

# 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



# BTA208-800B

3Q Hi-Com Triac

11 August 2014

Product data sheet

## 1. General description

Planar passivated high commutation three quadrant triac in a SOT78 (TO-220AB) plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series B" triac will commutate the full rated RMS current at the maximum rated junction temperature without the aid of a snubber.

## 2. Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High voltage capability
- Less sensitive gate for very high noise immunity
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only

## 3. Applications

- Electronic thermostats
- General purpose motor controls
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage			-	-	800	V
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 20 \text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		-	-	65	A
$I_{T(\text{RMS})}$	RMS on-state current	full sine wave; $T_{mb} \leq 102^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	-	8	A
Static characteristics							
$I_{GT}$	gate trigger current	$V_D = 12 \text{ V}$ ; $I_T = 0.1 \text{ A}$ ; T2+ G+; $T_j = 25^\circ\text{C}$ ; <a href="#">Fig. 6</a>		2	18	50	mA
		$V_D = 12 \text{ V}$ ; $I_T = 0.1 \text{ A}$ ; T2+ G-; $T_j = 25^\circ\text{C}$ ; <a href="#">Fig. 6</a>		2	21	50	mA



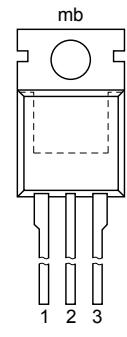
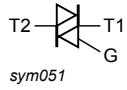
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Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		$V_D = 12 \text{ V}$ ; $I_T = 0.1 \text{ A}$ ; $T_2 - G -$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 6</a>		2	34	50	mA

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		
2	T2	main terminal 2		
3	G	gate		
mb	T2	mounting base; main terminal 2	 <b>TO-220AB (SOT78)</b>	 <i>sym051</i>

## 6. Ordering information

Table 3. Ordering information

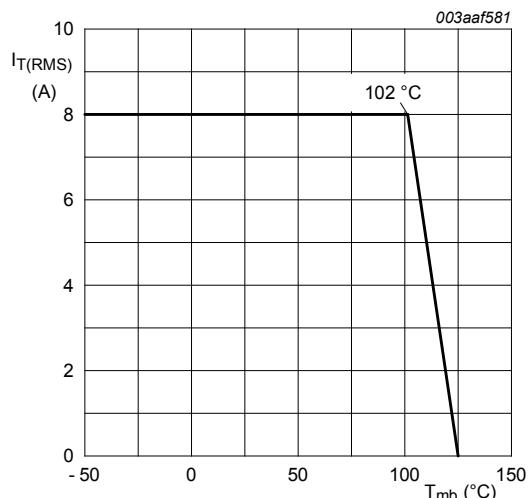
Type number	Package		
	Name	Description	Version
BTA208-800B	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78
BTA208-800B/DG	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78
BTA208-800B/L01	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

## 7. Limiting values

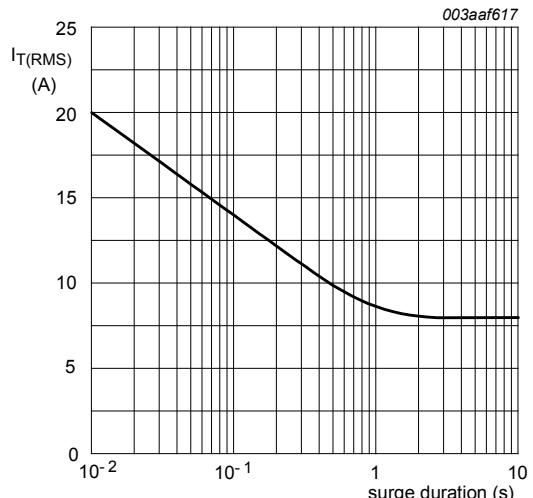
**Table 4. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage			-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	8	A
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		-	65	A
		full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 16.7\text{ ms}$		-	71	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN		-	21	$\text{A}^2\text{s}$
$dI_T/dt$	rate of rise of on-state current	$I_T = 12\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$		-	100	$\text{A}/\mu\text{s}$
$I_{GM}$	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	$^\circ\text{C}$
$T_j$	junction temperature			-	125	$^\circ\text{C}$



**Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values**



**Fig. 2. RMS on-state current as a function of surge duration; maximum values**

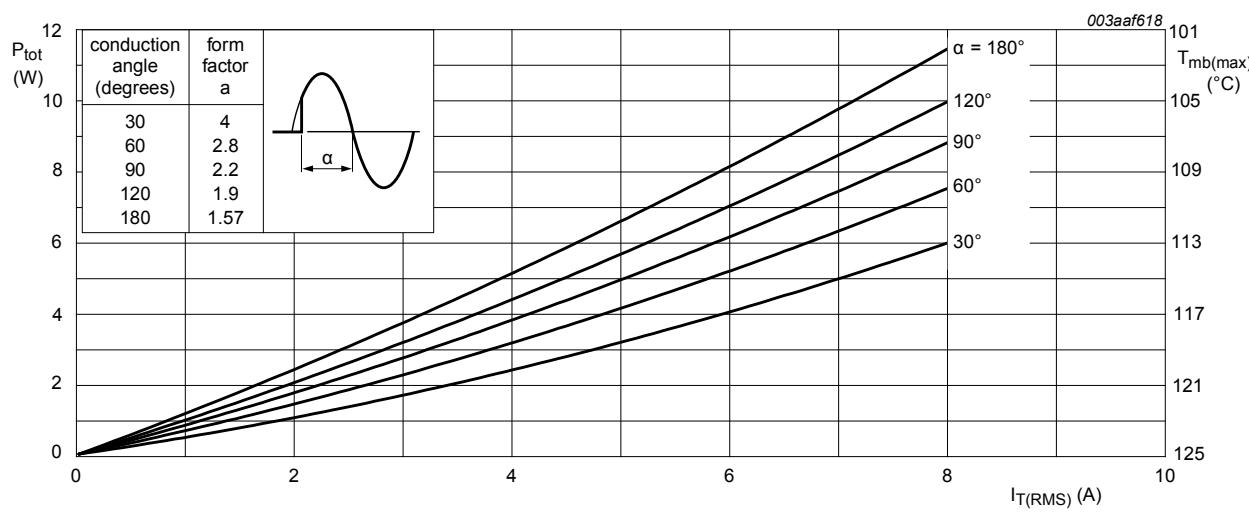


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

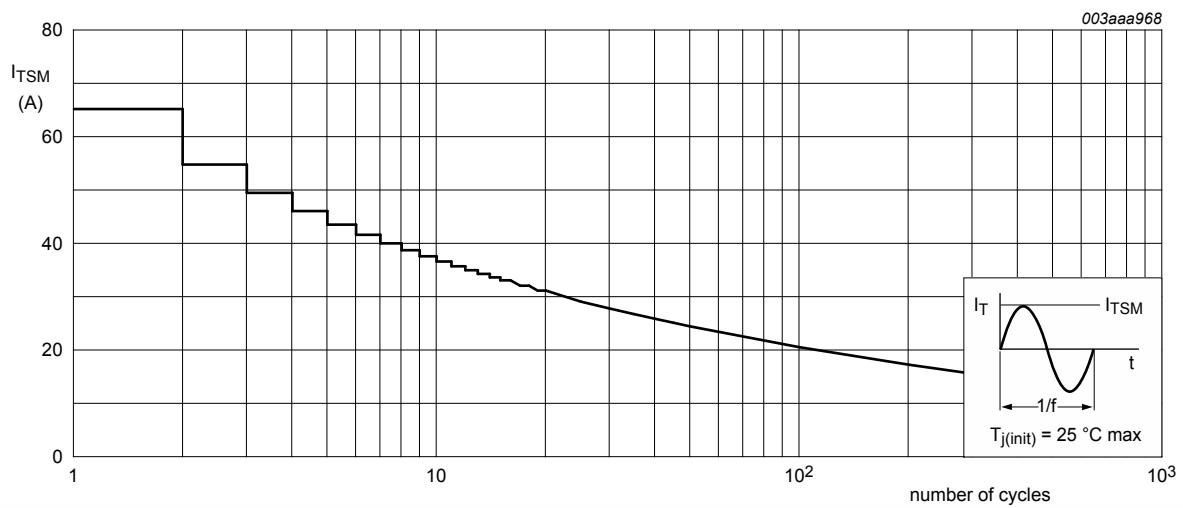
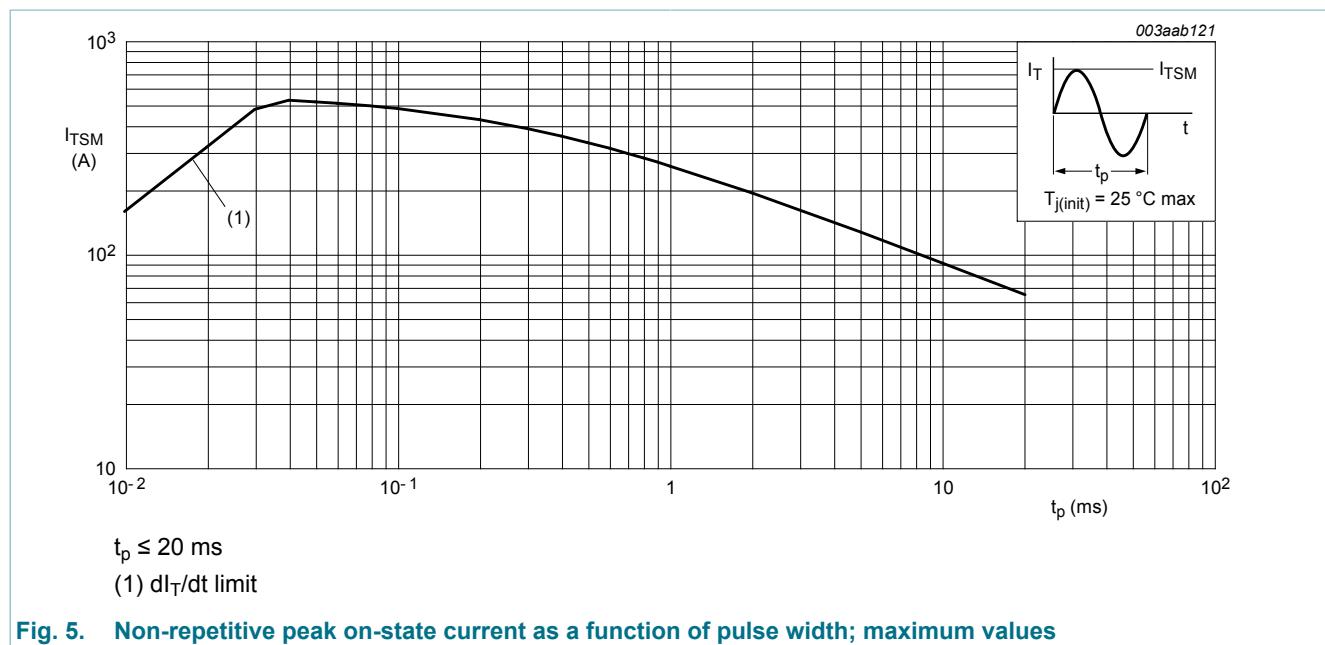


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



## 8. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle	-	-	2	K/W
		half cycle	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

## 9. Characteristics

**Table 6. Characteristics**

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Static characteristics</b>							
I <sub>GT</sub>	gate trigger current	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T2+ G+; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		2	18	50	mA
		V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T2+ G-; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		2	21	50	mA
		V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T2- G-; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		2	34	50	mA
I <sub>L</sub>	latching current	V <sub>D</sub> = 12 V; I <sub>G</sub> = 0.1 A; T2+ G+; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	31	60	mA
		V <sub>D</sub> = 12 V; I <sub>G</sub> = 0.1 A; T2+ G-; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	34	90	mA
		V <sub>D</sub> = 12 V; I <sub>G</sub> = 0.1 A; T2- G-; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	30	60	mA
I <sub>H</sub>	holding current	V <sub>D</sub> = 12 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 8</a>		-	31	60	mA
V <sub>T</sub>	on-state voltage	I <sub>T</sub> = 10 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 9</a>		-	1.3	1.65	V
V <sub>GT</sub>	gate trigger voltage	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 10</a>		-	0.7	1	V
		V <sub>D</sub> = 400 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 125 °C; <a href="#">Fig. 10</a>		0.25	0.4	-	V
I <sub>D</sub>	off-state current	V <sub>D</sub> = 800 V; T <sub>j</sub> = 125 °C		-	0.1	0.5	mA
<b>Dynamic characteristics</b>							
dV <sub>D</sub> /dt	rate of rise of off-state voltage	V <sub>DM</sub> = 535 V; T <sub>j</sub> = 125 °C; (V <sub>DM</sub> = 67% of V <sub>DRM</sub> ); exponential waveform; gate open circuit		1000	4000	-	V/μs
dI <sub>com</sub> /dt	rate of change of commutating current	V <sub>D</sub> = 400 V; T <sub>j</sub> = 125 °C; I <sub>T(RMS)</sub> = 8 A; dV <sub>com</sub> /dt = 20 V/μs; snubberless condition; gate open circuit; <a href="#">Fig. 11</a>		-	14	-	A/ms
t <sub>gt</sub>	gate-controlled turn-on time	I <sub>TM</sub> = 12 A; V <sub>D</sub> = 800 V; I <sub>G</sub> = 0.1 A; dI <sub>G</sub> /dt = 5 A/μs		-	2	-	μs

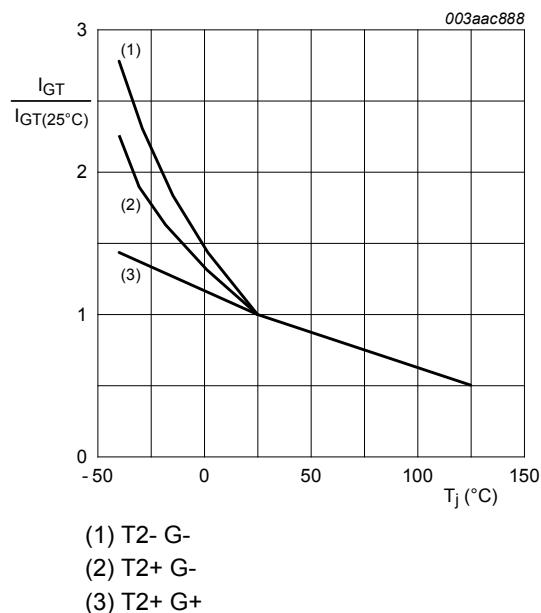


Fig. 6. Normalized gate trigger current as a function of junction temperature

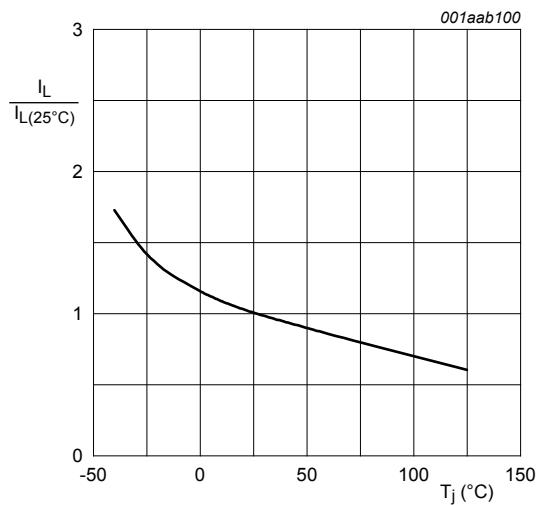


Fig. 7. Normalized latching current as a function of junction temperature

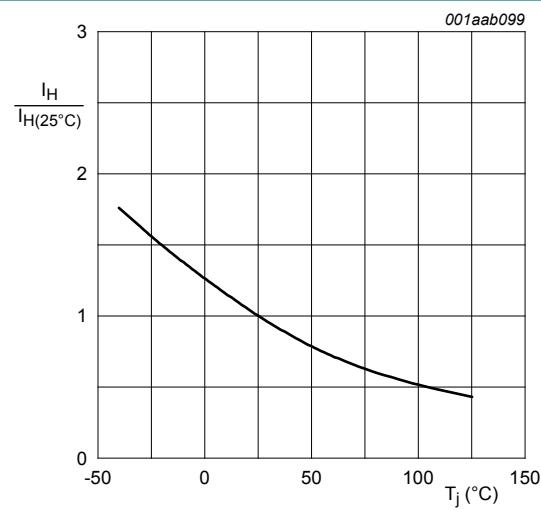


Fig. 8. Normalized holding current as a function of junction temperature

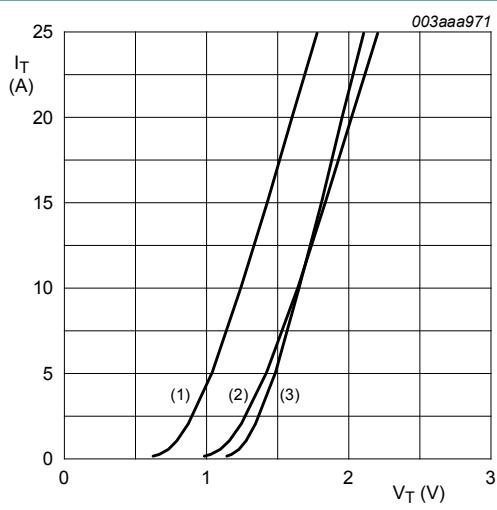


Fig. 9. On-state current as a function of on-state voltage

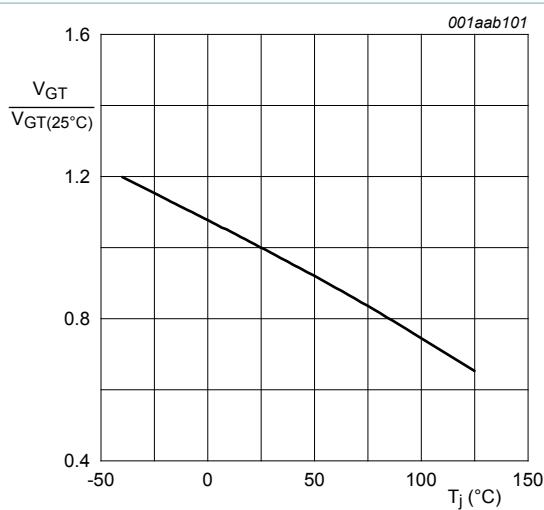


Fig. 10. Normalized gate trigger voltage as a function of junction temperature

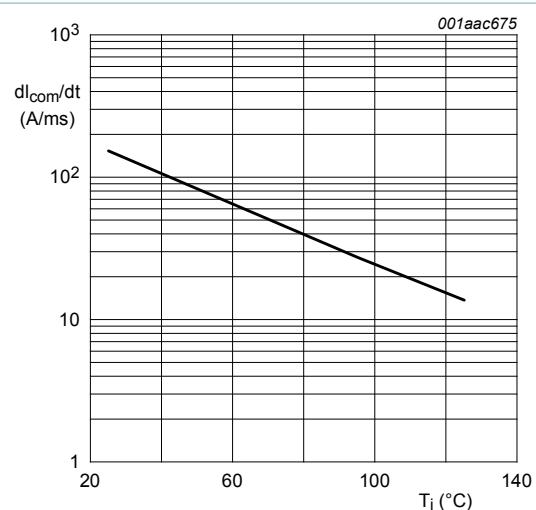
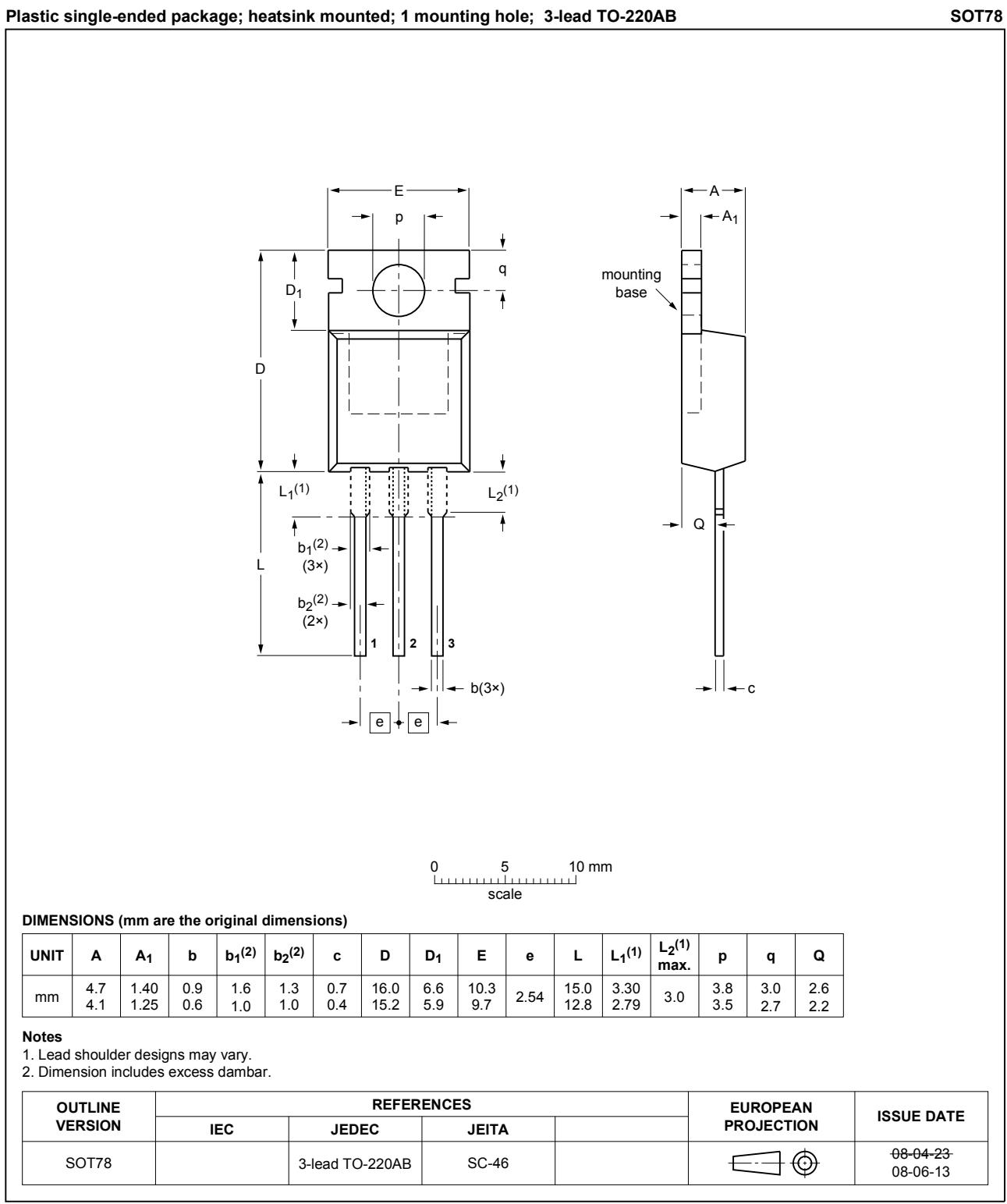


Fig. 11. Rate of rise of commutating current as a function of junction temperature; typical values

## 10. Package outline



## 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.

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## 12. Contents

1	General description .....	1
2	Features and benefits .....	1
3	Applications .....	1
4	Quick reference data .....	1
5	Pinning information .....	2
6	Ordering information .....	2
7	Limiting values .....	3
8	Thermal characteristics .....	6
9	Characteristics .....	7
10	Package outline .....	10
11	Legal information .....	11
11.1	Data sheet status .....	11
11.2	Definitions .....	11
11.3	Disclaimers .....	11
11.4	Trademarks .....	12

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