



**THE DATASHEET OF  
BTA06T-600CWRG**





# BTA06T-600CWRG

## 6 A Snubberless™ Triac

### Features

- High static and dynamic commutation
- BTA series is UL1557 certified (File ref.: 81734)
- Package is RoHS (2002/95/EC) compliant
- $I_{GT} = 35 \text{ mA}$

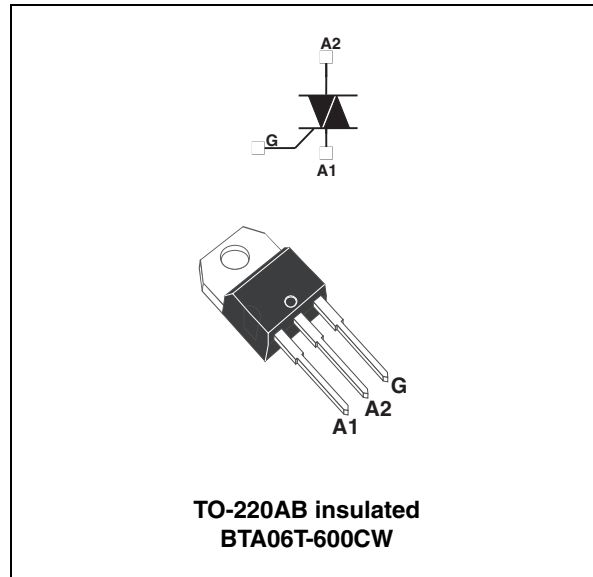
### Applications

Specially designed for power tool applications, it can also be used to drive loads like motor speed controller, kitchen equipments such as electro valves, light dimmers and similar.

### Description

Available in through-hole package, the Triac BTA06T-600CW is suitable for general purpose ac switching.

Being a fully insulated package, the BTA06T-600CW provides insulation rated at 2500 V rms.



TM: Snubberless is a trademark of STMicroelectronics

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	On-state rms current (full sine wave)		$T_c = 100\text{ }^\circ\text{C}$	6	A
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle sine wave, $T_j$ initial = $25\text{ }^\circ\text{C}$ )	F = 60 Hz	t = 16.7 ms	47	A
		F = 50 Hz	t = 20 ms	45	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10\text{ ms}$		13	A <sup>2</sup> s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	F = 120 Hz	$T_j = 125\text{ }^\circ\text{C}$	50	A/ $\mu$ s
$V_{DSM}/V_{RSM}$	Non repetitive surge peak off-state voitage	$t_p = 10\text{ ms}$	$T_j = 25\text{ }^\circ\text{C}$	$V_{DRM}/V_{RRM} + 100$	V
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu\text{s}$	$T_j = 125\text{ }^\circ\text{C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ }^\circ\text{C}$	1	W
$T_{stg}$	Storage junction temperature range			-40 to +150	$^\circ\text{C}$
$T_j$	Operating junction temperature range			-40 to +125	

**Table 2. Electrical characteristics, Snubberless (3 quadrants) ( $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified)**

Symbol	Test conditions	Quadrant		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$ $R_L = 30\text{ }\Omega$	I - II - III	MAX	35	mA
$V_{GT}$	$V_D = 12\text{ V}$ $R_L = 30\text{ }\Omega$	I - II - III	MAX	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$	I - II - III	MIN	0.2	V
$I_H^{(2)}$	$I_T = 100\text{ mA}$		MAX	35	mA
$I_L$	$I_G = 1.2 \times I_{GT}$	I - III	MAX	50	mA
		II		80	
dV/dt <sup>(2)</sup>	$V_D = 67\% V_{DRM}$ , gate open, $T_j = 125\text{ }^\circ\text{C}$		MIN	750	V/ $\mu$ s
(dI/dt) <sub>C</sub> <sup>(2)</sup>	Without snubber, $T_j = 125\text{ }^\circ\text{C}$		MIN	8.0	A/ms

1. Minimum  $I_{GT}$  is guaranteed at 5% of  $I_{GT}$  max.
2. For both polarities of A2 pin referenced to A1 pin

**Table 3. Static electrical characteristics**

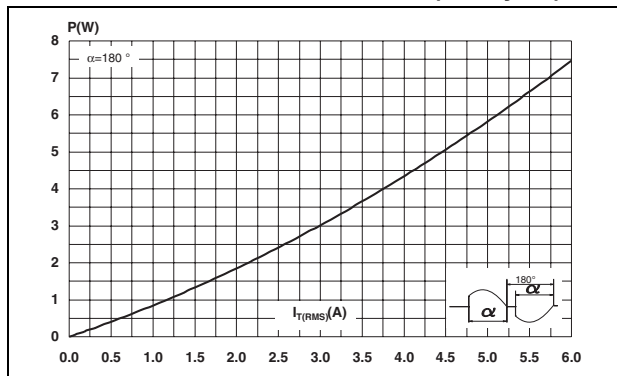
Symbol	Test conditions		Value	Unit		
$V_{TM}^{(1)}$	$I_{TM} = 8.5\text{ A}$ , $t_p = 380\text{ }\mu\text{s}$	$T_j = 25\text{ }^\circ\text{C}$	MAX	1.6	V	
$V_{TO}^{(1)}$	Threshold voltage		$T_j = 125\text{ }^\circ\text{C}$	MAX	0.85	V
$R_D^{(1)}$	Dynamic resistance		$T_j = 125\text{ }^\circ\text{C}$	MAX	80	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ }^\circ\text{C}$	MAX	5	$\mu$ A	
		$T_j = 125\text{ }^\circ\text{C}$		1	mA	

1. For both polarities of A2 pin referenced to A1 pin

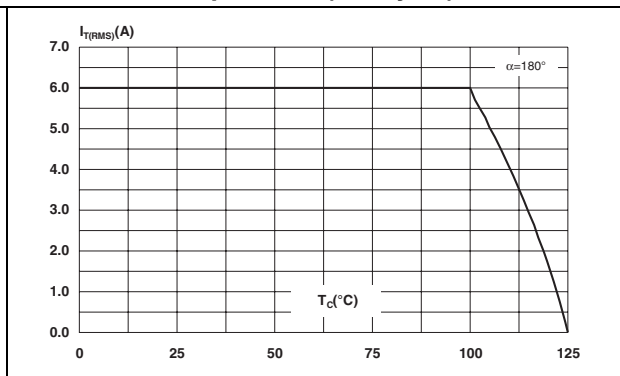
**Table 4. Thermal resistances**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (ac)	3.4	°C/W
$R_{th(j-a)}$	Junction to ambient	60	

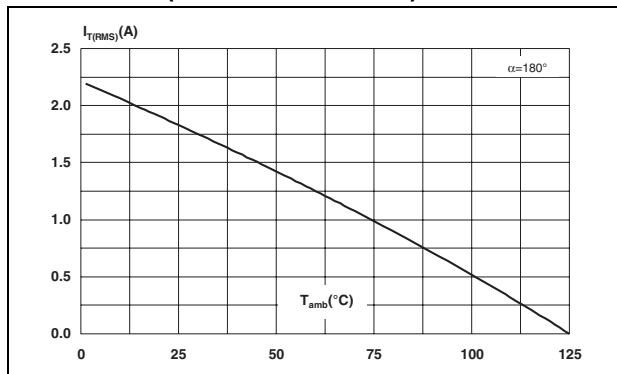
**Figure 1. Maximum power dissipation versus rms on-state current (full cycle)**



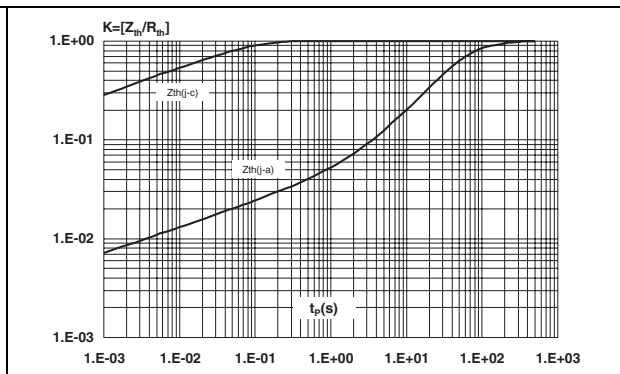
**Figure 2. On-state current (rms) versus case temperature (full cycle)**



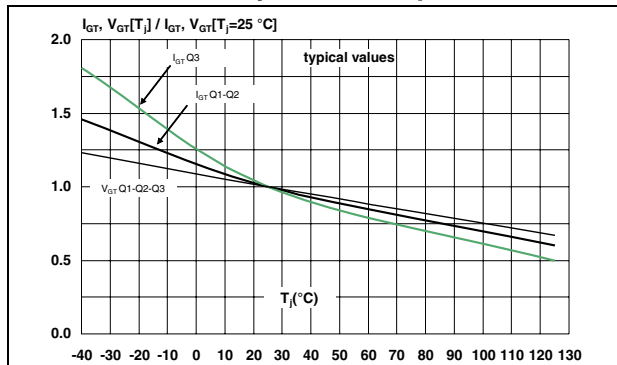
**Figure 3. On-state current (rms) versus ambient temperature (free air convection)**



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



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



**Figure 6. Relative variation of holding current and latching current versus junction temperature**

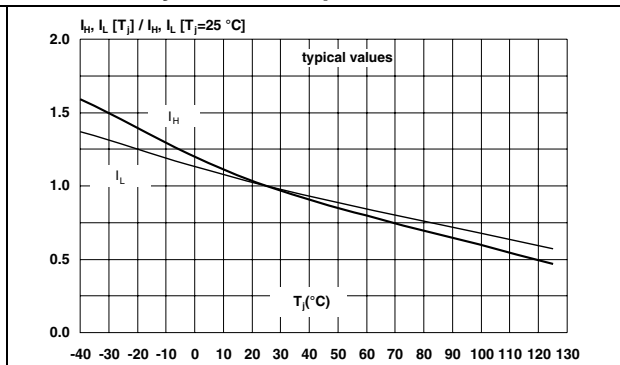


Figure 7. Surge peak on-state current versus number of cycles

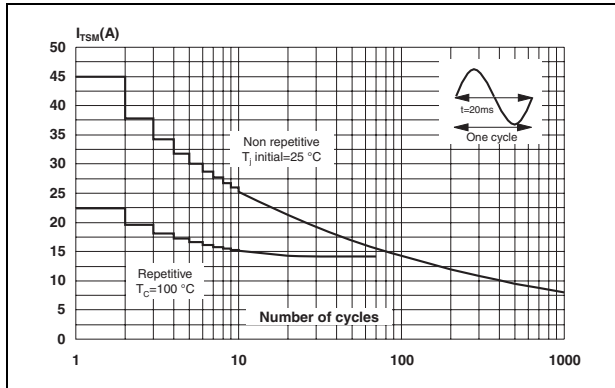


Figure 8. Non-repetitive surge peak on-state current for sinusoidal

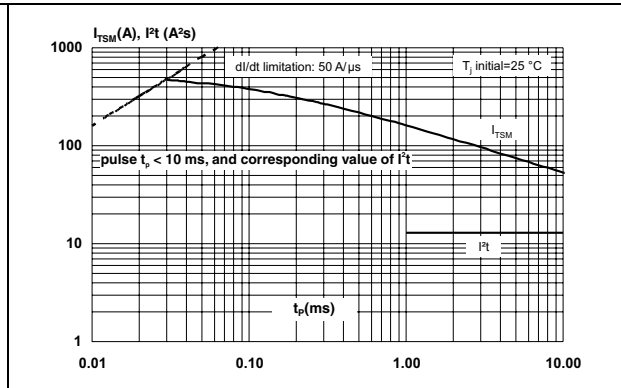


Figure 9. On-state characteristics (maximum values)

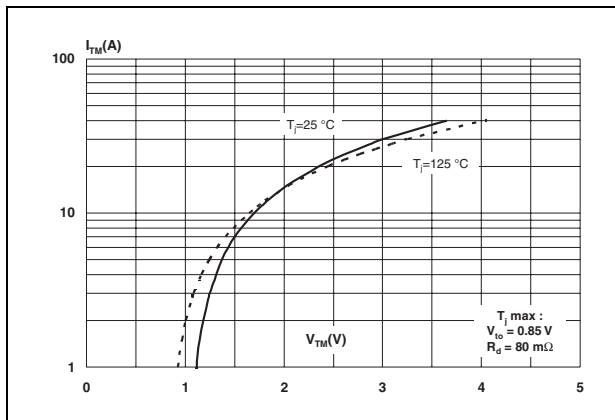


Figure 10. Relative variation of critical rate of decrease of main current ( $di/dt$ )<sub>c</sub> versus junction temperature

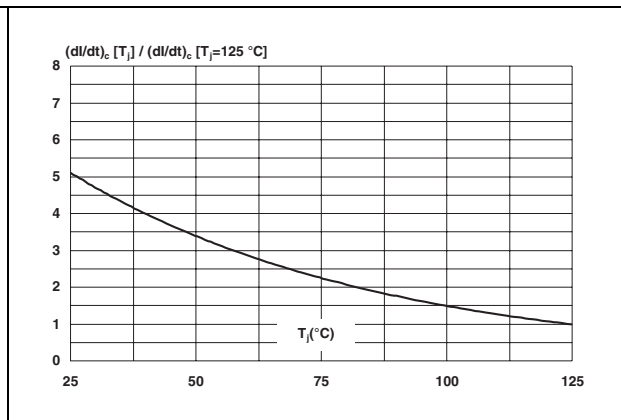


Figure 11. Relative variation of critical rate of decrease of main current ( $di/dt$ )<sub>c</sub> versus reapplied ( $dV/dt$ )<sub>c</sub>

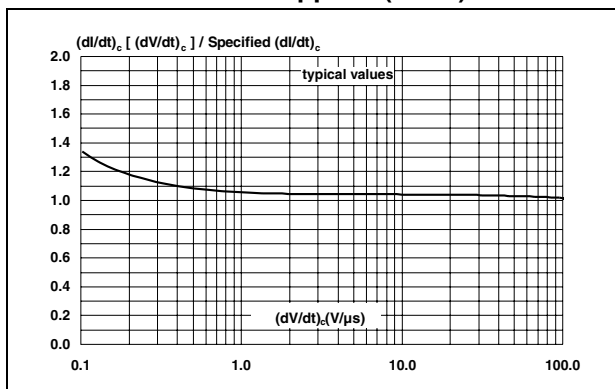
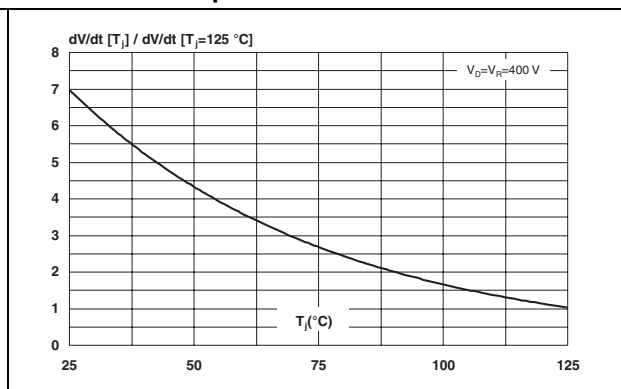
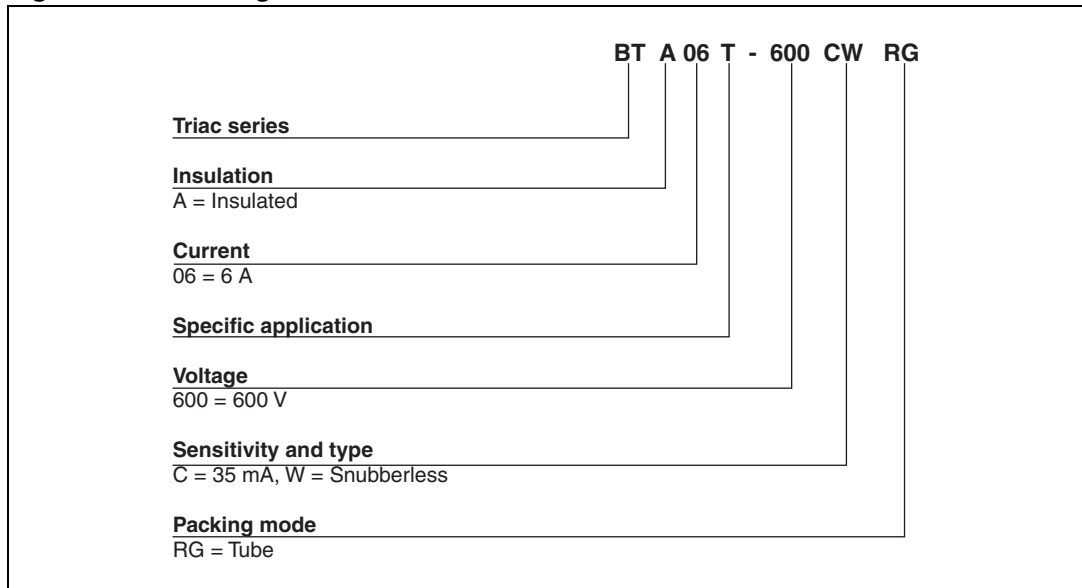


Figure 12. Relative variation of static  $dV/dt$  immunity versus junction temperature



## 2 Ordering information

Figure 13. Ordering information scheme



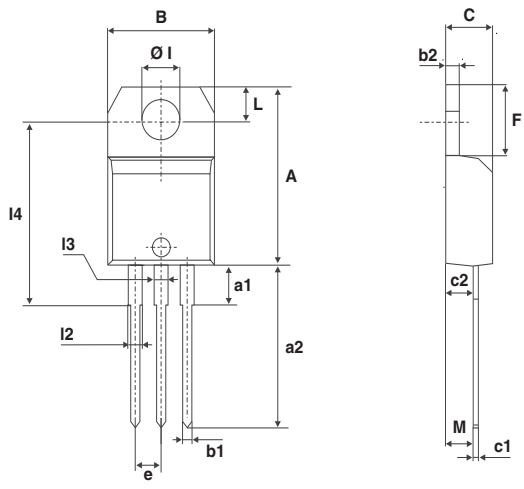
### 3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Table 5. TO-220AB insulated 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	



## 4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Packing mode
BTA06T-600CWRG	BTA06T-600CW	TO-220AB ins	2.3 g	50	Tube

## 5 Revision history

Table 7. Document revision history

Date	Revision	Changes
15-Nov-2007	1	Initial release.
17-Jun-2010	2	Updated title <a href="#">on page 1</a> . Updated ECOPACK statement.

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