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# STPS5045S

## Power Schottky rectifier

Datasheet – production data

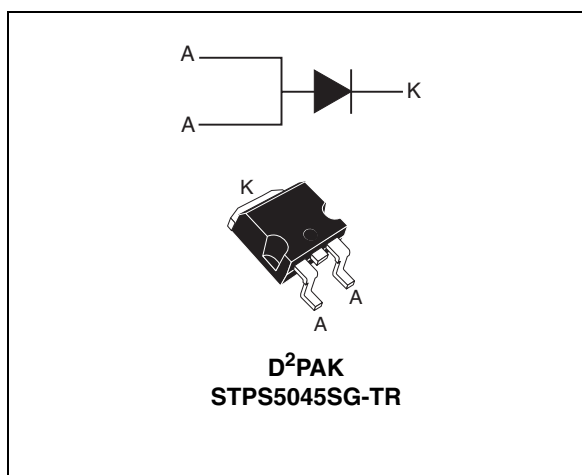
### Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- 200 °C maximum junction temperature
- Avalanche rated

### Description

This device is a dual center tap Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in D<sup>2</sup>PAK, this device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications. Also ideal for PV cell-bypass diode for junction and smart junction boxes.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	50 A
$V_{RRM}$	45 V
$T_j(max)$	200 °C
$V_F(max)$	0.48 V

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at 25 °C unless otherwise specified)**

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	45	V	
I <sub>F(RMS)</sub>	Forward rms current	90	A	
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	T <sub>c</sub> = 135 °C	50	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	600	A
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 10 $\mu$ s T <sub>j</sub> = 125 °C	1200	W
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub> <sup>(1)</sup>	Maximum operating junction temperature in DC forward mode <sup>(2)</sup>	+200	°C	
	Maximum operating junction temperature	+175	°C	

- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink
- Maximum operating junction temperature only in DC forward mode

**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
R <sub>th(j-c)</sub>	Junction to case	1.0	°C/W

**Table 4. 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>		0.090	0.36	mA	
		T <sub>j</sub> = 75 °C V <sub>R</sub> = 20 V		0.7	1.9		
		T <sub>j</sub> = 125 °C V <sub>R</sub> = V <sub>RRM</sub>		65	185		
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 50 A		0.55	0.61	V
		T <sub>j</sub> = 125 °C			0.48	0.56	
		T <sub>j</sub> = 200 °C	I <sub>F</sub> = 10 A		0.22		
			I <sub>F</sub> = 20 A		0.28		

- Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$
- Pulse test: t<sub>p</sub> = 380  $\mu$ s,  $\delta < 2\%$

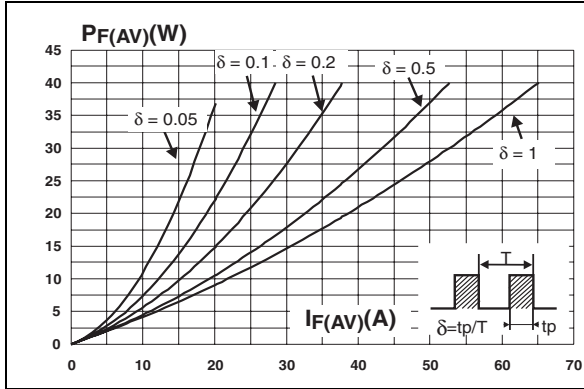
To evaluate the conduction losses use the following equation:

$$P = 0.38 \times I_{F(AV)} + 0.0036 I_{F(RMS)}^2$$

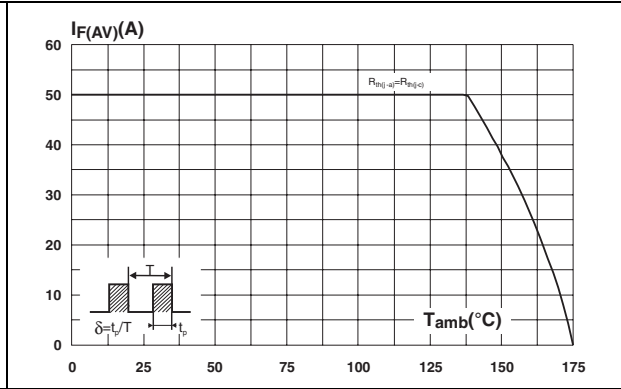
**STPS5045S**

**Characteristics**

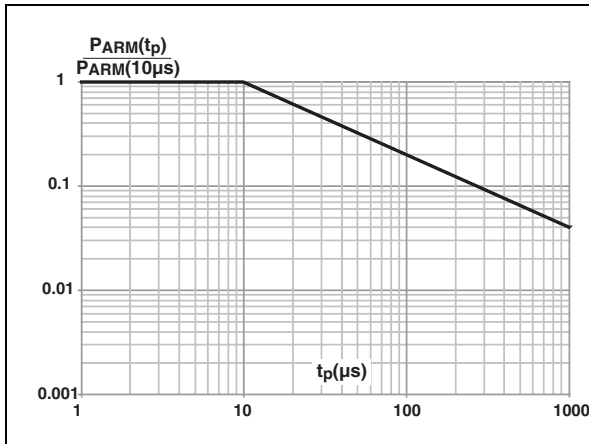
**Figure 1. Average forward power dissipation versus average forward current**



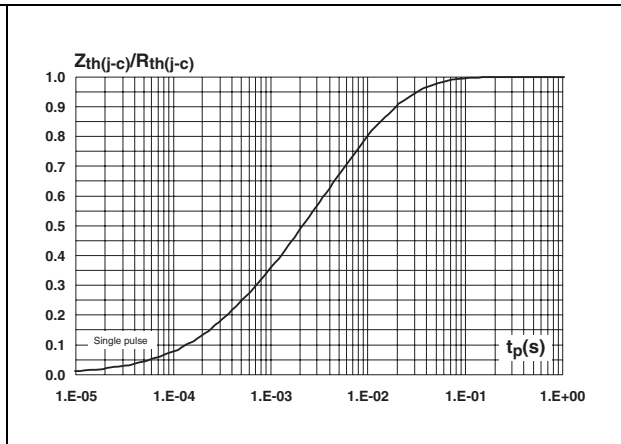
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



**Figure 3. Normalized avalanche power derating versus pulse duration**



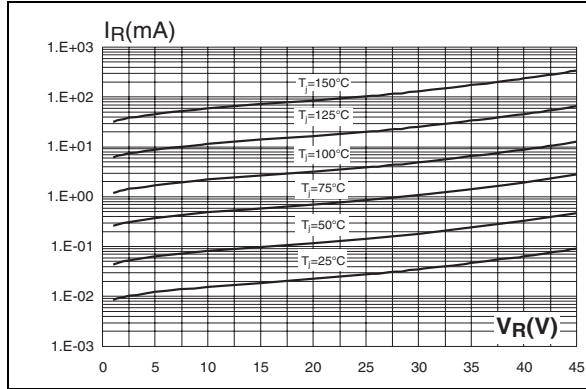
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



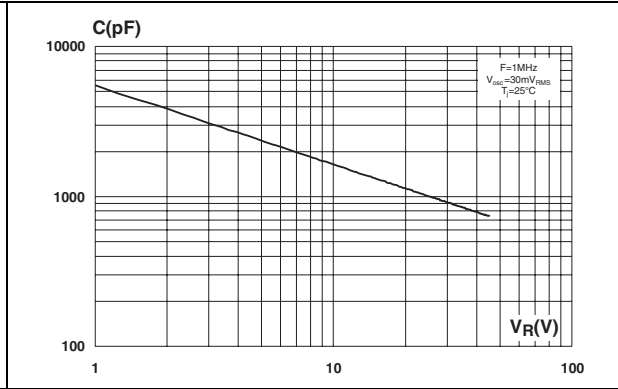
**Characteristics**

**STPS5045S**

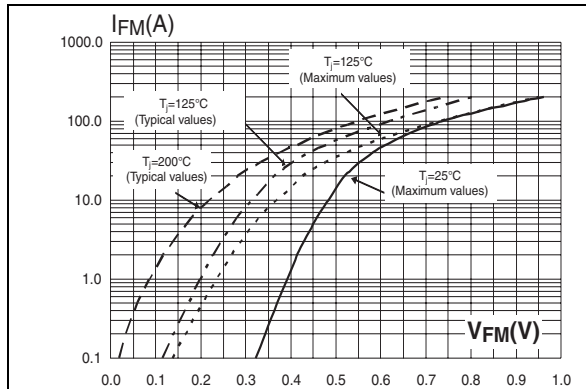
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



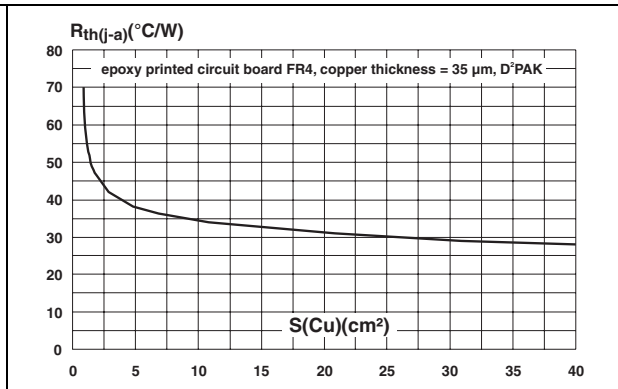
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 7. Forward voltage drop versus forward current**



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



## 2 Package information

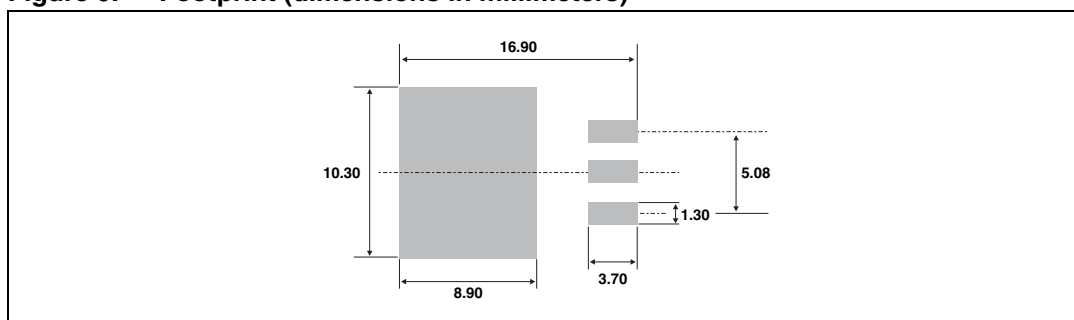
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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Table 5. D<sup>2</sup>PAK dimensions

Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 9. Footprint (dimensions in millimeters)



### 3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5045SG-TR	STPS5045SG	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel

### 4 Revision history

Table 7. Revision history

Date	Revision	Changes
28-June-2012	1	First issue.

## STPS5045S

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