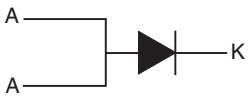
STPS5045S

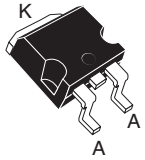
Power Schottky rectifier

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





D^2PAK
STPS5045SG-TR

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^2PAK, 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_{RRM}	Repetitive peak reverse voltage		45	V
$I_{F(RMS)}$	Forward rms current		90	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	T_c = 135 °C	50	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	600	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs T_j = 125 °C	1200	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j(1)	Maximum operating junction temperature in DC forward mode(2)		+200	°C
	Maximum operating junction temperature		+175	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink
2. Maximum operating junction temperature only in DC forward mode

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.0	°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	$V_R = V_{RRM}$		0.090	0.36	mA
		T_j = 75 °C	V_R = 20 V		0.7	1.9	
		T_j = 125 °C	$V_R = V_{RRM}$		65	185	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 50 A		0.55	0.61	V
		T_j = 125 °C			0.48	0.56	
		T_j = 200 °C	I_F = 10 A		0.22		
			I_F =20 A		0.28		

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

Figure 1. Average forward power dissipation versus average forward current

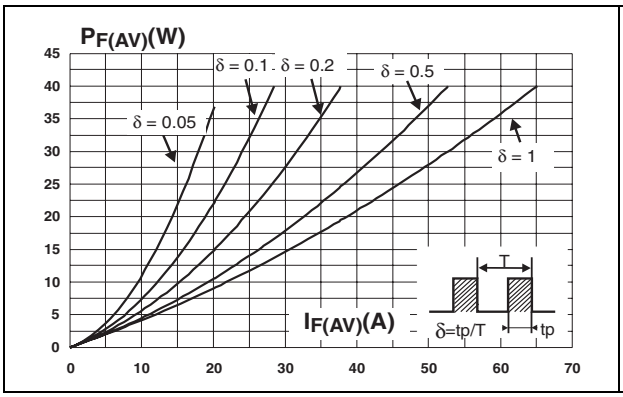


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

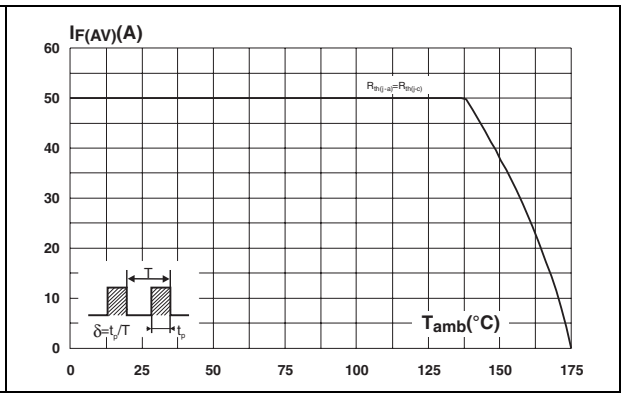


Figure 3. Normalized avalanche power derating versus pulse duration

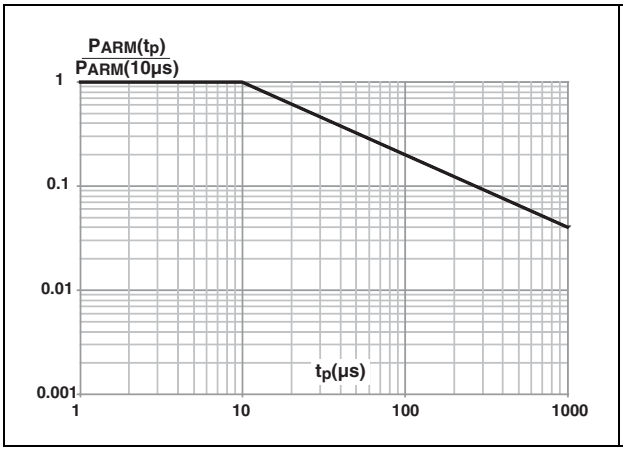


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

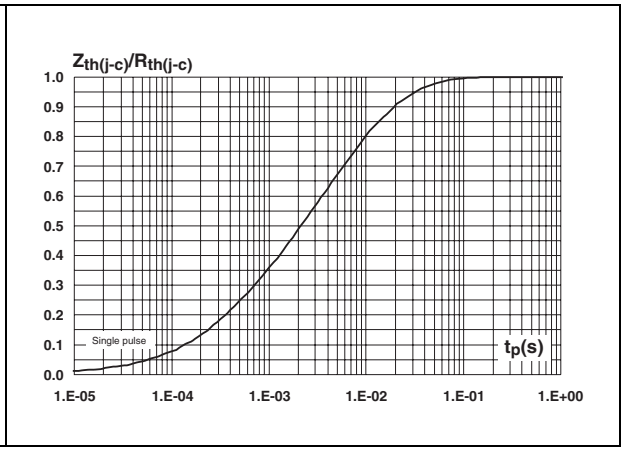


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

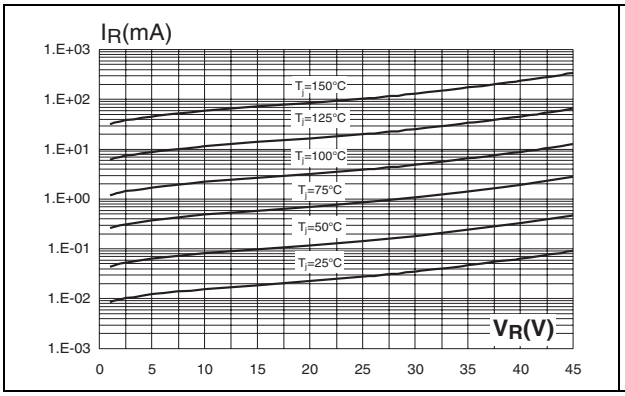


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

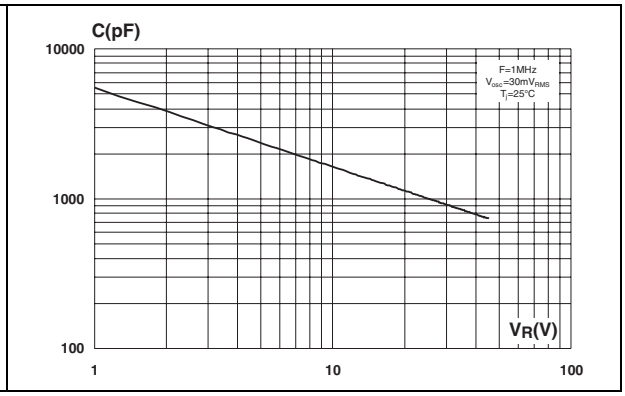


Figure 7. Forward voltage drop versus forward current

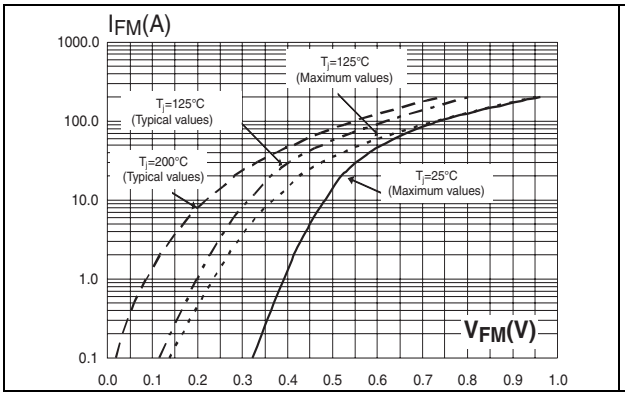
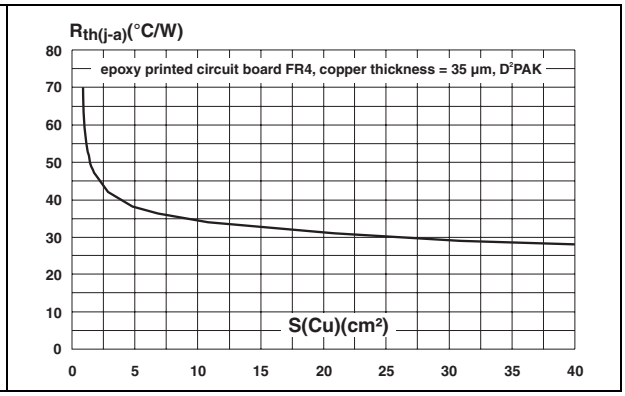


Figure 8. Thermal resistance junction to ambient versus copper surface under tab

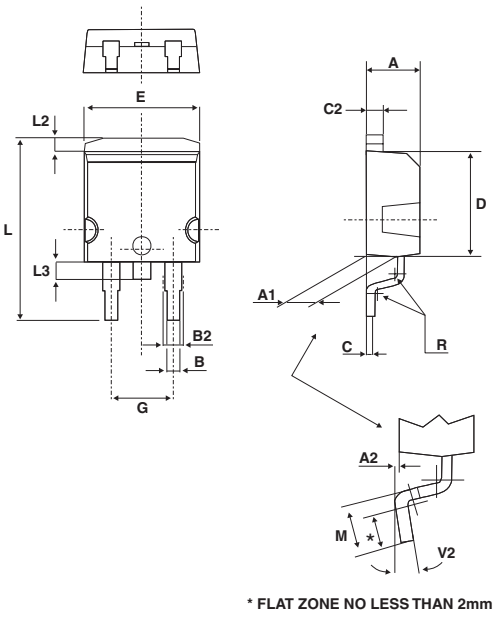


2 Package information

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

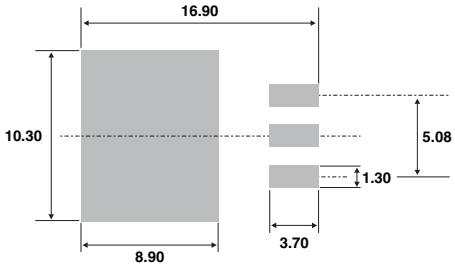
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. D²PAK 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^2PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 7. Revision history

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

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