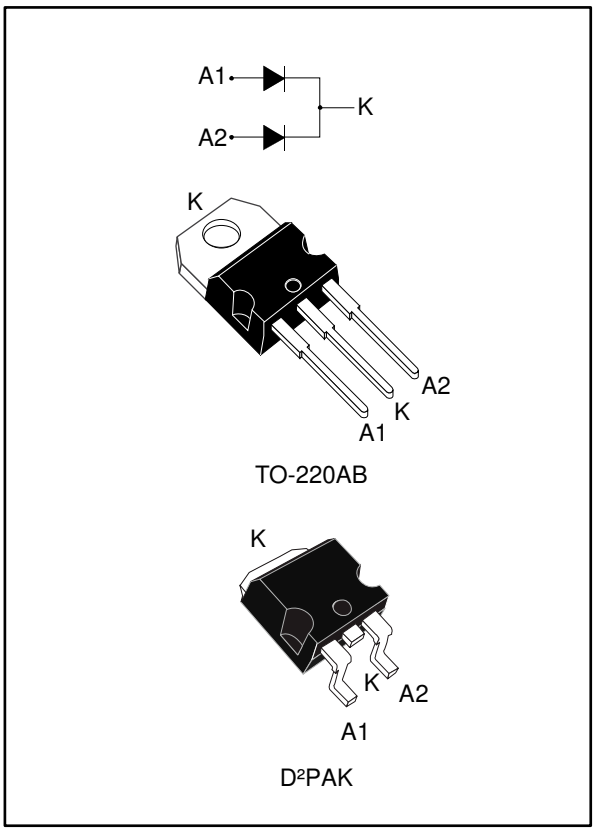
STTH16L06C-Y

Automotive Turbo 2 ultrafast high voltage rectifier

Datasheet - production data



Description

The STTH16L06C-Y is specially suited for use in switching power supplies as rectifier and discontinuous mode PFC boost diode for automotive applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 8 A
V_{RRM}	600 V
T_j	+175 °C
V_F (typ.)	1.05 V
t_{rr} (max.)	35 ns

Features

- AEC-Q101 qualified
- Low reverse recovery current
- Reduce switching and conduction losses
- Low thermal resistance
- Ultrafast switching
- PPAP capable
- ECOPACK®2 compliant component

This is information on a product in full production.

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_j = -40 °C to +175 °C		600	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 140 °C	Per diode	8	A
		T_C = 135 °C	Per device	16	
		T_C = 130 °C	Per diode	10	
		T_C = 120 °C	Per device	20	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		120	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature range			-40 to +175	°C

Table 3: Thermal parameters

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, D²PAK	Per diode	2.5	°C/W
			Total	1.6	
$R_{th(c)}$	Coupling			0.7	°C/W

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)}$ (per diode) + $P_{(diode2)} \times R_{th(c)}$

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		8	µA
		T_j = 150 °C		-	25	240	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 8 A	-		1.80	V
		T_j = 150 °C		-	1.05	1.35	
		T_j = 25 °C	I_F = 16 A	-		2.08	
		T_j = 150 °C		-	1.28	1.64	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 1.06 \times I_{F(AV)} + 0.036 \times I_{F^2(RMS)}$

Table 5: Dynamic electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A I_R = 1 A I_{rr} = 0.25 A	-		35	ns
			I_F = 1 A V_R = 30 V dI_F/dt = 50 A/µs	-	40	55	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 8 A V_R = 400 V dI_F/dt = 100 A/µs	-	4.5	6.5	A
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 8 A V_{FR} = 1.1 x $V_{Fmax.}$, dI_F/dt = 100 A/µs	-		200	ns
V_{FP}	Forward recovery voltage			-	3.5		V

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average forward current (per diode)

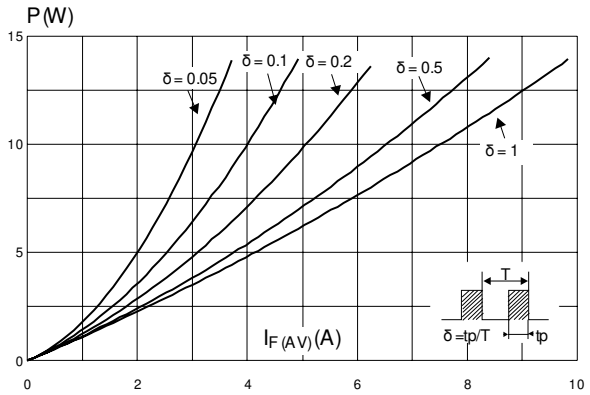


Figure 2: Forward voltage drop versus forward current (per diode)

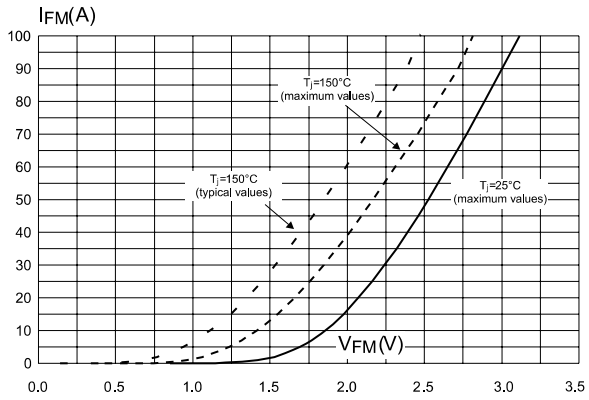


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

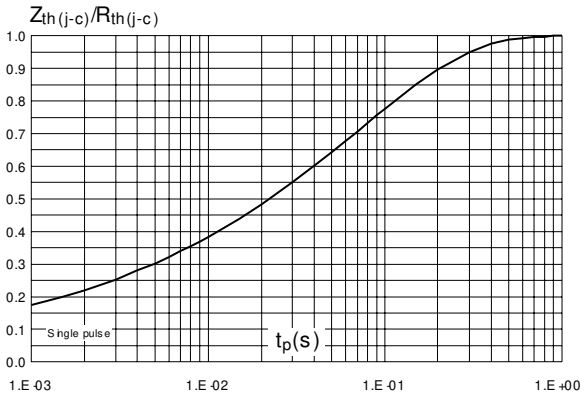


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

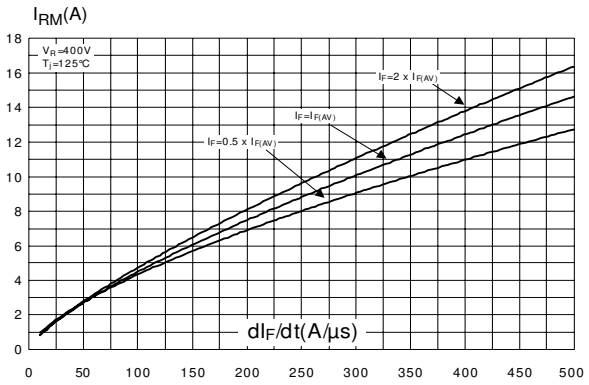


Figure 5: Reverse recovery time versus dI_F/dt (typical values, per diode)

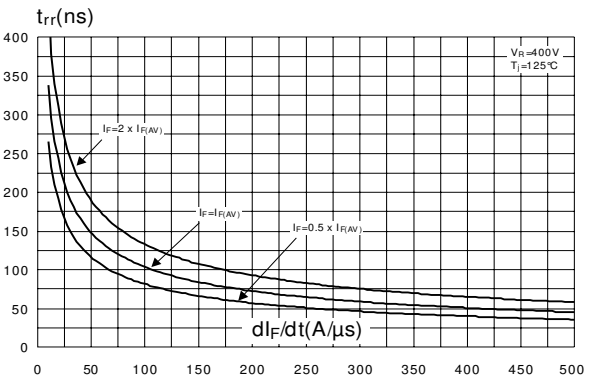


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)

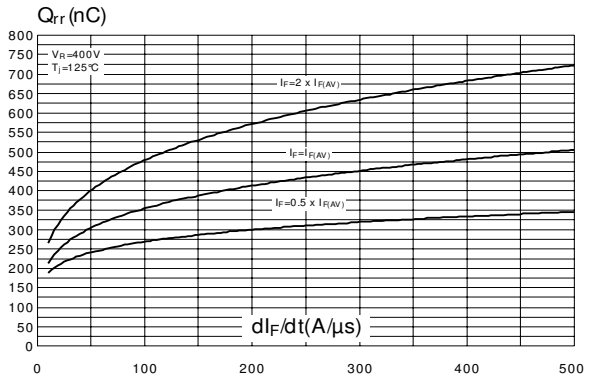


Figure 7: Relative variations of dynamic parameters versus junction temperature

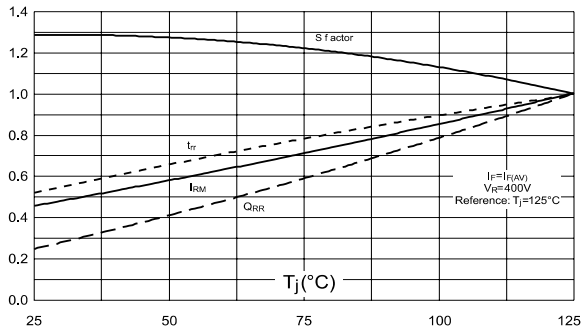


Figure 8: Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

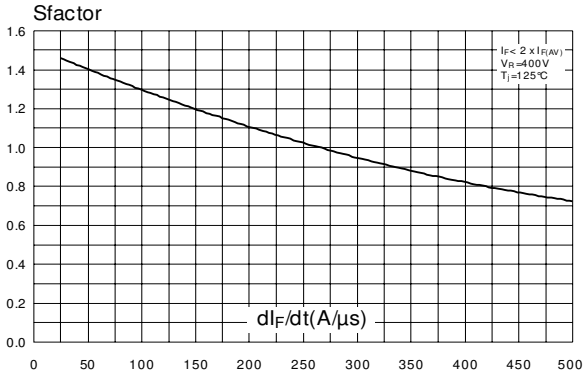


Figure 9: Forward recovery time versus dI_F/dt (typical values, per diode)

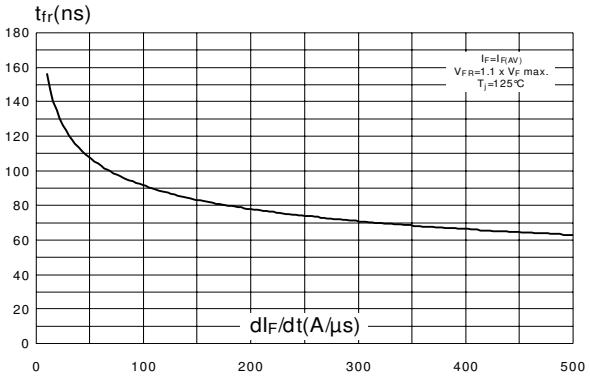


Figure 10: Transient peak forward voltage versus dI_F/dt (typical values, per diode)

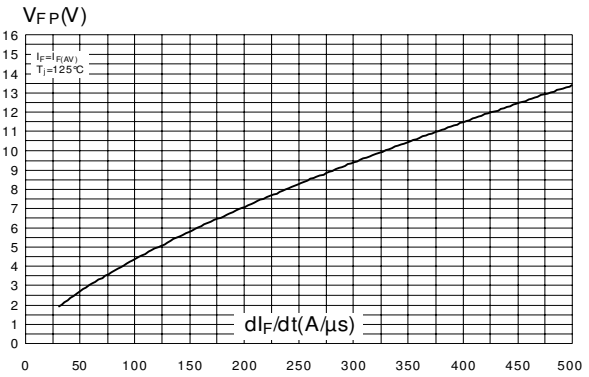


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

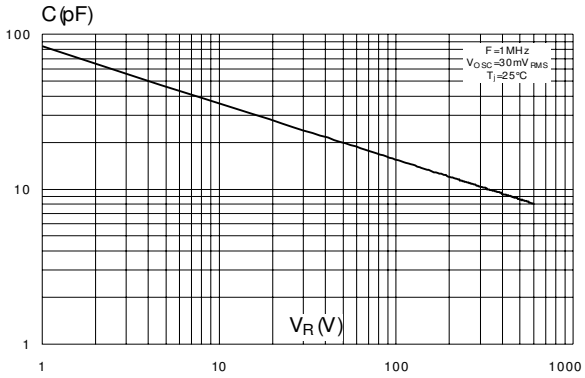
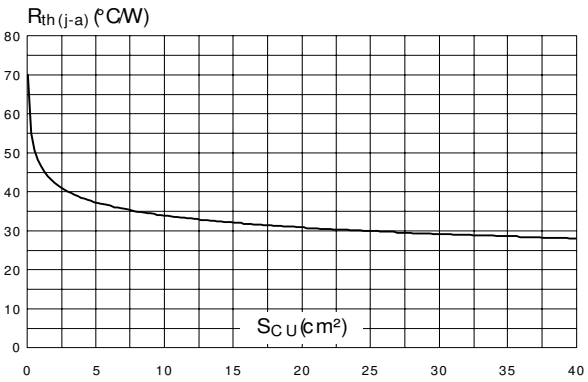


Figure 12: Thermal resistance, junction to ambient, versus copper surface under tab (epoxy FR4, coper thickness = 35 µm)(D2PAK)



2 Package information

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.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m (for TO-220AB)
- Maximum torque value: 0.7 N·m (for TO-220AB)

2.1 D²PAK package information

Figure 13: D²PAK package outline

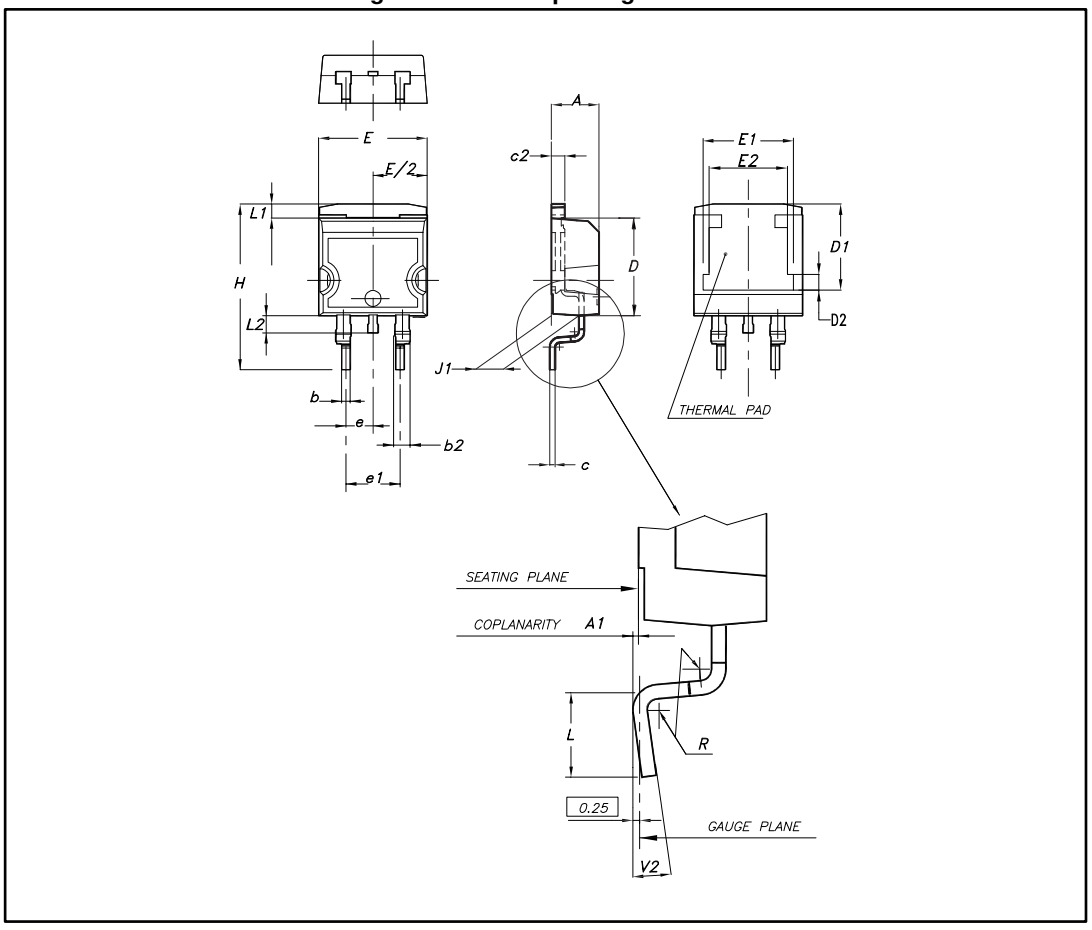
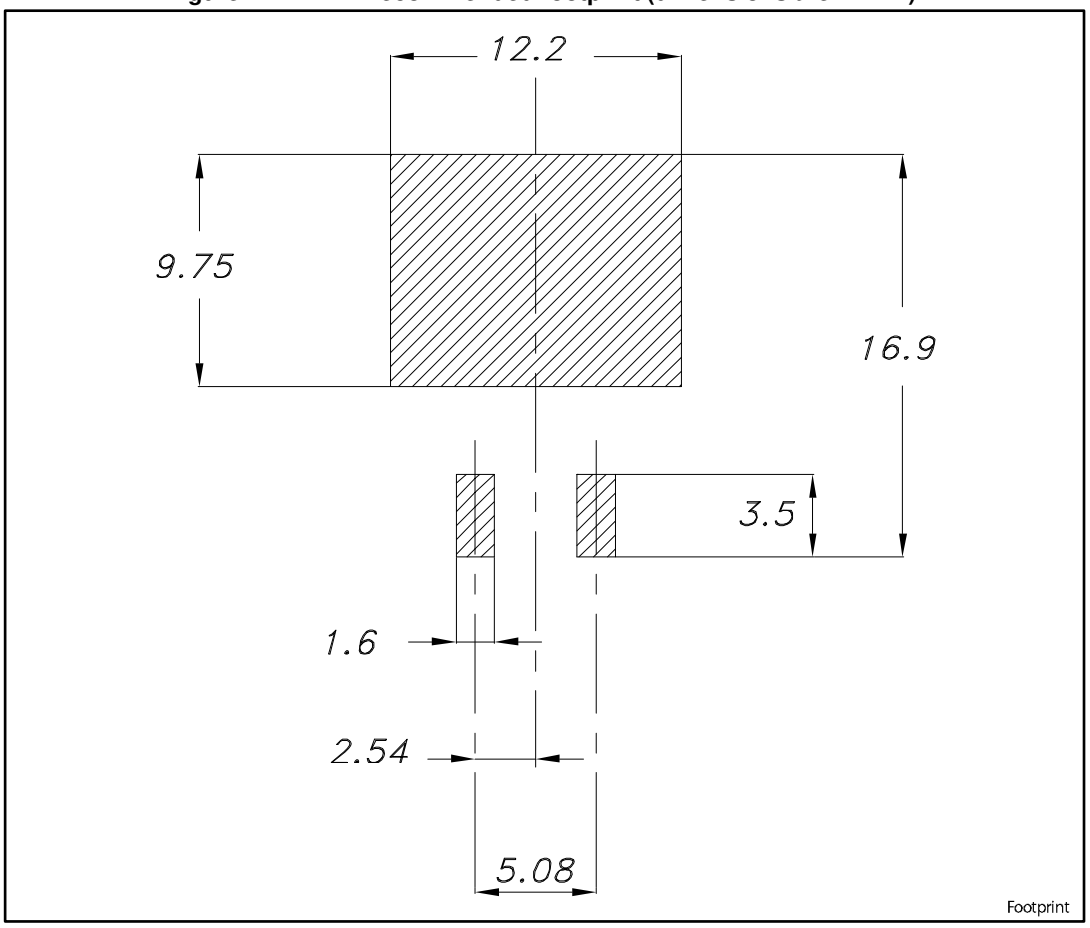


Table 6: D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
A1	0.03		0.23	0.001		0.009
b	0.70		0.93	0.028		0.037
b2	1.14		1.70	0.045		0.067
c	0.45		0.60	0.018		0.024
c2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1	7.50	7.75	8.00	0.295	0.305	0.315
D2	1.10	1.30	1.50	0.043	0.051	0.060
E	10		10.40	0.394		0.409
E1	8.50	8.70	8.90	0.335	0.343	0.346
E2	6.85	7.05	7.25	0.266	0.278	0.282
e		2.54			0.100	
e1	4.88		5.28	0.190		0.205
H	15		15.85	0.591		0.624
J1	2.49		2.69	0.097		0.106
L	2.29		2.79	0.090		0.110
L1	1.27		1.40	0.049		0.055
L2	1.30		1.75	0.050		0.069
R		0.4			0.015	
V2	0°		8°	0°		8°

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



2.2 TO-220AB package information

Figure 15: TO-220AB package outline

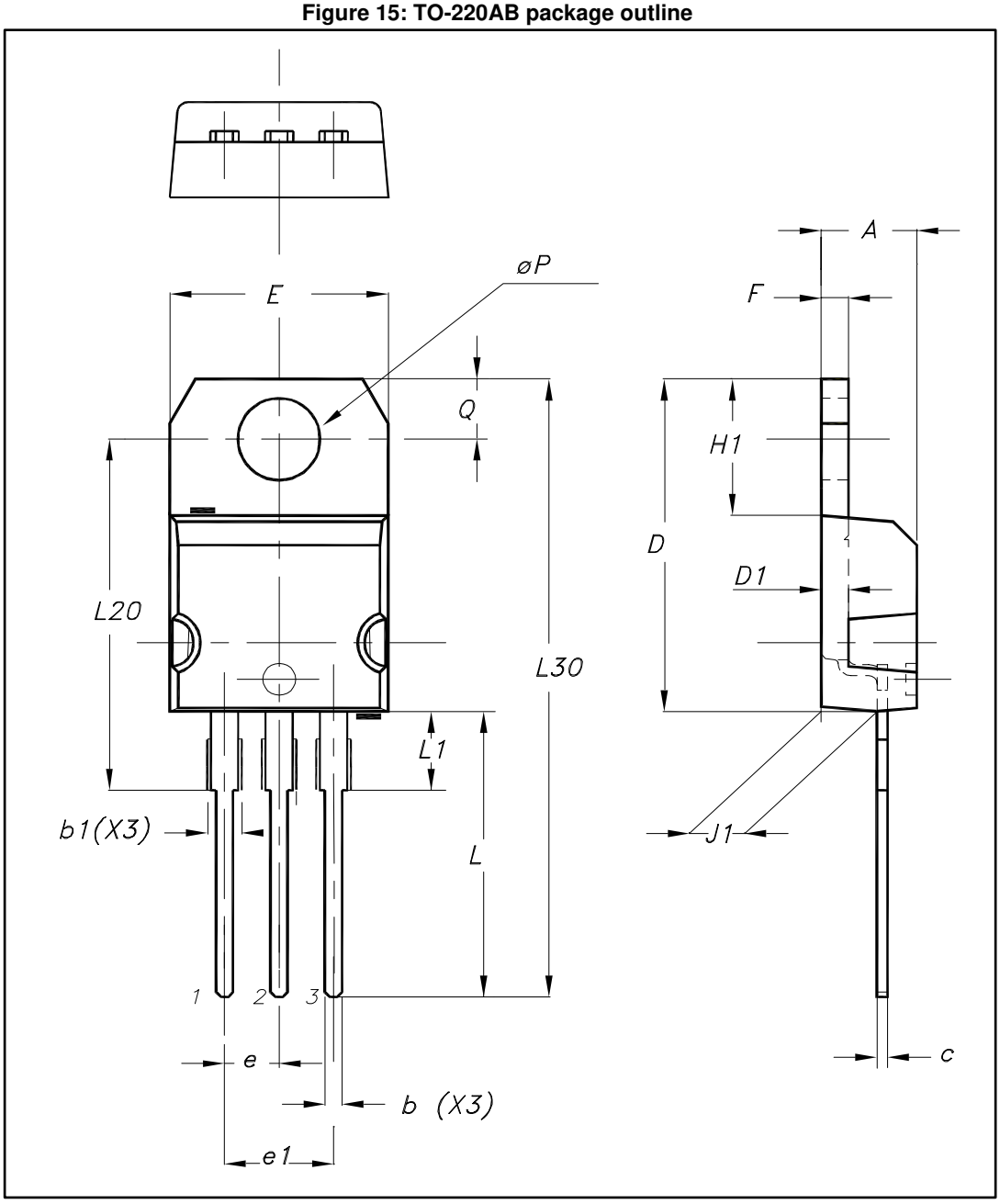


Table 7: TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.240	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
D1	1.27 typ.		0.050 typ.	
E	10.00	10.40	0.394	0.409
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.244	0.260
J1	2.40	2.72	0.094	0.107
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L20	16.40 typ.		0.646 typ.	
L30	28.90 typ.		1.138 typ.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH16L06CTY	STTH16L06CTY	TO-220AB	2.23 g	50	Tube
STTH16L06CGY-TR	STTH16L06CGY	D^2PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
19-Nov-2014	1	Initial release.
12-Dec-2014	2	Removed TO-220FPAB and D^2PAK package information.
20-Sep-2017	3	Added D^2PAK package information.

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