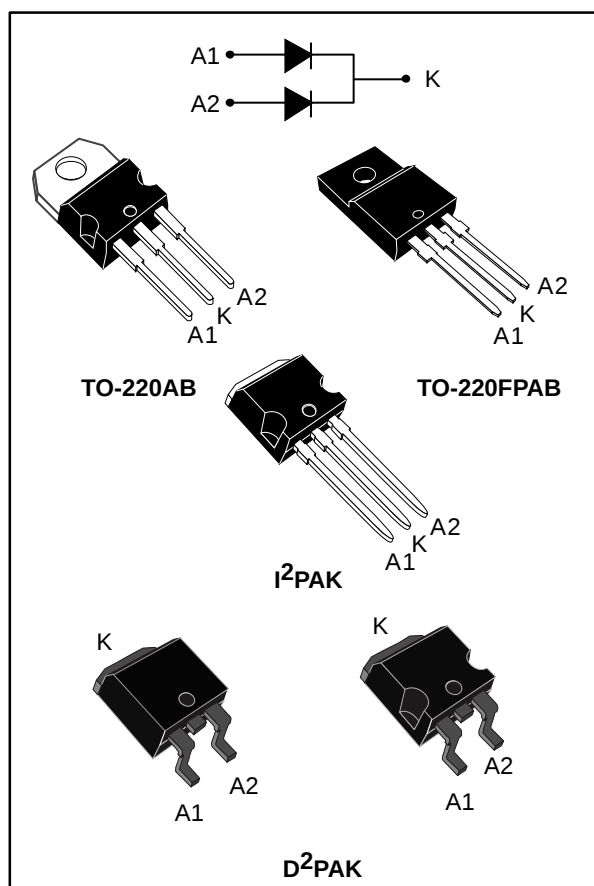


100 V power Schottky rectifier

Datasheet - production data



Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche rated
- Insulated package: TO-220FPAB
 - Insulating voltage = 2000 V_{RMS} sine
- ECOPACK®2 compliant component for D²PAK on demand

Description

Dual center tap Schottky rectifier designed for high frequency miniature switch mode power supplies such as adaptors and on-board DC-DC converters.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2x 10 A
V_{RRM}	100 V
$T_j (max)$	175 °C
$V_F (typ)$	0.59 V

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				30	A
I _{F(AV)}	Average forward current $\delta = 0.5$, square wave	TO-220AB, D ² PAK, I ² PAK	T _C = 160 °C	Per diode	10	A
				Per device	20	
		TO-220FPAB	T _C = 145 °C	Per diode	10	
			T _C = 125 °C	Per device	20	
I _{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal			250	A
P _{ARM}	Repetitive peak avalanche power	tp = 10 μs, T _J = 125 °C			775	W
T _{stg}	Storage temperature range				-65 to + 175	°C
T _j	Maximum operating junction temperature ⁽¹⁾				+ 175	°C

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 parameter

Symbol	Parameter			Value	Unit
R _{th(j-c)}	Junction to case	TO-220AB, D ² PAK, I ² PAK	Per diode	1.6	°C/W
		TO-220FPAB		4	
		TO-220AB, D ² PAK, I ² PAK	Total	0.9	
		TO-220FPAB		3.2	
R _{th(c)}	Coupling	TO-220AB, D ² PAK, I ² PAK	-	0.15	°C/W
		TO-220FPAB		2.5	

When the diodes 1 and 2 are used simultaneously :

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

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-		4.5	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		-	2	6	mA
$V_F^{(2)}$	Forward voltage drop	$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 8\text{ A}$	-		0.71	V
			$I_F = 10\text{ A}$	-		0.77	
			$I_F = 16\text{ A}$	-		0.81	
			$I_F = 20\text{ A}$	-		0.88	
		$T_J = 125\text{ }^{\circ}\text{C}$	$I_F = 8\text{ A}$	-	0.56	0.58	
			$I_F = 10\text{ A}$	-	0.59	0.64	
			$I_F = 16\text{ A}$	-	0.65	0.68	
			$I_F = 20\text{ A}$	-	0.67	0.73	

Notes:⁽¹⁾Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$ ⁽²⁾Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.55 \times I_{F(AV)} + 0.009 I_{F(RMS)}^2$$

1.1 Characteristics (curves)

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

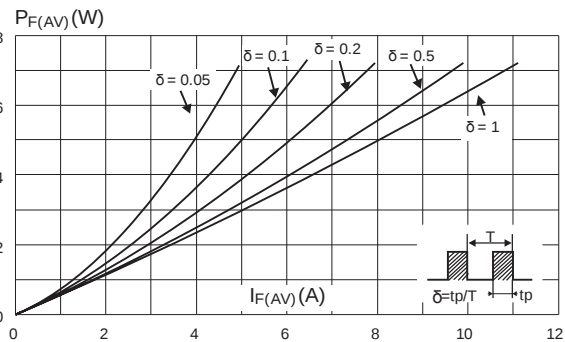


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

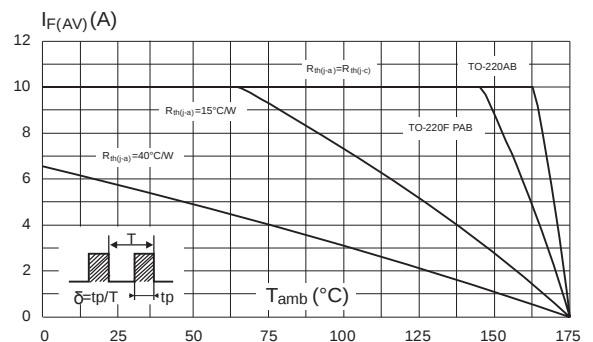


Figure 3: Normalized avalanche power derating versus pulse ($T_j = 125^\circ\text{C}$)

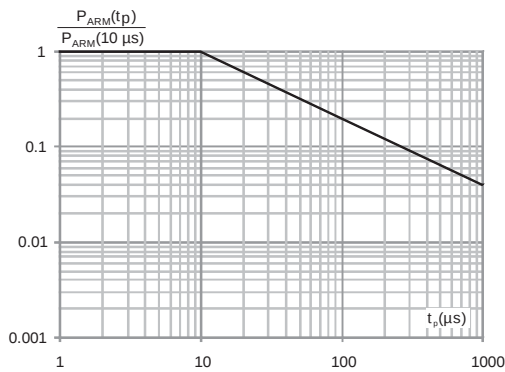


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (per diode)

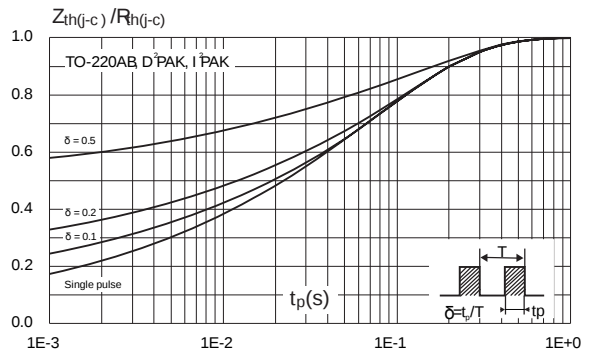


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (per diode)

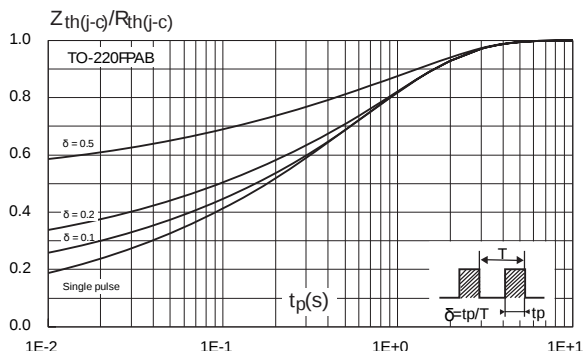


Figure 6: Reverse leakage current versus reverse voltage applied (typical values, per diode)

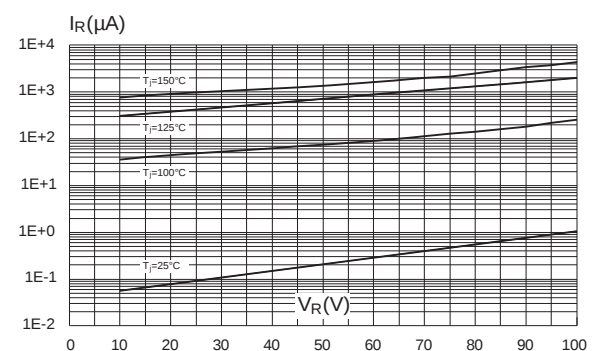


Figure 7: Junction capacitance versus reverse voltage applied (typical values, per diode)

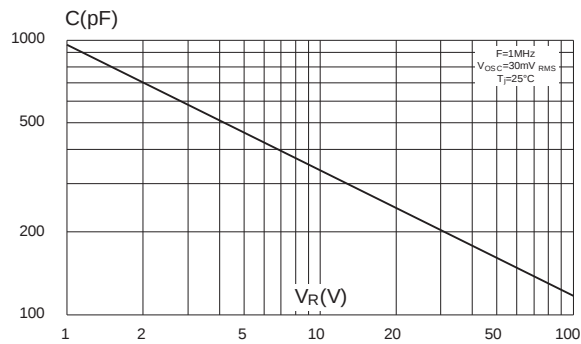


Figure 8: Forward voltage drop versus forward current (maximum values, per diode)

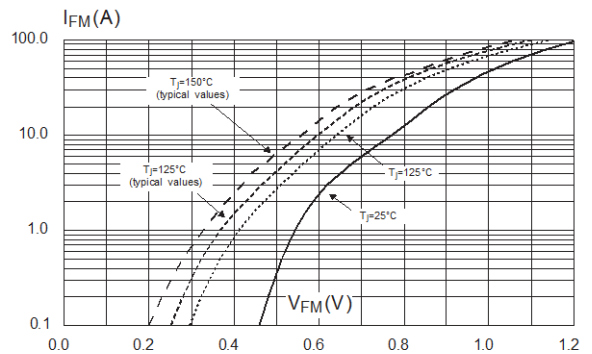
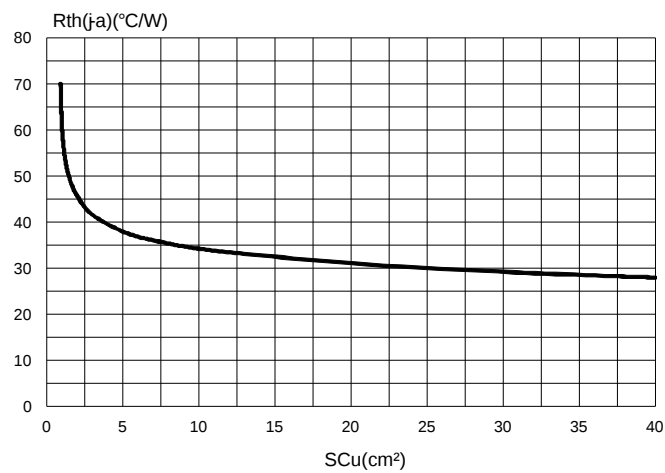


Figure 9: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, eCu = 35 μm) (D²PAK)

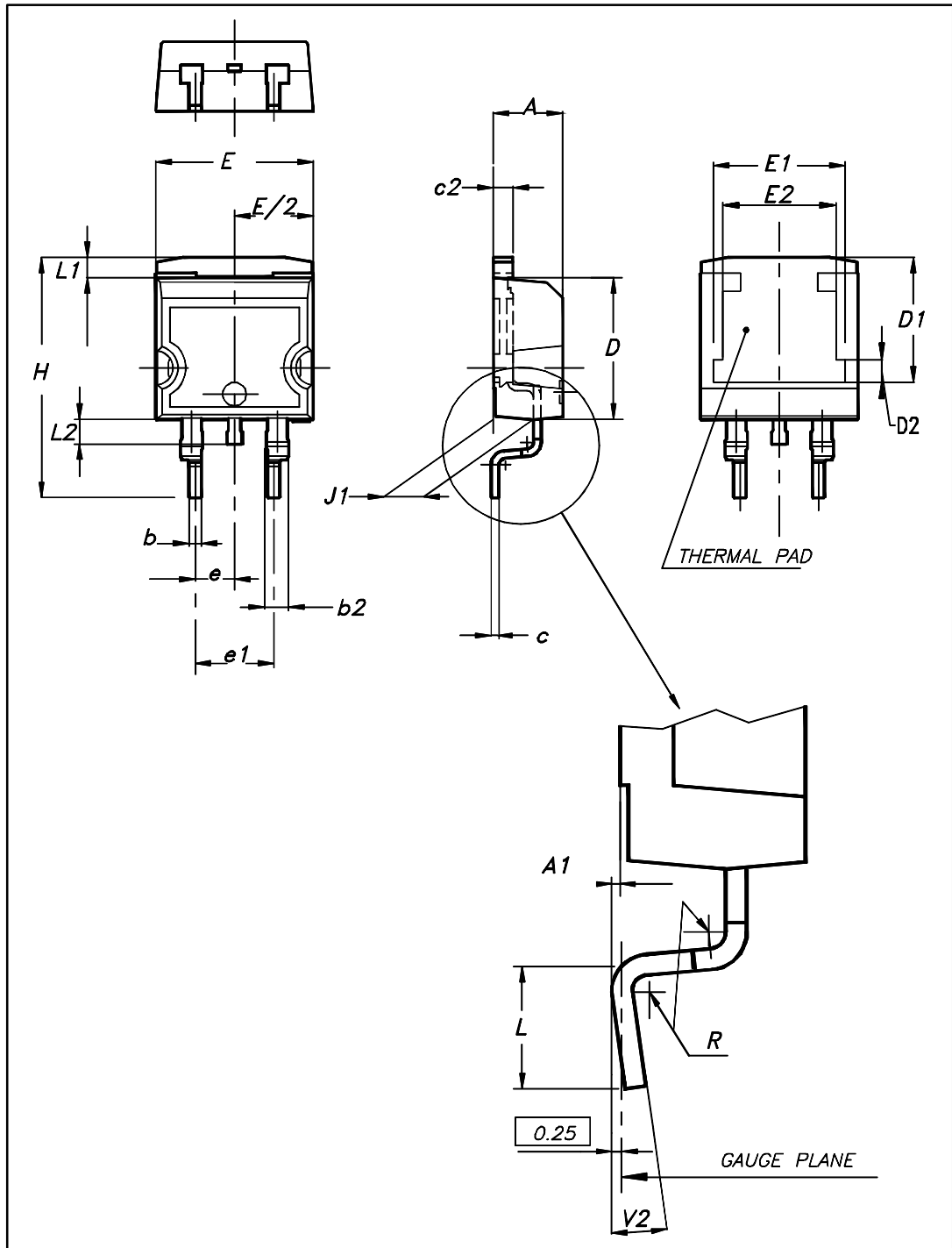


2 Package information

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 and TO-220FPAB)
- Maximum torque value: 0.7 N·m (for TO-220AB and TO-220FPAB)

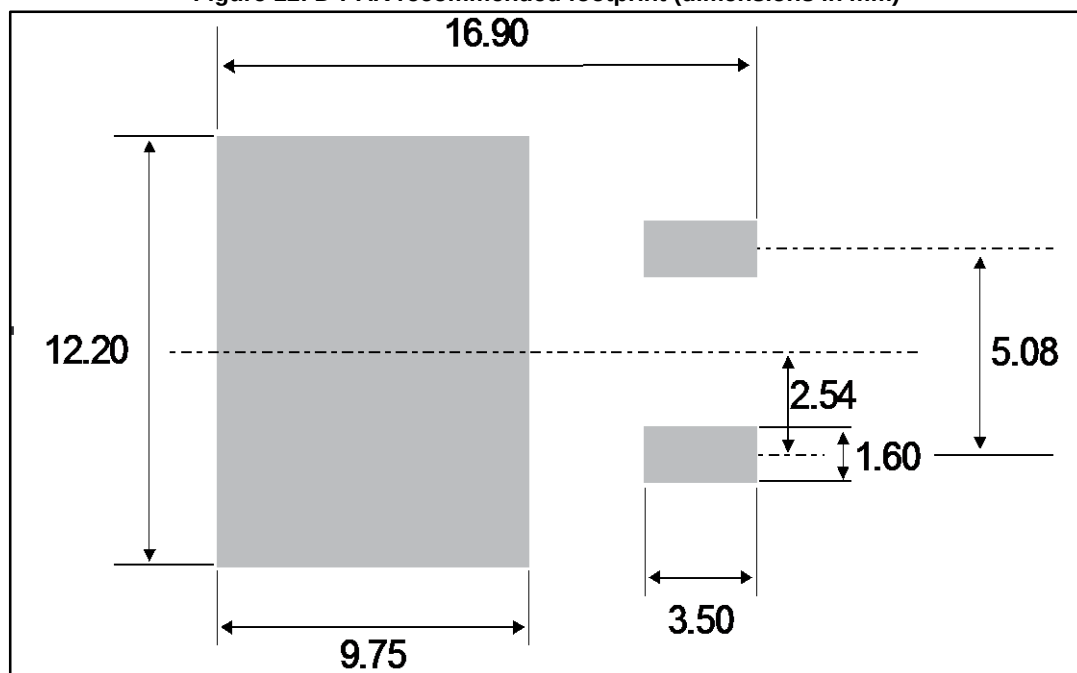
2.1 D²PAK package information

Figure 10: D²PAK package outline

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

Table 5: 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 11: D²PAK recommended footprint (dimensions in mm)

2.2 I²PAK package information

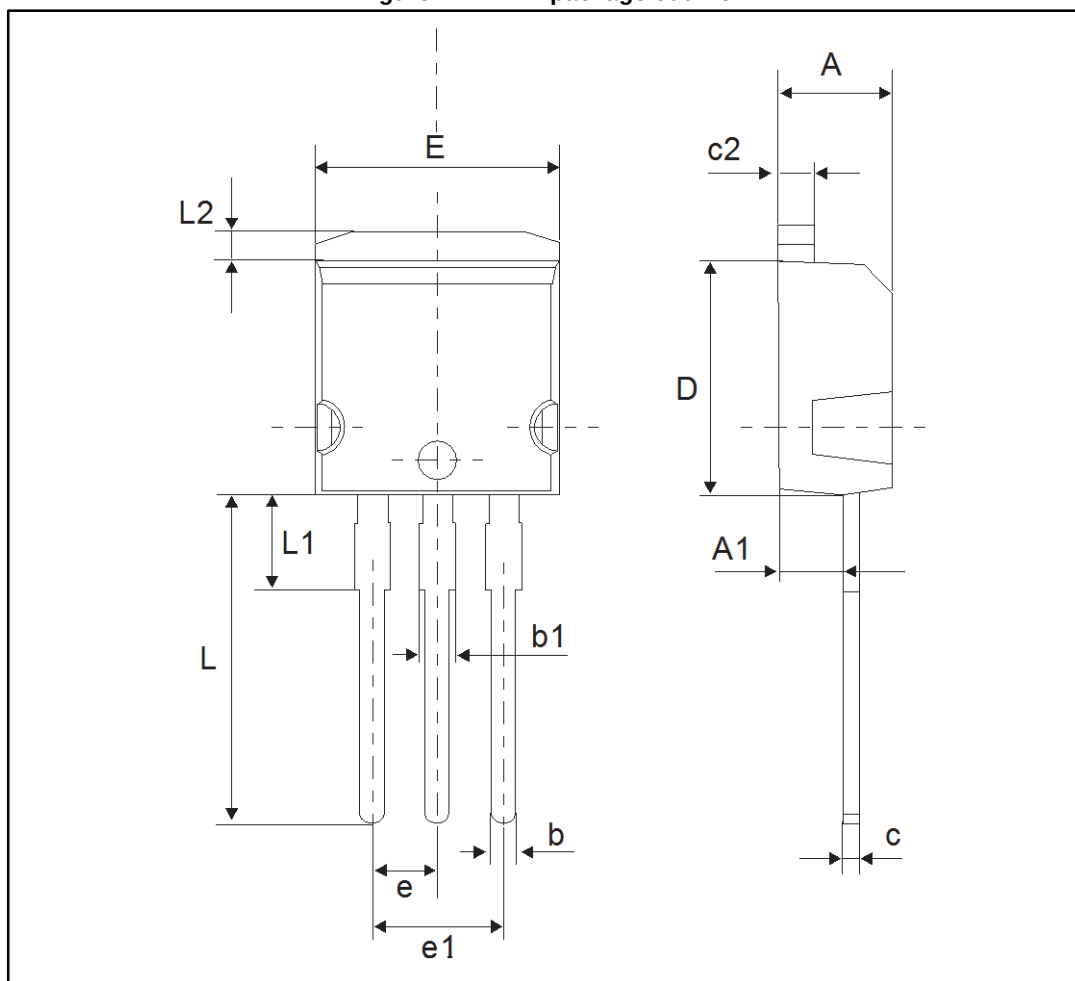
Figure 12: I²PAK package outline

Table 6: I²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
F	0.75	1.0	0.03	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	2.40	2.70	0.094	0.106
H	10.00	10.40	0.393	0.409
L2	16.00 typ.		0.63 typ.	
L3	28.60	30.60	1.126	1.205
L4	9.80	10.6	0.386	0.417
L5	2.90	3.60	0.114	0.142
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia	3.0	3.20	0.118	0.126

Mounting (soldering) the I²PAK metal slug (heatsink) with alloy, like a surface mount device, IS NOT PERMITTED. A standard through-hole mounting is mandatory.

2.3 TO-220AB package information

Figure 13: TO-220AB package outline

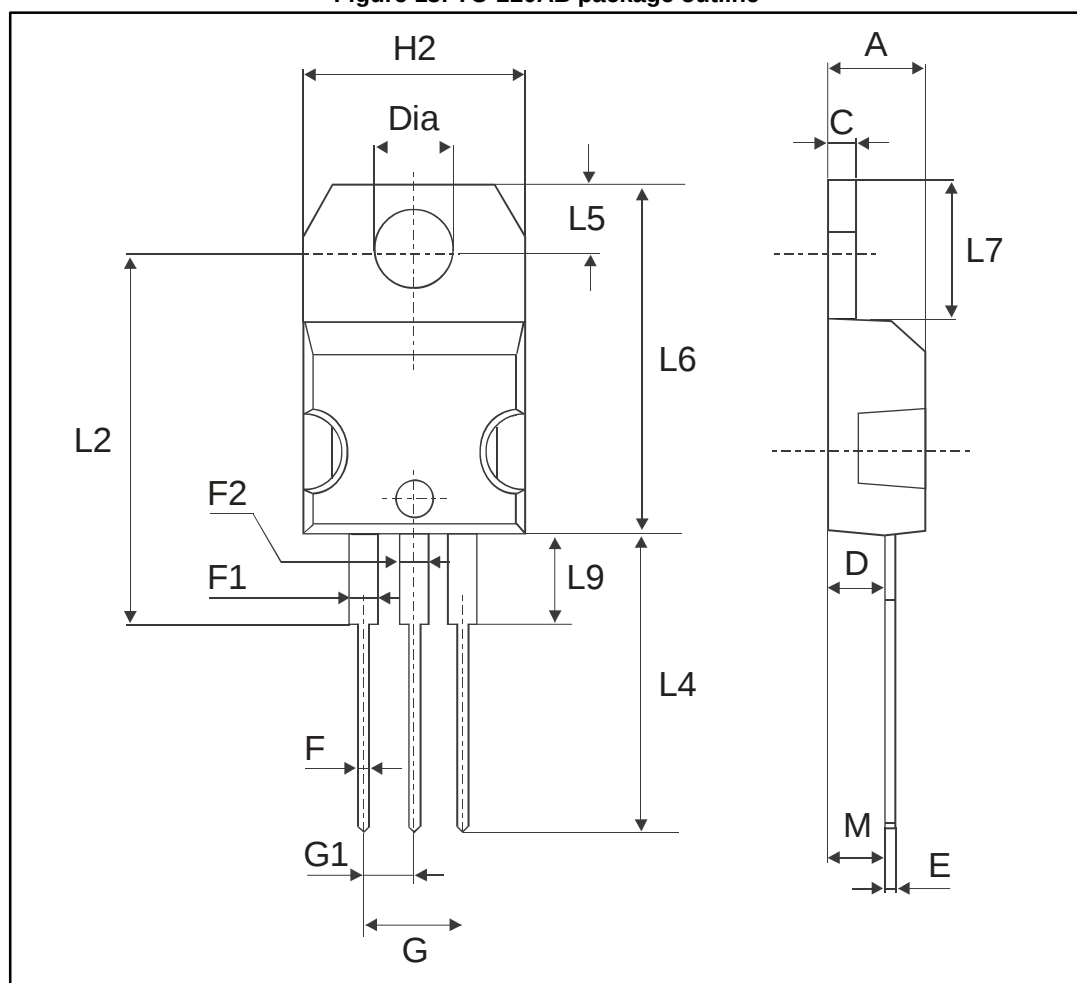


Table 7: TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam	3.75	3.85	0.147	0.151

2.4 TO-220FPAB package information

Figure 14: TO-220FPAB package outline

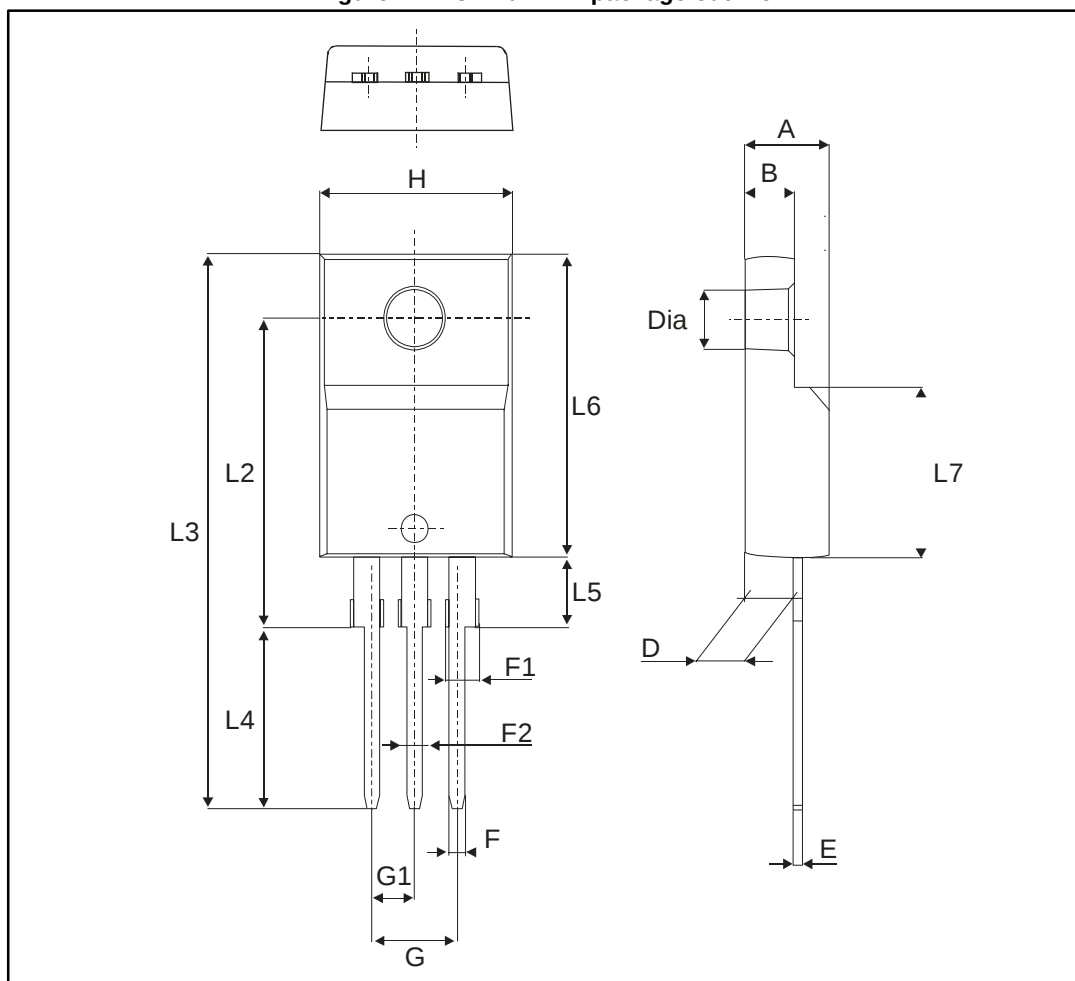


Table 8: TO-220FPAB package mechanical data

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	2.50	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1.0	0.03	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	2.40	2.70	0.094	0.106
H	10.00	10.40	0.393	0.409
L2	16.00 typ.		0.63 typ.	
L3	28.60	30.60	1.126	1.205
L4	9.80	10.6	0.386	0.417
L5	2.90	3.60	0.114	0.142
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia	3.0	3.20	0.118	0.126

3 Ordering information

Table 9: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20H100CT	STPS20H100CT	TO-220AB	1.9g	50	Tube
STPS20H100CFP	STPS20H100CFP	TO-220FPAB	1.9g	50	Tube
STPS20H100CR	STPS20H100CR	I ² PAK	1.5g	50	Tube
STPS20H100CG	STPS20H100CG	D ² PAK	1.38g	50	Tube
STPS20H100CG-TR	STPS20H100CG	D ² PAK	1.38g	1000	Tape and reel

4 Revision history

Table 10: Document revision history

Date	Revision	Changes
Jul-2003	4G	Previous release
21-Mar-2007	5	Removed ISOWATT package
10-Sep-2007	6	Reformatted cover page to current standards - no technical changes. Updated dimensions A1, b, b1, c, c2, L, and L1 in Table 8 .
22-Sep-2011	7	Updated Table 8
21-May-2015	8	Updated features, and packages silhouette in cover page. Updated Section 1: "Characteristics" and Section 1.1: "Characteristics (curves)" Updated Section 2.2: "D²PAK package information" .

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