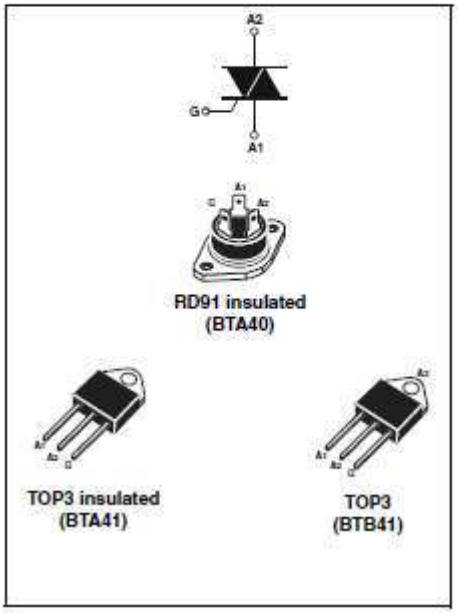
BTA40, BTA41, BTB41

40 A standard TRIACs



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Даташиты , Симисторы серии BTA40, BTA41, BTB41

Симисторы серии BTA40, BTA41, BTB41

Апрель 17, 2017

Свойства

Мощные симисторы

Низкое тепловое сопротивление

Высокая коммутирующая способность

Сертифицированы по стандарту UL1557

Корпусы соответствуют директиве RoHS (2002/95/EC)

Применение

В качестве ключа в релейных схемах, для регулировки нагрева, в цепях запуска асинхронных электродвигат

Для управления фазой в димерах света, в регуляторах частоты вращения коллекторных двигателей
Описание
Доступны в мощных корпусах. Симисторы серии BTA / BTB40-41 подходят для коммутации переменного тока общего назначения. Серия BTA снабжена изолированным язычком (номинальное среднеквадратичное напряжение пробоя 2500 В).
Типы корпусов (A1, A2 - аноды, G - управляющий электрод)
Типы корпусов (A1, A2 — аноды, G — управляющий электрод)
Общие характеристики
Обозначение
IT(RMS)
VDRM/VRRM
!gt
Абсолютные максимальные значения
RD91 / TOP ins.
ITSM
F = 60 Гц
I2t
dI/dt
VDSM/VRSM
IGM
PG(AV)
Tstg
Tj
Электрические характеристики (Tj = 25 °C)
IGT(1)
IV
VGT
VGD
IH (2)
IL
II
dV/dt(2)
(dV/dt)c(2)
Минимум IGT гарантируется на уровне 5% от IGT max.
Для обеих полярностей от A2 к A1.
Статические характеристики
VT(1)
Vt0(2)
Rd(2)
IDRM
IRRM
Тепловое сопротивление
Rth(j-c)
TOP3
Rth(j-a)
Зависимость максимальной рассеиваемой мощности от действующего тока (полный цикл)
Зависимость действующего тока от температуры корпуса
Зависимость теплового сопротивления от длительности импульса
Характеристики в отрытом состоянии (максимальные значения)
Зависимость ударного тока в открытом состоянии от количества циклов

Зависимость ударного тока в открытом состоянии от синусоидального импульса и значения плавления

Зависимость ударного тока в открытом состоянии от синусоидального импульса и значения плавления
Относительное изменение отпирающего тока, тока удержания и тока включения в зависимости от темпера
перехода
Относительное изменение критической скорости снижения основного тока в зависимости от критической скорости нарастания напряжения
Относительное изменение критической скорости снижения основного тока в зависимости от температуры перехода
Расшифровка серии
Размеры для корпуса TOP3
Размеры для корпуса RD91

bta40-600b (st)

bta40-800b (st)

bta40-700b (st)

bta40-800brg (st)

bta40-800bw (st)

bta41-600brg (st)

bta41-800brg (st)

bta41-700brg (st)

bta41-600b (st)

bta412y-600b.127 (ween/nxp)

bta412y-600c.127 (ween/nxp)

bta412y-800b.127 (ween/nxp)

bta412y-800c.127 (ween/nxp)

bta416y-600b.127 (ween/nxp)

bta416y-600c.127 (ween/nxp)

bta416y-800b.127 (ween/nxp)

bta416y-800c.127 (ween/nxp)

bta410y-600ct.127 (ween/nxp)

bta410y-600et.127 (ween/nxp)

bta410y-800bt.127 (ween/nxp)

bta410y-800ct.127 (ween/nxp)

bta41-800bq (ween/nxp)

bta410-600et127 (ween/nxp)

bta410-800ct127 (ween/nxp)

bta410x-600ct127 (ween/nxp)

bta410y-600ct127 (ween/nxp)

bta410y-600et127 (ween/nxp)

bta410x-800bt127 (ween/nxp)

bta410y-600ct (ween/nxp)

bta41-800b (st)

bta412y-600c (nxp)

bta412y-800c (nxp)

bta412y-800et (ween/nxp)

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).

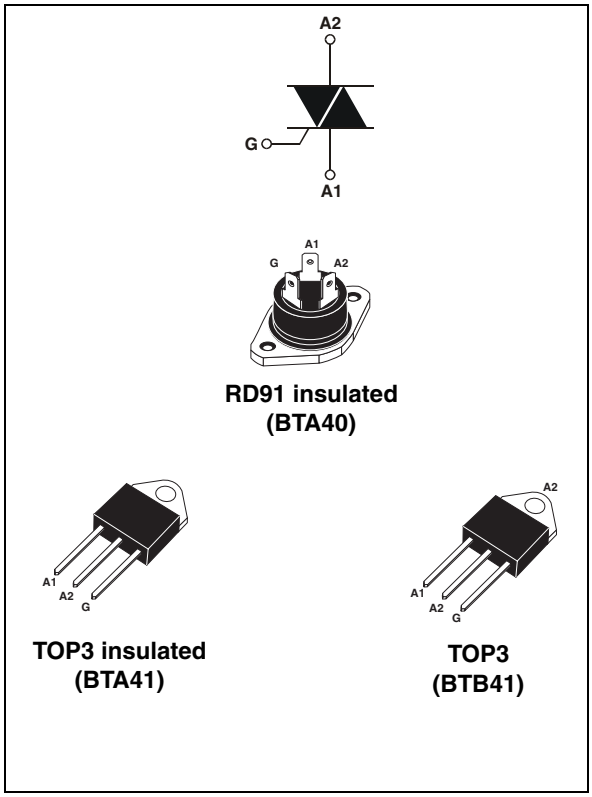


Table 1. Device summary

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 Ω	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 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} I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	MAX.	5	µA
		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)

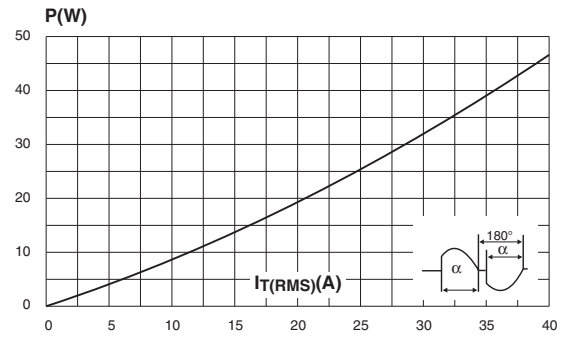


Figure 2. On-state rms current versus case temperature (full cycle)

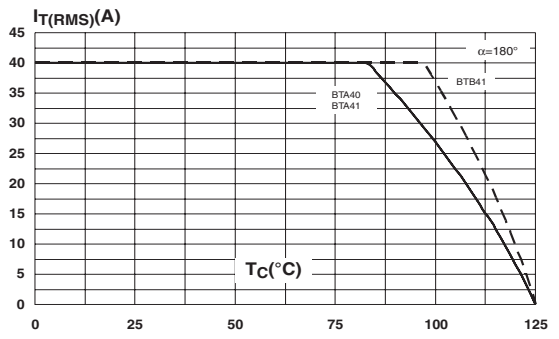


Figure 3. Relative variation of thermal impedance versus pulse duration

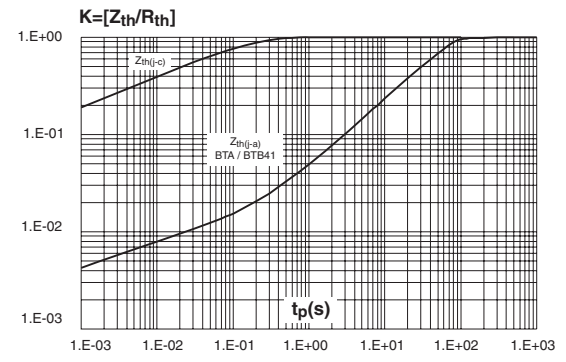


Figure 4. On-state characteristics (maximum values)

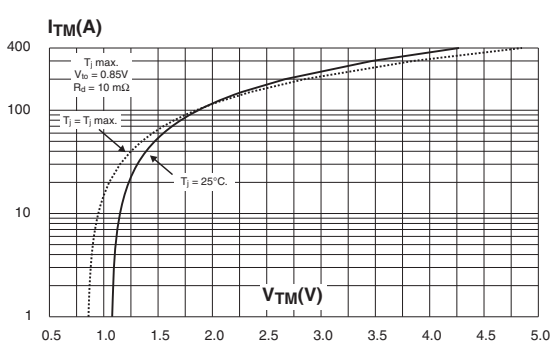


Figure 5. Surge peak on-state current versus number of cycles

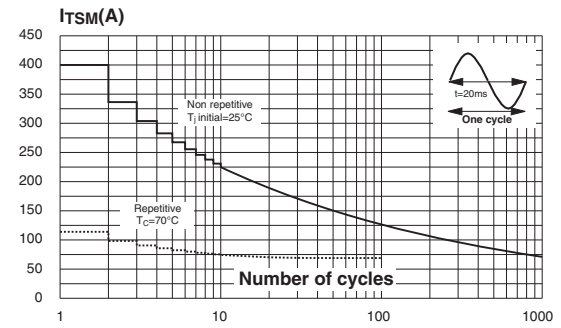


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding value of I^2t

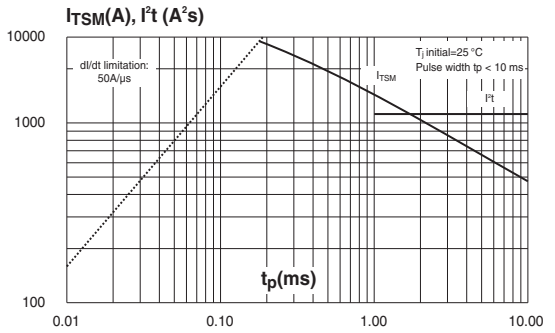


Figure 7. Relative variation of gate trigger, holding and latching current versus junction temperature

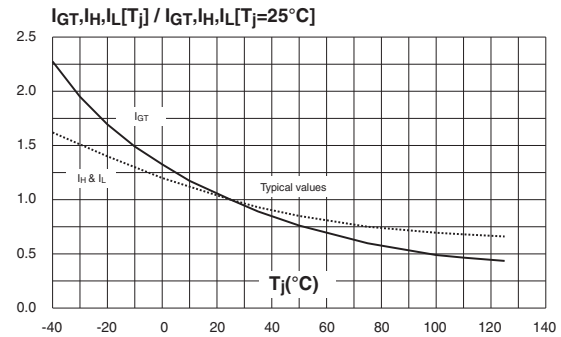


Figure 8. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

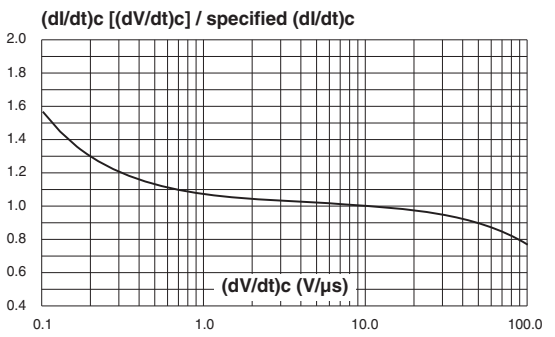
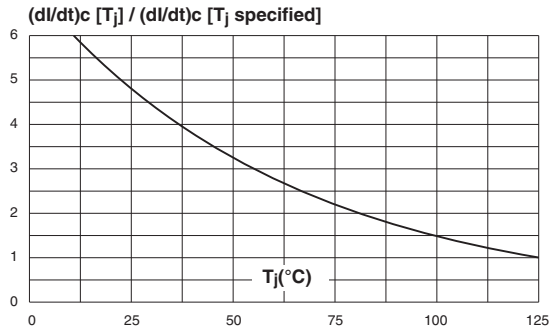
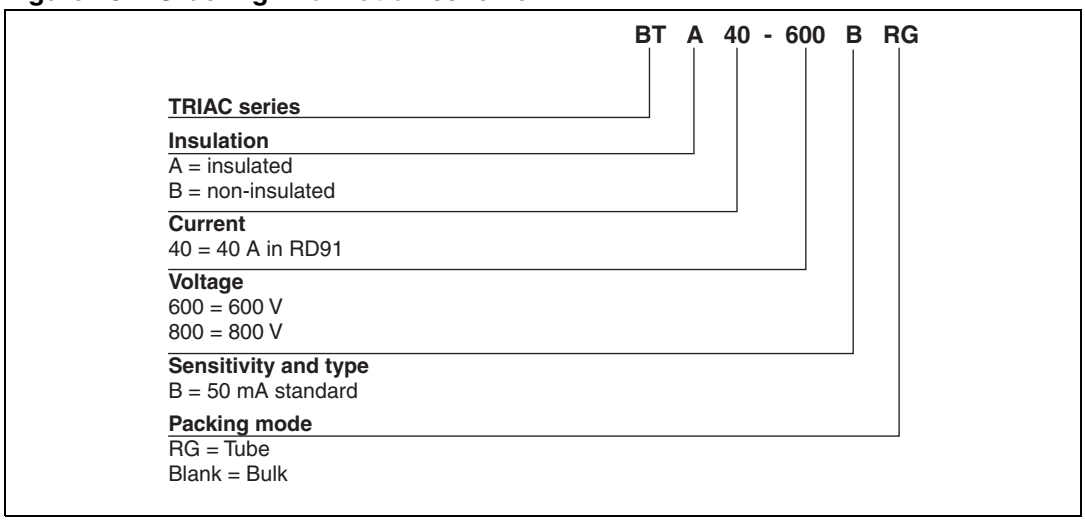


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c



2 Ordering information scheme

Figure 10. Ordering information scheme

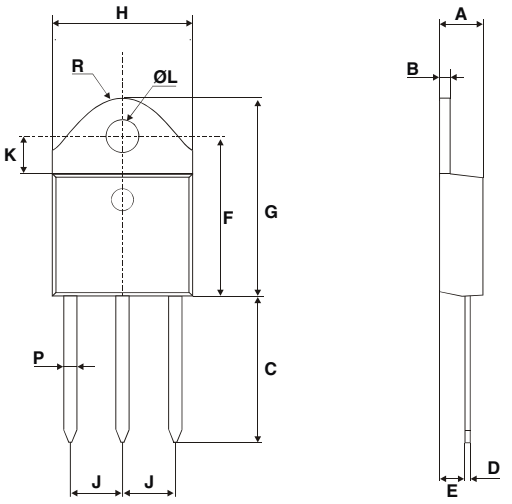


3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

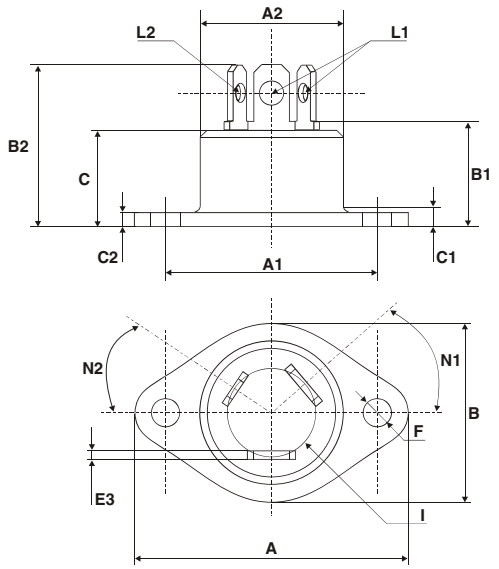
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

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.

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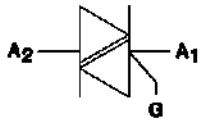
SGS-THOMSON MICROELECTRONICS

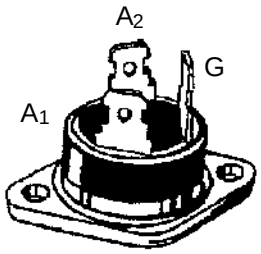
BTA40 A/B

STANDARD TRIACS

FEATURES

- HIGH SURGE CURRENT CAPABILITY
- COMMUTATION : (dV/dt)c > 10V/µs
- BTA Family :
  INSULATING VOLTAGE = 2500V(RMS)
  (UL RECOGNIZED : E81734)





RD91
(Plastic)

DESCRIPTION

The BTA40 A/B triac family are high performance glass passivated PNPN devices.
These parts are suitables for general purpose applications where high surge current capability is required. Application such as phase control and static switching on inductive or resistive load.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (360° conduction angle)	Tc = 75 °C	40	A
I_{TSM}	Non repetitive surge peak on-state current (Tj initial = 25°C)	tp = 8.3 ms	315	A
		tp = 10 ms	300	
I^2t	I^2t value	tp = 10 ms	450	A^2s
dI/dt	Critical rate of rise of on-state current Gate supply : I_G = 500mA di_G/dt = 1A/µs	Repetitive F = 50 Hz	10	A/µs
		Non Repetitive	50	
Tstg Tj	Storage and operating junction temperature range		- 40 to + 150 - 40 to + 125	°C °C
Tl	Maximum lead temperature for soldering during 10 s at 4.5 mm from case		260	°C

Symbol	Parameter	BTA40-... A/B				Unit
		400	600	700	800	
V_{DRM} V_{RRM}	Repetitive peak off-state voltage Tj = 125 °C	400	600	700	800	V

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
Rth (j-c) DC	Junction to case for DC	1.2	°C/W
Rth (j-c) AC	Junction to case for 360° conduction angle (F= 50 Hz)	0.9	°C/W

GATE CHARACTERISTICS (maximum values)

$P_{G\ (AV)}$ = 1W P_{GM} = 40W (tp = 20 µs) I_{GM} = 8A (tp = 20 µs) V_{GM} = 16V (tp = 20 µs).

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Quadrant		Suffix		Unit
					A	B	
I_{GT}	V_D=12V (DC) R_L=33Ω	Tj=25°C	I-II-III	MAX	100	50	mA
			IV	MAX	150	100	
V_{GT}	V_D=12V (DC) R_L=33Ω	Tj=25°C	I-II-III-IV	MAX	1.5		V
V_{GD}	V_D=V_{DRM} R_L=3.3kΩ	Tj=125°C	I-II-III-IV	MIN	0.2		V
tgt	V_D=V_{DRM} I_G = 500mA dI_G/dt = 3A/µs	Tj=25°C	I-II-III-IV	TYP	2.5		µs
I_L	I_G=1.2 I_{GT}	Tj=25°C	I-III-IV	TYP	70	60	mA
			II		200	180	
I_H *	I_T= 500mA gate open	Tj=25°C		MAX	100	80	mA
V_{TM} *	I_{TM}= 60A tp= 380µs	Tj=25°C		MAX	1.8		V
I_{DRM} I_{RRM}	V_{DRM} Rated V_{RRM} Rated	Tj=25°C		MAX	0.01		mA
		Tj=125°C		MAX	6		
dV/dt *	Linear slope up to V_D=67%V_{DRM} gate open	Tj=125°C		MIN	250		V/µs
(dV/dt)c *	(dI/dt)c = 18A/ms	Tj=125°C		MIN	10		V/µs

* For either polarity of electrode A_2 voltage with reference to electrode A_1.

ORDERING INFORMATION

Package	$I_{T(RMS)}$	V_{DRM} / V_{RRM}	Sensitivity Specification	
	A	V	A	B
BTA (Insulated)	40	400	X	X
		600	X	X
		700	X	X
		800	X	X

Fig.1 : Maximum RMS power dissipation versus RMS on-state current (F=50Hz).
(Curves are cut off by (dI/dt)c limitation)

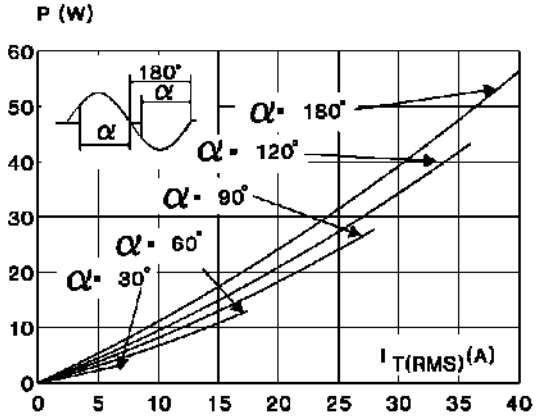


Fig.2 : Correlation between maximum RMS power dissipation and maximum allowable temperatures (T_{amb} and T_{case}) for different thermal resistances heatsink + contact.

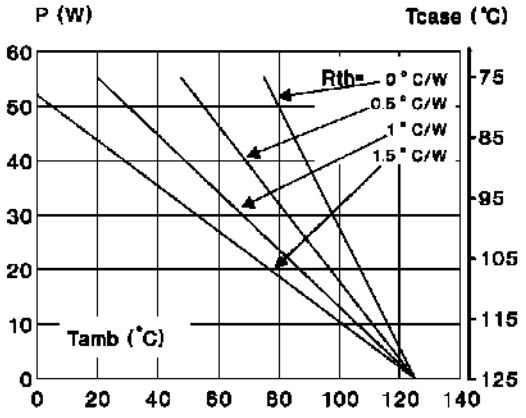


Fig.3 : RMS on-state current versus case temperature.

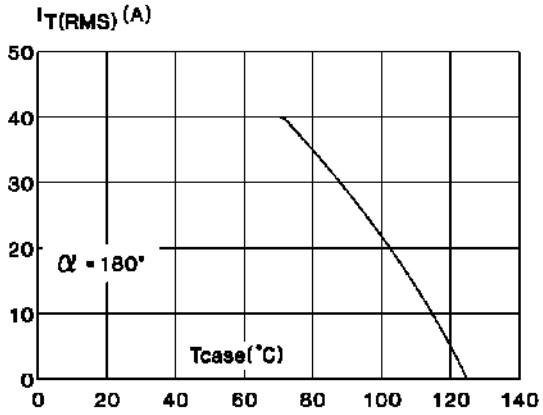


Fig.4 : relative variation of thermal impedance junction to case versus pulse duration.

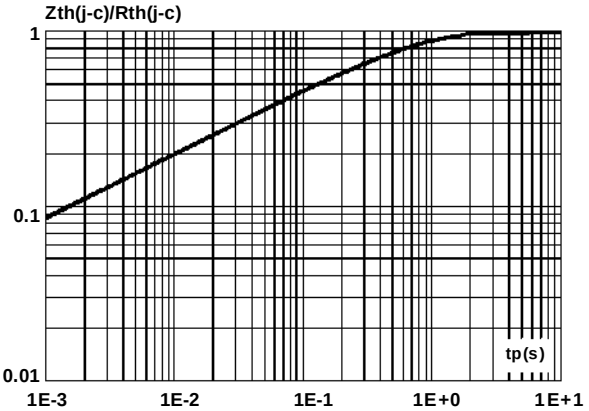


Fig.5 : Relative variation of gate trigger current and holding current versus junction temperature.

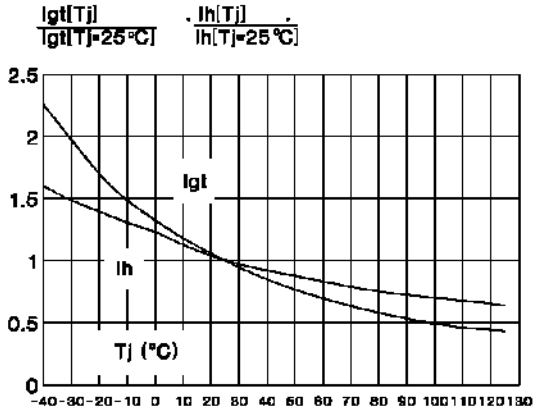


Fig.6 : Non Repetitive surge peak on-state current versus number of cycles.

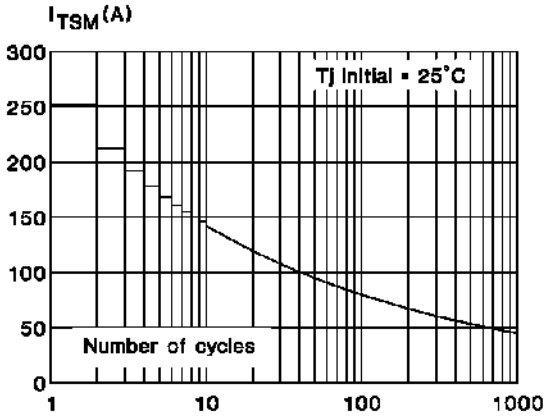


Fig.7 : Non repetitive surge peak on-state current for a sinusoidal pulse with width : t ≤ 10ms, and corresponding value of I^2t.

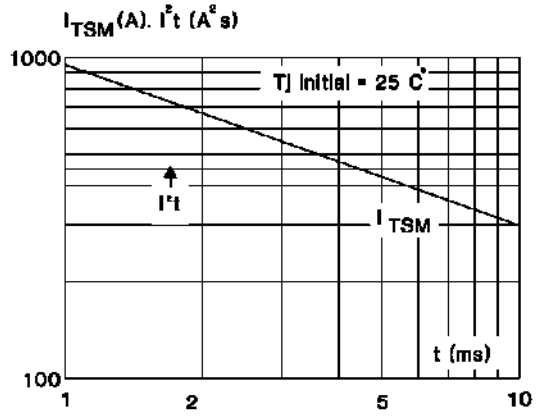
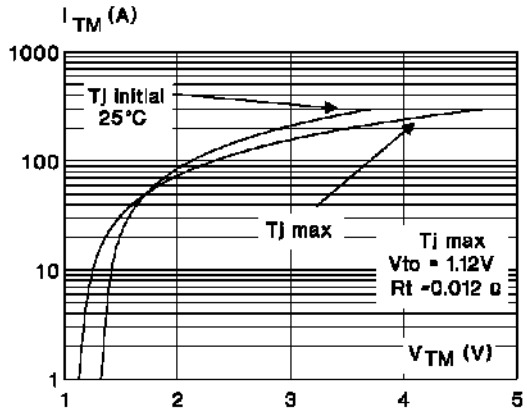
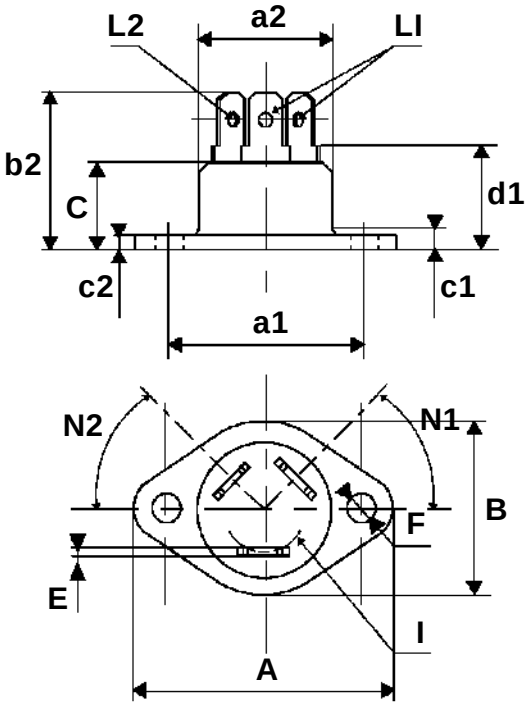


Fig.8 : On-state characteristics (maximum values).



PACKAGE MECHANICAL DATA

RD91 Plastic



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
E	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°

Marking : type number
Weight : 20 g