

# DATA SHEET

## **BT136X series E**

Triacs  
sensitive gate

Product specification

June 2001



## Triacs sensitive gate

## BT136X series E

### GENERAL DESCRIPTION

Passivated, sensitive gate triacs in a full pack plastic envelope, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.

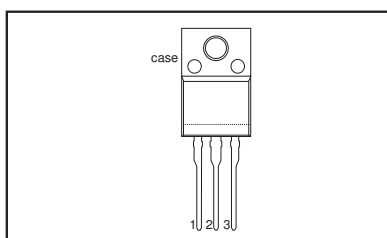
### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
$V_{\text{DRM}}$	Repetitive peak off-state voltages	600E 600	800E 800	V
$I_{\text{T(RMS)}}$	RMS on-state current	4	4	A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	25	25	A

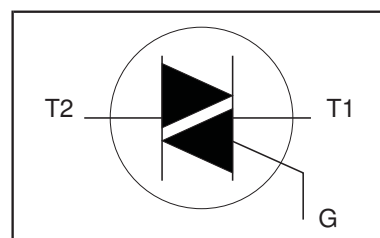
### PINNING - SOT186A

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
				-600 600 <sup>1</sup>	-800 800	
$V_{\text{DRM}}$	Repetitive peak off-state voltages		-			V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{hs}} \leq 92^\circ\text{C}$	-	4		A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	full sine wave; $T_{\text{j}} = 25^\circ\text{C}$ prior to surge $t = 20\text{ ms}$	-	25		A
		$t = 16.7\text{ ms}$	-	27		A
$I^2t$	$I^2t$ for fusing	$t = 10\text{ ms}$	-	3.1		A <sup>2</sup> s
$di_{\text{T}}/dt$	Repetitive rate of rise of on-state current after triggering	$I_{\text{TM}} = 6\text{ A}$ ; $I_{\text{G}} = 0.2\text{ A}$ ; $di_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$				
		T2+ G+	-	50		A/ $\mu\text{s}$
		T2+ G-	-	50		A/ $\mu\text{s}$
		T2- G-	-	50		A/ $\mu\text{s}$
		T2- G+	-	10		A/ $\mu\text{s}$
$I_{\text{GM}}$	Peak gate current		-	2		A
$V_{\text{GM}}$	Peak gate voltage		-	5		V
$P_{\text{GM}}$	Peak gate power		-	5		W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.5		W
$T_{\text{stg}}$	Storage temperature		-40	150		$^\circ\text{C}$
$T_{\text{j}}$	Operating junction temperature		-	125		$^\circ\text{C}$

<sup>1</sup> 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 3 A/ $\mu\text{s}$ .

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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	full or half cycle with heatsink compound	-	-	5.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	7.2	K/W

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{GT}$	Gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$	-	2.5	10	mA
		T2+ G+	-	4.0	10	mA
		T2+ G-	-	5.0	10	mA
		T2- G-	-	11	25	mA
		T2- G+	-	3.0	15	mA
$I_L$	Latching current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$	-	10	20	mA
		T2+ G+	-	2.5	15	mA
		T2+ G-	-	4.0	20	mA
		T2- G-	-	2.2	15	mA
		T2- G+	-	1.4	1.70	V
$I_H$	Holding current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$	-	0.7	1.5	V
$V_T$	On-state voltage	$I_T = 5\text{ A}$	-	0.4	-	V
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$	0.25	0.1	0.5	mA
$I_D$	Off-state leakage current	$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ °C}$ $V_D = V_{DRM(max)}$ ; $T_j = 125\text{ °C}$	-	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; gate open circuit	-	50	-	V/ $\mu$ s
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 6\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 0.1\text{ A}$ ; $di_G/dt = 5\text{ A}/\mu$ s	-	2	-	$\mu$ s

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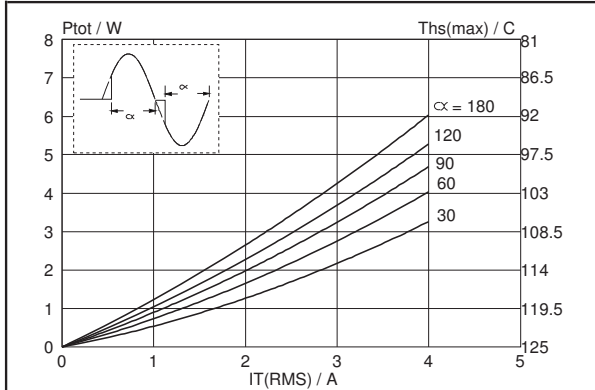


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha =$  conduction angle.

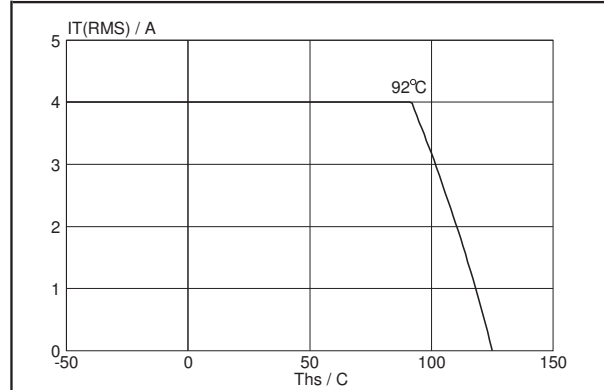


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus heatsink temperature  $T_{hs}$ .

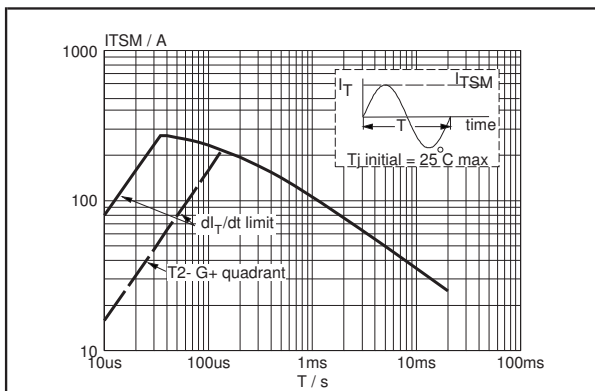


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20ms$ .

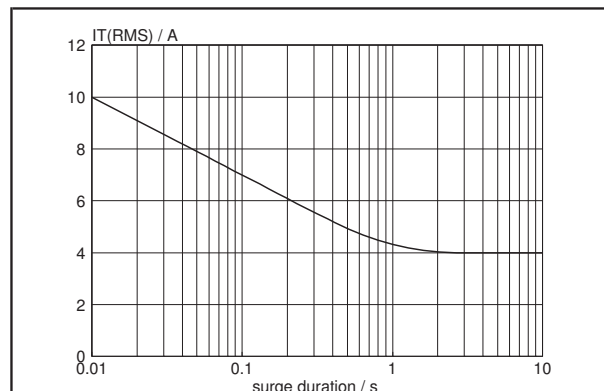


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50 Hz$ ;  $T_{hs} \leq 92^\circ C$ .

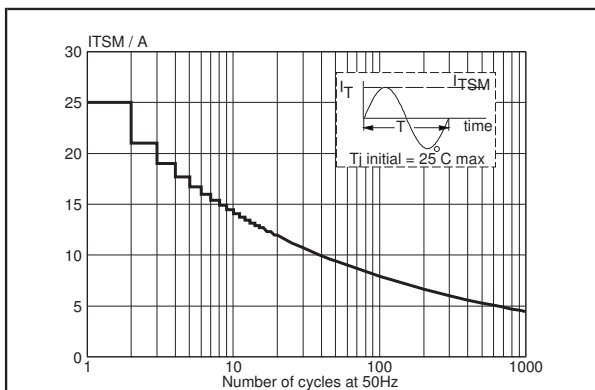


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50 Hz$ .

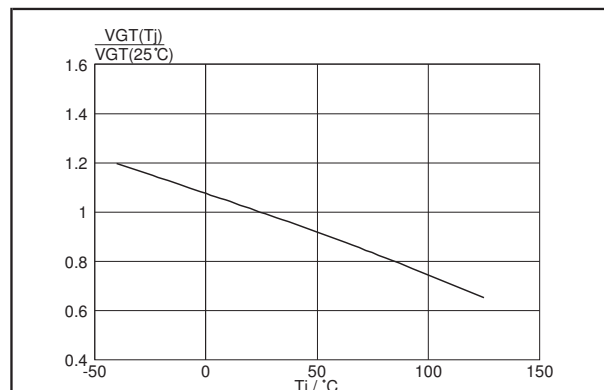
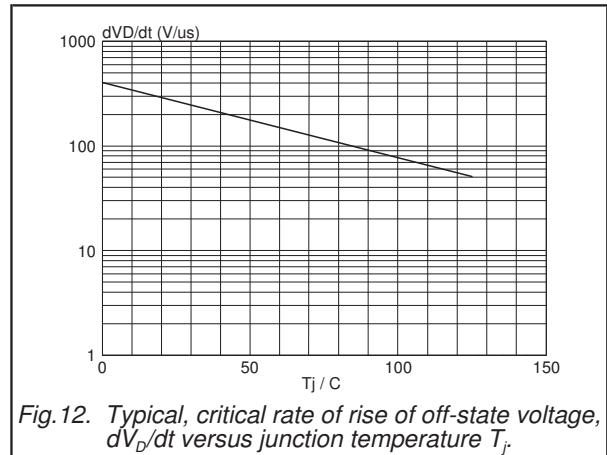
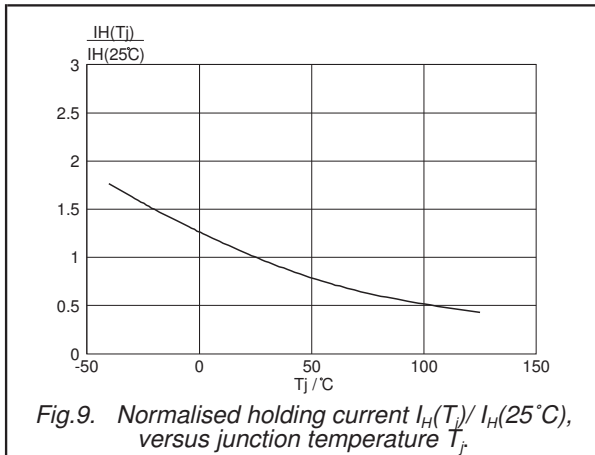
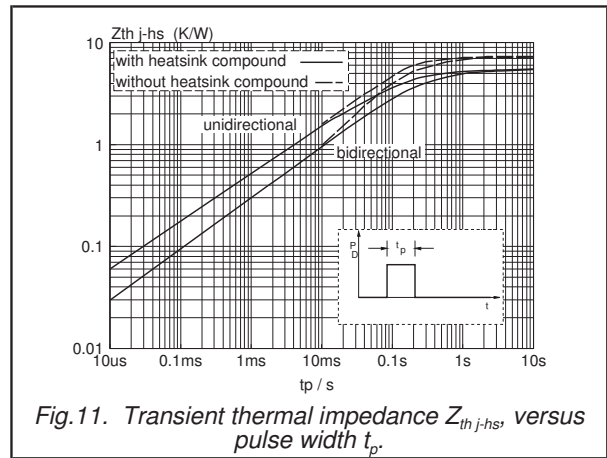
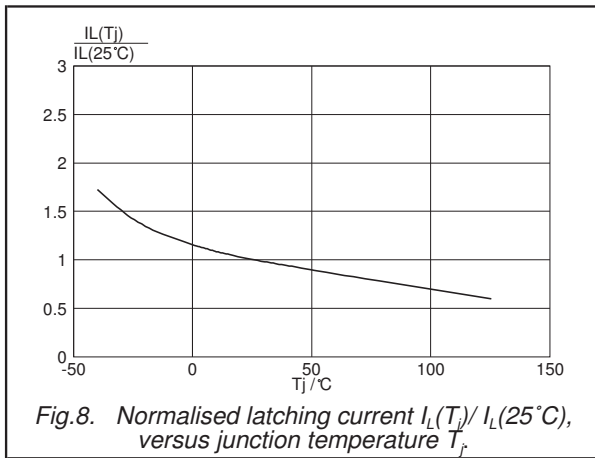
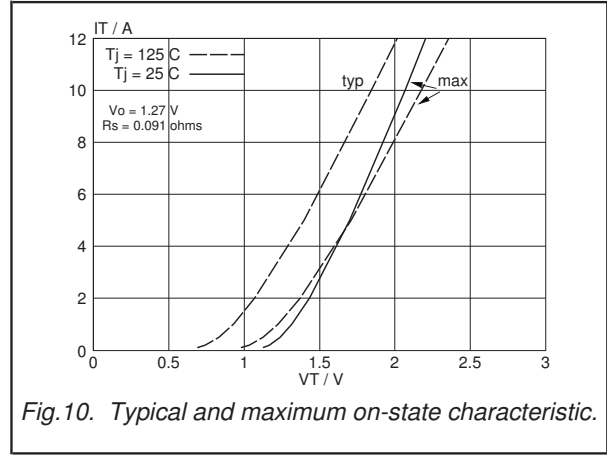
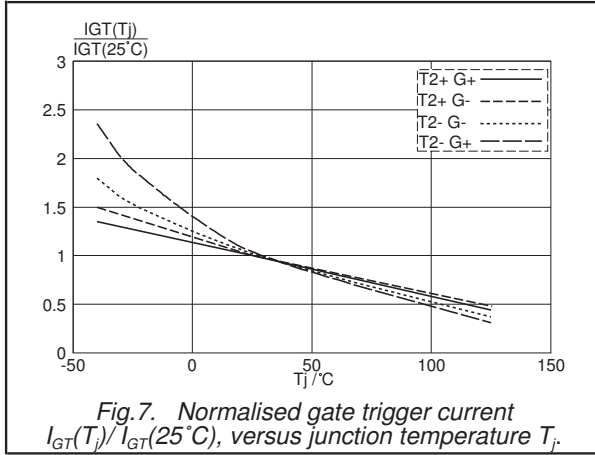


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j) / V_{GT}(25^\circ C)$ , versus junction temperature  $T_j$ .

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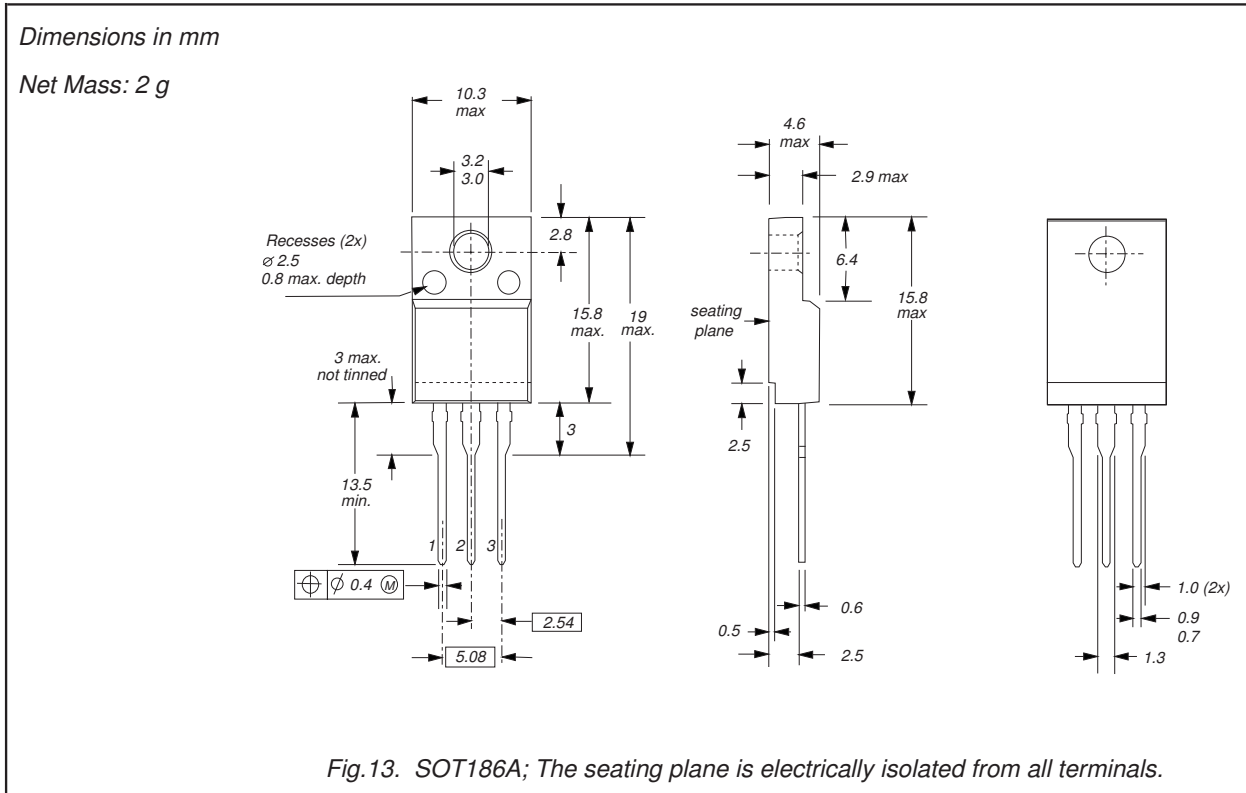
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**MECHANICAL DATA**



**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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