

20 A Snubberless™ Triacs

Datasheet – production data

Features

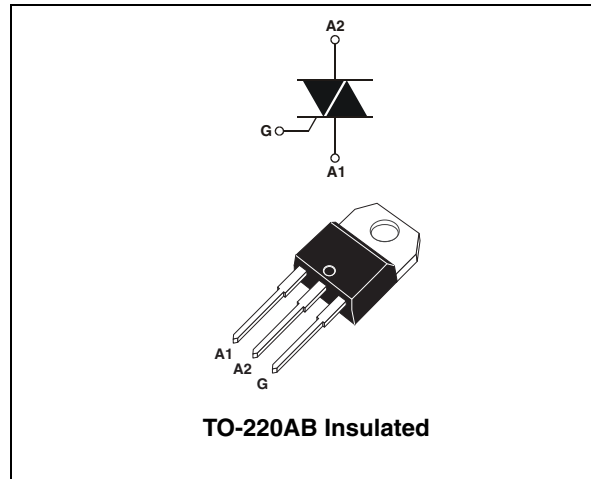
- $I_{T(RMS)} = 20\text{ A}$
- $V_{DRM}, V_{RRM} = 600\text{ and }700\text{ V}$
- $I_{GT(Q1)}(\text{max}) = 35\text{ and }50\text{ mA}$

Description

The BTA20 Triacs use high performance glass passivated chip technology. The Snubberless concept offers suppression of the RC network and is suitable for applications such as phase control and static switching on inductive or resistive load.

Thanks to their clip assembly technique, the BTA20 Triacs provide a superior performance in surge current handling capabilities.

By using an internal ceramic pad, the BTA series provides voltage insulated tab (rated at 2500 V rms) complying with UL standards (File ref.: E81734).



TM: Snubberless is a trademark of STMicroelectronics.

1 Characteristics

Table 1. Absolute maximum ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)		$T_c = 70\text{ °C}$	20	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25°C)	F = 50 Hz	t = 10 ms	210	A
		F = 60 Hz	t = 8.3 ms	200	
I^2t	I^2t Value for fusing	$t_p = 10\text{ ms}$		200	A ² s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	Repetitive F = 50 Hz	$T_j = 125\text{ °C}$	50	A/μs
		Non repetitive		100	
V_{DSM} , V_{RSM}	Non repetitive peak off-state voltage	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	$V_{DSM}/V_{RSM} + 100$	V
I_{GM}	Peak gate current	$t_p = 20\text{ μs}$	$T_j = 125\text{ °C}$	4	A
V_{GM}	Peak positive gate voltage	$t_p = 20\text{ μs}$		16	V
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ °C}$	1	W
T_{stg}	Storage junction temperature range			- 40 to + 150	°C
T_j	Operating junction temperature range			- 40 to + 125	

Table 2. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Test conditions	Quadrant		BTA20		Unit
				BW	CW	
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$, $R_L = 33\text{ Ω}$	ALL	Min.	2	1	mA
			Max.	50	35	
V_{GT}		ALL	Max.	1.5		V
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3\text{ kΩ}$, $T_j = 125\text{ °C}$	ALL	Min.	0.2		V
$I_H^{(2)}$	$I_T = 500\text{ mA}$, gate open		Max.	75	50	mA
I_L	$I_G = 1.2 I_{GT}$	I - III	Typ.	50	-	mA
		II		90	-	
		I - II - III	Max.	-	80	
dV/dt ⁽²⁾	$V_D = 67\% V_{DRM}$, gate open	$T_j = 125\text{ °C}$	Typ.	750	500	V/μs
			Min.	500	250	
(dV/dt) _c ⁽²⁾	(di/dt) _c = 20 A/ms	$T_j = 125\text{ °C}$	Typ.	36	22	V/μs
			Min.	18	11	

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

Table 3. Static characteristics

Symbol	Parameter		Value	Unit
$V_{TM}^{(1)}$	$I_{TM} = 28\text{ A}, t_p = 380\ \mu\text{s}$	$T_j = 125\text{ }^\circ\text{C}$	Max.	1.70 V
I_{DRM}	$V_{DRM} = V_{RRM}$	$T_j = 125\text{ }^\circ\text{C}$	Max.	10 μA
I_{RRM}		$T_j = 125\text{ }^\circ\text{C}$		3 mA

1. For both polarities of A2 referenced to A1.

Table 4. Thermal resistances

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case for AC	2.1	$^\circ\text{C/W}$
$R_{th(j-c)}$	Junction to case for DC	2.8	
$R_{th(j-a)}$	Junction to ambient	60	

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

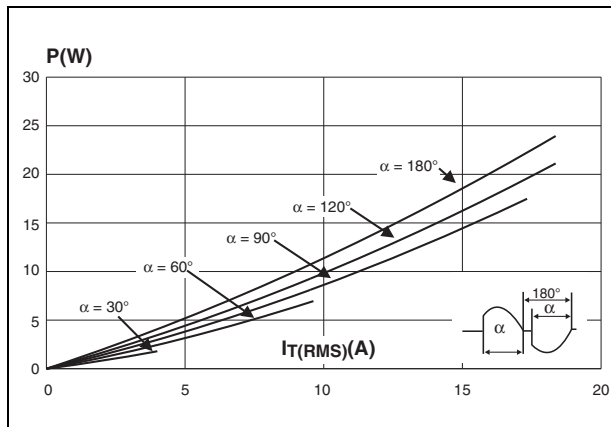


Figure 2. Correlation between maximum rms power dissipation and maximum allowable temperatures

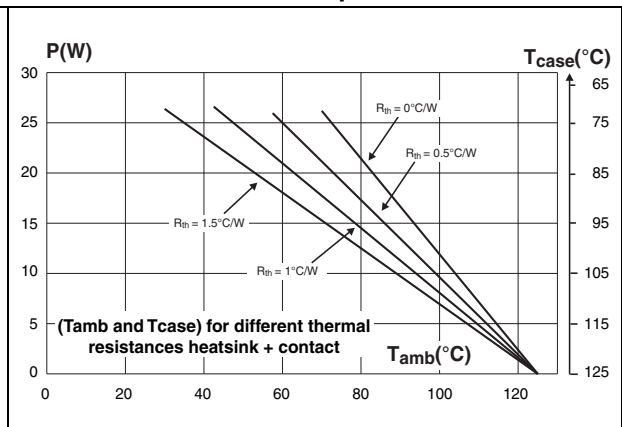


Figure 3. On-state rms current versus case temperature (full cycle)

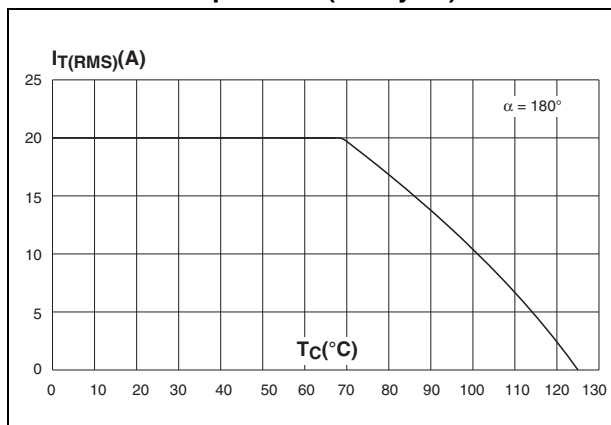


Figure 4. Relative variation of thermal impedance versus pulse duration

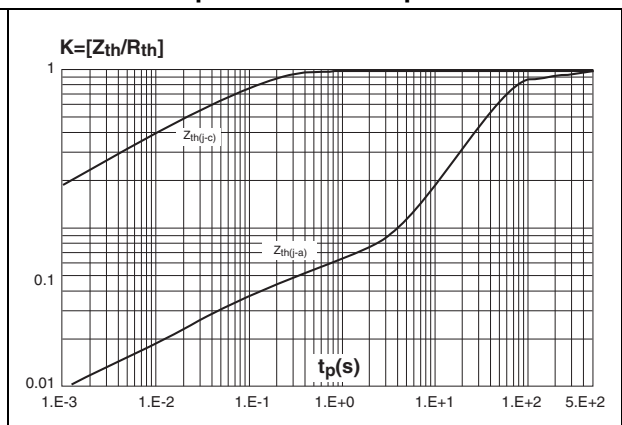


Figure 5. On-state characteristics (maximum values)

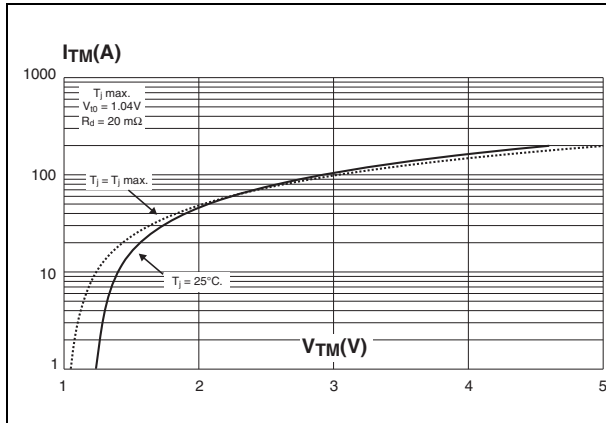


Figure 6. Non repetitive surge peak on-state current versus number of cycles

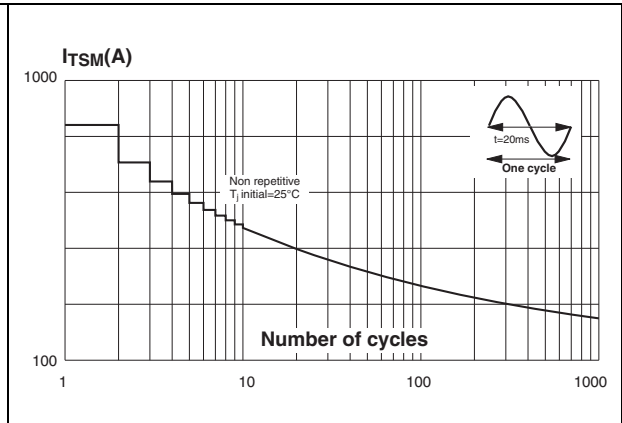


Figure 7. Non repetitive surge peak on-state current for a sinusoidal pulse and corresponding value of I^2t

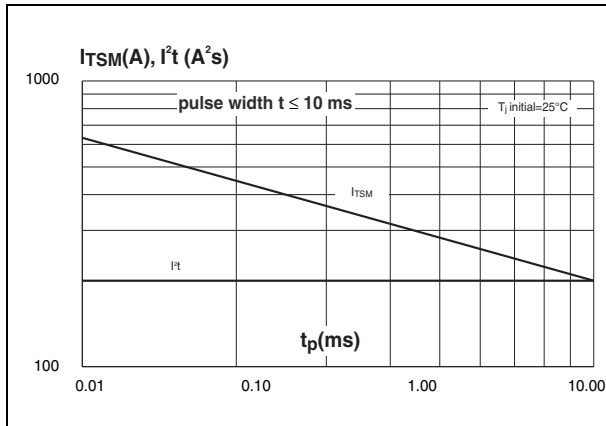
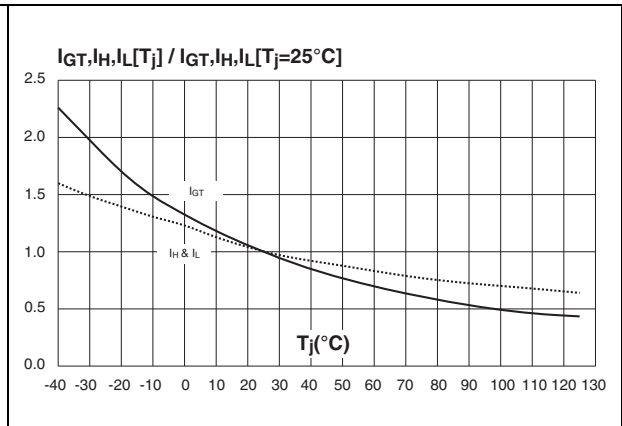


Figure 8. Relative variation of gate trigger current and holding current versus junction temperature



2 Ordering information scheme

Figure 9. Ordering information scheme

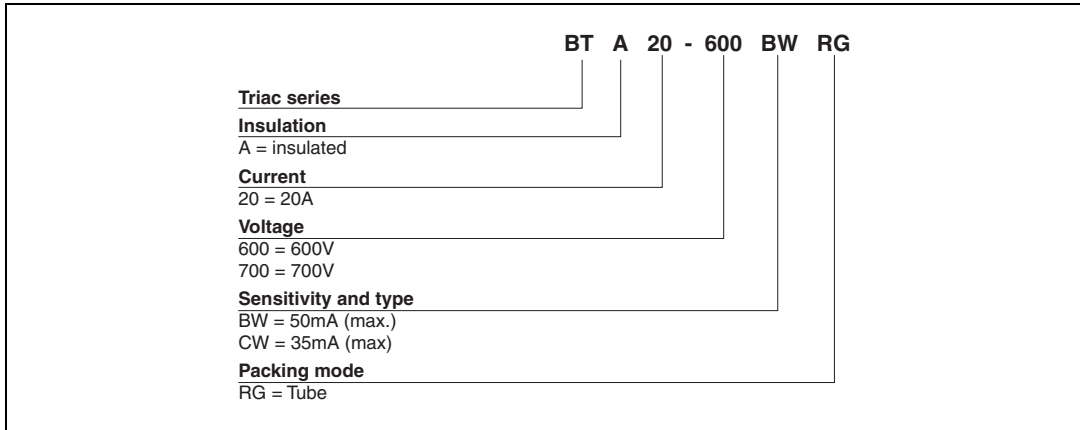


Table 5. Product selector

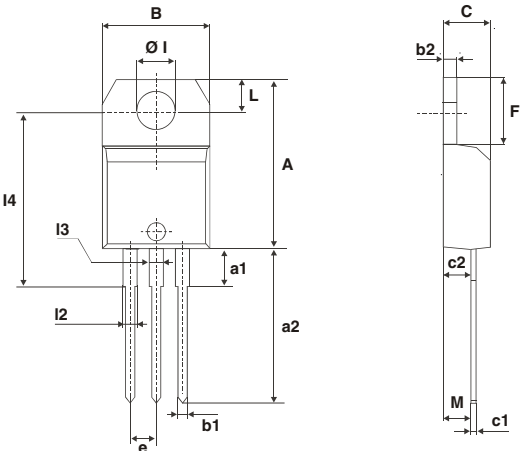
Order code	Voltage		Sensitivity	Type	Package
	600 V	700 V			
BTA20-600CWRG	X		35 mA	Snubberless	TO-220AB Ins.
BTA20-700BWRG		X	50 mA		
BTA20-700CWRG		X	35 mA		

3 Package information

- Epoxy meets UL94, V0
- Lead-free package

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. ECOPACK® is an ST trademark.

Table 6. 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	

4 Ordering information

Table 7. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
BTA20-600CWRG	BTA20-600CW	TO-220AB Ins.	2.3 g	50	Tube
BTA20-700BWRG	BTA20-700BW				
BTA20-700CWRG	BTA20-700CW				

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
Sep-2001	1A	Initial release.
08-Feb-2006	2	TO-220AB Ins. delivery mode changed from bulk to tube.
09-Jul-2012	3	Updated dl/dt repetitive value in Table 1 .

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2012 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com