



# BTA/BTB24, BTA25, BTA26 and T25 Series

SNUBBERLESS™ & STANDARD

25A TRIACs

## MAIN FEATURES:

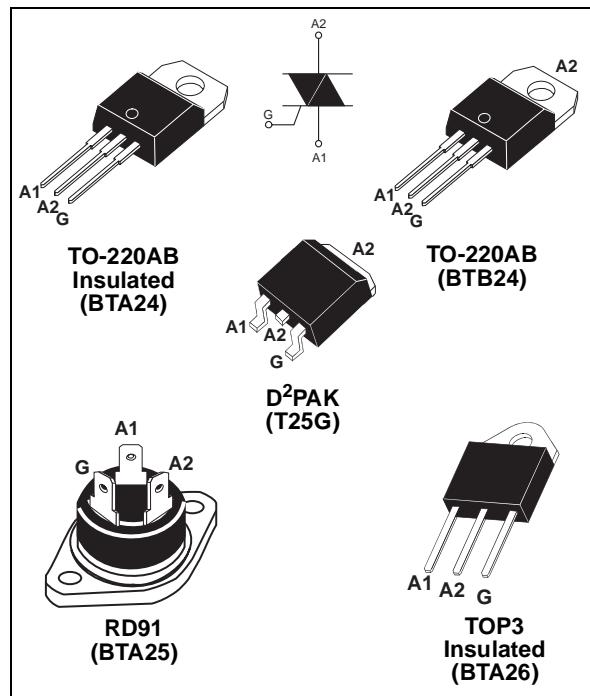
Symbol	Value	Unit
$I_T(\text{RMS})$	25	A
$V_{\text{DRM}}/V_{\text{RRM}}$	600 and 800	V
$I_{\text{GT}}(Q_1)$	35 to 50	mA

## DESCRIPTION

Available either in through-hole or surface mount packages, the BTA/BTB24-25-26 triac series is suitable for general purpose AC power switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, water heaters, induction motor starting circuits...or for phase control operation in high power motor speed controllers, soft start circuits...The snubberless versions (BTA/BTB...W and T25 series) are specially recommended for use on inductive loads, thanks to their high commutation performances.

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

## ABSOLUTE MAXIMUM RATINGS



Symbol	Parameter	Value	Unit
$I_T(\text{RMS})$	RMS on-state current (full sine wave)	25	A
	D2PAK TO-220AB		
	RD91 TOP3 Ins.		
$I_{\text{TSM}}$	$F = 60 \text{ Hz}$	$t = 16.7 \text{ ms}$	A
	$F = 50 \text{ Hz}$	$t = 20 \text{ ms}$	
$I^2t$	$I^2t$ Value for fusing	$tp = 10 \text{ ms}$	$\text{A}^2\text{s}$
$dI/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{\text{GT}}$ , $tr \leq 100 \text{ ns}$	$F = 120 \text{ Hz}$	$\text{A}/\mu\text{s}$
$V_{\text{DSM}}/V_{\text{RSM}}$	Non repetitive surge peak off-state voltage	$tp = 10 \text{ ms}$	$V_{\text{DRM}}/V_{\text{RRM}} + 100$
$I_{\text{GM}}$	Peak gate current	$tp = 20 \mu\text{s}$	$T_j = 125^\circ\text{C}$
$P_{\text{G(AV)}}$	Average gate power dissipation	$T_j = 125^\circ\text{C}$	1
$T_{\text{stg}}$ $T_j$	Storage junction temperature range Operating junction temperature range	- 40 to + 150 - 40 to + 125	$^\circ\text{C}$

## BTA/BTB24, BTA25, BTA26 and T25 Series

ELECTRICAL CHARACTERISTICS ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

### ■ SNUBBERLESS™ (3 Quadrants) T25-G, BTA/BTB24...W, BTA25...W, BTA26...W

Symbol	Test Conditions	Quadrant	T25			Unit	
			T2535	CW	BW		
$I_{GT}$ (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	I - II - III	MAX.	35	35	50	mA
$V_{GT}$		I - II - III	MAX.	1.3			V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^\circ\text{C}$	I - II - III	MIN.	0.2			V
$I_H$ (2)	$I_T = 500 \text{ mA}$		MAX.	50	50	75	mA
$I_L$	$I_G = 1.2 I_{GT}$	I - III	MAX.	70	70	80	mA
		II		80	80	100	
dV/dt (2)	$V_D = 67 \% V_{DRM}$ gate open $T_j = 125^\circ\text{C}$		MIN.	500	500	1000	V/ $\mu$ s
(dI/dt)c (2)	Without snubber $T_j = 125^\circ\text{C}$		MIN.	13	13	22	A/ms

### ■ STANDARD (4 Quadrants): BTB24...B, BTA25...B, BTA26...B

Symbol	Test Conditions	Quadrant		Value	Unit
$I_{GT}$ (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	I - II - III	MAX.	50	mA
$V_{GT}$		IV		100	
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^\circ\text{C}$	ALL	MIN.	0.2	V
$I_H$ (2)	$I_T = 500 \text{ mA}$		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 $T_j = 125^\circ\text{C}$		MIN.	500	V/ $\mu$ s
(dV/dt)c (2)	(dI/dt)c = 13.3 A/ms $T_j = 125^\circ\text{C}$		MIN.	10	V/ $\mu$ s

## STATIC CHARACTERISTICS

Symbol	Test Conditions			Value	Unit
$V_{TM}$ (2)	$I_{TM} = 35 \text{ A}$ $t_p = 380 \mu\text{s}$	$T_j = 25^\circ\text{C}$	MAX.	1.55	V
$V_{to}$ (2)	Threshold voltage	$T_j = 125^\circ\text{C}$	MAX.	0.85	V
$R_d$ (2)	Dynamic resistance	$T_j = 125^\circ\text{C}$	MAX.	16	$\text{m}\Omega$
$I_{DRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25^\circ\text{C}$	MAX.	5	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$		3	mA

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

Note 2: for both polarities of A2 referenced to A1

## BTA/BTB24, BTA25, BTA26 and T25 Series

### THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		D <sup>2</sup> PAK TO-220AB	0.8
			RD91 (Insulated) TOP3 Insulated	1.1
			TO-220AB Insulated	1.7
$R_{th(j-a)}$	Junction to ambient	$S = 1 \text{ cm}^2$	D <sup>2</sup> PAK	45
			TOP3 Insulated	50
			TO-220AB	60
			TO-220AB Insulated	

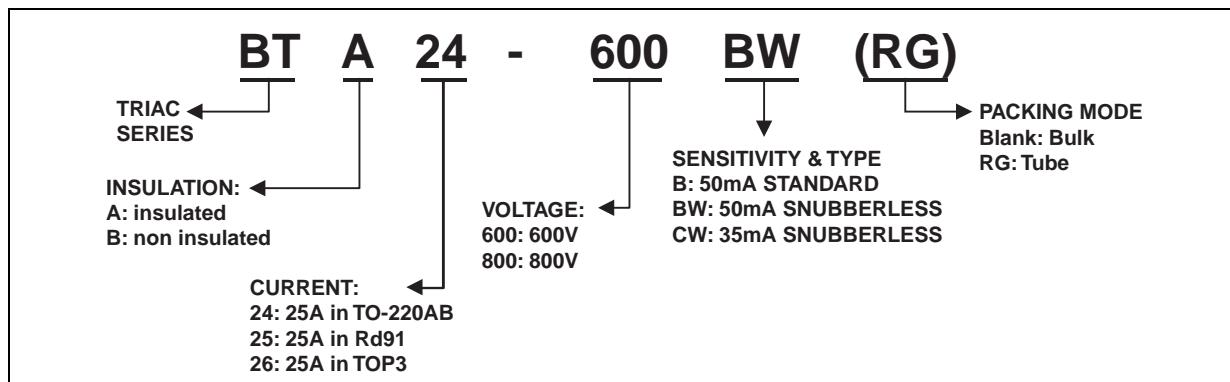
S: Copper surface under tab

### PRODUCT SELECTOR

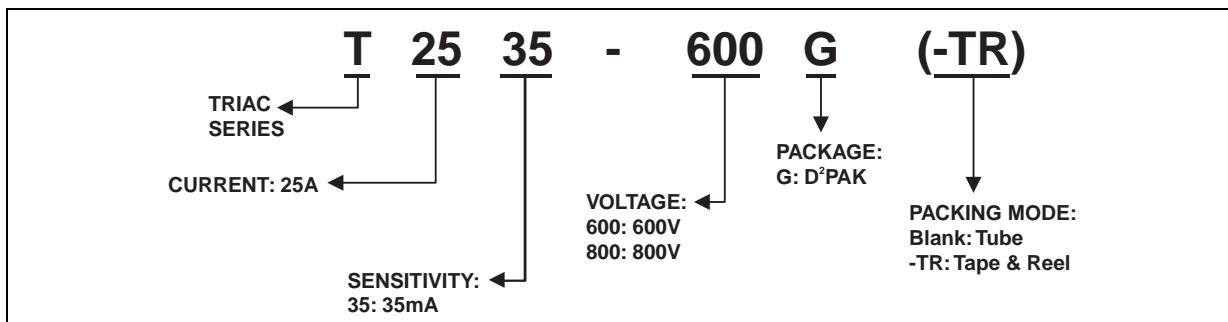
Part Number	Voltage (xxx)		Sensitivity	Type	Package
	600 V	800 V			
BTB24-xxxB	X	X	50 mA	Standard	TO-220AB
BTA/BTB24-xxxBW	X	X	50 mA	Snubberless	TO-220AB
BTA/BTB24-xxxCW	X	X	35 mA	Snubberless	TO-220AB
BTA25-xxxB	X	X	50 mA	Standard	RD-91
BTA25-xxxBW	X	X	50 mA	Snubberless	RD-91
BTA25-xxxCW	X	X	35 mA	Snubberless	RD-91
BTA26-xxxB	X	X	50 mA	Standard	TOP3 Ins.
BTA26-xxxBW	X	X	50 mA	Snubberless	TOP3 Ins.
BTA26-xxxCW	X	X	35 mA	Snubberless	TOP3 Ins.
T2535-xxxG	X	X	35 mA	Snubberless	D <sup>2</sup> PAK

BTB: Non insulated TO-220AB package

### ORDERING INFORMATION



## BTA/BTB24, BTA25, BTA26 and T25 Series

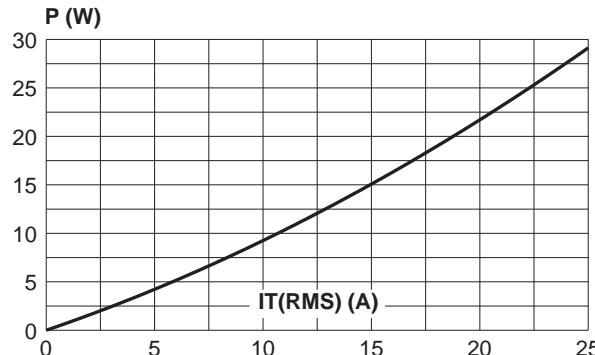


### OTHER INFORMATION

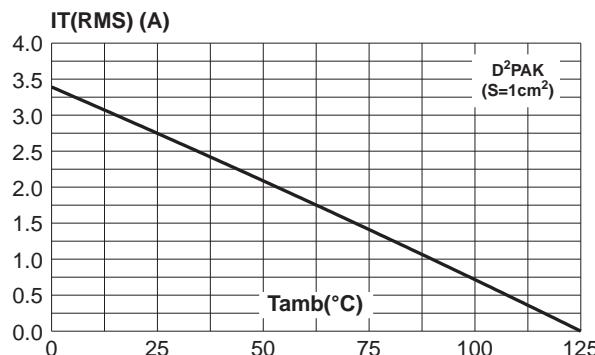
Part Number	Marking	Weight	Base quantity	Packing mode
BTA/BTB24-xxxxz	BTA/BTB24xxxxz	2.3 g	250	Bulk
BTA/BTB24-xxxxzRG	BTA/BTB24-xxxxz	2.3 g	50	Tube
BTA25-xxxxz	BTA25xxxxz	20 g	25	Bulk
BTA26-xxxxz	BTA26xxxxz	4.5 g	120	Bulk
T2535-xxxG	T2535xxxG	1.5 g	50	Tube
T2535-xxxG-TR	T2535xxxG	1.5 g	1000	Tape & reel

**Note:** xxx= voltage, y = sensitivity, z = type

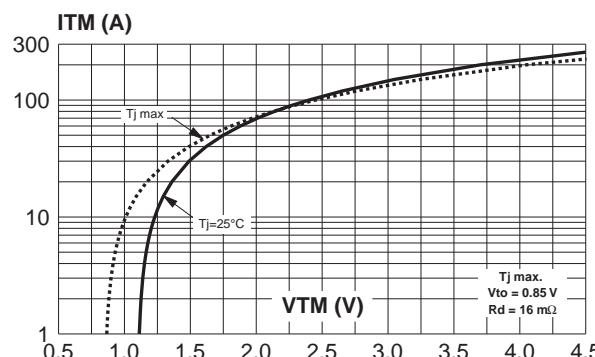
**Fig. 1:** Maximum power dissipation versus RMS on-state current (full cycle).



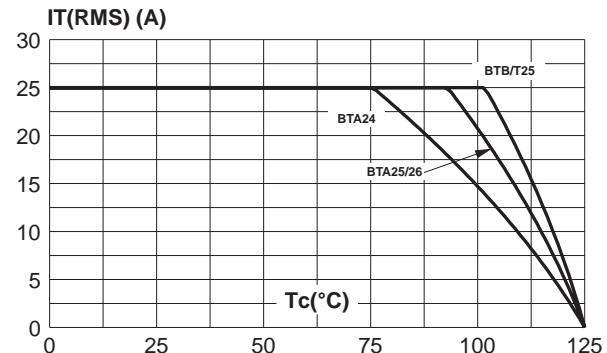
**Fig. 2-2:** D<sup>2</sup>PAK RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 µm), full cycle.



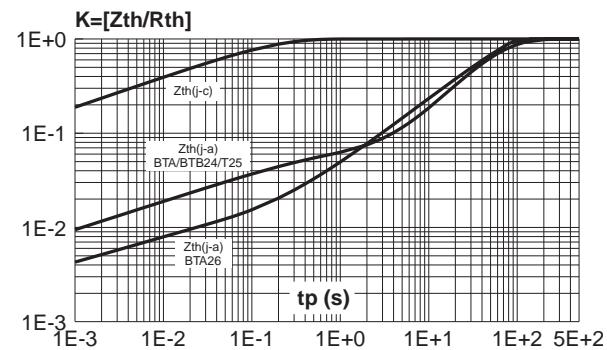
**Fig. 4:** On-state characteristics (maximum values).



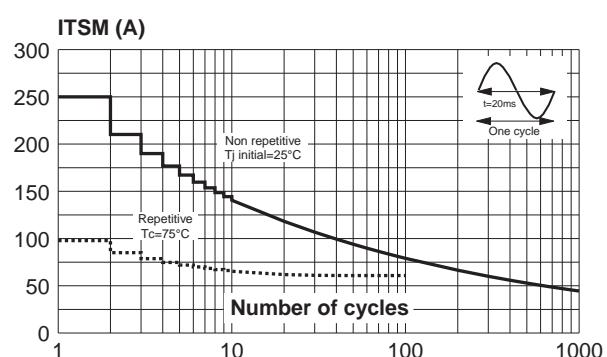
**Fig. 2-1:** RMS on-state current versus case temperature (full cycle).



**Fig. 3:** Relative variation of thermal impedance versus pulse duration.



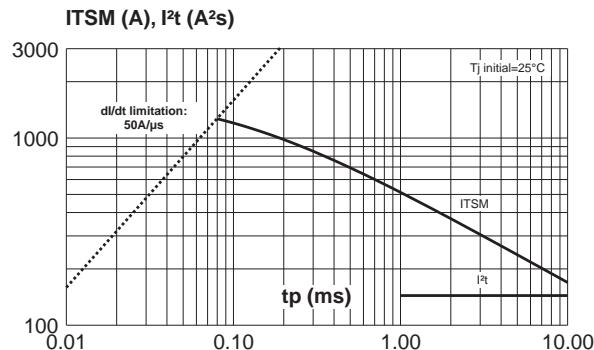
**Fig. 5:** Surge peak on-state current versus number of cycles.



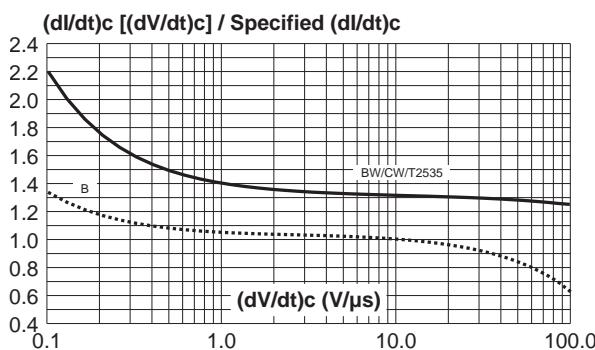
## BTA/BTB24, BTA25, BTA26 and T25 Series

---

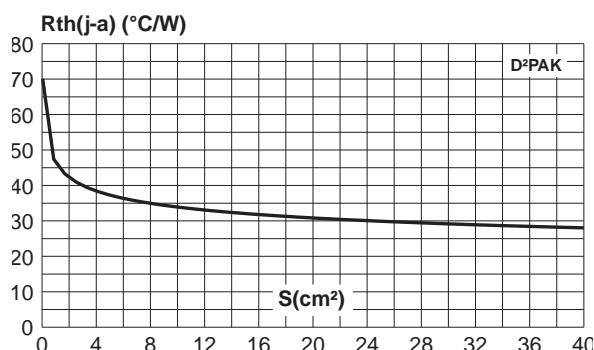
**Fig. 6:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2t$ .



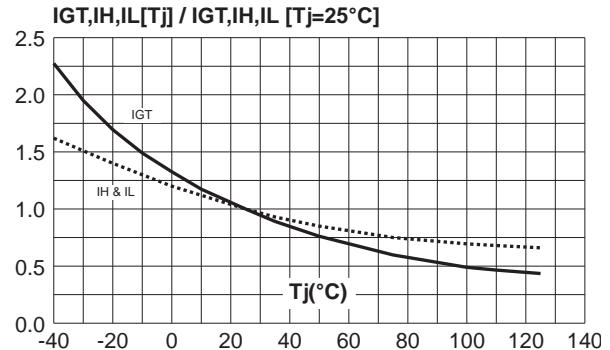
**Fig. 8:** Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values).



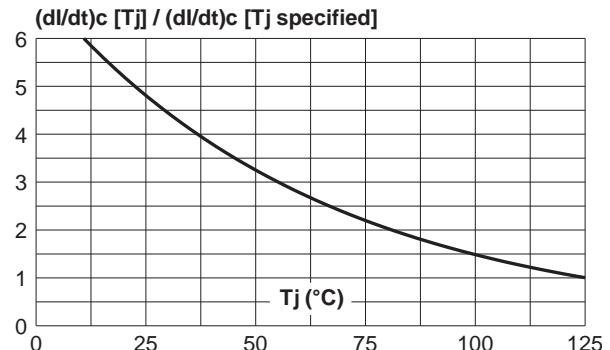
**Fig. 10:** D<sup>2</sup>PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness:  $35\text{ }\mu\text{m}$ ).



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

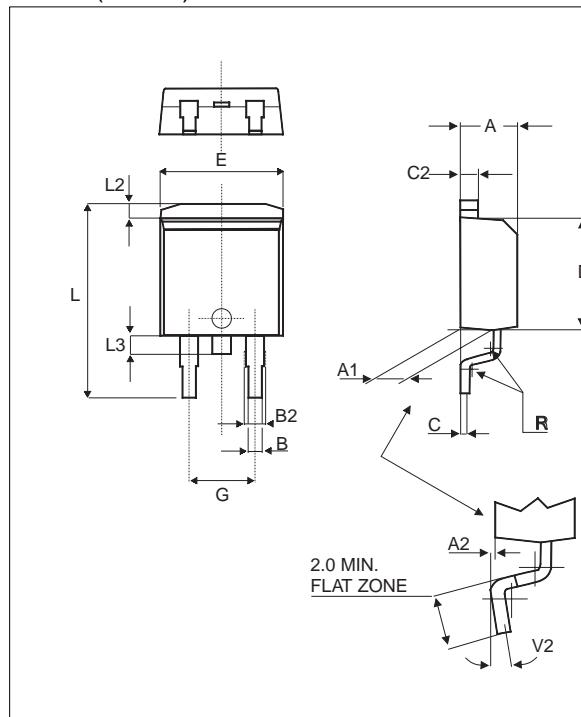


**Fig. 9:** Relative variation of critical rate of decrease of main current versus junction temperature.



**PACKAGE MECHANICAL DATA**

D<sup>2</sup>PAK (Plastic)

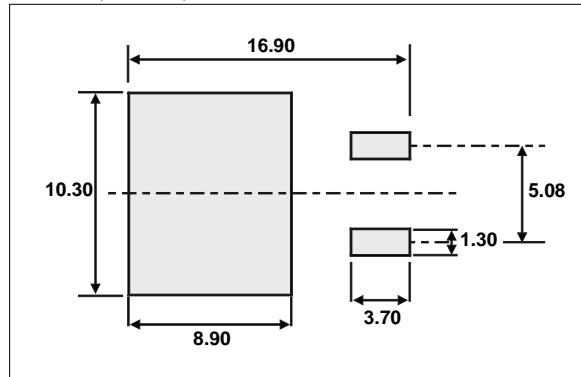


The technical drawing illustrates the physical dimensions of the D<sup>2</sup>PAK package. It includes three views: a top view showing lead spacing (E), lead height (L), lead thickness (L2), lead width (G), and lead height (L3); a side view showing lead height (A), lead thickness (C2), lead width (D), lead height (A1), lead width (B), lead height (C), lead width (R), and lead height (V2); and a bottom view showing lead height (A2) and lead width (2.0 MIN. FLAT ZONE).

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.169		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.037
B2	1.25	1.40		0.048	0.055	
C	0.45		0.60	0.017		0.024
C2	1.21		1.36	0.047		0.054
D	8.95		9.35	0.352		0.368
E	10.00		10.28	0.393		0.405
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.40	0.050		0.055
L3	1.40		1.75	0.055		0.069
R		0.40			0.016	
V2	0°		8°	0°		8°

**FOOTPRINT DIMENSIONS (in millimeters)**

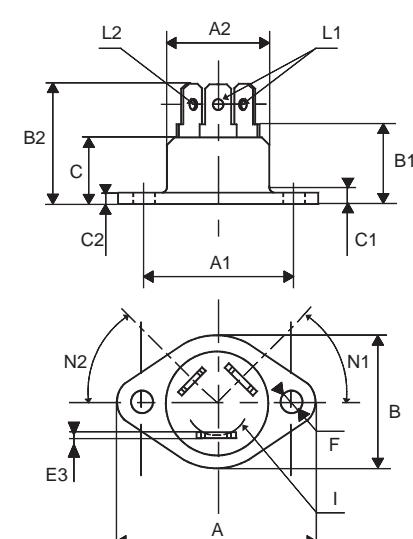
D<sup>2</sup>PAK (Plastic)



## BTA/BTB24, BTA25, BTA26 and T25 Series

### PACKAGE MECHANICAL DATA

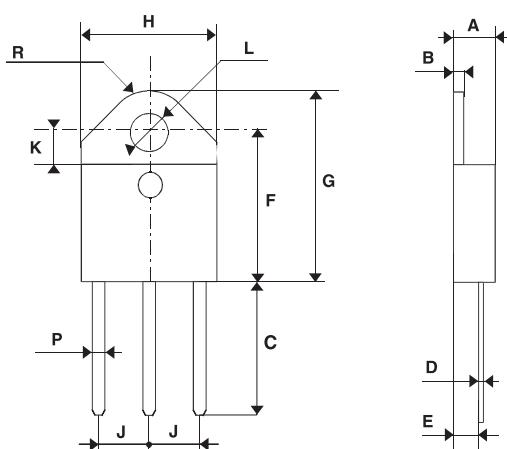
RD91 (Plastic)



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
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°

### PACKAGE MECHANICAL DATA

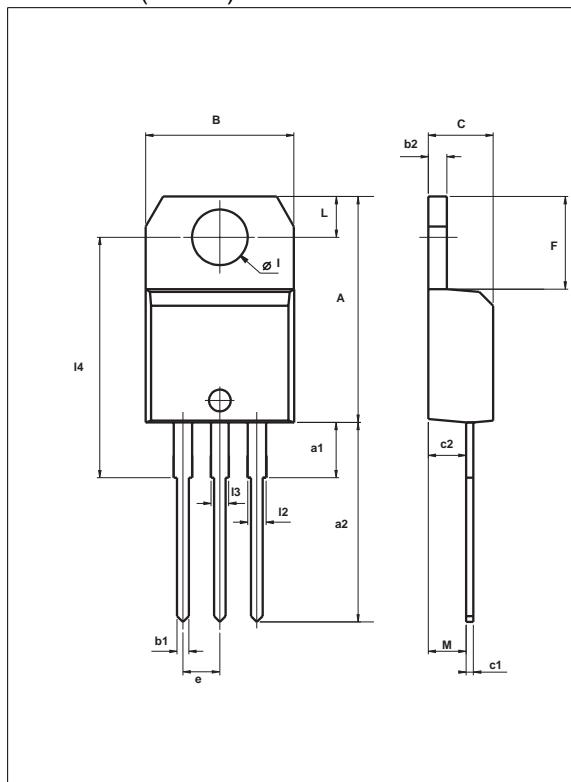
TOP3 (Plastic)



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
L	4.08		4.17	0.161		0.164
P	1.20		1.40	0.047		0.055
R		4.60			0.181	

**PACKAGE MECHANICAL DATA**

TO-220AB (Plastic)



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
I	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2002 STMicroelectronics - Printed in Italy - All Rights Reserved

STMicroelectronics GROUP OF COMPANIES  
 Australia - Brazil - Canada - China - Finland - France - Germany  
 Hong Kong - India - Isreal - Italy - Japan - Malaysia - Malta - Morocco - Singapore  
 Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>



This datasheet has been download from:

[www.datasheetcatalog.com](http://www.datasheetcatalog.com)

Datasheets for electronics components.