

Three quadrant triacs guaranteed commutation

BTA212X series D, E and F

GENERAL DESCRIPTION

Glass passivated high commutation triacs in a full pack 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.

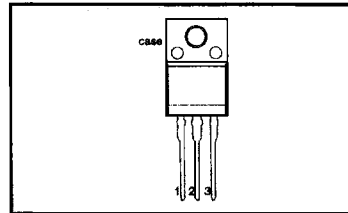
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages RMS on-state current Non-repetitive peak on-state current	500D 500E 500F 500	600D 600E 600F 600	- 800E 800F 800	V
$I_{T(RMS)}$		12	12	12	A
I_{TSM}		95	95	95	A

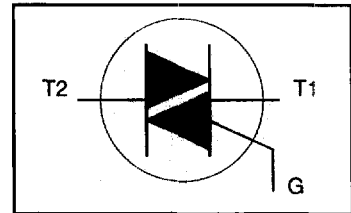
PINNING - SOT186A

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
				-500 500 ¹	-600 600 ¹	-800 800	
V_{DRM}	Repetitive peak off-state voltages		-				V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 56^\circ\text{C}$	-	12			A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 20\text{ ms}$	-	95			A
I^2t	I^2t for fusing	$t = 16.7\text{ ms}$	-	105			A
di_T/dt	Repetitive rate of rise of on-state current after triggering	$t = 10\text{ ms}$ $I_{TM} = 20\text{ A}; I_G = 0.2\text{ A};$ $di_G/dt = 0.2\text{ A}/\mu\text{s}$	-	45			A^2s
I_{GM}	Peak gate current		-	100			$\text{A}/\mu\text{s}$
V_{GM}	Peak gate voltage		-	2			A
P_{GM}	Peak gate power		-	5			V
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	5			W
T_{stg}	Storage temperature		-40	0.5			W
T_j	Operating junction temperature		-	150			$^\circ\text{C}$
				125			$^\circ\text{C}$

Objective specification

See Philips Semiconductors for Design-in information

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/ μs .

Three quadrant triacs guaranteed commutation

BTA212X series D, E and F

ISOLATION LIMITING VALUE & CHARACTERISTIC

 $T_{hs} = 25\text{ }^{\circ}\text{C}$ 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
$R_{th\text{-}hs}$	Thermal resistance junction to heatsink	full or half cycle with heatsink compound	-	-	4.0	K/W
$R_{th\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	5.5	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.			UNIT
					...D	...E	...F	
I_{GT}	Gate trigger current ²	BTA212X-						
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ T2+ G+	2	-	5	10	25	mA
		T2+ G- T2- G-	2	-	5	10	25	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ T2+ G+	-	-	6	12	30	mA
		T2+ G- T2- G-	-	-	9	18	45	mA
		$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ T2+ G- T2- G-	-	-	6	12	30	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	-	6	12	30	mA
V_T	On-state voltage	$I_T = 17\text{ A}$	-	1.3	-	-	1.6	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.7	-	-	1.5	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^{\circ}\text{C}$	0.25	0.4	-	-	-	V
I_D	Off-state leakage current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	0.1	-	-	0.5	mA

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

Three quadrant triacs guaranteed commutation

BTA212X series D, E and F

DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.			TYP.	MAX.	UNIT
			...D	...E	...F			
dV_D/dt	Critical rate of rise of off-state voltage	BTA212X- $V_{DM} = 67\% V_{DRM(max)}$; $T_j = 125\text{ }^\circ\text{C}$; exponential waveform; gate open circuit	10	20	50	TBF	-	V/ μs
di_{comm}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 12\text{ A}$; $dV_{comm}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit	2	3.5	4.5	TBF	-	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