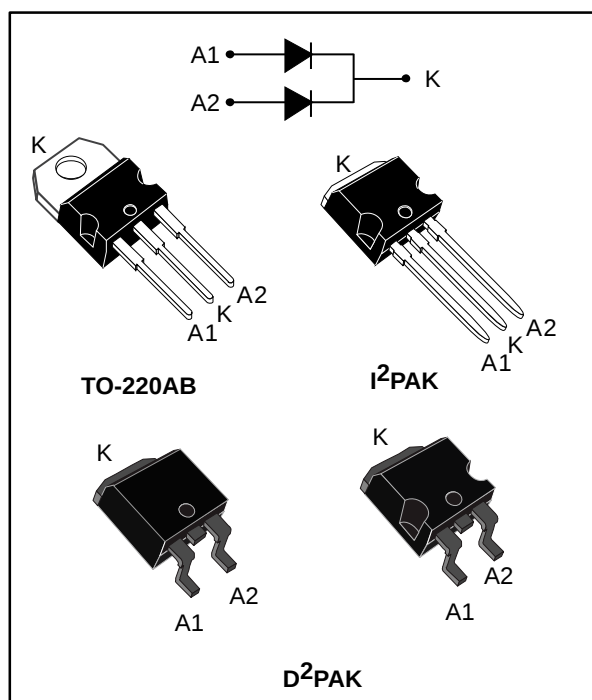


Power Schottky rectifier

Datasheet - production data



Description

Dual center tap Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged either in TO-220AB and D²PAK, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	45 V
T_j (max)	175 °C
V_F (typ)	0.5 V

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- 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			45	V
I _{F(RMS)}	Forward rms current			20	A
I _{F(AV)}	Average forward current δ = 0.5, square wave	T _C = 157 °C	Per diode	7.5	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		150	A
P _{ARM}	Repetitive peak avalanche power	t _p = 10 μs, T _j = 125 °C		190	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 parameters

Symbol	Parameter		Value	Unit
R _{th(j-c)}	Junction to case	Per diode	3.0	°C/W
		Total	1.7	
R _{th(c)}	Coupling	-	0.35	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P_{(\text{diode1})} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode2})} \times R_{th(c)}$$

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}	-		100	μA
		T _j = 125 °C		-	5	15	mA
V _F ⁽¹⁾	Forward voltage drop	T _j = 125 °C	I _F = 7.5 A	-	0.5	0.57	V
		T _j = 25 °C	I _F = 15 A	-	-	0.84	
		T _j = 125 °C	I _F = 15 A	-	0.65	0.72	

Notes:

⁽¹⁾Pulse test: t_p = 380 μs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.020 I_{F(RMS)}^2$$

1.1 Characteristics (curves)

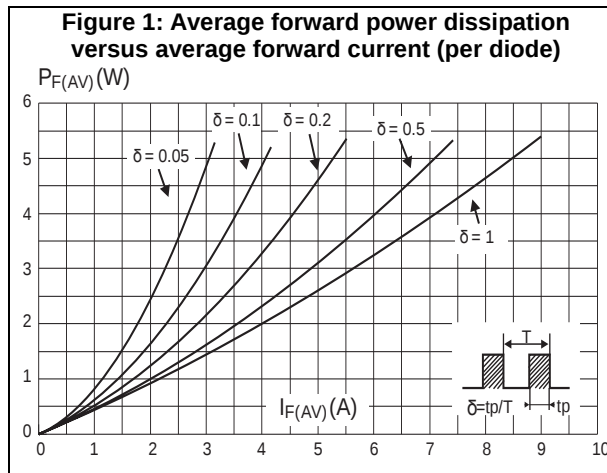


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

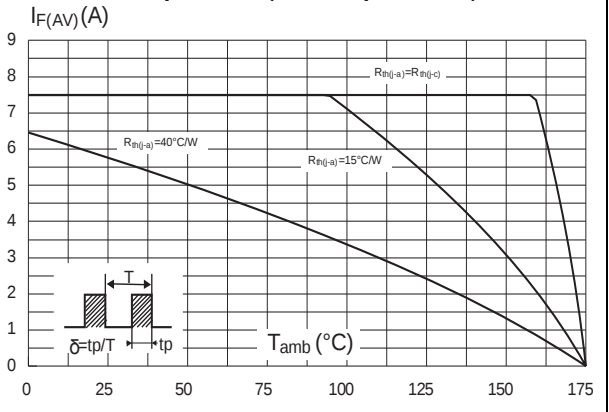


Figure 3: Normalized avalanche power derating versus pulse duration ($T_j = 125^\circ C$)

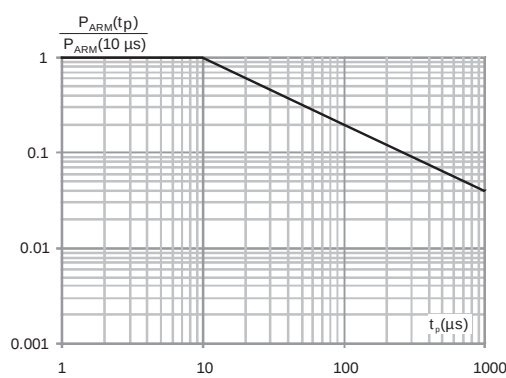


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

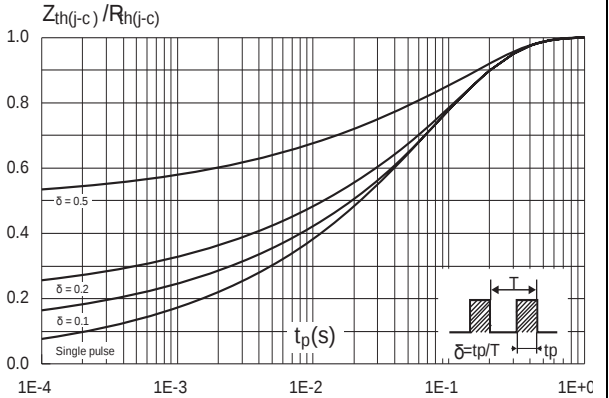


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

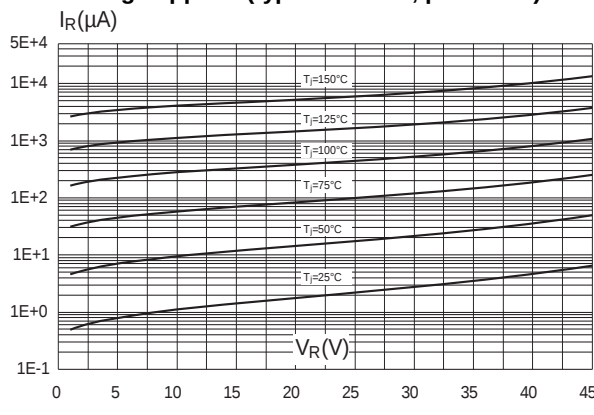


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

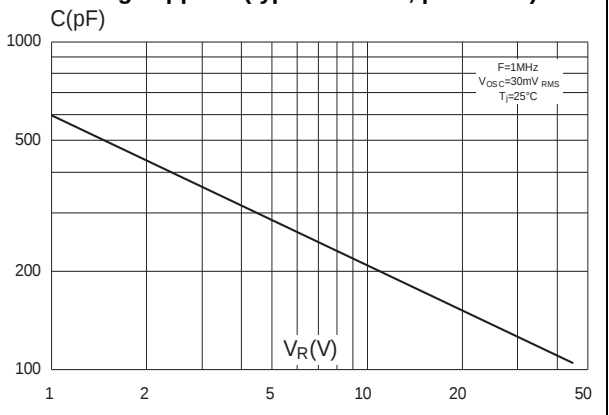


Figure 7: Forward voltage drop versus forward current (per diode)

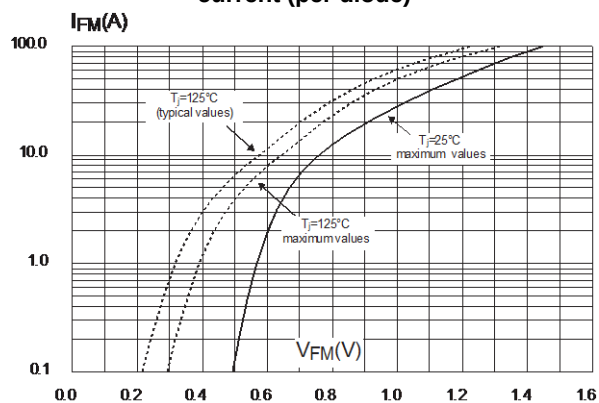
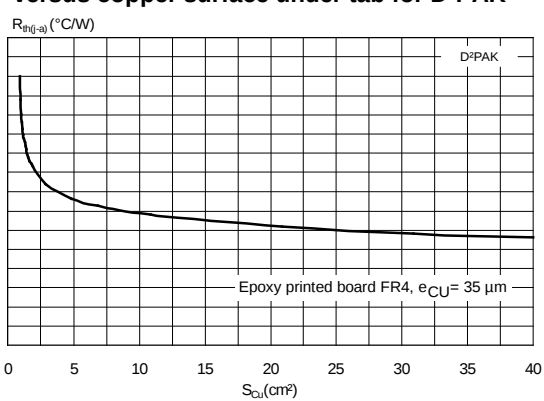


Figure 8: Thermal resistance junction to ambient versus copper surface under tab for D²PAK

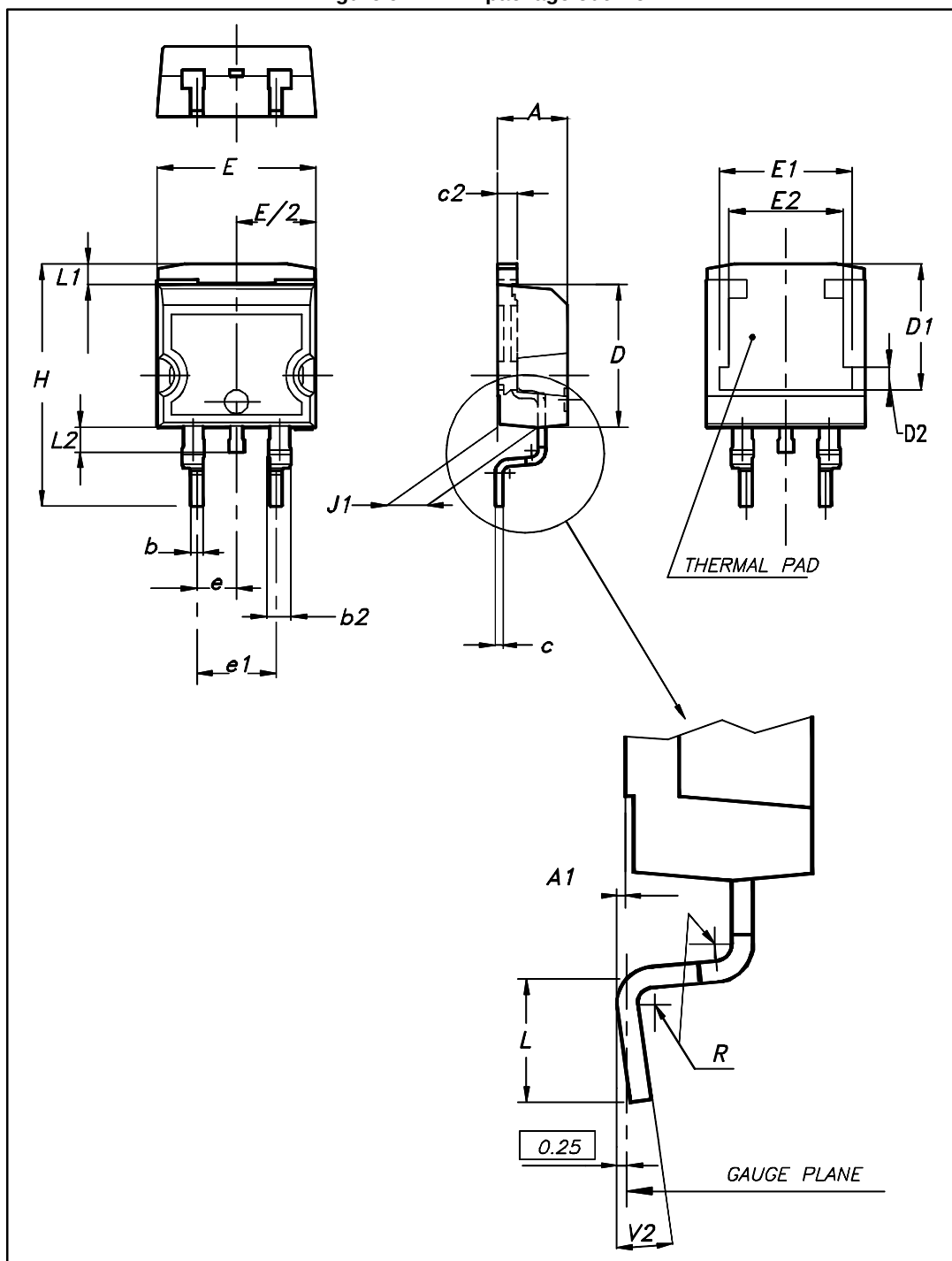


2 Package information

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

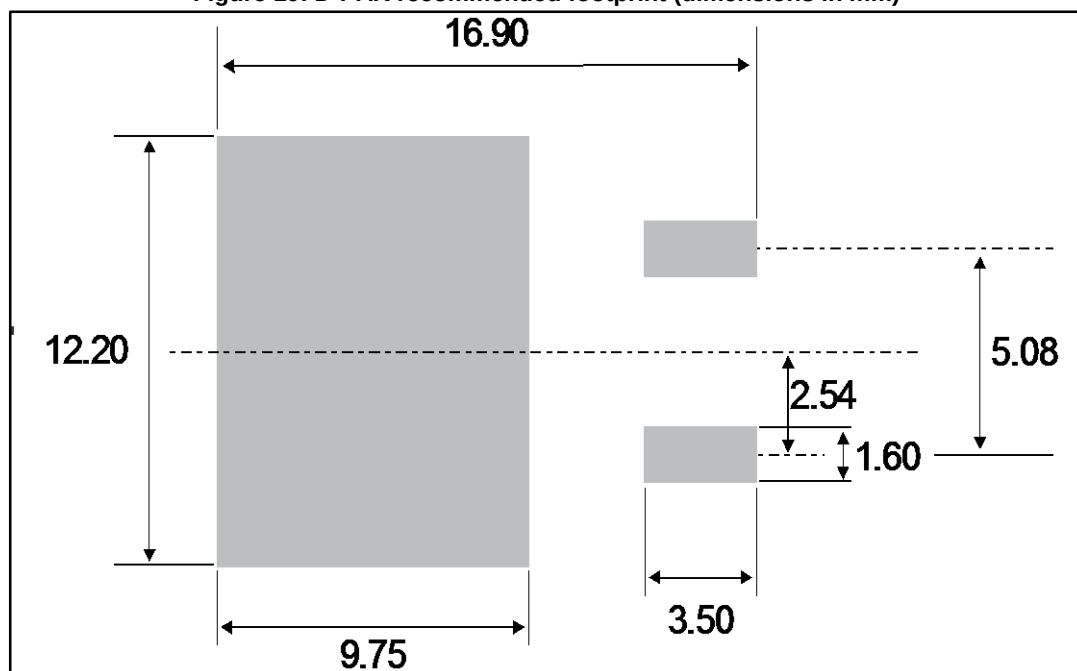
2.1 D²PAK package information

Figure 9: D²PAK package outline

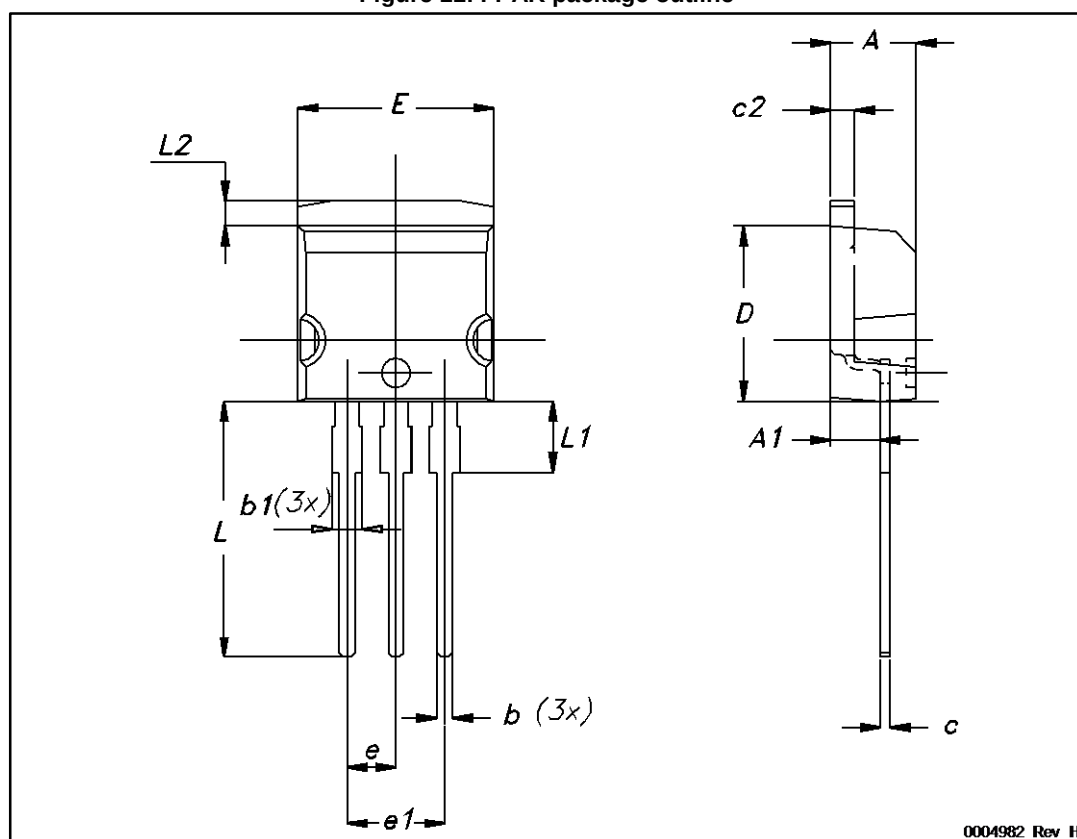
This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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 10: D²PAK recommended footprint (dimensions in mm)

2.2 I²PAK package information

Figure 11: I²PAK package outline

0004982_Rev_H

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	0.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10.00	10.40	0.394	0.409
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

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 12: TO-220AB package outline

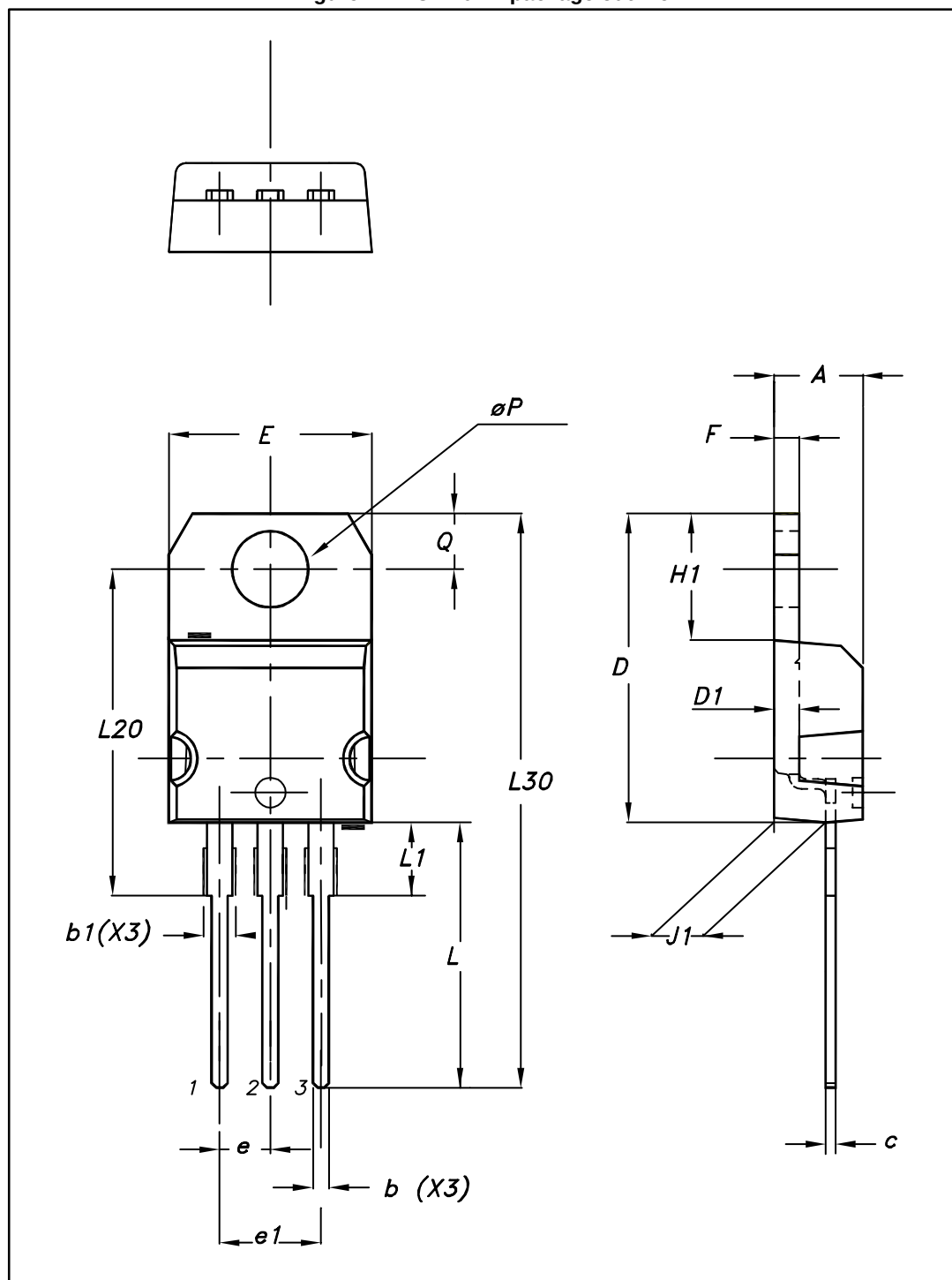


Table 7: TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
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

3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1545CT	STPS1545CT	TO-220AB	1.95g	50	Tube
STPS1545CR	STPS1545CR	I ² PAK	1.5g	50	Tube
STPS1545CG-TR	STPS1545CG	D ² PAK	1.38g	1000	Tape and reel

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
Jul-2003	5F	Last release.
21-Mar-2007	6	Removed ISOWATT and TO-220FPAB packages.
03-Nov-2010	7	Added DPAK package
26-Feb-2016	8	Removed DPAK package. Updated features and packages silhouette in cover page. Updated Section 1: "Characteristics" and Section 1.1: "Characteristics (curves)" . Updated Section 2.1: "D²PAK package information" .

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