

Automotive power Schottky rectifier

Features

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

Description

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

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

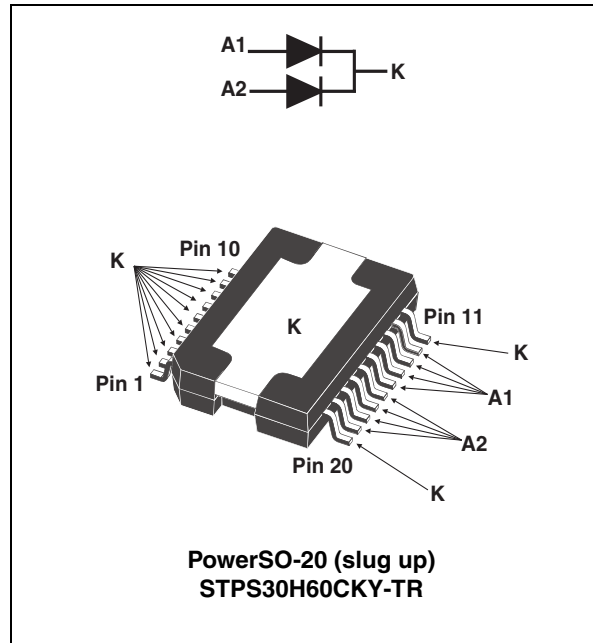


Table 1. Device summary

| Symbol | Value |
|--------------|----------|
| $I_{F(AV)}$ | 2 x 15 A |
| V_{RRM} | 60 V |
| $T_{J(max)}$ | 150 °C |
| $V_{F(max)}$ | 0.645 V |

1 Characteristics

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

| Symbol | Parameter | | | Value | Unit |
|------------------------------------|--|--|-----------------------------------|-------------|------|
| V _{RRM} | Repetitive peak reverse voltage | | | 60 | V |
| I _{F(RMS)} ⁽¹⁾ | Forward rms current | | | 45 | A |
| I _{F(AV)} ⁽¹⁾ | Average forward current | T _c = 140 °C, δ = 0.5 square pulse | Per diode | 15 | A |
| | | T _c = 135 °C, δ = 0.5 square pulse | Per device | 30 | |
| I _{FSM} ⁽¹⁾ | Surge non repetitive forward current | | t _p = 10 ms Sinusoidal | 250 | A |
| T _{stg} | Storage temperature range | | | -65 to +175 | °C |
| T _j | Operating junction temperature range | | | -40 to +150 | °C |
| T _R | 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 |
|---------------|------------------|-------------------------|--------------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode Per device | 0.95 0.61 | $^{\circ}\text{C/W}$ |
| $R_{th(c)}$ | Coupling | | 0.27 | $^{\circ}\text{C/W}$ |

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 |
|----------------|-------------------------|-------------------------------------|---------------------|------|------|-------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ }^{\circ}\text{C}$ | $V_R = V_{RRM}$ | | | 150 | μA |
| | | $T_j = 125\text{ }^{\circ}\text{C}$ | | | | 45 | mA |
| $V_F^{(1)(2)}$ | Forward voltage drop | $T_j = 25\text{ }^{\circ}\text{C}$ | $I_F = 15\text{ A}$ | | | 0.580 | V |
| | | $T_j = 125\text{ }^{\circ}\text{C}$ | $I_F = 15\text{ A}$ | | | 0.515 | |
| | | $T_j = 25\text{ }^{\circ}\text{C}$ | $I_F = 30\text{ A}$ | | | 0.700 | |
| | | $T_j = 125\text{ }^{\circ}\text{C}$ | $I_F = 30\text{ A}$ | | | 0.645 | |

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

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

To evaluate the maximum conduction losses use the following equation:

$$P = 0.385 \times I_{F(AV)} + 0.00867 \times I_F^2(\text{RMS})$$

Figure 1. Average forward power dissipation versus average forward current (per diode, all anode pins connected)

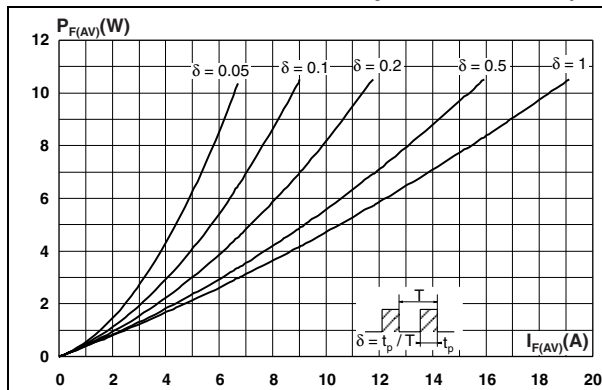


Figure 2. Average forward current versus ambient temperature (per diode, all anode pins connected) ($\delta = 0.5$)

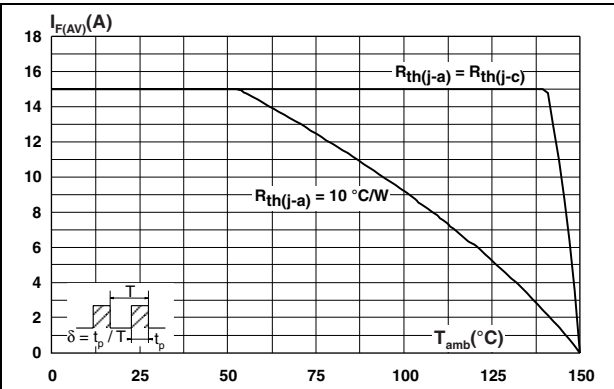


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

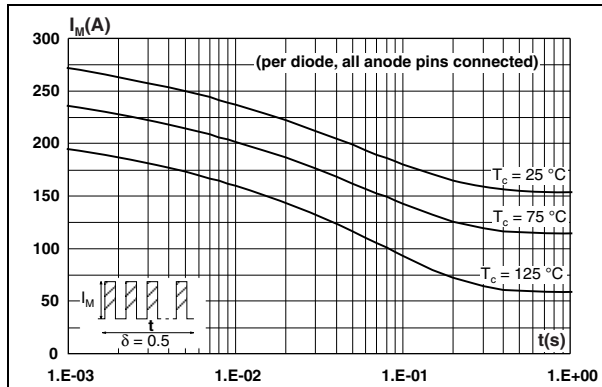


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

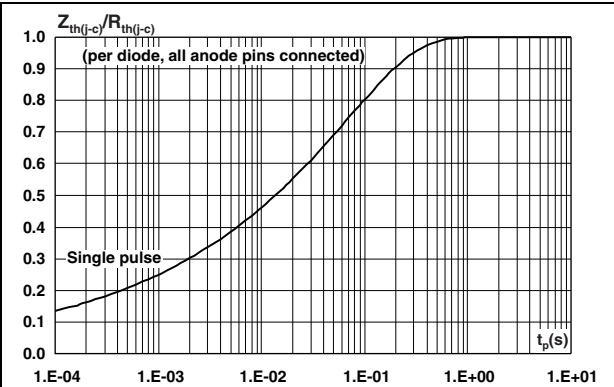


Figure 5. Reverse leakage current versus reverse voltage applied (per diode) (typical values)

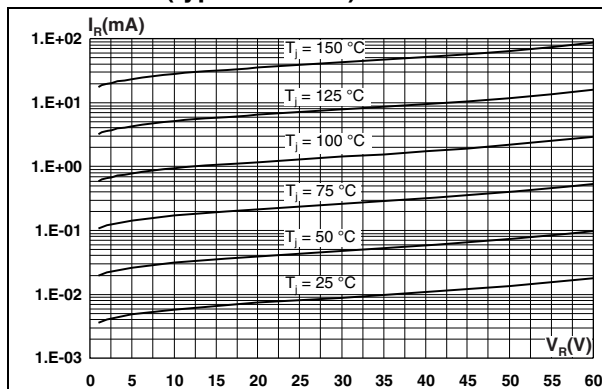


Figure 6. Junction capacitance versus reverse voltage applied (per diode) (typical values)

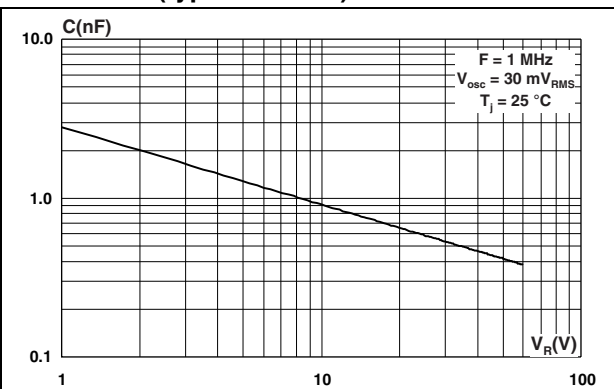


Figure 7. Forward voltage drop versus forward current (per diode, all anode pins connected, low level)

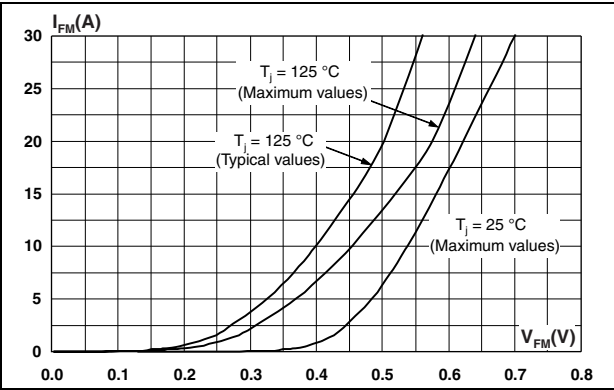
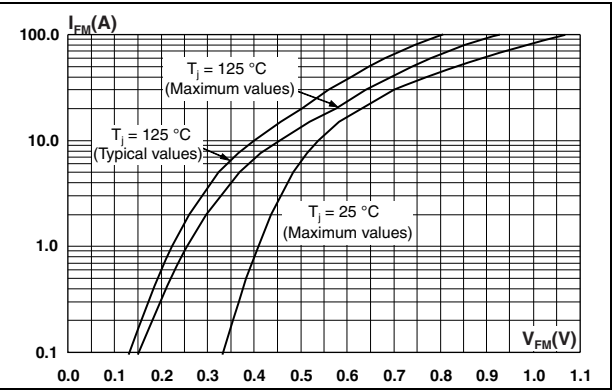


Figure 8. Forward voltage drop versus forward current (per diode, all anode pins connected, high level)



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. 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 ⁽¹⁾ | 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 ⁽¹⁾ | 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 |
|-----------------|-----------|------------|--------|----------|---------------|
| STPS30H60CKY-TR | PS30H60CY | PowerSO-20 | 1.93 g | 600 | Tape and reel |

4 Revision history

Table 7. Document revision history

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

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