

DATA SHEET

BTA204W series B and C

Three quadrant triacs
high commutation

Product specification

December 1998



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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 dI/dt can occur. These devices will commute the full rated rms current at the maximum rated junction temperature without the aid of a snubber.

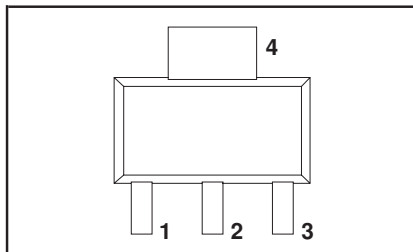
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
V_{DRM}	BTA204W- BTA204W- Repetitive peak off-state voltages	500B 500C 500	600B 600C 600	800B 800C 800	V
$I_{\text{T(RMS)}}$	RMS on-state current	1	1	1	A
I_{TSM}	Non-repetitive peak on-state current	10	10	10	A

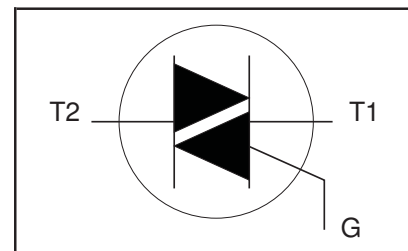
PINNING - SOT223

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

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 ¹	-600 600 ¹	-800 800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 108\text{ }^{\circ}\text{C}$	-	1			A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_{\text{j}} = 25\text{ }^{\circ}\text{C}$ prior to surge	-	10			A
		$t = 20\text{ ms}$	-	11			A
I^2t	I^2t for fusing	$t = 16.7\text{ ms}$	-	0.5			A ² s
dI_{T}/dt	Repetitive rate of rise of on-state current after triggering	$t = 10\text{ ms}$ $I_{\text{TM}} = 1.5\text{ A};$ $I_{\text{G}} = 0.2\text{ A};$ $dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-	100			A/ μs
I_{GM}	Peak gate current		-	2			A
V_{GM}	Peak gate voltage		-	5			V
P_{GM}	Peak gate power		-	5			W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.5			W
T_{stg}	Storage temperature		-40	150			$^{\circ}\text{C}$
T_{j}	Operating junction temperature		-	125			$^{\circ}\text{C}$

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 6 A/ μs .

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-sp}$	Thermal resistance junction to solder point	full or half cycle	-	-	15	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint	-	156	-	K/W
		pcb mounted; pad area as in fig:2	-	70	-	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.		UNIT
		BTA204W-			...B	...C	
I_{GT}	Gate trigger current ²	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	-	50	35	mA
		T2+ G+	-	-	50	35	mA
		T2+ G-	-	-	50	35	mA
		T2- G-	-	-	50	35	mA
I_L	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	-	30	20	mA
		T2+ G+	-	-	45	30	mA
		T2+ G-	-	-	30	20	mA
		T2- G-	-	-	30	20	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	-	30	20	mA
V_T	On-state voltage	$I_T = 2\text{ A}$	-	1.2	1.5		V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	0.7	1.5		V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A};$	0.25	0.4	-		V
		$T_j = 125\text{ °C}$					
I_D	Off-state leakage current	$V_D = V_{DRM(max)}; T_j = 125\text{ °C}$	-	0.1	0.5		mA

DYNAMIC CHARACTERISTICS

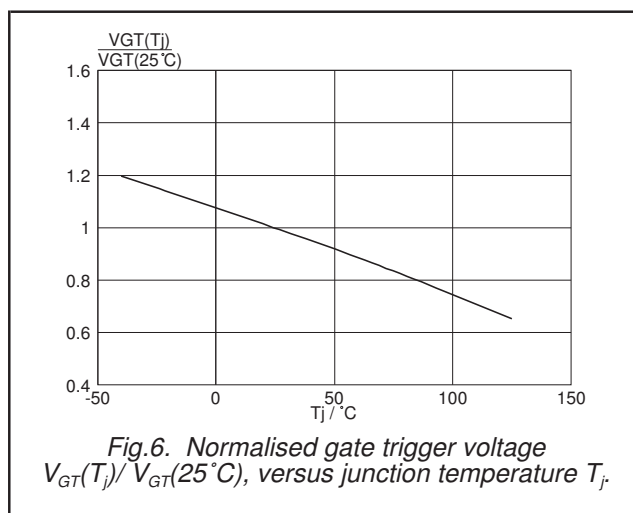
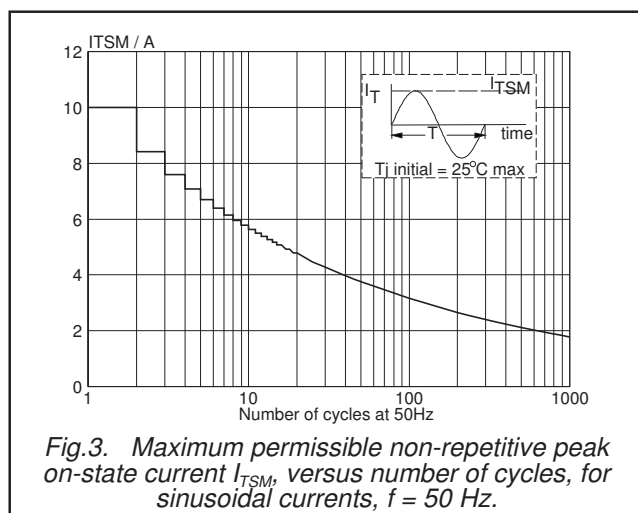
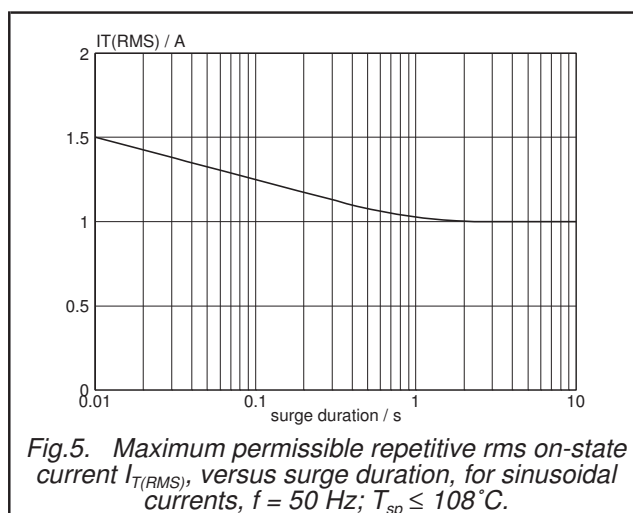
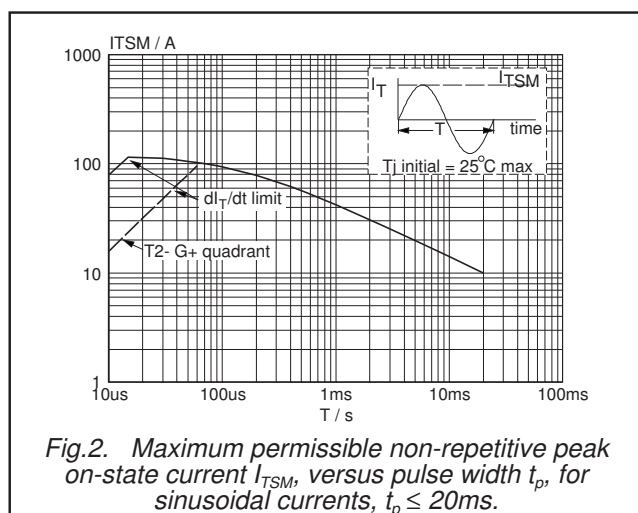
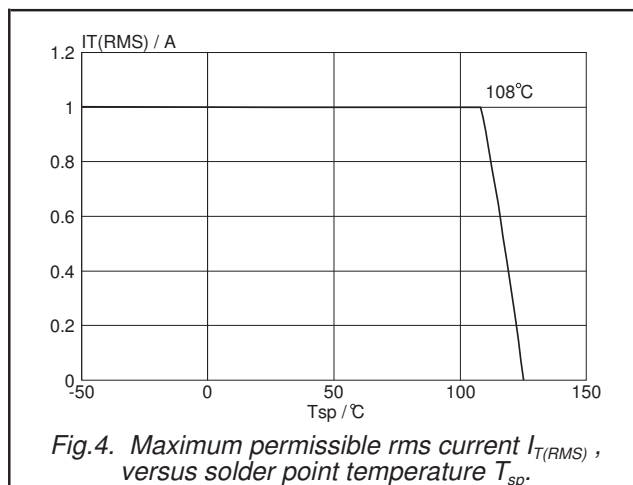
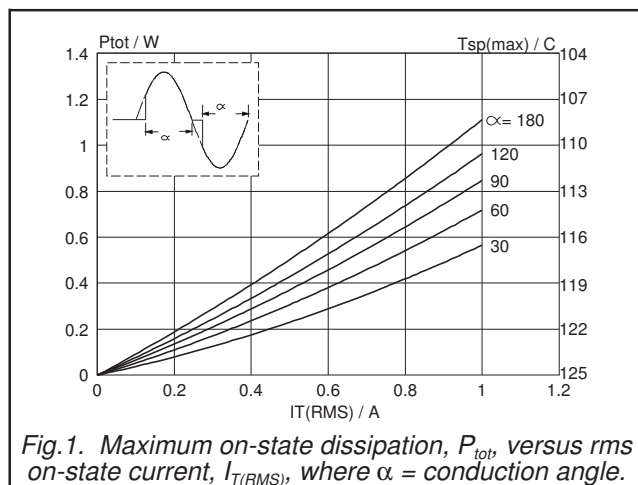
$T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.		TYP.	UNIT
		BTA204W-	...B	...C		
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	1000	1000	-	V/ μ s
dI_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125\text{ °C}; I_{T(RMS)} = 1\text{ A};$ $dV_{com}/dt = 20\text{ V}/\mu\text{s};$ gate open circuit	6	3	-	A/ms
t_{gt}	Gate controlled turn-on time	$I_{TM} = 12\text{ A}; V_D = V_{DRM(max)}; I_G = 0.1\text{ A};$ $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	-	2	μ s

² Device does not trigger in the T2-, G+ quadrant.

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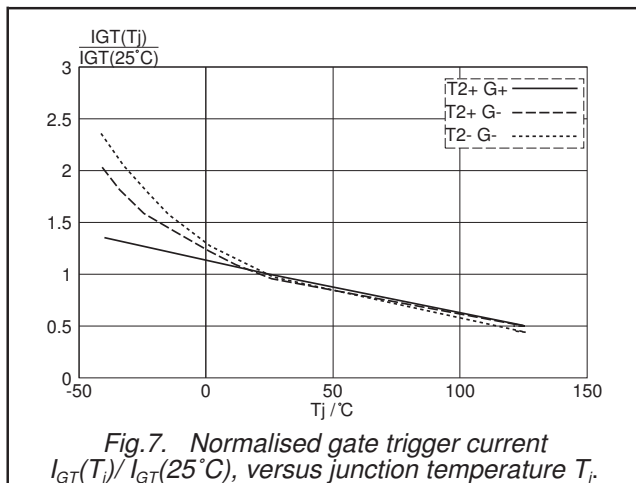


Fig. 7. Normalised gate trigger current $I_{GT}(T_j) / I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

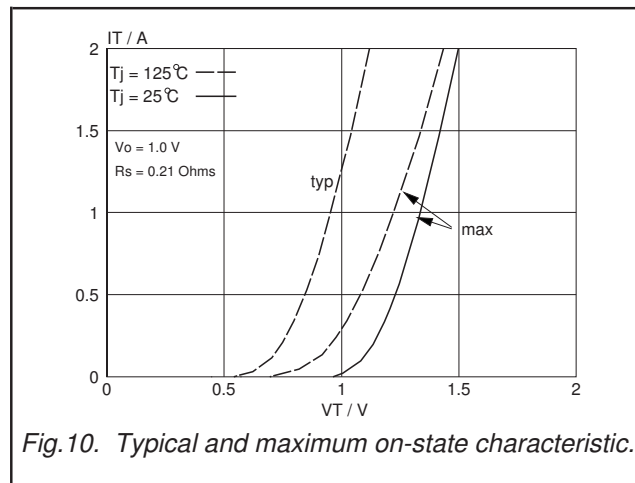


Fig. 10. Typical and maximum on-state characteristic.

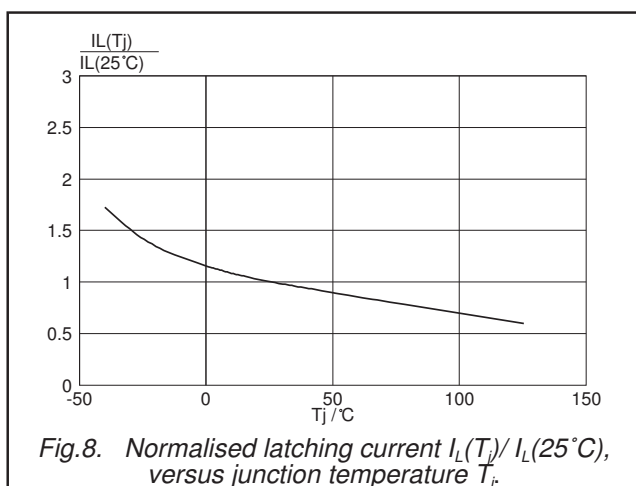


Fig. 8. Normalised latching current $I_L(T_j) / I_L(25^\circ\text{C})$, versus junction temperature T_j .

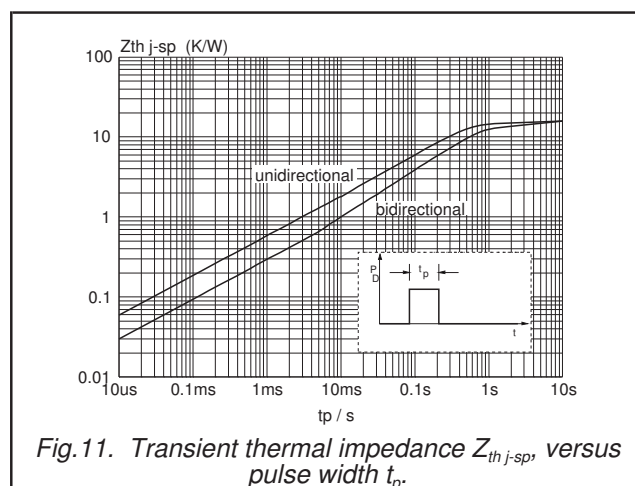


Fig. 11. Transient thermal impedance $Z_{th j-sp}$, versus pulse width t_p .

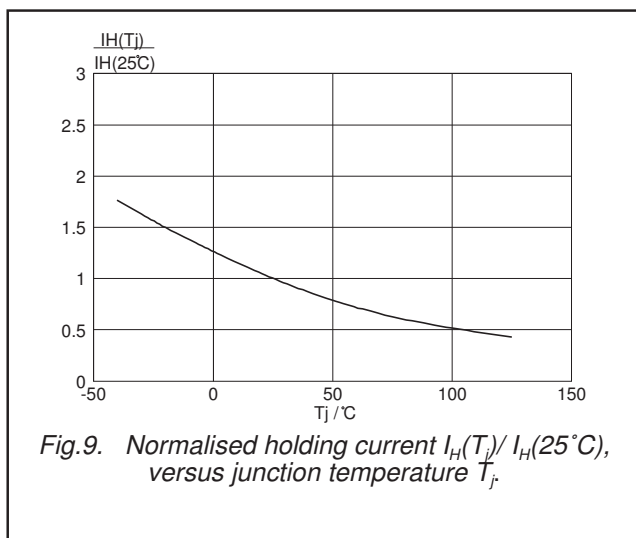


Fig. 9. Normalised holding current $I_H(T_j) / I_H(25^\circ\text{C})$, versus junction temperature T_j .

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MOUNTING INSTRUCTIONS

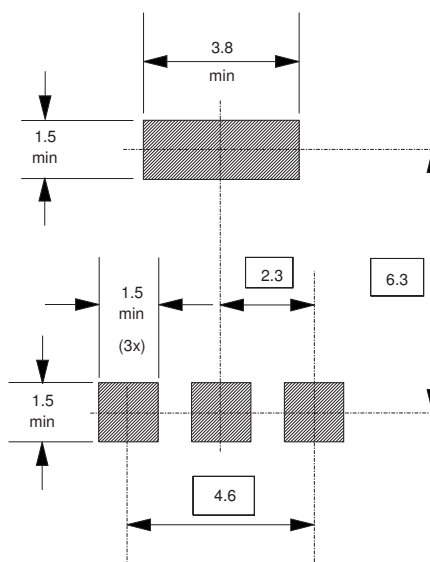


Fig.12. soldering pattern for surface mounting SOT223.

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.11 g

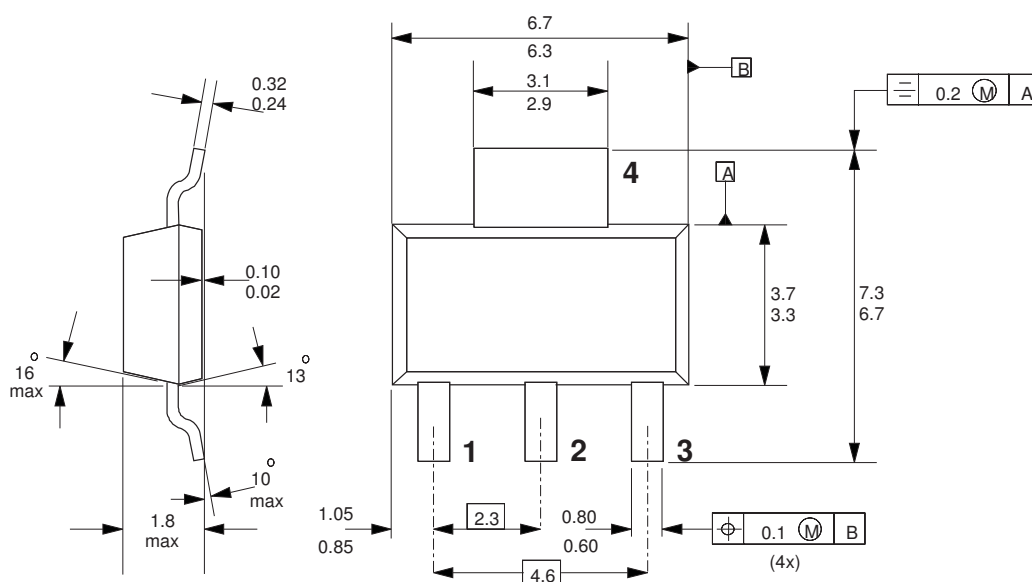


Fig.13. SOT223 surface mounting package.

Notes

1. For further information, refer to Philips publication SC18 "SMD Footprint Design and Soldering Guidelines".
Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".

Legal information

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DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
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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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