

## BTA40, BTA41 and BTB41 Series

40A TRIACs

STANDARD

**Table 1: Main Features** 

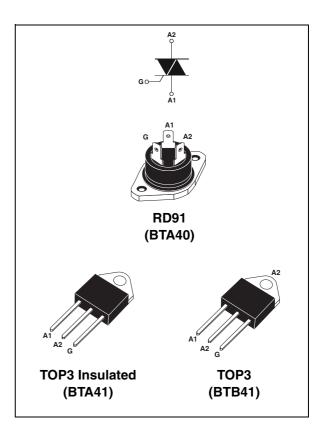
Symbol	Value	Unit
I <sub>T(RMS)</sub>	40	Α
V <sub>DRM</sub> /V <sub>RRM</sub>	600 and 800	V
I <sub>GT (Q₁)</sub>	50	mA

## **DESCRIPTION**

Available in high power packages, the **BTA/ BTB40-41** series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control operation in light dimmers, motor speed controllers, ...

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

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



**Table 2: Order Codes** 

Part Number	Marking
BTA40-xxxB	
BTA41-xxxBRG	See table 8 on page 6
BTB41-xxxBRG	

**Table 3: Absolute Maximum Ratings** 

Symbol	Parame		Value	Unit	
l======	RMS on-state current	RD91 / TOP3	$T_c = 95^{\circ}C$	40	Α
I <sub>T(RMS)</sub>	(full sine wave)	TOP Ins.	$T_c = 80^{\circ}C$	40	Α
l	Non repetitive surge peak on-state	F = 50 Hz	t = 20 ms	400	Α
I <sub>TSM</sub>	current (full cycle, $T_j$ initial = 25°C)	F = 60 Hz	t = 16.7 ms	420	Α
l²t	I <sup>2</sup> t Value for fusing	t <sub>p</sub> = 10 ms	880	A <sup>2</sup> s	
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \le 100 \text{ ns}$	F = 120 Hz		50	A/µs
V <sub>DSM</sub> /V <sub>RSM</sub>	Non repetitive surge peak off-state voltage	ve surge peak off-state $t_p = 10 \text{ ms}$ $T_j = 25^{\circ}\text{C}$		V <sub>DSM</sub> /V <sub>RSM</sub> + 100	V
I <sub>GM</sub>	Peak gate current $t_p = 20 \mu s$ $T_j = 125^{\circ}C$		8	Α	
P <sub>G(AV)</sub>	Average gate power dissipation	1	W		
T <sub>stg</sub> T <sub>j</sub>	Storage junction temperature range Operating junction temperature range	- 40 to + 150 - 40 to + 125	°C		

**Tables 4: Electrical Characteristics** ( $T_j = 25^{\circ}C$ , unless otherwise specified)

Symbol	Test Conditions	Quadrant		Value	Unit
I <sub>GT</sub> (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	I - II - III IV	MAX.	50 100	mA
V <sub>GT</sub>		ALL	MAX.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125 ^{\circ}\text{C}$	ALL	MIN.	0.2	V
I <sub>H</sub> (2)	I <sub>T</sub> = 500 mA		MAX.	80	mA
ΙL	I <sub>G</sub> = 1.2 I <sub>GT</sub>	I - III - IV	MAX.	70	mA
'L	'G = ' 'G	II	WIAX.	160	IIIA
dV/dt (2)	V <sub>D</sub> = 67 %V <sub>DRM</sub> gate open	T <sub>j</sub> = 125°C	MIN.	500	V/µs
(dV/dt)c (2)	(dl/dt)c = 20 A/ms	T <sub>j</sub> = 125°C	MIN.	10	V/µs

**Table 5: Static Characteristics** 

Symbol	Test Conditions			Value	Unit
V <sub>T</sub> (2)	$I_{TM} = 60 \text{ A}$ $t_p = 380  \mu\text{s}$	T <sub>j</sub> = 25°C	MAX.	1.55	V
V <sub>t0</sub> (2)	Threshold voltage	T <sub>j</sub> = 125°C	MAX.	0.85	V
R <sub>d</sub> (2)	Dynamic resistance	T <sub>j</sub> = 125°C	MAX.	10	mΩ
I <sub>DRM</sub>	V <sub>DRM</sub> = V <sub>RRM</sub>	T <sub>j</sub> = 25°C	MAX.	5	μA
I <sub>RRM</sub>	VDRM — VRRM	T <sub>j</sub> = 125°C	IVIAA.	5	mA

Note 1: minimum  $I_{\mbox{\footnotesize{GT}}}$  is guaranted at 5% of  $I_{\mbox{\footnotesize{GT}}}$  max.

Note 2: for both polarities of A2 referenced to A1.

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**Table 6: Thermal resistance** 

Symbol	Parameter			Unit
B., a	Junction to case (AC)	RD91 (Insulated) / TOP3	0.9	°C/W
R <sub>th(j-c)</sub>	Junction to case (AC)	TOP3 Insulated	0.6	C/VV
R <sub>th(j-a)</sub>	Junction to ambient	TOP3 / TOP3 Insulated	50	°C/W

S = Copper surface under tab.

Figure 1: Maximum power dissipation versus RMS on-state current (full cycle)

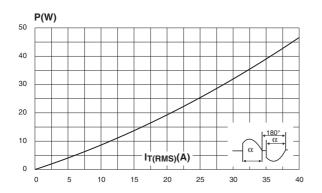


Figure 3: Relative variation of thermal

impedance versus pulse duration

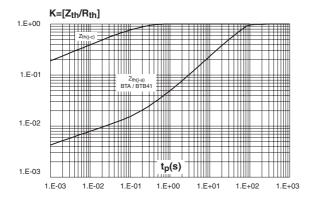


Figure 2: RMS on-state current versus case temperature (full cycle)

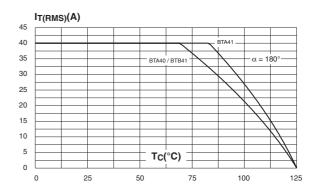
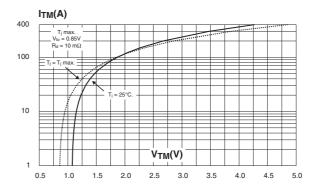


Figure 4: On-state characteristics (maximum values)



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Figure 5: Surge peak on-state current versus number of cycles

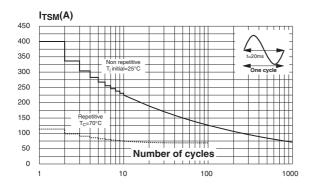


Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

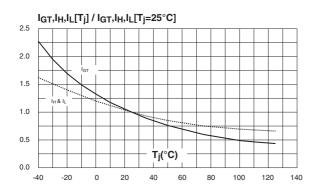


Figure 9: Relative variation of critical rate of decrease of main current versus (dV/dt)c

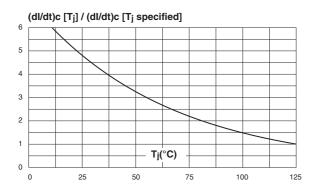


Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10 \text{ ms}$  and corresponding value of  $l^2t$ 

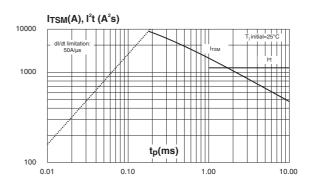
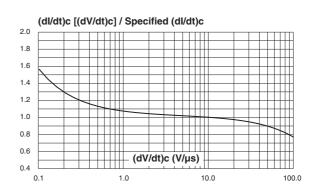
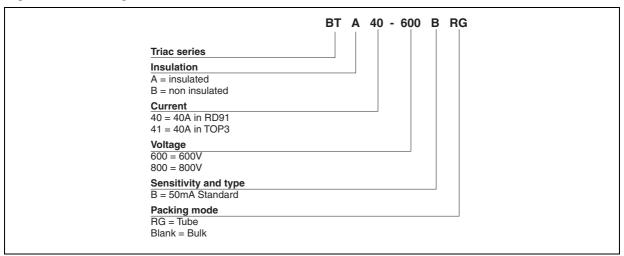


Figure 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)



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Figure 10: Ordering Information Scheme

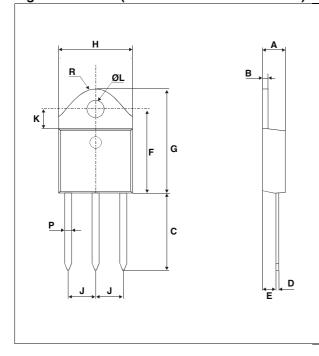


**Table 7: Product Selector** 

Part Numbers	Voltage (xxx)		Sensitivity	Туре	Package	
rait Numbers	600 V	800 V	Sensitivity	туре	rackage	
BTA40-xxxB	Х	Χ	50 mA	Standard	RD91	
BTA41-xxxBRG	Х	Χ	50 mA	Standard	TOP3 Ins.	
BTB41-xxxBRG	Х	Х	50 mA	Standard	TOP3	

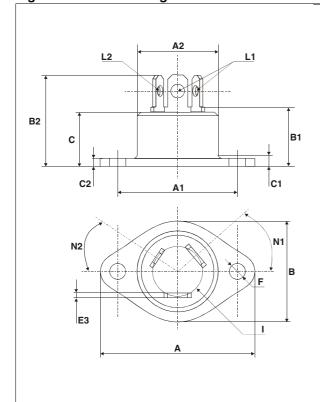
BTB: non insulated TOP3 package

Figure 11: TOP3 (Insulated and non insulated) Package Mechanical Data



	DIMENSIONS					
REF.	Millimeters				Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	4.4		4.6	0.173		0.181
В	1.45		1.55	0.057		0.061
С	14.35		15.60	0.565		0.614
D	0.5		0.7	0.020		0.028
Е	2.7		2.9	0.106		0.114
F	15.8		16.5	0.622		0.650
G	20.4		21.1	0.815		0.831
Н	15.1		15.5	0.594		0.610
J	5.4		5.65	0.213		0.222
K	3.4		3.65	0.134		0.144
ØL	4.08		4.17	0.161		0.164
Р	1.20		1.40	0.047		0.055
R		4.60			0.181	

Figure 12: RD91 Package Mechanical Data



	DIMENSIONS				
REF.	Millin	neters	Inc	hes	
1	Min.	Max.	Min.	Max.	
Α		40.00		1.575	
A1	29.90	30.30	1.177	1.193	
A2		22.00		0.867	
В		27.00		1.063	
B1	13.50	16.50	0.531	0.650	
B2		24.00		0.945	
С		14.00		0.551	
C1		3.50		0.138	
C2	1.95	3.00	0.077	0.118	
E3	0.70	0.90	0.027	0.035	
F	4.00	4.50	0.157	0.177	
I	11.20	13.60	0.441	0.535	
L1	3.10	3.50	0.122	0.138	
L2	1.70	1.90	0.067	0.075	
N1	33°	43°	33°	43°	
N2	28°	38°	28°	38°	

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: <a href="https://www.st.com">www.st.com</a>.

**Table 8: Ordering Information** 

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
BTA40-xxxB	BTA40xxxB	RD91	20 g	25	Bulk
BTA41-xxxBRG	BTA41xxxB	TOP3 Ins.	4.5 g	30	Tube
BTB41-xxxBRG	BTB41xxxB	TOP3	4.5 g	30	Tube

Note: xxx = voltage

**Table 9: Revision History** 

Date	Revision	Description of Changes
Sep-2003	5	Last update.
25-Mar-2005	6	TOP3 delivery mode changed from bulk to tube.
14-Oct-2005	7	$T_c$ values for $I_T$ changed in Table 3. ECOPACK statement added.

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