

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.

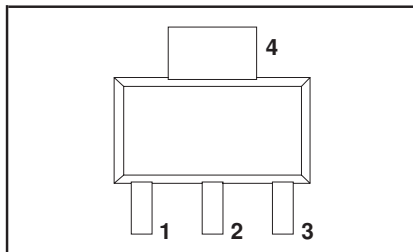
QUICK REFERENCE DATA

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

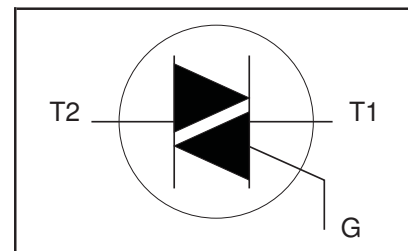
PINNING - SOT223

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

$T_j = 25\ ^\circ\text{C}$ 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
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
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
		$V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125\ ^\circ\text{C}$	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

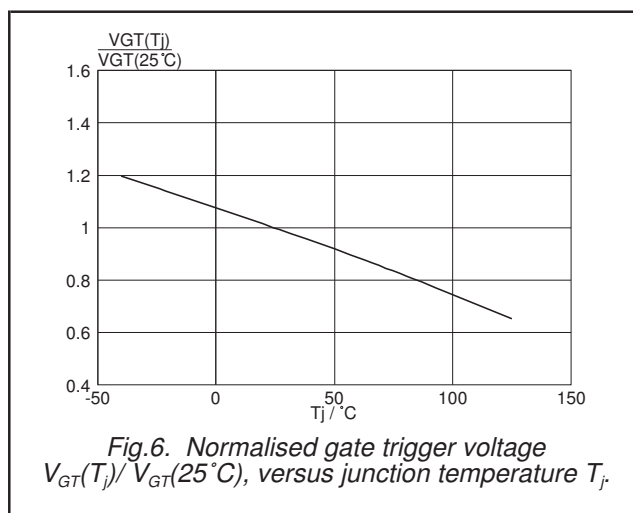
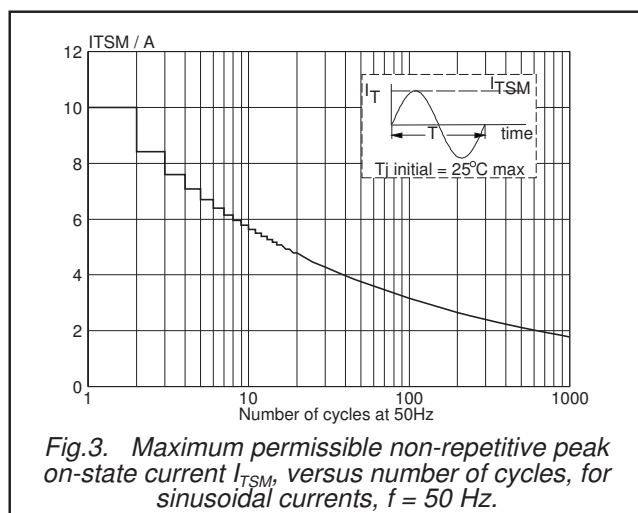
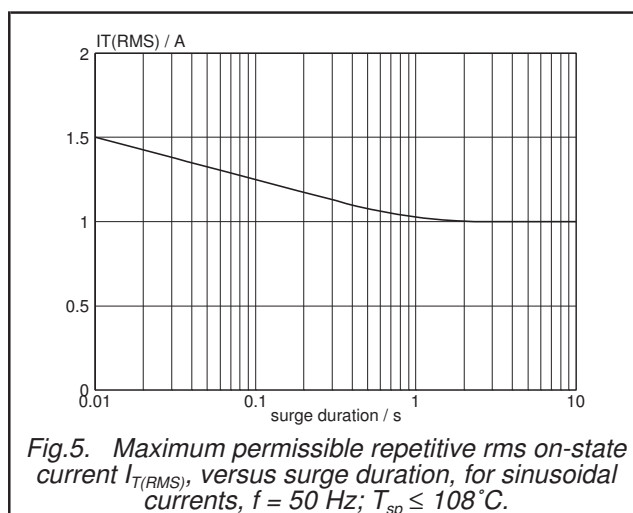
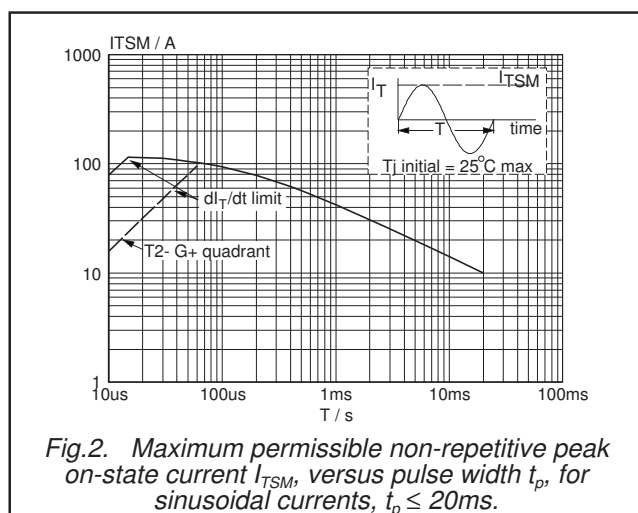
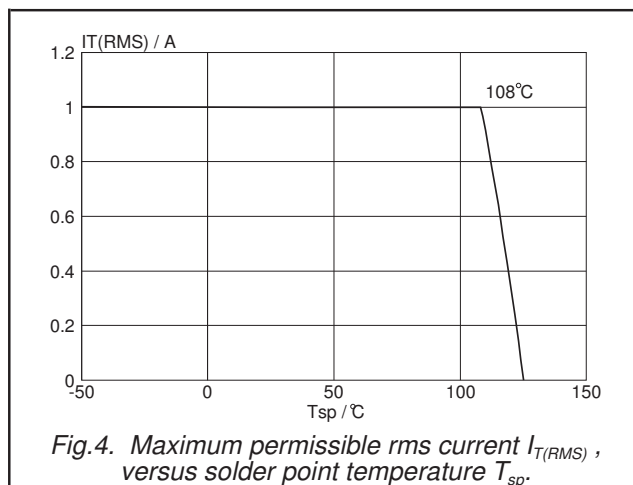
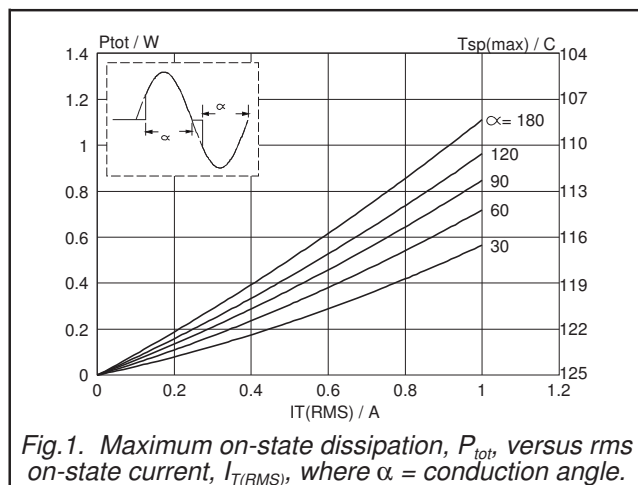
$T_j = 25\ ^\circ\text{C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.		TYP.	UNIT
		BTA204W-	...B	...C		
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}; T_j = 125\ ^\circ\text{C};$ exponential waveform; gate open circuit	1000	1000	-	V/ μs
dI_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125\ ^\circ\text{C}; I_{T(RMS)} = 1\text{ A};$ $dV_{com}/dt = 20\text{ V}/\mu\text{s};$ 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	μs

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

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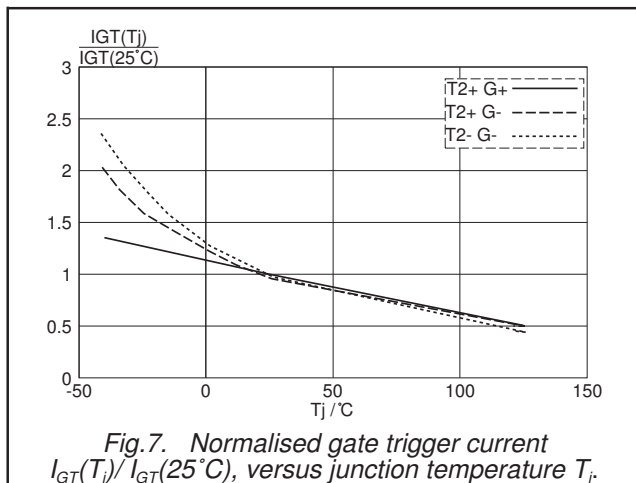


Fig. 7. Normalised gate trigger current $I_{GT}(T_j) / I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

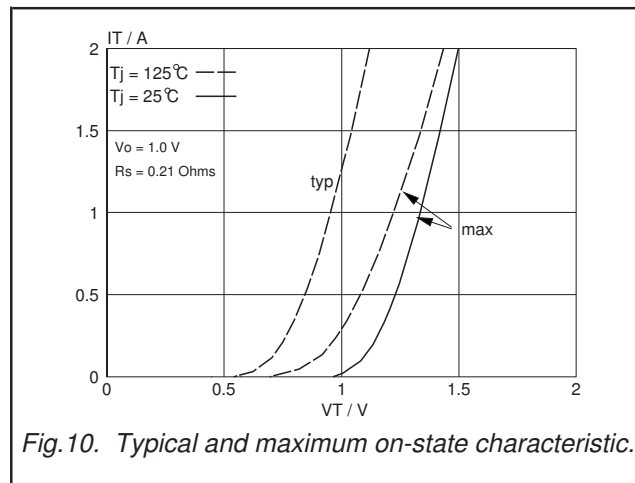


Fig. 10. Typical and maximum on-state characteristic.

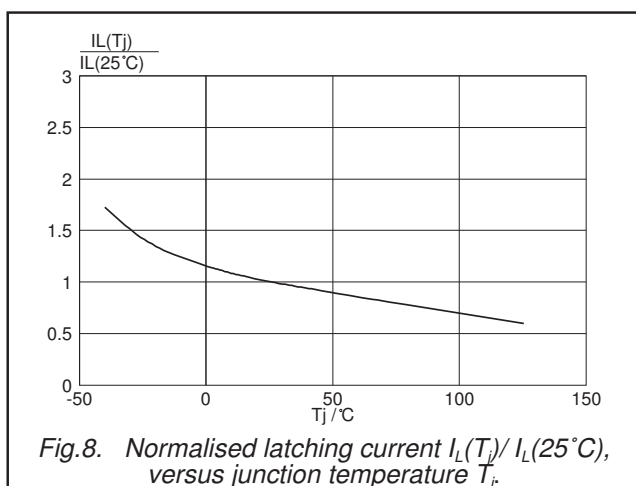


Fig. 8. Normalised latching current $I_L(T_j) / I_L(25^\circ\text{C})$, versus junction temperature T_j .

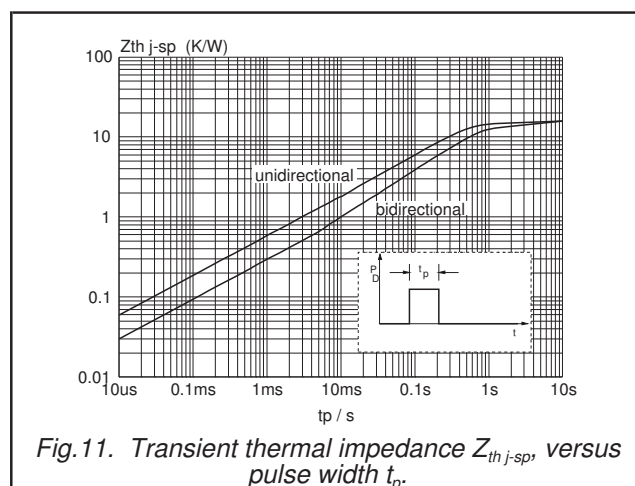


Fig. 11. Transient thermal impedance $Z_{th j-sp}$, versus pulse width t_p .

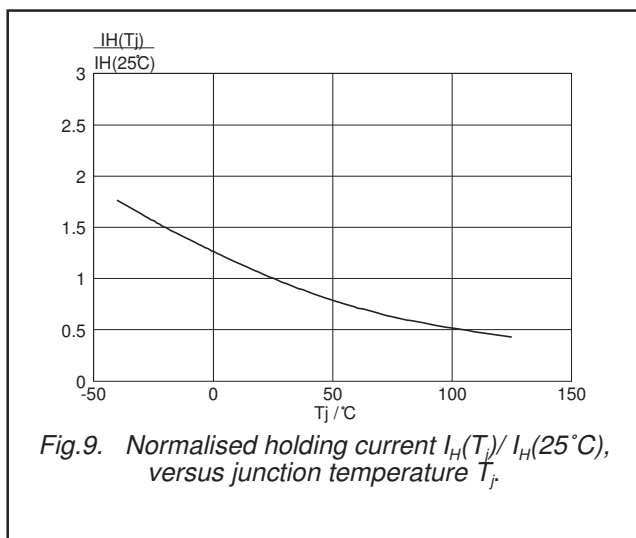


Fig. 9. Normalised holding current $I_H(T_j) / I_H(25^\circ\text{C})$, versus junction temperature T_j .

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MOUNTING INSTRUCTIONS

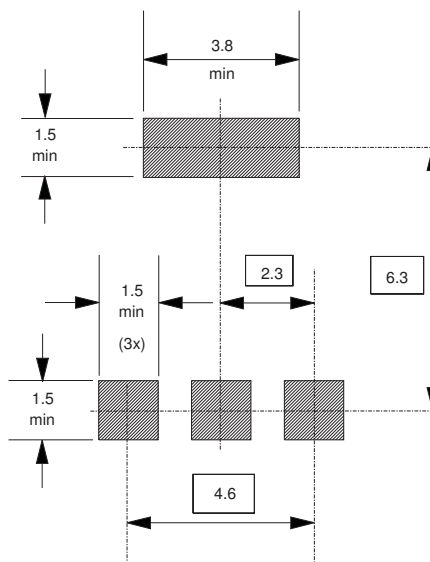


Fig.12. soldering pattern for surface mounting SOT223.

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.11 g

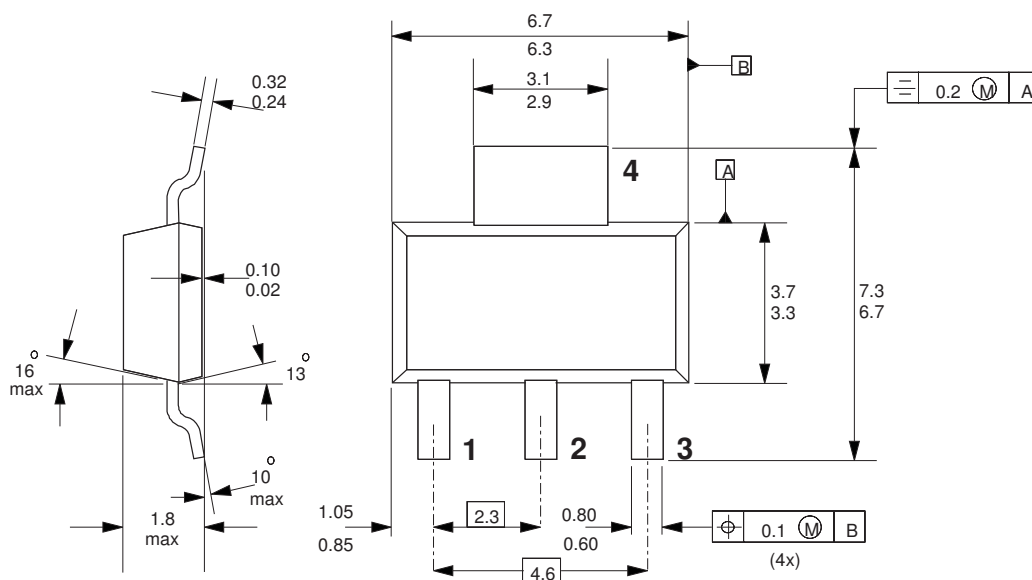


Fig.13. SOT223 surface mounting package.

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

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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