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

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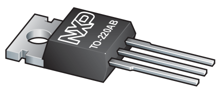


BTA216-600BT

Triacs high commutation

Rev. 2 — 9 November 2011 **Product data sheet**

1. Product profile

1.1 General description

Passivated high commutation triac in a plastic envelope. Featuring high maximum junction temperature and high commutation capability. Intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This device will commutate the full rated RMS current at the maximum rated junction temperature, without the aid of a snubber.

1.2 Features and benefits

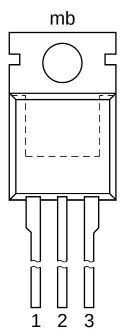
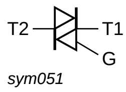
- High maximum junction temperature
- High commutation capability

1.3 Quick reference data

- $V_{DRM} \leq 600$ V
- $I_{GT} \leq 50$ mA
- $T_j \leq 150$ °C
- $I_{T(RMS)} \leq 16$ A
- $I_{TSM} \leq 140$ A
- $dI_{com}/dt = 18$ A/ms

2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	main terminal 1 (T1)	 SOT78 (TO-220AB)	
2	main terminal 2 (T2)		
3	gate (G)		
mb	mounting base [1]		

[1] Connected to main terminal 2 (T2)

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BTA216-600BT	TO-220AB	plastic single-ended package; heatsink mounted; 3 leads; 1 mounting hole	SOT78

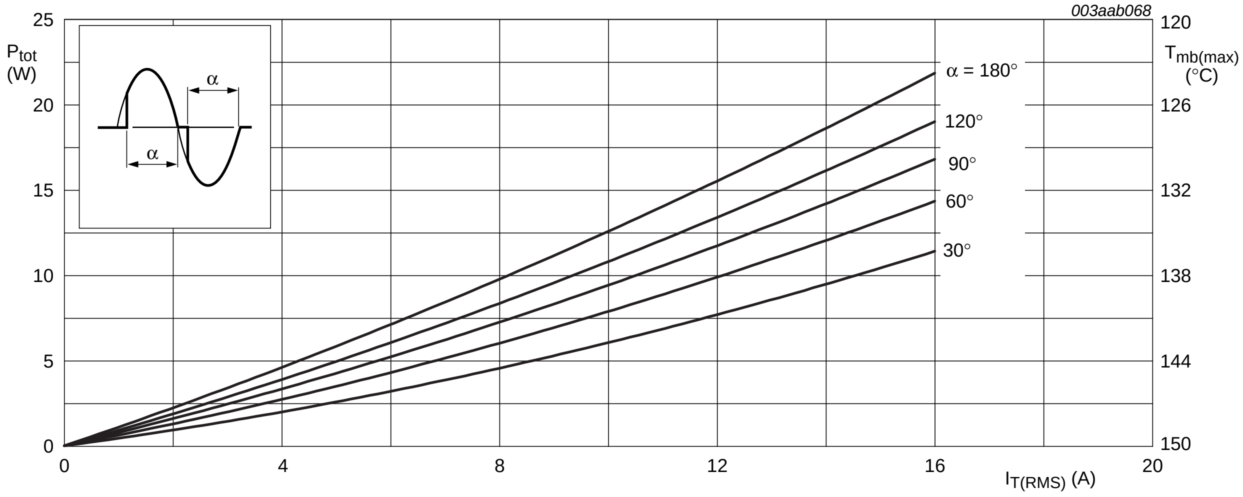
4. Limiting values

Table 3: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

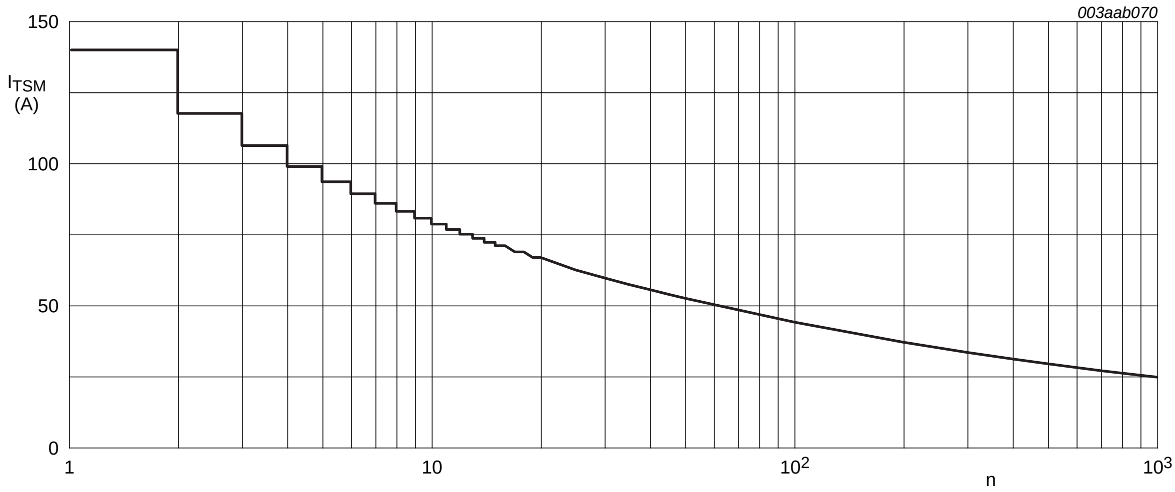
Symbol	Parameter	Conditions		Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage		[1]	-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 124$ °C; see Figure 4 and 5		-	16	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_j = 25$ °C prior to surge; see Figure 2 and 3				
		t = 20 ms		-	140	A
		t = 16.7 ms		-	150	A
I^2t	I^2t for fusing	t = 10 ms		-	98	A^2s
dI_T/dt	rate of rise of on-state current	$I_{TM} = 20$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/µs		-	100	A/µs
I_{GM}	peak gate current			-	2	A
V_{GM}	peak gate voltage			-	5	V
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	junction temperature			-	150	°C

[1] Although not recommended, off-state voltages up to 800 V 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.



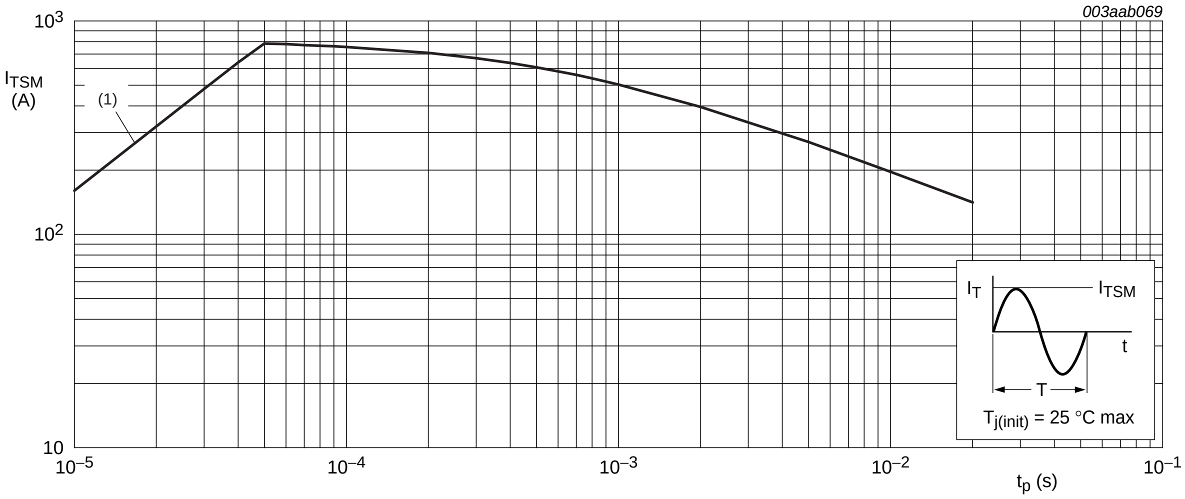
α = conduction angle

Fig 1. On-state power dissipation as a function of RMS on-state current; maximum values



f = 50 Hz

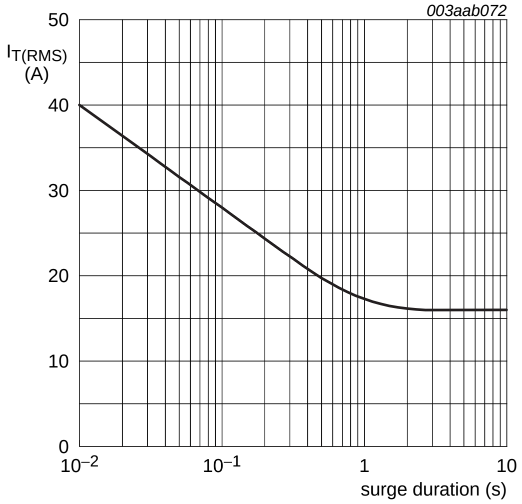
Fig 2. Non-repetitive peak on-state current as a function of number of half cycles; sinusoidal currents; maximum values



$t_p \leq 20$ ms

(1) dI_T/dt limit

Fig 3. Non-repetitive peak on-state current as a function of pulse width; sinusoidal currents; maximum values



f = 50 Hz; $T_{mb} \leq 131$ °C

Fig 4. RMS on-state current as a function of surge duration; sinusoidal currents; maximum values

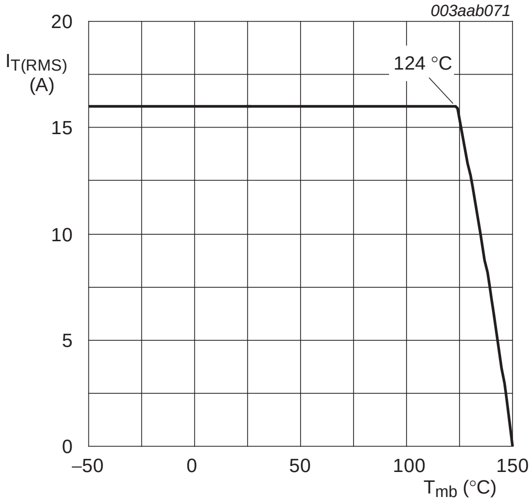
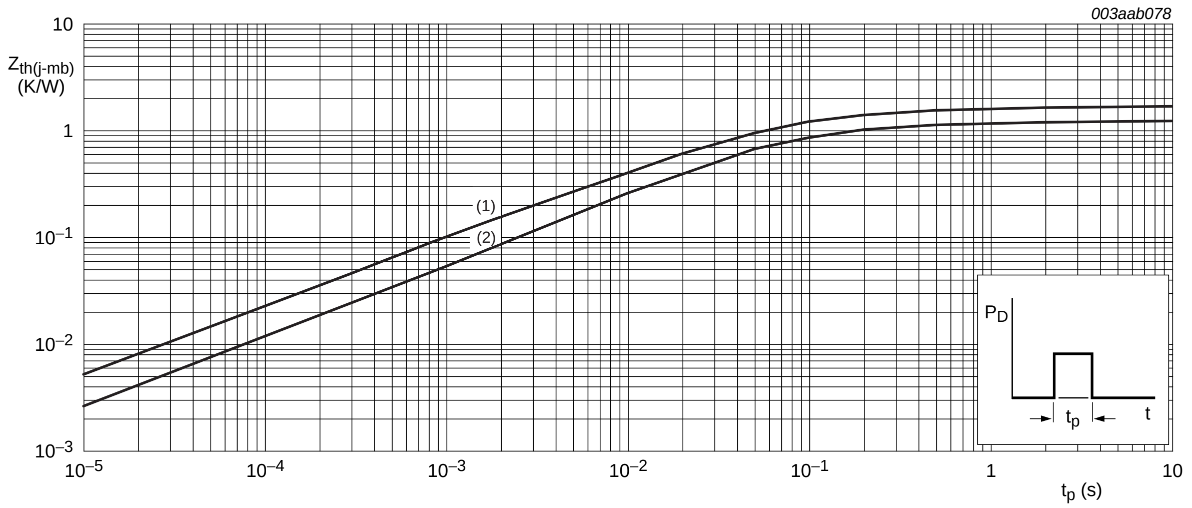


Fig 5. RMS on-state current as a function of mounting base temperature; maximum values

5. Thermal characteristics

Table 4: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle; see Figure 6	-	-	1.2	K/W
		half cycle; see Figure 6	-	-	1.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W



(1) half cycle

(2) full cycle

Fig 6. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Static characteristics

Table 5: Static characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; see Figure 8	[1]				
		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 V; I_{GT} = 0.1 A; see Figure 10					
		T2+ G+		-	31	60	mA
		T2+ G–		-	34	90	mA
		T2– G–		-	30	60	mA
I_H	holding current	V_D = 12 V; I_{GT} = 0.1 A; see Figure 11		-	31	60	mA
V_T	on-state voltage	I_T = 20 A; see Figure 9		-	1.2	1.5	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; see Figure 7		-	0.7	1.5	V
		V_D = 400 V; I_T = 0.1 A; T_j = 150 °C		0.25	0.4	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; T_j = 150 °C		-	0.5	3	mA

[1] Device does not trigger in the T2– G+ quadrant.

7. Dynamic characteristics

Table 6: Dynamic characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 0.67$V_{DRM(max)}$; T_j = 150 °C; exponential waveform; gate open circuit	500	1500	-	V/µs
dI_{com}/dt	rate of change of commutating current	V_{DM} = 400 V; T_j = 150 °C; $I_{T(RMS)}$ = 16 A; without snubber; gate open circuit; see Figure 12	9	18	-	A/ms
t_{gt}	gate-controlled turn-on time	I_{TM} = 20 A; V_D = $V_{DRM(max)}$; I_G = 0.1 A; dI_G/dt = 5 A/µs	-	2	-	µs

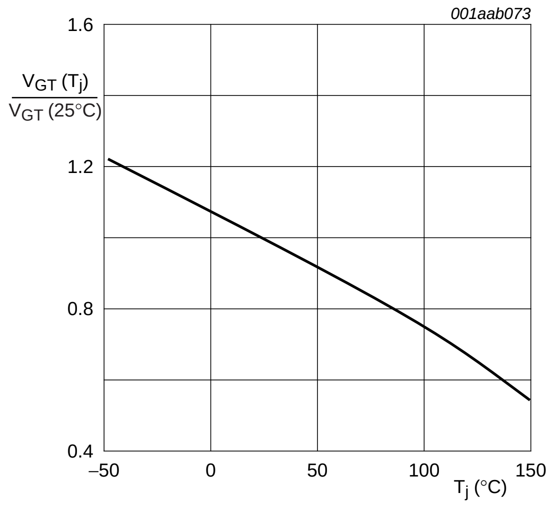
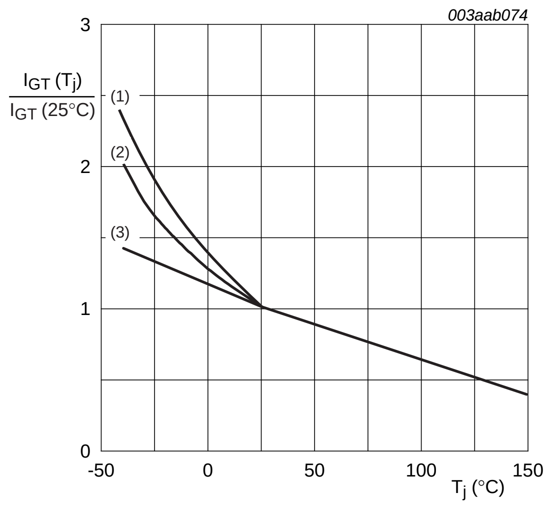


Fig 7. Normalized gate trigger voltage as a function of junction temperature

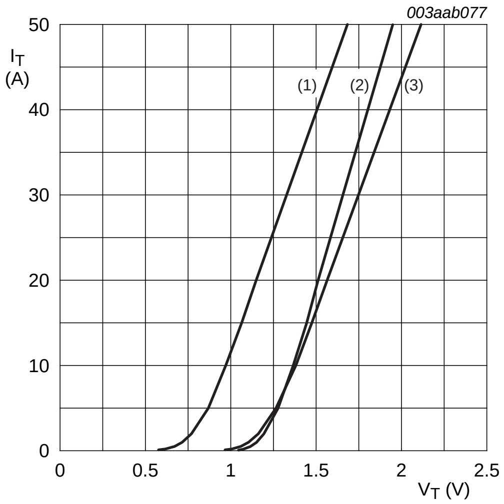


(1) T2– G–

(2) T2+ G–

(3) T2+ G+

Fig 8. Normalized gate trigger current as a function of junction temperature



V_O = 1.195 V; R_S = 18 mΩ

(1) T_j = 150 °C; typical values

(2) T_j = 25 °C; maximum values

(3) T_j = 150 °C; maximum values

Fig 9. On-state characteristic

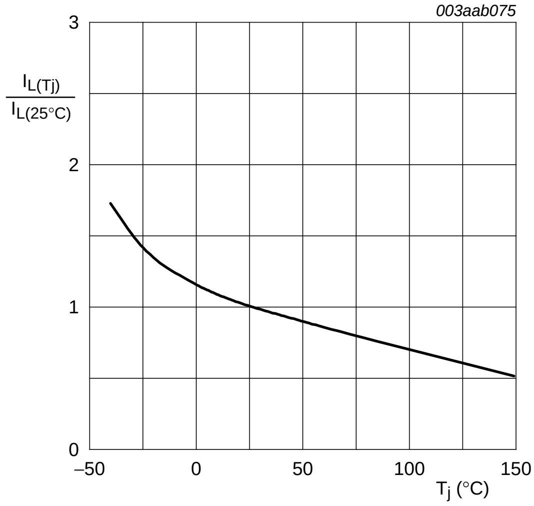


Fig 10. Normalized latching current as a function of junction temperature

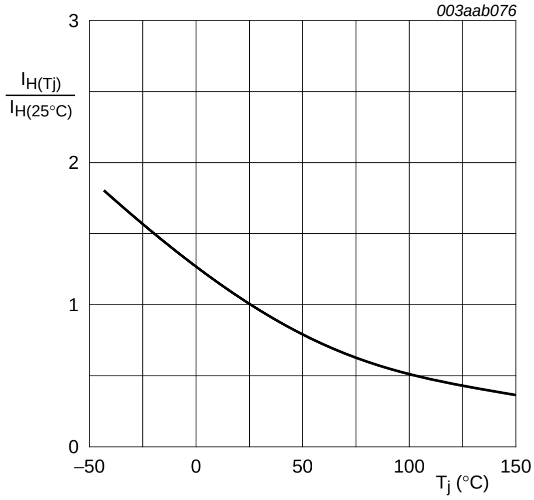


Fig 11. Normalized holding current as a function of junction temperature

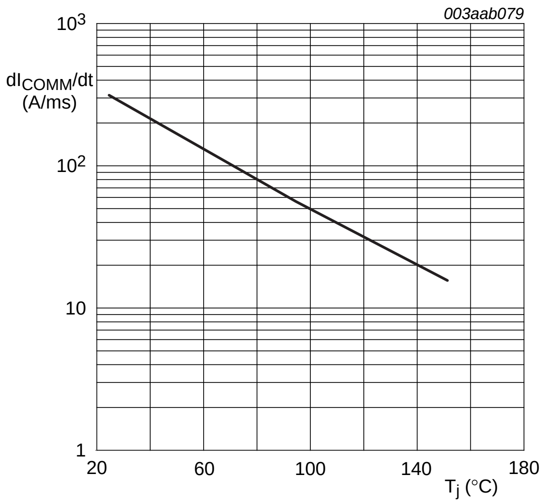


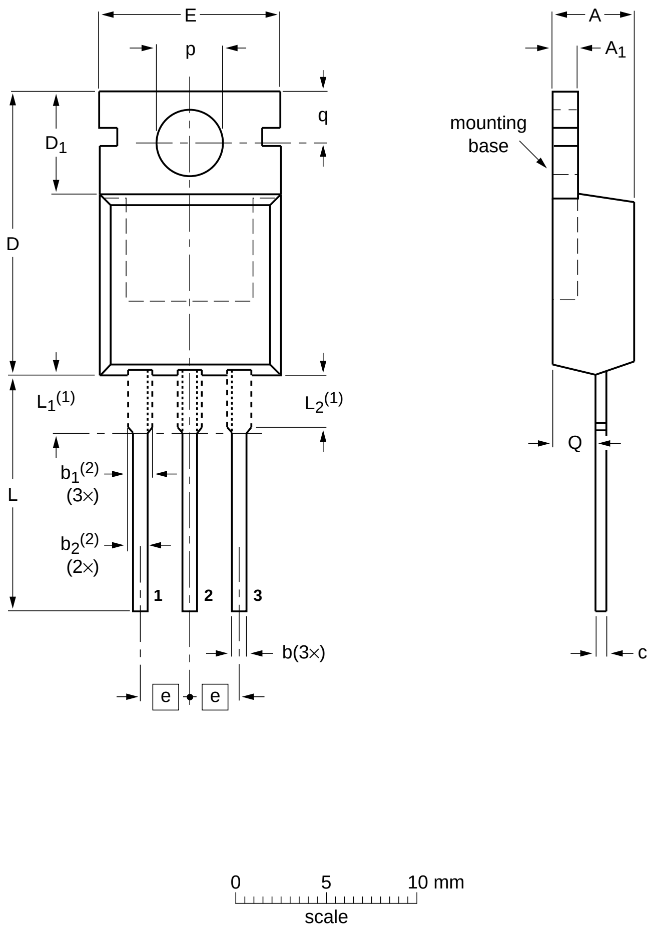
Fig 12. Rate of change of commutating current as a function of junction temperature; typical values

8. Package information

Plastic meets UL94 V-0 at ⅛ inch.

9. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB **SOT78**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1(2)	b_2(2)	c	D	D_1	E	e	L	L_1(1)	L_2(1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78		3-lead TO-220AB	SC-46			~~08-04-23~~ 08-06-13

Fig 13. Package outline SOT78 (TO-220AB)

10. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BTA216-600BT v.2	20111109	Product data sheet	-	BTA216-600BT v.1
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate.			
BTA216-600BT v.1	20050825	Product data sheet	-	-

11. Legal information

11.1 Data sheet status

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.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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13. Contents

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