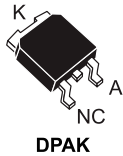


## Automotive 100 V - 5 A power Schottky rectifier




## Product status

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

## Features

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

## Applications

- DC/DC converter
- LED lighting
- Sound system
- ECU

## Description

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.

The STPS5H100-Y is housed in a DPAK package.

It is ideally suited for LED lighting and car radio applications, as well as ECU (engine control unit) in automotive environment.

# 1 Characteristics

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

Symbol	Parameter	Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage, T <sub>j</sub> = -40 °C to +175 °C	100	V
I <sub>F(RMS)</sub>	Forward rms current	10	A
I <sub>F(AV)</sub>	Average forward current	T <sub>c</sub> = 165 °C, δ = 0.5	5
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	75
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	518
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C
T <sub>j</sub>	Operating junction temperature range <sup>(1)</sup>	-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 <sub>th(j-c)</sub>	Junction to case	2.5	°C/W

For more information, please refer to the following application note:

- [AN5088](#): Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		3.5	μA
		T <sub>j</sub> = 125 °C		-	1.3	4.5	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A	-		0.73	V
		T <sub>j</sub> = 125 °C		-	0.57	0.61	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A	-		0.85	
		T <sub>j</sub> = 125 °C		-	0.66	0.71	

1. Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

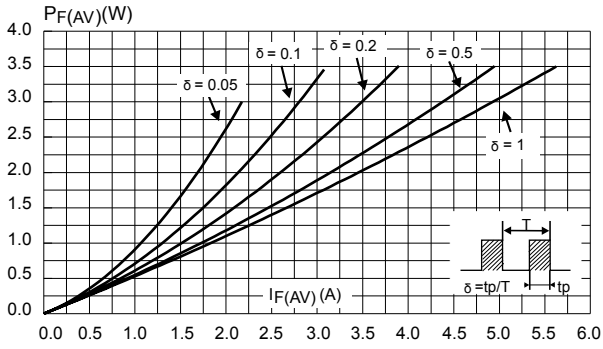
$$P = 0.51 \times I_{F(AV)} + 0.02 \times I_{F(RMS)}^2$$

For more information, please refer to the following application notes related to the power losses:

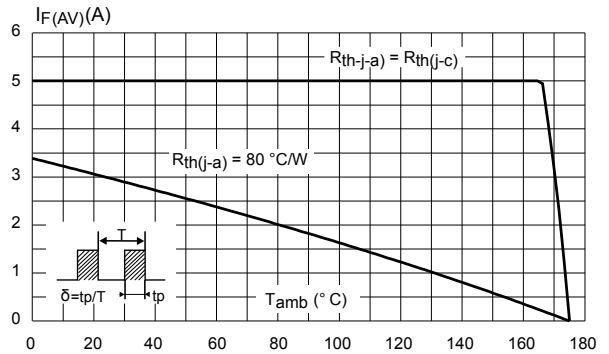
- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

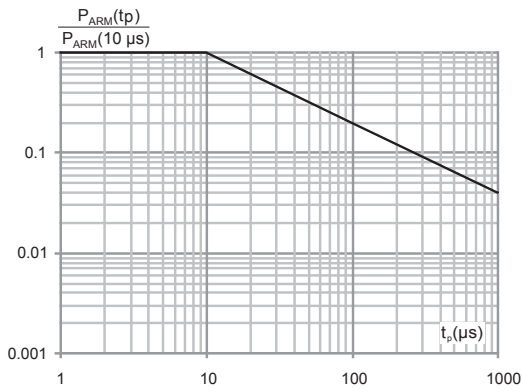
**Figure 1. Average forward power dissipation versus average forward current**



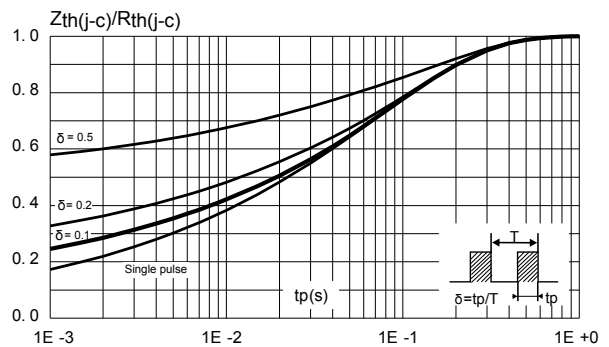
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



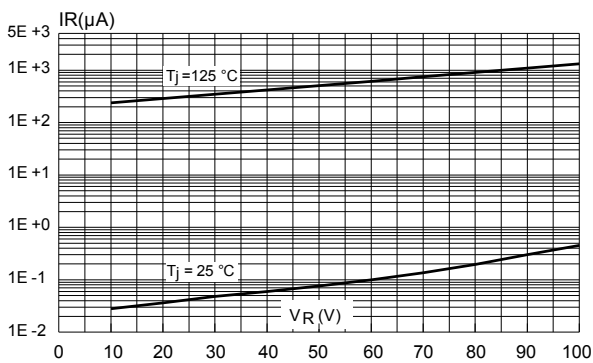
**Figure 3. Normalized avalanche power derating versus junction temperature ( $T_j = 125^{\circ}C$ )**



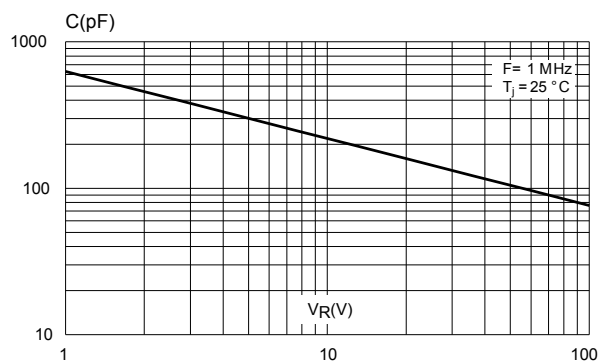
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



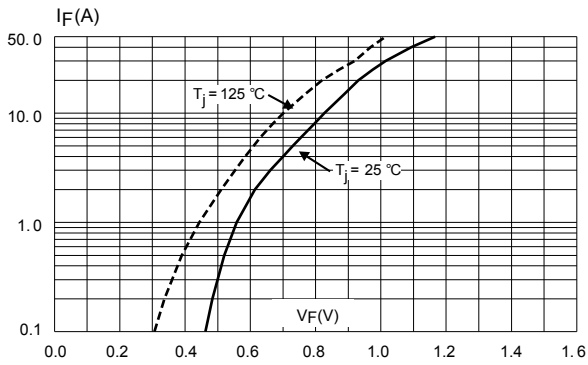
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



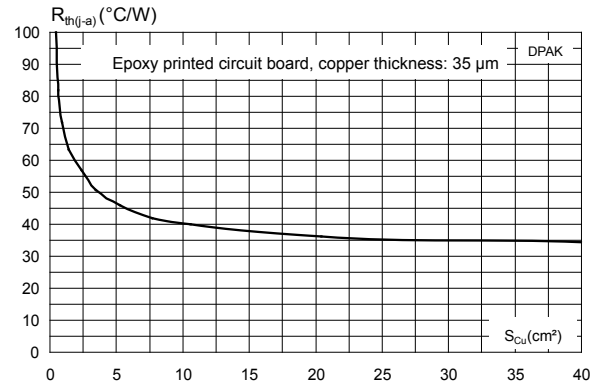
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



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



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



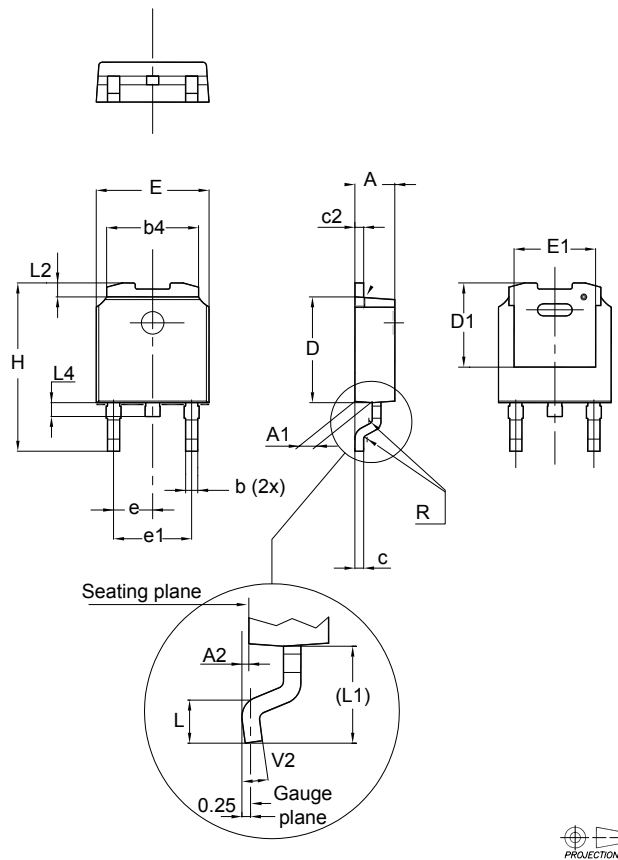
## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 DPAK package information

- Epoxy meets UL94, V0

Figure 9. DPAK package outline

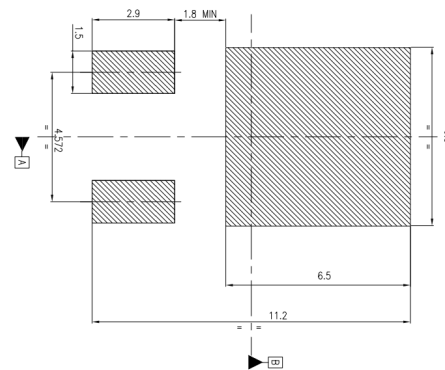


**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

**Table 4. DPAK mechanical data**

Dim.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	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	2.159	2.286	2.413	0.085	0.090	0.095
e1	4.445	4.572	4.699	0.175	0.180	0.185
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°

1. Inches dimensions given for reference only

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


Note: For package and tape orientation, reel and inner box dimensions and tape outline please check [TN1173](#)

### 3 Ordering information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5H100BY-TR	STPS5 H100Y	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	<p>Removed figure 4 and figure 5.</p> <p>Updated <a href="#">Section Features</a> and <a href="#">Section Description</a>.</p> <p>Updated <a href="#">Figure 3</a>. Normalized avalanche power derating versus junction temperature (<math>T_j = 125\text{ °C}</math>) and <a href="#">Table 1</a>. Absolute ratings (limiting values at 25 °C, unless otherwise specified).</p> <p>Minor text changes to improve readability.</p>
10-Jan-2024	3	<p>Added ST Power logo and <a href="#">Section Applications</a>. Updated <a href="#">Section 3: Ordering information</a> and minor text changes.</p>



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