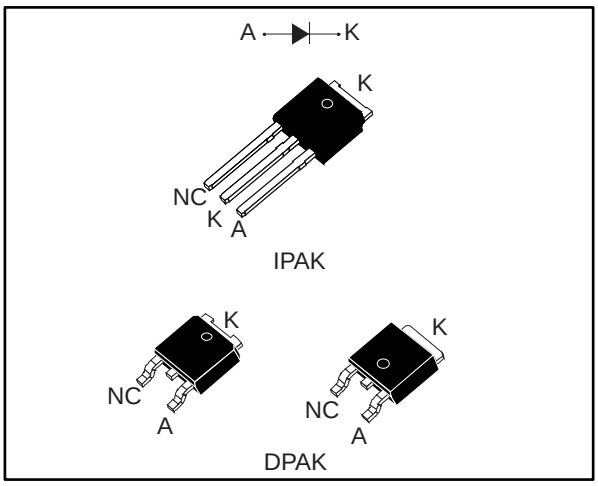
STPS5H100

High voltage power Schottky rectifier

Datasheet - production data



Description

This high voltage Schottky barrier rectifier is packaged in DPAK and IPAK and designed for high frequency compact switched mode power supply such as adapters and on board DC-DC converters.

Table 1: Device summary

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

Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche specification
- ECOPACK® compliant component for IPAK and DPAK on demand

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(RMS)}$	RMS forward voltage		10	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 165 °C	5	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	75	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	°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	Max. value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

Table 4: Static electrical characteristics

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

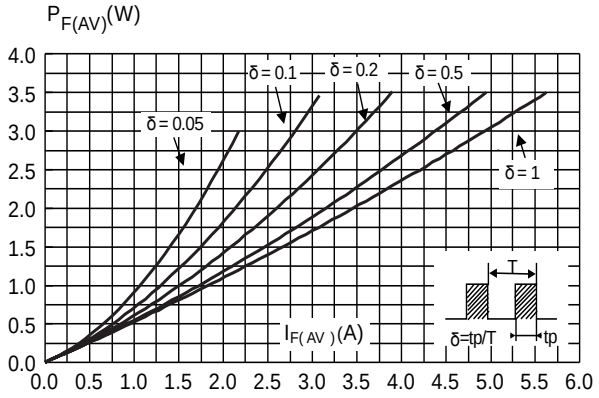


Figure 2: Average forward current versus ambient temperature (δ = 0.5)

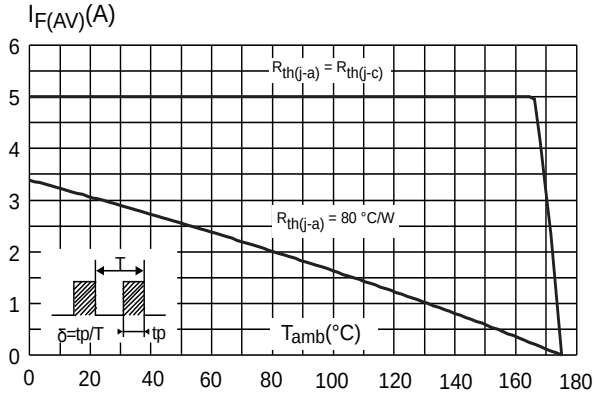


Figure 3: Normalized avalanche power derating versus pulse duration (at T_j = 125 °C)

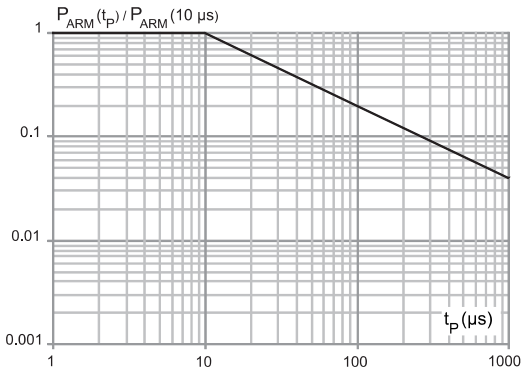


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

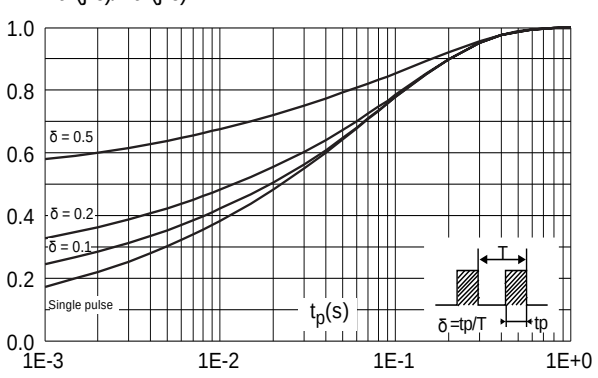


Figure 5: Reverse leakage current versus reverse voltage applied (typical values)

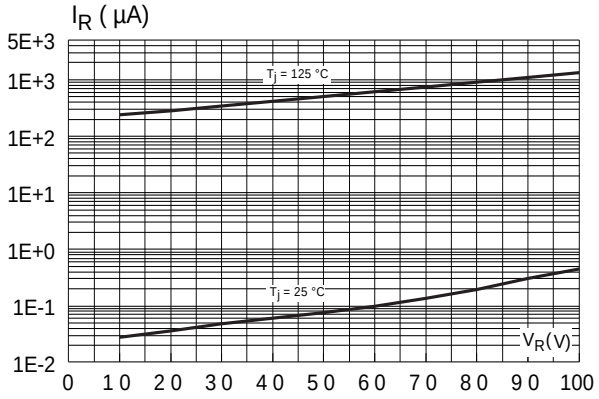


Figure 6: Junction capacitance versus reverse voltage applied (typical values)

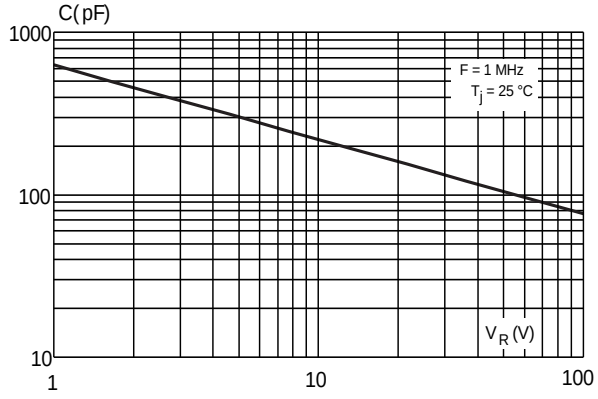


Figure 7: Forward voltage drop versus forward current (typical values)

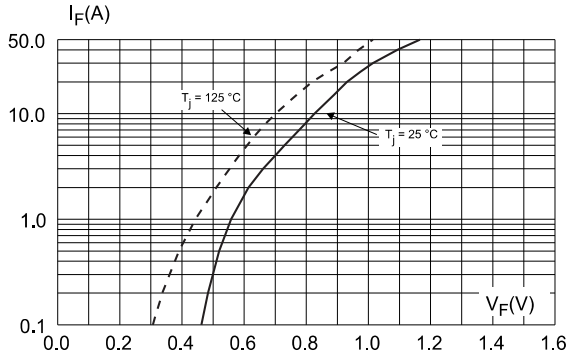
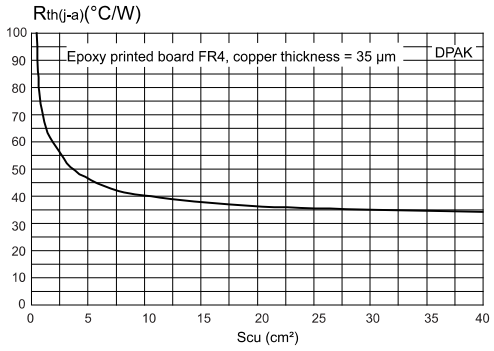


Figure 8: Thermal resistance junction to ambient versus copper surface under tab



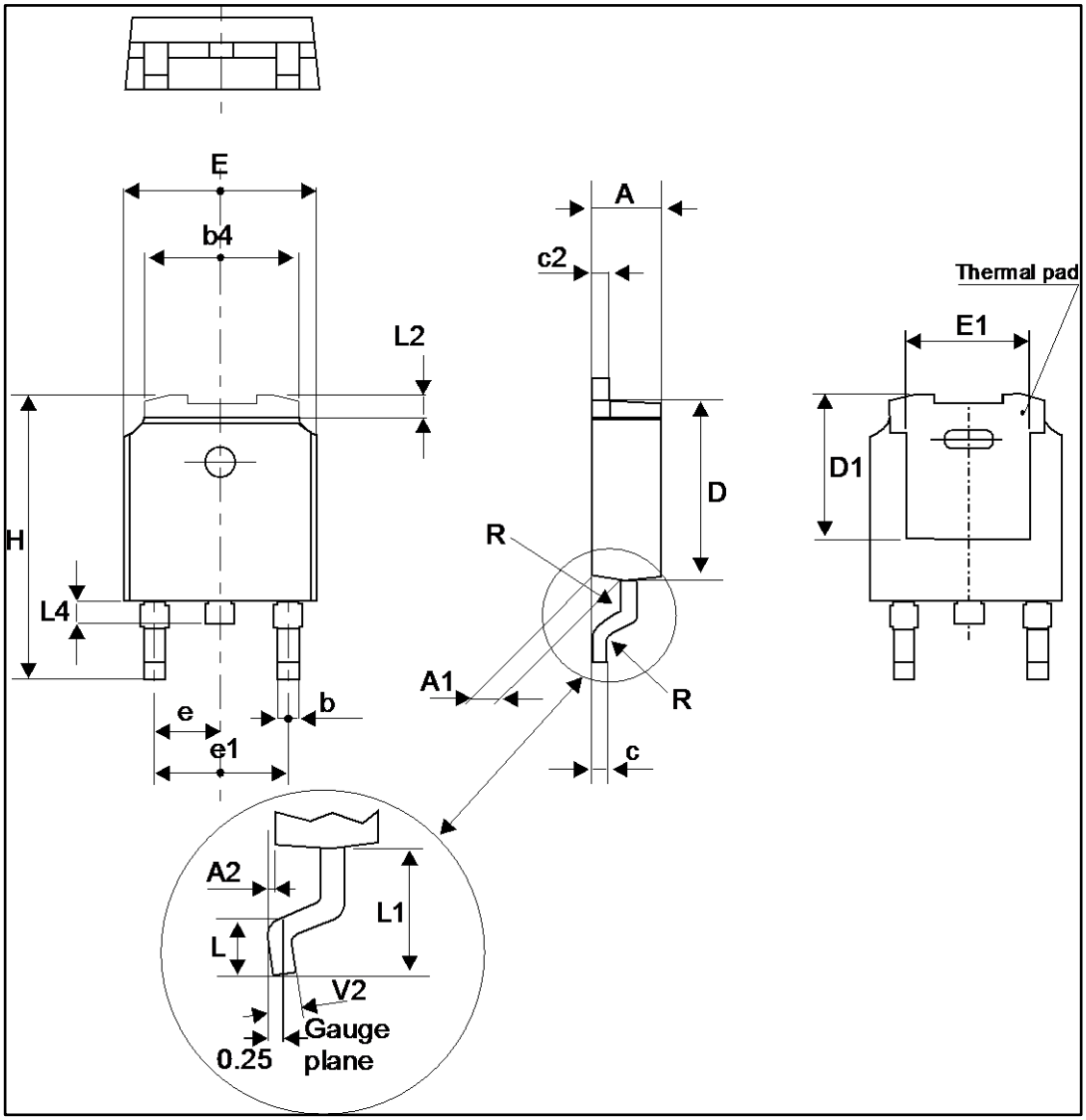
2 Package information

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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

2.1 DPAK package information

Figure 9: DPAK package outline

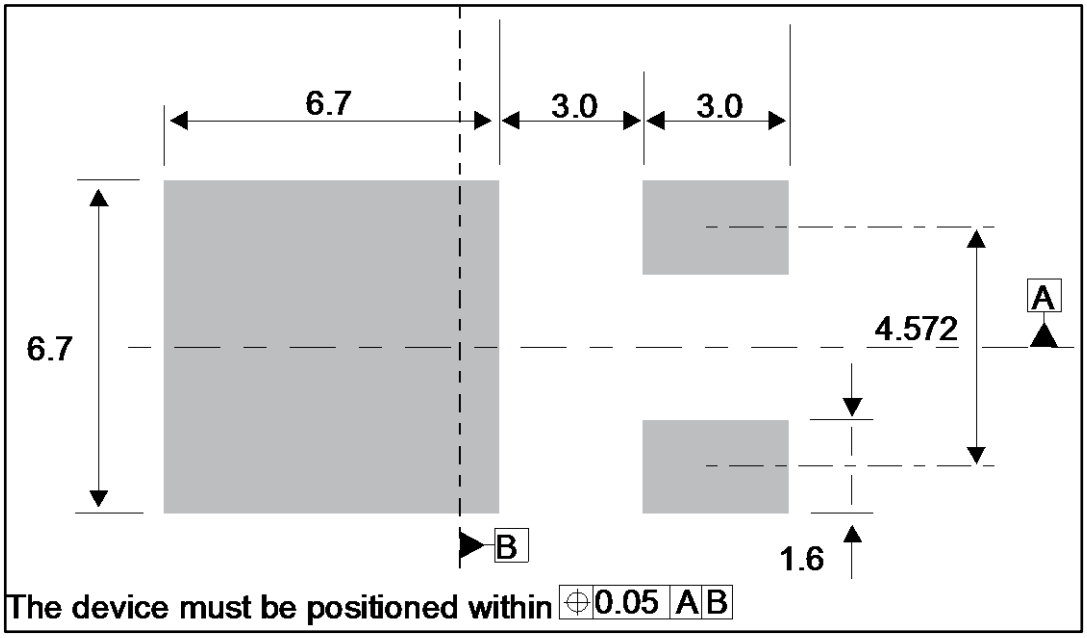


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: DPAK package mechanical data

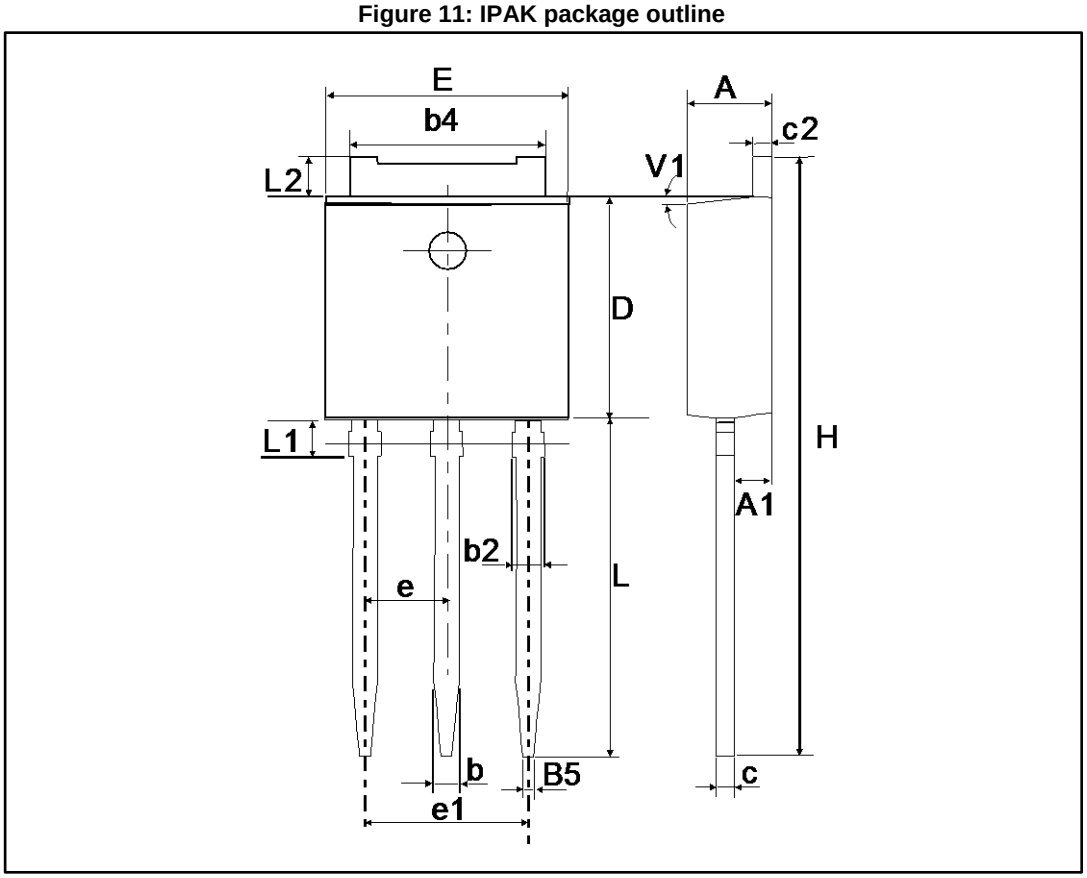
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.18	2.40	0.085	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
b	0.64	0.90	0.025	0.035
b4	4.95	5.46	0.194	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.60	0.018	0.023
D	5.97	6.22	0.235	0.244
D1	4.95	5.60	0.194	0.220
E	6.35	6.73	0.250	0.265
E1	4.32	5.50	0.170	0.216
e	2.286 typ.		0.090 typ.	
e1	4.40	4.70	0.173	0.185
H	9.35	10.40	0.368	0.409
L	1.0	1.78	0.039	0.070
L2		1.27		0.050
L4	0.60	1.02	0.023	0.040
V2	-8°	+8°	-8°	+8°

Figure 10: DPAK recommended footprint (dimensions in mm)



2.2 IPAK package information

Figure 11: IPAK package outline



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

Table 6: IPAK package mechanical data

Ref.	Dimensions					
	Millimiters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43	0.204		0.213
B5		0.30			0.012	
c	0.45		0.60	0.017		0.023
c2	0.46		0.60	0.018		0.023
D	6.00		6.20	0.236		0.244
E	6.40		6.65	0.252		0.261
e		2.28			0.089	
e1	4.40		4.60	0.173		0.181
H		16.10			0.633	
L	9.00		9.60	0.354		0.378
L1	0.80		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
V1		10°			10°	

Notes:

(1)Inch dimensions are for reference only.

3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS5H100B	S5 H100	DPAK	320 mg	75	Tube
STPS5H100B-TR	S5 H100			2500	Tape and reel
STPS5H100H	S5 H100H	IPAK	310 mg	75	Tube

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
Jul-2003	6B	Last issue.
03-Nov-2005	7	DPAK footprint dimensions updated.
15-Feb-2006	8	ECOPACK statement added.
05-Mar-2007	9	IPAK package added.
01-Aug-2014	10	Updated DPAK package information.
17-Sep-2014	11	Updated *Table 2*, *title Figure 3* and *Figure 11*.
14-Oct-2014	12	Updated DPAK package information.
12-May-2017	13	Updated DPAK package information and reformatted to current standard.

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