

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 10 A   |
| $V_{RRM}$   | 45 V   |
| $V_F (max)$ | 0.57 V |

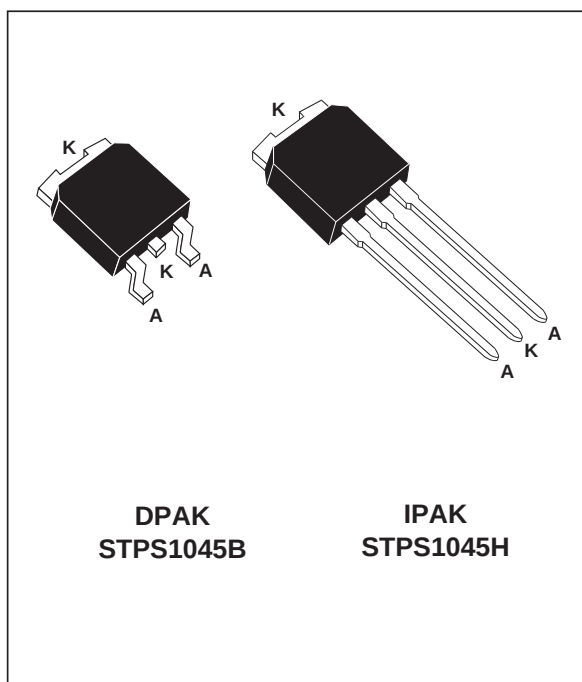
### FEATURES AND BENEFITS

- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD DROP VOLTAGE
- LOW CAPACITANCE
- HIGH REVERSE AVALANCHE SURGE CAPABILITY

### DESCRIPTION

High voltage Schottky rectifier suited for Switch Mode Power Supplies and other Power Converters.

Packaged in DPAK and IPAK, these devices are intended for use in high frequency circuitries where low switching losses are required.



### ABSOLUTE MAXIMUM RATINGS

| Symbol             | Parameter                                |                                            | Value         | Unit                   |
|--------------------|------------------------------------------|--------------------------------------------|---------------|------------------------|
| $V_{RRM}$          | Repetitive peak reverse voltage          |                                            | 45            | V                      |
| $I_{F(RMS)}$ / pin | RMS forward current / pin                |                                            | 7             | A                      |
| $I_{F(AV)}$        | Average forward current                  | $T_c = 150^{\circ}\text{C}$<br>$d = 0.5$   | 10            | A                      |
| $I_{FSM}$          | Surge non repetitive forward current     | $t_p = 10 \text{ ms}$<br>Sinusoidal        | 75            | A                      |
| $I_{RRM}$          | Repetitive peak reverse current          | $t_p = 2 \mu\text{s}$<br>$F = 1\text{KHz}$ | 1             | A                      |
| $T_{stg}$          | Storage temperature range                |                                            | - 65 to + 175 | $^{\circ}\text{C}$     |
| $T_j$              | Maximum junction temperature             |                                            | 175           | $^{\circ}\text{C}$     |
| $dV/dt$            | Critical rate of rise of reverse voltage |                                            | 10000         | $\text{V}/\mu\text{s}$ |

## STPS1045B/H

### THERMAL RESISTANCES

| Symbol        | Parameter        | Value | Unit |
|---------------|------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case | 3     | °C/W |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol     | Parameter               | Tests Conditions          | Min.                | Typ. | Max. | Unit          |
|------------|-------------------------|---------------------------|---------------------|------|------|---------------|
| $I_R^*$    | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = 45\text{ V}$ |      | 100  | $\mu\text{A}$ |
|            |                         | $T_j = 125^\circ\text{C}$ |                     | 7    | 15   | mA            |
| $V_F^{**}$ | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 10\text{ A}$ |      | 0.63 | V             |
|            |                         | $T_j = 125^\circ\text{C}$ | $I_F = 10\text{ A}$ | 0.5  | 0.57 |               |
|            |                         | $T_j = 25^\circ\text{C}$  | $I_F = 20\text{ A}$ |      | 0.84 |               |
|            |                         | $T_j = 125^\circ\text{C}$ | $I_F = 20\text{ A}$ | 0.65 | 0.72 |               |

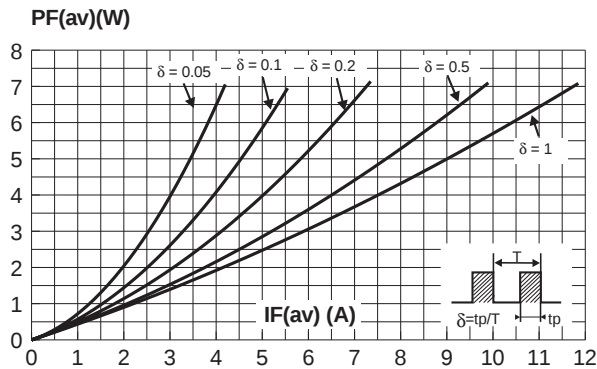
Pulse test : \*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

\*\* $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

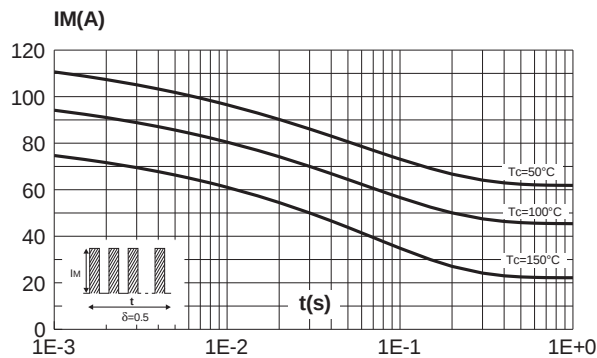
To evaluate the maximum conduction losses use the following equation :

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

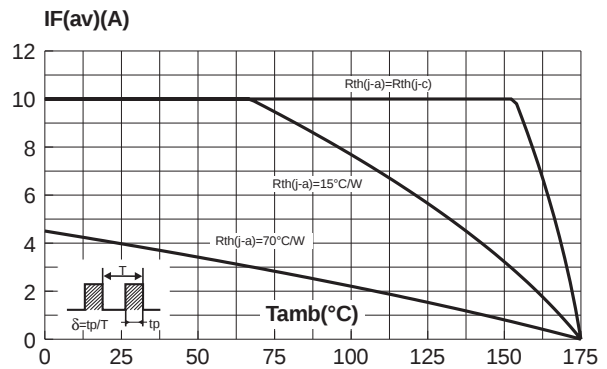
**Fig. 1:** Average forward power dissipation versus average forward current.



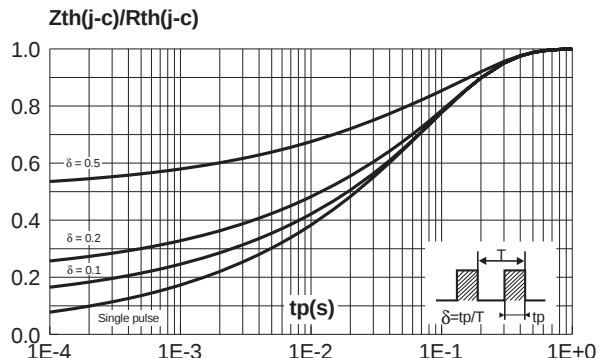
**Fig. 3:** Non repetitive surge peak forward current versus overload duration (maximum values).



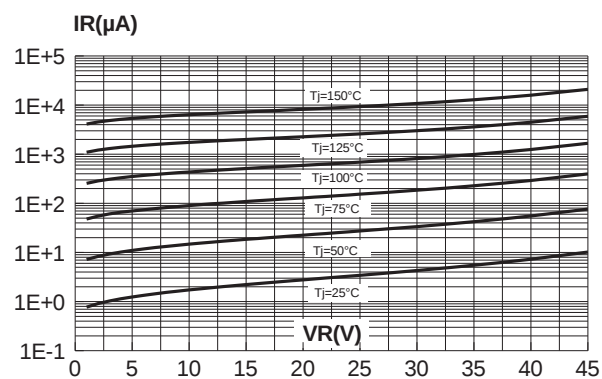
**Fig. 2:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



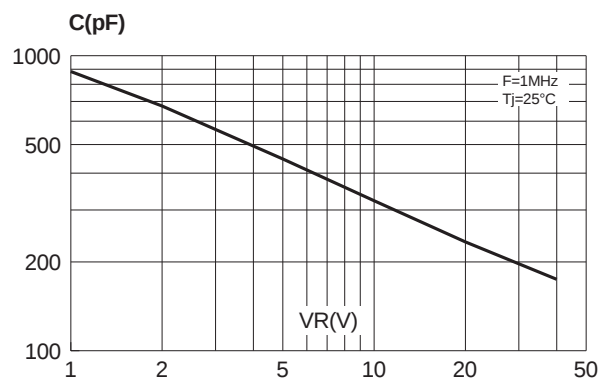
**Fig. 4:** Relative variation of thermal impedance junction to case versus pulse duration.



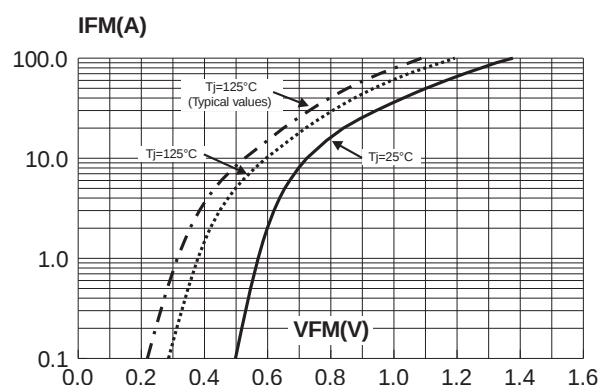
**Fig. 5:** Reverse leakage current versus reverse voltage applied (typical values).



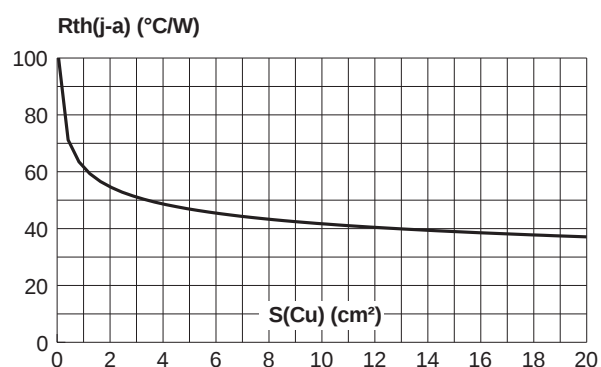
**Fig. 6:** Junction capacitance versus reverse voltage applied (typical values).



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



**Fig. 8:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness:  $35\mu m$ ) (STPS1045B).



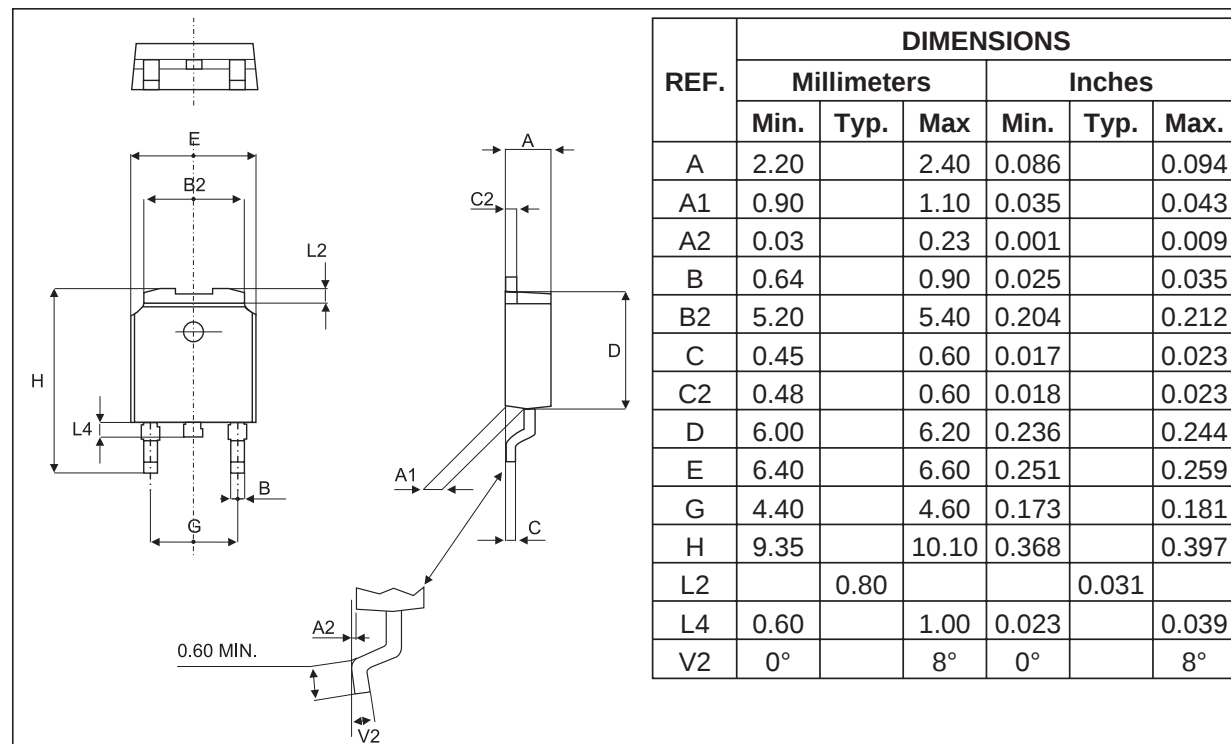
PACKAGE MECHANICAL DATA  
IPAK

| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.2         |      | 2.4  | 0.086  |       | 0.094 |
| A1   | 0.9         |      | 1.1  | 0.035  |       | 0.043 |
| A3   | 0.7         |      | 1.3  | 0.027  |       | 0.051 |
| B    | 0.64        |      | 0.9  | 0.025  |       | 0.035 |
| B2   | 5.2         |      | 5.4  | 0.204  |       | 0.212 |
| B3   |             |      | 0.85 |        |       | 0.033 |
| B5   |             | 0.3  |      |        | 0.035 |       |
| B6   |             |      | 0.95 |        |       | 0.037 |
| C    | 0.45        |      | 0.6  | 0.017  |       | 0.023 |
| C2   | 0.48        |      | 0.6  | 0.019  |       | 0.023 |
| D    | 6           |      | 6.2  | 0.236  |       | 0.244 |
| E    | 6.4         |      | 6.6  | 0.252  |       | 0.260 |
| G    | 4.4         |      | 4.6  | 0.173  |       | 0.181 |
| H    | 15.9        |      | 16.3 | 0.626  |       | 0.641 |
| L    | 9           |      | 9.4  | 0.354  |       | 0.370 |
| L1   | 0.8         |      | 1.2  | 0.031  |       | 0.047 |
| L2   |             | 0.8  | 1    |        | 0.031 | 0.039 |
| V1   |             | 10°  |      |        | 10°   |       |

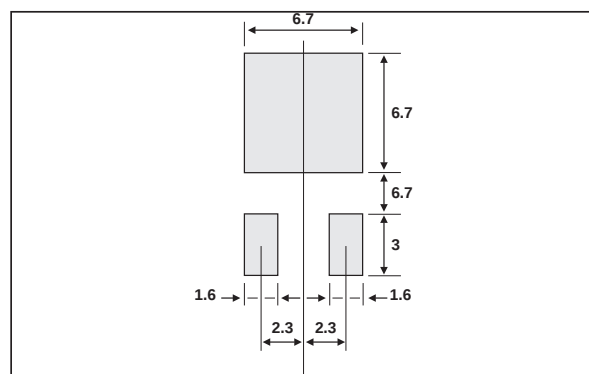
- Cooling method: by conduction (C)

**PACKAGE MECHANICAL DATA**

DPAK



- Cooling method: by conduction (C)

**FOOT PRINT DIMENSIONS (in millimeters)**

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied.

STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2000 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia

Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>