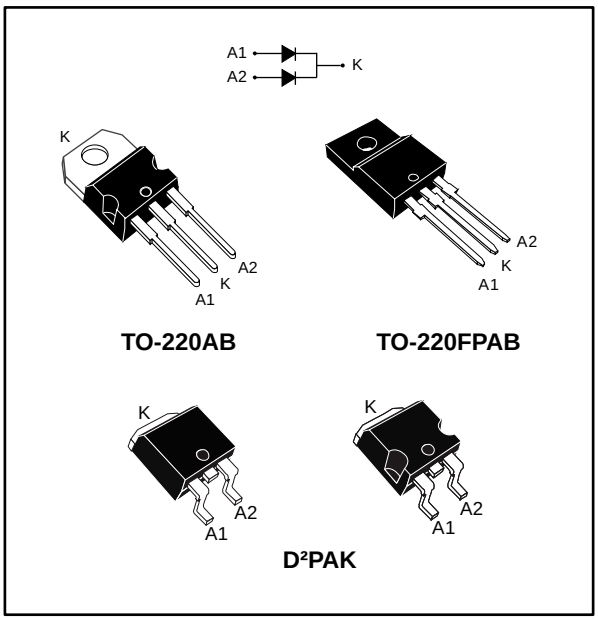
STPS10H100C

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

Symbol	Value
$I_{F(AV)}$	2 x 5 A
V_{RRM}	100 V
V_F (typ.)	0.57 V
T_j (max.)	175 °C

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
- Insulated package: TO-220FPAB
  - Insulating voltage = 2000 V_{RMS} sine
- Avalanche capability specified
- ECOPACK®2 compliant component for D²PAK on demand

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				100	V
$I_{F(RMS)}$	Forward rms current				10	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	TO-220AB / D²PAK	T_C = 165 °C	Per diode	5	A
				Per device	10	
		TO-220FPAB	T_C = 155 °C	Per diode	5	
			T_C = 150 °C	Per device	10	
I_{FSM}	Surge non repetitive forward current			t_p = 10 ms sinusoidal	180	A
P_{ARM}	Repetitive peak avalanche power			t_p = 10 µs, T_j = 125 °C	515	W
T_{stg}	Storage temperature range				-65 to +175	°C
T_j	Maximum operating junction temperature (1)				175	

Notes:

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

Table 3: Thermal parameters

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
		TO-220AB / D²PAK	Per diode	2.2	
			Total	1.3	
$R_{th(c)}$	Coupling	TO-220FPAB		2.5	
		TO-220AB / D²PAK		0.3	

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	$V_R = V_{RRM}$	-		3.5	µA
		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		-	0.57	0.61	
		T_j = 25 °C	I_F = 10 A	-		0.85	
		T_j = 125 °C		-	0.66	0.71	

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:

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

1.1 Characteristics (curves)

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

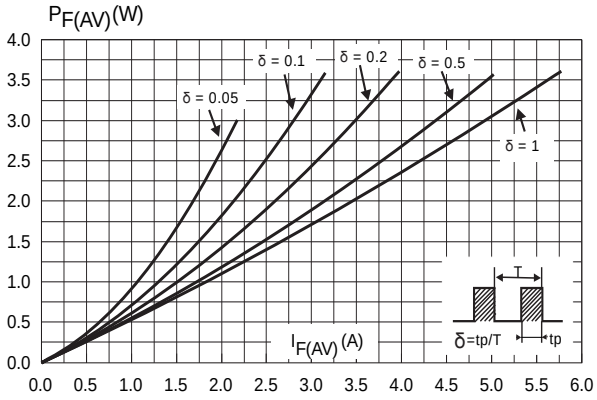


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

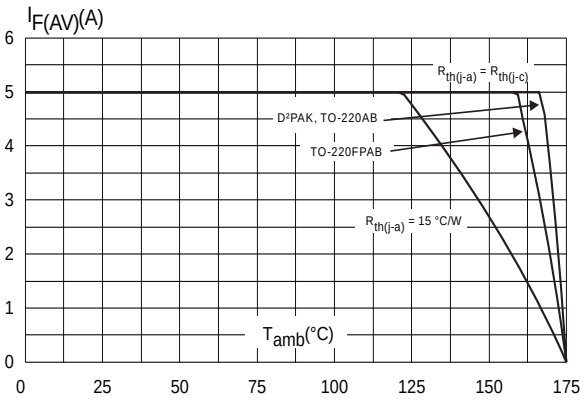


Figure 3: Normalized avalanche power deratings versus pulse duration (T_j = 125 °C)

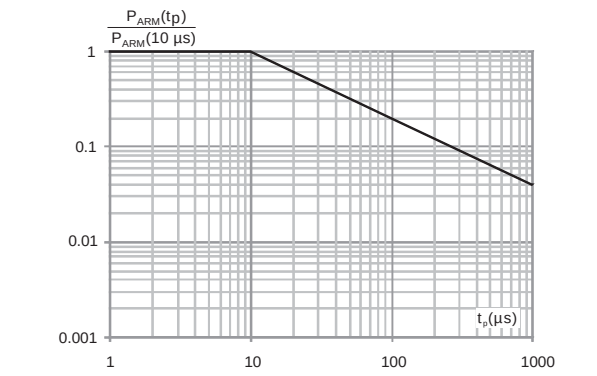


Figure 4: Reverse leakage current versus reverse voltage applied (typical values, per diode)

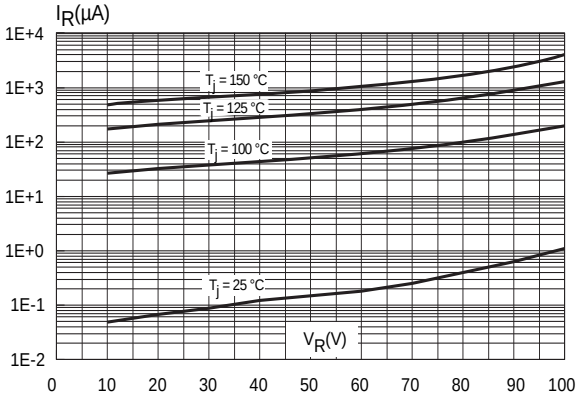


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

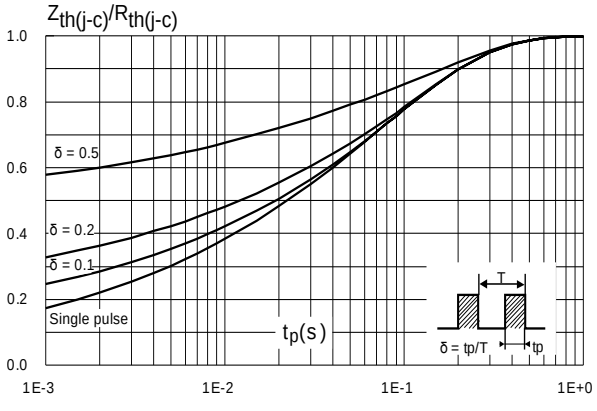


Figure 6: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

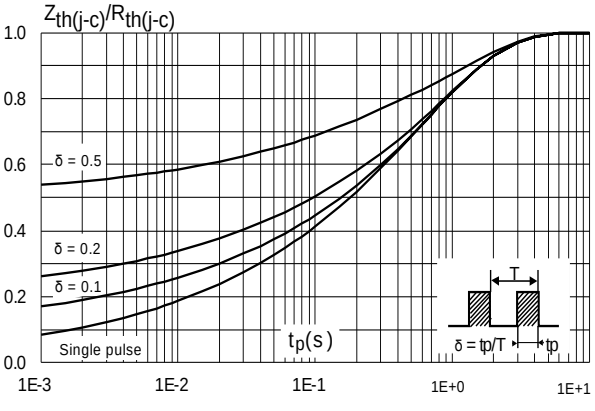


Figure 7: Junction capacitance versus reverse voltage applied (typical values, per diode)

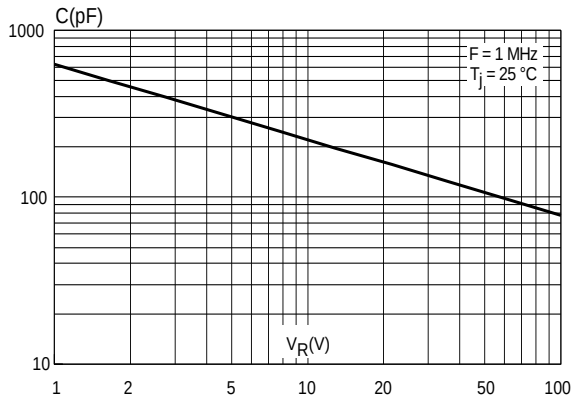


Figure 8: Forward voltage drop versus forward current (maximum values, per diode)

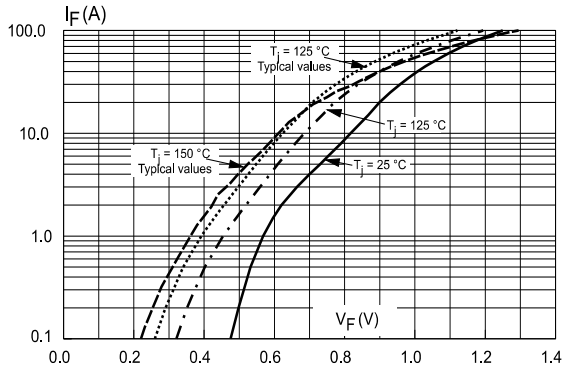
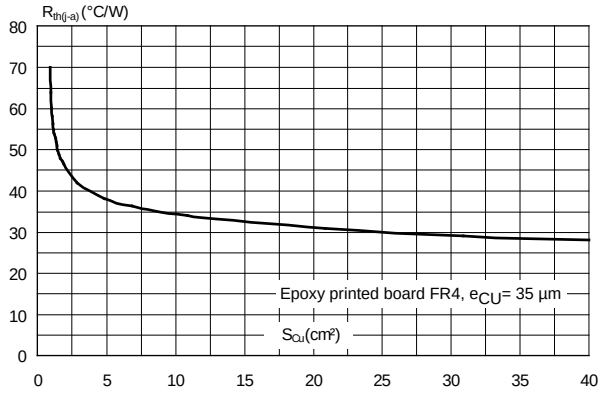


Figure 9: Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)



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 TO-220AB package information

Figure 10: TO-220AB package outline

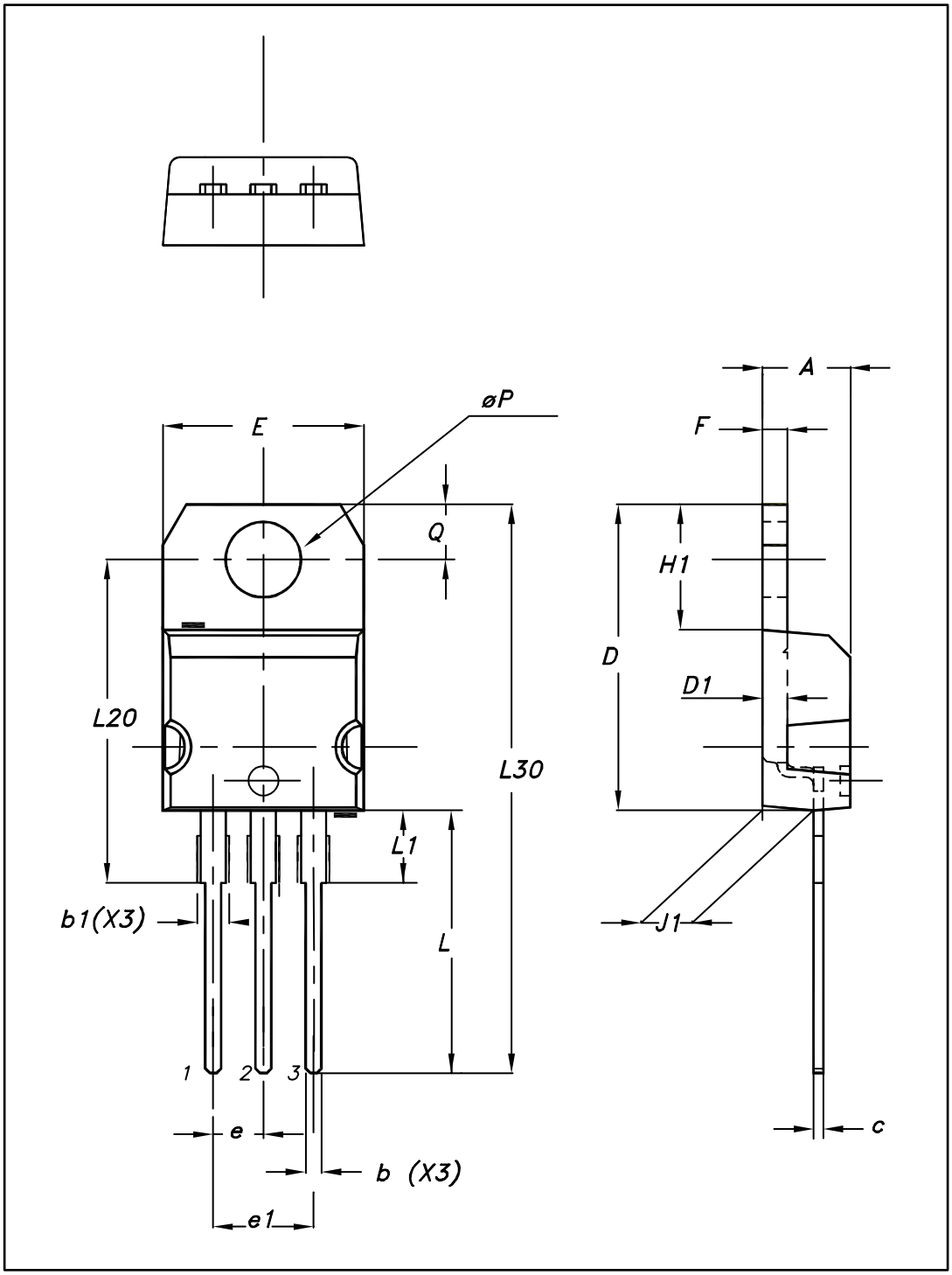


Table 5: TO-220AB package mechanical data

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

2.2 TO-220FPAB package information

Figure 11: TO-220FPAB package outline

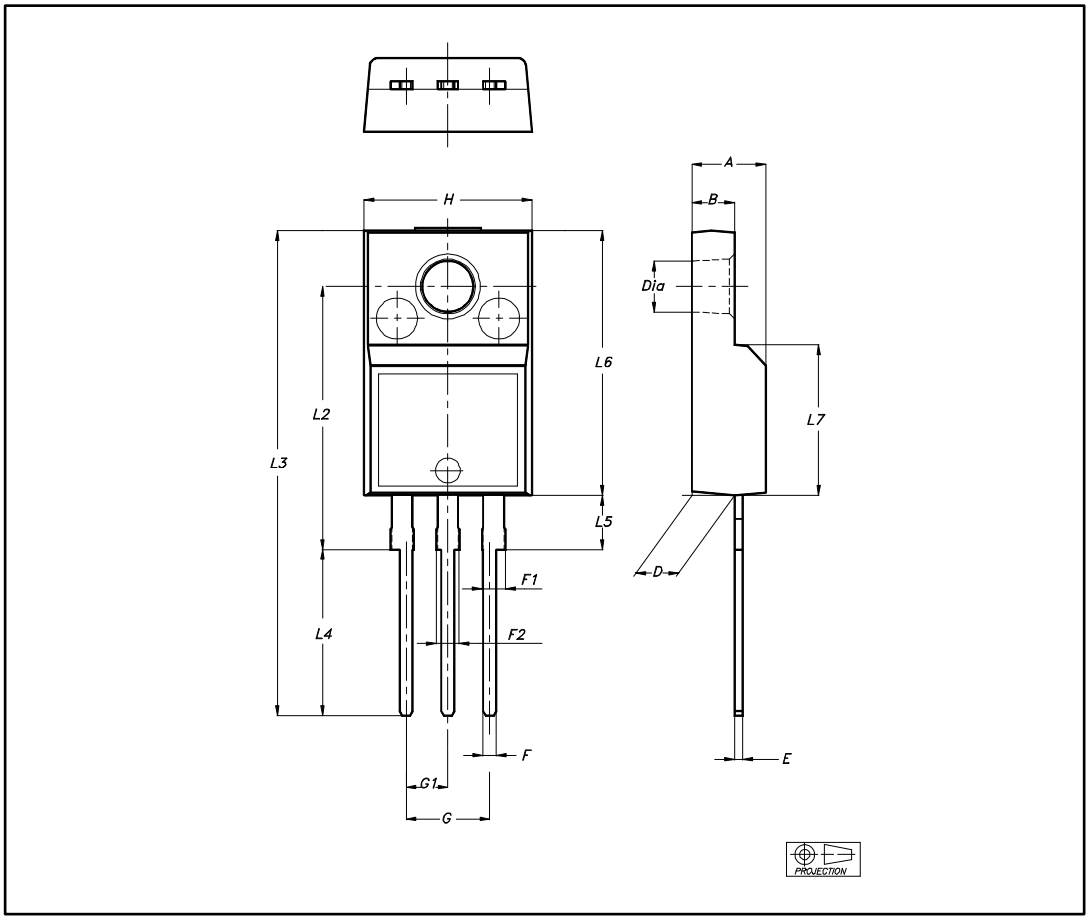
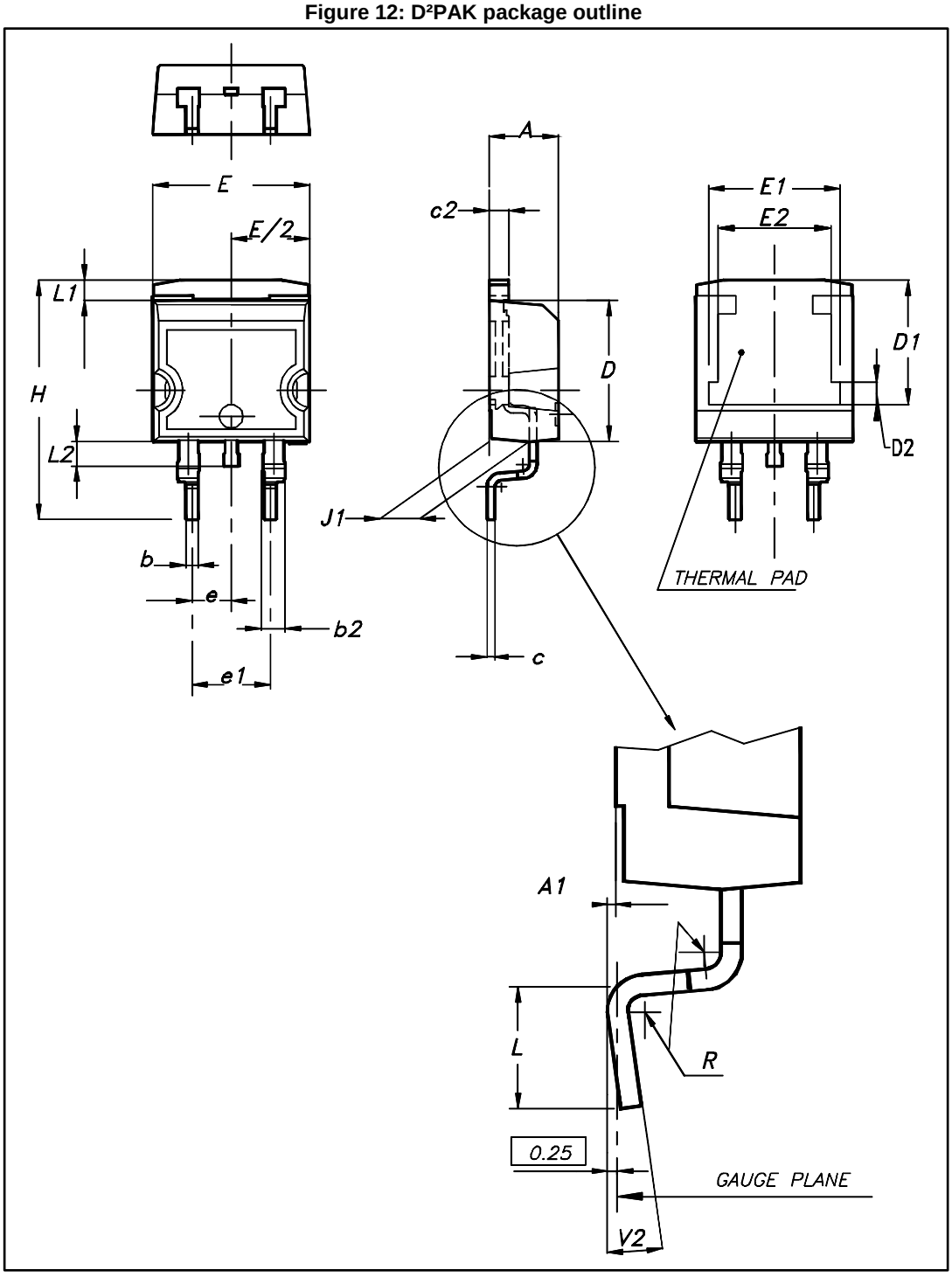


Table 6: TO-220FPAB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	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	0.028
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	5.2	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.394	0.409
L2	16 typ.		0.63 typ.	
L3	28.60	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	9.3	0.354	0.366
Dia	3	3.2	0.118	0.126

2.3 D²PAK package information

Figure 12: D²PAK package outline

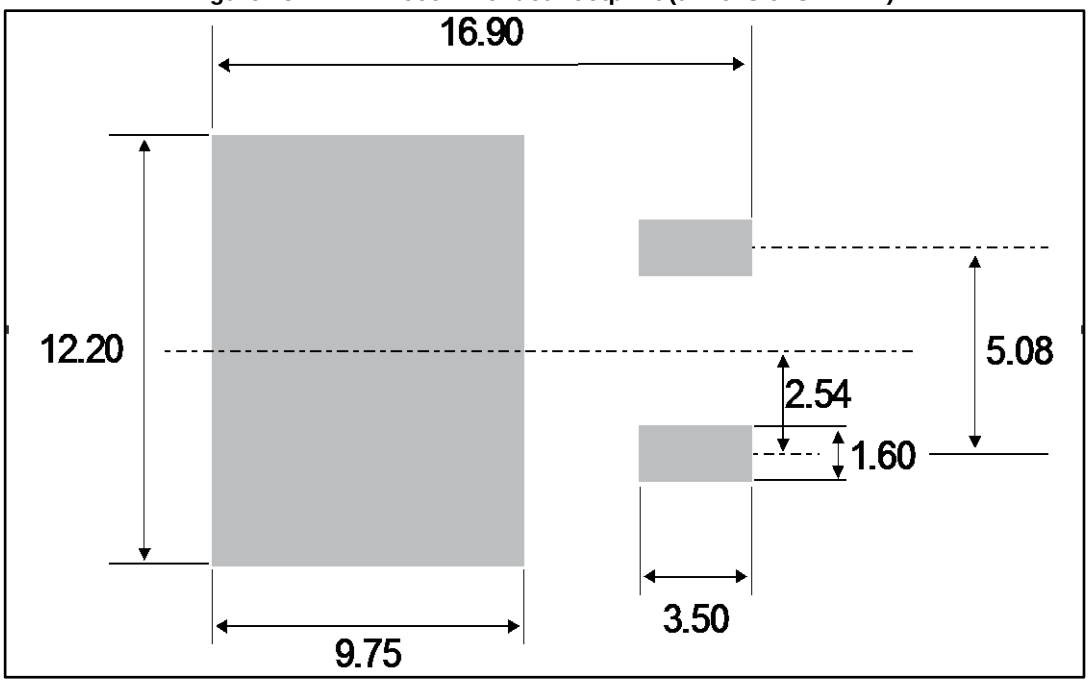


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 7: D²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
E	10.00	10.55	0.394	0.415
E1	8.10	8.90	0.319	0.346
E2	6.85	7.25	0.266	0.282
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	15.00	15.85	0.591	0.624
J1	2.49	2.90	0.097	0.112
L	1.90	2.79	0.075	0.110
L1	1.27	1.65	0.049	0.065
L2	1.30	1.78	0.050	0.070
R	0.4 typ.		0.015	
V2	0°	8°	0°	8°

Figure 13: D²PAK recommended footprint (dimensions in mm)



3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS10H100CT	STPS10H100CT	TO-220AB	1.9 g	50	Tube
STPS10H100CFP	STPS10H100CFP	TO-220FPAB	1.9 g	50	Tube
STPS10H100CG-TR	STPS10H100CG	D²PAK	1.38 g	1000	Tape and 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 I²PAK package.
17-Oct-2016	2	Updated cover page, and *Section 3.1: "Characteristics (curves)"*, *Section 3: "Characteristics"*, *Section 5: "Ordering information"* and *Section 4.4: "D²PAK package information"*.

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