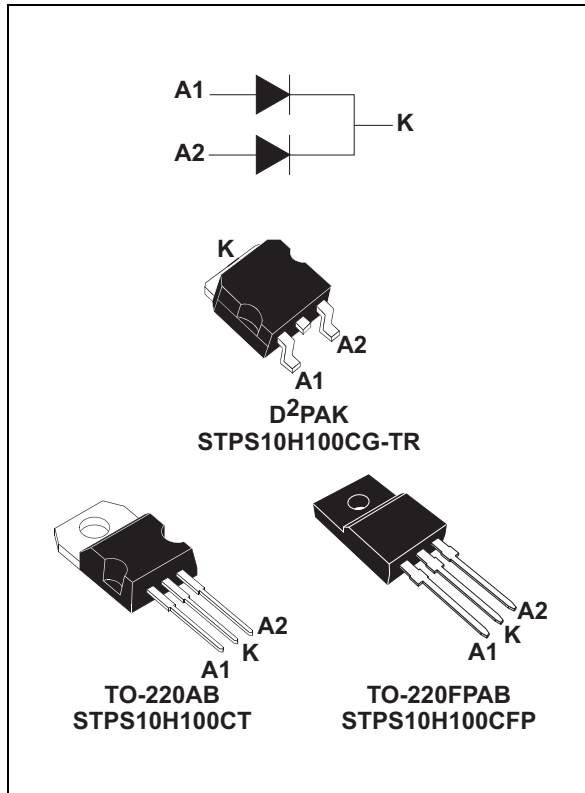


High voltage power Schottky rectifier

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 D²PAK.

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 _{RRM}	Repetitive peak reverse voltage				100	V
I _{F(RMS)}	Forward rms current				10	A
I _{F(AV)}	Average forward current $\delta = 0.5$	TO-220AB, D ² PAK	T _c = 165 °C	Per diode	5	A
		TO-220FPAB	T _c = 160 °C	Per device	10	
I _{FSM}	Surge non repetitive forward current		t _p = 10 ms sinusoidal		180	A
I _R RM	Repetitive peak reverse current		t _p = 2 μ s square F= 1 kHz		1	A
P _{ARM}	Repetitive peak avalanche power		t _p = 10 μ s T _j = 125 °C		515	W
T _{stg}	Storage temperature range				-65 to + 175	°C
T _j	Maximum operating junction temperature ⁽¹⁾				175	°C
dV/dt	Critical rate of rise of reverse voltage				10000	V/ μ 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 _{th(j-c)}	Junction to case	TO-220AB, D ² PAK	Per diode	2.2	°C/W
			Total	1.3	
R _{th(c)}	Coupling			0.3	
R _{th(j-c)}	Junction to case	TO-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
R _{th(c)}	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 _R ⁽¹⁾	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}			3.5	μ A
		T _j = 125 °C			1.3	4.5	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 5 A			0.73	V
		T _j = 125 °C	I _F = 5 A		0.57	0.61	
		T _j = 25 °C	I _F = 10 A			0.85	
		T _j = 125 °C	I _F = 10 A		0.66	0.71	

1. Pulse test: t_p = 5 ms, $\delta < 2\%$

2. Pulse test: t_p = 380 μ 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)

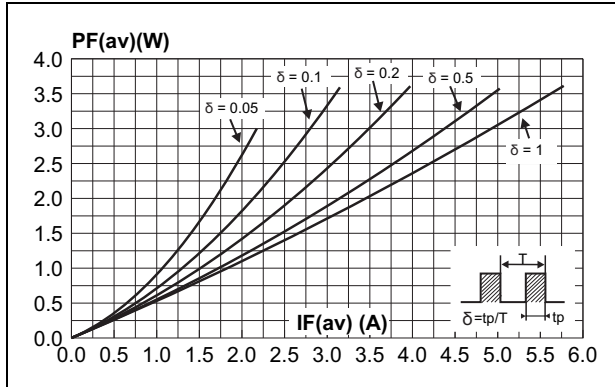


Figure 2. Average forward current versus ambient temperature (delta = 0.5, per diode)

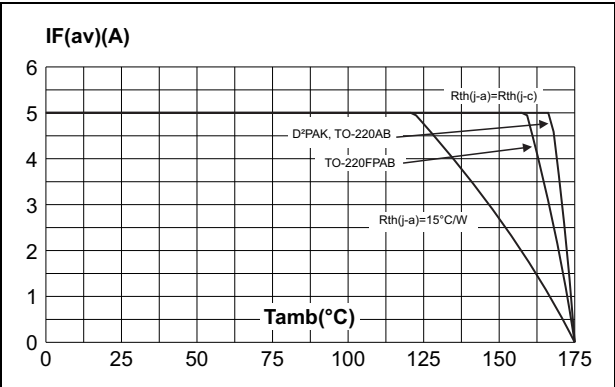


Figure 3. Normalized avalanche power derating versus pulse duration

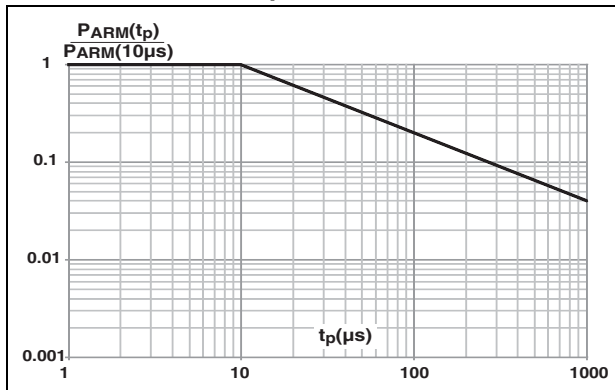


Figure 4. Non repetitive surge peak forward current versus overload duration

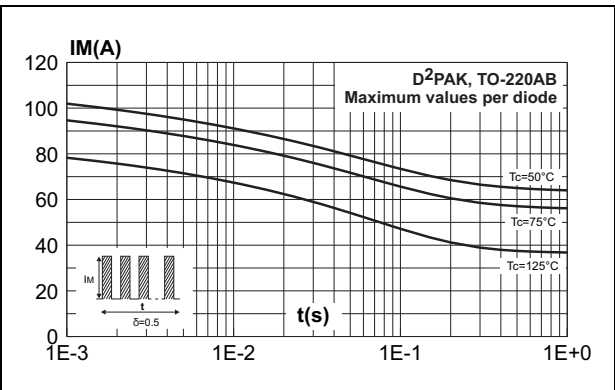


Figure 5. Non repetitive surge peak forward current versus overload duration (TO-220FPAB)

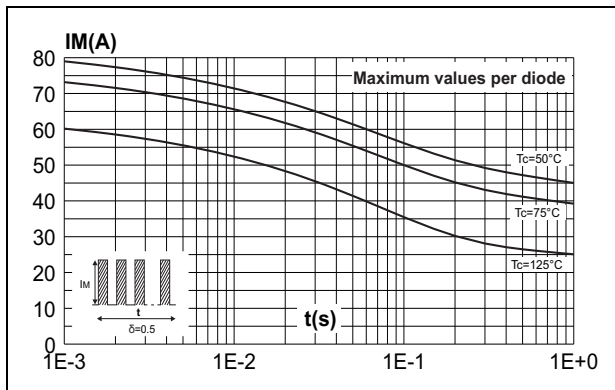


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

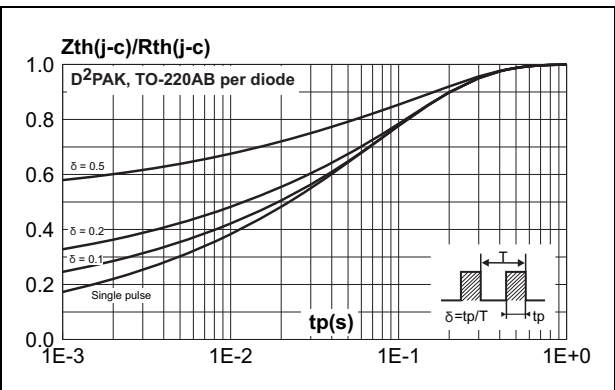


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

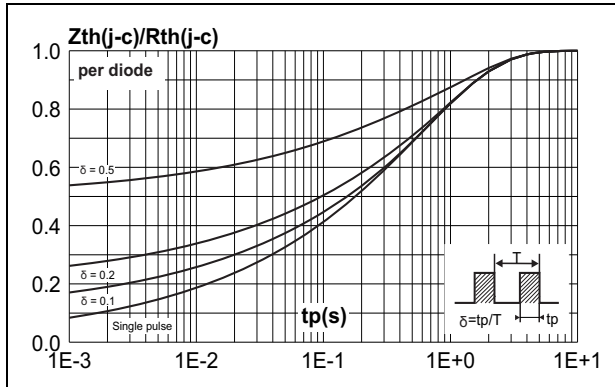


Figure 8. Reverse leakage current versus reverse voltage applied (typical values, per diode)

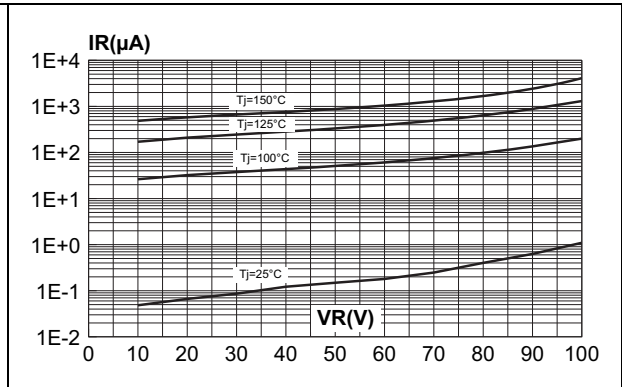


Figure 9. Junction capacitance versus reverse voltage applied (typical values, per diode)

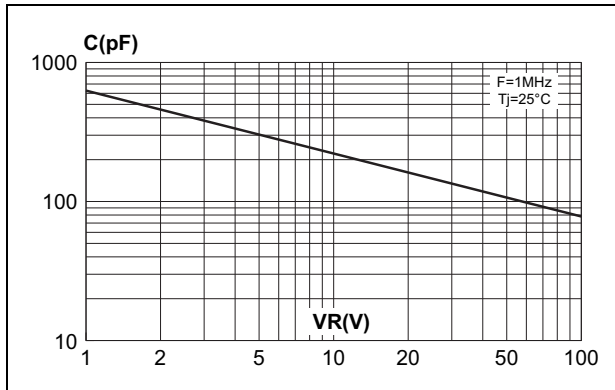


Figure 10. Forward voltage drop versus forward current (maximum values, per diode)

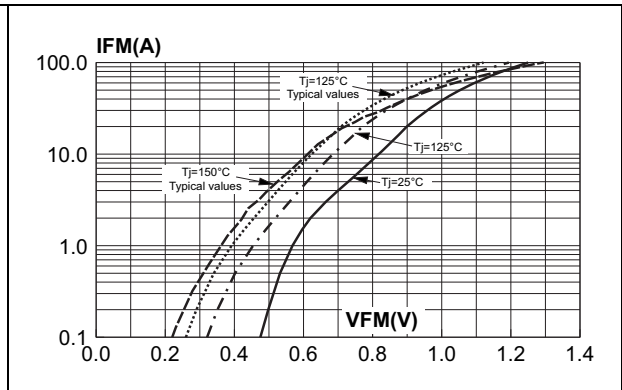
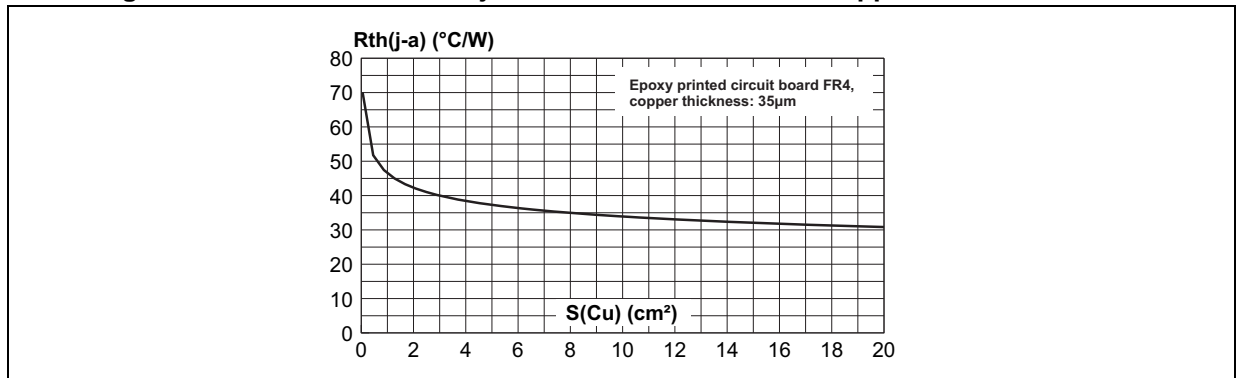


Figure 11. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

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

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Figure 12. D²PAK dimension definitions

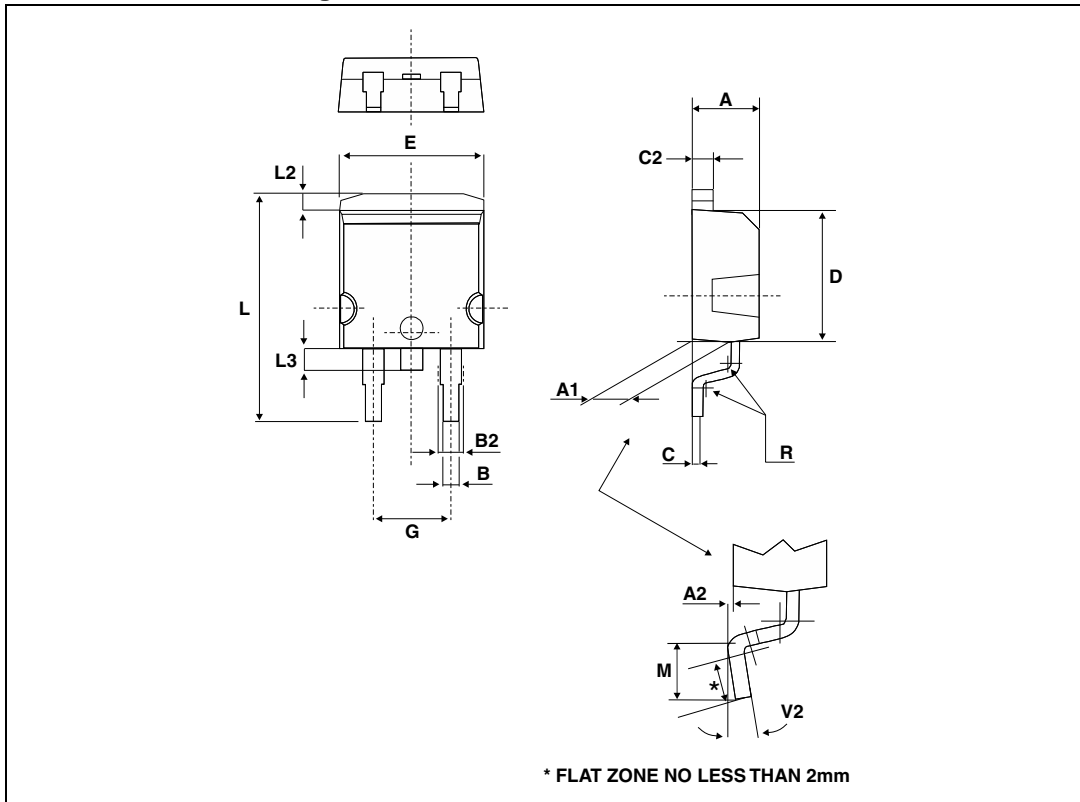


Table 5. D²PAK dimension values

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)

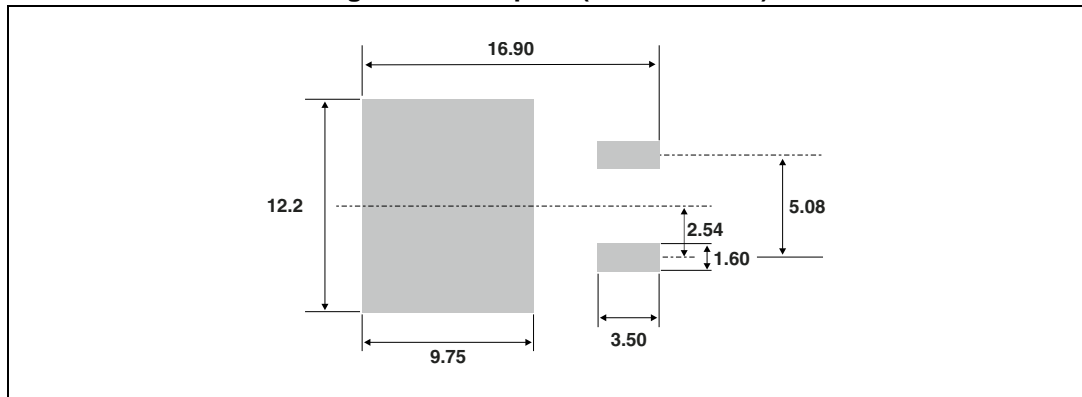


Figure 14. TO-220FPAB dimension definitions

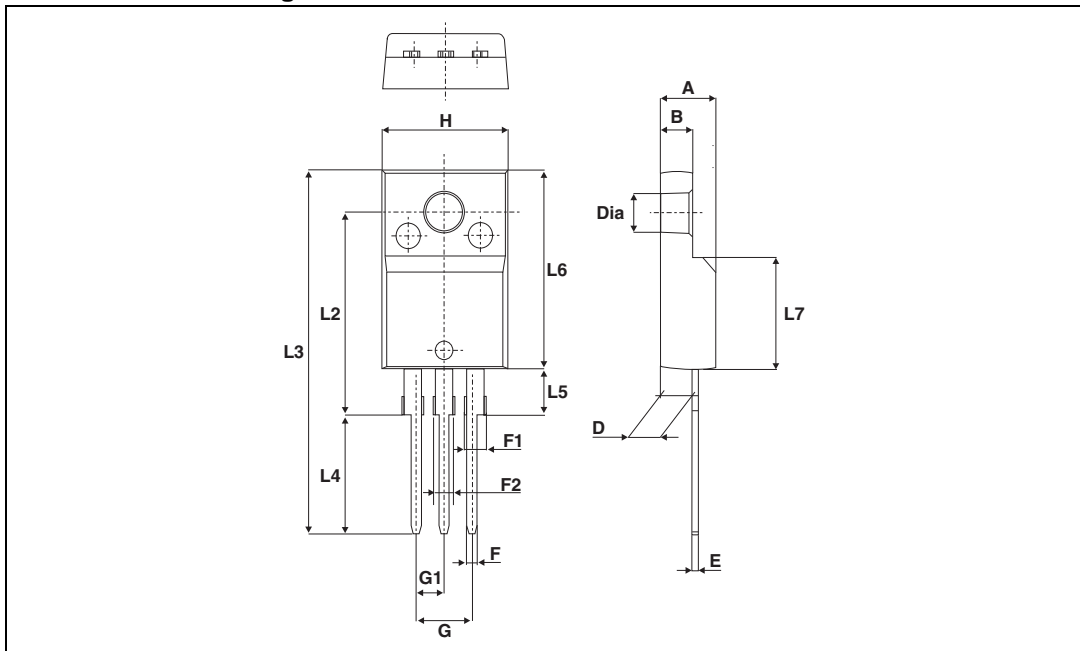


Table 6. TO-220FPAB dimension values

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

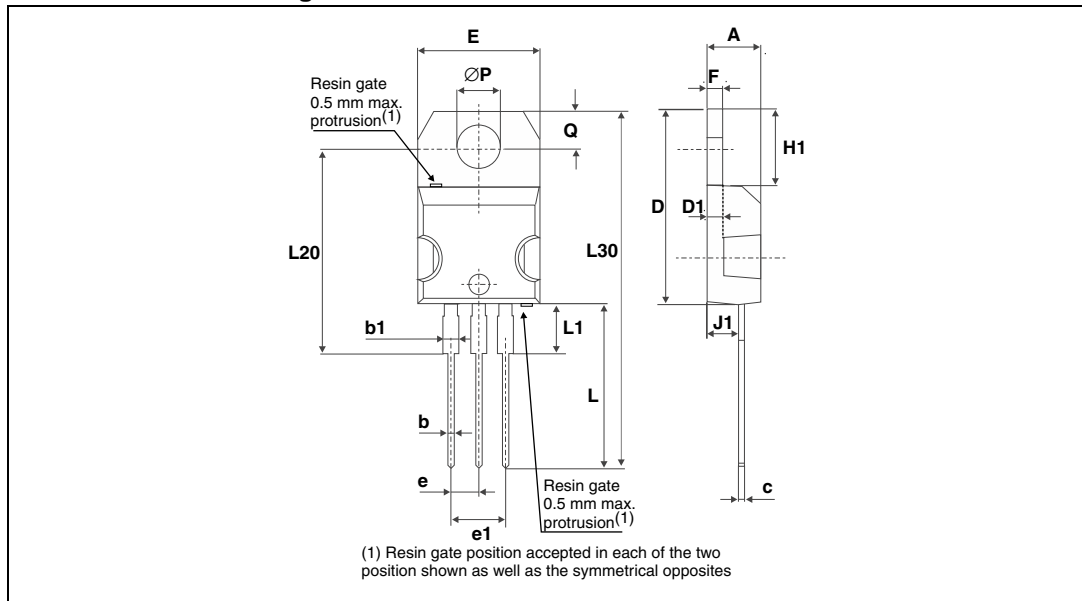


Table 7. TO-220AB dimension values

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.	
ØP	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 ² 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 ² PAK package.

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