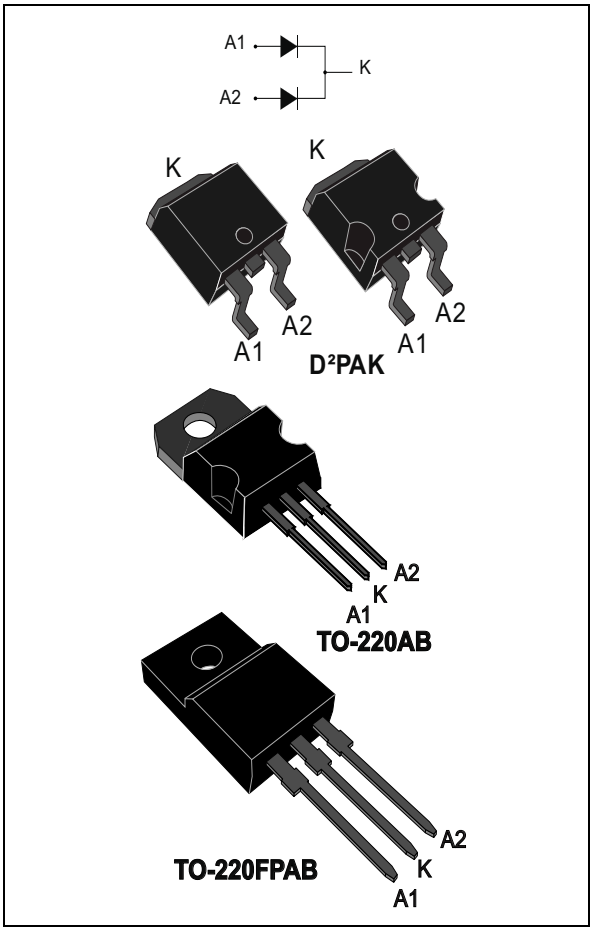
STPS10150C

High voltage power Schottky rectifier

Datasheet – production data



Description

This dual center tab Schottky rectifier is suited for high frequency switched mode power supplies.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 5A
V_{RRM}	150 V
$T_{j(max)}$	175 °C
$V_{F\ (Typ)}$	0.69 V

Features

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

This is information on a product in full production. www.st.com

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at T_{amb} = 25 °C unless otherwise stated)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				150	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 = 155 °C	Per diode	5	A
		TO-220FPAB	T_c = 145 °C			
		TO-220AB, D²PAK	T_c = 150 °C	Per device	10	
		TO-220FPAB	T_c = 130 °C			
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		120	A
P_{ARM}(1)	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C		220	W
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Maximum operating junction temperature(2)				175	°C

1. For pulse time duration derating, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	TO-220AB, D²PAK	Per diode	4	°C/W
		TO-220FPAB		7	
		TO-220AB, D²PAK	Total	2.4	
		TO-220FPAB		5.3	
$R_{th(c)}$	Coupling	TO-220AB, D²PAK		0.7	
		TO-220FPAB		3.7	

When the diodes 1 and 2 are used simultaneously:
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

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	$V_R = V_{RRM}$	-	-	2.0	µA
		T_j = 125 °C		-	0.40	2.0	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5A	-	-	0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 10 A	-	-	1.0	
		T_j = 125 °C		-	0.79	0.85	

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:
$P = 0.65 \times I_{F(AV)} + 0.02 \times I_F{}^2{}_{(RMS)}$

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

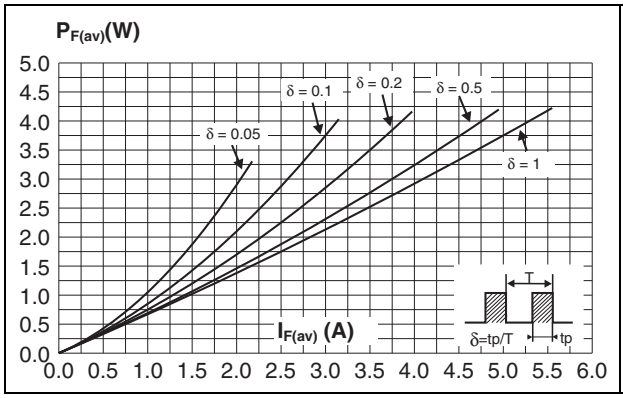


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

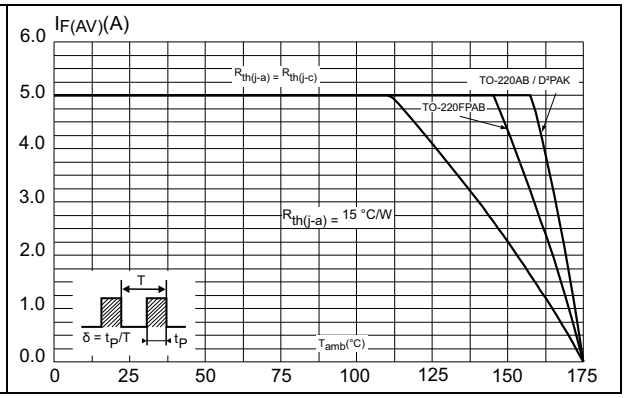


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

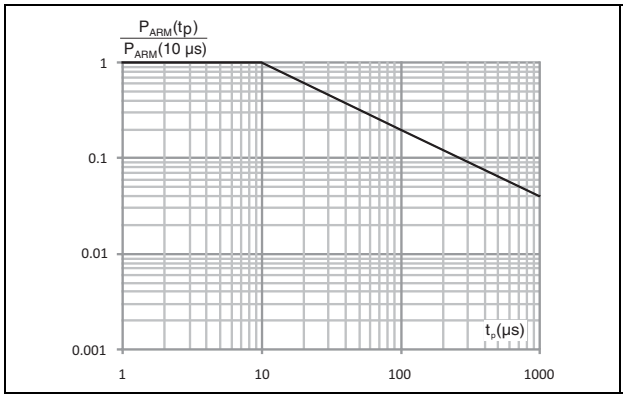


Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)

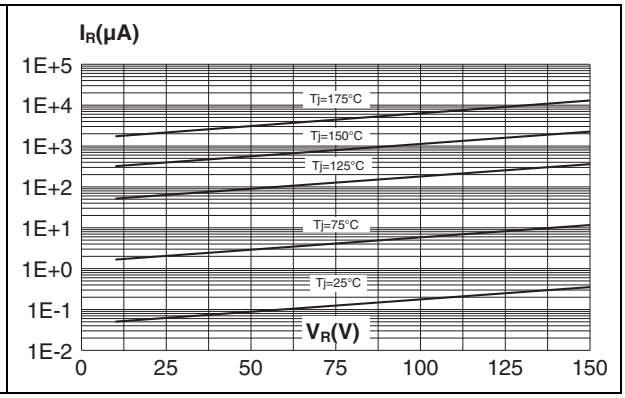


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

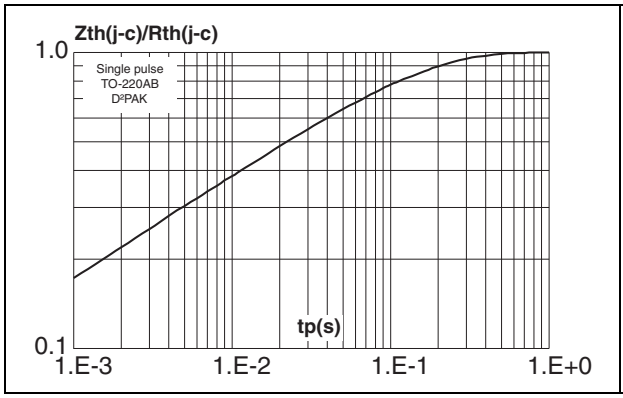


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

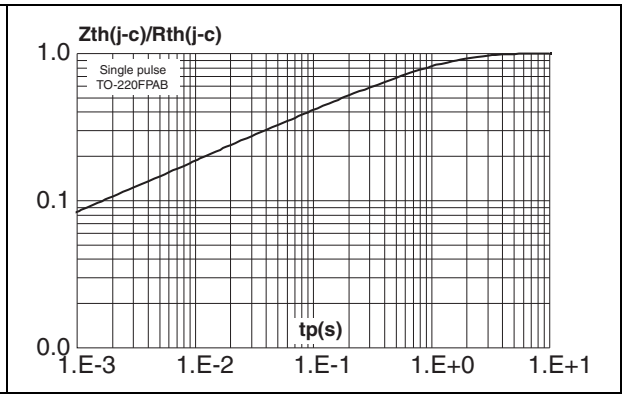


Figure 7. Forward voltage drop vs. forward current (per diode)

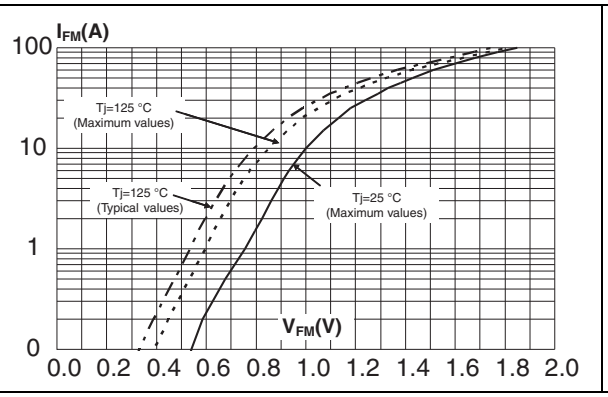


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

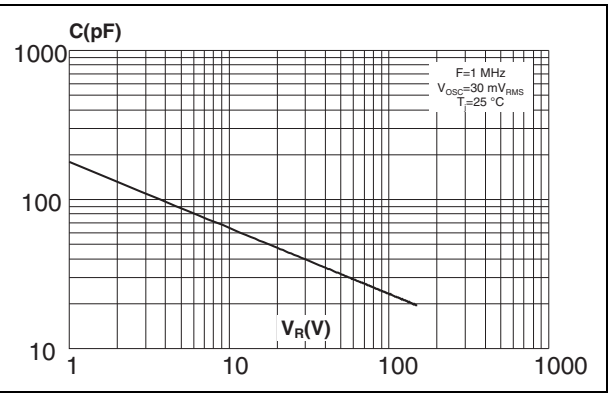
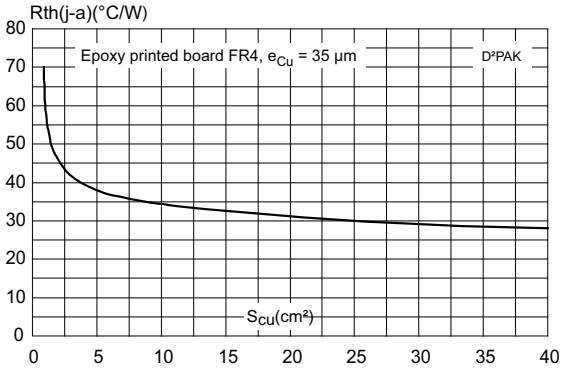


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (D²PAK)



2 Package Information

- Epoxy meets UL94,V0
- Recommended torque value: 0.55 N·m (TO-220AB, TO-220FPAB)
- Maximum torque value: 0.7 N·m (TO-220AB, TO-220FPAB)

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.

2.1 TO-220FPAB package information

Figure 10. TO-220FPAB package outline

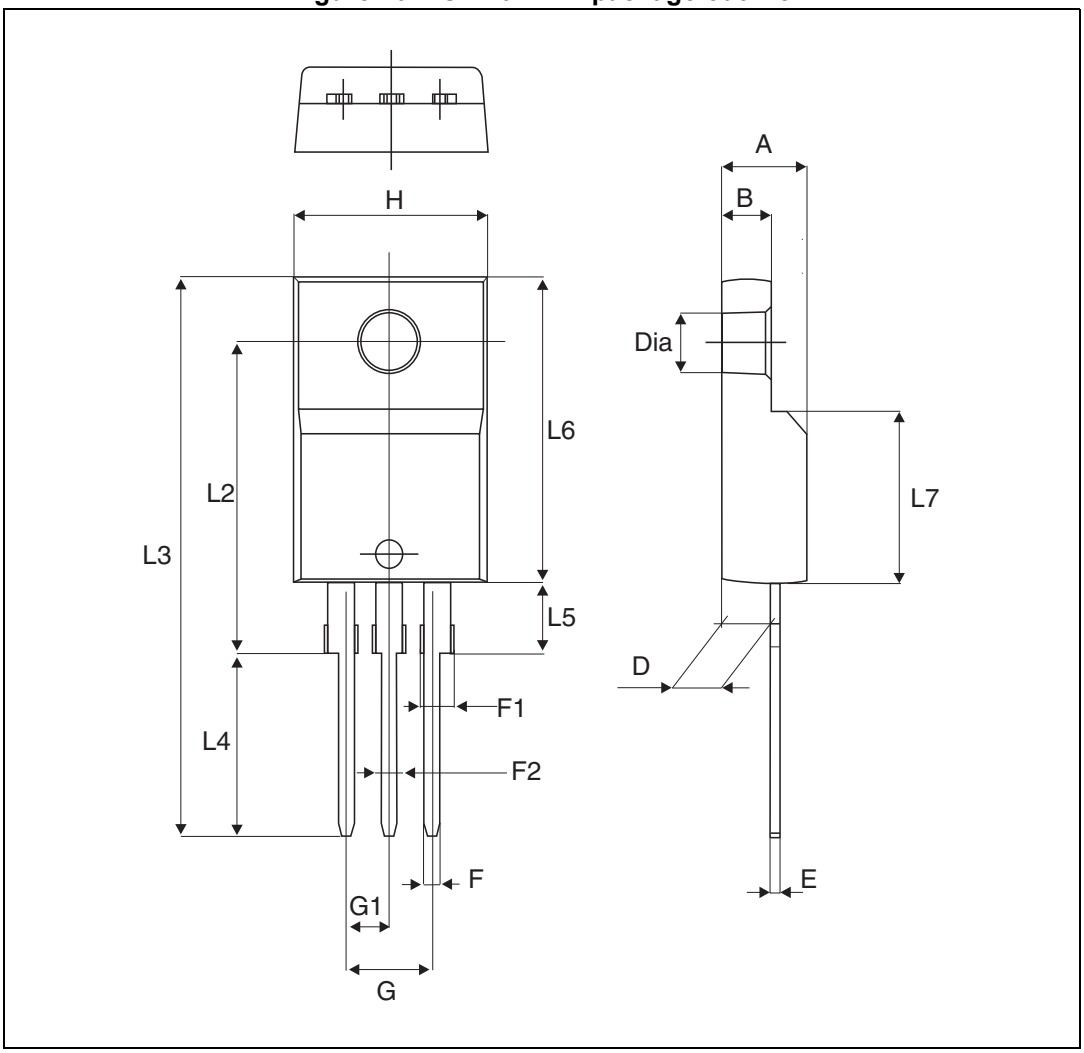


Table 5. TO-220FPAB package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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

2.2 TO-220AB package information

Figure 11. TO-220AB package outline

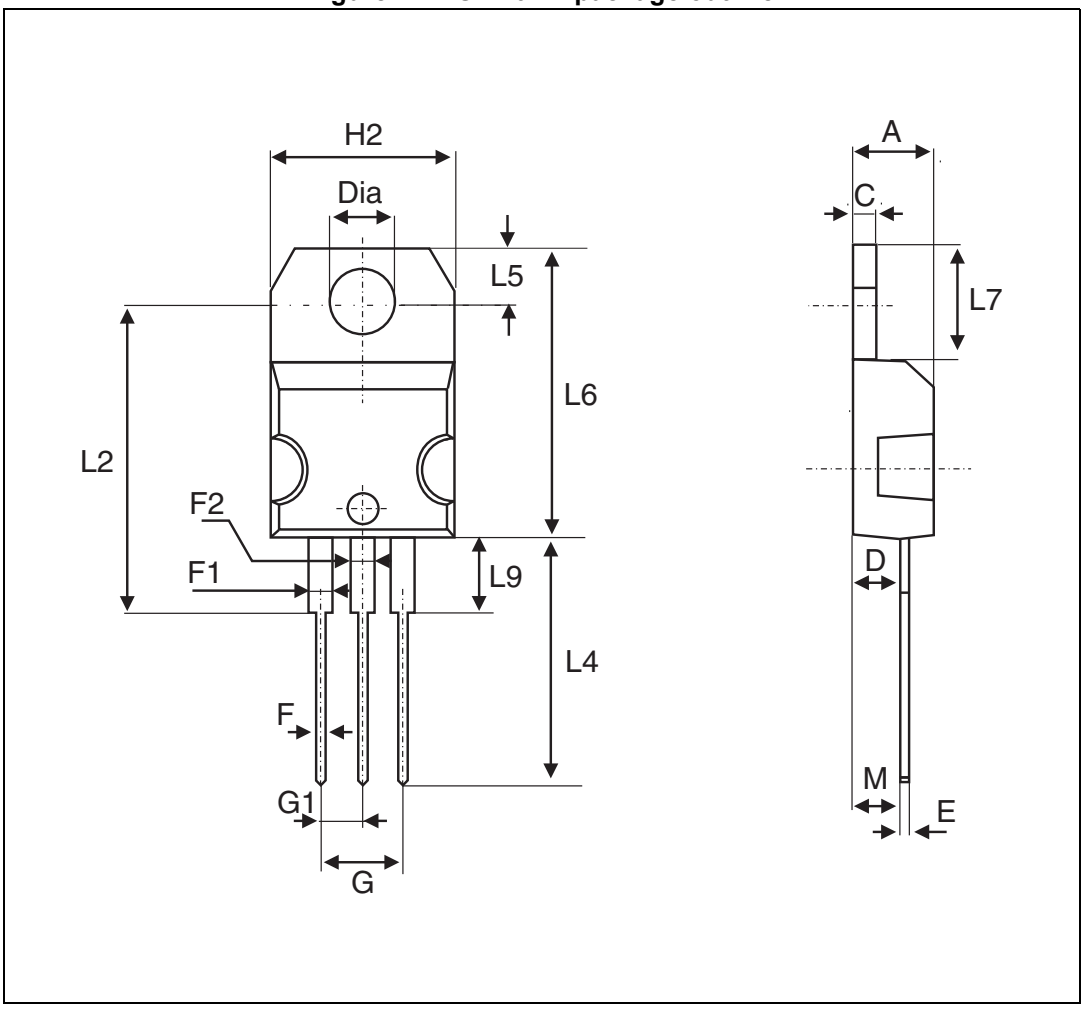
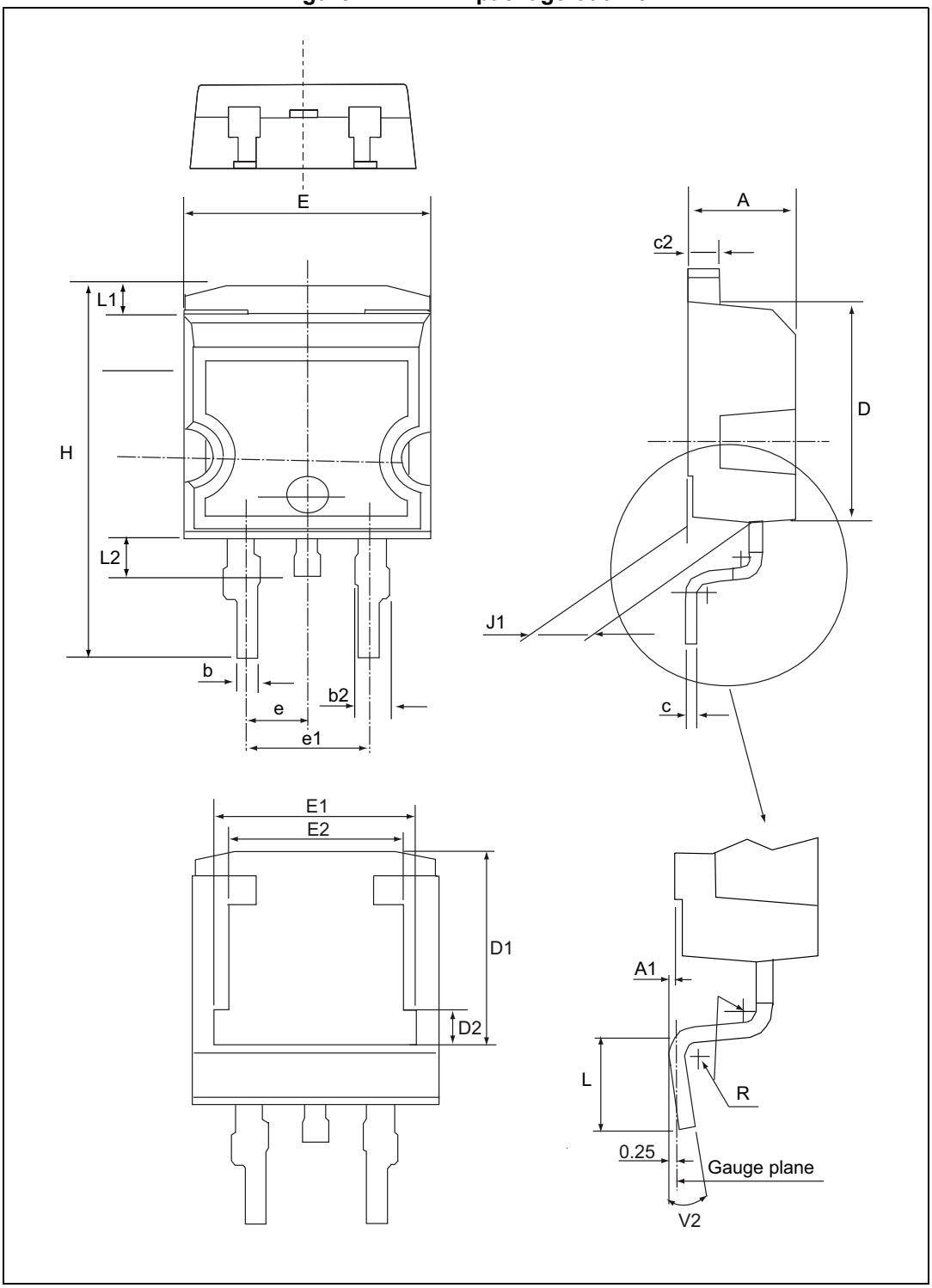


Table 6. TO-220AB package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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		10.40	0.393		0.409
L2		16.4 typ.			0.645 typ.	
L4	13		14	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

2.3 D²PAK package information

Figure 12. D²PAK package outline

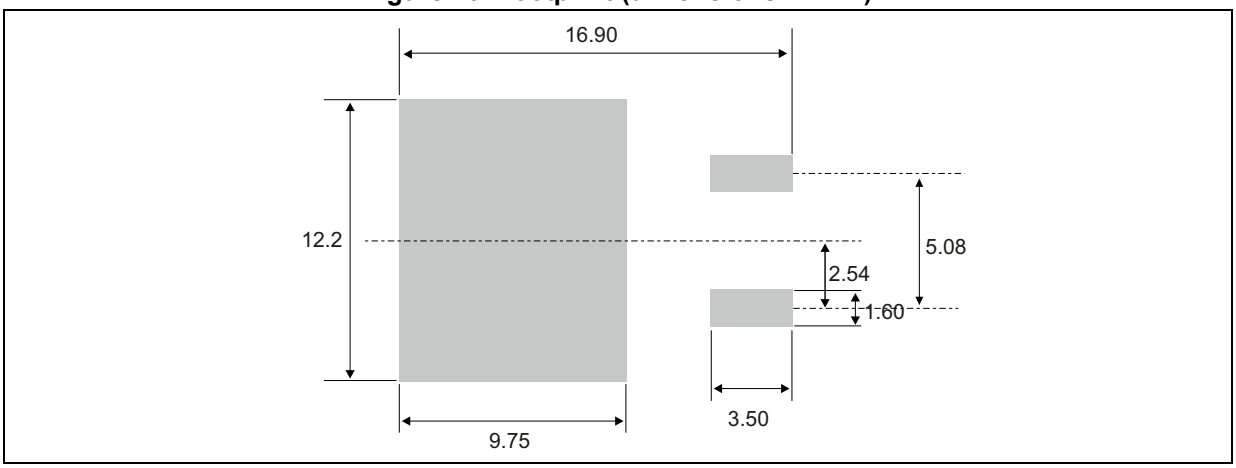


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 7. D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.36		4.60	0.171		0.181
A1	0		0.25			0.010
b	0.70		0.93	0.027		0.037
b2	1.14		1.70	0.045		0.067
c	0.38		0.69	0.014		0.027
c2	1.19		1.36	0.046		0.053
D	8.60		9.35	0.338		0.368
D1	6.90		8.0	0.271		0.315
D2	1.10		1.50	0.043		0.060
E	10.00		10.55	0.393		0.415
E1	8.10		8.90	0.318		0.350
E2	6.85		7.25	0.269		0.285
e		2.54			0.1	
e1	4.88		5.28	0.192		0.208
H	15.00		15.85	0.590		0.624
J1	2.49		2.90	0.098		0.114
L	1.9		2.79	0.074		0.110
L1	1.27		1.65	0.050		0.065
L2	1.30		1.78	0.051		0.070
R		0.40 typ.		0.016 typ.		
V2	0°		8°	0°		8°

Figure 13. Footprint (dimensions in mm)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS10150CT	STPS10150CT	TO-220AB	1.95 g	50	Tube
STPS10150CFP	STPS10150CFP	TO-220FPAB	1.90 g	50	
STPS10150CG-TR	STPS10150CG	D²PAK	1.38 g	1000	Tape and reel

4 Revision history

Table 9. Revision history

Date	Revision	Changes
Jul-2003	5B	Last update.
19-Jun-2006	6	Reformatted to current standard. Added ECOPACK statement. Added TO220FPAB.
23-Apr-2015	7	Updated D²PAK and reformatted to current standard.

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