

BTA40, BTA41 and BTB41 Series

STANDARD

40A TRIACs

Table 1: Main Features

Symbol	Value	Unit	
I _{T(RMS)}	40	А	
V _{DRM} /V _{RRM}	600 and 800	V	
I _{GT (Q1})	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).

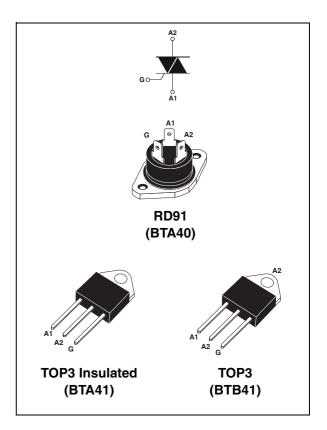


Table 2: Order Codes

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

BTA40, BTA41 and BTB41 Series

Symbol	Parame	Value	Unit		
I	RMS on-state current	RD91 / TOP3 T _c = 95°C		40	А
I _{T(RMS)}	(full sine wave)	TOP Ins.	$T_c = 80^{\circ}C$	40	A
Irou	Non repetitive surge peak on-state	F = 50 Hz	t = 20 ms	400	А
ITSM	current (full cycle, T_j initial = 25°C)	F = 60 Hz	t = 16.7 ms	420	A
l²t	I ^² t Value for fusing	t _p = 10 ms		880	A²s
dl/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 120 Hz $T_j = 125^{\circ}C$		50	A/µs
V _{DSM} /V _{RSM}	Non repetitive surge peak off-state voltage		T _j = 25°C	V _{DSM} /V _{RSM} + 100	V
I _{GM}	Peak gate current $t_p = 20 \ \mu s$ $T_j = 125^{\circ}C$		8	А	
P _{G(AV)}	Average gate power dissipation	1	W		
T _{stg} T _j	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 _{GT} (1)	$V_D = 12 V$ $R_L = 33 \Omega$	I - II - III IV	MAX.	50 100	mA
V _{GT}		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 _H (2)	I _T = 500 mA		MAX.	80	mA
IL.	$I_{G} = 1.2 I_{GT}$	I - III - IV	MAX.	70	mA
·L		II		160	
dV/dt (2)	$V_{D} = 67 \% V_{DRM}$ gate open	T _j = 125°C	MIN.	500	V/µs
(dV/dt)c (2)	(dl/dt)c = 20 A/ms	$T_j = 125^{\circ}C$	MIN.	10	V/µs

Table 5: Static Characteristics

Symbol	Test C		Value	Unit	
V _T (2)	I _{TM} = 60 A t _p = 380 μs	$T_j = 25^{\circ}C$	MAX.	1.55	V
V _{t0} (2)	Threshold voltage	T _j = 125°C	MAX.	0.85	V
R _d (2)	Dynamic resistance	T _j = 125°C	MAX.	10	mΩ
I _{DRM}	V _{DBM} = V _{BBM}	$T_j = 25^{\circ}C$	MAX.	5	μA
I _{RRM}		T _j = 125°C		5	mA

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Note 1: minimum I_{GT} is guaranted at 5% of I_{GT} max. Note 2: for both polarities of A2 referenced to A1.

Symbol	Parameter			Unit
B ., <i>n</i> . ,	lupation to appa (AC)	RD91 (Insulated) / TOP3	0.9	°C/W
nth(j-c)	R _{th(j-c)} Junction to case (AC)	TOP3 Insulated	0.6	- C/W
R _{th(j-a)}	Junction to ambient	TOP3 / TOP3 Insulated	50	°C/W

Table 6: Thermal resistance

S = Copper surface under tab.

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

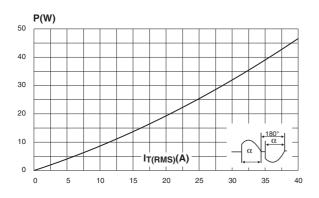


Figure 3: Relative variation of thermal impedance versus pulse duration

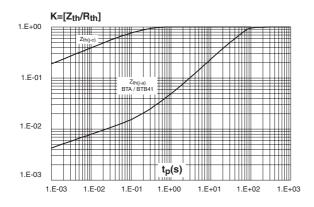


Figure 2: RMS on-state current versus case temperature (full cycle)

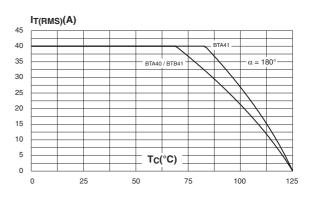
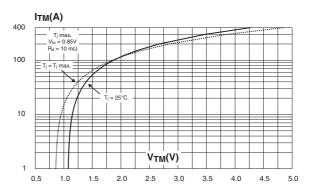


Figure 4: On-state characteristics (maximum values)



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

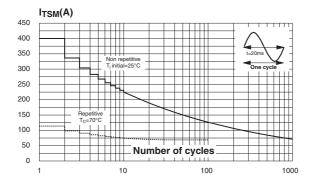


Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

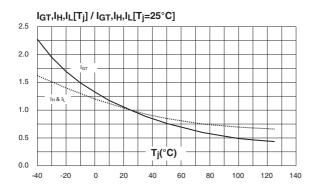


Figure 9: Relative variation of critical rate of decrease of main current versus (dV/dt)c

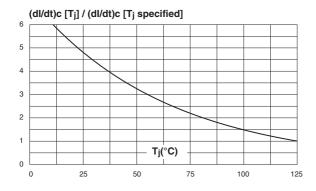


Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10$ ms and corresponding value of l^2t

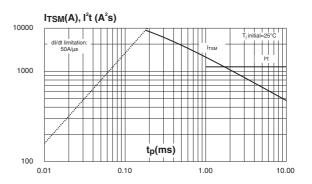
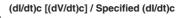
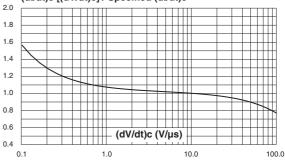
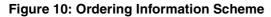


Figure 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)





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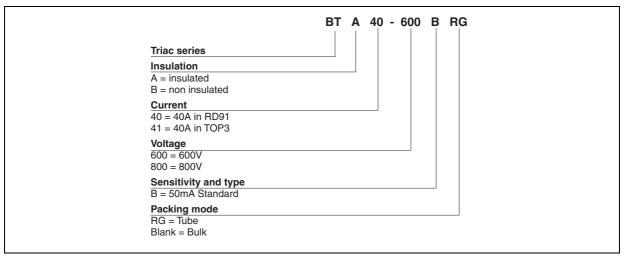
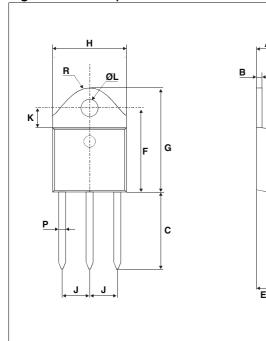


Table 7: Product Selector

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

BTB: non insulated TOP3 package



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			DIMEN	SIONS		
REF.	Mi	llimete	neters		Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
А	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 11: TOP3 (Insulated and non insulated) Package Mechanical Data

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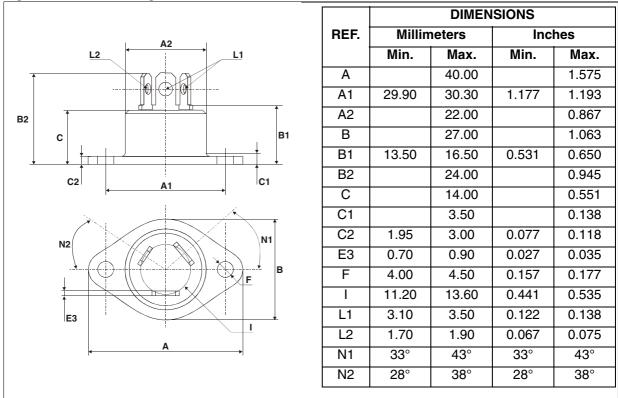


Figure 12: RD91 Package Mechanical Data

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: <u>www.st.com</u>.

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	$\rm T_{c}$ values for $\rm I_{T}$ changed in Table 3. ECOPACK statement added.

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