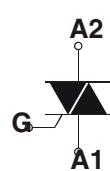


**Table 1: Main Features**

Symbol	Value	Unit
$I_T(\text{RMS})$	40	A
$V_{\text{DRM}}/V_{\text{RRM}}$	600 and 800	V
$I_{\text{GT}}(Q_1)$	50	mA

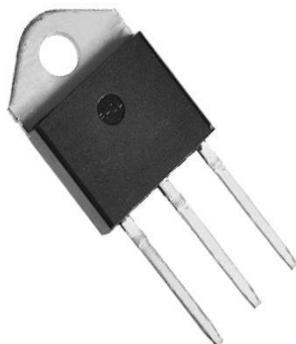
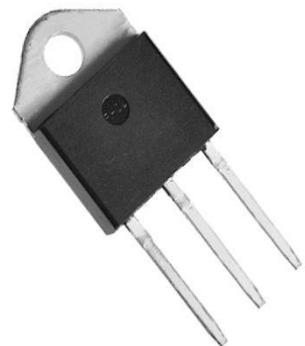

**RD91  
(BTA40)**

**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<sub>RMS</sub>) complying with UL standards (File ref.: E81734).

**TOP3 Insulated  
(BTA41)**

**TOP3  
(BTB41)**

**Table 2: Order Codes**

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

**Table 3: Absolute Maximum Ratings**

<b>Symbol</b>	<b>Parameter</b>			<b>Value</b>	<b>Unit</b>
$I_{T(RMS)}$	RMS on-state current (full sine wave)	RD91 / TOP3	$T_c = 95^\circ C$	40	A
		TOP Ins.	$T_c = 80^\circ C$		
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle, $T_j$ initial = 25°C)	F = 50 Hz	t = 20 ms	400	A
		F = 60 Hz	t = 16.7 ms	420	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10 \text{ ms}$		880	A <sup>2</sup> s
$dI/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100 \text{ ns}$	F = 120 Hz	$T_j = 125^\circ C$	50	A/ $\mu$ s
$V_{DSM}/V_{RSM}$	Non repetitive surge peak off-state voltage	$t_p = 10 \text{ ms}$	$T_j = 25^\circ C$	$V_{DSM}/V_{RSM} + 100$	V
$I_{GM}$	Peak gate current	$t_p = 20 \mu\text{s}$	$T_j = 125^\circ C$	8	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125^\circ C$	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)**

<b>Symbol</b>	<b>Test Conditions</b>	<b>Quadrant</b>		<b>Value</b>	<b>Unit</b>
$I_{GT}$ (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	I - II - III	MAX.	50	mA
		IV		100	
$V_{GT}$		ALL	MAX.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^\circ C$	ALL	MIN.	0.2	V
$I_H$ (2)	$I_T = 500 \text{ mA}$		MAX.	80	mA
$I_L$	$I_G = 1.2 I_{GT}$	I - III - IV	MAX.	70	mA
		II		160	
$dV/dt$ (2)	$V_D = 67 \% V_{DRM}$ gate open	$T_j = 125^\circ C$	MIN.	500	V/ $\mu$ s
$(dV/dt)c$ (2)	$(dI/dt)c = 20 \text{ A/ms}$	$T_j = 125^\circ C$	MIN.	10	V/ $\mu$ s

**Table 5: Static Characteristics**

<b>Symbol</b>	<b>Test Conditions</b>			<b>Value</b>	<b>Unit</b>
$V_T$ (2)	$I_{TM} = 60 \text{ A}$ $t_p = 380 \mu\text{s}$	$T_j = 25^\circ C$	MAX.	1.55	V
$V_{t0}$ (2)	Threshold voltage	$T_j = 125^\circ C$	MAX.	0.85	V
$R_d$ (2)	Dynamic resistance	$T_j = 125^\circ C$	MAX.	10	mΩ
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25^\circ C$	MAX.	5	μA
		$T_j = 125^\circ C$		5	mA

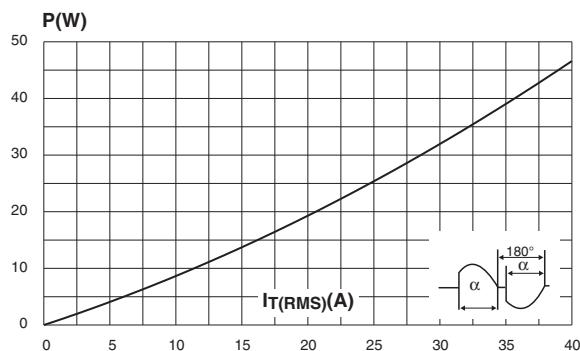
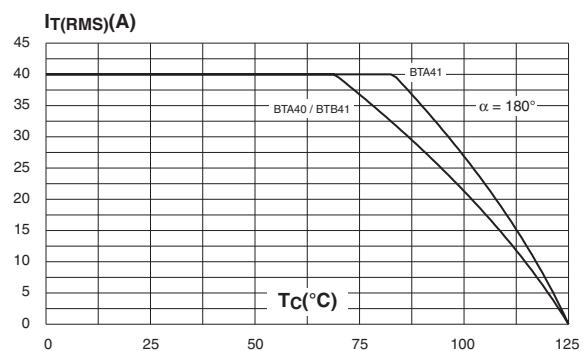
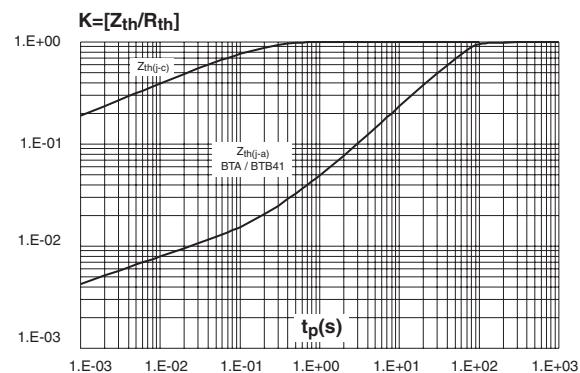
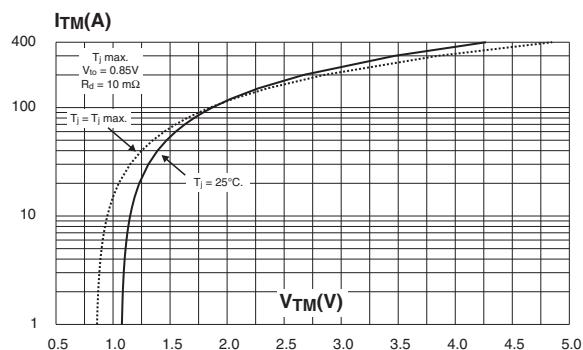
Note 1: minimum  $I_{GT}$  is guaranteed at 5% of  $I_{GT}$  max.

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

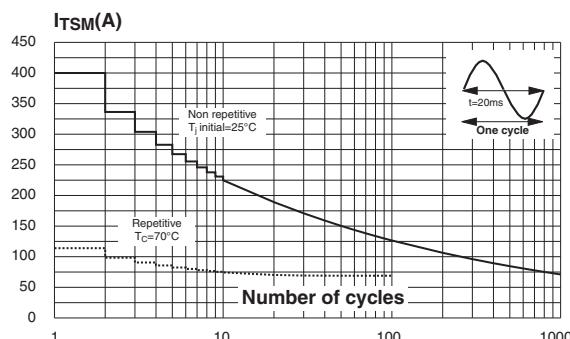
**Table 6: Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	RD91 (Insulated) / TOP3	0.9
	TOP3 Insulated	0.6	°C/W
$R_{th(j-a)}$	Junction to ambient	TOP3 / TOP3 Insulated	50
			°C/W

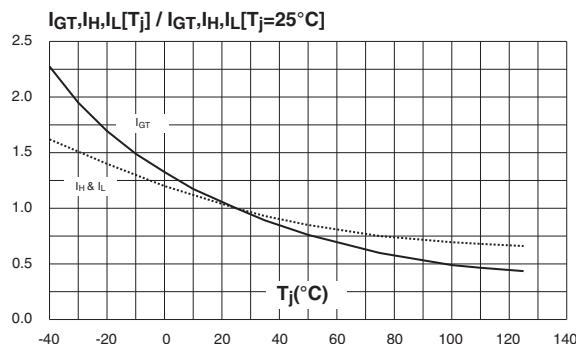
S = Copper surface under tab.

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

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

**Figure 3: Relative variation of thermal impedance versus pulse duration**

**Figure 4: On-state characteristics (maximum values)**


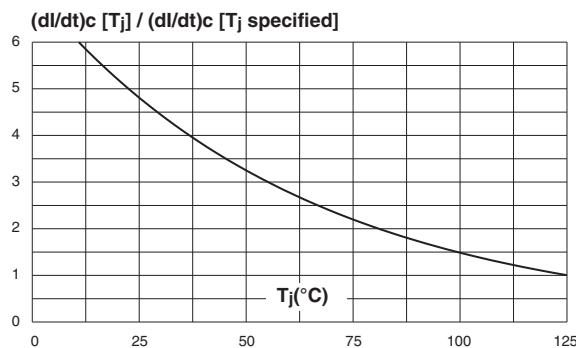
**Figure 5: Surge peak on-state current versus number of cycles**



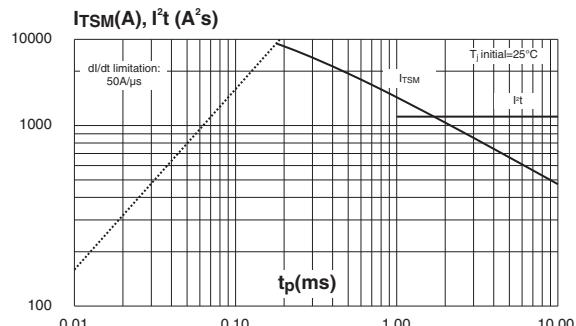
**Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)**



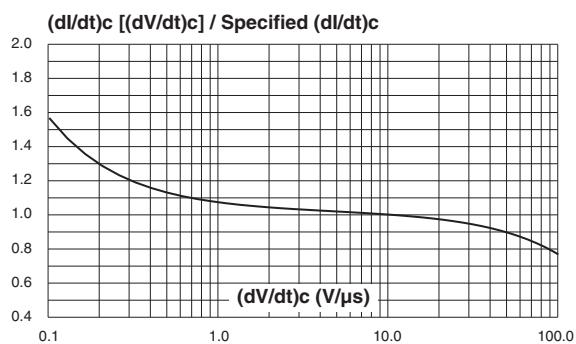
**Figure 9: Relative variation of critical rate of decrease of main current versus  $(dV/dt)c$**

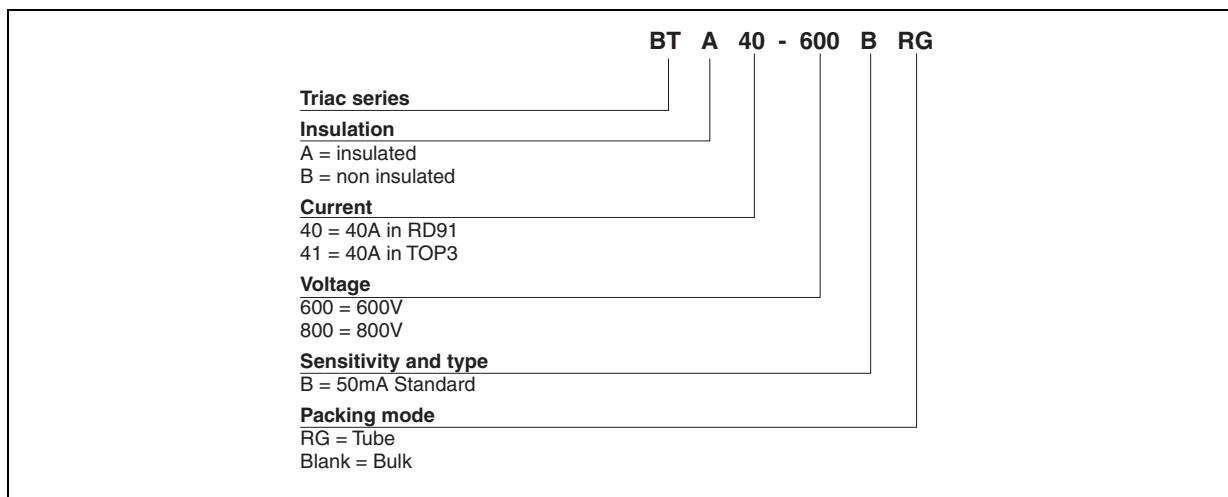


**Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms and corresponding value of  $I^2t$**



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



**Figure 10: Ordering Information Scheme**

**Table 7: Product Selector**

Part Numbers	Voltage (xxx)		Sensitivity	Type	Package
	600 V	800 V			
BTA40-xxxB	X	X	50 mA	Standard	RD91
BTA41-xxxBRG	X	X	50 mA	Standard	TOP3 Ins.
BTB41-xxxBRG	X	X	50 mA	Standard	TOP3

**BTB:** non insulated TOP3 package

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

The diagram shows the mechanical dimensions for the TOP3 package. The dimensions are:

- A**: Width of the lead frame
- B**: Lead thickness
- C**: Total height of the package
- D**: Lead spacing
- E**: Lead pitch
- F**: Lead height
- G**: Lead width
- H**: Total width of the package
- J**: Lead thickness at the base
- K**: Lead height at the base
- P**: Lead pitch at the base
- R**: Lead radius
- ØL**: Lead diameter

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
B	1.45		1.55	0.057		0.061
C	14.35		15.60	0.565		0.614
D	0.5		0.7	0.020		0.028
E	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
H	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
P	1.20		1.40	0.047		0.055
R		4.60			0.181	

**Figure 12: RD91 Package Mechanical Data**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		40.00		1.575
A1	29.90	30.30	1.177	1.193
A2		22.00		0.867
B		27.00		1.063
B1	13.50	16.50	0.531	0.650
B2		24.00		0.945
C		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°

**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 <sub>c</sub> values for I <sub>T</sub> changed in Table 3. ECOPACK statement added.