DISCRETE SEMICONDUCTORS

DATA SHEET

BTA212 series D, E and F Three quadrant triacs guaranteed commutation

Product specification

June 2003



NXP Semiconductors Product specification

Three quadrant triacs guaranteed commutation

BTA212 series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope 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.

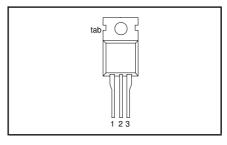
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
	BTA212- BTA212- BTA212-	600D 600E 600F	
V_{DRM}	Repetitive peak off-state	600	V
I _{T(RMS)} I _{TSM}	voltages RMS on-state current Non-repetitive peak on-state	12 95	A A

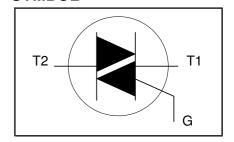
PINNING - TO220AB

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		-	600¹	v
I _{T(RMS)}	RMS on-state current Non-repetitive peak	full sine wave; $T_{mb} \le 99 ^{\circ}C$ full sine wave;	-	12	А
I ² t dI _T /dt	on-state current I ² t for fusing Repetitive rate of rise of on-state current after	T_j = 25 °C prior to surge t = 20 ms t = 16.7 ms t = 10 ms I_{TM} = 20 A; I_G = 0.2 A; dI_G/dt = 0.2 Å/ μ s		95 105 45 100	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 Storage temperature Operating junction temperature	over any 20 ms period	- - -40 -	2 5 0.5 150 125	A W C C

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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 $A/\mu s$.

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R _{th j-mb}	Thermal resistance junction to mounting base Thermal resistance junction to ambient	full cycle half cycle in free air		- - 60	1.5 2.0 -	K/W K/W K/W

STATIC CHARACTERISTICS

T_i = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	. MAX.		UNIT	
		BTA212-		D	Е	F	
I _{GT}	Gate trigger current ²	$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$					
		T2+ G+	-	5 5 5	10	25	mA
		T2+ G-	-	5	10	25	mA
		T2- G-	-	5	10	25	mA
I _L	Latching current	$V_{\underline{D}} = 12 \text{ V}; I_{GT} = 0.1 \text{ A}$					_
		T2+ G+	-	15	20	25	mA.
		T2+ G-	-	25	30	40	mA
		T2- G-	-	25	30	40	mA
I _H	Holding current	$V_D = 12 \text{ V}; I_{GT} = 0.1 \text{ A}$	-	15	25	30	mA
V_{T}	On-state voltage	$I_{T} = 17 \text{ A}$	_		1.6		V
V _{GT}	Gate trigger voltage	$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$	_		1.5		Ϊ́
- 01		$V_D = 400 \text{ V}; I_T = 0.1 \text{ A};$	0.25		-		V
1.		$T_{j} = 125 ^{\circ}\text{C}$			٥.		
I _D	Off-state leakage current	$V_D = V_{DRM(max)}$; $T_j = 125 °C$	-		0.5		mA

DYNAMIC CHARACTERISTICS

T_i = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS		MIN.		MAX.	UNIT
		BTA212-	D	Е	F		
dV _D /dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)};$ $T_j = 110 ^{\circ}C;$ exponential waveform; gate open	30	60	70	-	V/μs
dl _{com} /dt	Critical rate of change of commutating current	circuit $V_{DM} = 400 \text{ V}; T_j = 125 ^{\circ}\text{C};$ $I_{T(RMS)} = 12 \text{ A};$ $dV_{com}/dt = 10 \text{ V}/\mu\text{s};$ gate open circuit	1.0	8	21	-	A/ms
dl _{com} /dt	Critical rate of change of commutating current	$ \begin{vmatrix} V_{\text{DM}} = 400 \text{ V; } T_{j} = 125 \text{ °C;} \\ I_{\text{T(RMS)}} = 12 \text{ A;} \\ dV_{\text{com}}/dt = 0.1 \text{ V/}\mu\text{s; gate} \\ \text{open circuit} $	3.5	16	32	-	A/ms

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

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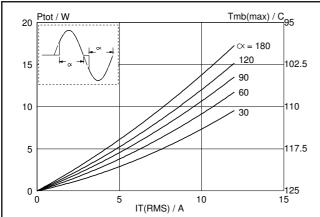


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

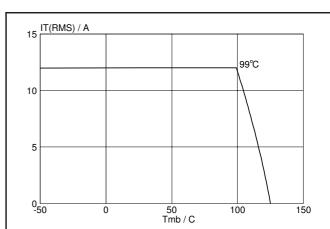


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

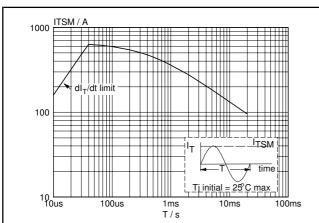


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \le 20$ ms.

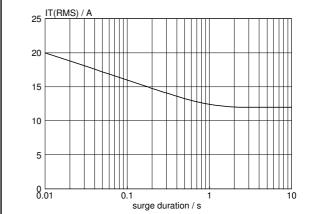


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{mb} \le 99$ °C.

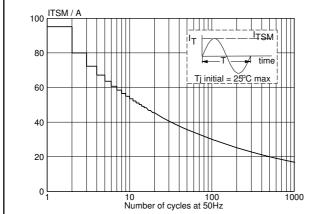


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, f = 50 Hz.

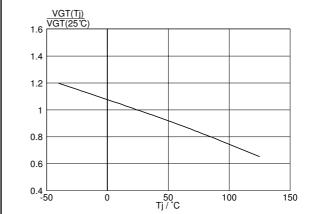
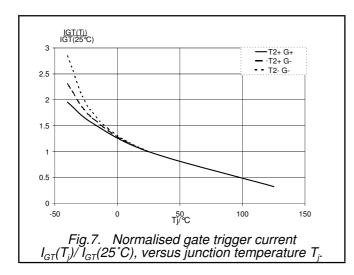
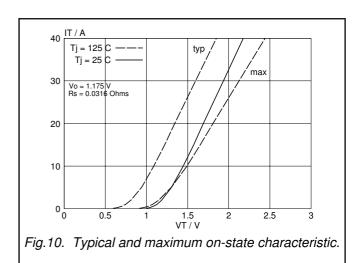


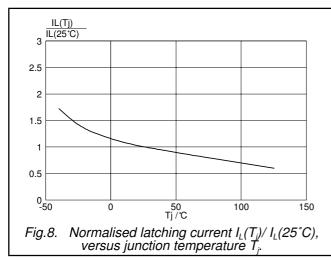
Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^{\circ}C)$, versus junction temperature T_j .

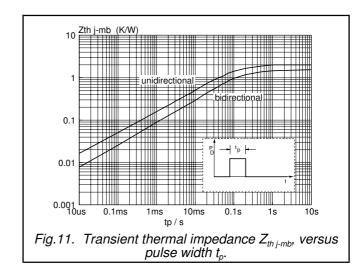
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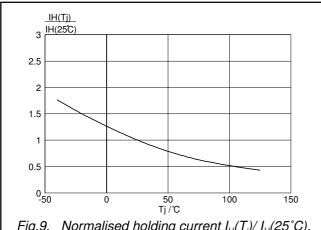
BTA212 series D, E and F











dlcom/dt (A/ms)

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104

105

106

107

107

108

109

109

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120

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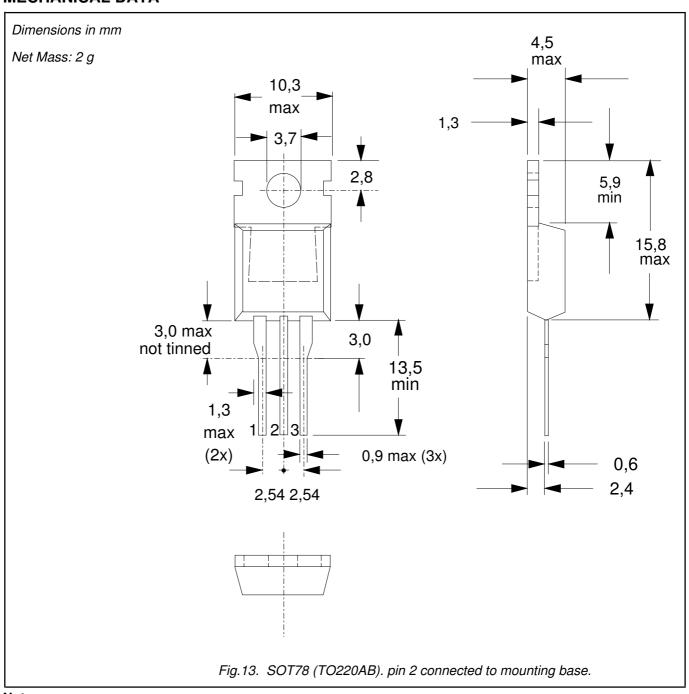
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Fig.9. Normalised holding current $I_H(T_i)/I_H(25^{\circ}C)$, versus junction temperature T_i .

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MECHANICAL DATA



- Notes
 1. Refer to mounting instructions for SOT78 (TO220) envelopes.
 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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