

# DATA SHEET

## **BT258X series**

Thyristors  
logic level

Product specification

October 2002



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## BT258X series

### GENERAL DESCRIPTION

Passivated, sensitive gate thyristors in a full pack, plastic envelope, intended for use in general purpose switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

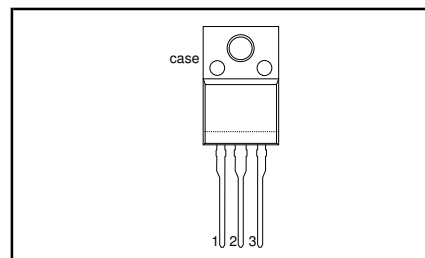
### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{DRM}, V_{RRM}$	Repetitive peak off-state voltages	<b>500R</b> 500	<b>600R</b> 600	<b>800R</b> 800	V
$I_{T(AV)}$	Average on-state current	5	5	5	A
$I_{T(RMS)}$	RMS on-state current	8	8	8	A
$I_{TSM}$	Non-repetitive peak on-state current	75	75	75	A

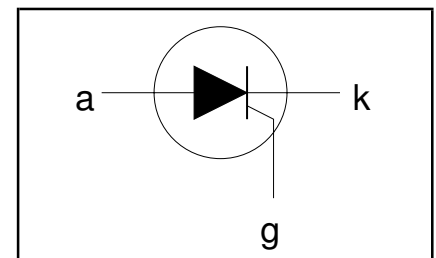
### PINNING - SOT186A

PIN	DESCRIPTION
1	cathode
2	anode
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
				-500R 500 <sup>1</sup>	-600R 600 <sup>1</sup>	-800R 800	
$V_{DRM}, V_{RRM}$	Repetitive peak off-state voltages		-				V
$I_{T(AV)}$	Average on-state current	half sine wave; $T_{HS} \leq 90^\circ\text{C}$	-	5			A
$I_{T(RMS)}$	RMS on-state current	all conduction angles	-	8			A
$I_{TSM}$	Non-repetitive peak on-state current	half sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 10\text{ ms}$	-	75			A
$I^2t$	$I^2t$ for fusing	$t = 8.3\text{ ms}$	-	82			A
$dl_T/dt$	Repetitive rate of rise of on-state current after triggering	$t = 10\text{ ms}$	-	28			A <sup>2</sup> s
$I_{GM}$	Peak gate current	$I_{TM} = 10\text{ A}; I_G = 50\text{ mA}; dl_G/dt = 50\text{ mA}/\mu\text{s}$	-	50			A/ $\mu\text{s}$
$V_{RGM}$	Peak reverse gate voltage		-	2			A
$P_{GM}$	Peak gate power		-	5			V
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	5			W
$T_{stg}$	Storage temperature		-40	0.5			W
$T_j$	Operating junction temperature		-	150			$^\circ\text{C}$
				125 <sup>2</sup>			$^\circ\text{C}$

1 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/ $\mu\text{s}$ .

2 Note: Operation above 110 $^\circ\text{C}$  may require the use of a gate to cathode resistor of 1k $\Omega$  or less.

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**ISOLATION LIMITING VALUE & CHARACTERISTIC** $T_{hs} = 25\text{ °C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	R.M.S. isolation voltage from all three terminals to external heatsink	$f = 50\text{-}60\text{ Hz}$ ; sinusoidal waveform; R.H. $\leq 65\%$ ; clean and dustfree	-	-	2500	V
$C_{isol}$	Capacitance from T2 to external heatsink	$f = 1\text{ MHz}$	-	10	-	pF

**THERMAL RESISTANCES**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	6.9	K/W

**STATIC CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{GT}$	Gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$	-	50	200	$\mu\text{A}$
$I_L$	Latching current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$	-	0.4	10	mA
$I_H$	Holding current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$	-	0.3	6	mA
$V_T$	On-state voltage	$I_T = 16\text{ A}$	-	1.3	1.6	V
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$	-	0.4	1.5	V
$I_D, I_R$	Off-state leakage current	$V_D = V_{DRM(max)}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 110\text{ °C}$ $V_D = V_{DRM(max)}$ ; $V_R = V_{RRM(max)}$ ; $T_j = 125\text{ °C}$	0.1	0.2	-	V
			-	0.1	0.5	mA

**DYNAMIC CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\text{ °C}$ ; exponential waveform; $R_{GK} = 100\ \Omega$	50	100	-	V/ $\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 10\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 5\text{ mA}$ ; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	2	-	$\mu\text{s}$
$t_q$	Circuit commutated turn-off time	$V_D = 67\% V_{DRM(max)}$ ; $T_j = 125\text{ °C}$ ; $I_{TM} = 12\text{ A}$ ; $V_R = 24\text{ V}$ ; $dI_{TM}/dt = 10\text{ A}/\mu\text{s}$ ; $dV_D/dt = 2\text{ V}/\mu\text{s}$ ; $R_{GK} = 1\text{ k}\Omega$	-	100	-	$\mu\text{s}$

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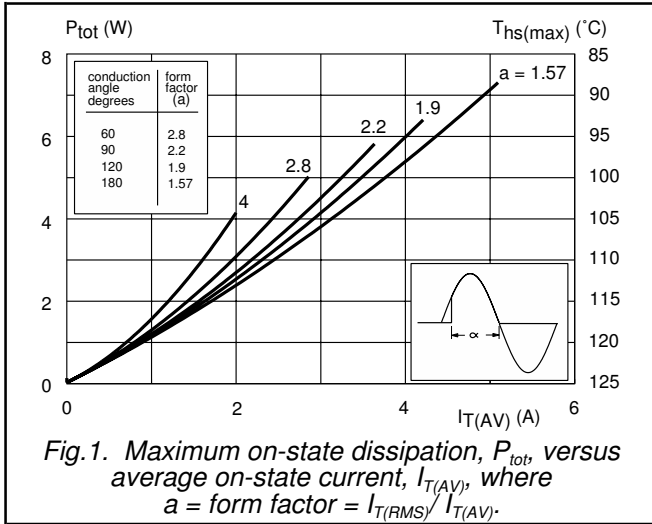


Fig. 1. Maximum on-state dissipation,  $P_{tot}$ , versus average on-state current,  $I_{T(AV)}$ , where  $a = \text{form factor} = I_{T(RMS)}/I_{T(AV)}$ .

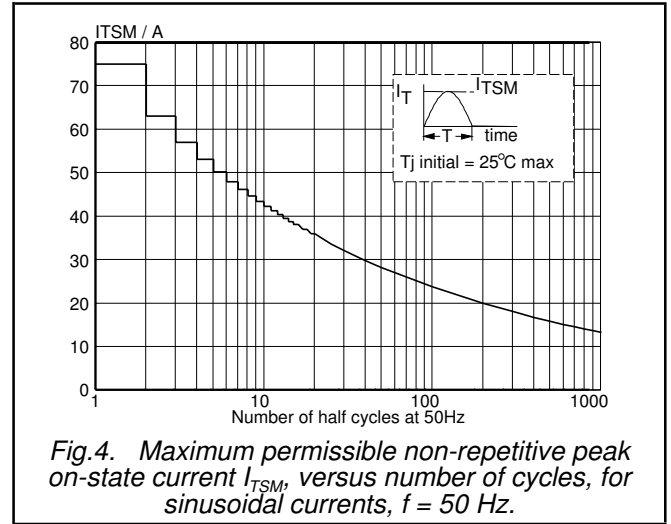


Fig. 4. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50 \text{ Hz}$ .

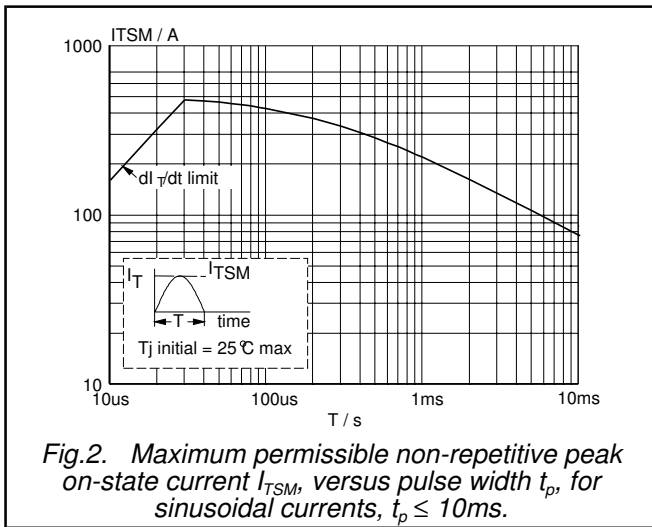


Fig. 2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 10 \text{ ms}$ .

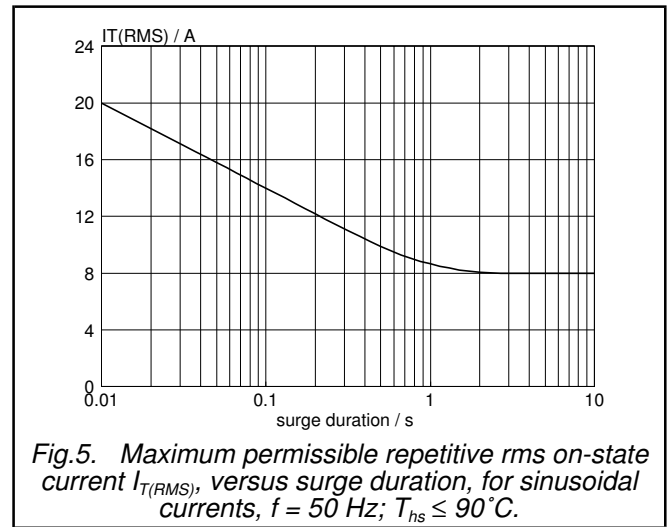


Fig. 5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50 \text{ Hz}$ ;  $T_{hs} \leq 90^{\circ}C$ .

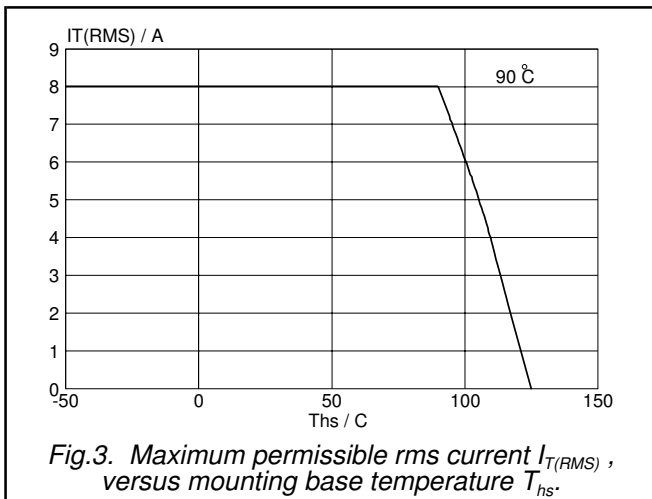


Fig. 3. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{hs}$ .

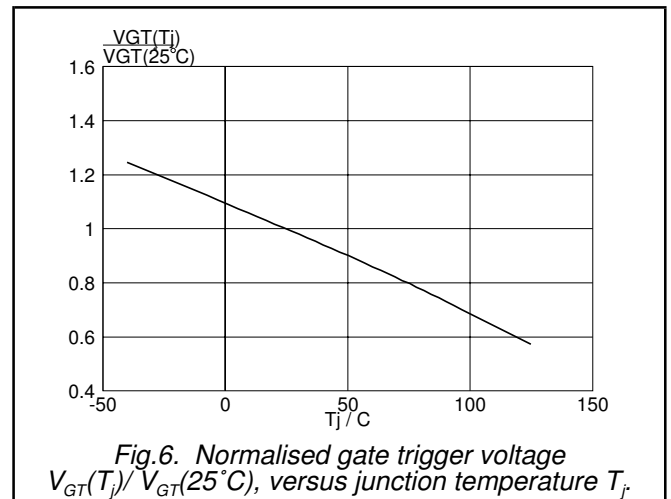
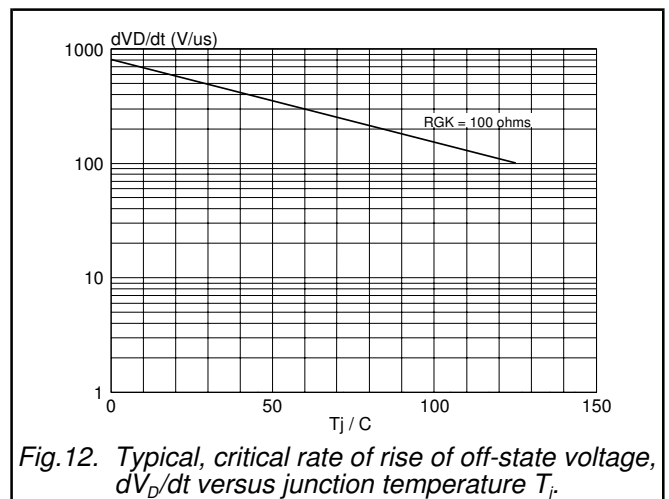
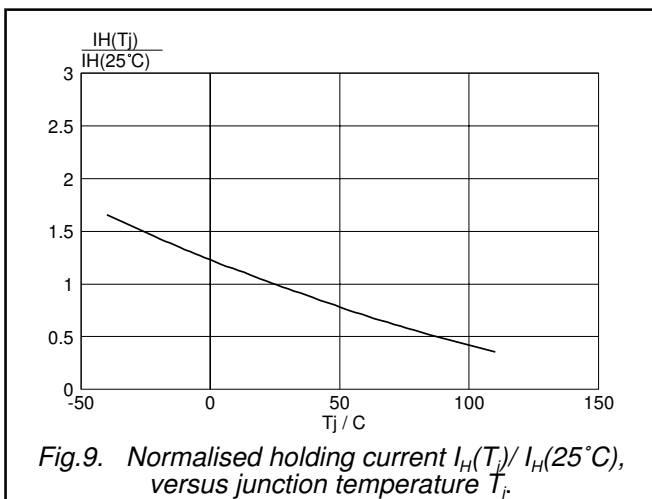
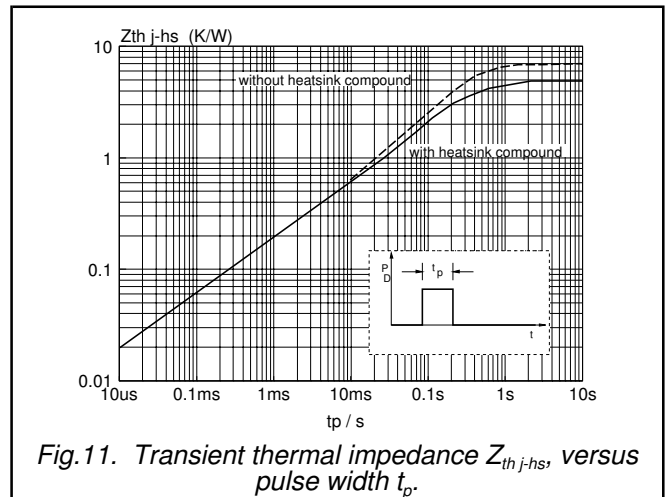
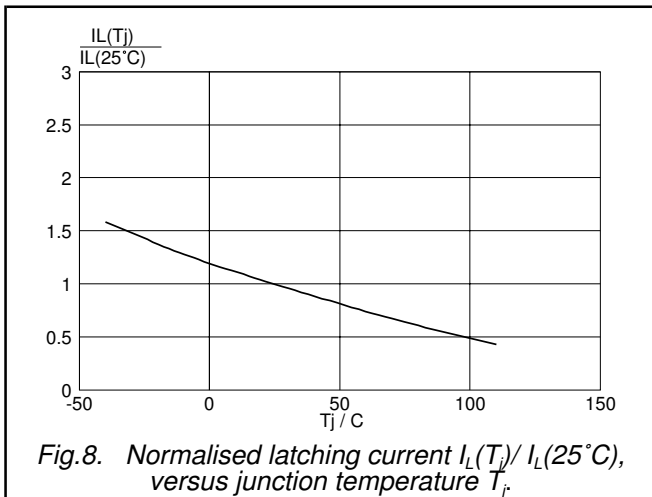
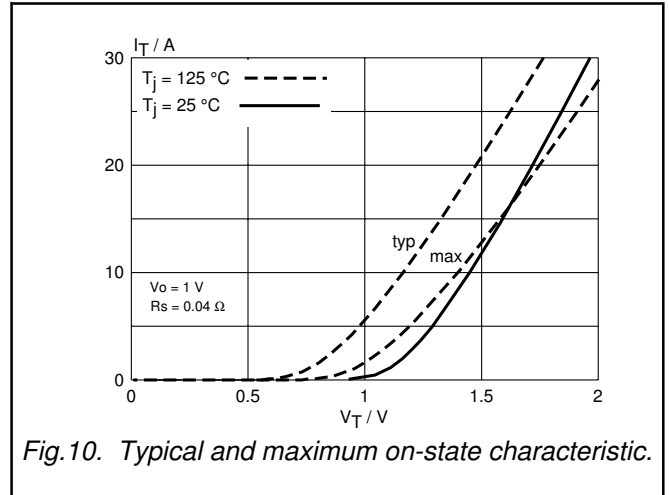
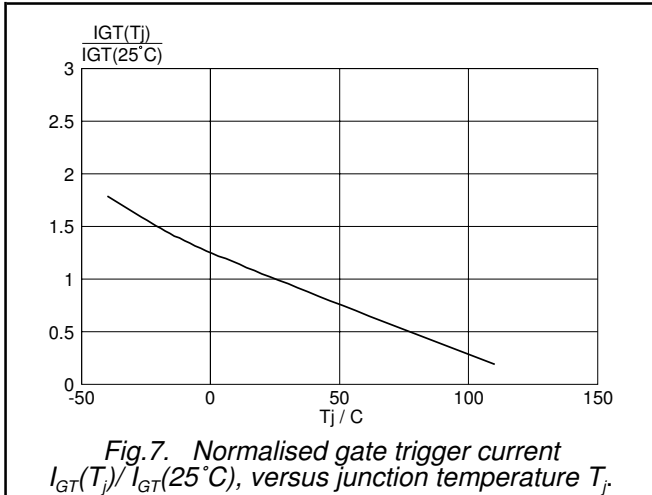


Fig. 6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^{\circ}C)$ , versus junction temperature  $T_j$ .

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**MECHANICAL DATA**

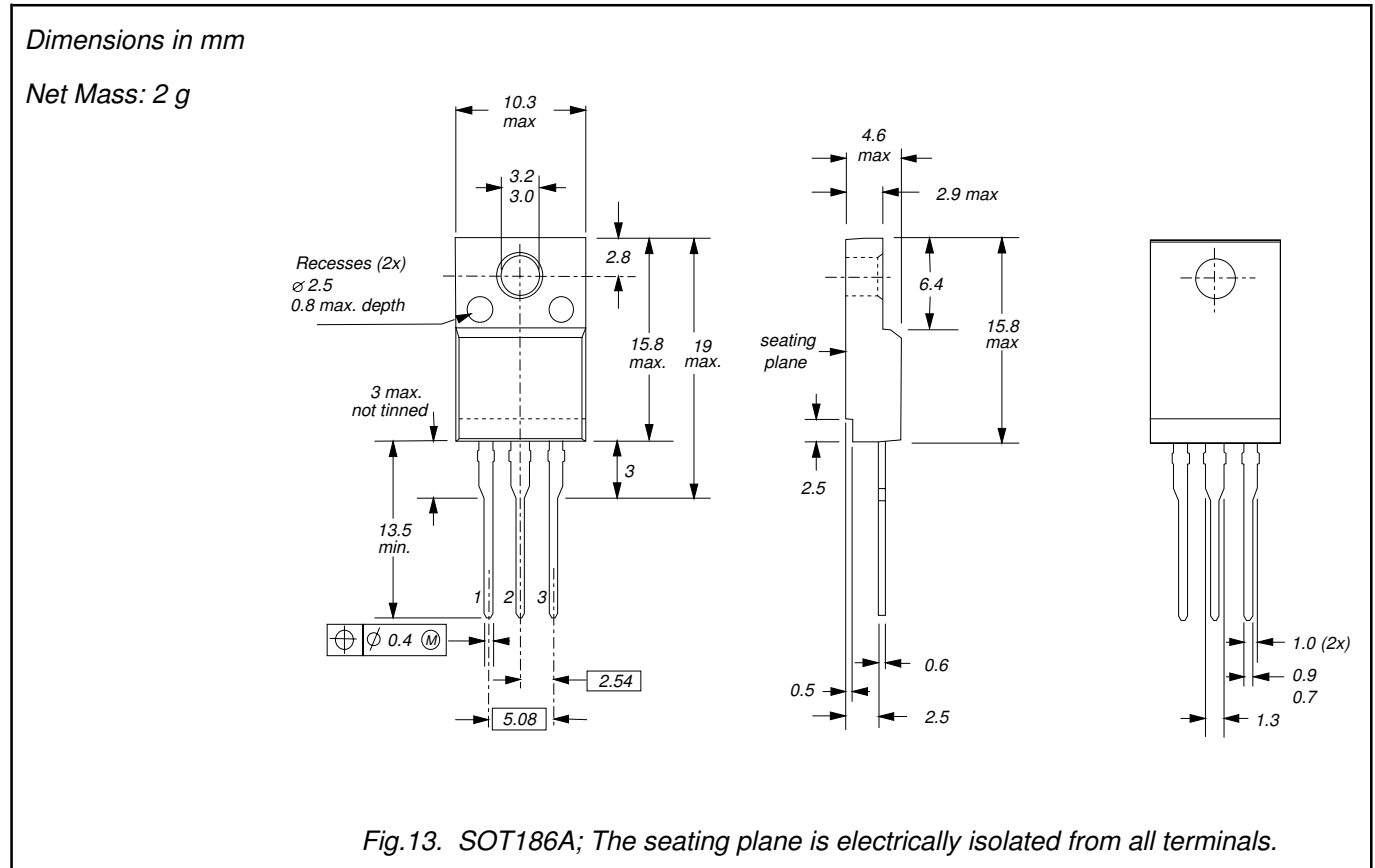


Fig.13. SOT186A; The seating plane is electrically isolated from all terminals.

**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 <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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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