

## **STPS1045**

## Power Schottky rectifier

## Main product characteristics

I <sub>F(AV)</sub>	10 A
V <sub>RRM</sub>	45 V
V <sub>F</sub>	0.57 V

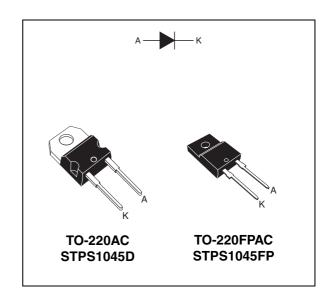
### **Features and Benefits**

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Insulated package: TO-220FPAC
  Insulating voltage = 2000V DC
  Capacitance = 12 pF
- Avalanche capability specified

### **Description**

Single chip Schottky rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters.

This device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



**Characteristics** STPS1045

#### **Characteristics** 1

Table 1. **Absolute Ratings (limiting values)** 

Symbol	Parameter			Value	Unit
V <sub>RRM</sub>	Repetitive peak revers	se voltage		45	V
I <sub>F(RMS)</sub>	RMS forward voltage			30	Α
	Average forward	TO-220AC	T <sub>c</sub> = 150° C	40	А
I <sub>F(AV)</sub>	current $\delta = 0.5$	TO-220FPAC	T <sub>c</sub> = 145° C	10	
I <sub>FSM</sub>	Surge non repetitive for	t <sub>p</sub> = 10 ms sinusoidal	180	Α	
	Repetitive peak reverse current $ \begin{aligned} t_p &= 2 \; \mu s \\ F &= 1 \; kHz \end{aligned} $			1	Α
P <sub>ARM</sub>	Repetitive peak avalanche power			4000	W
T <sub>stg</sub>	Storage temperature range			-65 to + 175	°C
T <sub>j</sub>	Maximum junction temperature			175	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

Table 2. Thermal resistances

Symbol	Parameter		Value	Unit
В	Junction to case	TO-220AC	2.2	°C/W
R <sub>th(j-c)</sub>		TO-220FPAC	4.5	C/VV

Table 3. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
I <sub>B</sub> <sup>(1)</sup>	Povorco logicado gurront	T <sub>j</sub> = 25° C	$V_R = V_{RRM}$			100	μΑ
'R`	I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	T <sub>j</sub> = 125° C				15	mA
		T <sub>j</sub> = 25° C	I <sub>F</sub> = 20 A			0.84	
V <sub>F</sub> <sup>(2)</sup>	V <sub>F</sub> <sup>(2)</sup> Forward voltage drop	T <sub>j</sub> = 125° C	I <sub>F</sub> = 20 A			0.72	V
		T <sub>j</sub> = 125° C	I <sub>F</sub> = 10 A			0.60	

<sup>1.</sup> Pulse test:  $tp = 5 \text{ ms}, \delta < 2\%$ 

To evaluate the conduction losses use the following equation: P = 0.42 x  $I_{F(AV)}$  + 0.015  $I_{F}^{2}_{(RMS)}$ 

$$P = 0.42 \times I_{F(AV)} + 0.015 I_{F^2(RMS)}$$

<sup>2.</sup> Pulse test: tp = 380  $\mu$ s,  $\delta$  < 2%

STPS1045 Characteristics

Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature ( $\delta = 0.5$ )

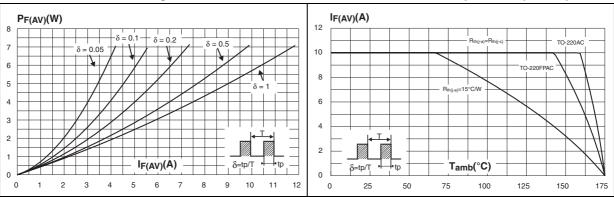


Figure 3. Normalized avalanche power derating versus pulse duration

Figure 4. Normalized avalanche power derating versus junction temperature

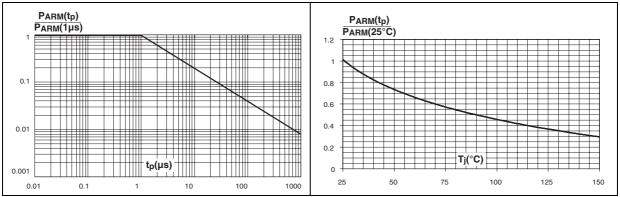
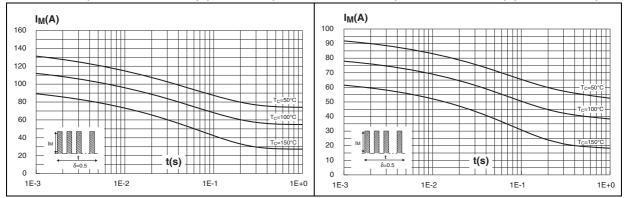


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC)

Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220FPAC)



Characteristics STPS1045

Figure 7. Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC)

Figure 8. Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220FPAC)

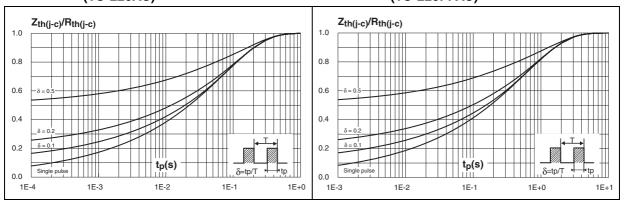


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

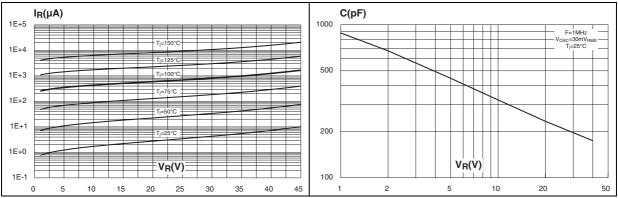
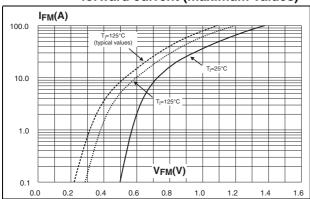


Figure 11. Forward voltage drop versus forward current (maximum values)



577

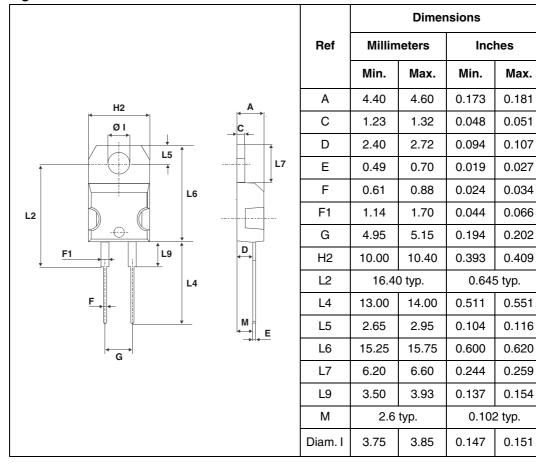
STPS1045 Package Information

# 2 Package Information

Epoxy meets UL94, V0

Cooling method: by conduction (C)
 Recommended torque value: 0.55 Nm
 Maximum torque value: 0.70 Nm

Figure 12. TO-220AC dimensions



Package Information STPS1045

Figure 13. TO-220FPAC dimensions

	Dimensions				
Ref	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
Α	4.4	4.6	0.173	0.181	
В	2.5	2.7	0.098	0.106	
D	2.5	2.75	0.098	0.108	
Е	0.45	0.70	0.018	0.027	
F	0.75	1	0.030	0.039	
F1	1.15	1.70	0.045	0.067	
G	4.95	5.20	0.195	0.205	
G1	2.4	2.7	0.094	0.106	
Н	10	10.4	0.393	0.409	
L2	16	Тур.	0.63	Тур.	
L3	28.6	30.6	1.126	1.205	
L4	9.8	10.6	0.386	0.417	
L5	2.9	3.6	0.114	0.142	
L6	15.9	16.4	0.626	0.646	
L7	9.00	9.30	0.354	0.366	
Dia.	3.00	3.20	0.118	0.126	

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

6/8

# 3 Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS1045D	STPS1045D	TO-220AC	1.86 g	50	Tube
STPS1045FP	STPS1045FP	TO-220FPAC	1.9 g	50	Tube

# 4 Revision history

Date	Revision	Description of Changes
Jul-2003	5D	Last release.
22-Mar-2007	6	Removed ISOWATT package.

#### 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 AN AUTHORIZED ST REPRESENTATIVE, 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.

© 2007 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 - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

577