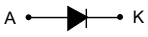
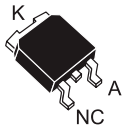
STPS5H100-Y

Datasheet

Automotive high voltage power Schottky rectifier





DPAK



Features

- AEC-Q101 qualified
- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche specification
- PPAP capable
- V_{RRM} guaranteed from -40 °C to +175 °C

Description

The STPS5H100-Y is housed in a DPAK package. This high voltage Schottky barrier rectifier is designed for high frequency miniature switched mode power supplies and on board DC to DC converters for automotive applications.

It is ideally suited for LED lighting and car radio applications, as well as ECU (Engine Control Unit) in automotive environment.

Product status link	
STPS5H100-Y	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	5 A
V_{RRM}	100 V
T_j range	-40 °C to +175 °C
V_F (max.)	0.61 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C to +175 °C		100	V
$I_{F(RMS)}$	Forward rms current		10	A
$I_{F(AV)}$	Average forward current	T_c = 165 °C, δ = 0.5	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	518	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range(1)		-40 to +175	°C

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

Table 2. Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

Table 3. 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	

1. *Pulse test: tp = 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

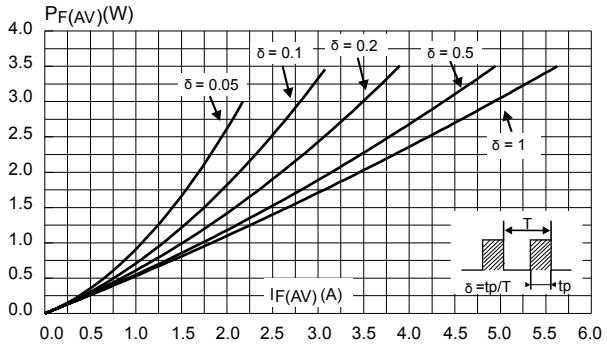


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

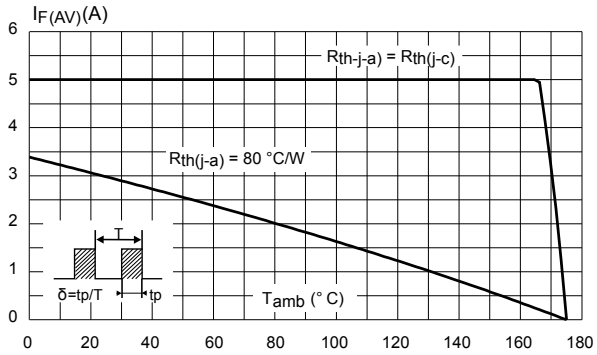


Figure 3. Normalized avalanche power derating versus junction temperature (T_j = 125 °C)

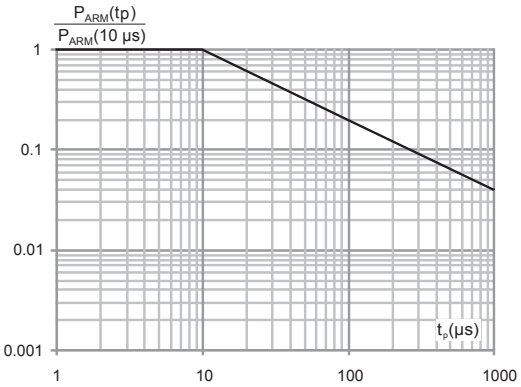


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

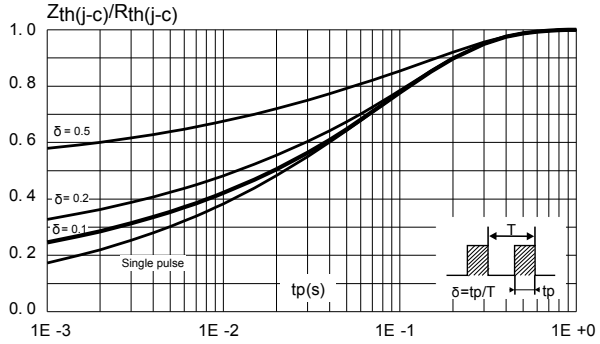


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

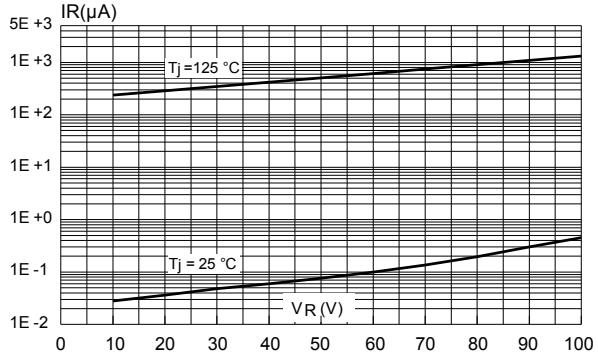


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

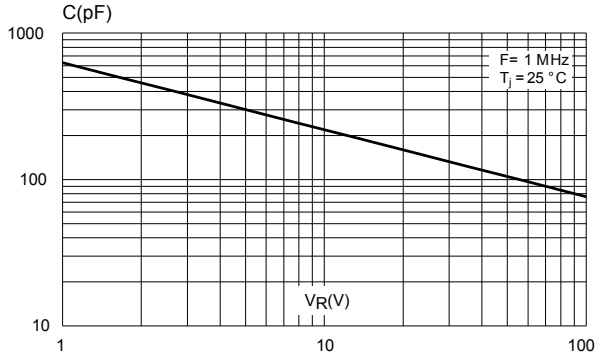


Figure 7. Forward voltage drop versus forward current (maximum values)

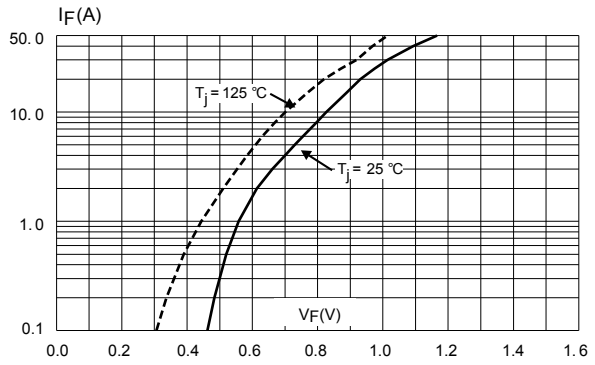
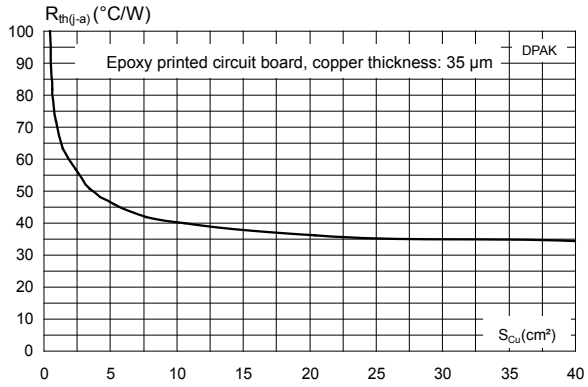


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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.

2.1 DPAK package information

- Epoxy meets UL94, V0
- Lead-free packages

Figure 9. DPAK package outline

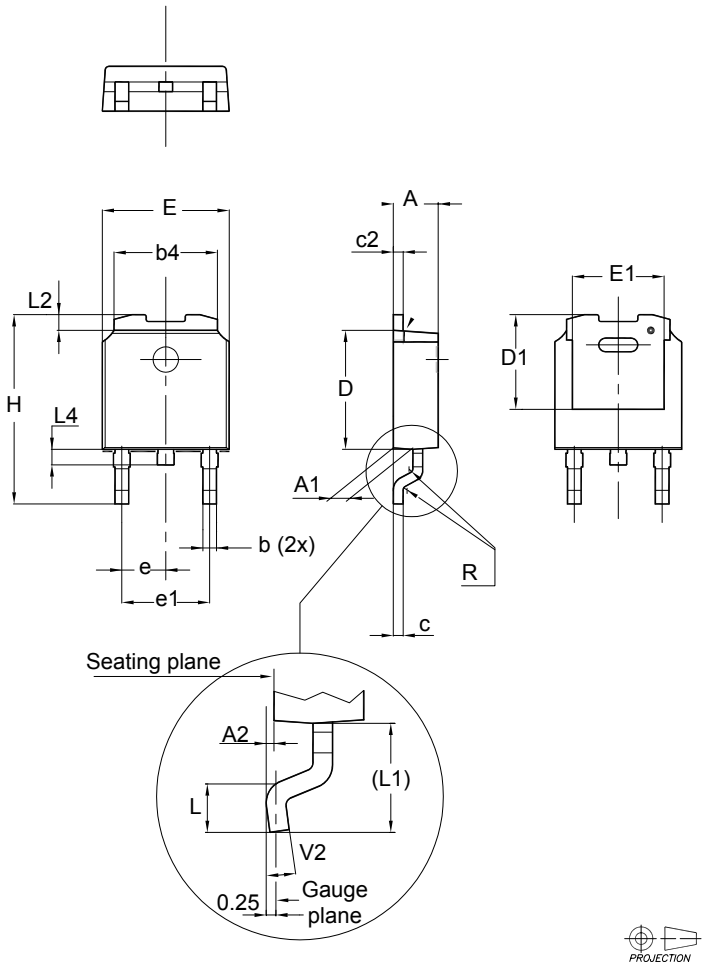
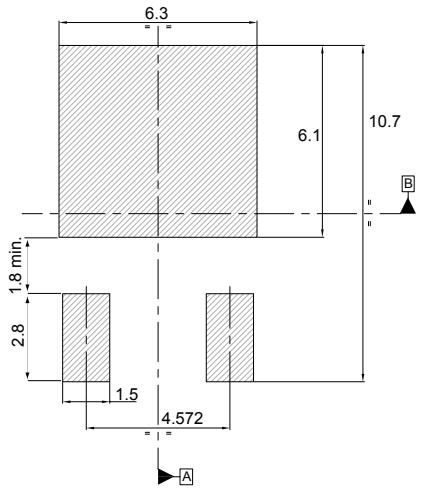


Table 4. DPAK mechanical data

Dim.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.087		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	5.20		5.40	0.205		0.213
c	0.45		0.60	0.018		0.024
c2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
D1	4.95	5.10	5.25	0.195	0.201	0.207
E	6.40		6.60	0.252		0.260
E1	4.60	4.70	4.80	0.181	0.185	0.189
e	2.16	2.28	2.40	0.085	0.090	0.094
e1	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L	1.00		1.50	0.039		0.059
(L1)	2.60	2.80	3.00	0.102	0.110	0.118
L2	0.65	0.80	0.95	0.026	0.031	0.037
L4	0.60		1.00	0.024		0.039
R		0.20			0.008	
V2	0°		8°	0°		8°

Figure 10. DPAK recommended footprint (dimensions are in mm)



The device must be positioned within ⌖ 0.05 A B

3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5H100BY-TR	S5H100Y	DPAK	0.30 g	2500	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
07-Nov-2011	1	Initial release.
06-Apr-2018	2	Removed figure 4 and figure 5. Updated Section ● Features and Section ● Description. Updated Figure 3. Normalized avalanche power derating versus junction temperature (T_j = 125 °C) and Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified). Minor text changes to improve readability.

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