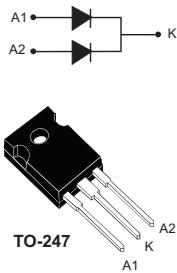


## 100 V power Schottky rectifier



### Features

- Negligible switching losses
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche specification
- ECOPACK<sup>®</sup>2 compliant

### Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

### Description

This dual diode common cathode Schottky rectifier is suited for switch mode power supply and high frequency DC to DC converters.

Packaged in TO-247, the **STPS40H100CW** is optimized for use in high frequency inverters.

| Product status link          |          |
|------------------------------|----------|
| <a href="#">STPS40H100CW</a> |          |
| Product summary              |          |
| Symbol                       | Value    |
| $I_{F(AV)}$                  | 2 x 20 A |
| $V_{RRM}$                    | 100 V    |
| $T_j$                        | 175 °C   |
| $V_F$ (typ.)                 | 0.58 V   |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)**

| Symbol              | Parameter   |  | Value       | Unit |   |
|---------------------|---|--|-------------|------|---|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                             |  | 100         | V    |   |
| I <sub>F(RMS)</sub> | Forward rms current   |  | 30          | A    |   |
| I <sub>F(AV)</sub>  | Average forward current, $\delta = 0.5$ square wave         | T <sub>c</sub> = 160 °C                              | Per diode   | 20   | A |
|                     |   |  | Per device  | 40   |   |
| I <sub>FSM</sub>    | Surge non repetitive forward current                        | t <sub>p</sub> = 10 ms sinusoidal                    | 300         | A    |   |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                             | t <sub>p</sub> = 10 $\mu$ s, T <sub>j</sub> = 125 °C | 1900        | W    |   |
| T <sub>stg</sub>    | Storage temperature range                                   |  | -65 to +175 | °C   |   |
| T <sub>j</sub>      | Maximum operating junction temperature range <sup>(1)</sup> |  | +175        | °C   |   |

1.  $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$  condition to avoid thermal runaway for a diode on its own heatsink.

**Table 2. Thermal resistance parameters**

| Symbol               | Parameter        |           | Max. value | Unit |
|----------------------|------------------|-----------|------------|------|
| R <sub>th(j-c)</sub> | Junction to case | Per diode | 0.9        | °C/W |
|                      |                  | Total     | 0.50       |      |
| R <sub>th(c)</sub>   | Coupling         |           | 0.1        |      |

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

For more information, please refer to the following application note:

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics (per diode)**

| 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> | -    |      | 10   | $\mu$ A |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 5    | 15   | mA      |
| V <sub>F</sub> <sup>(2)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 20 A             | -    |      | 0.73 | V       |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.58 | 0.61 |         |
|                               |                         | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 40 A             | -    |      | 0.85 |         |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.67 | 0.72 |         |

1. Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

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

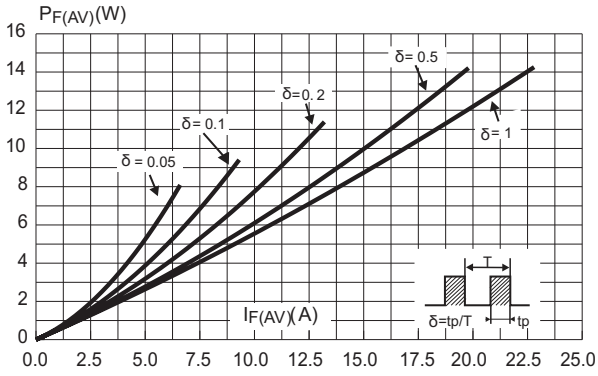
To evaluate the conduction losses, use the following equation:  $P = 0.5 \times I_{F(AV)} + 0.0055 \times I_{F(RMS)}^2$

For more information, please refer to the following application notes related to the power losses :

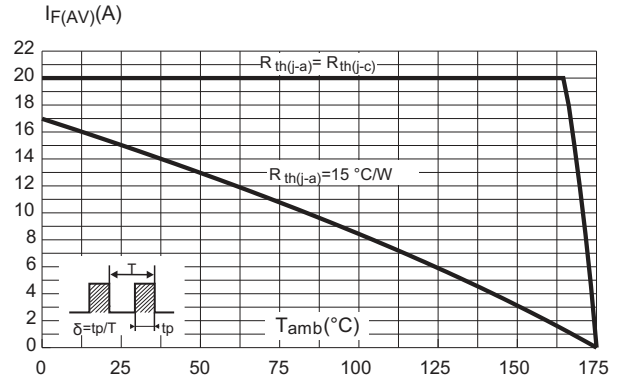
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

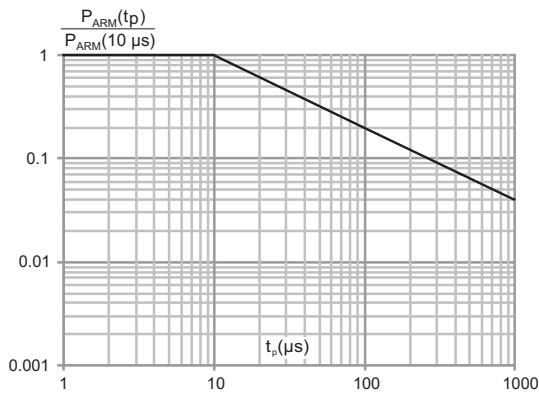
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



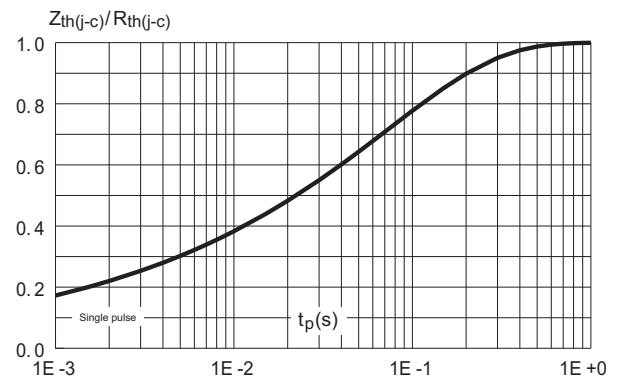
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



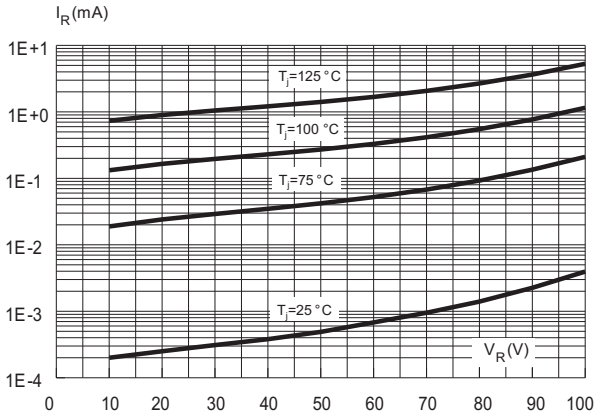
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^{\circ}C$ )**



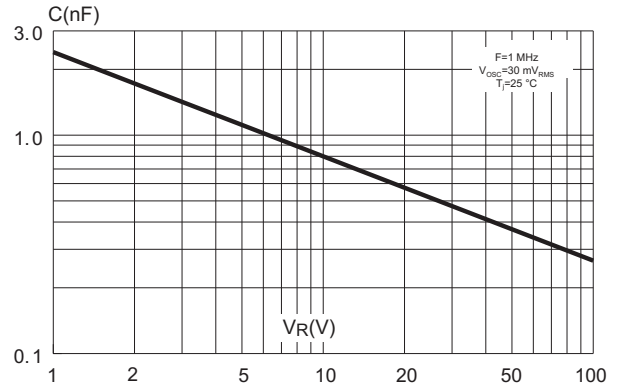
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



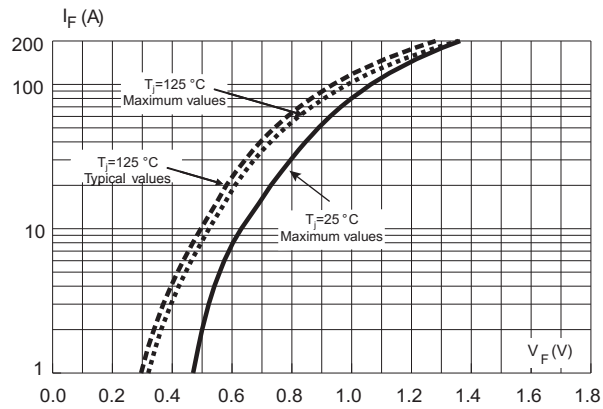
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



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



**Figure 7. Forward voltage drop versus forward current (per diode)**



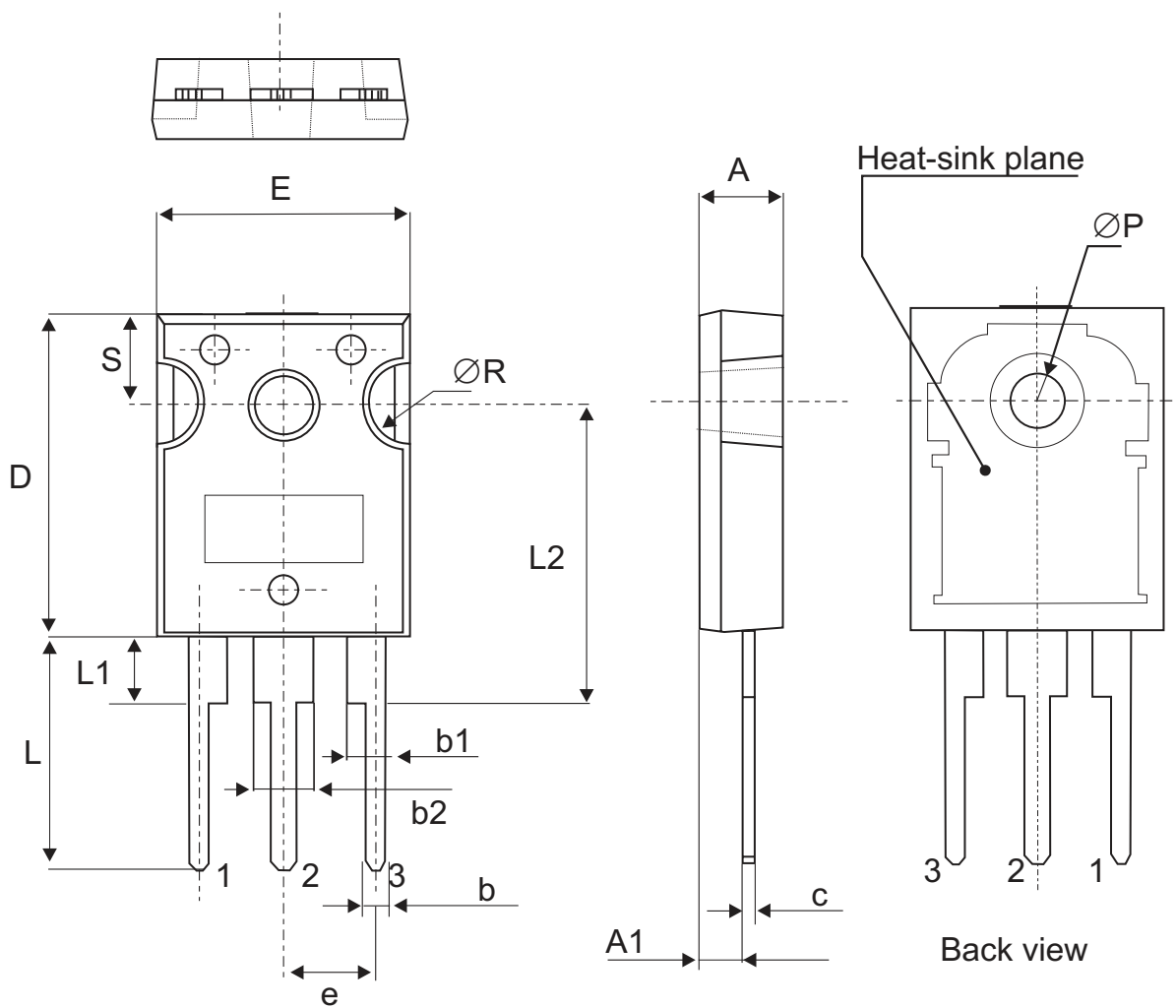
## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 TO-247 package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 8. TO-247 package outline



**Table 4. TO-247 package mechanical data**

| Ref. | Dimensions  |       |       |                             |       |       |
|------|-------------|-------|-------|-----------------------------|-------|-------|
|      | Millimeters |       |       | Inches (for reference only) |       |       |
|      | Min.        | Typ.  | Max.  | Min.                        | Typ.  | Max.  |
| A    | 4.85        |       | 5.15  | 0.191                       |       | 0.203 |
| A1   | 2.20        |       | 2.60  | 0.086                       |       | 0.102 |
| b    | 1.00        |       | 1.40  | 0.039                       |       | 0.055 |
| b1   | 2.00        |       | 2.40  | 0.078                       |       | 0.094 |
| b2   | 3.00        |       | 3.40  | 0.118                       |       | 0.133 |
| c    | 0.40        |       | 0.80  | 0.015                       |       | 0.031 |
| D    | 19.85       |       | 20.15 | 0.781                       |       | 0.793 |
| E    | 15.45       |       | 15.75 | 0.608                       |       | 0.620 |
| e    | 5.30        | 5.45  | 5.60  | 0.209                       | 0.215 | 0.220 |
| L    | 14.20       |       | 14.80 | 0.559                       |       | 0.582 |
| L1   | 3.70        |       | 4.30  | 0.145                       |       | 0.169 |
| L2   |             | 18.50 |       |                             | 0.728 |       |
| ØP   | 3.55        |       | 3.65  | 0.139                       |       | 0.143 |
| ØR   | 4.50        |       | 5.50  | 0.177                       |       | 0.217 |
| S    | 5.30        | 5.50  | 5.70  | 0.209                       | 0.216 | 0.224 |

### 3 Ordering information

**Table 5. Ordering information**

| Order code   | Marking      | Package | Weight | Base qty. | Delivery mode |
|--------------|--------------|---------|--------|-----------|---------------|
| STPS40H100CW | STPS40H100CW | TO-247  | 4.36 g | 30        | Tube          |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes   |
|-------------|---------|---|
| Jul-2003    | 4D      | Previous release.   |
| 16-Jan-2013 | 5       | Updated package graphic to clarify lead length.   |
| 03-Jul-2018 | 6       | Updated Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified) and Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125\text{ °C}$ ). |



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