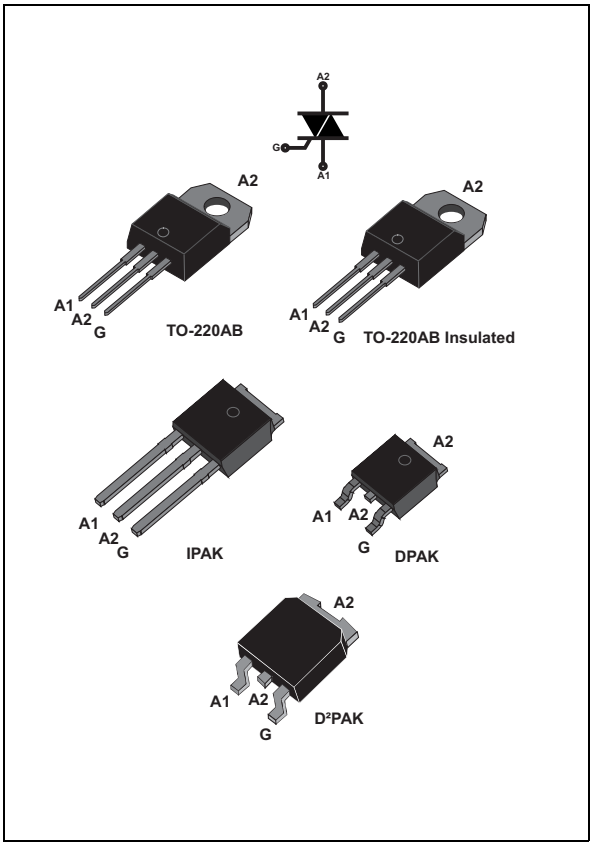
BTA08, BTB08, T810, T835

Snubberless™, logic level and standard 8 A Triacs

Datasheet – production data



Description

Available either in through-hole or surface-mount packages, the BTA08, BTB08, T810, T835 is suitable for general purpose AC switching. It 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 (BTABTB08_xxxxW and T8 series) are specially recommended for use on inductive loads, thanks to their high commutation performances.

Logic level versions are designed to interface directly with low power drivers such as micro-controller.

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

Features

- On-state rms current, $I_{T(RMS)}$ 8 A
- Repetitive peak off-state voltage, V_{DRM}/V_{RRM} 600 to 800 V
- Triggering gate current, $I_{GT\ (Q1)}$ 5 to 50 mA

1 Characteristics

Table 1. Absolute maximum ratings (T_j = 25 °C unless otherwise stated)

Symbol	Parameter			Value	Unit
$I_{T(rms)}$	On-state rms current (full sine wave)	IPAK, DPAK, TO-220AB	T_c = 110 °C	8	A
		TO-220ABIns.	T_c = 100 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	80	A
		F = 60 Hz	t = 16.7 ms	84	
I^2t	I^2t value for fusing		t_p = 10 ms	36	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
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	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 + 150	°C

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

Symbol	Test conditions	Quadrant		T8		BTA08 / BTB08				Unit
				T810	T835	TW	SW	CW	BW	
I_{GT} (1)	V_D = 12 V R_L = 30 Ω	I - II - III	MAX.	10	35	5	10	35	50	mA
V_{GT}		I - II - III	MAX.	1.3						V
V_{GD}	V_D = V_{DRM} R_L = 3.3 k Ω T_j = 125 °C	I - II - III	MIN.	0.2						V
I_H (2)	I_T = 100 mA		MAX.	15	35	10	15	35	50	mA
I_L	I_G = 1.2 I_{GT}	I - III	MAX.	25	50	10	25	50	70	mA
		II		30	60	15	30	60	80	
dV/dt (2)	V_D = 67% V_{DRM} gate open T_j = 125 °C		MIN.	40	400	20	40	400	1000	V/µs
$(dI/dt)_c$ (2)	$(dV/dt)_c$ = 0.1 V/µs T_j = 125 °C		MIN.	5.4	-	3.5	5.4	-	-	A/ms
	$(dV/dt)_c$ = 10 V/µs T_j = 125 °C			2.8	-	1.5	2.98	-	-	
	Without snubber T_j = 125 °C			-	4.5	-	-	4.5	7	

Table 3. Standard (4 quadrants)

Symbol	Test conditions	Quadrant		BTA08 / BTB08		Unit
				C	B	
I_{GT} (1)	V_D = 12 V, R_L = 33 Ω	I - II - III IV	MAX.	25 50	50 100	mA
V_{GT}		ALL	MAX.	1.3		V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3 k Ω , T_j = 125 °C	ALL	MIN.	0.2		V
I_H (2)	I_T = 500 mA		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 °C	MIN.	200	400	V/µs
$(dV/dt)_c$ (2)	(dI/dt)c = 5.3 A/ms	T_j = 125 °C	MIN.	5	10	V/µs

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_{TM} (1)	I_{TM} = 11 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.	50	mΩ
I_{DRM}	$V_{DRM} = V_{RRM}$	T_j = 25 °C	MAX.	5	µA
I_{RRM}		T_j = 125 °C		1	mA

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

Table 5. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		IPAK / D^2PAK / DPAK / TO-220AB	1.6	°C/W
			TO-220AB Insulated	2.5	
$R_{th(j-a)}$	Junction to ambient	S = 1 cm^2	D^2PAK	45	°C/W
		S = 0.5 cm^2	DPAK	70	
			TO-220AB / TO-220AB Insulated	60	
			IPAK	100	

S = Copper surface under tab.

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

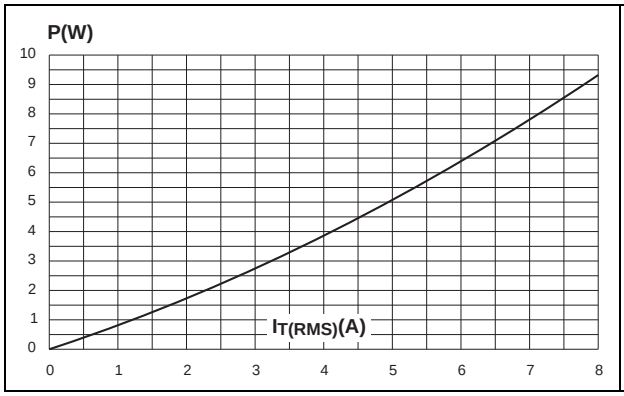


Figure 2. RMS on-state current versus case temperature (full cycle)

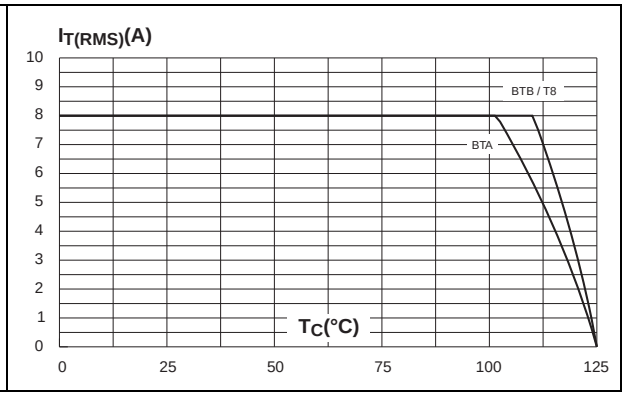


Figure 3. RMS on-state current versus ambient temperature (full cycle)

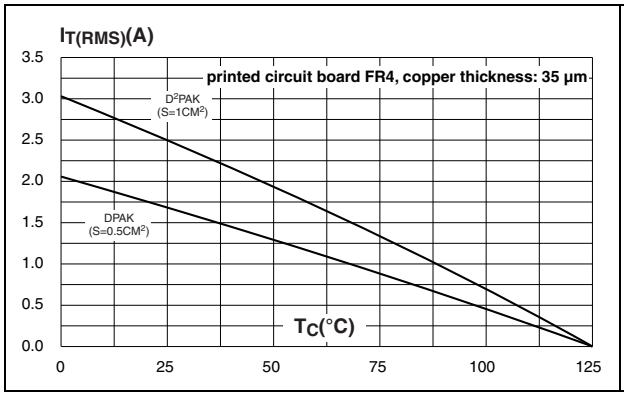


Figure 4. Relative variation of thermal impedance versus pulse duration

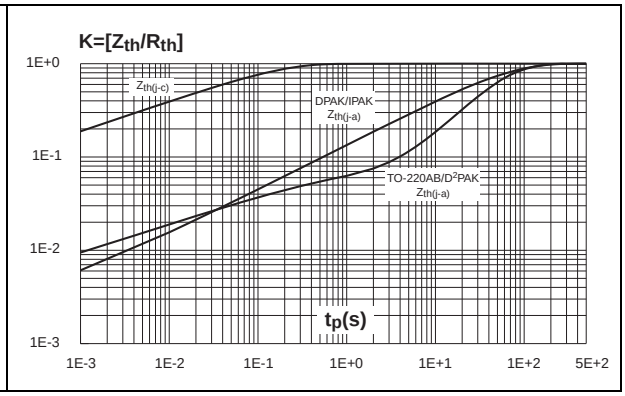


Figure 5. On-state characteristics (maximum values)

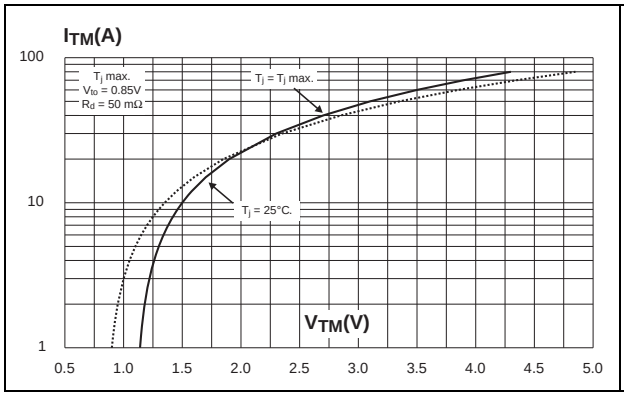


Figure 6. Surge peak on-state current versus number of cycles

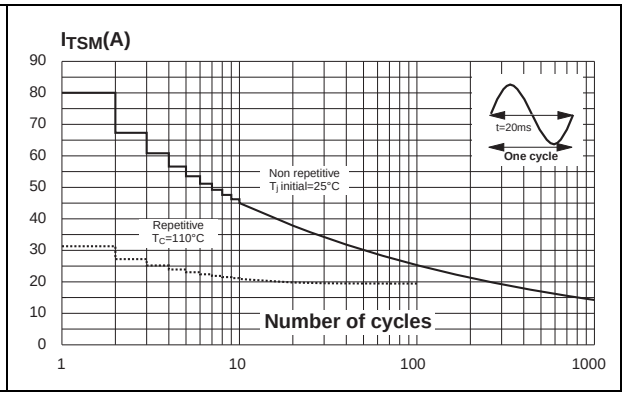


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal

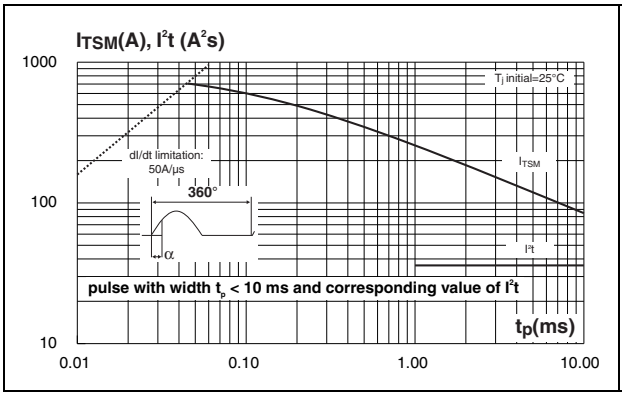


Figure 8. Relative variation of gate trigger current

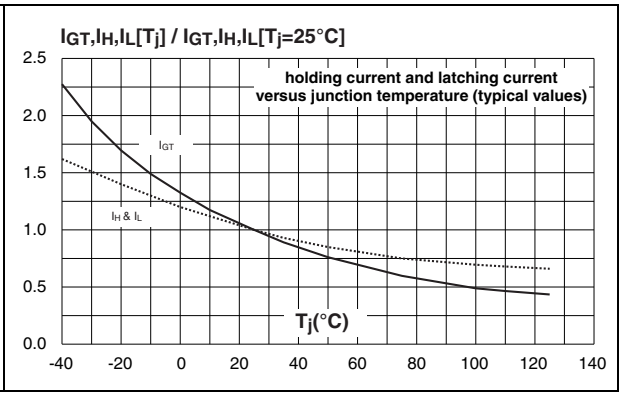


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

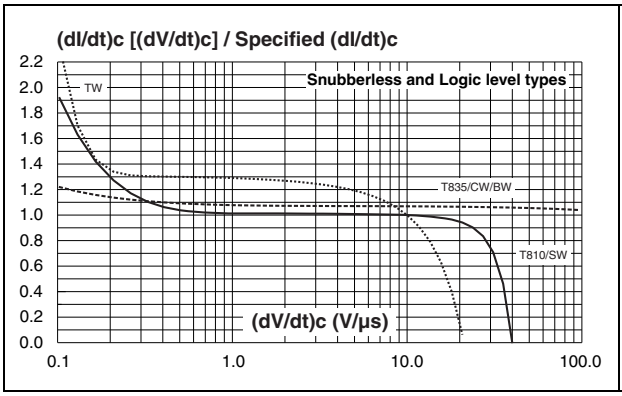


Figure 10. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

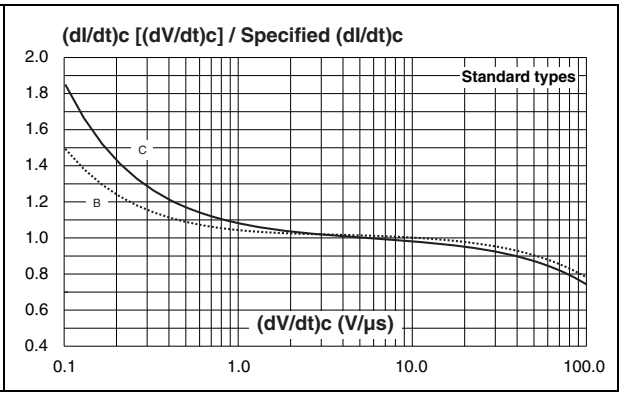


Figure 11. Relative variation of critical rate of decrease of main current versus junction temperature

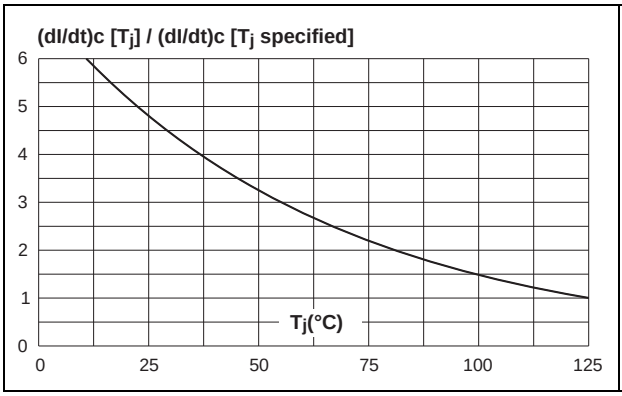
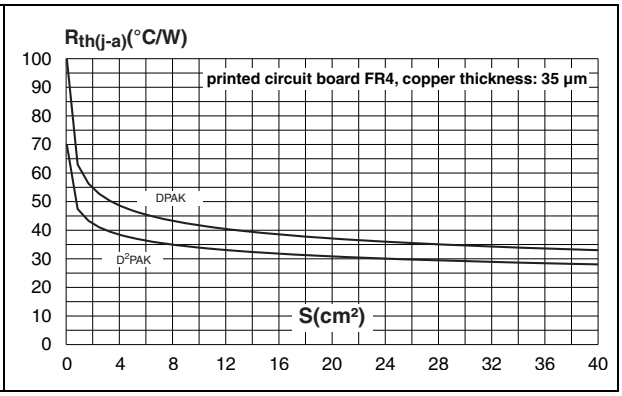


Figure 12. DPAK and D²PAK thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque: 0.4 to 0.6 N·m

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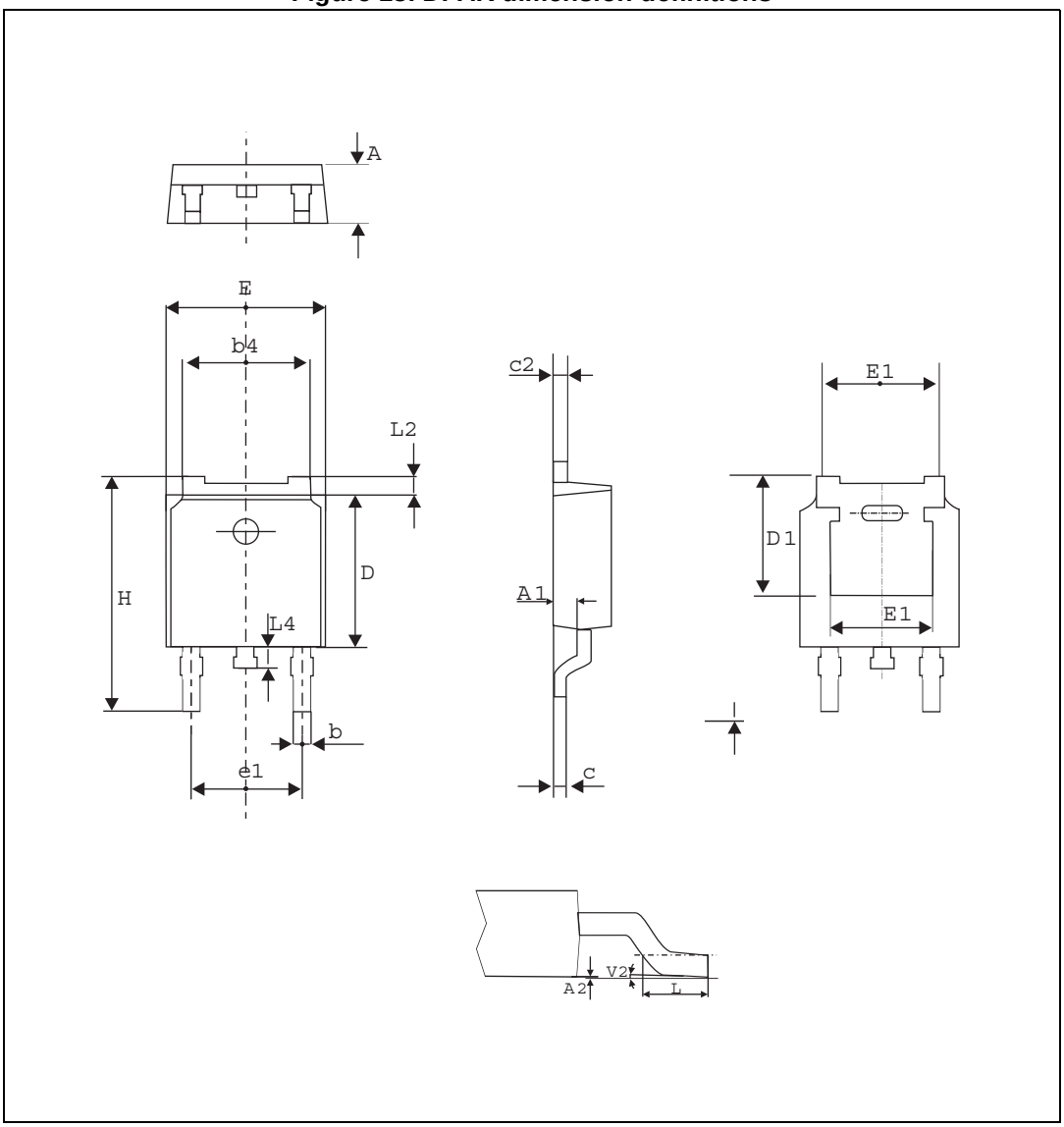
Figure 13. DPAK dimension definitions



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

Table 6. DPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.195		0.215
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	5.10			0.201		
E	6.35		6.73	0.250		0.264
E1		4.32			0.170	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2			1.27			0.05
L4	0.60		1.02	0.023		0.040
V2	0°		8°	0°		8°

Figure 14. Footprint (dimensions in mm)

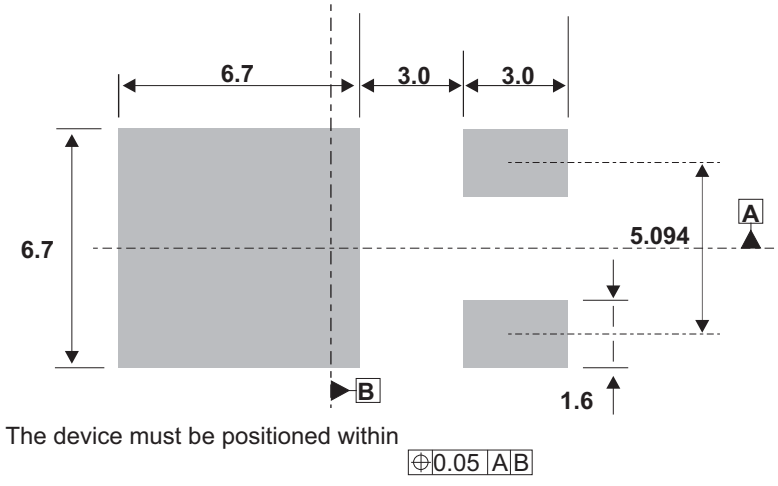
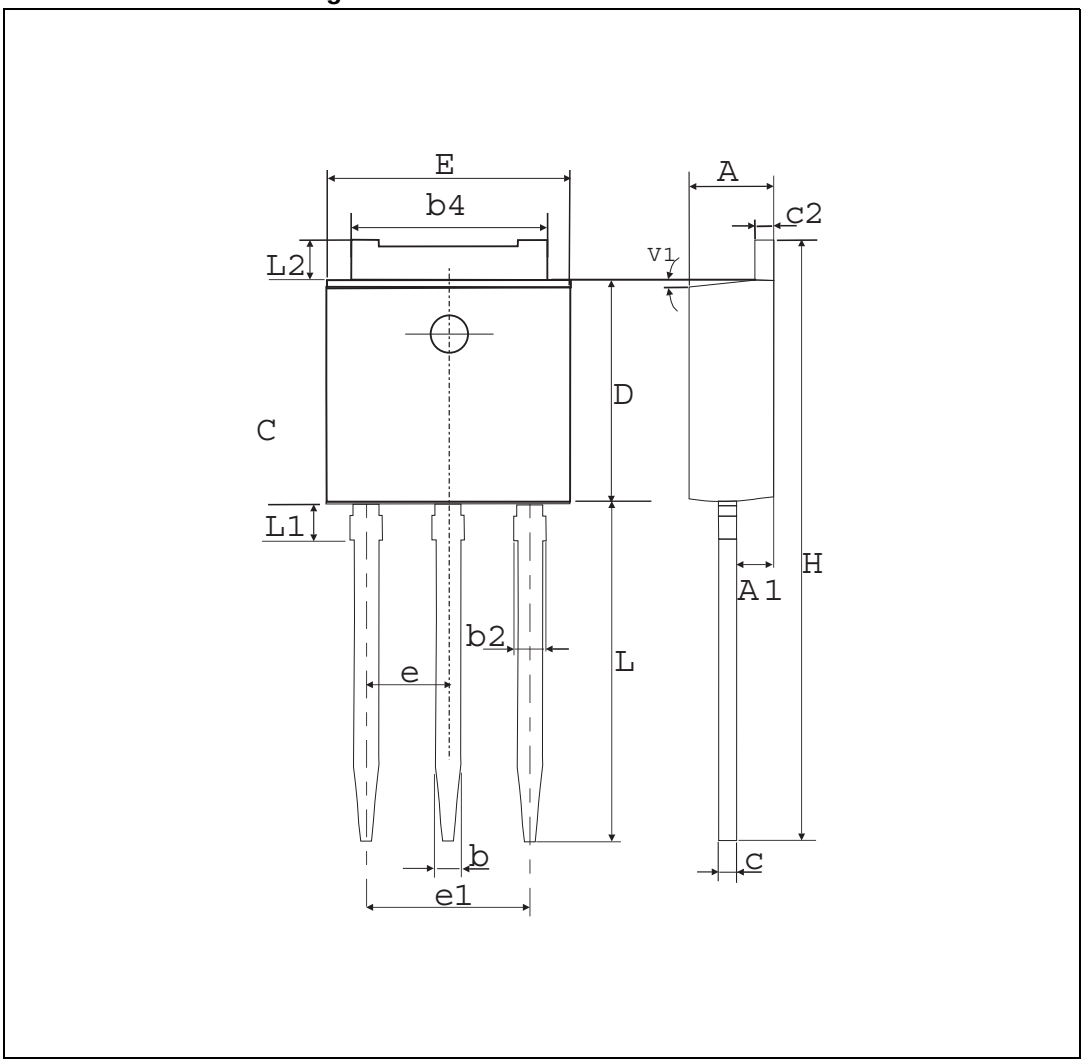


Figure 15. IPAK dimension definitions



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

Table 7. IPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43	0.204		0.213
c	0.45		0.60	0.017		0.023
c2	0.46		0.60	0.018		0.023
D	6		6.20	0.236		0.244
E	6.40		6.70	0.252		0.263
e		2.28			0.090	
e1	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.60	0.354		0.377
L1	0.8		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
V1		10°			10°	

Figure 16. TO-220AB (NIns. & Ins. 20-up) dimension definitions

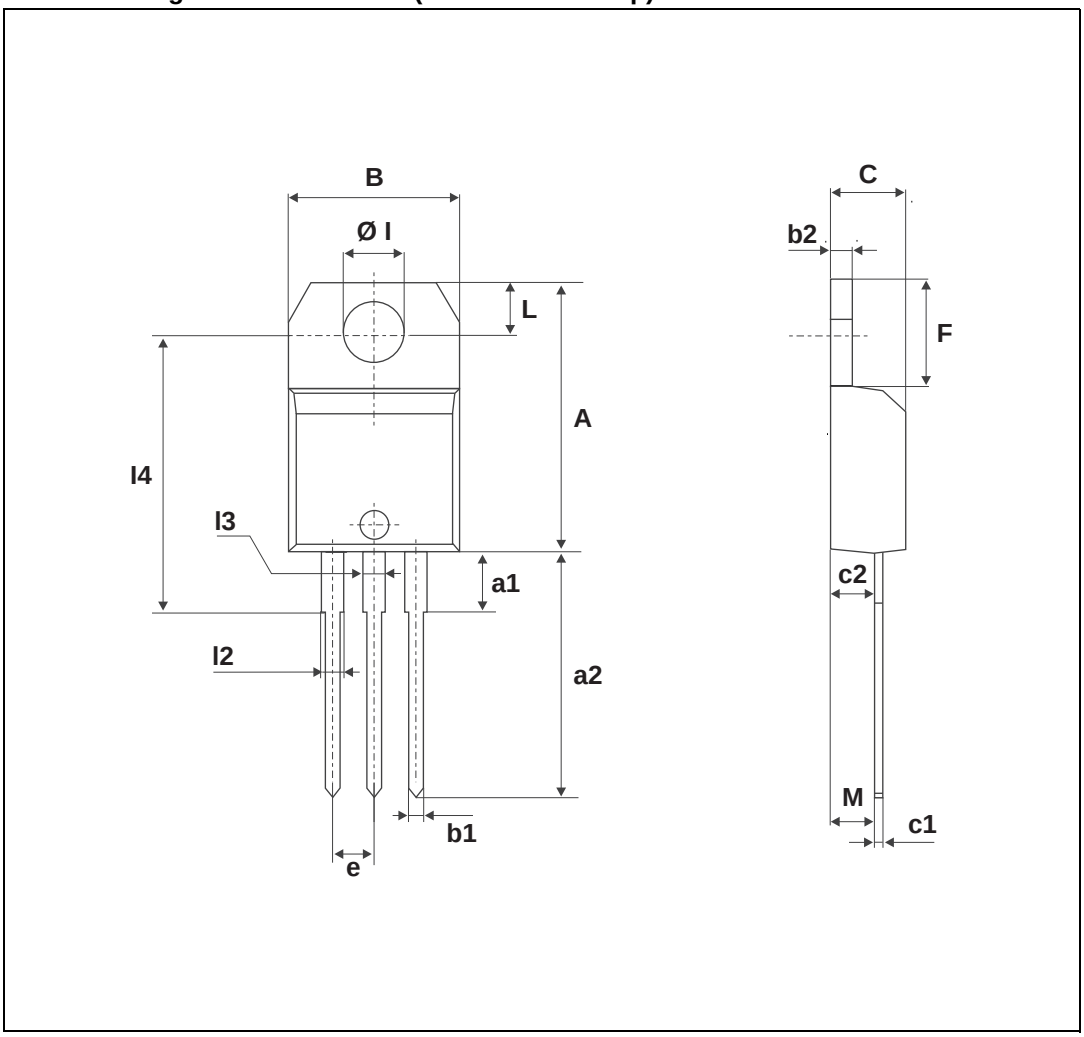


Table 8. TO-220AB (NIns. & Ins. 20-up) dimension values

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
ØI	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	

Figure 17. D^{2}PAK dimension definitions

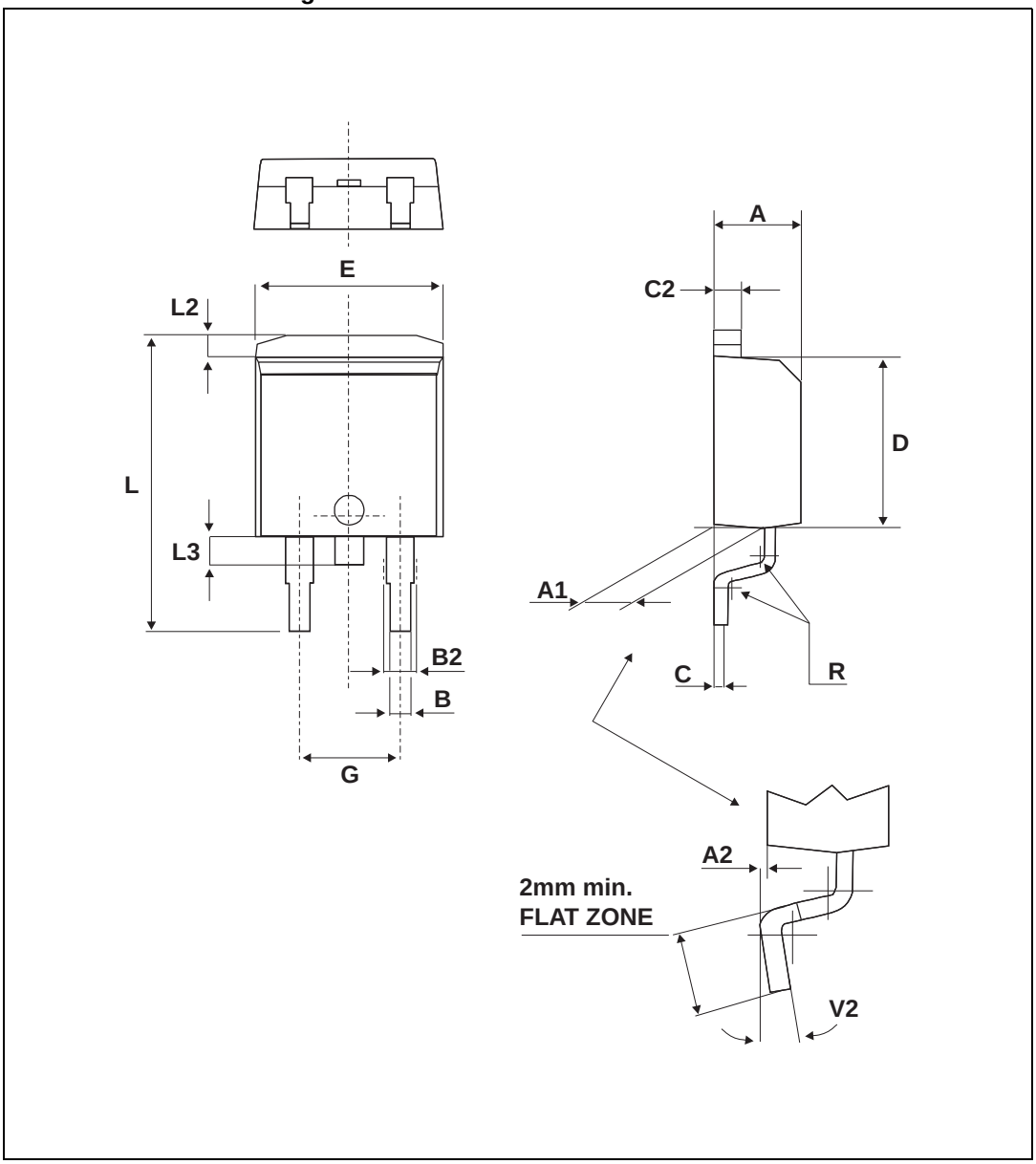
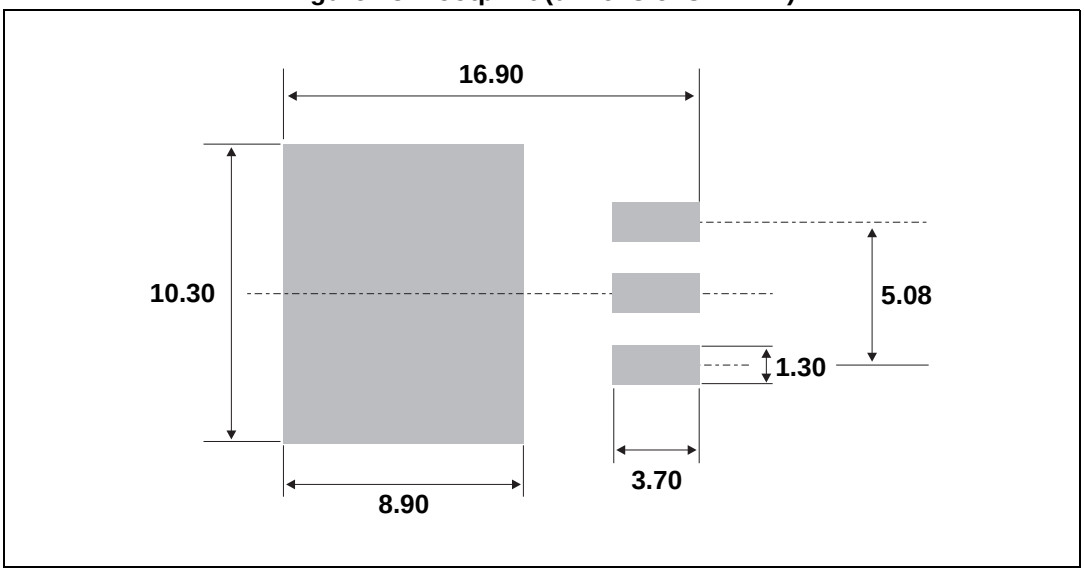


Table 9. D^2PAK dimension values

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°

Figure 18. Footprint (dimensions in mm)



3 Ordering information

Figure 19. Ordering information scheme (BTA08 and BTB08 series)

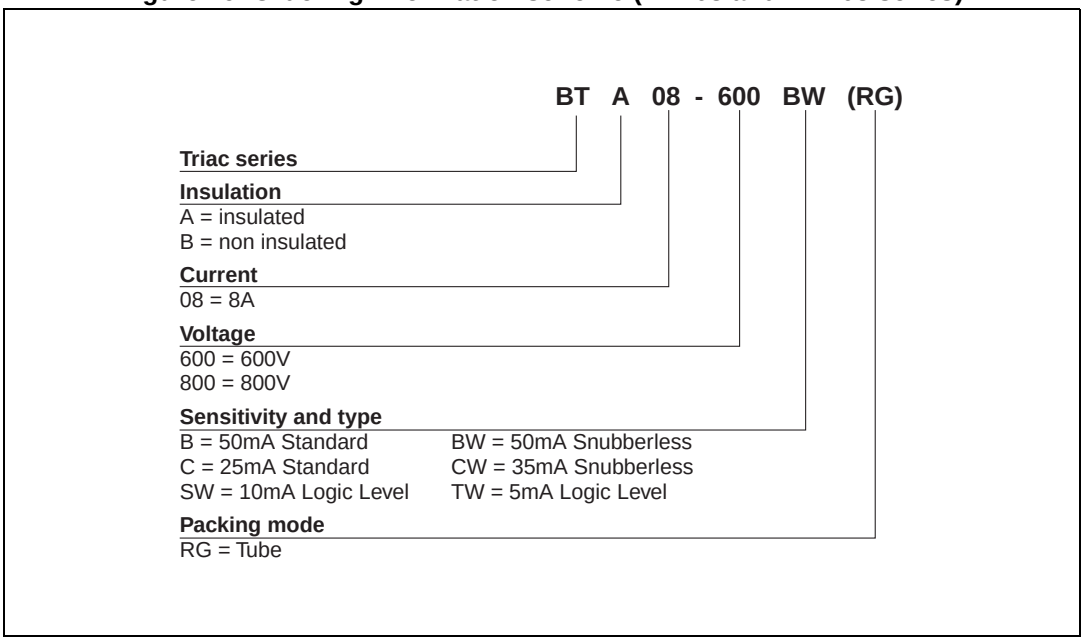


Figure 20. Ordering information scheme (T8 series)

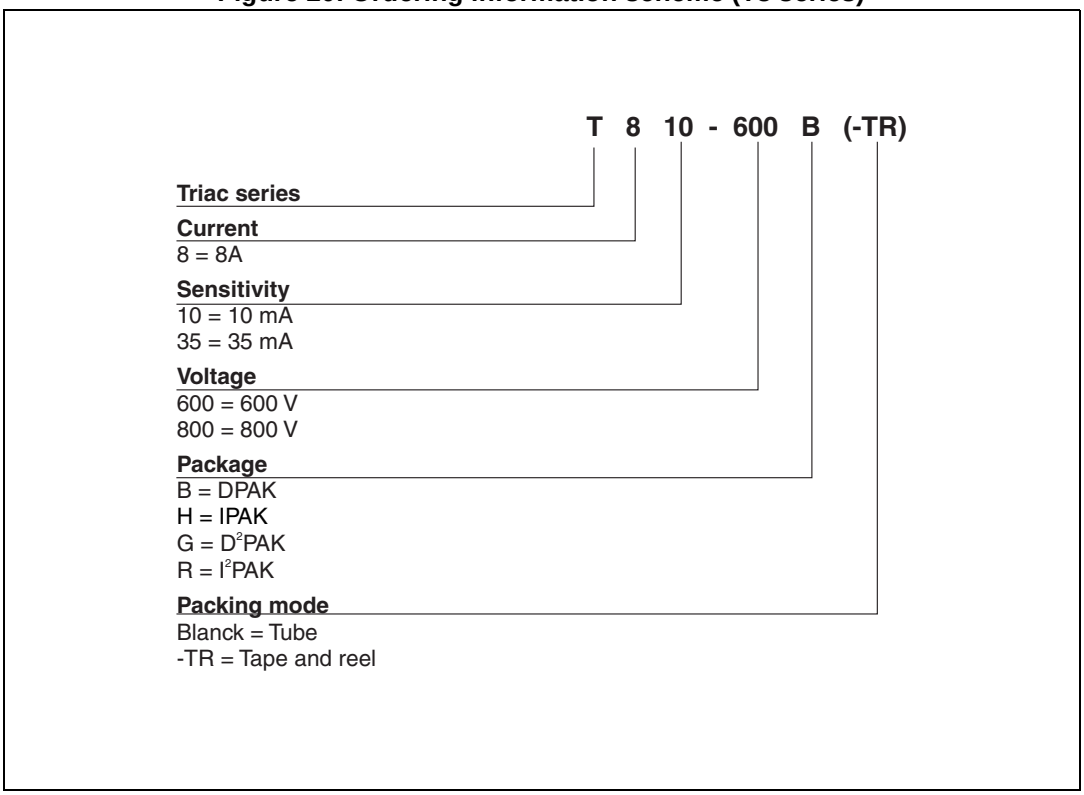


Table 10. Product selector

Part Number	Voltage (xxx)		Sensitivity	Type	Package
	600 V	800 V			
BTA/BTB08-xxxB	X	X	50 mA	Standard	TO-220AB
BTA/BTB08-xxxBW	X	X	50 mA	Snubberless	TO-220AB
BTA/BTB08-xxxC	X	X	25 mA	Standard	TO-220AB
BTA/BTB08-xxxCW	X	X	35 mA	Snubberless	TO-220AB
BTA/BTB08-xxxSW	X	X	10 mA	Logic level	TO-220AB
BTA/BTB08-xxxTW	X	X	5 mA	Logic Level	TO-220AB
T810-xxxG	X	X	10 mA	Logic Level	D^2PAK
T810-xxxH	X	X	10 mA	Logic Level	IPAK
T835-xxxB	X	X	35 mA	Snubberless	DPAK
T835-xxxG	X	X	35 mA	Snubberless	D^2PAK
T835-xxxH	X	X	35 mA	Snubberless	IPAK

BTB: non insulated TO-220AB package

xxx = voltage, y (y) = sensitivity, z = type

Table 11. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T810-600G	T810-600	D^2PAK	1.5 g	50	Tube
T835-600G	T835-600				
T810-800G	T810-800				
T835-800G	T835-800				
T810-600G-TR	T810-600				Tape and reel
T835-600G-TR	T835-600				
T810-800G-TR	T810-800				
T835-800G-TR	T835-800				
T835-600B	T835-600	DPAK	0.3 g	75	Tube
T835-800B	T835-800				
T810-600H	T810-600	IPAK	0.4 g	75	Tube
T835-600H	T835-600				
T810-800H	T810-800				
T835-800H	T835-800				

Table 11. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BTA08-800SWRG	BTA08-800SW	TO-220AB	2.3 g	50 g	Tube
BTB08-600SWRG	BTB08-600SW				
BTB08-800SWRG	BTB08-800SW				
BTA08-600SWRG	BTA08-600SW				
BTA08-800CRG	BTA08-800C				
BTB08-600CRG	BTB08-600C				
BTB08-800CRG	BTB08-800C				
BTA08-600CRG	BTA08-600C				
BTA08-800CWRG	BTA08-800CW				
BTB08-600CWRG	BTB08-600CW				
BTB08-800CWRG	BTB08-800CW				
BTA08-600CWRG	BTA08-600CW				
BTA08-800TWRG	BTA08-800TW				
BTB08-600TWRG	BTB08-600TW				
BTB08-800TWRG	BTB08-800TW				
BTA08-600TWRG	BTA08-600TW				
BTA08-800BRG	BTA08-800B				
BTA08-800BWRG	BTA08-800BW				
BTB08-600BRG	BTB08-600B				
BTB08-600BWRG	BTB08-600BW				
BTB08-800BRG	BTB08-800B	TO-220AB	2.3 g	50	Tube
BTB08-800BWRG	BTB08-800BW				
BTA08-600BRG	BTA08-600B				
BTA08-600BWRG	BTA08-600BW				
T835-600B	T835-600	DPAK	0.3 g	2500	Tape and reel
T835-800B	T835-800				

4 Revision history

Table 12. Document revision history

Date	Revision	Changes
Apr-2002	5A	Last update.
13-Feb-2006	6	TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added.
10-Mar-2010	7	Updated ECOPACK statement and *Figure 20*
02-Jun-2014	8	Updated DPAK and IPAK package information and reformatted to current standard.

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