

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 D²PAK, 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.

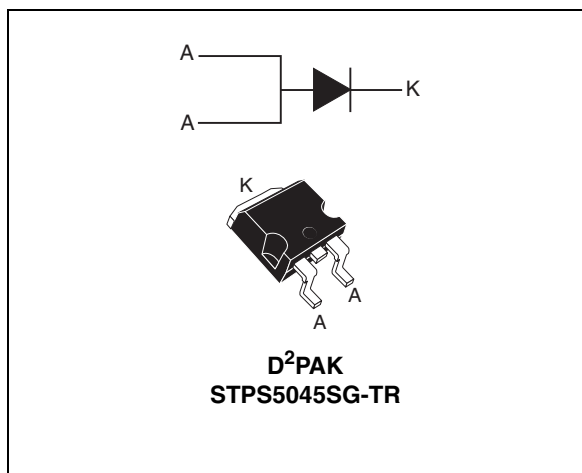


Table 1. Device summary

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 μ s 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

- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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 _{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		

- Pulse test: t_p = 5 ms, $\delta < 2\%$
- Pulse test: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

Figure 1. Average forward power dissipation versus average forward current

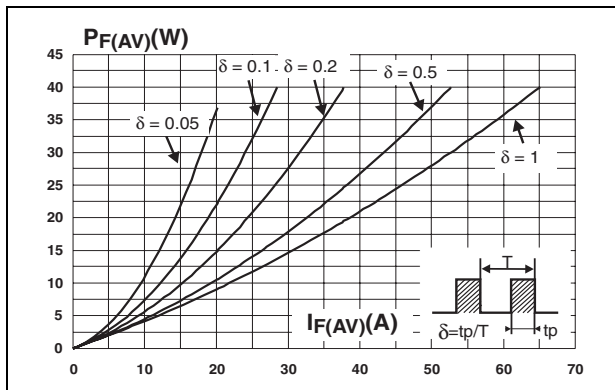


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

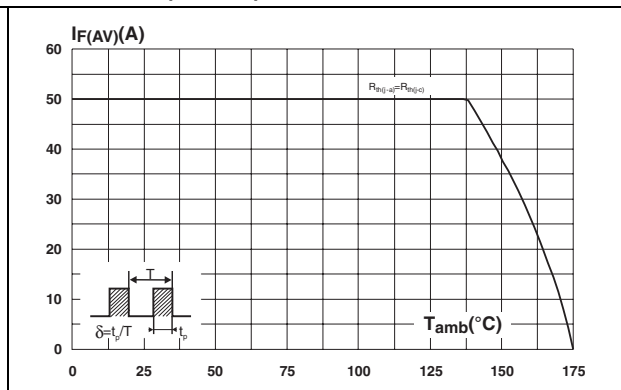


Figure 3. Normalized avalanche power derating versus pulse duration

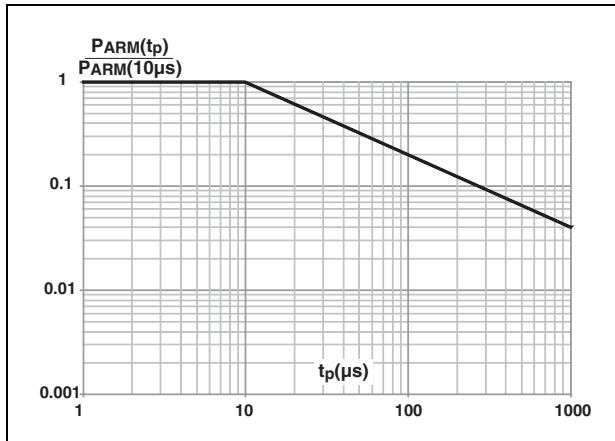


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

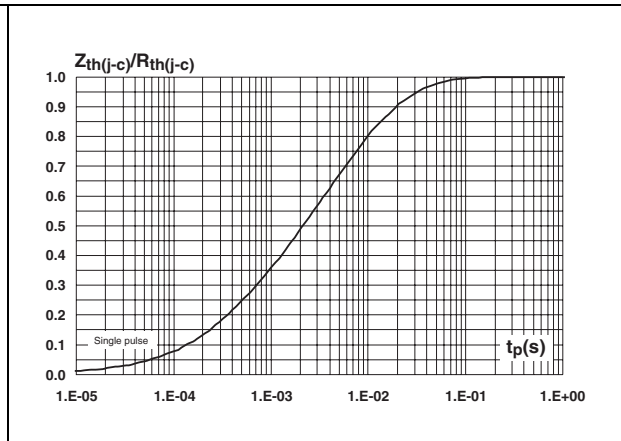


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

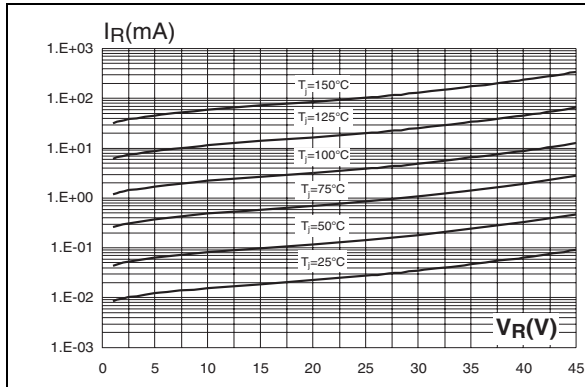


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

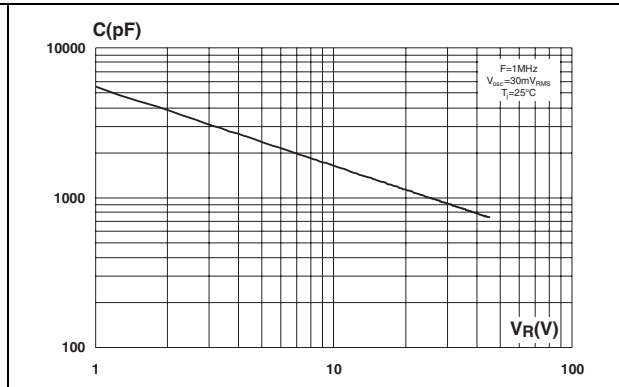


Figure 7. Forward voltage drop versus forward current

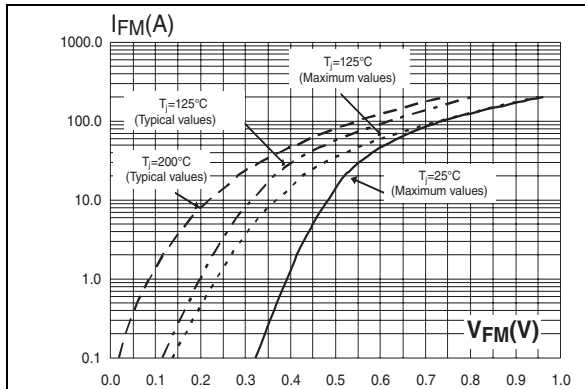
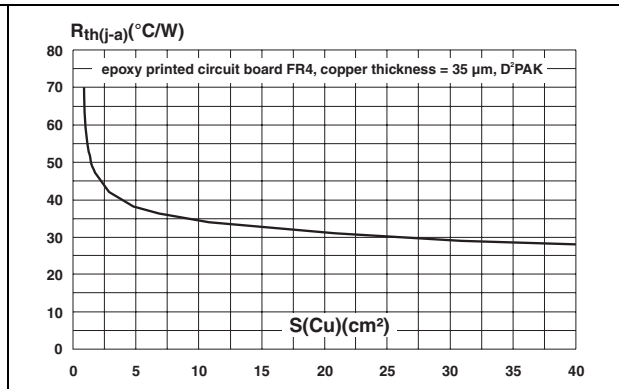


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

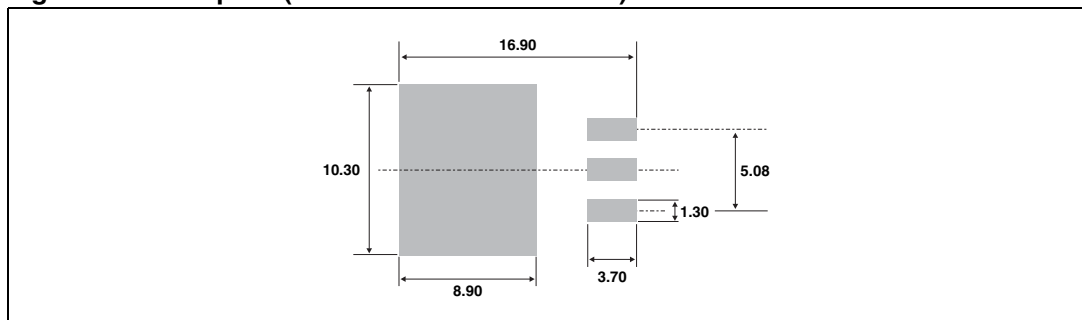
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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 ² PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 7. Revision history

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

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2012 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com