

**Triacs**

**BT136S series**  
BT136M series

**GENERAL DESCRIPTION**

Glass passivated triacs in a plastic envelope, suitable for surface mounting, 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.

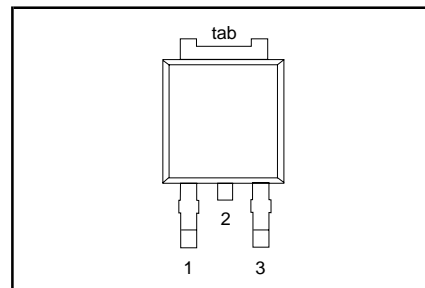
**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{DRM}$	Repetitive peak off-state voltages	<b>500</b>	<b>600</b>	<b>800</b>	V
		<b>500F</b>	<b>600F</b>	<b>800F</b>	
		<b>500G</b>	<b>600G</b>	<b>800G</b>	
$I_{T(RMS)}$	RMS on-state current	4	4	4	A
$I_{TSM}$	Non-repetitive peak on-state current	25	25	25	A

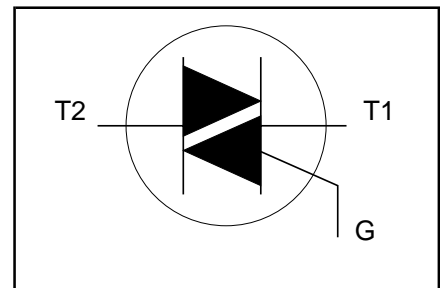
**PINNING - SOT428**

PIN NUMBER	Standard S	Alternative M
1	MT1	gate
2	MT2	MT2
3	gate	MT1
tab	MT2	MT2

**PIN CONFIGURATION**



**SYMBOL**



**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-500	-600	-800	
$V_{DRM}$	Repetitive peak off-state voltages		-	500 <sup>1</sup>	600 <sup>1</sup>	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 107^\circ\text{C}$	-	4			A
$I_{TSM}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ 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
$dl_T/dt$	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 6\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dl_G/dt = 0.2\text{ A}/\mu\text{s}$					
		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/ $\mu\text{s}$
$I_{GM}$	Peak gate current		-	2			A
$V_{GM}$	Peak gate voltage		-	5			V
$P_{GM}$	Peak gate power		-	5			W
$P_{G(AV)}$	Average gate power		-	0.5			W
$T_{stg}$	Storage temperature	over any 20 ms period	-40	150			$^\circ\text{C}$
$T_j$	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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## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	full cycle	-	-	3.0	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	half cycle pcb (FR4) mounted; footprint as in Fig.14	-	-	3.7	K/W
			-	75	-	K/W

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.			UNIT
$I_{GT}$	Gate trigger current	<b>BT136S-</b> $V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	-	...	...F	...G	
		T2+ G+	-	5	35	25	50	mA
		T2+ G-	-	8	35	25	50	mA
		T2- G-	-	11	35	25	50	mA
		T2- G+	-	30	70	70	100	mA
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	-	-	-	-	
		T2+ G+	-	7	20	20	30	mA
		T2+ G-	-	16	30	30	45	mA
		T2- G-	-	5	20	20	30	mA
		T2- G+	-	7	30	30	45	mA
$I_H$	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	5	15	15	30	mA
$V_T$	On-state voltage	$I_T = 5\text{ A}$	-	1.4	1.70			V
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	0.7	1.5			V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125\text{ }^\circ\text{C}$	0.25	0.4	-			V
$I_D$	Off-state leakage current	$V_D = V_{DRM(max)};$ $T_j = 125\text{ }^\circ\text{C}$	-	0.1	0.5			mA

## DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.			TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	<b>BT136S</b> (or BT136M)- $V_{DM} = 67\% V_{DRM(max)};$ $T_j = 125\text{ }^\circ\text{C};$ exponential waveform; gate open circuit	...	...F	...G	250	-	V/ $\mu\text{s}$
$dV_{com}/dt$	Critical rate of change of commutating voltage	$V_{DM} = 400\text{ V}; T_j = 95\text{ }^\circ\text{C};$ $I_{T(RMS)} = 4\text{ A};$ $dl_{com}/dt = 1.8\text{ A/ms};$ gate open circuit	-	-	10	50	-	V/ $\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 6\text{ A}; V_D = V_{DRM(max)};$ $I_G = 0.1\text{ A}; dl_G/dt = 5\text{ A}/\mu\text{s}$	-	-	-	2	-	$\mu\text{s}$

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

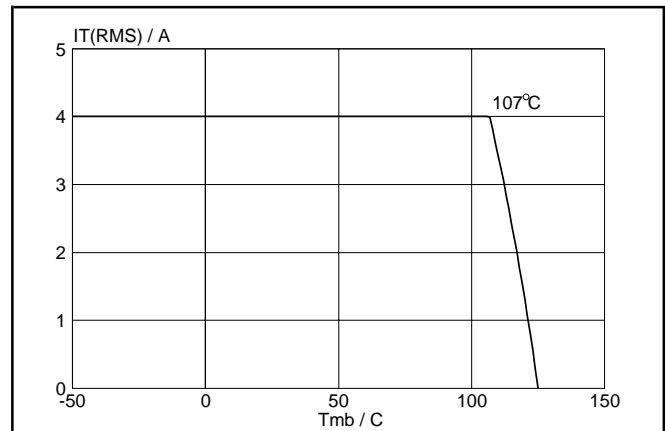


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .



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

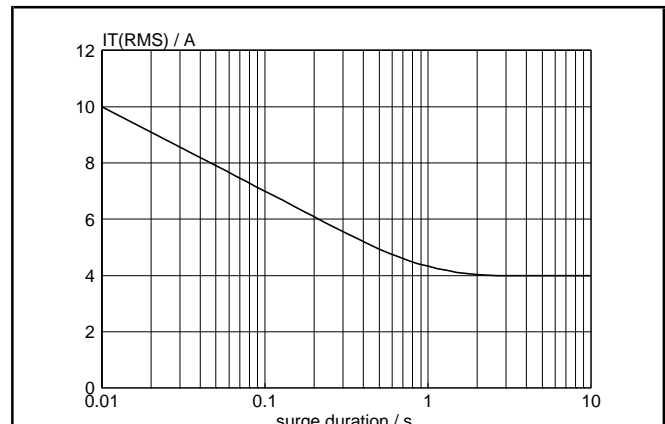


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{ Hz}$ ;  $T_{mb} \leq 107^\circ\text{C}$ .



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

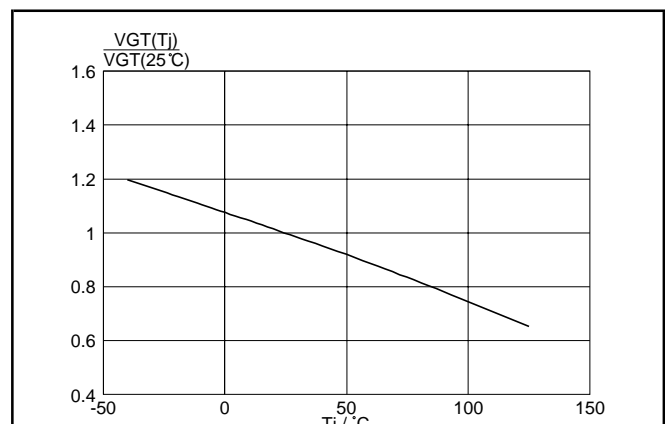
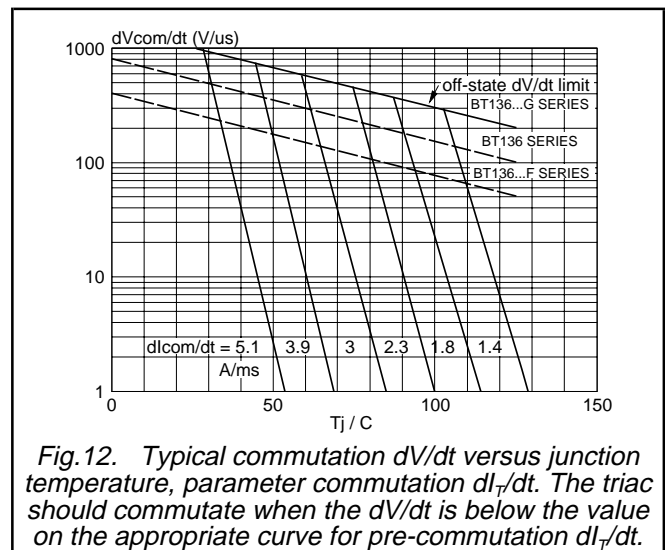
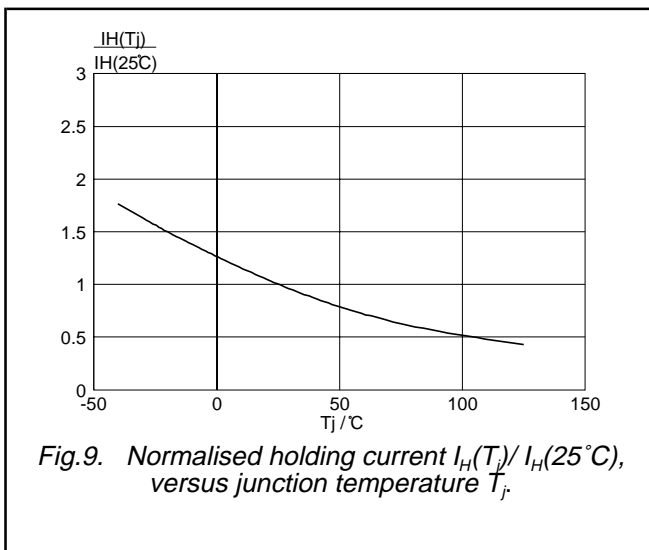
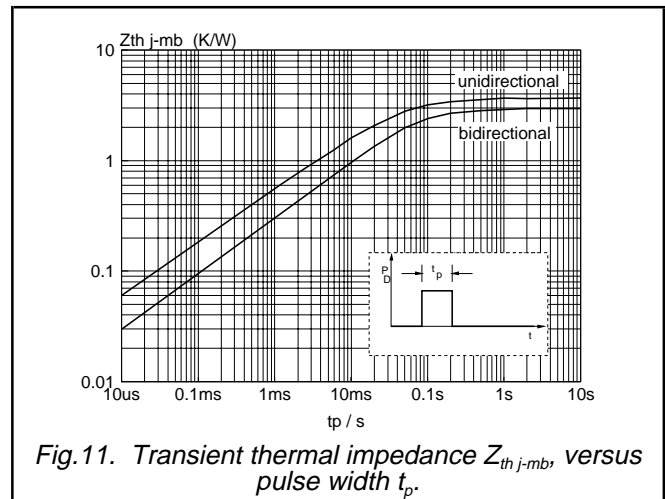
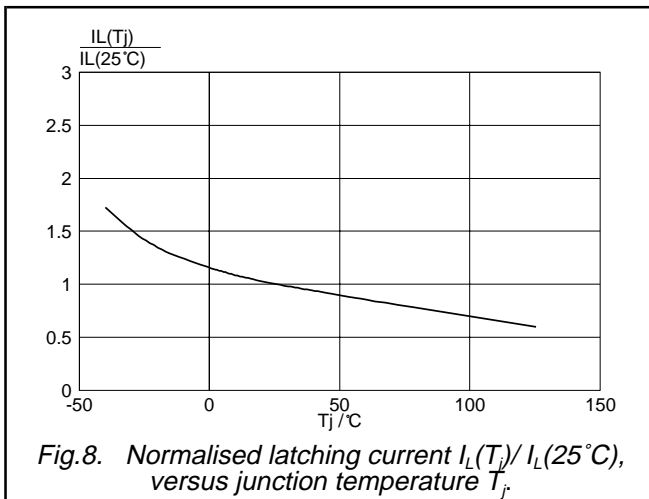
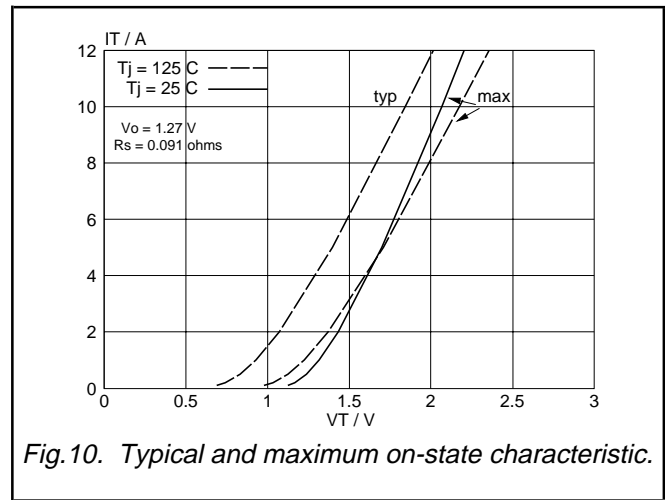
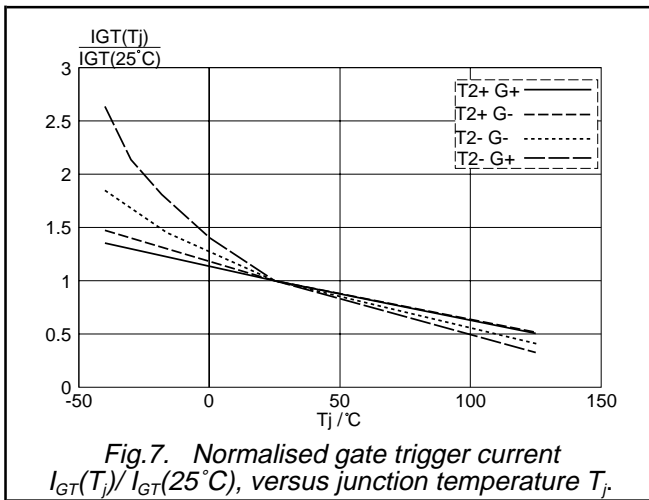


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

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**MECHANICAL DATA**

*Dimensions in mm*

*Net Mass: 1.1 g*

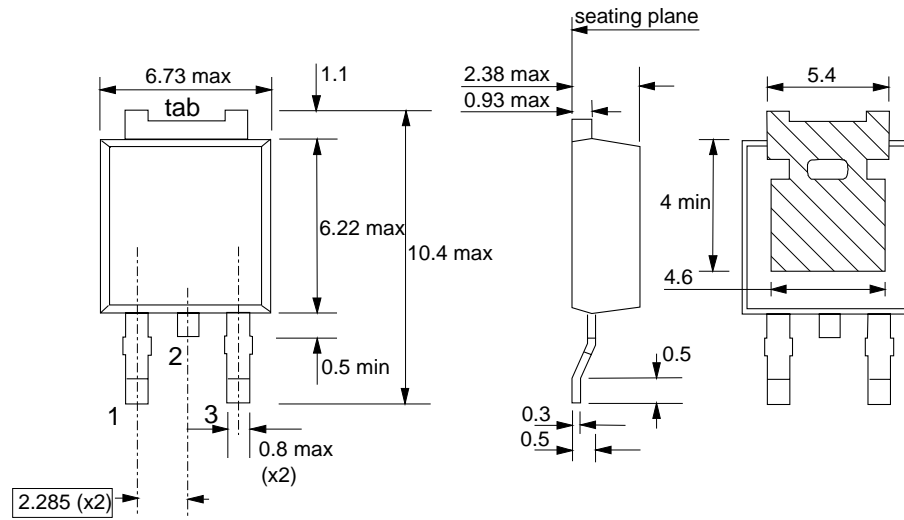


Fig.13. SOT428 : centre pin connected to tab.

**MOUNTING INSTRUCTIONS**

*Dimensions in mm*

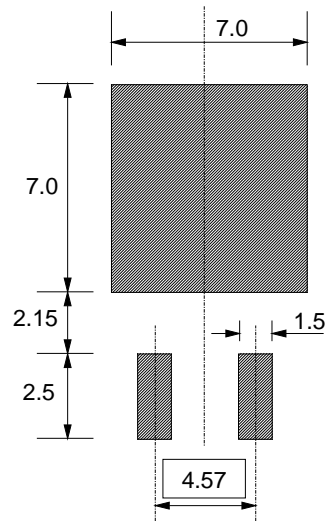


Fig.14. SOT428 : minimum pad sizes for surface mounting.

**Notes**

- 1. Plastic meets UL94 V0 at 1/8".

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<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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