BTA40, BTA41, BTB41

40 A standard TRIACs

Features

- High current TRIAC
- Low thermal resistance with clip bonding
- High commutation capability
- BTA series UL1557 certified (File ref: 81734)
- Packages are RoHS (2002/95/EC) compliant

Applications

- On/off function in static relays, heating regulation, induction motor starting circuits
- Phase control operations in light dimmers, motor speed controllers, and similar

Description

Available in high power packages, the BTA/BTB40-41 series is suitable for general purpose AC switching.

The BTA series provides an insulated tab (rated at 2500 V rms).

RD91 insulated
(BTA40)

TOP3 insulated
(BTA41)

TOP3
(BTB41)

Table 1. Device summary

Symbol	Parameter	BTA40[1]	BTA41[1]	BTB41	Unit
$I_{T(RMS)}$	On-state rms current	40	41	41	A
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage	600 and 800	600 and 800	600 and 800	V
I_{GT}	Triggering gate current	50	50	50	mA

1. Insulated package

1 Characteristics

Table 2. Absolute maximum ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	TOP3	$T_c = 95\ °C$	40	A
		RD91 / TOP ins.	$T_c = 80\ °C$		
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 ms		1000	A^2s
dI/dt	Critical rate of rise of on-state current $I_G = 2$ x I_{GT} , $t_r \leq 100$ ns	F = 120 Hz	$T_j = 125\ °C$	50	A/µs
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	t_p = 10 ms	$T_j = 25\ °C$	$V_{DSM}/V_{RSM} +$ 100	V
I_{GM}	Peak gate current	t_p = 20 µs	$T_j = 125\ °C$	8	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\ °C$	1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

Table 3. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Parameter			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}	$V_D = V_{DRM}$ $R_L = 3.3$ kΩ $T_j = 125\ °C$	ALL	MIN.	0.2	V
I_H (2)	$I_T = 500$ 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	$T_j = 125\ °C$	MIN.	500	V/µs
(dV/dt)c[2]	(dI/dt)c = 20 A/ms	$T_j = 125\ °C$	MIN.	10	V/µs

1. Minimum I_{GT} is guaranted at 5% of I_{GT} max.

2. for both polarities of A2 referenced to A1

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_T [1]	I_{TM} = 60 A $\quad$ t_p = 380 µs	T_j = 25 °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}	$V_{DRM} = V_{RRM}$	T_j = 25 °C	MAX.	5	µA
I_{RRM}		T_j = 125 °C		5	mA

1. Minimum I_{GT} is guaranted at 5% of I_{GT} max.

2. for both polarities of A2 referenced to A1

Table 5. Thermal resistance

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

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

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

Figure 3. Relative variation of thermal impedance versus pulse duration
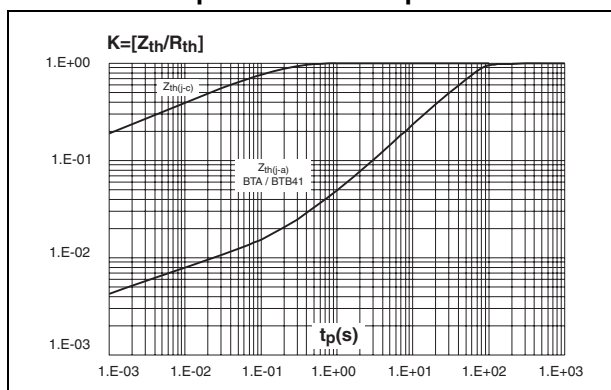
Figure 4. On-state characteristics (maximum values)
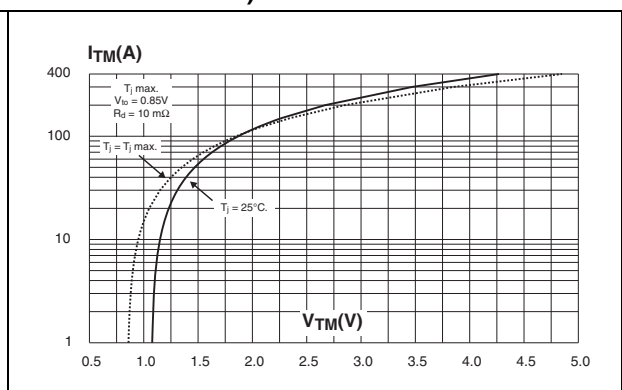
Figure 5. Surge peak on-state current versus number of cycles

Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding value of I^2t
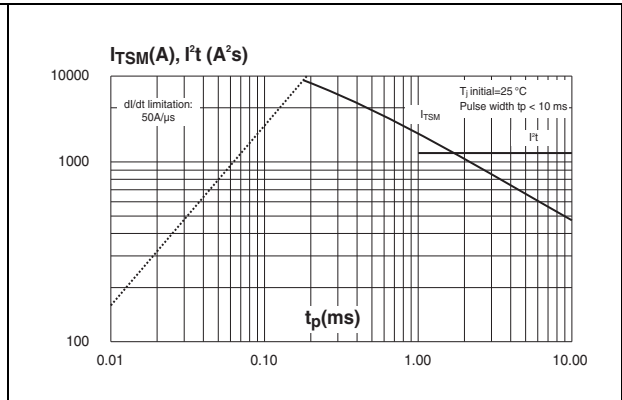

Figure 7. Relative variation of gate trigger, holding and latching current versus junction temperature

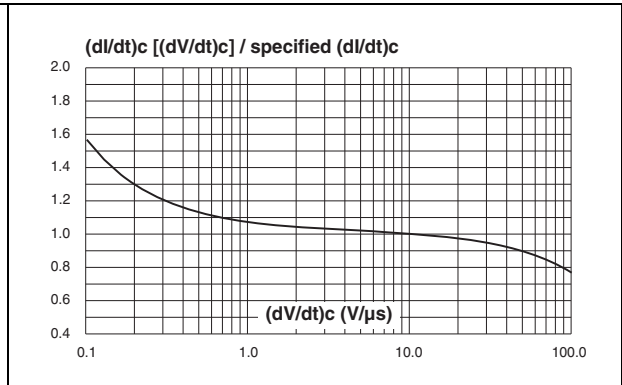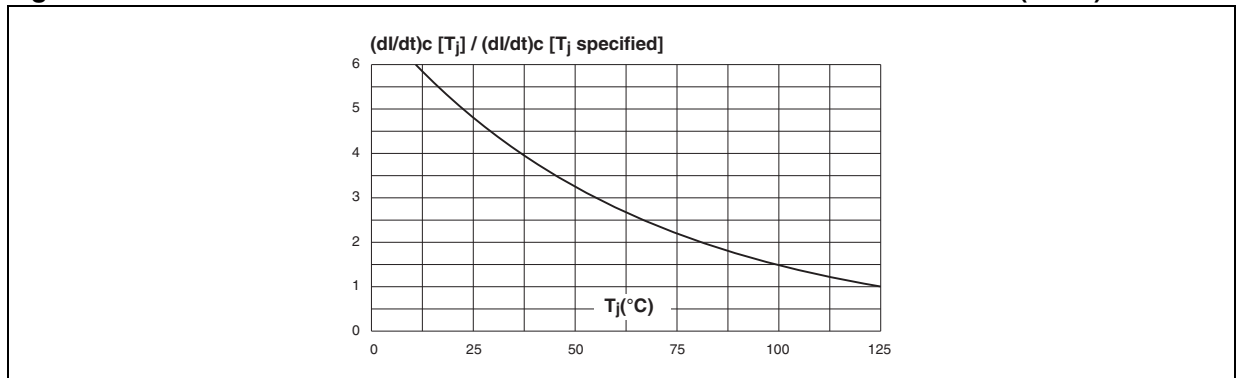**Figure 8.** Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

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

2 Ordering information scheme

Figure 10. Ordering information scheme

BT A 40 - 600 B RG

TRIAC series

Insulation
A = insulated
B = non-insulated

Current
40 = 40 A in RD91

Voltage
600 = 600 V
800 = 800 V

Sensitivity and type
B = 50 mA standard

Packing mode
RG = Tube
Blank = Bulk

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*. ECOPACK® is an ST trademark.

Table 6.   TOP3 insulated and non-insulated dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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 typ.		0.181 typ.	
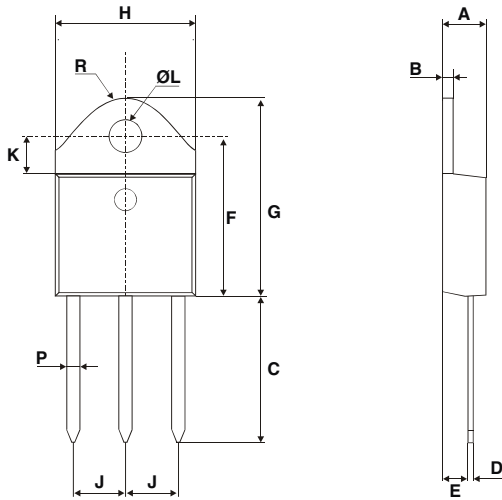
Table 7.   RD91 dimensions

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°

4   Ordering information

Table 8.   Ordering information

Order code[1]	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

1.   xxx = voltage

5   Revision history

Table 9.   Document revision history

Date	Revision	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.
10-Aug-2009	8	Updated *Table 2* to correctly place packages. Updated *Figure 2*. *Table 5* changed to correctly place TOP3. Updated ECOPACK statement.

Please Read Carefully: