



# 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](http://www.nxp.com) use [www.ween-semi.com](http://www.ween-semi.com)

**Email** - For [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com) use [salesaddresses@ween-semi.com](mailto:salesaddresses@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](mailto:salesaddresses@ween-semi.com)).

Thank you for your cooperation and understanding,

WeEn Semiconductors



## Thyristors

## BT145 series

## GENERAL DESCRIPTION

Glass passivated thyristors in a plastic envelope, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

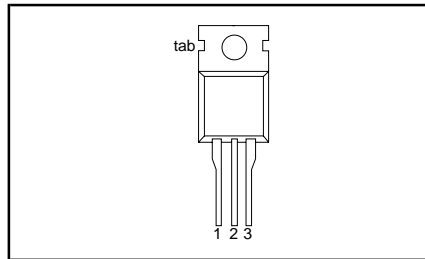
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	<b>BT145-</b>	<b>500R</b>	<b>600R</b>	<b>800R</b>	
$V_{DRM}$ , $V_{RRM}$	Repetitive peak off-state voltages	500	600	800	V
$I_{T(AV)}$	Average on-state current	16	16	16	A
$I_{T(RMS)}$	RMS on-state current	25	25	25	A
$I_{TSM}$	Non-repetitive peak on-state current	300	300	300	A

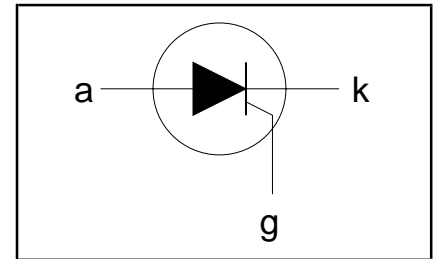
## PINNING - TO220AB

PIN	DESCRIPTION
1	cathode
2	anode
3	gate
tab	anode

## PIN CONFIGURATION



## SYMBOL



## LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
$V_{DRM}$ , $V_{RRM}$	Repetitive peak off-state voltages		-	<b>-500R</b> 500 <sup>1</sup>	<b>-600R</b> 600 <sup>1</sup>	<b>-800R</b> 800	V
$I_{T(AV)}$	Average on-state current	half sine wave; $T_{mb} \leq 101\text{ °C}$ all conduction angles	-	16			A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_j = 25\text{ °C}$ prior to surge	-	25			A
$I_{TSM}$	Non-repetitive peak on-state current	$t = 10\text{ ms}$	-	300			A
		$t = 8.3\text{ ms}$	-	330			A
$I^2t$	$I^2t$ for fusing	$t = 10\text{ ms}$	-	450			A <sup>2</sup> s
$di_T/dt$	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 50\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $di_G/dt = 0.2\text{ A}/\mu\text{s}$	-	200			A/ $\mu\text{s}$
$I_{GM}$	Peak gate current		-	5			A
$V_{GM}$	Peak gate voltage		-	5			V
$V_{RGM}$	Peak reverse gate voltage		-	5			V
$P_{GM}$	Peak gate power		-	20			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

<sup>1</sup> Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/ $\mu\text{s}$ .

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## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	in free air	-	-	1.0	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient		-	60	-	K/W

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{GT}$	Gate trigger current	$V_D = 12\ \text{V}$ ; $I_T = 0.1\ \text{A}$	-	5	35	mA
$I_L$	Latching current	$V_D = 12\ \text{V}$ ; $I_{GT} = 0.1\ \text{A}$	-	25	80	mA
$I_H$	Holding current	$V_D = 12\ \text{V}$ ; $I_{GT} = 0.1\ \text{A}$	-	20	60	mA
$V_T$	On-state voltage	$I_T = 30\ \text{A}$	-	1.1	1.5	V
$V_{GT}$	Gate trigger voltage	$V_D = 12\ \text{V}$ ; $I_T = 0.1\ \text{A}$	-	0.6	1.0	V
$I_D, I_R$	Off-state leakage current	$V_D = V_{DRM(max)}$ ; $I_T = 0.1\ \text{A}$ ; $T_j = 125\ ^\circ\text{C}$	0.25	0.4	-	V
		$V_D = V_{DRM(max)}$ ; $V_R = V_{RRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$	-	0.2	1.0	mA

## DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ; exponential waveform; gate open circuit	200	500	-	V/ $\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 40\ \text{A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 0.1\ \text{A}$ ; $dI_G/dt = 5\ \text{A}/\mu\text{s}$	-	2	-	$\mu\text{s}$
$t_q$	Circuit commutated turn-off time	$V_D = 67\% V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ; $I_{TM} = 50\ \text{A}$ ; $V_R = 25\ \text{V}$ ; $dI_{TM}/dt = 30\ \text{A}/\mu\text{s}$ ; $dV_D/dt = 50\ \text{V}/\mu\text{s}$	-	70	-	$\mu\text{s}$

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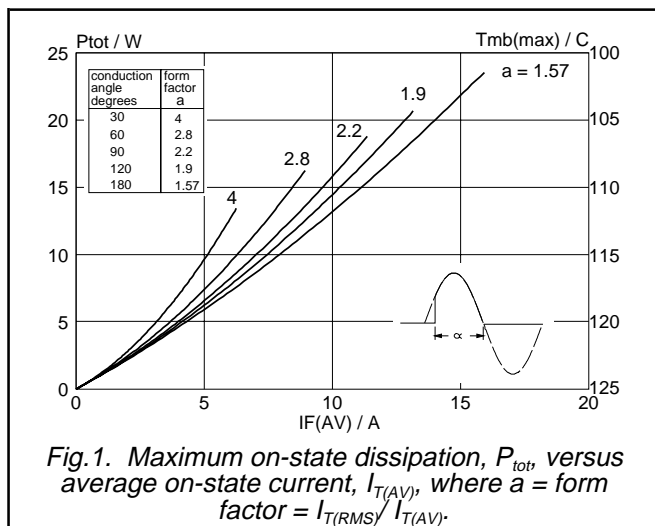


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus average on-state current,  $I_{T(AV)}$ , where  $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$ .

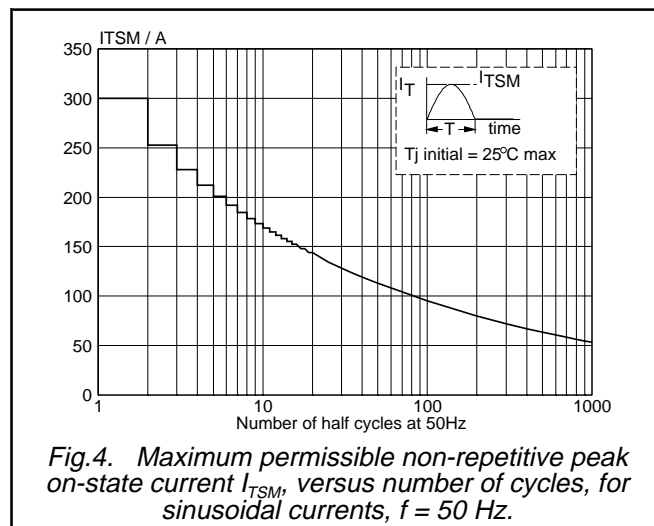


Fig.4. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50 \text{ Hz}$ .

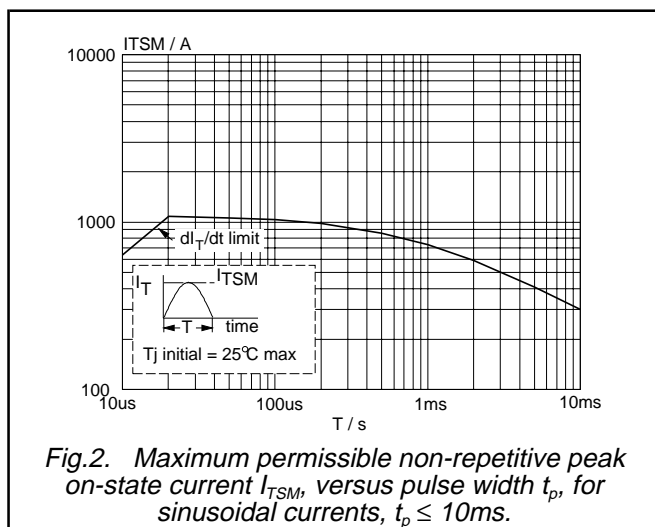


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 10 \text{ ms}$ .

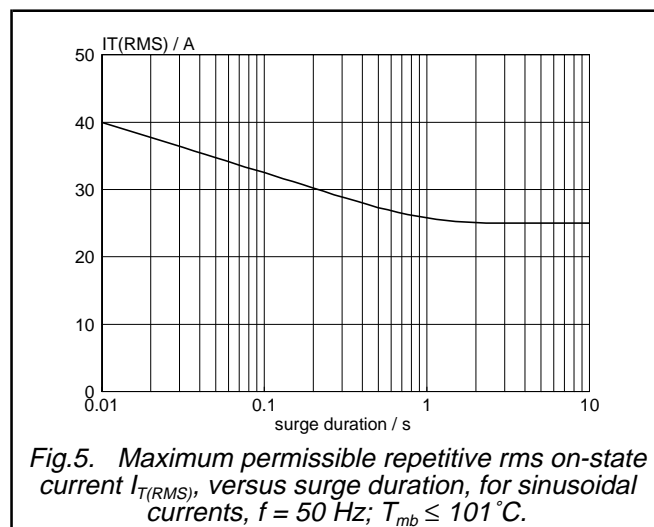


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50 \text{ Hz}$ ;  $T_{mb} \leq 101^\circ\text{C}$ .

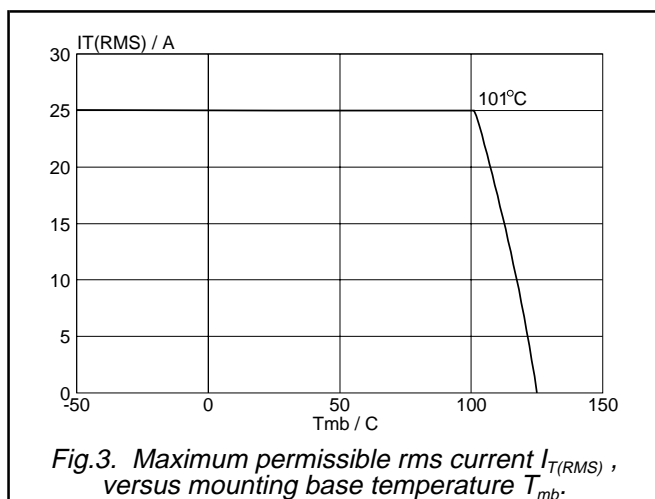


Fig.3. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

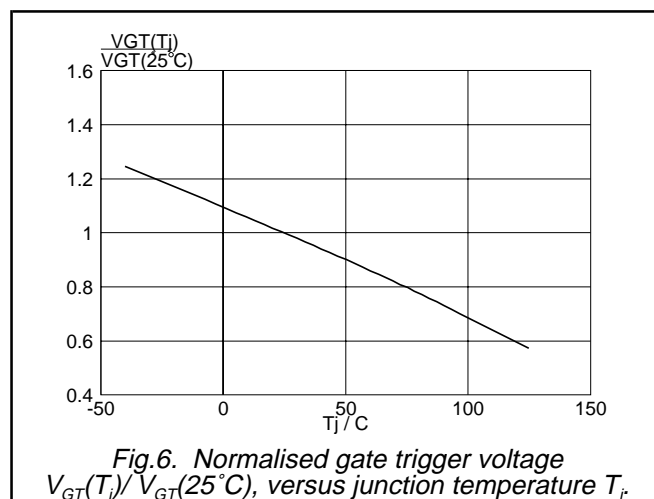
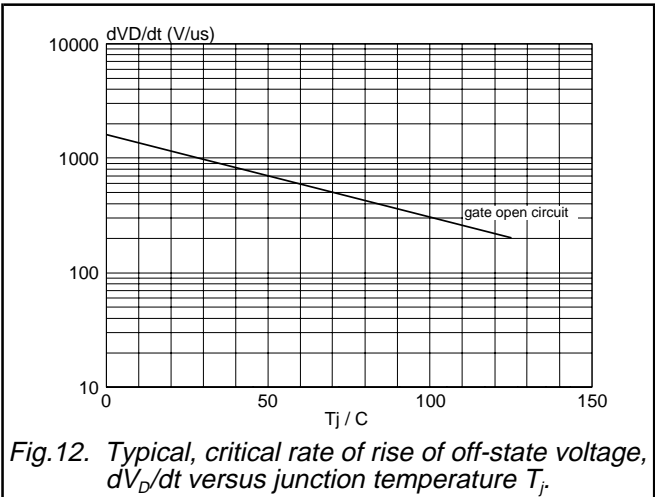
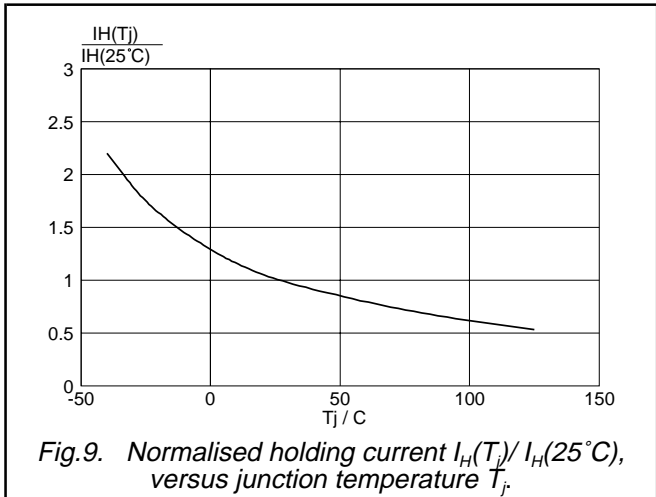
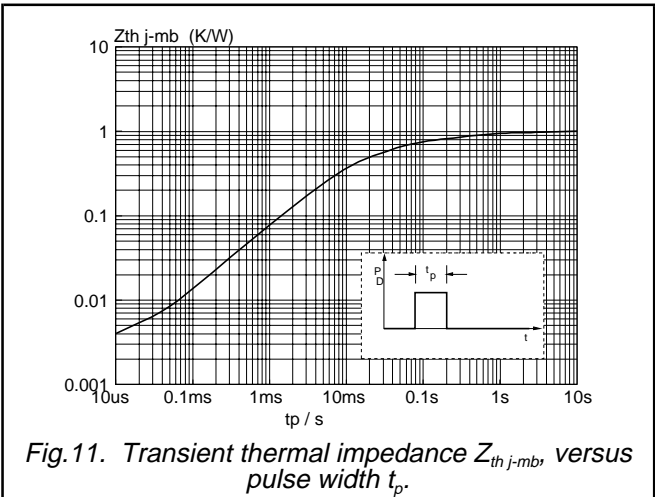
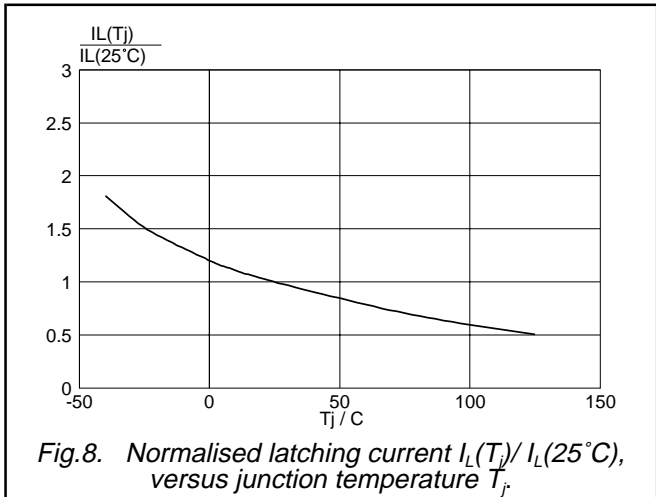
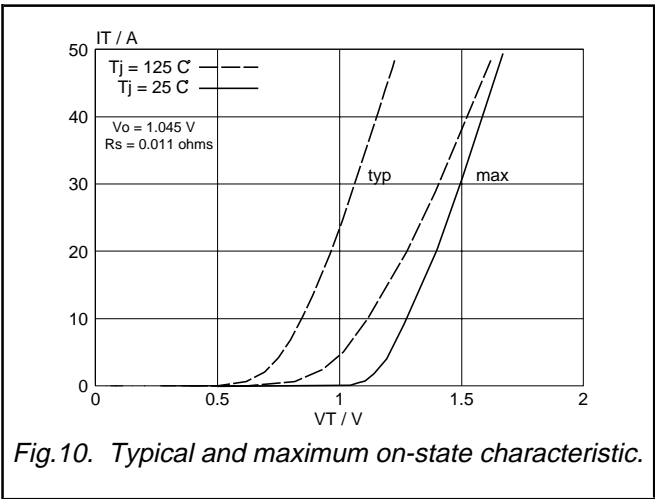
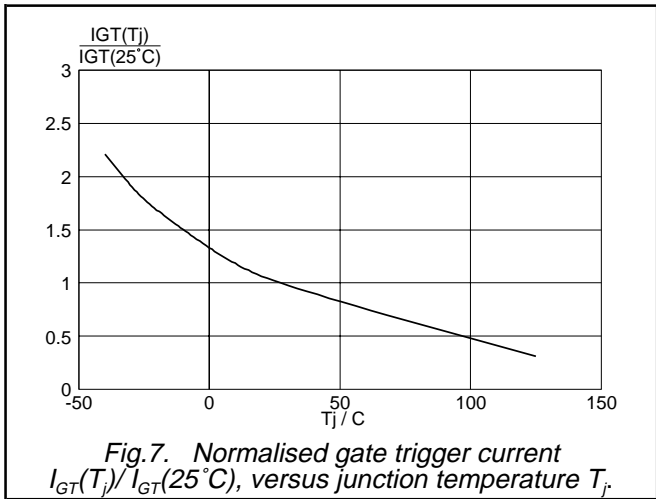


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

Thyristors

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## MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

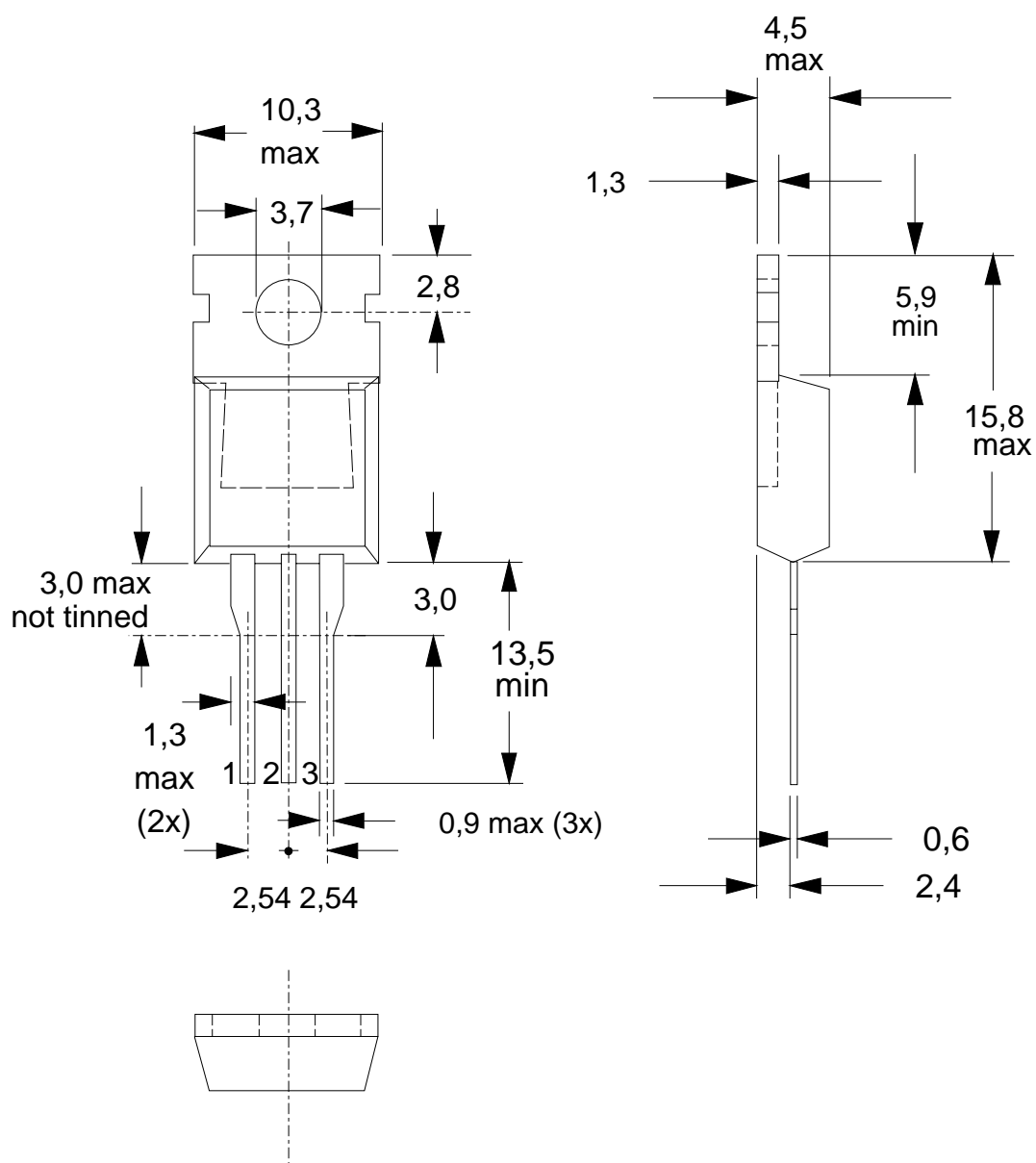


Fig.13. TO220AB; pin 2 connected to mounting base.

## Notes

1. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

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**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	
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