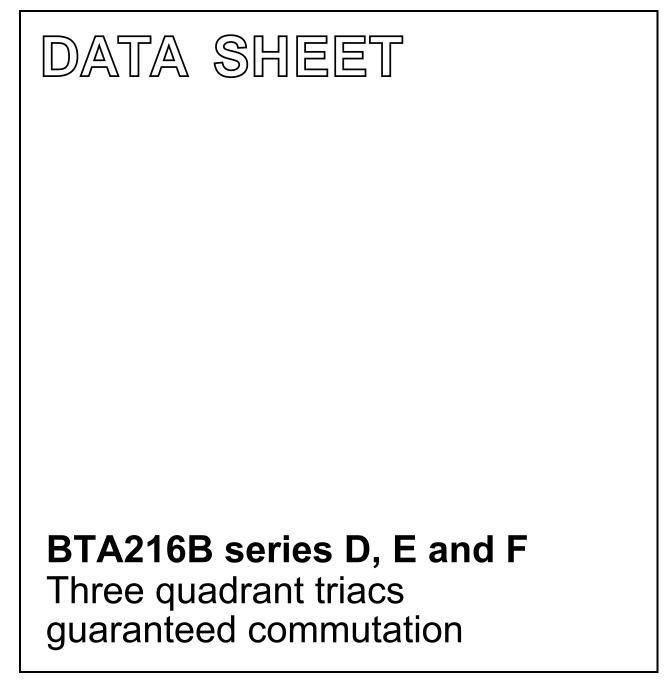
DISCRETE SEMICONDUCTORS



Product specification

April 2002



MAX.

600D

600E

600F

600

16

140

UNIT

٧

А

А

Three quadrant triacs guaranteed commutation

BTA216B series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope suitable for surface mounting, intended for use in motor control circuits or with other highly inductive loads. These devices balance the requirements of commutation performance and gate sensitivity. The "sensitive gate" E series and "logic level" D series are intended for interfacing with low power drivers, including micro controllers.

DESCRIPTION

PINNING - SOT404

main terminal 1

main terminal 2

main terminal 2

PIN

1

2

3

mb

QUICK REFERENCE DATA

current

PARAMETER

SYMBOL

 V_{DRM}

T(RMS)

PIN CONFIGURATION

I_{TSM}

SYMBOL

BTA216B-

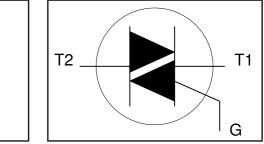
BTA216B-

BTA216B-

Repetitive peak off-state

Non-repetitive peak on-state

voltages RMS on-state current



LIMITING VALUES

gate

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{DRM}	Repetitive peak off-state voltages		-	600 ¹	V
I _{T(RMS)} I _{TSM}	RMS on-state current Non-repetitive peak on-state current	full sine wave; $T_{mb} \le 99 \degree C$ full sine wave; $T_i = 25 \degree C$ prior to	-	16	A
l²t dl⊤/dt	I ² t for fusing Repetitive rate of rise of on-state current after	surge t = 20 ms t = 16.7 ms t = 10 ms $I_{TM} = 20 \text{ A}; I_G = 0.2 \text{ A};$ $dI_G/dt = 0.2 \text{ A}/\mu\text{s}$	- -	140 150 98 100	Α Α Α²s Α/μs
$\begin{matrix} I_{GM} \\ P_{GM} \\ P_{G(AV)} \end{matrix}$	triggering Peak gate current Peak gate power Average gate power	over any 20 ms	- - -	2 5 0.5	A W W
T _{stg} T _j	Storage temperature Operating junction temperature	penou	-40 -	150 125	Ĵ, Ĵ

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 15 $A/\mu s$.

BTA216B series D, E and F

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R _{th j-mb} R _{th j-a}	Thermal resistance junction to mounting base Thermal resistance junction to ambient	full cycle half cycle minimum footprint, FR4 board		- - 55	1.2 1.7 -	K/W K/W K/W

STATIC CHARACTERISTICS

 $T_j = 25$ °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.		MAX.		UNIT
		BTA216B-		D	E	F	
I _{GT}	Gate trigger current ²	$V_{D} = 12 V; I_{T} = 0.1 A$ T2+ G+ T2+ G- T2- G-	- - -	5 5 5	10 10 10	25 25 25	mA mA mA
IL.	Latching current	$V_{D} = 12 V; I_{GT} = 0.1 A$ T2+G+ T2+G- T2-G-	- - -	15 25 25	25 30 30	30 40 40	mA mA mA
I _H	Holding current	$V_{\rm D} = 12 \text{ V}; \text{ I}_{\rm GT} = 0.1 \text{ A}$	-	15	25	30	mA
			D, E, F				
V _T V _{GT}	On-state voltage Gate trigger voltage		- - 0.25		1.5 1.5 -		V V V
I _D	Off-state leakage current	$V_{\rm D} = V_{\rm DRM(max)}; T_{\rm j} = 125 ^{\circ}{\rm C}$	-		0.5		mA

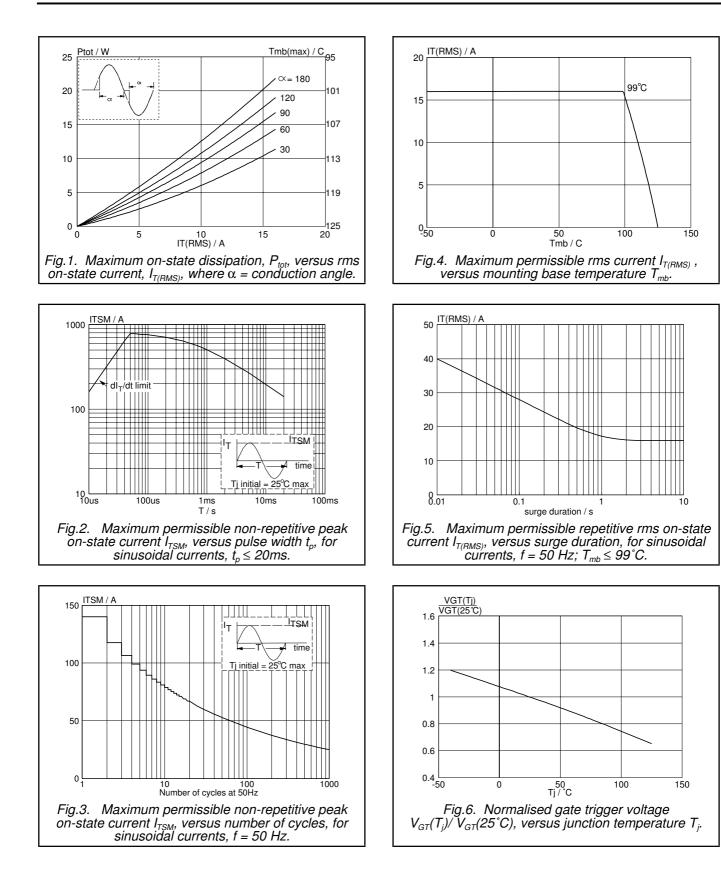
DYNAMIC CHARACTERISTICS

 $T_i = 25$ °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.		MAX.	UNIT	
		BTA216B-	D	E	F		
dV _D /dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)};$ $T_j = 110$ °C; exponential	30	60	70	-	V/µs
dl _{com} /dt	Critical rate of change of commutating current	waveform; gate open circuit $V_{DM} = 400 \text{ V}; \text{ T}_{j} = 125 \text{ °C};$ $I_{T(RMS)} = 16 \text{ A};$ $dV_{com}/dt = 10V/\mu \text{s}; \text{ gate}$ open circuit	2.5	6.2	18	-	A/ms
dl _{com} /dt	Critical rate of change of commutating current	$V_{DM} = 400 \text{ V}; \text{ T}_{j} = 125 \text{ °C};$ $I_{T(RMS)} = 16 \text{ A};$ $dV_{com}/dt = 0.1 V/\mu s; \text{ gate}$ open circuit	12	20	50	-	A/ms

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

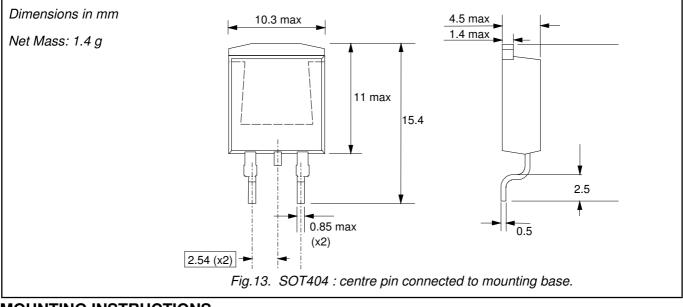
BTA216B series D, E and F



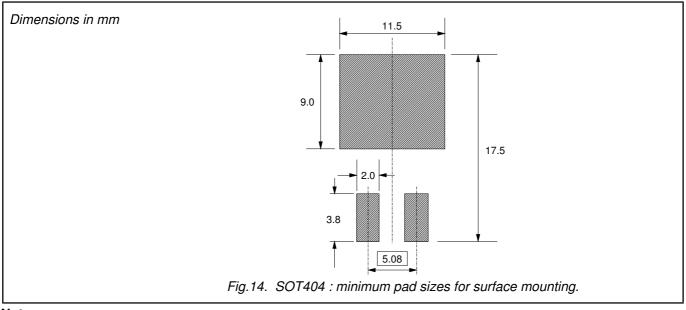
IT / A IGT(Tj) IGT(25℃) 50 Tj = 125 C Tj = 25 C 3 — T2+ G+ — T2+ Gtyp ma - T2- G-40 2.5 Vo = 1.195 V Rs = 0.018 Ohms 2 30 1.5 20 1 10 0.5 0 L 0 0 1.5 VT / V 150 0.5 2 2.5 3 -50 0 тј/℃ 100 1 Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^{\circ}C)$, versus junction temperature T_{j} . Fig.10. Typical and maximum on-state characteristic. 10 _____(K/W) IL(Tj) IL(25°C) 3 25 1 bidirectional 2 0.1 1.5 1 0.01 0.5 0.001 – 10us 0 -50 0.1ms 10ms 0.1s 1s 10s 50 Tj /℃ 100 1ms 0 150 tp/s Fig.11. Transient thermal impedance $Z_{th j-mb}$, versus Fig.8. Normalised latching current $I_L(T_i)/I_L(25^{\circ}C)$, versus junction temperature T_{i} pulse width $t_{\rm p}$. dlcom/dt (A/ms) IH(Tj) 100 3 IH(25°C F TYPE E TYPE D TYPE 2.5 2 10 1.5 1 0.5 1 0 -50 50 Tj /℃ 20 40 60 100 120 140 100 150 80 Tj/°C 0 Fig.9. Normalised holding current $I_H(T_i)/I_H(25^{\circ}C)$, versus junction temperature T_j . Fig.12. Mimimum, critical rate of change of commutating current dI_{com}/dt versus junction temperature, $dV_{com}/dt = 10V/\mu s$.

BTA216B series D, E and F

MECHANICAL DATA



MOUNTING INSTRUCTIONS



Notes

1. Plastic 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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