DISCRETE SEMICONDUCTORS

DATA SHEET

BT136X seriesTriacs

Product specification

June 2001



Triacs BT136X series

GENERAL DESCRIPTION

Passivated triacs in a full pack plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

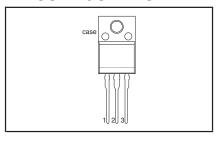
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BT136X- BT136X-	600 600F	800	
V _{DRM}	Repetitive peak off-state voltages	600	800	V
I _{T(RMS)} I _{TSM}	RMS on-state current Non-repetitive peak on-state current	4 25	4 25	A A

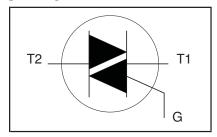
PINNING - SOT186A

PIN	DESCRIPTION	
1	main terminal 1	
2	main terminal 2	
3	3 gate	
case	isolated	

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	M.A	XX.	UNIT
V_{DRM}	Repetitive peak off-state voltages		-	-600 600 ¹	-800 800	V
I _{T(RMS)}	RMS on-state current Non-repetitive peak on-state current	full sine wave; $T_{hs} \le 92 ^{\circ}C$ full sine wave; $T_{j} = 25 ^{\circ}C$ prior to surge	-	4	-	A
		t = 20 ms t = 16.7 ms	-	2 2	5 7	A
l²t dl _⊤ /dt	I ² t for fusing Repetitive rate of rise of on-state current after	t = 10.7 ms t = 10 ms $I_{TM} = 6 \text{ A}; I_{G} = 0.2 \text{ A};$ $dI_{G}/dt = 0.2 \text{ A}/\mu\text{s}$	-	3.	.1	A A ² s
	triggering	T2+ G+ T2+ G- T2- G-	- - -	5 5 5	0 0	Α/μs Α/μs Α/μs
I _{GM} V _{GM} P _{GM}	Peak gate current Peak gate voltage Peak gate power	T2- G+	- - -	1		A/μs A V W
$\begin{array}{c} P_{G(AV)} \\ T_{stg} \\ T_j \end{array}$	Average gate power Storage temperature Operating junction temperature	over any 20 ms period	-40 -	0.	.5 50	°C °C

¹ 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 $A/\mu s$.

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ISOLATION LIMITING VALUE & CHARACTERISTIC

 T_{hs} = 25 °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 = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C _{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R _{th j-hs}	Thermal resistance junction to heatsink	full or half cycle with heatsink compound without heatsink compound	-	-	5.5 7.2	K/W K/W
R _{th j-a}	Thermal resistance junction to ambient	in free air	-	55	-	K/W

STATIC CHARACTERISTICS

T_i = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MA	λX.	UNIT
I _{GT}	Gate trigger current	$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$				F	
		T2+ G+ T2+ G-	- -	5 8	35 35	25 25	mA mA
		T2- G- T2- G+	- -	11 30	35 70	25 70	mA mA
	Latching current	$V_D = 12 \text{ V}; I_{GT} = 0.1 \text{ A} $ $T2+ G+$ $T2+ G-$	- -	7 16	20 30	20 30	mA mA
I _H	Holding current	T2- G- T2- G+ $V_D = 12 \text{ V}; I_{GT} = 0.1 \text{ A}$	- - -	5 7 5	20 30 15	20 30 15	mA mA mA
V_{T}	On-state voltage Gate trigger voltage	$I_T = 5 \text{ A}$ $V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$ $V_D = 400 \text{ V}; I_T = 0.1 \text{ A};$	- - 0.25	1.4 0.7 0.4		70 .5	V V V
I _D	Off-state leakage current		-	0.1	0.	.5	mA

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DYNAMIC CHARACTERISTICS

 $T_j = 25$ °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MI	N.	TYP.	MAX.	UNIT
dV _D /dt	Critical rate of rise of off-state voltage	BT136X- $V_{DM} = 67\% V_{DRM(max)};$ $T_i = 125 °C;$ exponential	 100	F 50	250	-	V/μs
dV _{com} /dt	Critical rate of change of	waveform; gate open circuit $V_{DM} = 400 \text{ V}; T_j = 95 ^{\circ}\text{C};$ $I_{T(RMS)} = 4 \text{ A};$ $dI_{com}/dt = 1.8 \text{ A/ms};$ gate	-	-	50	-	V/µs
t _{gt}	Gate controlled turn-on time	open circuit $I_{TM} = 6 \text{ A}; V_D = V_{DRM(max)};$ $I_G = 0.1 \text{ A}; dI_G/dt = 5 \text{ A}/\mu s$	-	-	2	-	μs

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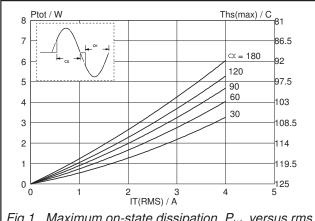


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

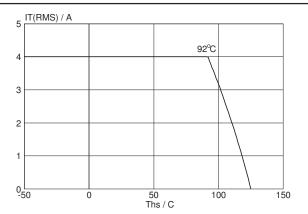


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus heatsink temperature T_{hs} .

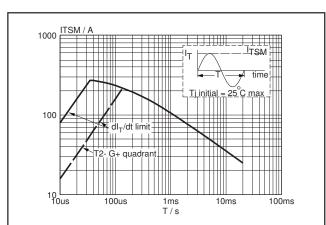


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \le 20$ ms.

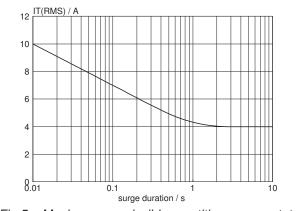


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{hs} \le 92$ °C.

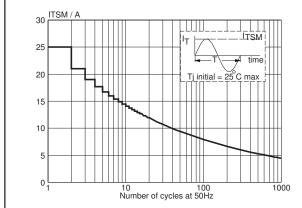


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, f = 50 Hz.

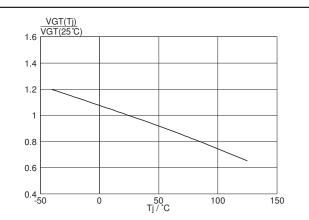
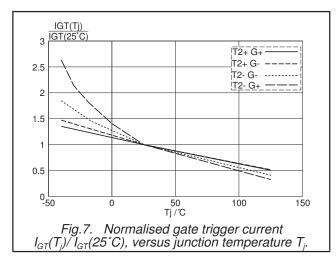
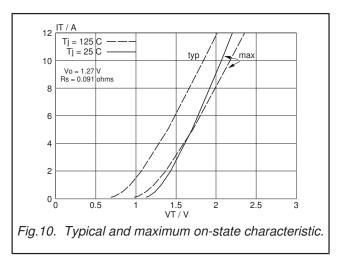
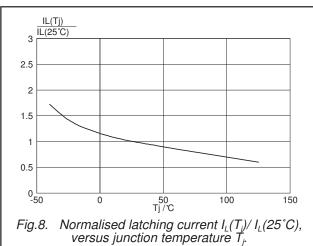


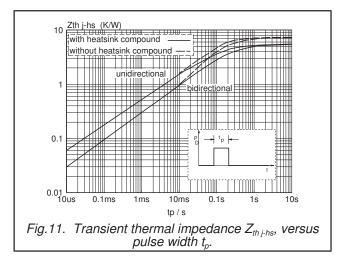
Fig.6. Normalised gate trigger voltage $V_{GT}(T_i)/V_{GT}(25^{\circ}C)$, versus junction temperature T_i .

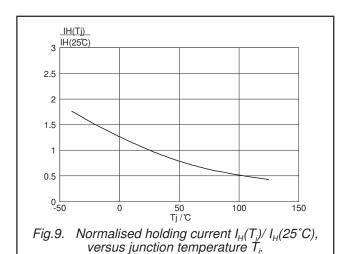
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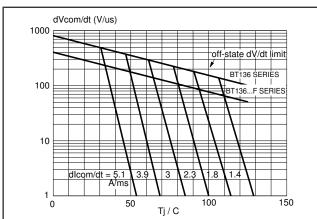
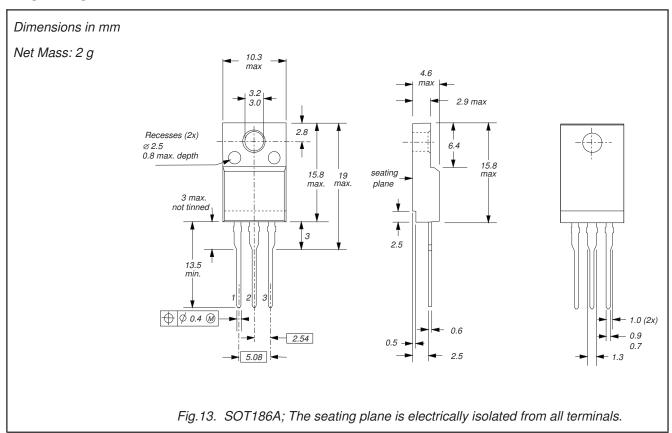


Fig. 12. Typical commutation dV/dt versus junction temperature, parameter commutation dI_{7}/dt . The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation dI_{7}/dt .

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MECHANICAL DATA



- Refer to mounting instructions for F-pack envelopes.
 Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	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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