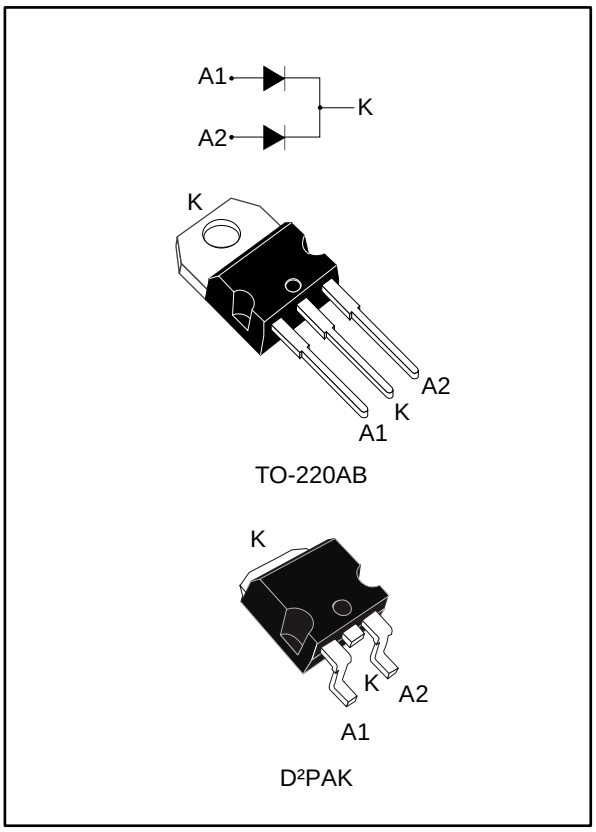
STTH16L06C-Y

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.

Downloaded from Arrow.com.

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:

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

Downloaded from Arrow.com.

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

Downloaded from Arrow.com.

1.1 Characteristics (curves)

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

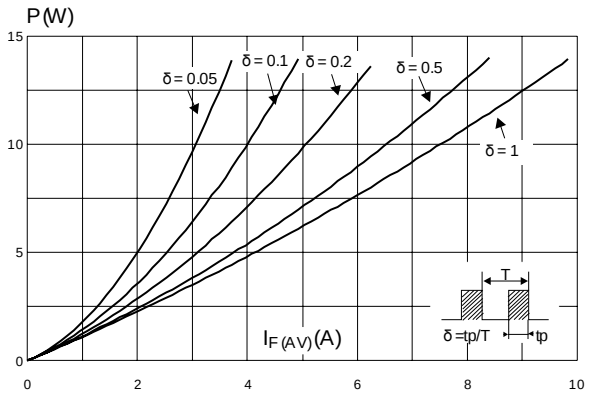


Figure 2: Forward voltage drop versus forward current (per diode)

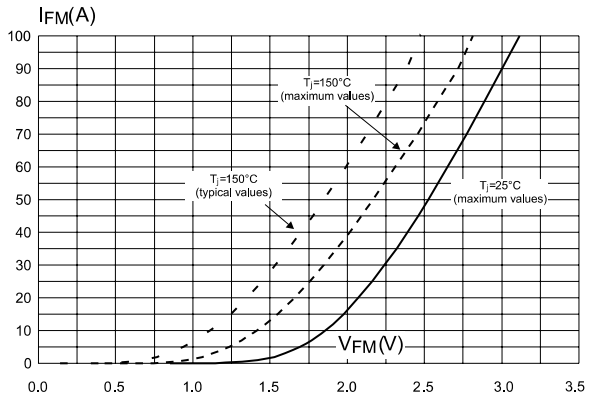


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

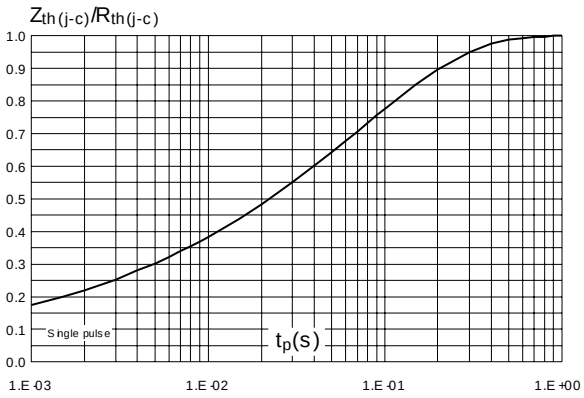


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

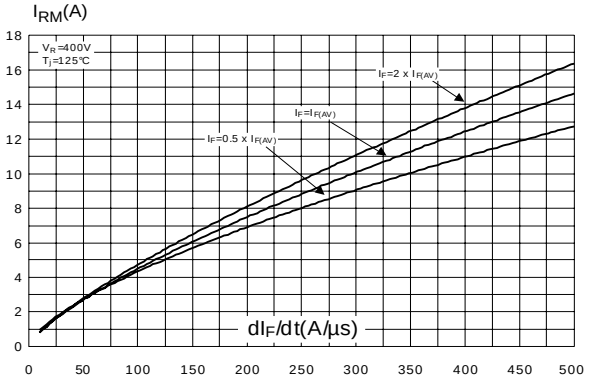


Figure 5: Reverse recovery time versus dI_F/dt (typical values, per diode)

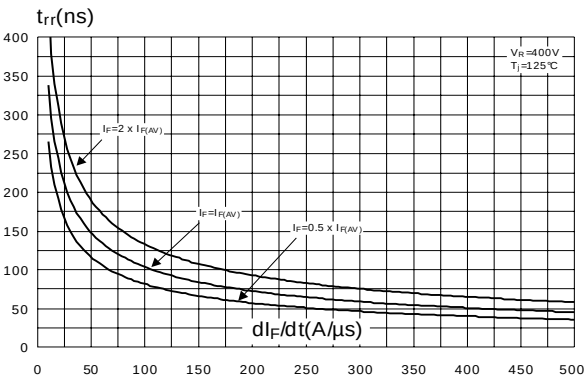
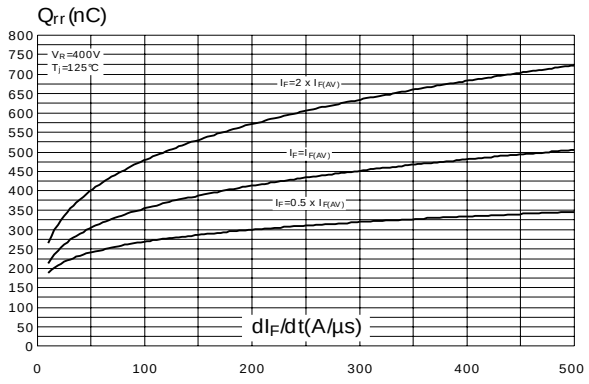


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)



Downloaded from Arrow.com.

Figure 7: Relative variations of dynamic parameters versus junction temperature

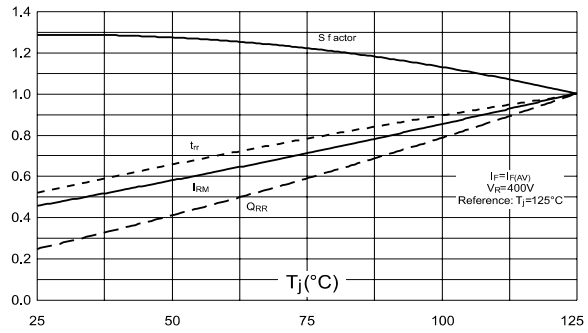


Figure 8: Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

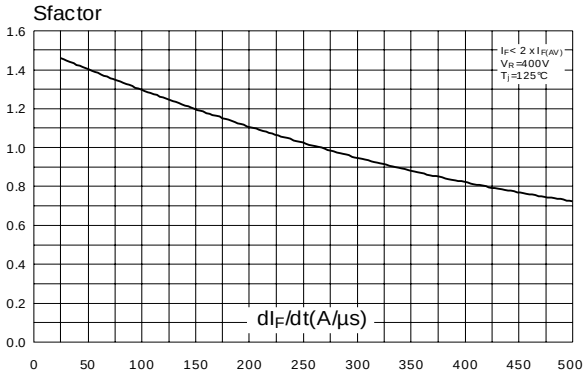


Figure 9: Forward recovery time versus dI_F/dt (typical values, per diode)

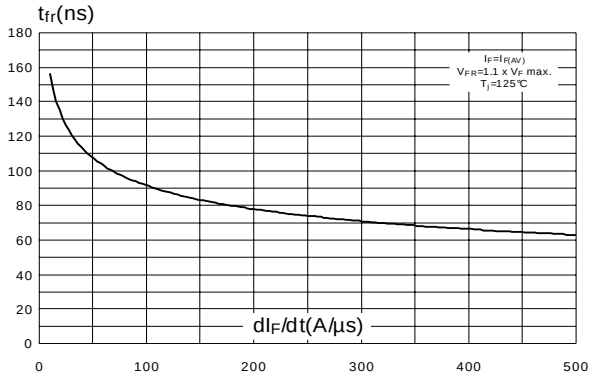


Figure 10: Transient peak forward voltage versus dI_F/dt (typical values, per diode)

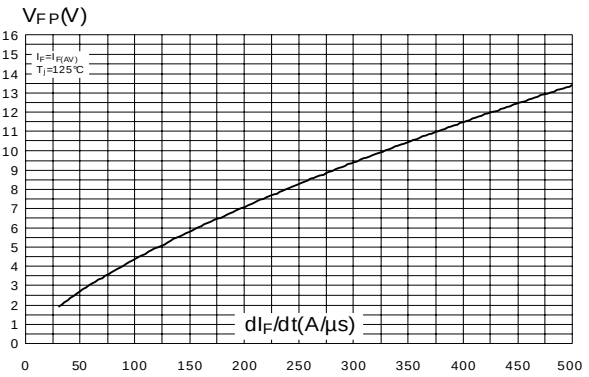


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

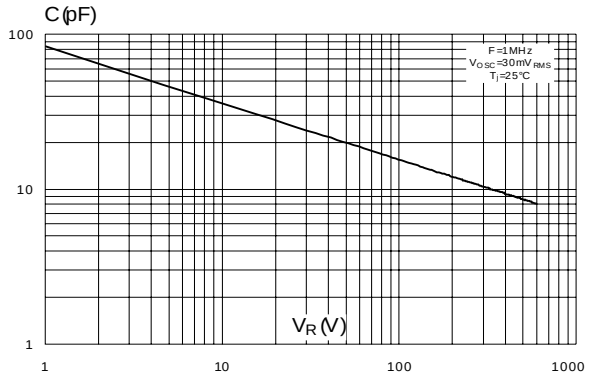
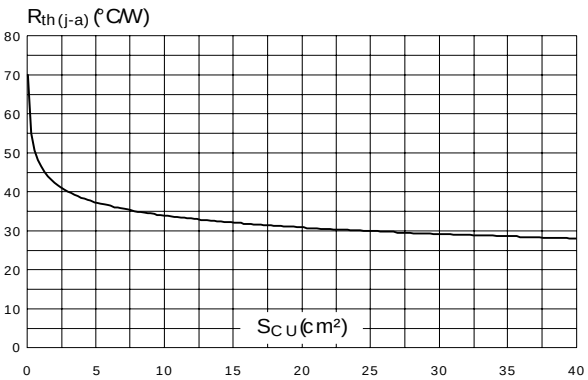


Figure 12: Thermal resistance, junction to ambient, versus copper surface under tab (epoxy FR4, coper thickness = 35 µm)(D2PAK)



Downloaded from Arrow.com.

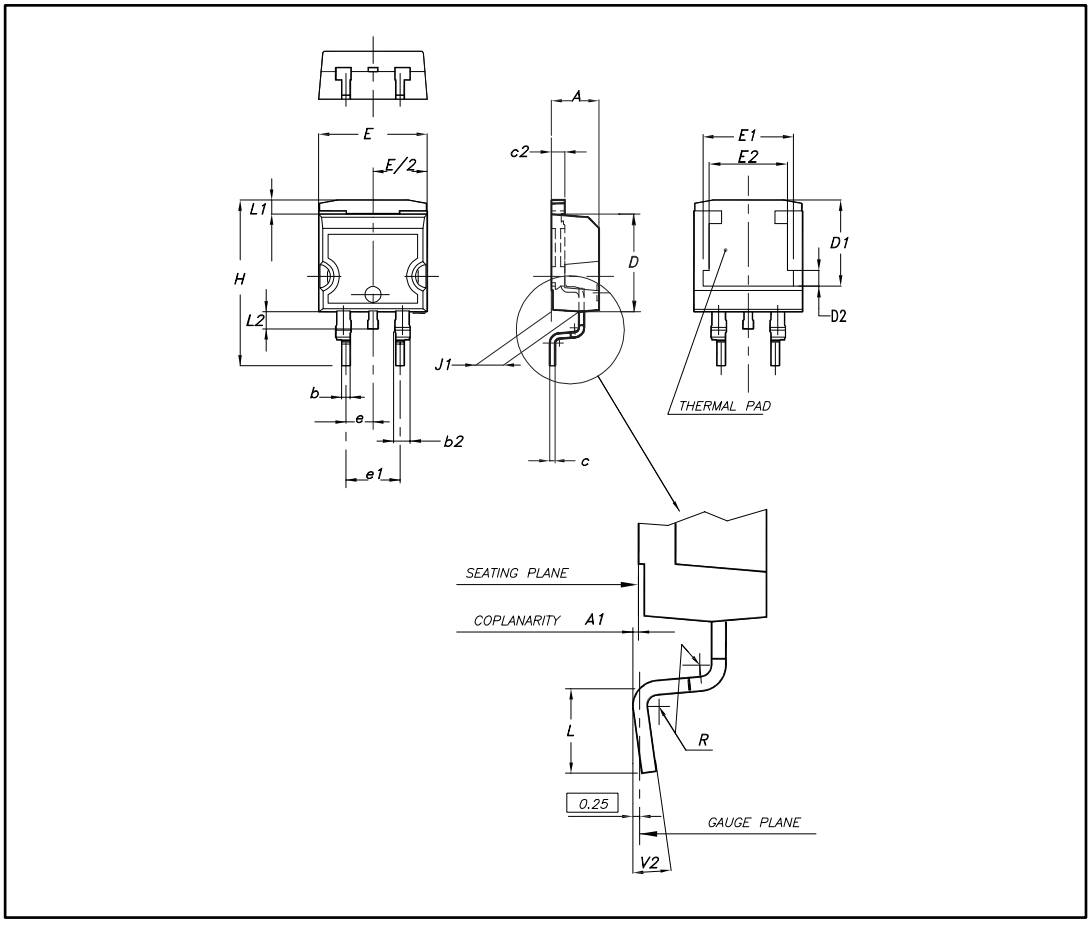
2 Package information

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



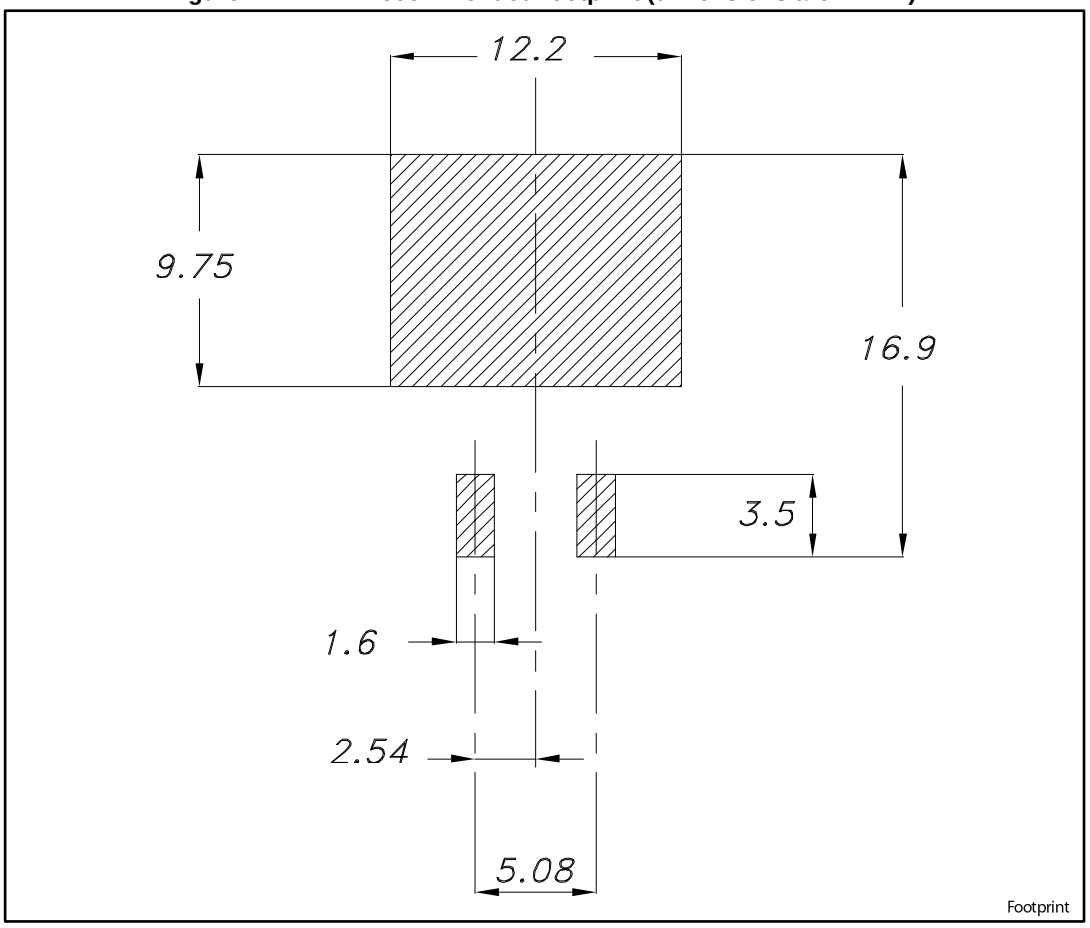
Downloaded from Arrow.com.

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°

Downloaded from Arrow.com.

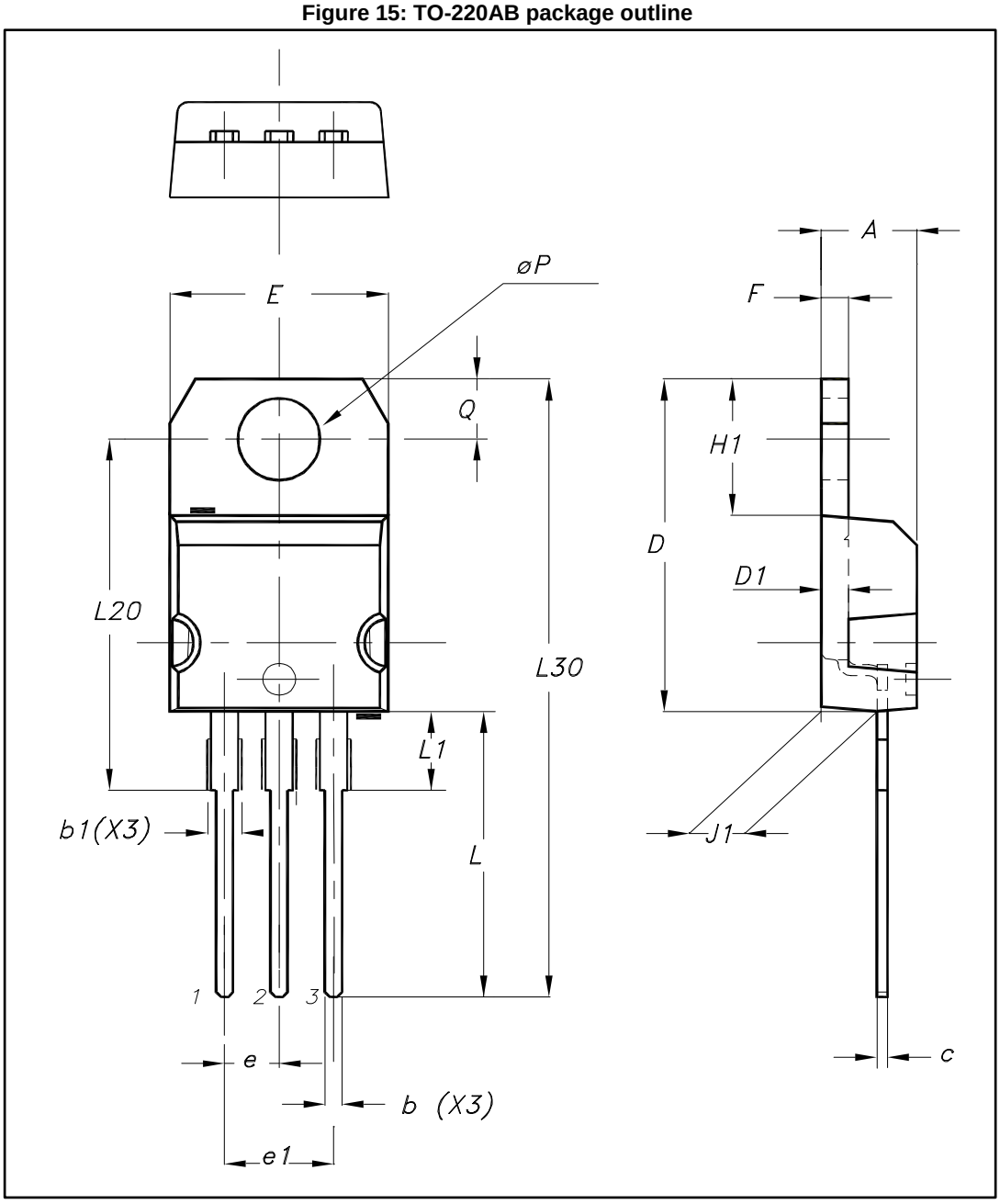
Figure 14: D²PAK recommended footprint (dimensions are in mm)



Downloaded from Arrow.com.

2.2 TO-220AB package information

Figure 15: TO-220AB package outline



Downloaded from Arrow.com.

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

Downloaded from Arrow.com.

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.

Downloaded from Arrow.com.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2017 STMicroelectronics – All rights reserved

Downloaded from Arrow.com.