

## Automotive power Schottky rectifier

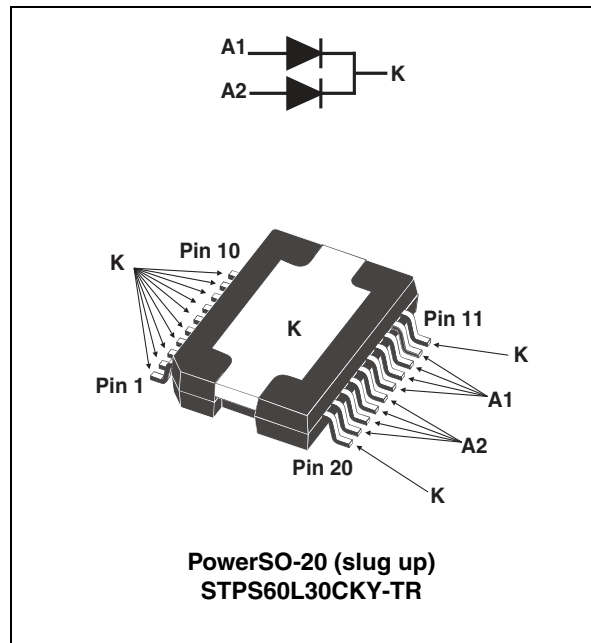
### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- AEC-Q101 qualified

### Description

60 A dual center tab Schottky rectifier suitable for automotive applications.

Packaged in PowerSO-20 (slug up), this device is especially intended for use in a low voltage applications.



**Table 1. Device summary**

| Symbol       | Value    |
|--------------|----------|
| $I_{F(AV)}$  | 2 x 30 A |
| $V_{RRM}$    | 30 V     |
| $T_{J(max)}$ | 150 °C   |
| $V_{F(max)}$ | 0.415 V  |

# 1 Characteristics

**Table 2. Absolute rating (limiting value, per diode)**

| Symbol                             | Parameter                                      |  |                         | Value       | Unit |
|------------------------------------|--|--|-------------------------|-------------|------|
| V <sub>RRM</sub>                   | Repetitive peak reverse voltage                |  |                         | 30          | V    |
| I <sub>F(RMS)</sub> <sup>(1)</sup> | Forward rms current                            |  |                         | 45          | A    |
| I <sub>F(AV)</sub> <sup>(1)</sup>  | Average forward current                        | T <sub>c</sub> = 130 °C, δ = 0.5<br>Square pulse | Per diode<br>Per device | 30<br>60    | A    |
| I <sub>FSM</sub> <sup>(1)</sup>    | Surge non repetitive forward current           | t <sub>p</sub> = 10 ms                           | Sinusoidal              | 250         | A    |
| T <sub>stg</sub>                   | Storage temperature range                      |  |                         | -65 to +175 | °C   |
| T <sub>j</sub>                     | Operating junction temperature range           |  |                         | -40 to +150 | °C   |
| T <sub>R</sub>                     | Recommended reflow soldering temperature range |  |                         | 245 +0/-5   | °C   |

1. All anode pins (A1, A2) must be connected

**Table 3. Thermal parameters**

| Symbol               | Parameter        |                         | Value        | Unit |
|----------------------|------------------|-------------------------|--------------|------|
| R <sub>th(j-c)</sub> | Junction to case | Per diode<br>Per device | 0.95<br>0.61 | °C/W |
| R <sub>th(c)</sub>   | Coupling         |                         | 0.27         | °C/W |

When 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 (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> |      |      | 2     | mA   |
|                                   |                         | T <sub>j</sub> = 125 °C |                                   |      |      | 400   | mA   |
| V <sub>F</sub> <sup>(1) (2)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 10 A             |      |      | 0.420 | V    |
|                                   |                         | T <sub>j</sub> = 125 °C | I <sub>F</sub> = 10 A             |      |      | 0.310 |      |
|                                   |                         | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 30 A             |      |      | 0.490 |      |
|                                   |                         | T <sub>j</sub> = 125 °C | I <sub>F</sub> = 30 A             |      |      | 0.415 |      |

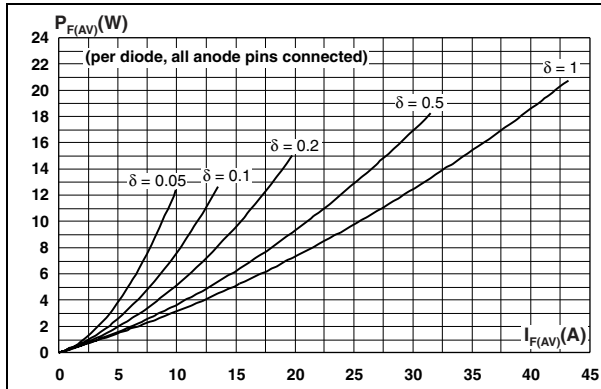
1. Pulse test : t<sub>p</sub> = 380 μs, δ < 2%

2. All anode pins (A1, A2) must be connected

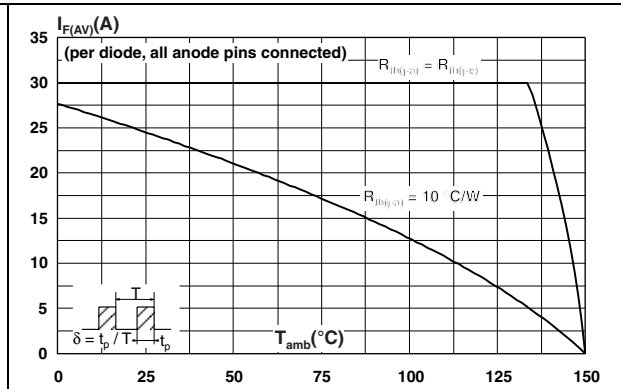
To evaluate the maximum conduction losses use the following equation:

$$P = 0.315 \times I_{F(AV)} + 0.00333 \times I_{F(RMS)}^2$$

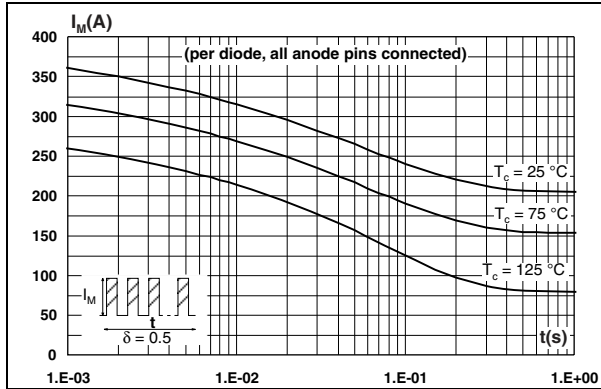
**Figure 1. Average forward power dissipation versus average forward current**



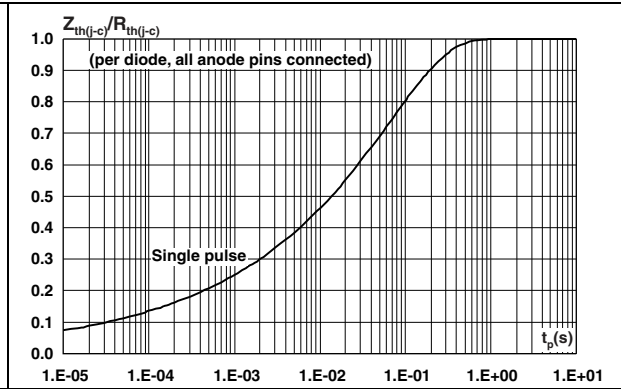
**Figure 2. Average forward current versus ambient temperature per diode ( $\delta = 0.5$ )**



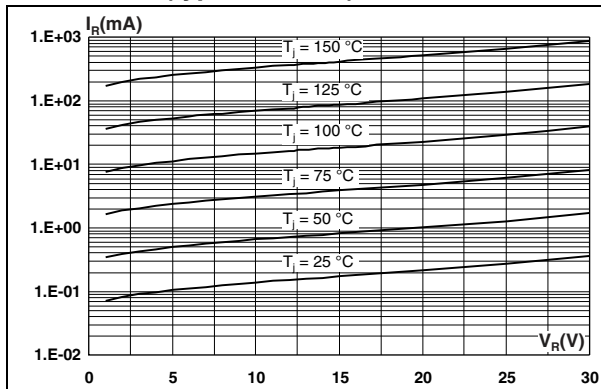
**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**



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



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



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

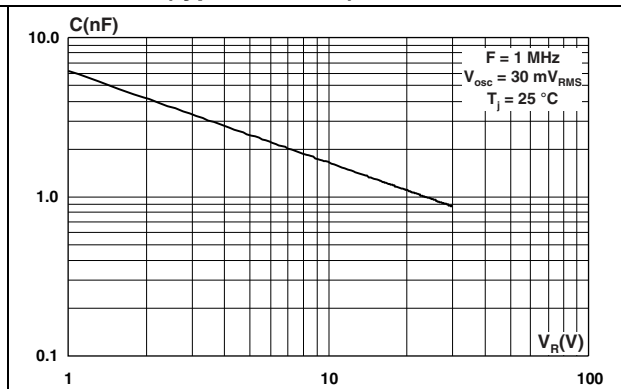
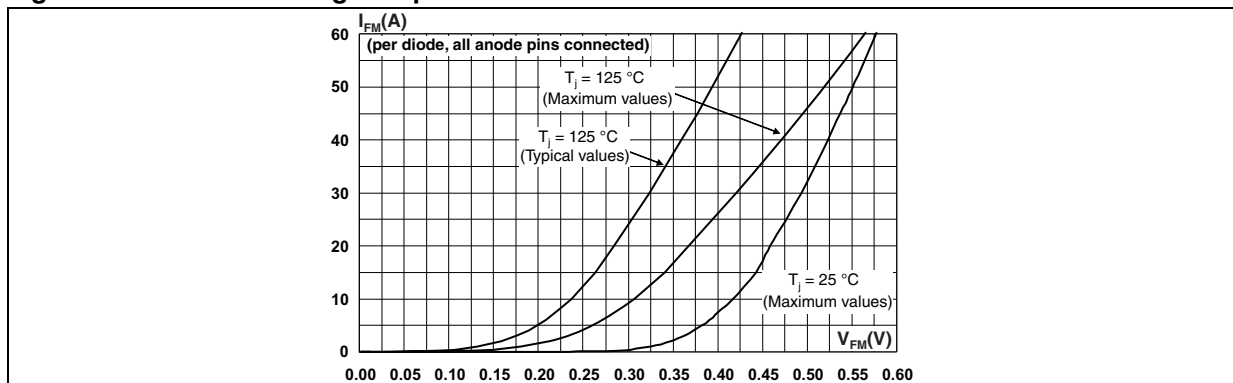


Figure 7. Forward voltage drop versus forward current



## 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.

**Table 5. PowerSO-20 (slug up) dimensions**

| Ref               | Dimensions |       |       |        |       |         |
|-------------------|------------|-------|-------|--------|-------|---------|
|                   | Millimeter |       |       | Inch   |       |         |
|                   | Min.       | Typ.  | Max.  | Min.   | Typ.  | Max.    |
| A                 | 3.25       |       | 3.5   | 0.128  |       | 0.138   |
| A2                | 3          | 3.15  | 3.3   | 0.118  | 0.124 | 0.13    |
| A4                | 0.8        |       | 1     | 0.031  |       | 0.039   |
| A5                | 0.15       | 0.2   | 0.25  | 0.006  | 0.008 | 0.01    |
| a1                | 0.03       |       | -0.04 | 0.0012 |       | -0.0016 |
| b                 | 0.4        |       | 0.53  | 0.016  |       | 0.021   |
| c                 | 0.23       |       | 0.32  | 0.009  |       | 0.012   |
| D <sup>(1)</sup>  | 15.8       |       | 16    | 0.622  |       | 0.63    |
| D1                | 9.4        |       | 9.8   | 0.37   |       | 0.385   |
| D2                |            | 1     |       |        | 0.039 |         |
| E                 | 13.9       |       | 14.5  | 0.547  |       | 0.57    |
| E1 <sup>(1)</sup> | 10.9       |       | 11.1  | 0.429  |       | 0.437   |
| E2                |            |       | 2.9   |        |       | 0.114   |
| E3                | 5.8        |       | 6.2   | 0.228  |       | 0.244   |
| e                 | 1.12       | 1.27  | 1.42  | 0.044  | 0.05  | 0.056   |
| e3                |            | 11.43 |       |        | 0.45  |         |
| G                 | 0          |       | 0.1   | 0      |       | 0.004   |
| H                 | 15.5       |       | 15.9  | 0.61   |       | 0.625   |
| h                 |            |       | 1.1   |        |       | 0.043   |
| L                 | 0.8        |       | 1.1   | 0.031  |       | 0.043   |
| N                 |            |       | 10°   |        |       | 10°     |
| R                 |            | 0.6   |       |        | 0.024 |         |
| S                 | 0°         |       | 8°    | 0°     |       | 8°      |
| V                 | 5°         |       | 7°    | 5°     |       | 7°      |

1. These measurements do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm (0.006"). Critical dimensions: E, a1, e, and G.

### 3 Ordering information

Table 6. Ordering information

| Order code      | Marking   | Package    | Weight | Base qty | Delivery mode |
|-----------------|-----------|------------|--------|----------|---------------|
| STPS60L30CKY-TR | PS60L30CY | PowerSO-20 | 1.93 g | 600      | Tape and reel |

### 4 Revision history

Table 7. Document revision history

| Date        | Revision | Changes      |
|-------------|----------|--------------|
| 02-Dec-2010 | 1        | First issue. |

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