

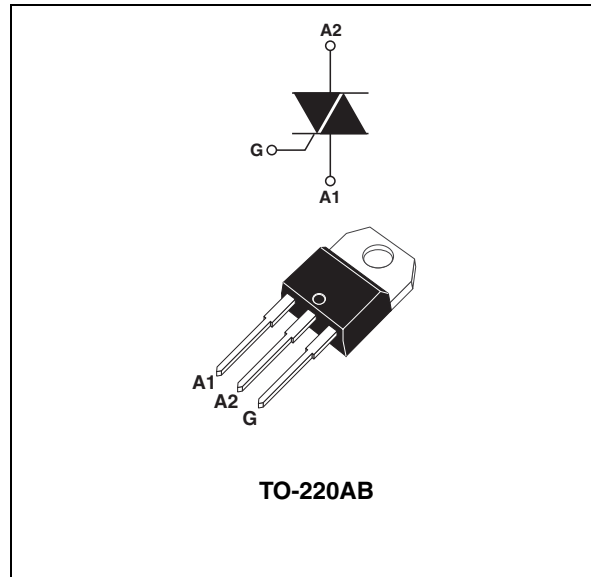
### Features

- Low  $I_H$ :
  - 13 mA max
- High surge current:
  - $I_{TSM} = 120\text{ A}$
- $I_{GT}$  specified in four quadrants
- Insulating voltage:
  - 2500 V<sub>(RMS)</sub> (UL Recognized: E81734)

### Description

The BTA10-600GP uses high performance, glass passivated chips.

The insulated TO-220AB package, the high surge current and low holding current make this product well adapted to CFL and LED dimmer applications.



# 1 Characteristics

**Table 1. Absolute ratings (limiting values)**

Symbol	Parameter		Value	Unit
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage $T_j = 125^\circ\text{C}$		600	V
$I_{T(RMS)}$	RMS on-state current (360° conduction angle)	$T_c = 90^\circ\text{C}$	10	A
$I_{TSM}$	Non repetitive surge peak on-state current ( $T_j$ initial = 25° C)	$t_p = 8.3\text{ ms}$	126	A
		$t_p = 10\text{ ms}$	120	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10\text{ ms}$	72	A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current $I_G = 500\text{ mA}$ $di_G/dt = 1\text{ A}/\mu\text{s}$	Repetitive $F = 50\text{ Hz}$	10	A/ $\mu\text{s}$
		Non repetitive	50	
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range		-40 to +150 -40 to +125	° C

**Table 2. Electrical characteristics**

Symbol	Test conditions		Quadrant		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V (DC)}$ $R_L = 33\ \Omega$	$T_j = 25^\circ\text{C}$	I - II - III	MAX	25	mA
			IV	MAX	100	
$V_{GT}$	$V_D = 12\text{ V (DC)}$ $R_L = 33\ \Omega$	$T_j = 25^\circ\text{C}$	I - II - III - IV	MAX	1.5	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$	$T_j = 110^\circ\text{C}$	I - II - III - IV	MIN	0.2	V
$t_{gt}$	$V_D = V_{DRM}$ $I_G = 500\text{ mA}$ $di_G/dt = 3\text{ A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	I - II - III - IV	TYP	2	$\mu\text{s}$
$I_L$	$I_G = 1.2 I_{GT}$	$T_j = 25^\circ\text{C}$	I - II - III	TYP	20	mA
			IV		40	
$I_H^{(1)}$	$I_T = 100\text{ mA}$ gate open	$T_j = 25^\circ\text{C}$		MAX	13	mA
$V_{TM}^{(1)}$	$I_{TM} = 14\text{ A}$ $t_p = 380\ \mu\text{s}$	$T_j = 25^\circ\text{C}$		MAX	1.5	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25^\circ\text{C}$		MAX	0.01	mA
		$T_j = 110^\circ\text{C}$		MAX	0.5	
$dV/dt^{(1)}$	Linear slope up to $V_D = 67\% V_{DRM}$ gate open	$T_j = 110^\circ\text{C}$		MIN	30	V/ $\mu\text{s}$
				TYP	100	
$(dV/dt)_c^{(1)}$	$(di/dt)_c = 2.2\text{ A/ms}$	$T_j = 110^\circ\text{C}$		MIN	1	V/ $\mu\text{s}$
				TYP	10	

1. For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>.

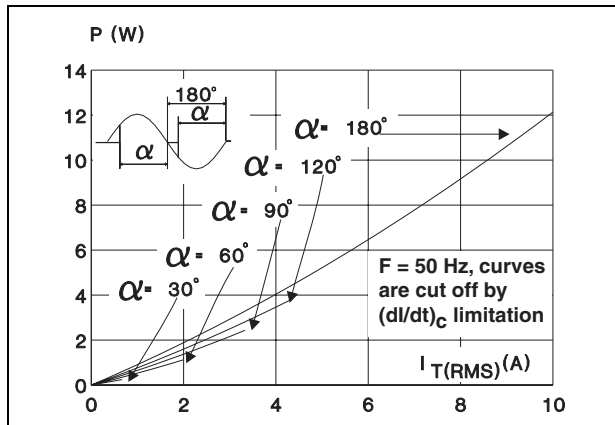
**Table 3. Gate characteristics (maximum values)**

Symbol	Parameter	Value	Unit
$P_{G(AV)}$	Average gate power dissipation	1	W
$P_{GM}$	Peak gate power dissipation	$t_p = 20 \mu s$ 10	W
$I_{GM}$	Peak gate current	$t_p = 20 \mu s$ 4	A
$V_{GM}$	Peak positive gate voltage	$t_p = 20 \mu s$ 16	V

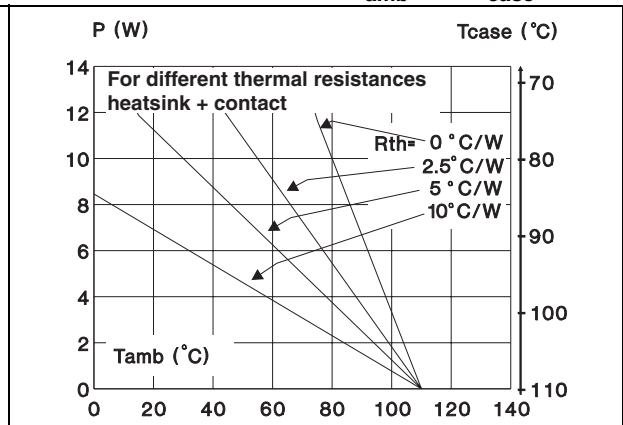
**Table 4. Thermal resistances**

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient	60	°C/W
$R_{th(j-c)}$ DC	Junction to case for DC	4	
$R_{th(j-c)}$ AC	Junction to case for 360° conduction angle (F = 50 Hz)	3	

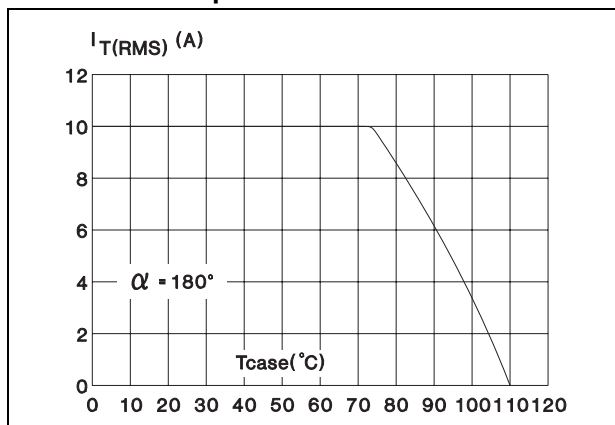
**Figure 1. Maximum rms power dissipation versus rms on-state current**



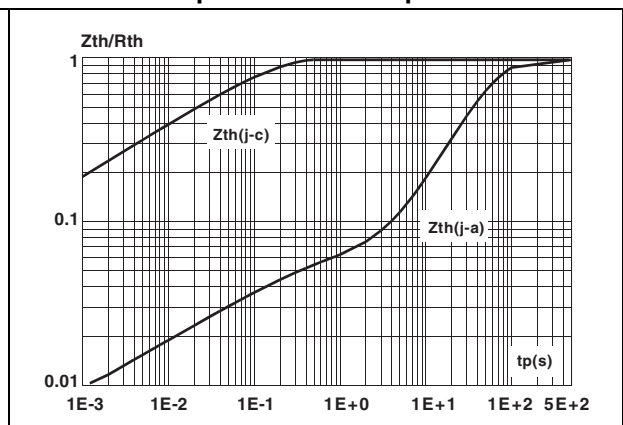
**Figure 2. Maximum rms power dissipation and maximum allowable temperatures (Tamb and Tcase)**



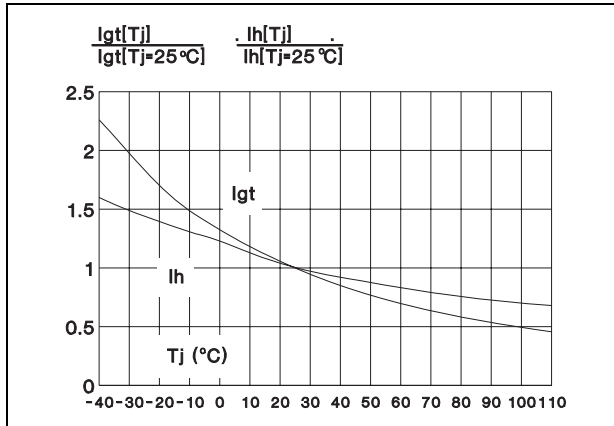
**Figure 3. On-state rms current versus case temperature**



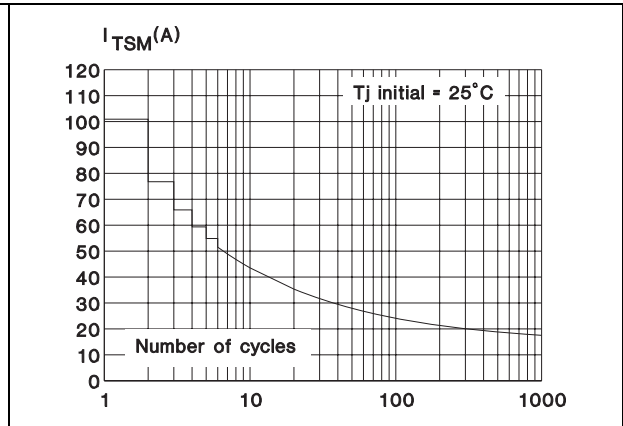
**Figure 4. Relative variation of thermal impedance versus pulse duration**



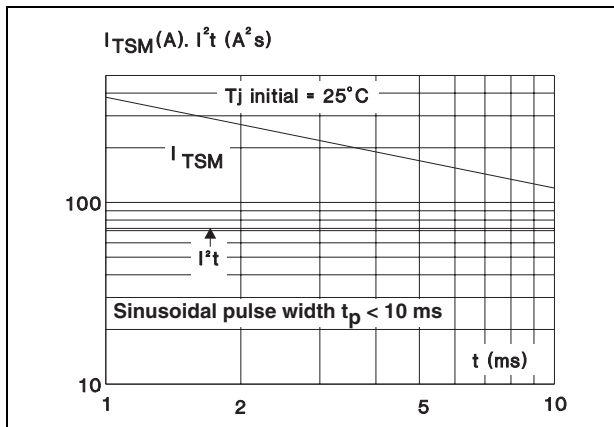
**Figure 5. Relative variation of gate trigger current and holding current versus junction temperature**



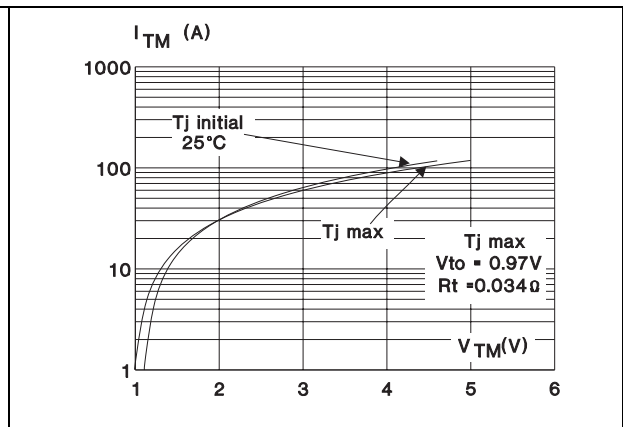
**Figure 6. Non repetitive surge peak on-state current versus number of cycles**



**Figure 7. Non repetitive surge peak on-state current and corresponding value of  $I^2t$**



**Figure 8. On-state characteristics (maximum values)**



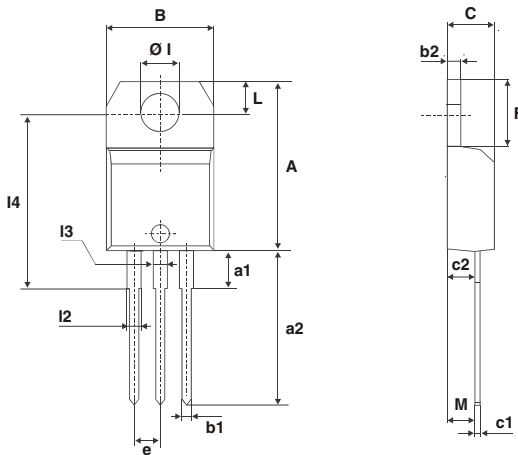
## 2 Package information

- Epoxy meets UL94,V0
- Cooling method: Conduction
- Recommended torque value: 0.4 to 0.6 N·m

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**Table 5. TO-220AB dimensions**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	



### 3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BTA10-600GPRG	BTA10 600GP	TO-220AB	2.3 g	50	Tube

### 4 Revision history

Table 7. Document revision history

Date	Revision	Changes
13-Sep-2011	1	Initial release

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