

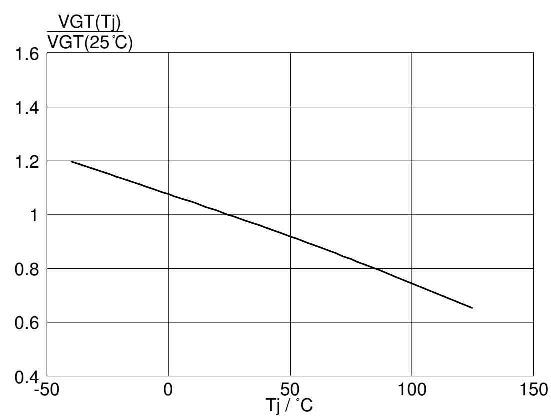


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/ V_{GT}(25^{\circ}C)$, versus junction temperature T_j.

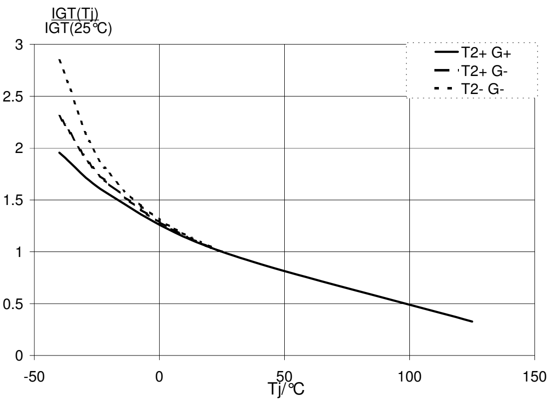


Fig.7. Normalised gate trigger current $I_{GT}(T_j)$/ I_{GT}(25˚C), versus junction temperature T_j.

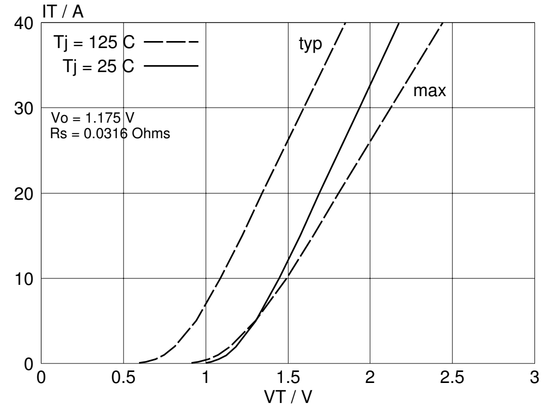


Fig.10. Typical and maximum on-state characteristic.

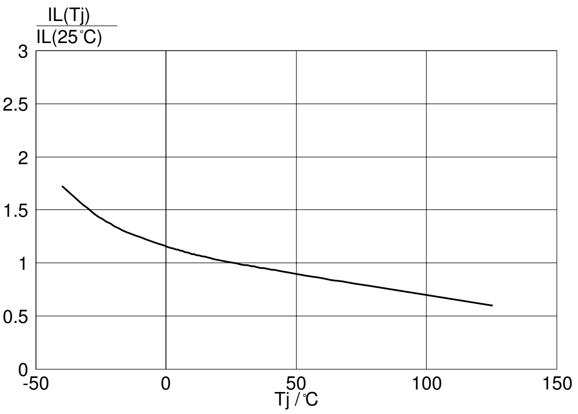


Fig.8. Normalised latching current $I_L(T_j)$/ I_L(25˚C), versus junction temperature T_j.

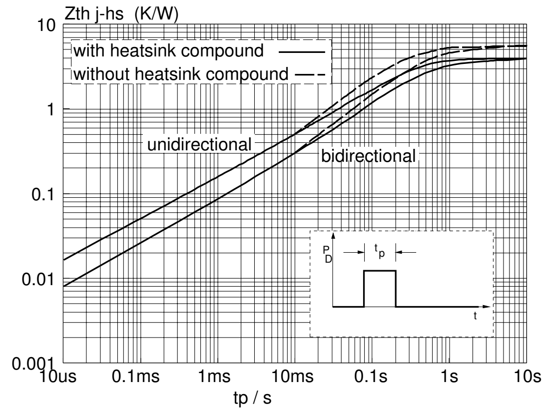


Fig.11. Transient thermal impedance $Z_{th\ j\text{-}hs}$, versus pulse width t_p.

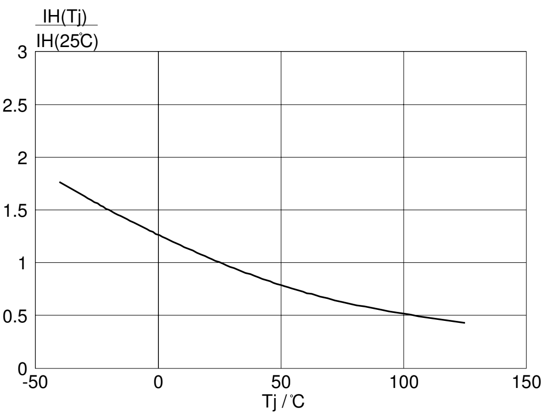


Fig.9. Normalised holding current $I_H(T_j)$/ I_H(25˚C), versus junction temperature T_j.

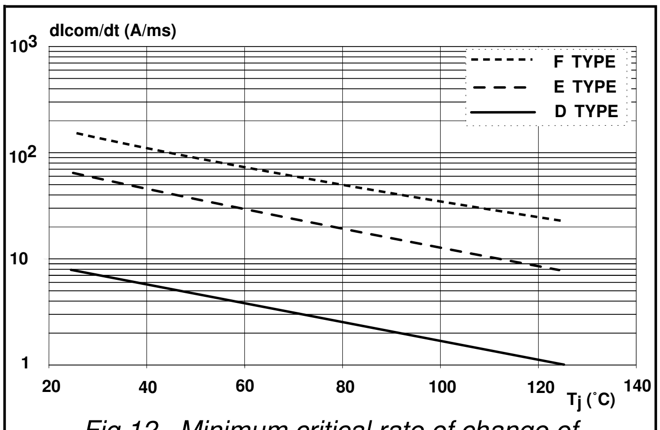


Fig.12. Minimum critical rate of change of commutating current dI_{com}/dt versus junction temperature, dV_{com}/dt = 10 V/µs.

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

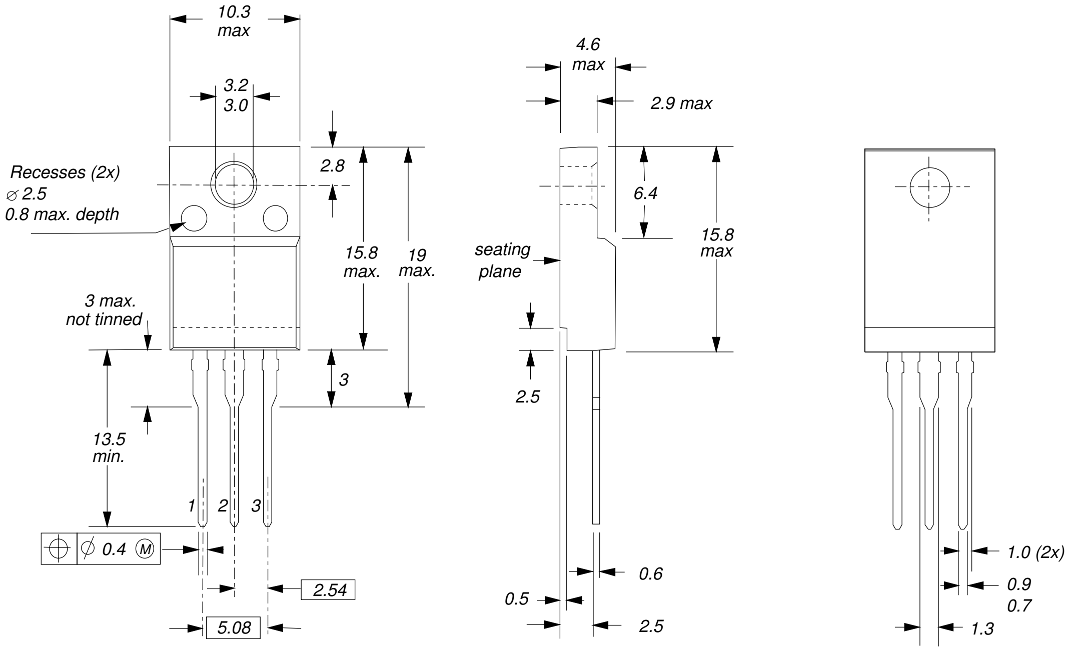


Fig.13. SOT186A; The seating plane is electrically isolated from all terminals.

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.

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Contact information

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