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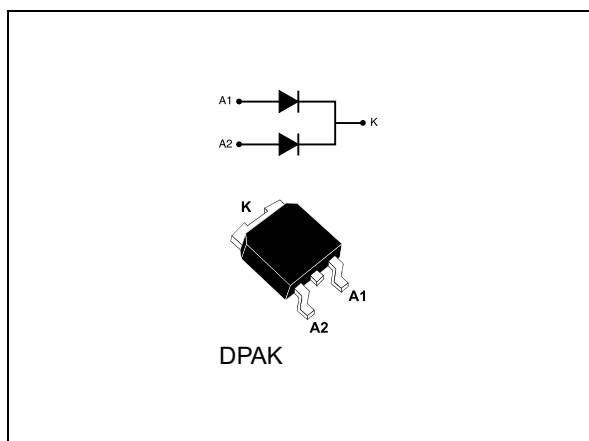
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## STPS15L45C-Y

### Automotive low drop power Schottky rectifier

Datasheet - production data



### Description

Dual center tab Schottky rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters.

Package in DPAK, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection for automotive application.

### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Avalanche capability specified
- AEC-Q101 qualified

Table 1. Device summary

| Symbol       | Value     |
|--------------|-----------|
| $I_{F(AV)}$  | 2 x 7.5 A |
| $V_{RRM}$    | 45 V      |
| $T_j$ (max.) | 150 °C    |
| $V_f$ (max.) | 0.46 V    |

## Characteristics

## STPS15L45C-Y

# 1 Characteristics

**Table 2. Absolute Ratings (limiting values)**

| Symbol       | Parameter                                                   |                                                                   |                         | Value          | Unit               |
|--------------|-------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|----------------|--------------------|
| $V_{RRM}$    | Repetitive peak reverse voltage                             |                                                                   |                         | 45             | V                  |
| $I_{F(RMS)}$ | Forward rms voltage                                         |                                                                   |                         | 10             | A                  |
| $I_{F(AV)}$  | Average forward current                                     | $T_c = 140\text{ }^{\circ}\text{C}$<br>$\delta = 0.5$             | Per diode<br>Per device | 7.5<br>15      | A                  |
| $I_{FSM}$    | Surge non repetitive forward current                        | $t_p = 10\text{ ms}$ sinusoidal                                   |                         | 75             | A                  |
| $I_{RRM}$    | Peak repetitive reverse current                             | $t_p = 2\text{ }\mu\text{s}$ square<br>$F = 1\text{ kHz}$         |                         | 1              | A                  |
| $P_{ARM}$    | Repetitive peak avalanche power                             | $t_p = 10\text{ }\mu\text{s}$ $T_j = 125\text{ }^{\circ}\text{C}$ |                         | 266            | W                  |
| $T_{stg}$    | Storage temperature range                                   |                                                                   |                         | -65 to<br>+175 | $^{\circ}\text{C}$ |
| $T_j$        | Maximum operating junction temperature range <sup>(1)</sup> |                                                                   |                         | -40 to<br>+150 | $^{\circ}\text{C}$ |
| $dV/dt$      | Critical rate of rise of reverse voltage                    |                                                                   |                         | 10000          | V/ $\mu\text{s}$   |

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

**Table 3. Thermal resistance**

| Symbol        | Parameter        |           | Value | Unit                 |
|---------------|------------------|-----------|-------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 4     | $^{\circ}\text{C/W}$ |
|               |                  | Total     | 2.4   |                      |
| $R_{th(c)}$   | Coupling         |           | 0.7   |                      |

When the diodes 1 and 2 are used simultaneously:

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

**Table 4. Static electrical characteristics**

| Symbol      | Parameter               | Test conditions                     |                 | Min. | Typ. | Max. | Unit |
|-------------|-------------------------|-------------------------------------|-----------------|------|------|------|------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ }^{\circ}\text{C}$  | $V_R = V_{RRM}$ | -    |      | 1    | mA   |
|             |                         | $T_j = 125\text{ }^{\circ}\text{C}$ |                 | -    | 23   | 45   | mA   |

**STPS15L45C-Y**

**Characteristics**

**Table 4. Static electrical characteristics (continued)**

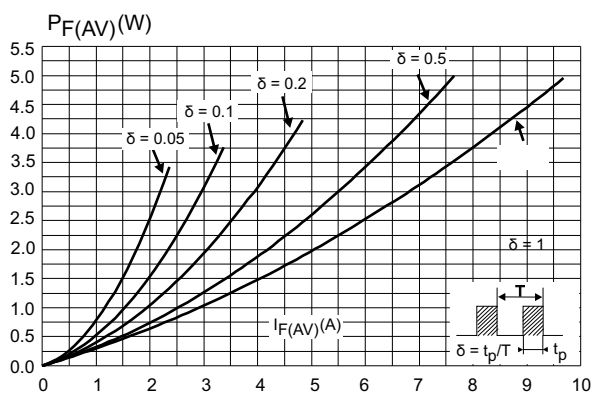
| Symbol      | Parameter            | Test conditions                                        | Min. | Typ. | Max. | Unit |
|-------------|----------------------|--------------------------------------------------------|------|------|------|------|
| $V_F^{(1)}$ | Forward voltage drop | $T_j = 25\text{ }^\circ\text{C}$ $I_F = 7.5\text{ A}$  | -    |      | 0.52 | V    |
|             |                      | $T_j = 125\text{ }^\circ\text{C}$ $I_F = 7.5\text{ A}$ | -    | 0.40 | 0.46 |      |
|             |                      | $T_j = 25\text{ }^\circ\text{C}$ $I_F = 12\text{ A}$   | -    |      | 0.60 |      |
|             |                      | $T_j = 125\text{ }^\circ\text{C}$ $I_F = 12\text{ A}$  | -    | 0.49 | 0.57 |      |
|             |                      | $T_j = 25\text{ }^\circ\text{C}$ $I_F = 15\text{ A}$   | -    |      | 0.64 |      |
|             |                      | $T_j = 125\text{ }^\circ\text{C}$ $I_F = 15\text{ A}$  | -    | 0.53 | 0.63 |      |

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

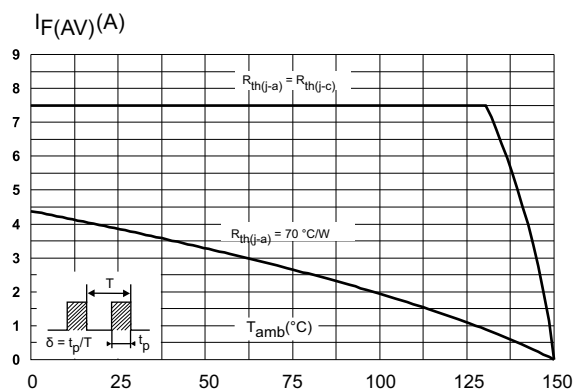
To evaluate the conduction losses use the following equation:

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

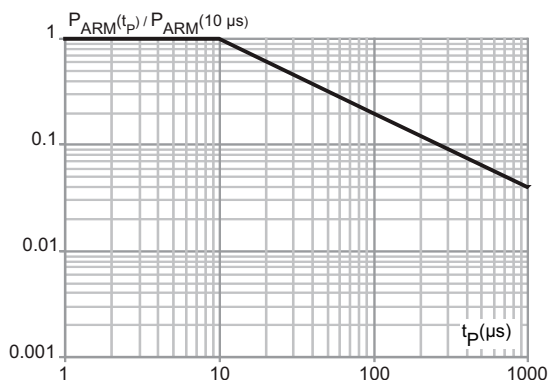
**Figure 1. Conduction losses versus average current**



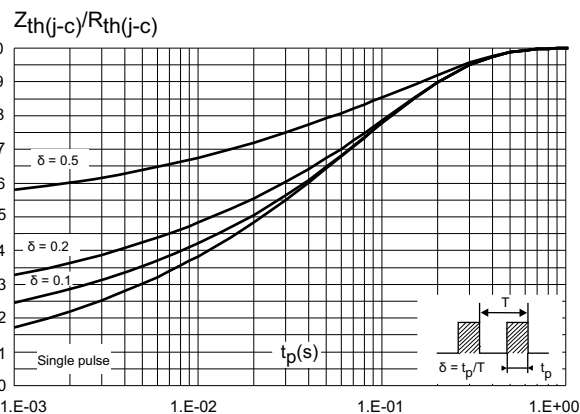
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



**Figure 3. Normalized avalanche power derating versus pulse duration**



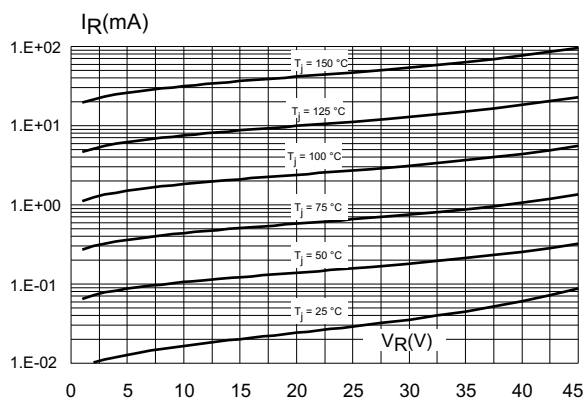
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration**



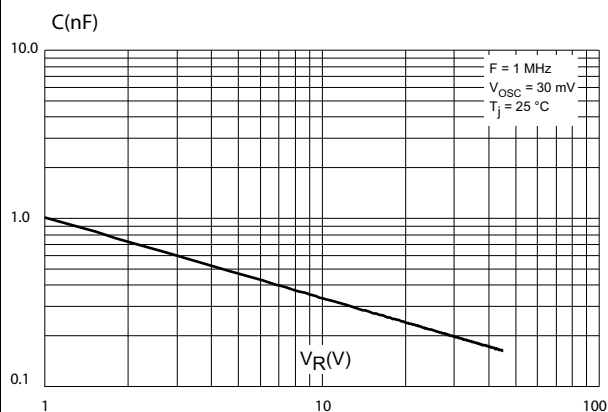
## Characteristics

## STPS15L45C-Y

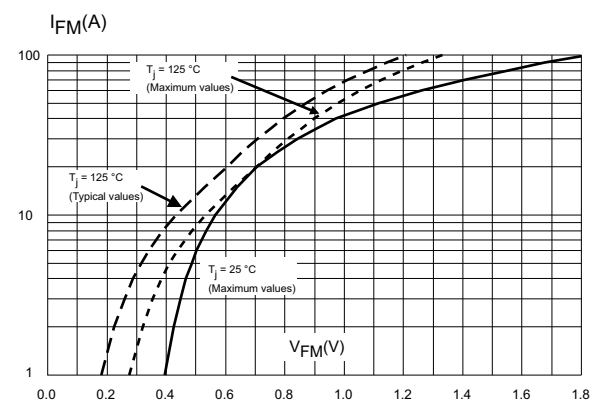
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



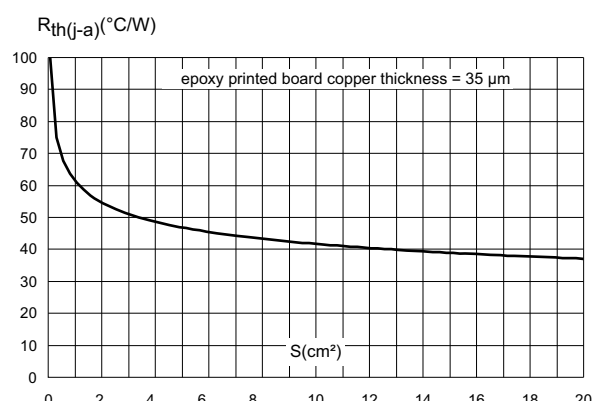
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 7. Forward voltage drop versus forward current**



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



STPS15L45C-Y

Package information

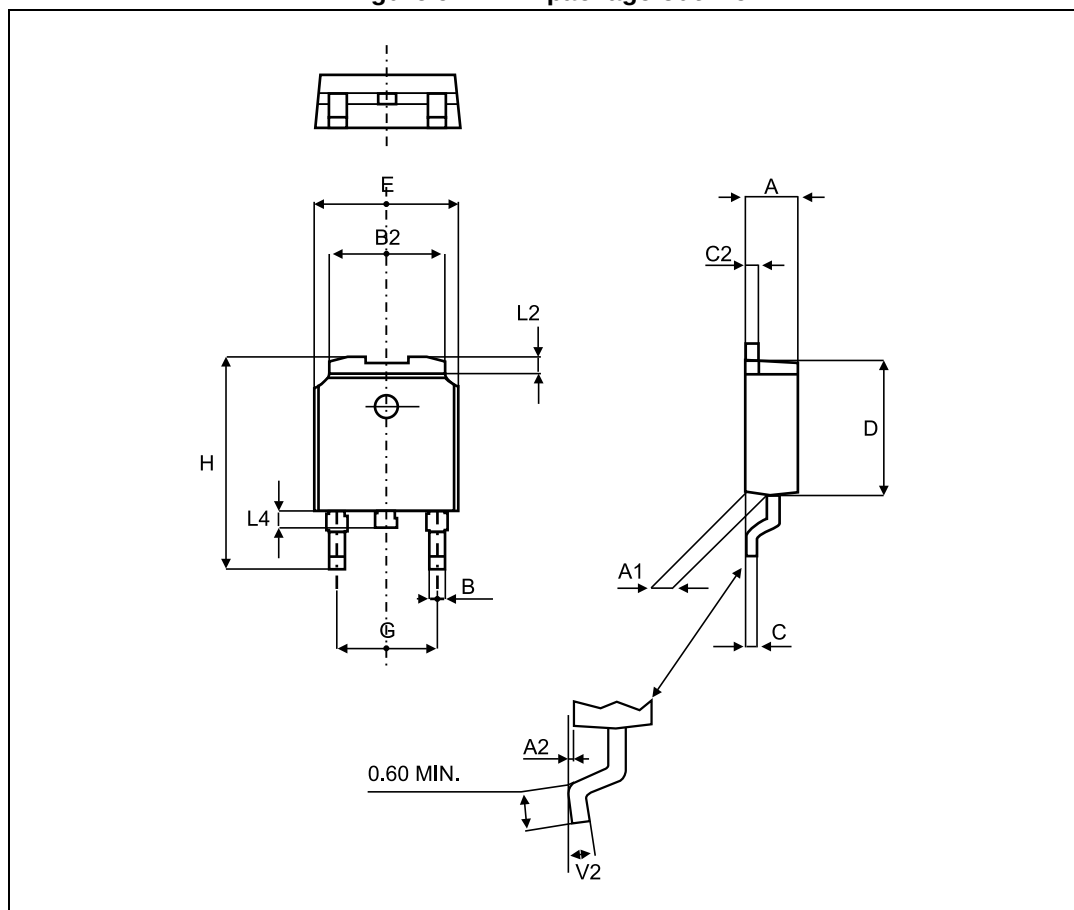
## 2 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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

Figure 9. DPAK package outline



**Package information**

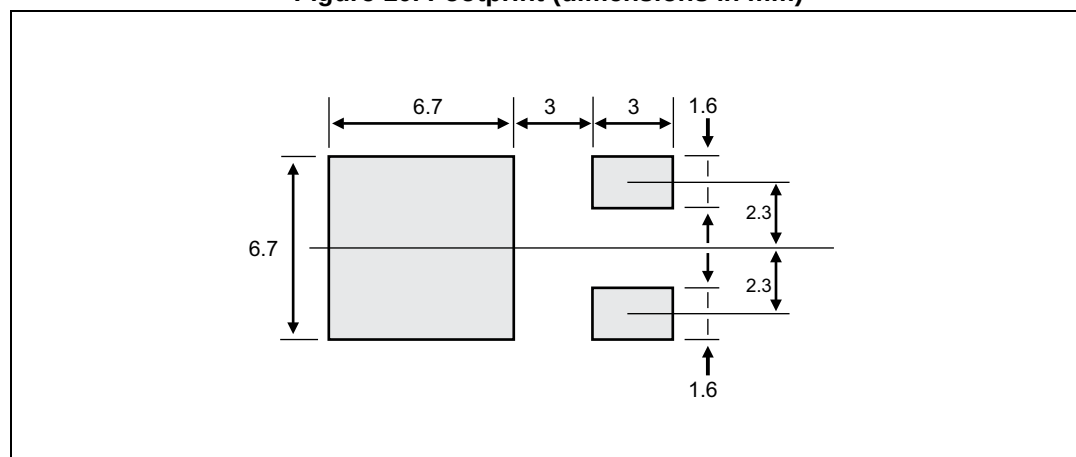
**STPS15L45C-Y**

**Table 5. DPAK package mechanical data**

| Ref. | Dimensions  |      |       |                       |       |       |
|------|-------------|------|-------|-----------------------|-------|-------|
|      | Millimeters |      |       | Inches <sup>(1)</sup> |       |       |
|      | Typ.        | Min. | Max.  | Typ.                  | Min.  | Max.  |
| A    |             | 2.20 | 2.40  |                       | 0.086 | 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 |
| B2   |             | 5.20 | 5.40  |                       | 0.204 | 0.212 |
| C    |             | 0.45 | 0.60  |                       | 0.017 | 0.023 |
| C2   |             | 0.48 | 0.60  |                       | 0.018 | 0.023 |
| D    |             | 6.00 | 6.20  |                       | 0.236 | 0.244 |
| E    |             | 6.40 | 6.60  |                       | 0.251 | 0.259 |
| G    |             | 4.40 | 4.60  |                       | 0.173 | 0.181 |
| H    |             | 9.35 | 10.10 |                       | 0.368 | 0.397 |
| L2   | 0.80        |      |       | 0.031                 |       |       |
| L4   |             | 0.60 | 1.00  |                       | 0.023 | 0.039 |
| V2   |             | 0°   | 8°    |                       | 0°    | 8°    |

1. Values in inches are converted from mm and rounded to 4 decimal digits.

**Figure 10. Footprint (dimensions in mm)**



STPS15L45C-Y

Ordering information

### 3 Ordering information

Table 6. Ordering information

| Order code      | Marking  | Package | Weight | Base qty. | Delivery mode |
|-----------------|----------|---------|--------|-----------|---------------|
| STPS15L45CBY-TR | S15L45CY | DPAK    | 0.30 g | 2500      | Tape and reel |

### 4 Revision history

Table 7. Document revision history

| Date        | Revision | Changes                                                                  |
|-------------|----------|--------------------------------------------------------------------------|
| 10-Mar-2011 | 1        | First issue.                                                             |
| 07-Jul-2015 | 2        | Updated <a href="#">Table 2</a> .<br>Format updated to current standard. |

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**STPS15L45C-Y**

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