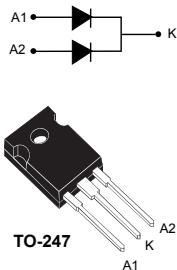


150 V power Schottky rectifier



Features

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- High frequency operation
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

Description

This dual diode common cathode Schottky rectifier is optimized for high frequency switched mode power supplies.

Packaged in TO-247, the **STPS61150C** combines high current rating and low volume to enhance both reliability and power density of the application.

| Product status | |
|----------------------|----------|
| STPS61150C | |
| Product summary | |
| I _{F(AV)} | 2 x 30 A |
| V _{RRM} | 150 V |
| T _{j(max.)} | 175 °C |
| V _{F(typ.)} | 0.63 V |

1 Characteristics

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

| Symbol | Parameter | Value | Unit |
|--------------|---|-------------------------------|------------|
| V_{RRM} | Repetitive peak reverse voltage | 150 | V |
| $I_{F(RMS)}$ | Forward rms current | 80 | A |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$, square wave | $T_c = 150$ °C | Per diode |
| | | $T_c = 145$ °C | Per device |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10$ ms sinusoidal | 500 |
| P_{ARM} | Repetitive peak avalanche power | $t_p = 10$ µs, $T_j = 125$ °C | 2290 |
| T_{stg} | Storage temperature range | -65 to +175 | °C |
| T_j | Maximum operating junction temperature ⁽¹⁾ | +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 | Value | Unit |
|---------------|------------------|-----------|------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 0.9 |
| | | Total | 0.6 |
| $R_{th(c)}$ | Coupling | 0.3 | °C/W |

When the diodes 1 and 2 are used simultaneously: $\Delta T_j \text{ (diode1)} = P_{\text{(diode1)}} \times R_{th(j-c)} \text{ (per diode)} + P_{\text{(diode2)}} \times R_{th(c)}$

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 | $T_j = 25$ °C | $V_R = V_{RRM}$ | - | 7 | 20 | µA |
| | | $T_j = 125$ °C | | - | 7 | 25 | mA |
| V_F ⁽²⁾ | Forward voltage drop | $T_j = 25$ °C | $I_F = 30$ A | - | | 0.84 | V |
| | | $T_j = 125$ °C | | - | 0.63 | 0.67 | |
| | | $T_j = 25$ °C | $I_F = 60$ A | - | | 0.92 | |
| | | $T_j = 125$ °C | | - | 0.76 | 0.80 | |

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

2. Pulse test: $t_p = 380$ µs, $\delta < 2\%$

To evaluate the conduction losses, use the following equation: $P = 0.54 \times I_{F(AV)} + 0.0043 \times I_F^2 \text{ (RMS)}$

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)

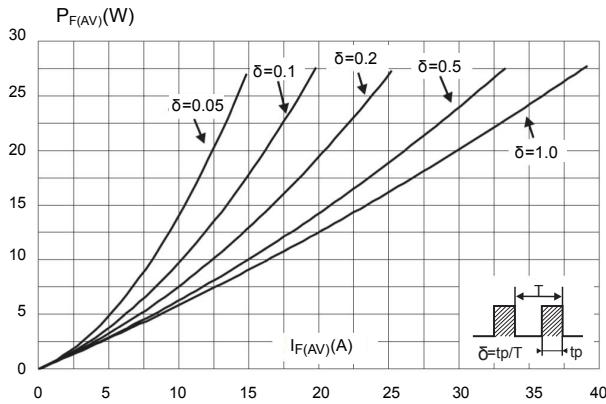


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

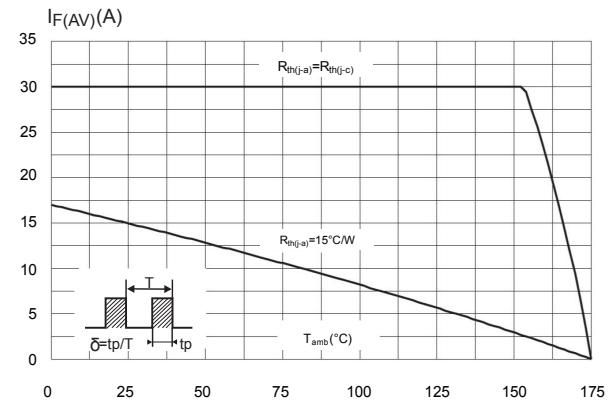


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125$ °C)

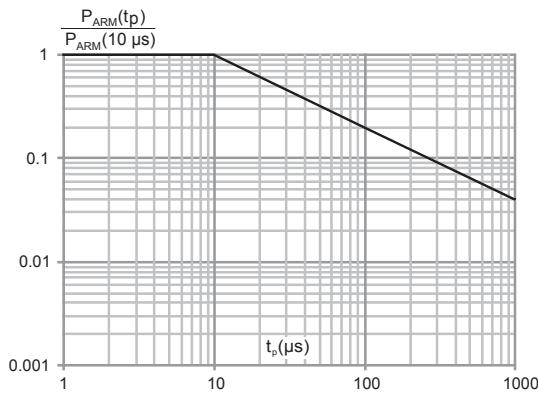


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

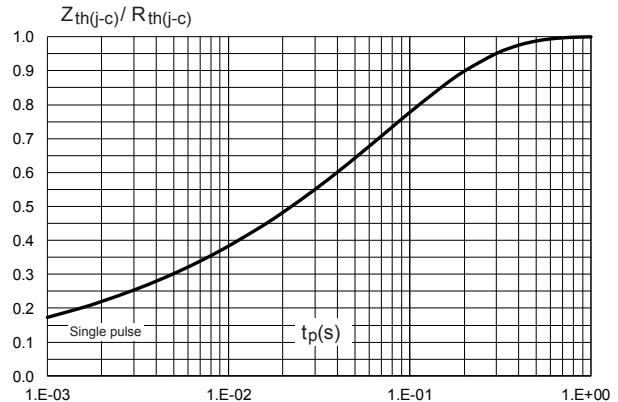


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

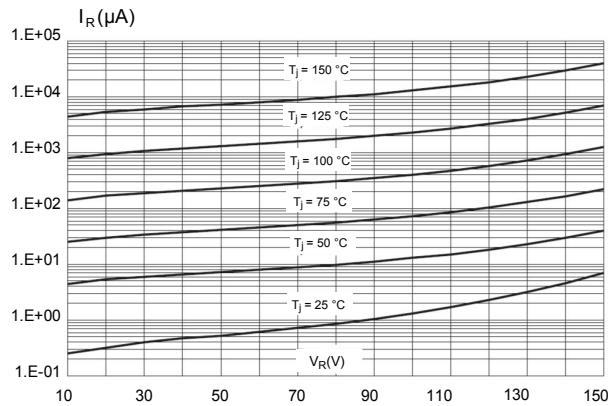


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

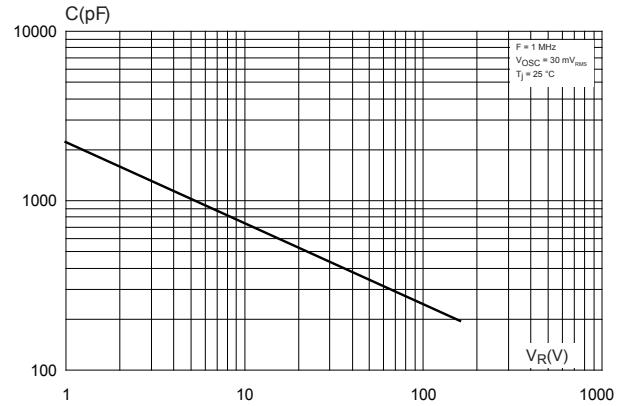
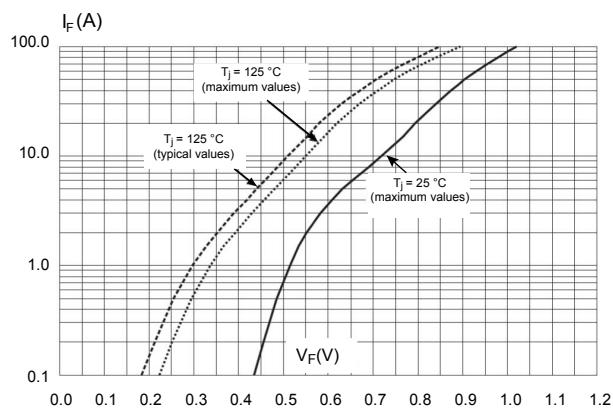


Figure 7. Forward voltage drop versus forward current (per diode)



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. 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

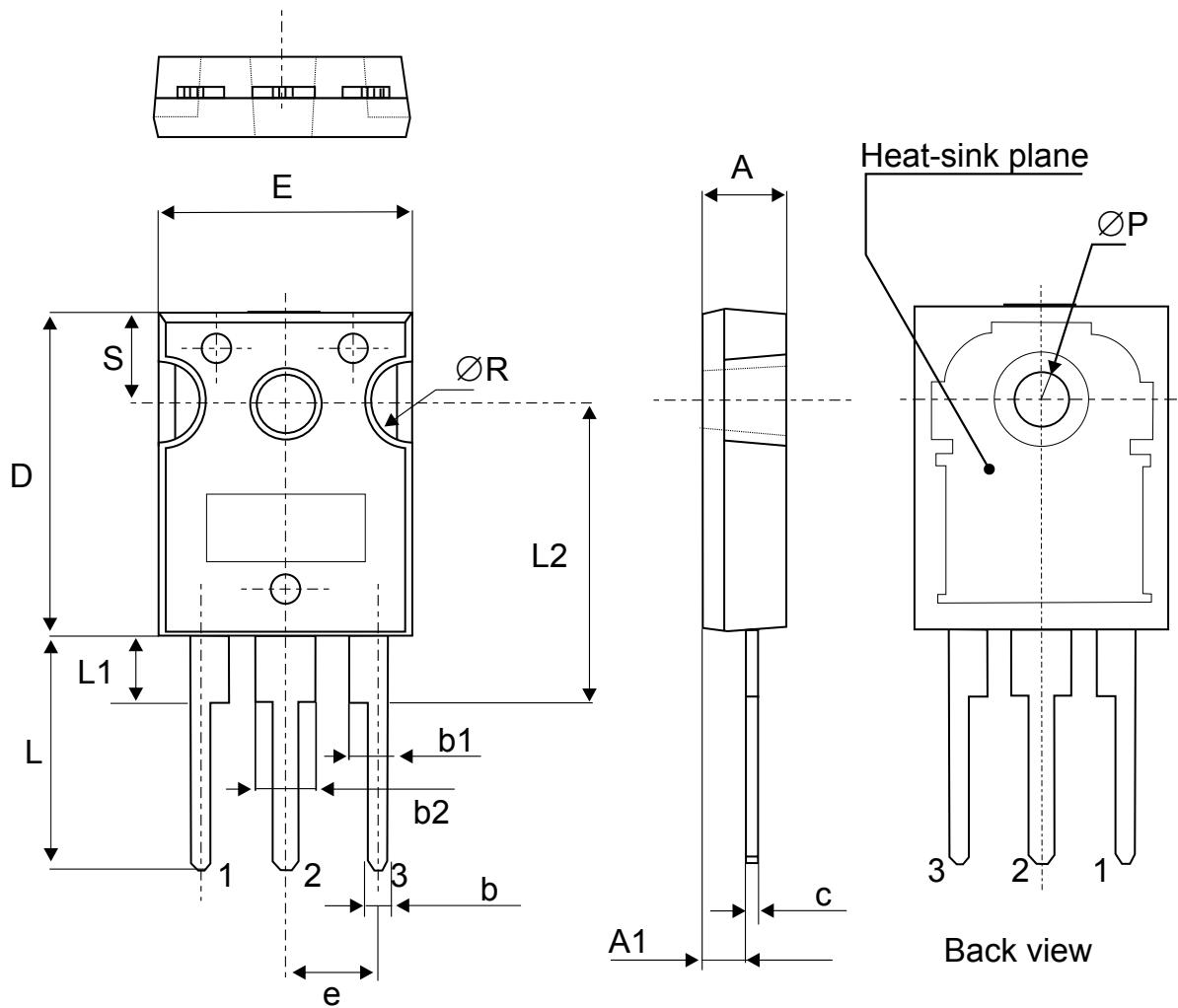


Table 4. TO-247 package mechanical data

| 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. Order code

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|-------------|-------------|---------|--------|-----------|---------------|
| STPS61150CW | STPS61150CW | TO-247 | 4.36 g | 30 | Tube |

Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 24-Jul-2012 | 1 | First issue. |
| 27-Jun-2018 | 2 | 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 ($T_J = 125$ °C). |

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