

## Triacs

## BT136S series

## GENERAL DESCRIPTION

Glass passivated triacs in a plastic envelope, suitable for mounting, intended for applications requiring high bidirectional transient and voltage capability and high cycling performance. Typical applications include motor control, industrial and domestic heating and static switching.

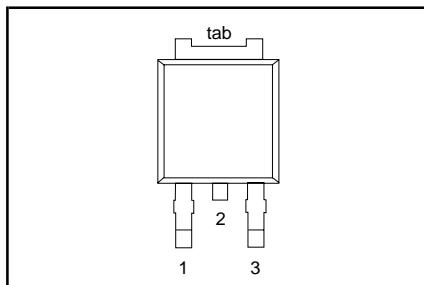
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{DRM}$	<b>BT136S</b> (or BT136M)-	<b>500</b>	<b>600</b>	<b>800</b>	
	<b>BT136S</b> (or BT136M)-	<b>500F</b>	<b>600F</b>	<b>800F</b>	
	<b>BT136S</b> (or BT136M)-	<b>500G</b>	<b>600G</b>	<b>800G</b>	
$I_{T(RMS)}$	Repetitive peak off-state voltages	500	600	800	V
	RMS on-state current	4	4	4	A
$I_{TSM}$	Non-repetitive peak on-state current	25	25	25	A

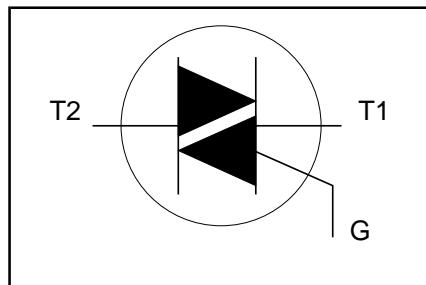
## PINNING - SOT428

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
$V_{DRM}$	Repetitive peak off-state voltages		-	-500 500 <sup>1</sup>	-600 600 <sup>1</sup>	-800 800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 107^\circ C$	-	4			A
$I_{TSM}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ C$ prior to surge					
$I^2t$	$I^2t$ for fusing	$t = 20$ ms	-	25			A
$dl_T/dt$	Repetitive rate of rise of on-state current after triggering	$t = 16.7$ ms	-	27			A
		$t = 10$ ms	-	3.1			$A^2s$
		$I_{TM} = 6$ A; $I_G = 0.2$ A; $dl_G/dt = 0.2$ A/ $\mu$ s	T2+ G+	-	50		
			T2+ G-	-	50		
			T2- G-	-	50		
			T2- G+	-	10		
$I_{GM}$	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	over any 20 ms period	-	0.5			W
$T_{stg}$	Storage temperature		-40	150			$^\circ C$
$T_j$	Operating junction temperature		-	125			$^\circ C$

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/μs.

## Triacs

BT136S series  
BT136M series

## THERMAL RESISTANCES

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

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.		UNIT
					...F	...G	
$I_{GT}$	Gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$			...		mA
					5	25	
					8	25	
					11	25	
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$			30	70	mA
					7	20	
					16	30	
					5	20	
$I_H$	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$			7	30	mA
					5	15	
					15	15	
						30	
$V_T$	On-state voltage	$I_T = 5\text{ A}$			1.4	1.70	V
					0.7	1.5	
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	0.25	0.4		-	V
$I_D$	Off-state leakage current	$V_D = V_{DRM(max)}$ ; $T_j = 125^\circ\text{C}$	-	0.1		0.5	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	$BT136S$ (or $BT136M$ )- $V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125^\circ\text{C}$ ; exponential waveform; gate open circuit	...	100	50	200	250	-
$dV_{com}/dt$	Critical rate of change of commutating voltage	$V_{DM} = 400\text{ V}$ ; $T_j = 95^\circ\text{C}$ ; $I_{T(RMS)} = 4\text{ A}$ ; $dI_{com}/dt = 1.8\text{ A/ms}$ ; gate open circuit	-	-	10	50	-	$\text{V}/\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 6\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 0.1\text{ A}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	-	-	2	-	$\mu\text{s}$

## Triacs

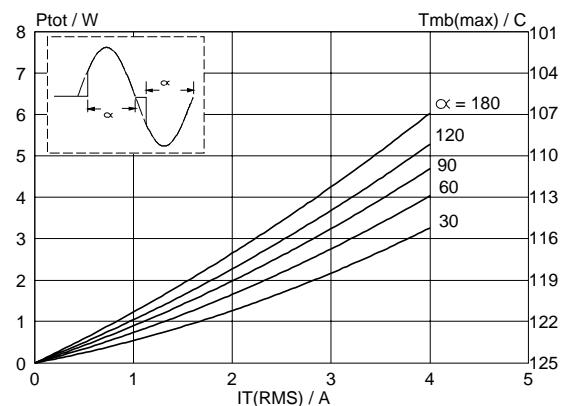
BT136S series  
BT136M series

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

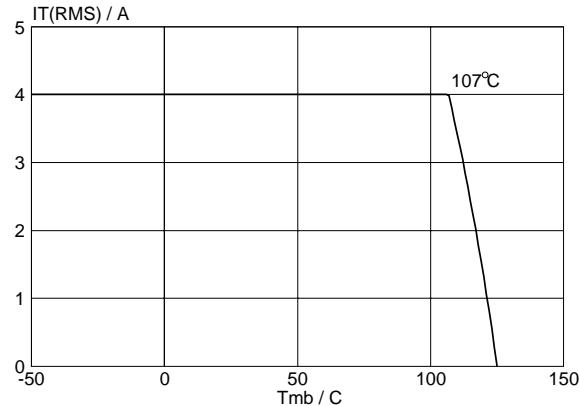


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

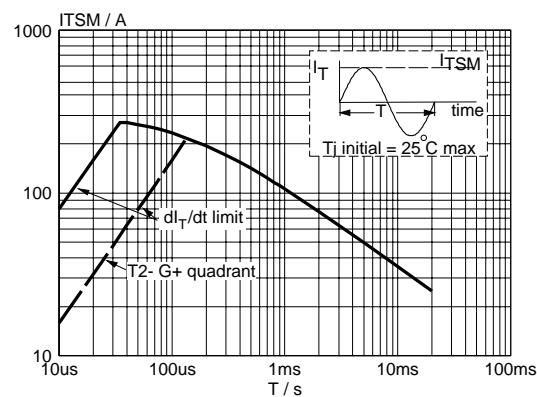


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20ms$ .

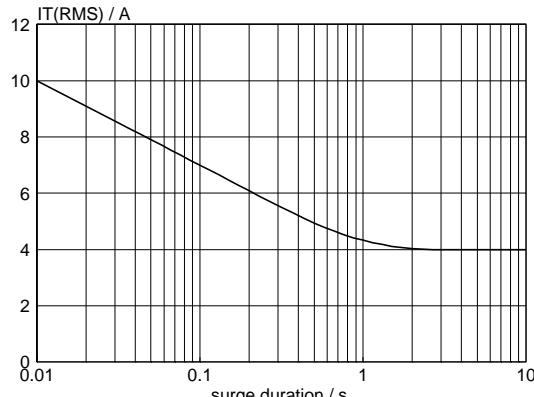


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50$  Hz;  $T_{mb} \leq 107^\circ\text{C}$ .

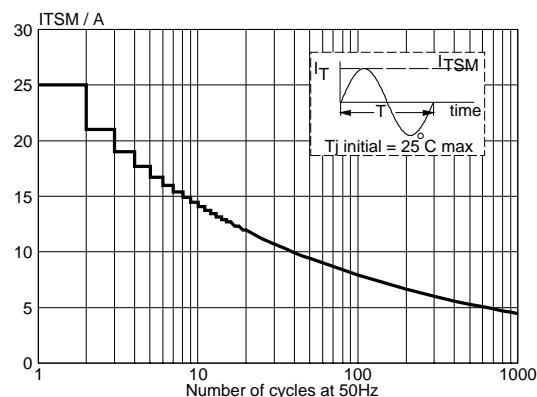


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50$  Hz.

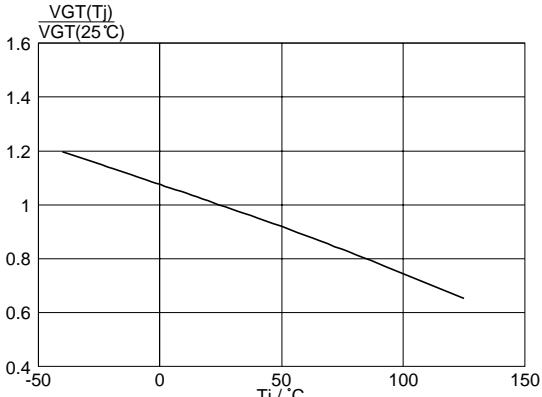


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

## Triacs

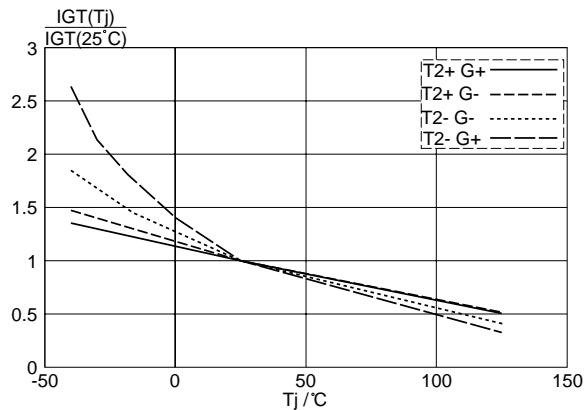
BT136S series  
BT136M series

Fig.7. Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

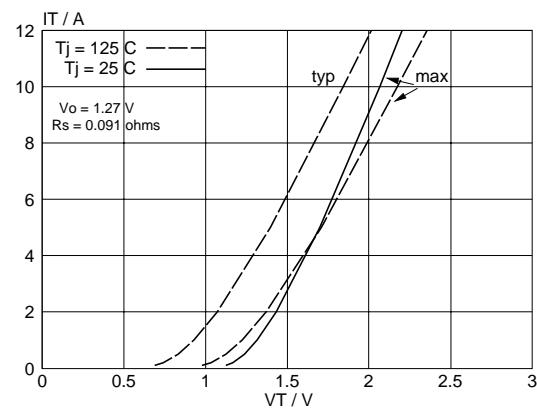


Fig.10. Typical and maximum on-state characteristic.

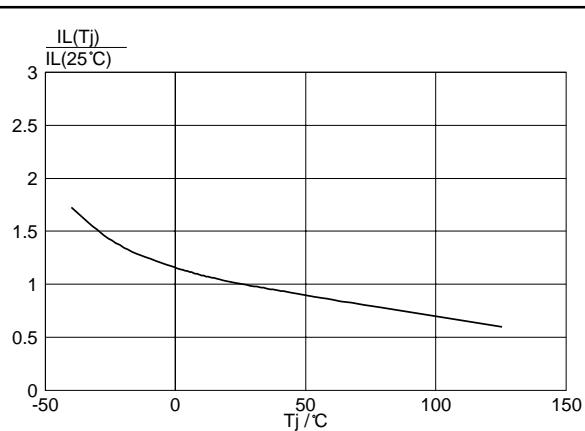


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

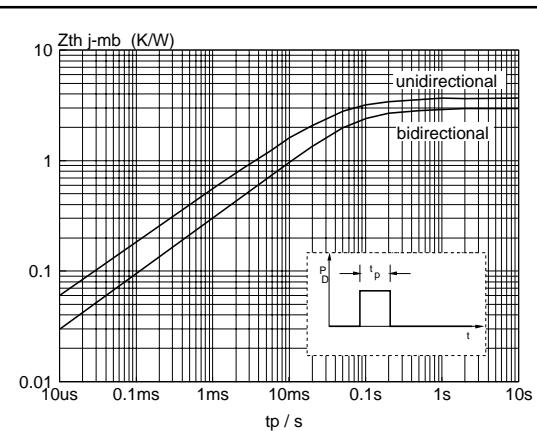


Fig.11. Transient thermal impedance  $Z_{th,j-mb}$ , versus pulse width  $t_p$ .

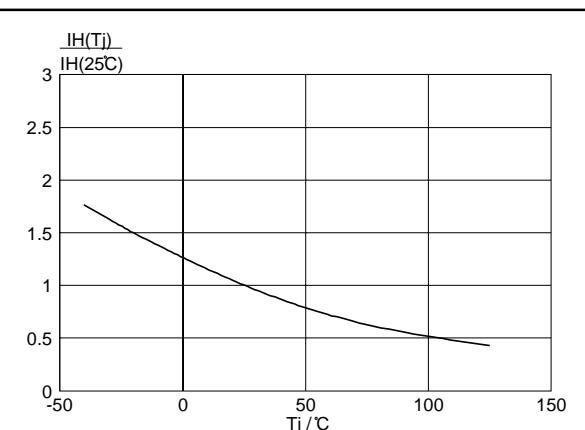


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

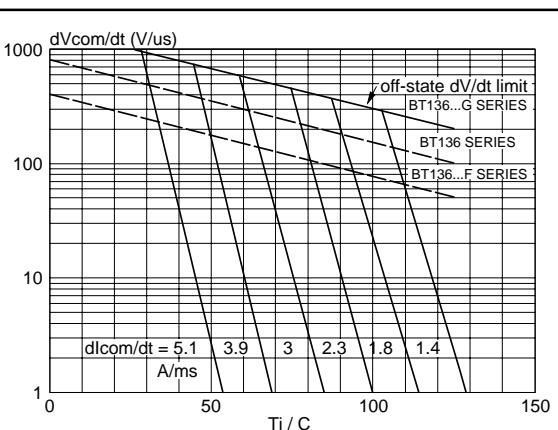


Fig.12. Typical commutation  $dV/dt$  versus junction temperature, parameter commutation  $dl_I/dt$ . The triac should commutate when the  $dV/dt$  is below the value on the appropriate curve for pre-commutation  $dl_I/dt$ .

## MECHANICAL DATA

*Dimensions in mm*

Net Mass: 1.1 g

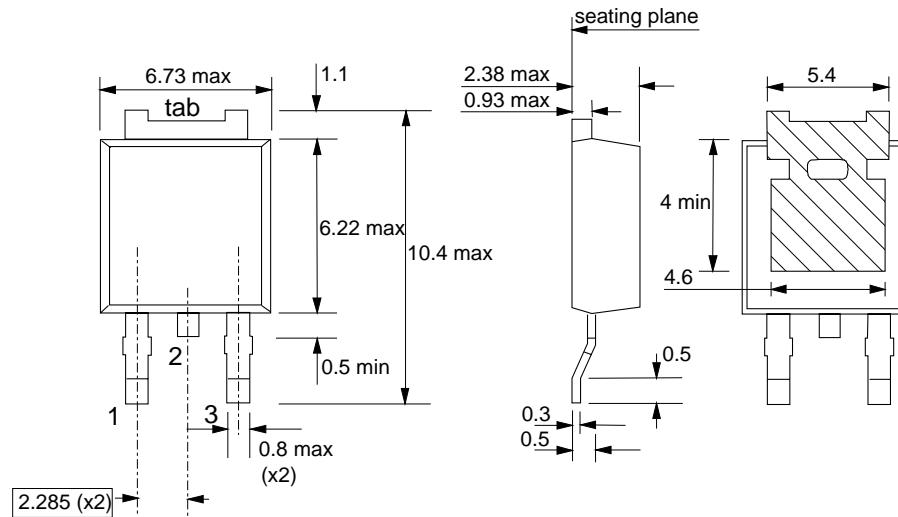


Fig.13. SOT428 : centre pin connected to tab.

## MOUNTING INSTRUCTIONS

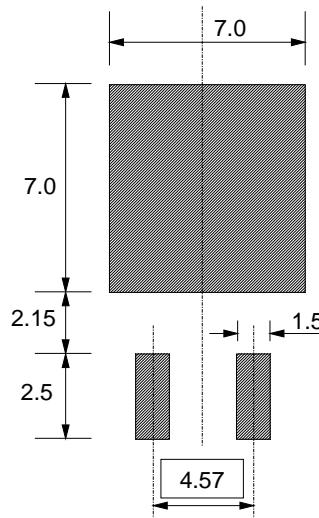
*Dimensions in mm*

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

## Notes

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

## 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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