

## GENERAL DESCRIPTION

Passivated high commutation triacs in a plastic envelope suitable for surface mounting intended for use in circuits where high static and dynamic dV/dt and high dl/dt can occur. These devices will commutate the full rated rms current at the maximum rated junction temperature without the aid of a snubber.

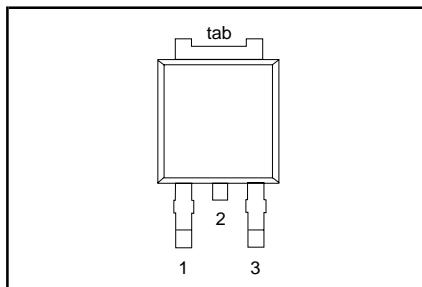
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX. 500B 500C 500	MAX. 600D 600E 600	MAX. 800B 800C 800	UNIT V A A
$V_{DRM}$	BTA204S (or BTA204M)- BTA204S (or BTA204M)- Repetitive peak off-state voltages				
$I_{T(RMS)}$	RMS on-state current	4	4	4	
$I_{TSM}$	Non-repetitive peak on-state current	25	25	25	

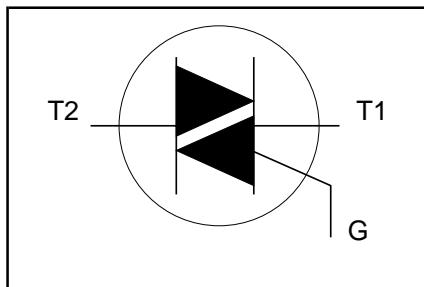
## PINNING - SOT428

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; $T_{mb} \leq 107^\circ\text{C}$	-	4			A
$I_{TSM}$	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ prior to surge					
$I^2t$	$I^2t$ for fusing	$t = 20\text{ ms}$	-	25			A
$dl_t/dt$	Repetitive rate of rise of on-state current after triggering	$t = 16.7\text{ ms}$	-	27			A
$I_{GM}$	Peak gate current	$t = 10\text{ ms}$	-	3.1			$\text{A}^2\text{s}$
$V_{GM}$	Peak gate voltage	$I_{TM} = 6\text{ A}; I_G = 0.2\text{ A};$ $dl_G/dt = 0.2\text{ A}/\mu\text{s}$		100			$\text{A}/\mu\text{s}$
$P_{GM}$	Peak gate power				2		A
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	5	5		V
$T_{stg}$	Storage temperature			5			W
$T_j$	Operating junction temperature		-40	0.5	0.5		W
				150	150		$^\circ\text{C}$
				125	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 6 A/ $\mu\text{s}$ .

## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle	-	-	3.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	half cycle pcb (FR4) mounted; footprint as in Fig.2	-	75	3.7	K/W

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.		UNIT
$I_{GT}$	Gate trigger current <sup>2</sup>	<b>BTA204</b> (or BTA204M)- $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	-	50	35	mA
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	-	50	35	mA
$I_H$	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	-	30	20	mA
$V_T$ $V_{GT}$	On-state voltage Gate trigger voltage	$I_T = 5\text{ A}$ $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125^\circ\text{C}$	-	1.4	30	20	V
$I_D$	Off-state leakage current	$V_D = V_{DRM(\max)}; T_j = 125^\circ\text{C}$	0.25	0.7	45	30	V
				0.4	-	-	V
			-	0.1	0.5	-	mA

## DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	<b>BTA204S</b> (or BTA204M)- $V_{DM} = 67\% V_{DRM(\max)}; T_j = 125^\circ\text{C}$ ; exponential waveform; gate open circuit	1000	1000	-
$dl_{com}/dt$	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125^\circ\text{C}; I_{T(RMS)} = 4\text{ A}$ ; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$ ; gate open circuit	6	3	A/ms
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 12\text{ A}; V_D = V_{DRM(\max)}; I_G = 0.1\text{ A}$ ; $dl_G/dt = 5\text{ A}/\mu\text{s}$	-	-	$\mu\text{s}$

<sup>2</sup> Device does not trigger in the T2-, G+ quadrant.

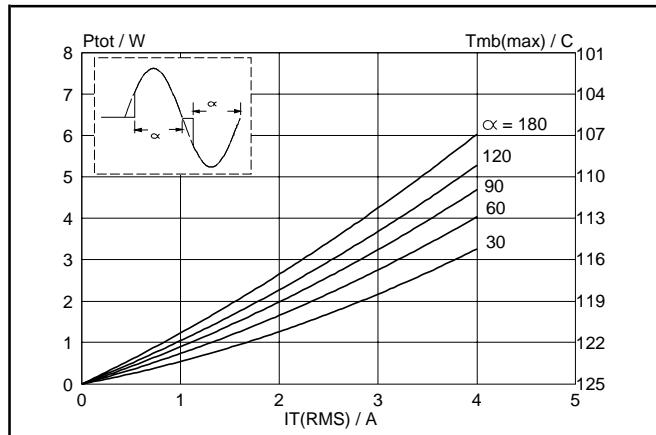


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.

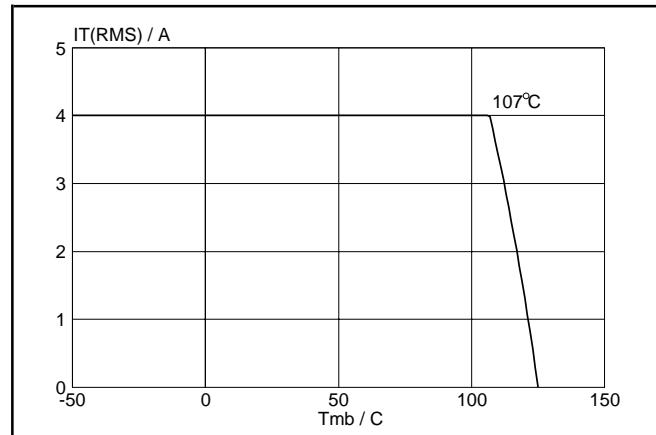


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

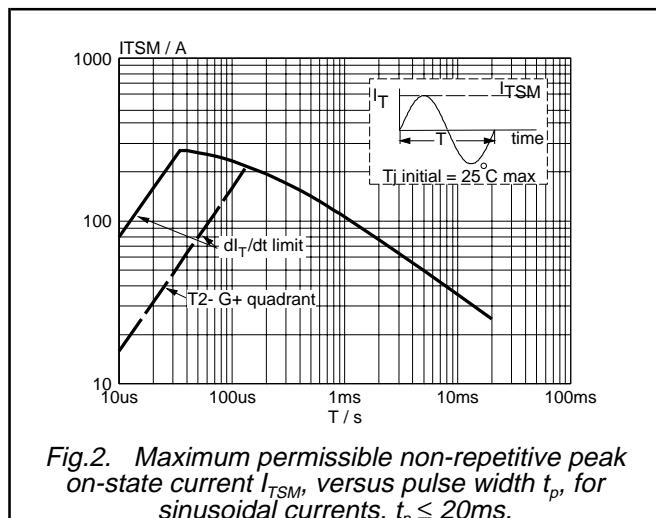


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20ms$ .

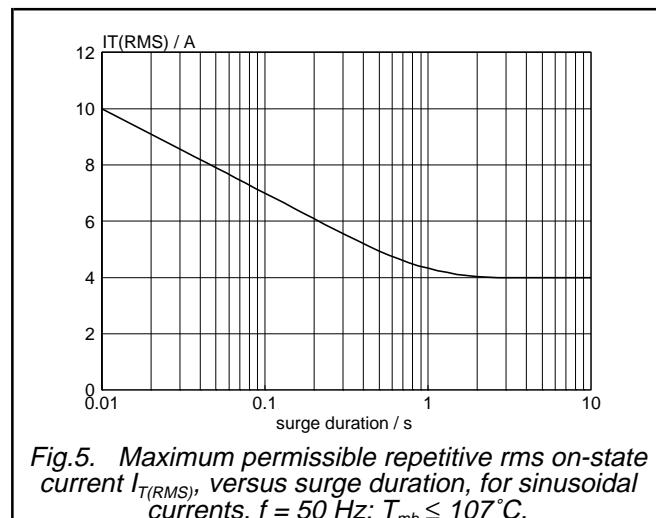


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50$  Hz;  $T_{mb} \leq 107^\circ C$ .

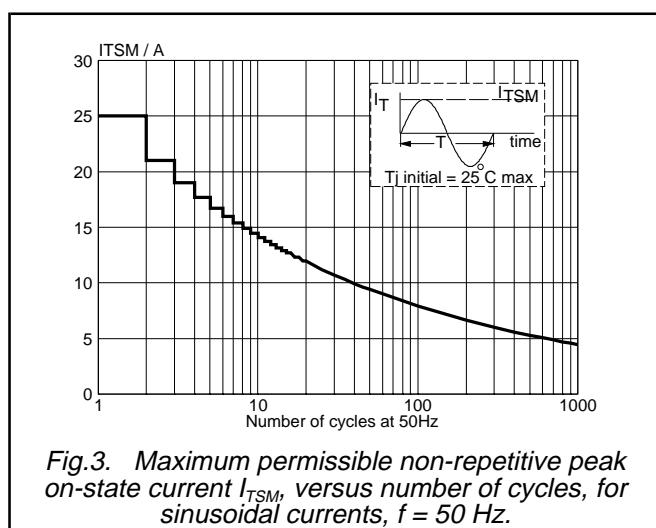


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50$  Hz.

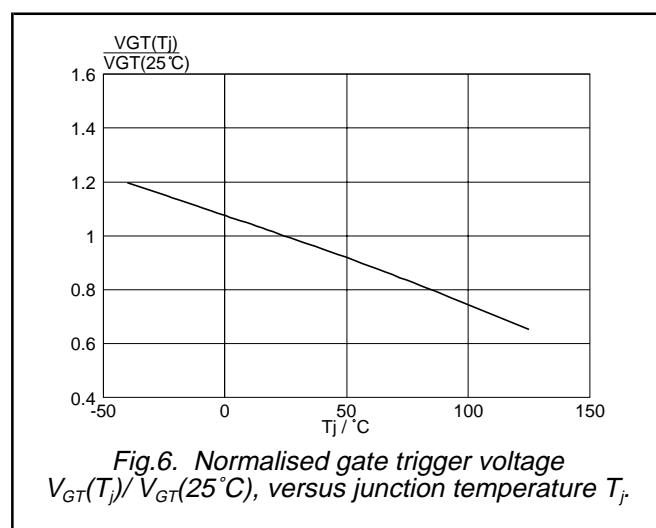


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ C)$ , versus junction temperature  $T_j$ .

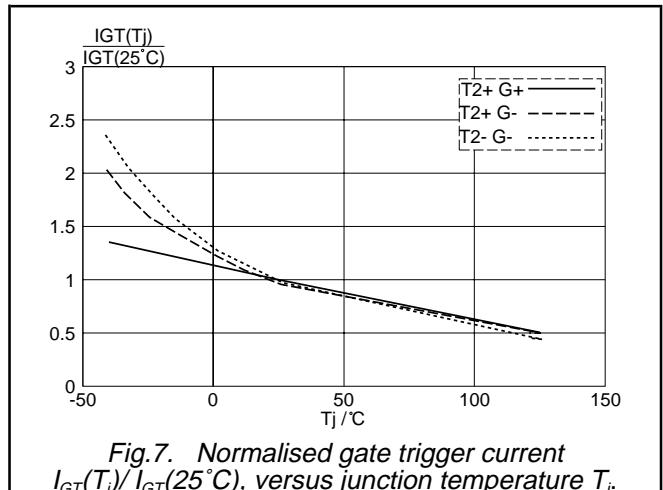


Fig.7. Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ C)$ , versus junction temperature  $T_j$ .

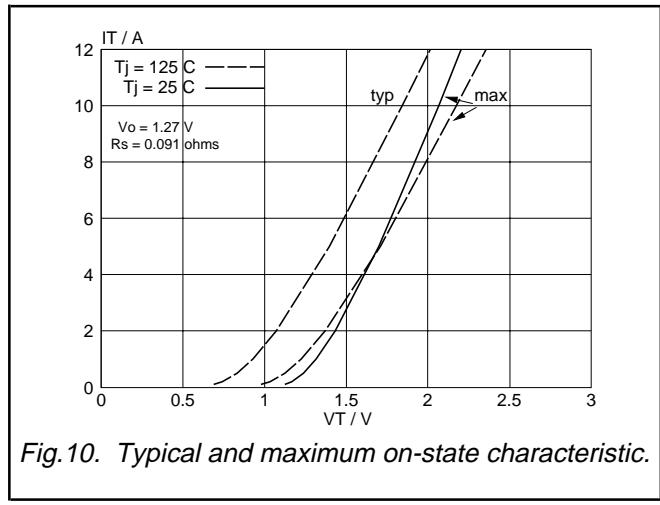


Fig.10. Typical and maximum on-state characteristic.

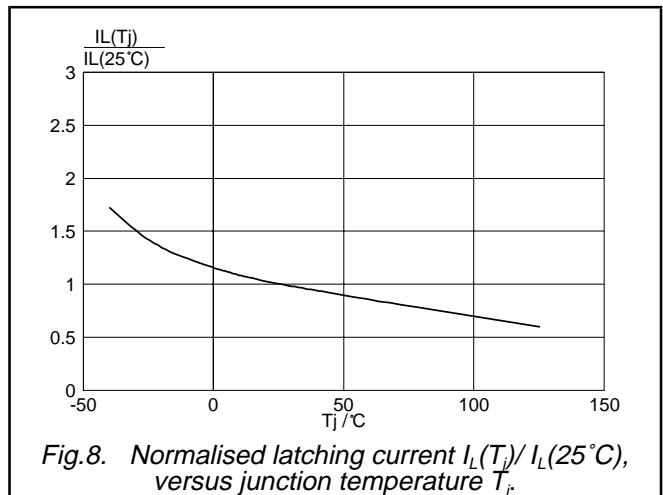


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ C)$ , versus junction temperature  $T_j$ .

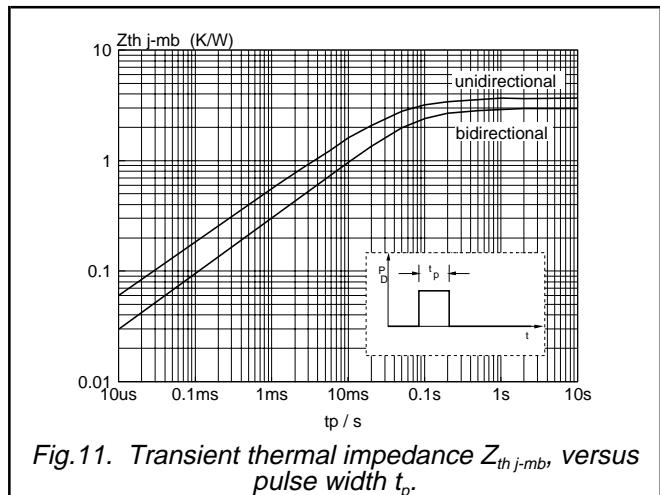


Fig.11. Transient thermal impedance  $Z_{th,j-mb}$ , versus pulse width  $t_p$ .

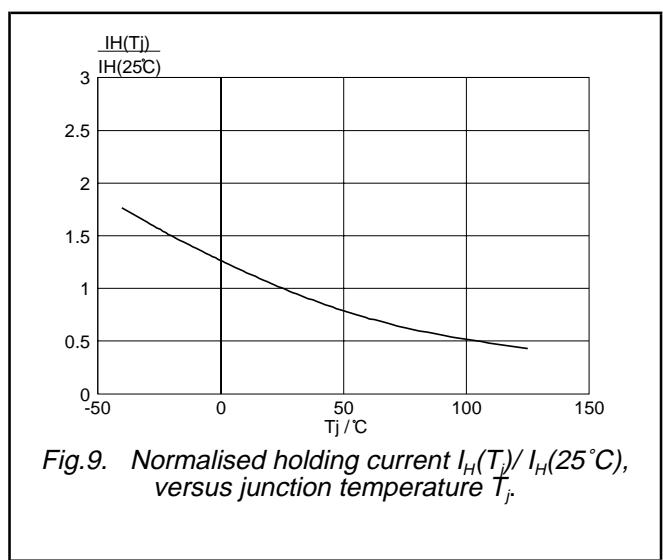


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ C)$ , versus junction temperature  $T_j$ .

## MECHANICAL DATA

Dimensions in mm

Net Mass: 1.1 g

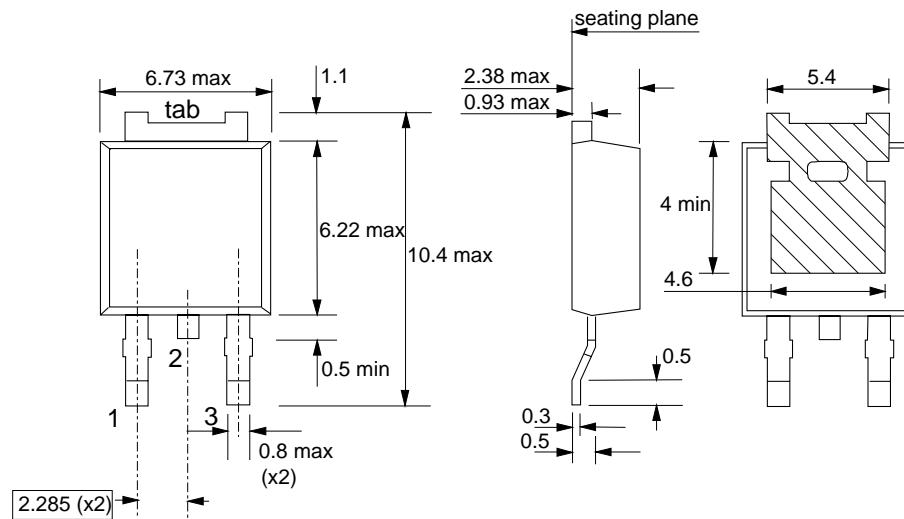


Fig.12. SOT428 : centre pin connected to tab.

## MOUNTING INSTRUCTIONS

Dimensions in mm

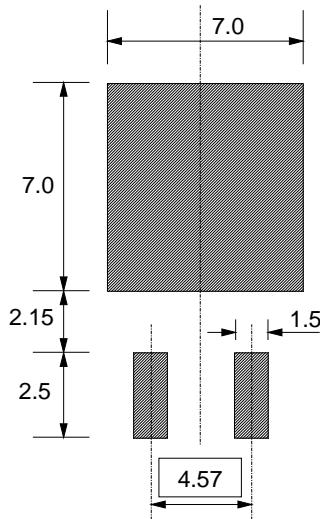


Fig.13. SOT428 : minimum pad sizes for surface mounting.

### Notes

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