

Three quadrant triacs high commutation

BTA208X-1000B

GENERAL DESCRIPTION

Passivated high voltage, high commutation triac in a full pack, plastic envelope. This triac is intended for use in motor control circuits where high blocking voltage, high static and dynamic dV/dt and high dI/dt can occur. This device will commute the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

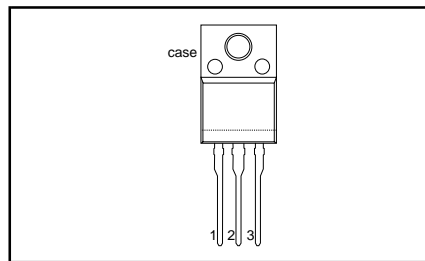
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages	1000	V
$I_{T(RMS)}$	RMS on-state current	8	A
I_{TSM}	Non-repetitive peak on-state current	65	A

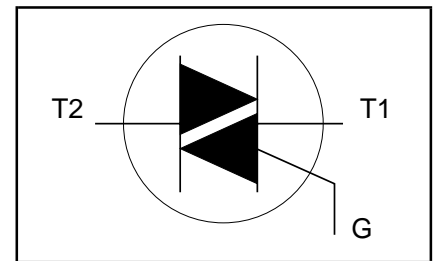
PINNING - SOT186A

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
case	isolated

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		-	1000	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{hs} \leq 73\text{ }^\circ\text{C}$	-	8	A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25\text{ }^\circ\text{C}$ prior to surge	-	65	A
		$t = 20\text{ ms}$	-	71	A
		$t = 16.7\text{ ms}$	-	21	A^2s
I^2t	I^2t for fusing	$t = 10\text{ ms}$	-	100	$\text{A}/\mu\text{s}$
dI_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 12\text{ A}; I_G = 0.2\text{ A}; dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-		
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	over any 20 ms period	-	0.5	W
T_{stg}	Storage temperature		-40	150	$^\circ\text{C}$
T_j	Operating junction temperature		-	125	$^\circ\text{C}$

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ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25\text{ °C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	$f = 50\text{-}60\text{ Hz}$; sinusoidal waveform; $R.H. \leq 65\%$; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	$f = 1\text{ MHz}$	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	full or half cycle with heatsink compound	-	-	4.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	6.5	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current ¹	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$				
		T2+ G+	2	18	50	mA
		T2+ G-	2	21	50	mA
		T2- G-	2	34	50	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$				
		T2+ G+	-	31	60	mA
		T2+ G-	-	34	90	mA
		T2- G-	-	30	60	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	31	60	mA
V_T	On-state voltage	$I_T = 10\text{ A}$	-	1.3	1.65	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.7	1.5	V
I_D	Off-state leakage current	$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$	0.25	0.4	-	V
		$V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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	4000	-	V/ μ s
di_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ °C}$; $I_{T(RMS)} = 8\text{ A}$; without snubber; gate open circuit	15	38	-	A/ms
t_{gt}	Gate controlled turn-on time	$I_{TM} = 12\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $di_G/dt = 5\text{ A}/\mu$ s	-	2	-	μ s

¹ Device does not trigger in the T2-, G+ quadrant.

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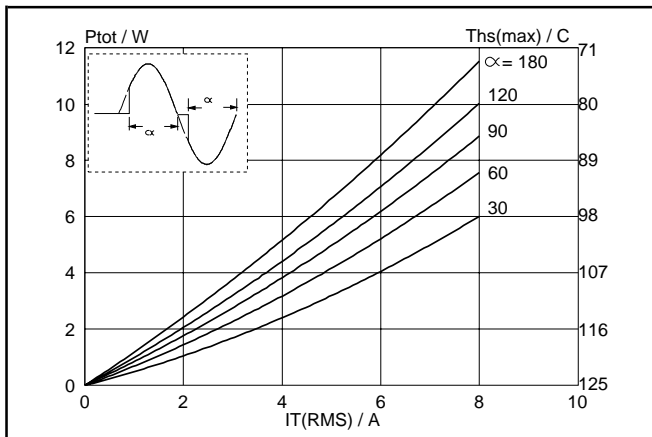


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

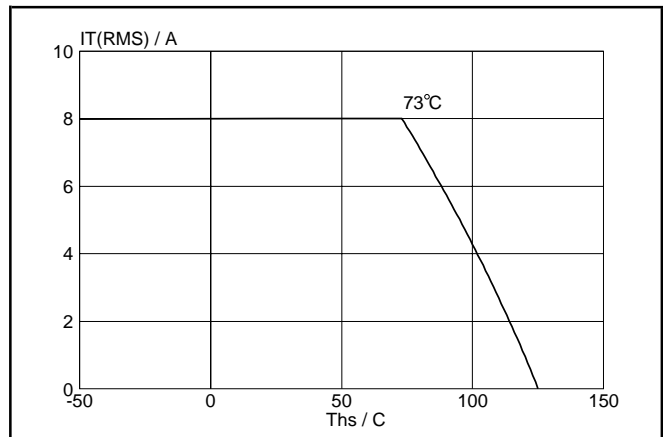


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus heatsink temperature T_{hs} .

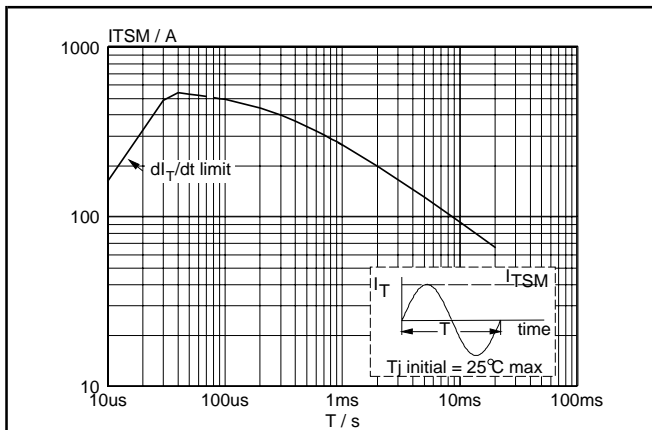


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

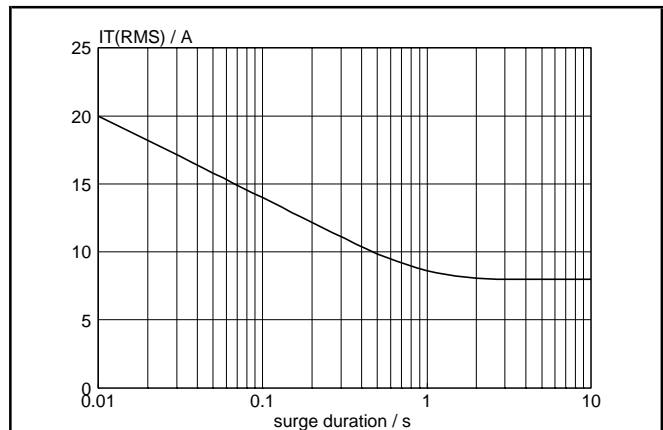


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$; $T_{hs} \leq 73^\circ\text{C}$.

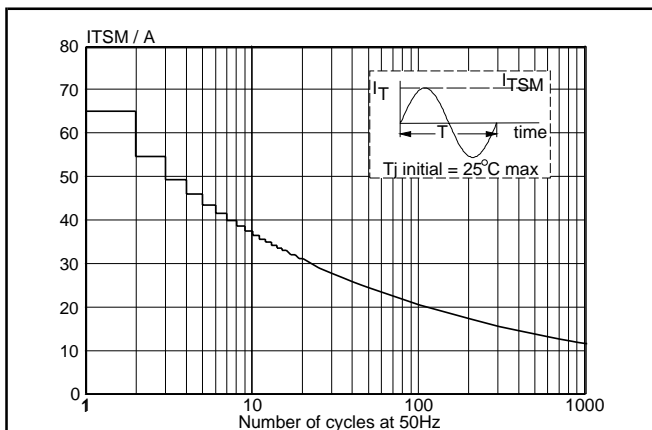


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

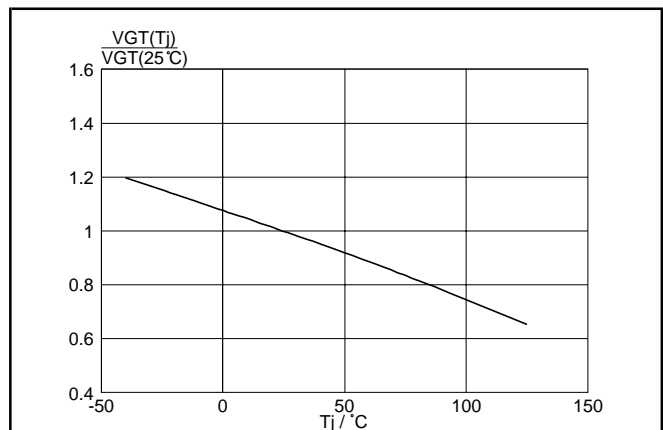


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

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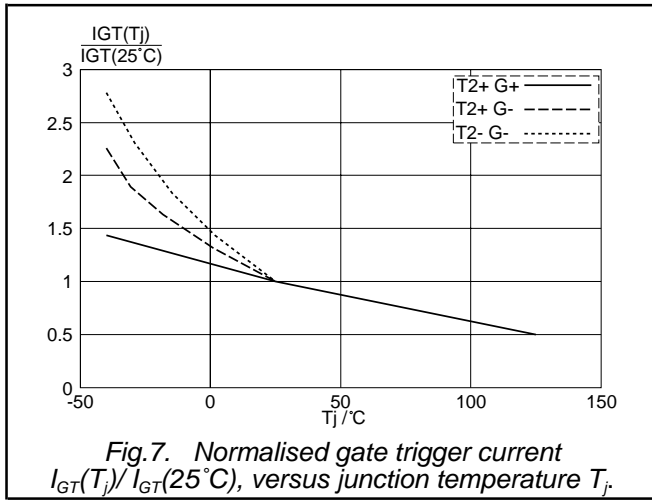


Fig. 7. Normalised gate trigger current $I_{GT}(T_j) / I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

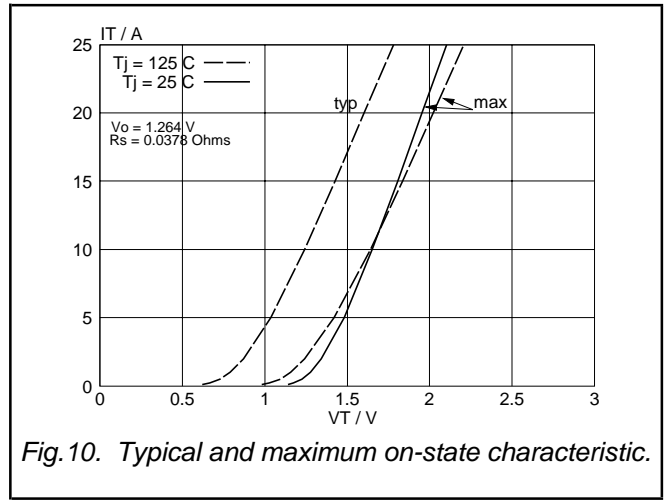


Fig. 10. Typical and maximum on-state characteristic.

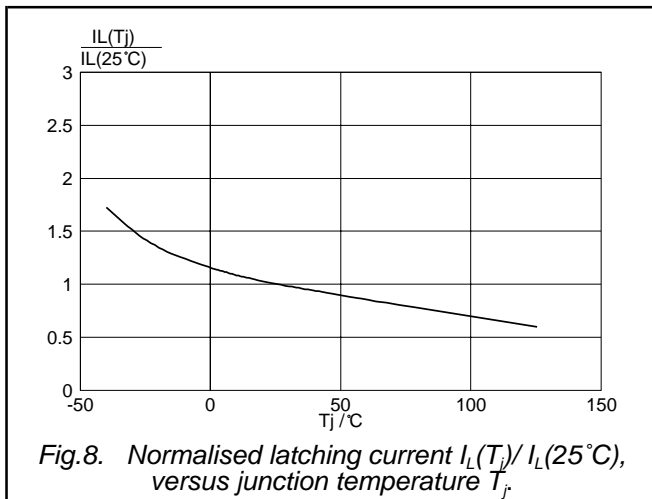


Fig. 8. Normalised latching current $I_L(T_j) / I_L(25^\circ\text{C})$, versus junction temperature T_j .

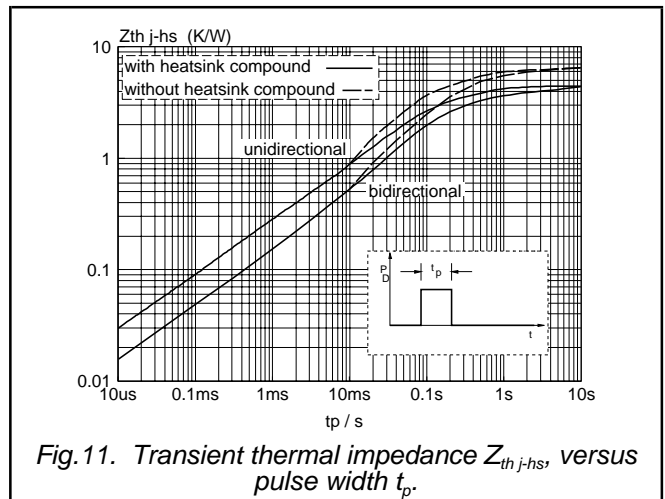


Fig. 11. Transient thermal impedance $Z_{th\ j-hs}$, versus pulse width t_p .

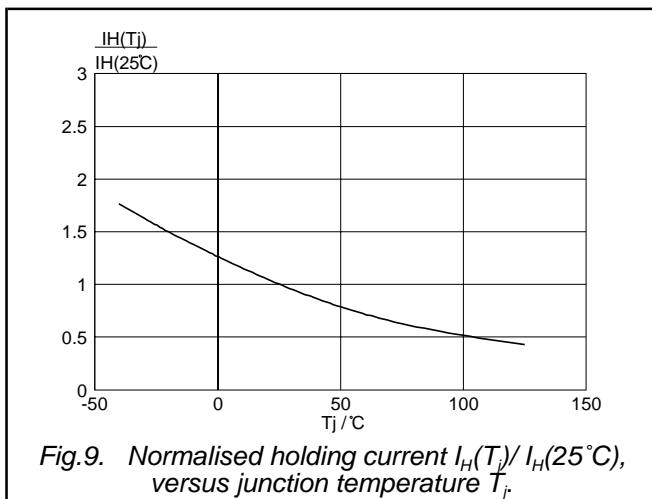


Fig. 9. Normalised holding current $I_H(T_j) / I_H(25^\circ\text{C})$, versus junction temperature T_j .

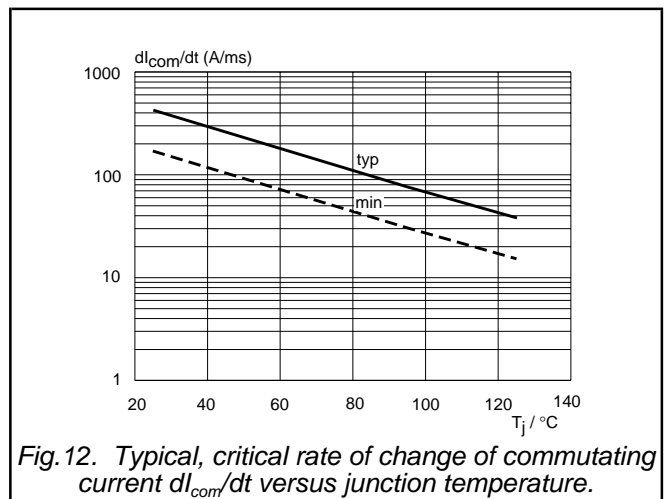


Fig. 12. Typical, critical rate of change of commutating current di_{com}/dt versus junction temperature.

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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

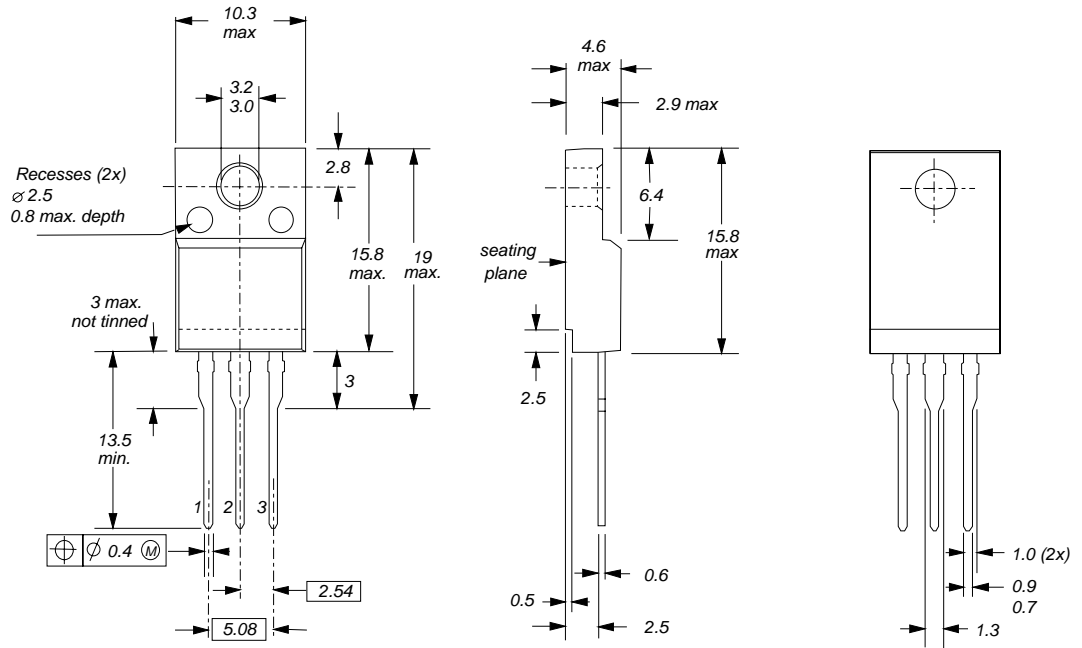


Fig. 13. SOT186A; The seating plane is electrically isolated from all terminals.

Notes

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

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DEFINITIONS

DATA SHEET STATUS		
DATA SHEET STATUS ²	PRODUCT STATUS ³	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A
Limiting values		
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.		
Application information		
Where application information is given, it is advisory and does not form part of the specification.		
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