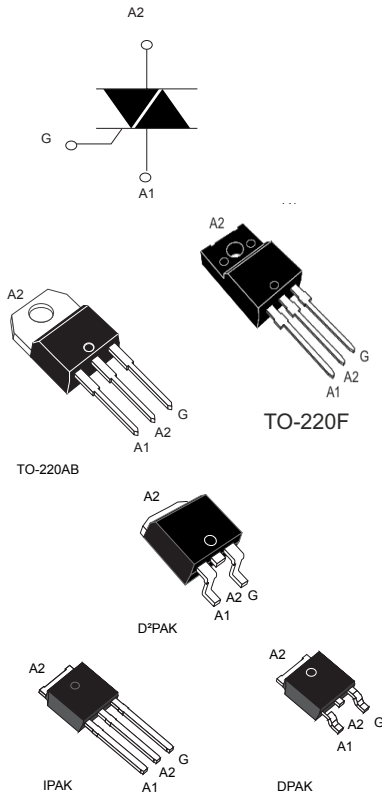


Snubberless, logic level and standard 8 A Triacs



Features

- On-state rms current, $I_{T(RMS)}$ 8 A
- Repetitive peak off-state voltage, V_{DRM} / V_{RRM} 600 V to 800 V
- Triggering gate current, I_{GT} 5 to 50 mA

Description

Available either in through-hole and surface-mount packages, these devices are 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 and motor speed controllers, etc.

The Snubberless versions (BTA, BTB08_XXXXW and T8 series) are specially recommended for use on inductive loads, thanks to their high commutation performance.

Logic level versions are designed to interface directly with low power drivers such as Microcontrollers.

By using an internal ceramic pad, the BTA series provide voltage insulated tab (rated at 2500 V_{RMS}).

Figure 1. Ordering information scheme (BTA08 and BTB08 series)

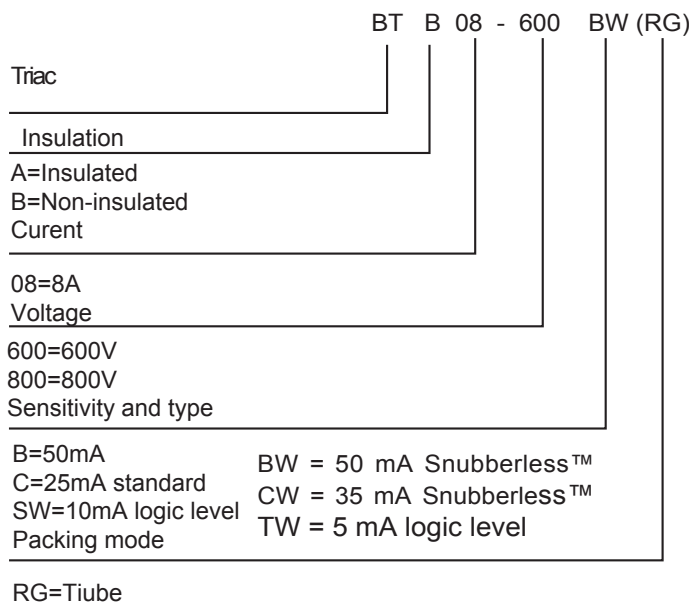
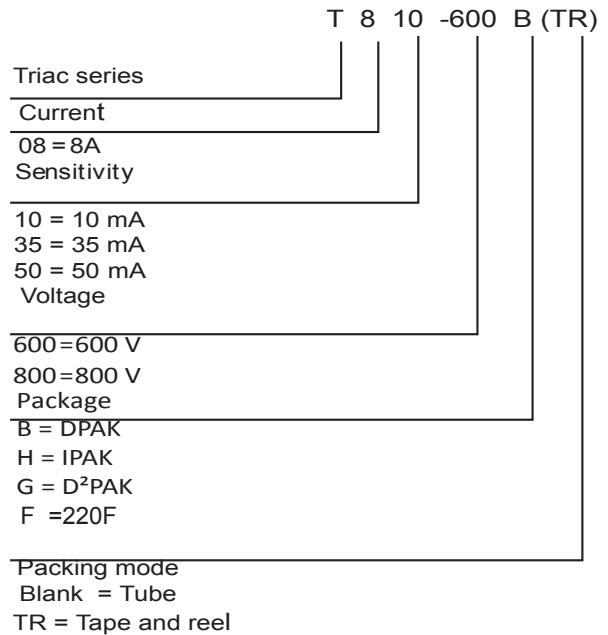


Figure 2. Ordering information scheme (T8series)



1 Characteristics

Table 1. Absolute maximum ratings ($T_j = 25\text{ °C}$ unless otherwise stated)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	IPAK, DPAK, TO-220AB, D ² PAK	$T_c = 110\text{ °C}$	8	A
		TO-220AB Ins.	$T_c = 100\text{ °C}$		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	$f = 50\text{ Hz}$	$t = 20\text{ ms}$	80	A
		$f = 60\text{ Hz}$	$t_p = 16.7\text{ ms}$	84	
I^2t	I^2t value for fusing		$t_p = 10\text{ ms}$	36	A ² s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	$f = 120\text{ Hz}$	$T_j = 125\text{ °C}$	50	A/ μ s
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu$ s	$T_j = 125\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ °C}$	1	W
T_{stg}	Storage junction temperature range			-40 to +150	$^{\circ}$ C
T_j	Operating junction temperature range			-40 to +125	$^{\circ}$ C

Table 2. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified) Snubberless and logic level (3 quadrants)

Symbol	Parameter	Quadrant		T8			BTA08BTB08				Unit
				10	35	50	TW	SW	CW	BW	
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$, $R_L = 30\text{ }\Omega$	I - II - III	Max.	10	35	50	5	10	35	50	mA
V_{GT}		I - II - III	Max.	1.2				V			
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$, $T_j = 125\text{ °C}$	I - II - III	Min.	0.2				V			
$I_H^{(2)}$	$I_T = 100\text{ mA}$	I - II - III	Max.	15	35	75	10	15	35	50	mA
I_L	$I_G = 1.2 \times I_{GT}$	I - III	Max.	25	50	70	10	25	50	70	mA
		II	Max.	30	60	110	15	30	60	80	
$dV/dt^{(2)}$	$V_D = 67\% V_{DRM}$, gate open, $T_j = 125\text{ °C}$		Max.	40	400	1000	20	40	400	1000	V/ μ s
$(di/dt)_c^{(2)}$	$(dV/dt)_c = 0.1\text{ V}/\mu$ s, $T_j = 125\text{ °C}$		Min.	5.4			3.5	5.4			A/ms
	$(dV/dt)_c = 10\text{ V}/\mu$ s, $T_j = 125\text{ °C}$		Min.	2.8			1.5	2.98			
	Without snubber, $T_j = 125\text{ °C}$		Min.		4.5	7			4.5	7	

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

2. For both polarities of A2 referenced to A1

Table 3. Standard (4 quadrants)

Symbol	Parameter	Quadrant		BTA08BTB08		Unit
				C	B	
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 33\ \Omega$	I - II - III	Max.	25	50	mA
		IV		50	100	
V_{GT}		All	Max.	1.3		V
V_{GD}	$V_D = V_{DRM}, R_L = 33\text{ k}\Omega, T_j = 125\text{ }^\circ\text{C}$	All	Min.	0.2		V
$I_H^{(2)}$	$I_T = 500\text{ mA}$	I - II - III	Max.	25	50	mA
I_L	$I_G = 1.2\ I_{GT}$	I - III - IV	Max.	40	50	mA
		II		80	100	
$dV/dt^{(2)}$	$V_D = 67\% V_{DRM}$ gate open, $T_j = 125\text{ }^\circ\text{C}$		Min.	200	400	V/ μs
$(dV/dt)_C^{(2)}$	$(dI/dt)_C = 3.5\text{ A/ms}, T_j = 125\text{ }^\circ\text{C}$		Min.	5	10	V/ μs

1. Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.
2. For both polarities of A2 referenced to A1

Table 4. Static electrical characteristics

Symbol	Test conditions			Value	Unit
$V_{TM}^{(1)}$	$I_{TM} = 11\text{ A}, t_p = 380\ \mu\text{s}$	$T_j = 25\text{ }^\circ\text{C}$	Max.	1.55	V
$V_{TO}^{(1)}$	threshold on-state voltage	$T_j = 125\text{ }^\circ\text{C}$	Max.	0.85	V
$R_D^{(1)}$	Dynamic resistance	$T_j = 125\text{ }^\circ\text{C}$	Max.	50	m Ω
$I_{DRM}\ I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ }^\circ\text{C}$	Max.	5	μA
		$T_j = 125\text{ }^\circ\text{C}$	Max.	1	mA

1. For both polarities of A2 referenced to A1

Table 5. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Max. junction to case thermal resistance (AC)		IPAK / D2PAK / DPAK / TO-220AB	$^\circ\text{C/W}$
			TO-220AB Insulated	
$R_{th(j-a)}$	Junction to ambient (typ.)	$S = 2\text{ cm}^2^{(1)}$	D ² PAK	45
		$S = 1\text{ cm}^2^{(1)}$	DPAK	70
	Junction to ambient (typ.)	TO-220AB / TO-220AB Insulated		60
		IPAK		100

1. S = Copper surface under tab.

1.1 Characteristics (curves)

Figure 3. Maximum power dissipation versus on-state RMS current (full cycle)

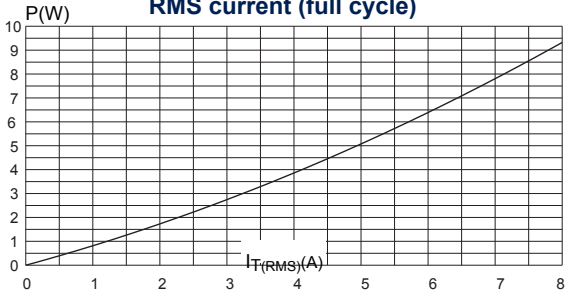


Figure 4. RMS on-state current versus ambient temperature (full cycle)

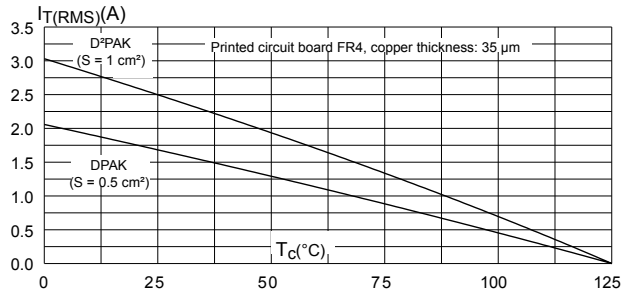


Figure 5. On-state characteristics (maximum values)

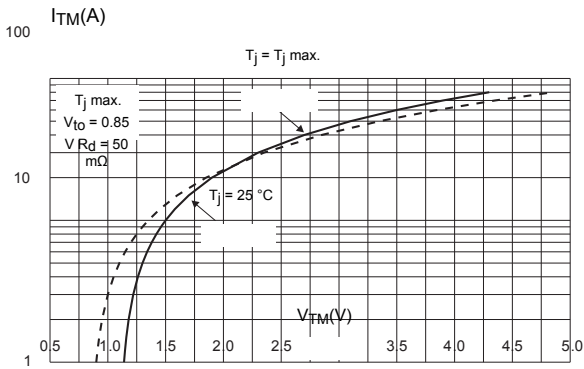


Figure 6. Surge peak on-state current versus number of cycles

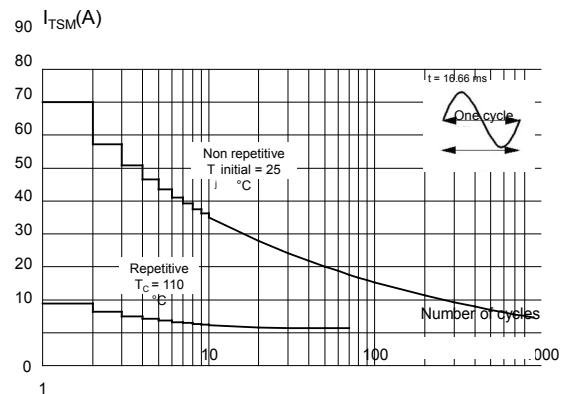


Figure 7. Non repetitive surge peak on-state current for a sinusoidal pulse (t_p < 10 ms)

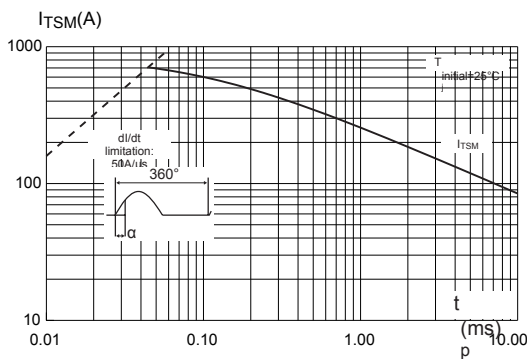
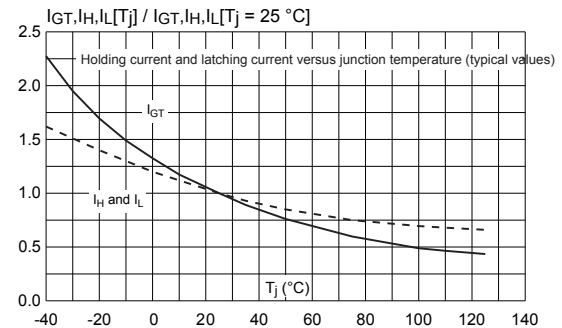


Figure 8. Relative variation of gate trigger current



2.1 DPAK package information

- Lead-free package
- Recommended torque: 0.4 to 0.6 N·m

Figure 9. DPAK package outline

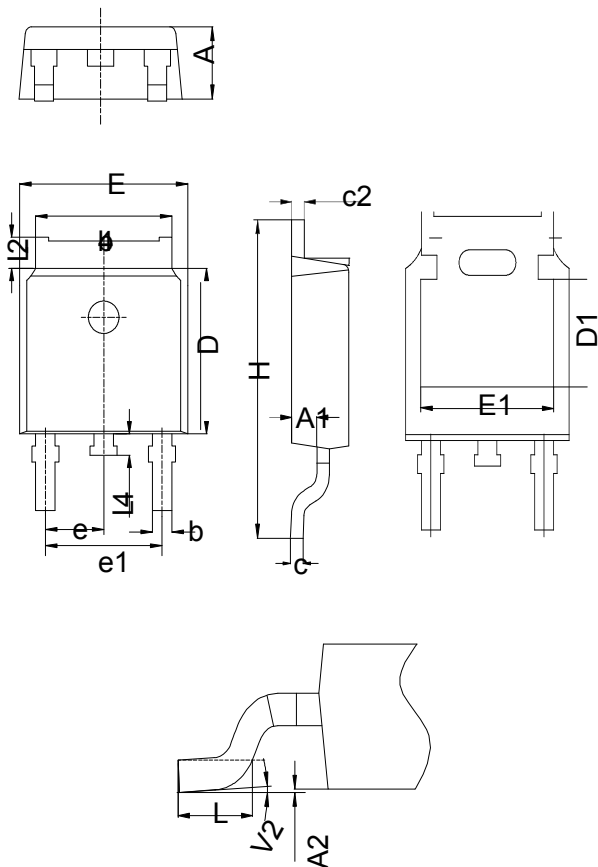


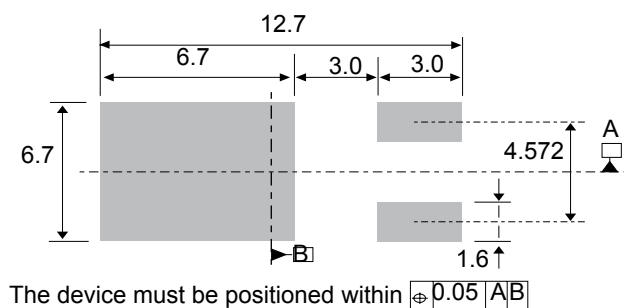
Table 6. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.0858		0.0945
A1	0.90		1.10	0.0354		0.0433
A2	0.03		0.23	0.0012		0.0091
b	0.64		0.90	0.0252		0.354
b4	4.95		5.46	0.1949		0.2150
c	0.46		0.61	0.0181		0.0240
c2	0.46		0.60	0.0181		0.0236
D	5.97		6.22	0.2350		0.2449
D1	5.10			0.2008		
E	6.35		6.73	0.2500		0.2650
E1	4.32			0.1701		
e		2.29			0.0900	
e1		4.57			0.1800	
H	9.35		10.40	0.3681		0.4094
L	1.00		1.78	0.0394		0.0701
L2			1.27			0.0500
L4	0.60		1.02	0.0236		0.0402
V2	0°		+8°	0°		+8°

1. Dimensions in inches are given for reference only

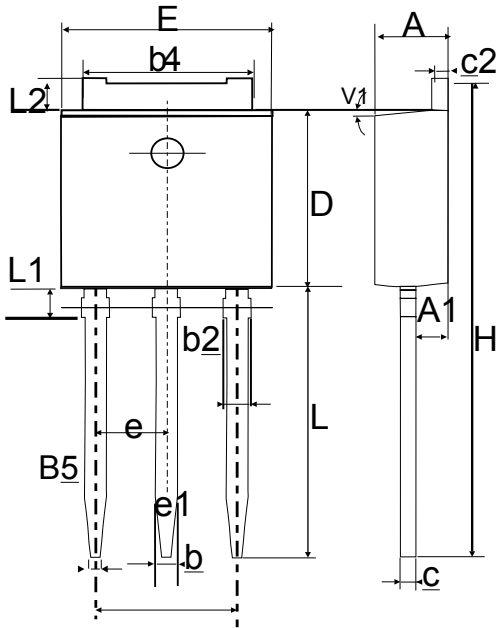
Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Figure 10. DPAK recommended footprint (dimensions are in mm)



2.2 IPAK package information

Figure 11. IPAK package outline



Note:

This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

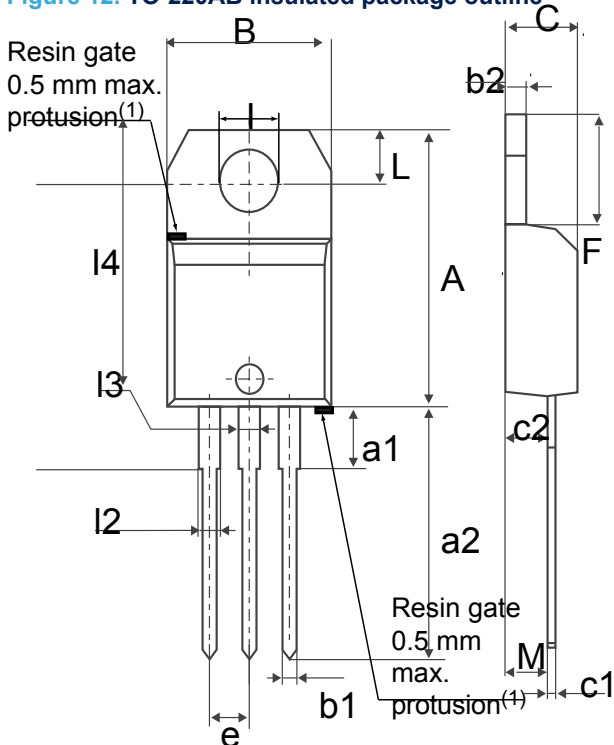
Table 7. IPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.0866		0.0945
A1	0.90		1.10	0.0354		0.0433
b	0.64		0.90	0.0252		0.0354
b2			0.95			0.0374
b4	5.20		5.43	0.2047		0.2138
B5		0.30			0.0118	
c	0.45		0.60	0.0177		0.0236
c2	0.46		0.60	0.0181		0.0236
D	6.00		6.20	0.2362		0.2441
E	6.40		6.65	0.2520		0.2618
e		2.28			0.0898	
e1	4.40		4.60	0.1732		0.1811
H		16.10			0.6339	
L	9.00		9.60	0.3545		0.3780
L1	0.80		1.20	0.0315		0.0472
L2		0.80	1.25		0.0315	0.0492
V1		10°			10°	

1. Inch dimensions are for reference only.

2.3 TO-220AB insulated package information

Figure 12. TO-220AB insulated package outline



(1) Resin gate position accepted in one of the two positions or in the symmetrical opposites.

Table 8. TO-220AB insulated package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.5984		0.6260
a1		3.75			0.1476	
a2	13.00		14.00	0.5118		0.5512
B	10.00		10.40	0.3937		0.4094
b1	0.61		0.88	0.0240		0.0346
b2	1.23		1.32	0.0484		0.0520
C	4.40		4.60	0.1732		0.1811
c1	0.49		0.70	0.0193		0.0276
c2	2.40		2.72	0.0945		0.1071
e	2.40		2.70	0.0945		0.1063
F	6.20		6.60	0.2441		0.2598
I	3.73		3.88	0.1469		0.1528
L	2.65		2.95	0.1043		0.1161
I2	1.14		1.70	0.0449		0.0669
I3	1.14		1.70	0.0449		0.0669
I4	15.80	16.40	16.80	0.6220	0.6457	0.6614
M		2.6			0.1024	

1. Inch dimensions are for reference only.

2.4 D²PAK package information

Figure 13. D²PAK package outline

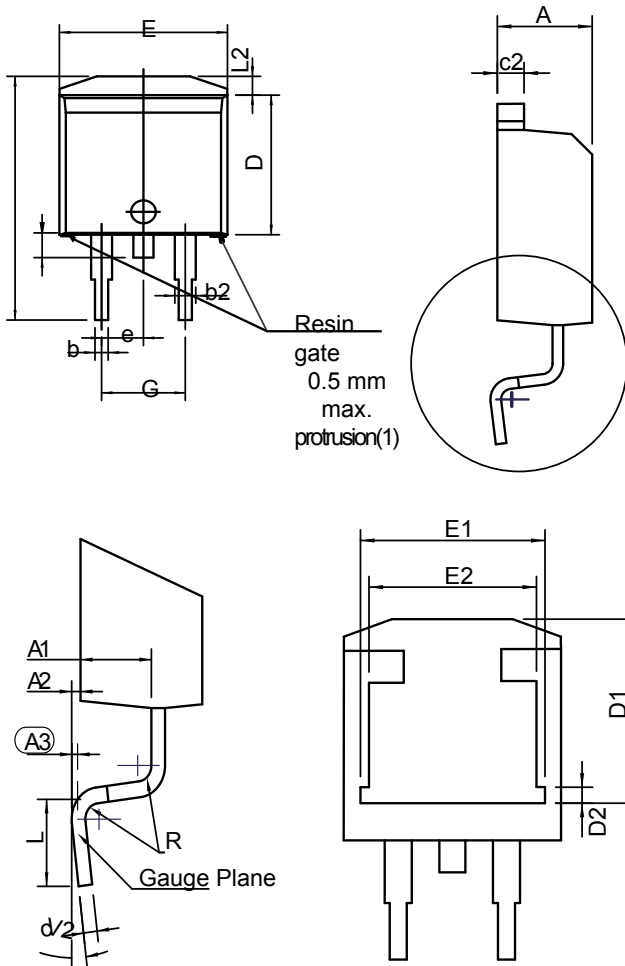


Table 9. D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.1693		0.1811
A1	2.49		2.69	0.0980		0.1059
A2	0.03		0.23	0.0012		0.0091
A3		0.25			0.0098	
b	0.70		0.93	0.0276		0.0366
b2	1.25		1.7	0.0492		0.0669
c	0.45		0.60	0.0177		0.0236
c2	1.21		1.36	0.0476		0.0535
D	8.95		9.35	0.3524		0.3681
D1	7.50		8.00	0.2953		0.3150
D2	1.30		1.70	0.0512		0.0669
e	2.54			0.1		
E	10.00		10.28	0.3937		0.4047
E1	8.30		8.70	0.3268		0.3425
E2	6.85		7.25	0.2697		0.2854
G	4.88		5.28	0.1921		0.2079
H	15		15.85	0.5906		0.6240
L	1.78		2.28	0.0701		0.0898
L2	1.27		1.40	0.0500		0.0551
L3	1.40		1.75	0.0551		0.0689
R		0.40			0.0157	
V2	0°		8°	0°		8°

(1) Resin gate position accepted in one of the two positions or in the symmetrical opposites

1. Dimensions in inches are given for reference only

Figure 14. D²PAK recommended footprint (dimensions are in mm)

