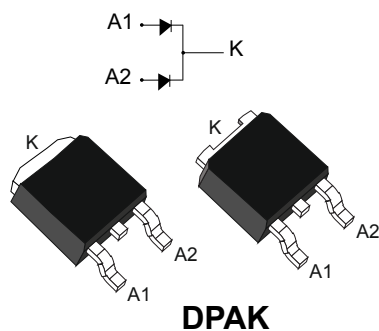


## 2 x 7.5 A - 45 V low drop power Schottky rectifier



### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low capacitance
- Avalanche capability specified
- **ECOPACK2** compliant component

### Applications

- SMPS
- Freewheeling diodes
- Switching diodes

### Description

Dual center tab Schottky rectifier suited for SMPS and high frequency DC to DC converters.

Packaged in DPAK, the **STPS15L45C** is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications.

| Product status link        |           |
|----------------------------|-----------|
| <a href="#">STPS15L45C</a> |           |
| Product summary            |           |
| Symbol                     | Value     |
| $I_{F(AV)}$                | 2 x 7.5 A |
| $V_{RRM}$                  | 45 V      |
| $T_{j(max.)}$              | 150 °C    |
| $V_{F(typ.)}$              | 0.40 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                       |                                              |                                                 | 45          | V    |
| I <sub>F(RMS)</sub> | Forward rms current                                   |                                              |                                                 | 10          | A    |
| I <sub>F(AV)</sub>  | Average forward current                               | T <sub>c</sub> = 140 °C, δ = 0.5 square wave | Per diode                                       | 7.5         | A    |
|                     |                                                       |                                              | Per device                                      | 15          |      |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  |                                              | t <sub>p</sub> = 10 ms sinusoidal               | 75          | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       |                                              | t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C | 265         | W    |
| T <sub>stg</sub>    | Storage temperature range                             |                                              |                                                 | -65 to +175 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature <sup>(1)</sup> |                                              |                                                 | 150         | °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 |
|---------------|------------------|-----------|------------|------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 4          | °C/W |
|               |                  | Total     | 2.4        |      |
| $R_{th(c)}$   | Coupling         |           | 0.7        |      |

When the diodes 1 and 2 are used simultaneously :

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

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          |
|-------------|-------------------------|-----------------------|----------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$      | -    |      | 500  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                      | -    | 60   | 120  | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 7.5\text{ A}$ | -    |      | 0.52 | V             |
|             |                         | $T_j = 125\text{ °C}$ |                      | -    | 0.40 | 0.46 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 12\text{ A}$  | -    |      | 0.60 |               |
|             |                         | $T_j = 125\text{ °C}$ |                      | -    | 0.49 | 0.57 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 15\text{ A}$  | -    |      | 0.64 |               |
|             |                         | $T_j = 125\text{ °C}$ |                      | -    | 0.53 | 0.63 |               |

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

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

To evaluate the conduction losses, use the following equation:

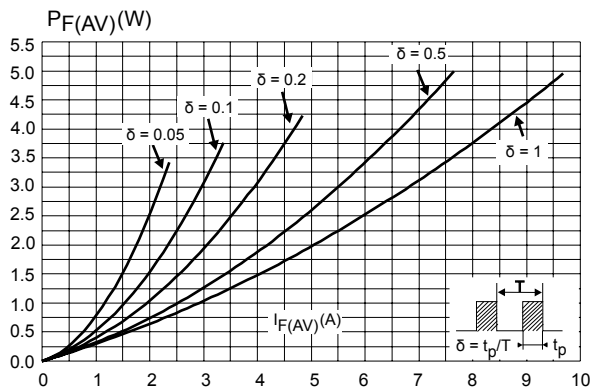
$$P = 0.29 \times I_{F(AV)} + 0.023 \times I_{F(RMS)}^2$$

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

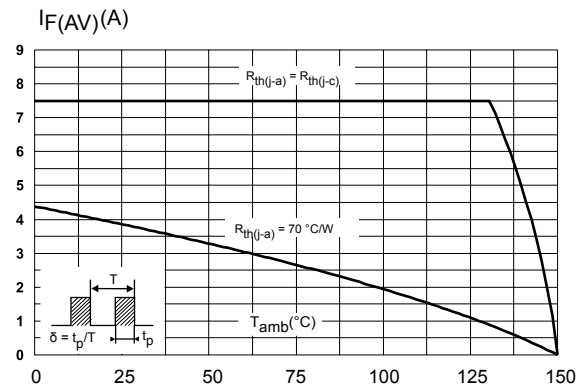
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

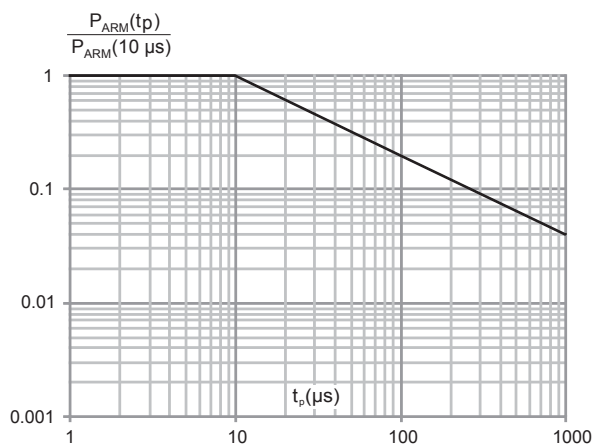
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



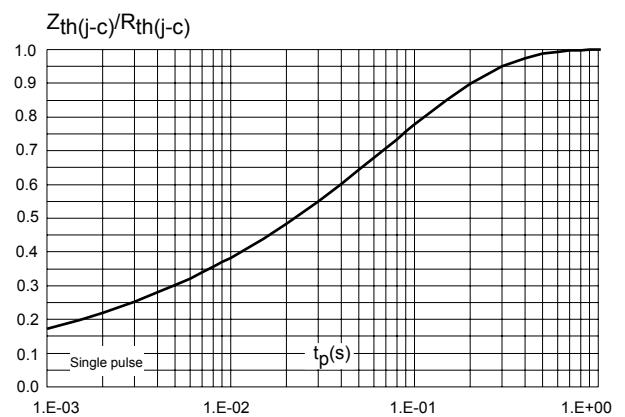
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



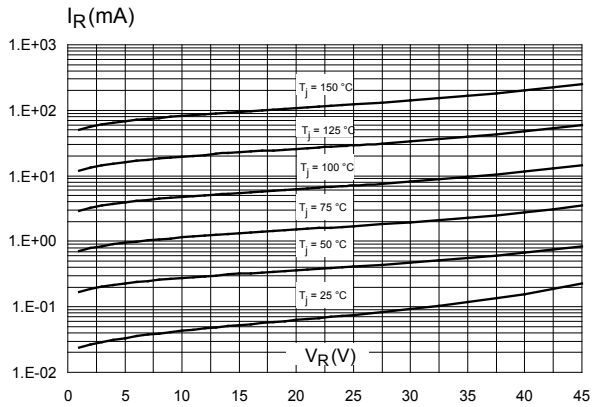
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



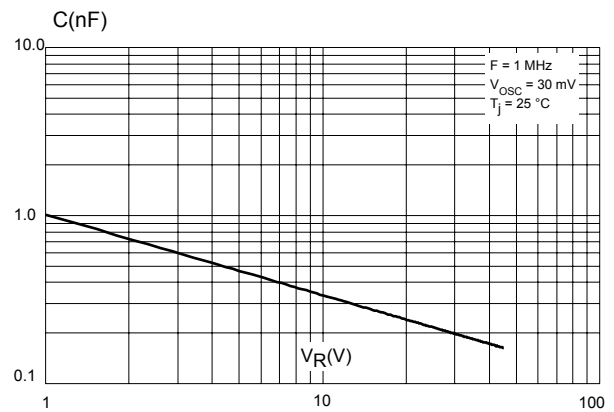
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



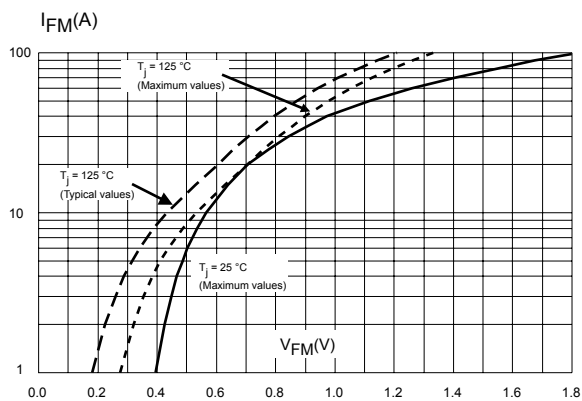
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



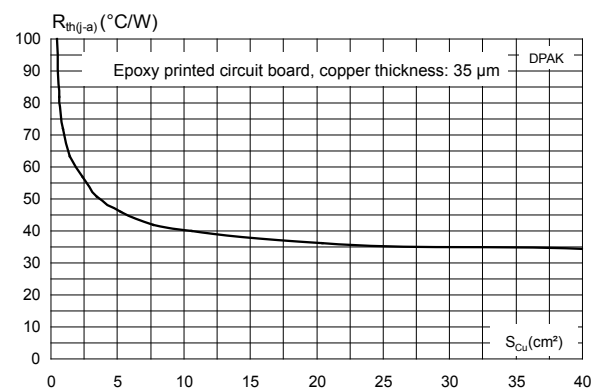
**Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)**



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



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



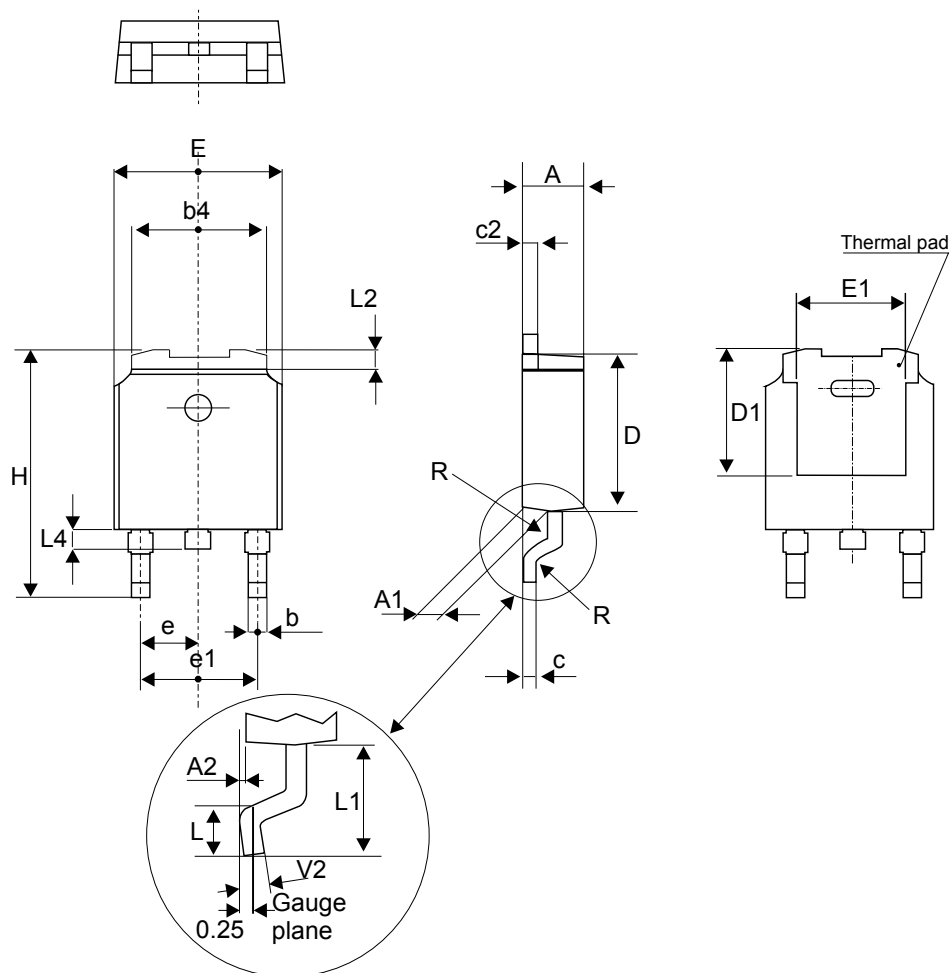
## 2 Package information

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 DPAK package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

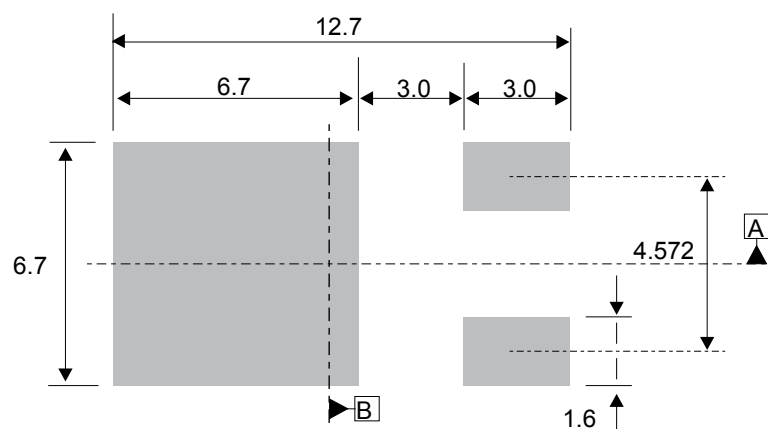
**Figure 9. DPAK package outline**



**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

**Table 4. DPAK package mechanical data**

| Ref. | Dimensions  |       |                             |       |
|------|-------------|-------|-----------------------------|-------|
|      | Millimeters |       | Inches (for reference only) |       |
|      | Min.        | Max.  | Min.                        | Max.  |
| A    | 2.18        | 2.40  | 0.085                       | 0.094 |
| A1   | 0.90        | 1.10  | 0.035                       | 0.043 |
| A2   | 0.03        | 0.23  | 0.001                       | 0.009 |
| b    | 0.64        | 0.90  | 0.025                       | 0.035 |
| b4   | 4.95        | 5.46  | 0.194                       | 0.215 |
| c    | 0.46        | 0.61  | 0.018                       | 0.024 |
| c2   | 0.46        | 0.60  | 0.018                       | 0.023 |
| D    | 5.97        | 6.22  | 0.235                       | 0.244 |
| D1   | 4.95        | 5.60  | 0.194                       | 0.220 |
| E    | 6.35        | 6.73  | 0.250                       | 0.265 |
| E1   | 4.32        | 5.50  | 0.170                       | 0.216 |
| e    | 2.286 typ.  |       | 0.090 typ.                  |       |
| e1   | 4.40        | 4.70  | 0.173                       | 0.185 |
| H    | 9.35        | 10.40 | 0.368                       | 0.409 |
| L    | 1.0         | 1.78  | 0.039                       | 0.070 |
| L2   |             | 1.27  |                             | 0.050 |
| L4   | 0.60        | 1.02  | 0.023                       | 0.040 |
| V2   | -8°         | +8°   | -8°                         | +8°   |

**Figure 10. DPAK recommended footprint (dimensions in mm)**


The device must be positioned within  $\oplus 0.05$  AB

### 3 Ordering Information

**Table 5. Ordering information**

| Order code     | Marking | Package | Weight | Base qty. | Delivery mode |
|----------------|---------|---------|--------|-----------|---------------|
| STPS15L45CB    | S15L45C | DPAK    | 0.35 g | 75        | Tube          |
| STPS15L45CB-TR |         |         |        | 2500      | Tape and reel |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes                                                                                                                               |
|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------|
| 10-Mar-2011 | 2       | Automatic revalidation date workflow started.                                                                                         |
| 07-Jul-2015 | 3       | Updated DPAK package information and reformatted to current standard.<br>Removed IPAK.                                                |
| 29-Nov-2018 | 4       | Updated DPAK package information and reformatted to current standard.                                                                 |
| 09-Aug-2019 | 5       | Added <a href="#">Section Applications</a> . Updated <a href="#">Table 3</a> , <a href="#">Figure 4</a> and <a href="#">Table 5</a> . |
| 02-Apr-2020 | 6       | Updated <a href="#">Figure 5</a> .                                                                                                    |

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