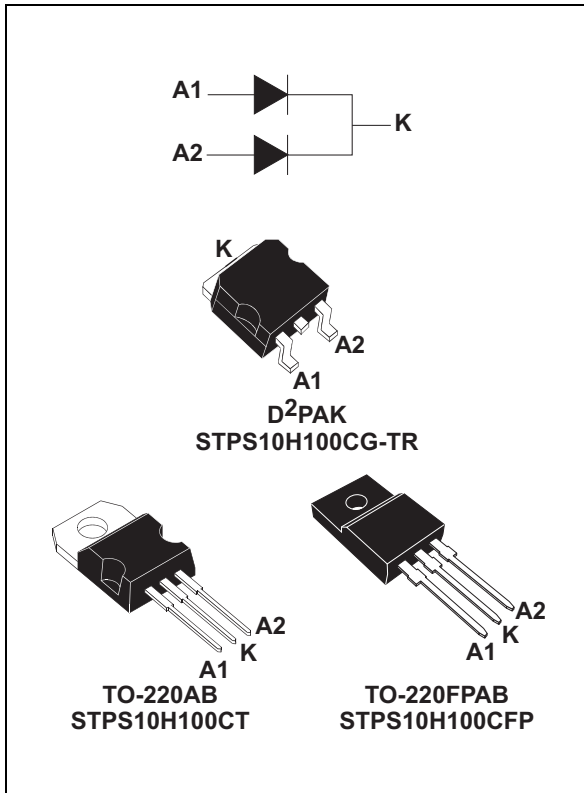


## High voltage power Schottky rectifier

Datasheet - production data



### Description

Schottky barrier rectifier designed for high frequency miniature switched mode power supplies such as adapters and on-board DC/DC converters.

The product is packaged in TO-220AB, TO-220FPAB, and D<sup>2</sup>PAK.

**Table 1. Device summary**

$I_{F(AV)}$	2 x 5 A
$V_{RRM}$	100 V
$T_j(max)$	175 °C
$V_F(max)$	0.61 V

### Features

- High junction temperature capability for converters located in confined environment
- Low leakage current at high temperature
- Low static and dynamic losses as a result of the Schottky barrier
- Avalanche capability specified

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode)**

Symbol	Parameter				Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage				100	V
I <sub>F(RMS)</sub>	Forward rms current				10	A
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	TO-220AB, D <sup>2</sup> PAK	T <sub>c</sub> = 165 °C	Per diode	5	A
		TO-220FPAB	T <sub>c</sub> = 160 °C	Per device	10	
I <sub>FSM</sub>	Surge non repetitive forward current			t <sub>p</sub> = 10 ms sinusoidal	180	A
I <sub>R</sub> RM	Repetitive peak reverse current			t <sub>p</sub> = 2 $\mu$ s square F= 1 kHz	1	A
P <sub>ARM</sub>	Repetitive peak avalanche power			t <sub>p</sub> = 10 $\mu$ s T <sub>j</sub> = 125 °C	515	W
T <sub>stg</sub>	Storage temperature range				-65 to + 175	°C
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>				175	°C
dV/dt	Critical rate of rise of reverse voltage				10000	V/ $\mu$ s

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

Symbol	Parameter			Value	Unit
R <sub>th(j-c)</sub>	Junction to case	TO-220AB, D <sup>2</sup> PAK	Per diode	2.2	°C/W
			Total	1.3	
R <sub>th(c)</sub>	Coupling			0.3	
R <sub>th(j-c)</sub>	Junction to case	TO-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
R <sub>th(c)</sub>	Coupling			2.5	

When diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>			3.5	$\mu$ A
		T <sub>j</sub> = 125 °C			1.3	4.5	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A			0.73	V
		T <sub>j</sub> = 125 °C	I <sub>F</sub> = 5 A		0.57	0.61	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A			0.85	
		T <sub>j</sub> = 125 °C	I <sub>F</sub> = 10 A		0.66	0.71	

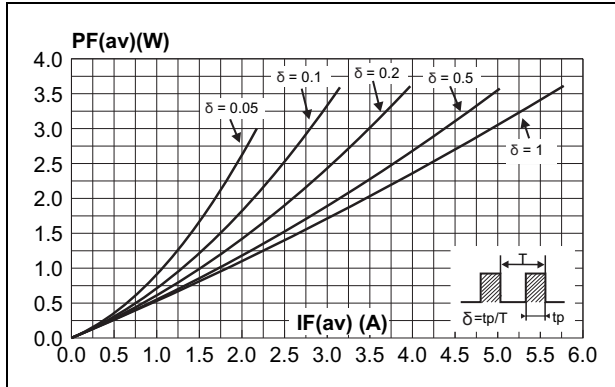
1. Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

2. Pulse test: t<sub>p</sub> = 380  $\mu$ s,  $\delta < 2\%$

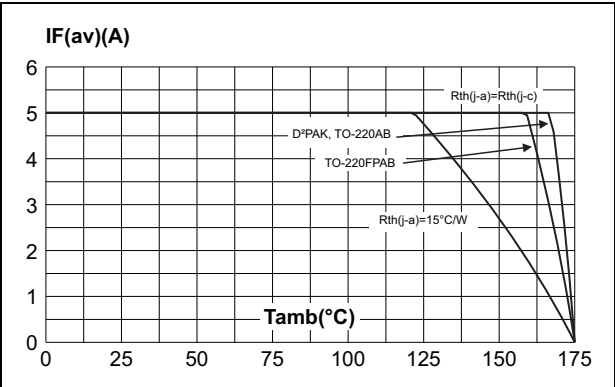
To evaluate the conduction losses use the following equation:

$$P = 0.51 \times I_{F(AV)} + 0.02 I_{F(RMS)}^2$$

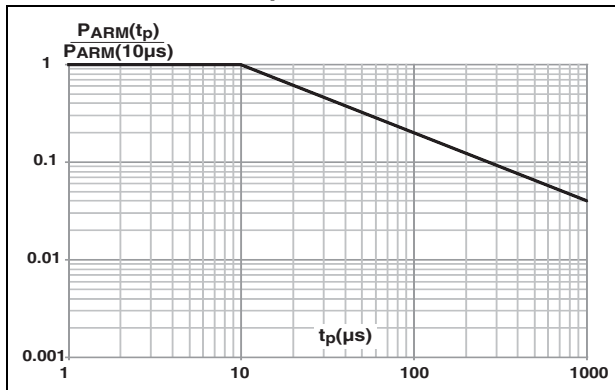
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



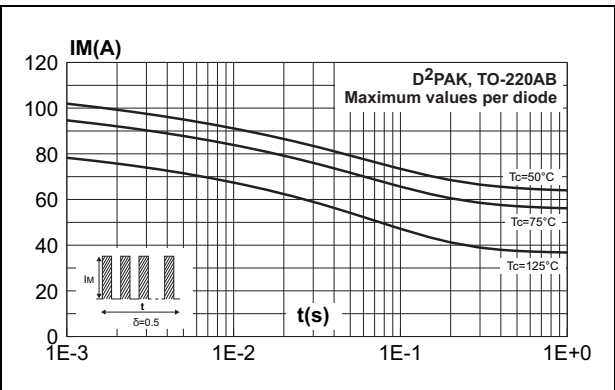
**Figure 2. Average forward current versus ambient temperature (delta = 0.5, per diode)**



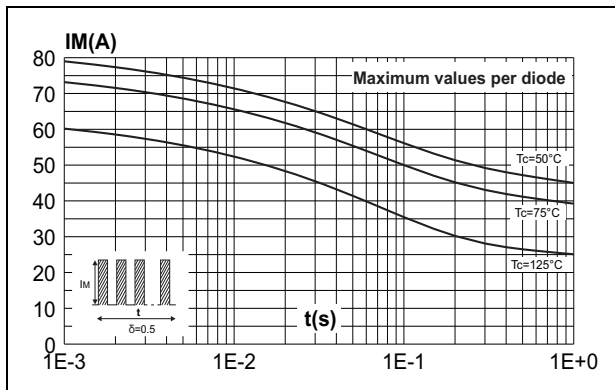
**Figure 3. Normalized avalanche power derating versus pulse duration**



**Figure 4. Non repetitive surge peak forward current versus overload duration**



**Figure 5. Non repetitive surge peak forward current versus overload duration (TO-220FPAB)**



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

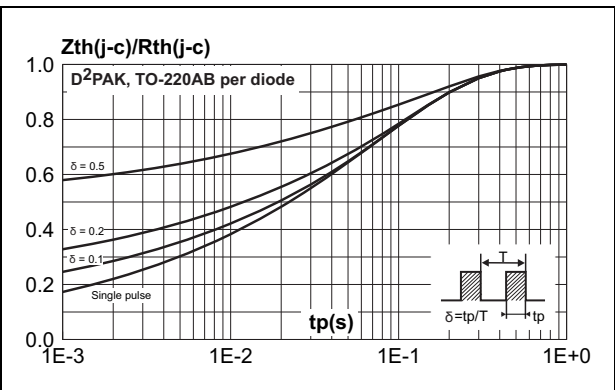


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

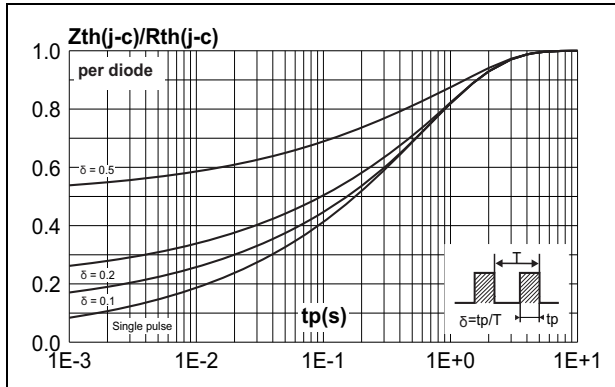


Figure 8. Reverse leakage current versus reverse voltage applied (typical values, per diode)

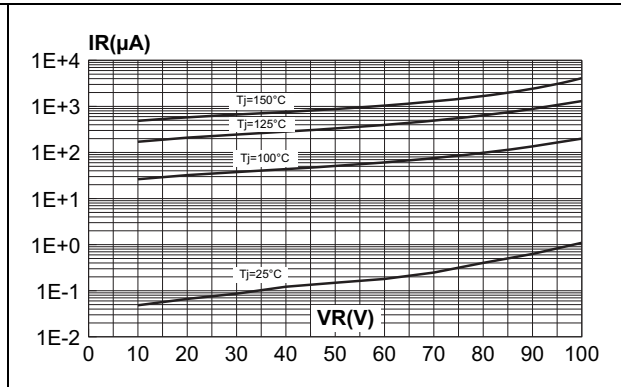


Figure 9. Junction capacitance versus reverse voltage applied (typical values, per diode)

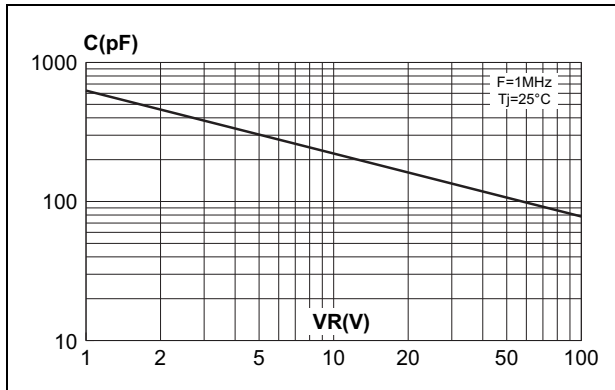


Figure 10. Forward voltage drop versus forward current (maximum values, per diode)

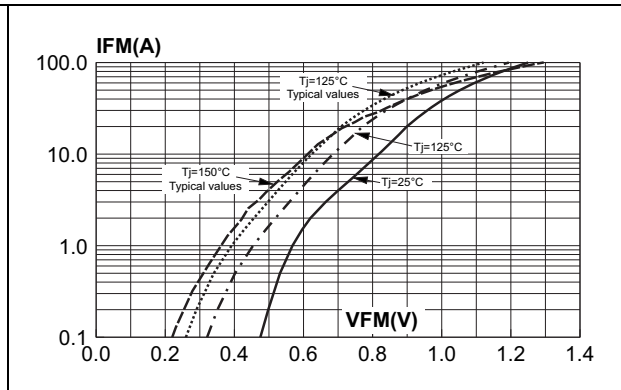
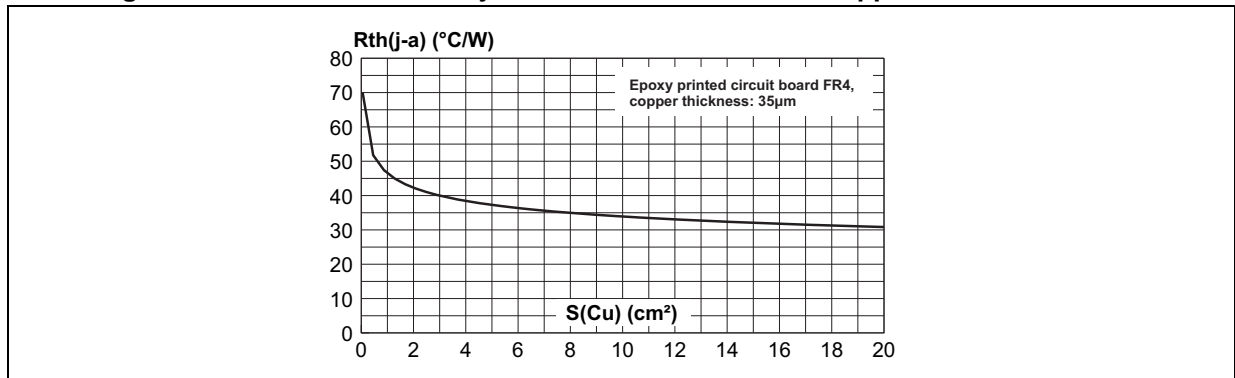


Figure 11. Thermal resistance junction to ambient versus copper surface under tab



## 2 Package information

- Epoxy meets UL94,V0
- Cooling method: Conduction
- Recommended torque value: 0.4 to 0.6 N·m

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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 12. D<sup>2</sup>PAK dimension definitions

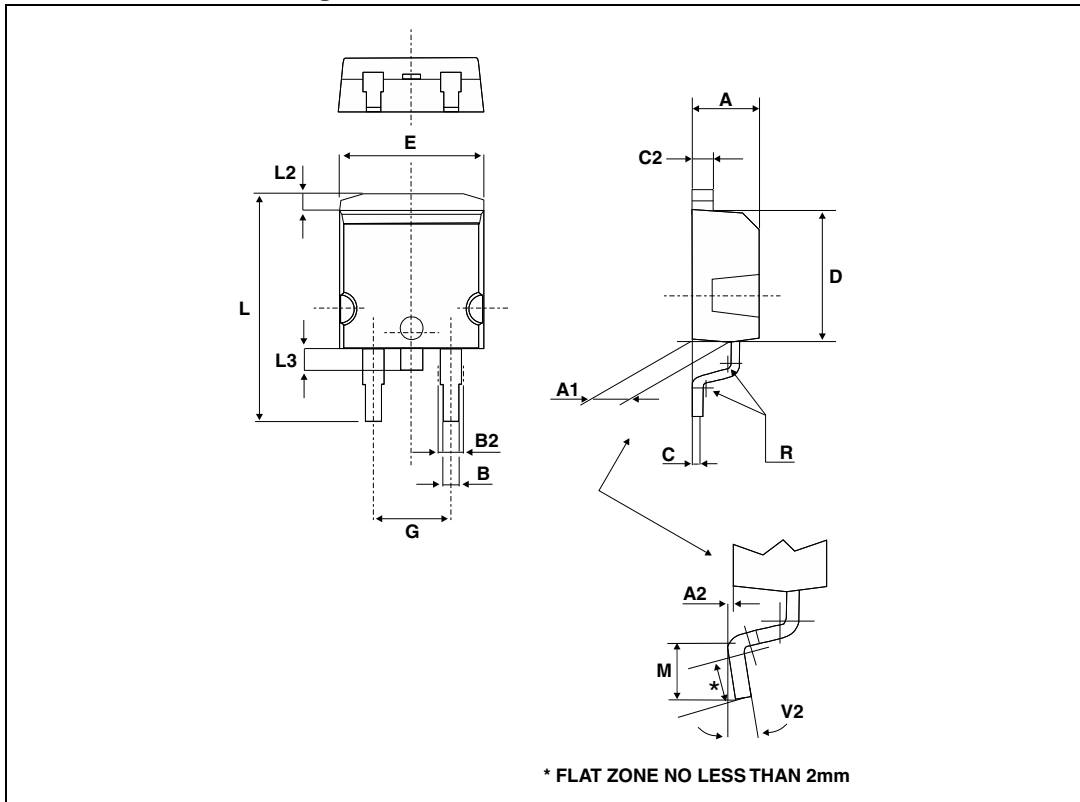


Table 5. D<sup>2</sup>PAK dimension values

Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	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	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
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
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 13. Footprint (in millimeters)

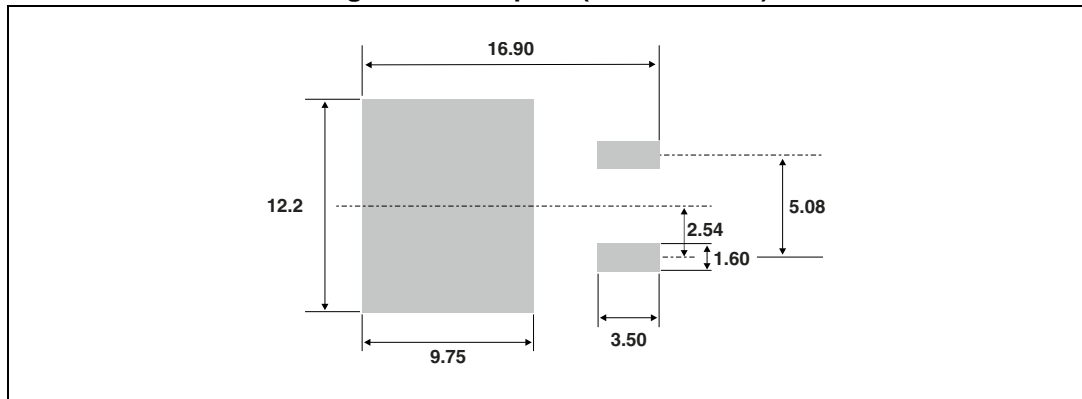


Figure 14. TO-220FPAB dimension definitions

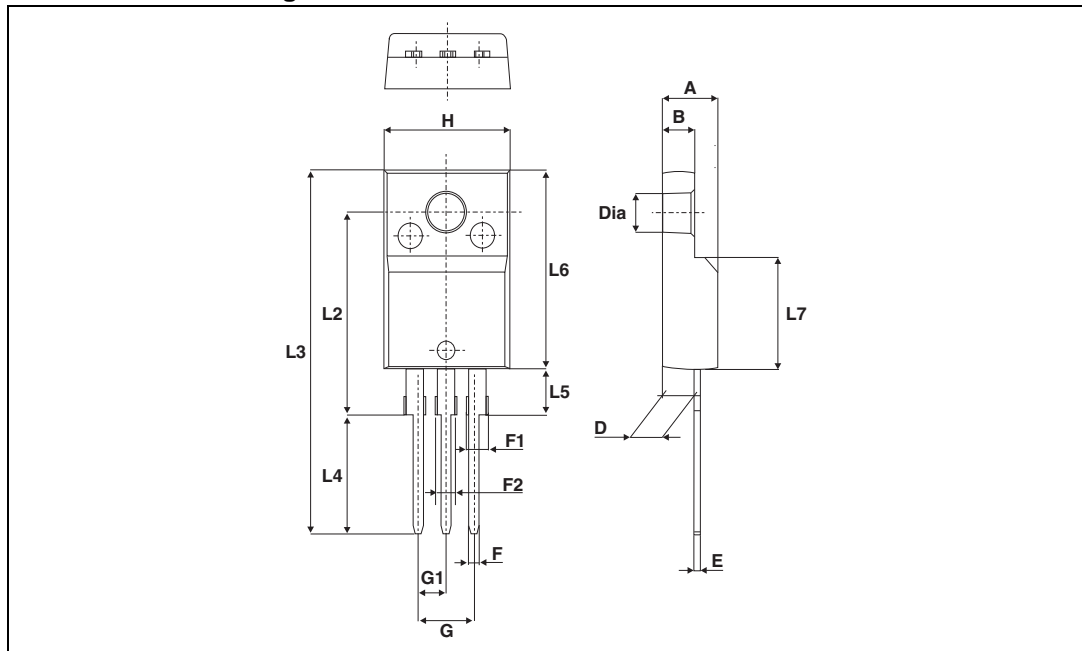


Table 6. TO-220FPAB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

Figure 15. TO-220AB dimension definitions

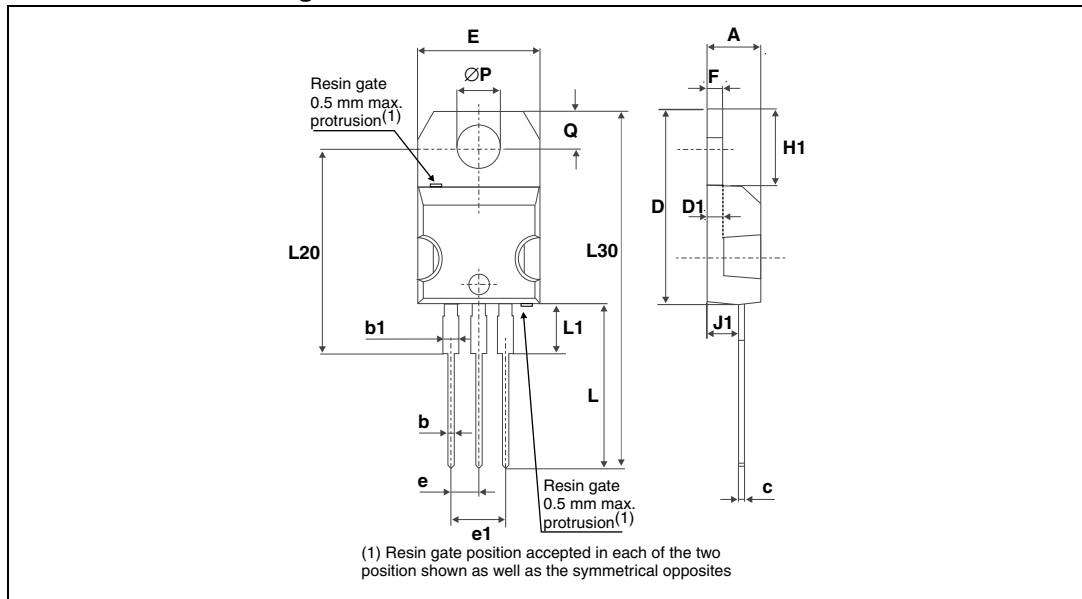


Table 7. TO-220AB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
∅P	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116



### 3 Ordering information

Table 8. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS10H100CT	STPS10H100CT	TO-220AB	2.20 g	50	Tube
STPS10H100CFP	STPS10H100CFP	TO-220FPAB	2.0 g	50	Tube
STPS10H100CG-TR	STPS10H100CG	D <sup>2</sup> PAK	1.48 g	1000	Tape & reel

### 4 Revision history

Table 9. Document revision history

Date	Revision	Changes
20-Dec-2013	1	Recovered contents of document STPS10H100, July 2003, Revision 3F (DocID6476), and removed I <sup>2</sup> PAK package.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2013 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

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