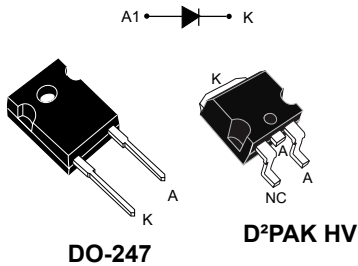



Automotive 800 V, 30 A bridge rectifier diode



Features

- AEC-Q101 qualified 
- Ultra low conduction losses
- Ultra-low reverse losses
- High junction temperature capability (+175 °C)
- V_{RRM} guaranteed from -40 to +175 °C
- D²PAK HV creepage distance (anode to cathode) = 5.38 mm min. (with top coating)
- PPAP capable
- ECOPACK2 compliant for DO-247
- ECOPACK1 compliant for D²PAK HV

Applications

- On board charger (OBC)
- Charging stations
- Bridge function

Description

The high quality design of this diode has produced a device with consistently reproducible characteristics and intrinsic ruggedness. These characteristics make it ideal for heavy duty applications that demand long term reliability like automotive applications.

Thanks to its ultra-low conduction losses, the **STBR3008-Y** is especially suitable for use as input bridge diode in battery chargers or charging stations.

Product status link

[STBR3008-Y](#)

Product summary

| Symbol | Value |
|--------------|----------------|
| $I_{F(AV)}$ | 30 A |
| V_{RRM} | 800 V |
| T_j | -40 to +175 °C |
| V_F (typ.) | 1.0 V |

1 Characteristics

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

| Symbol | Parameter | | Value | Unit |
|--------------|--------------------------------------|--|-------------|------|
| V_{RRM} | Repetitive peak reverse voltage | $T_j = -40\text{ °C to }+175\text{ °C}$ | 800 | V |
| V_{RSM} | Non-repetitive surge reverse voltage | $t_p = 10\text{ ms square}$ | 900 | V |
| $I_{F(RMS)}$ | Forward rms current | | 45 | A |
| $I_{F(AV)}$ | Average forward current | $T_C = 160\text{ °C}, \delta = 0.5\text{ square wave}$ | 30 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms sinusoidal}$ | 350 | A |
| T_{stg} | Storage temperature range | | -65 to +175 | °C |
| T_j | Operating junction temperature | | -40 to +175 | °C |

Table 2. Thermal parameters

| Symbol | Parameter | Typ. value | Unit |
|---------------|--|------------|------|
| $R_{th(j-c)}$ | Junction to case (DO-247) | 0.35 | °C/W |
| $R_{th(j-c)}$ | Junction to case (D ² PAK HV) | 0.40 | °C/W |

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------|-------------------------|-----------------------|---------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | - | | 2 | μA |
| | | $T_j = 150\text{ °C}$ | | - | 10 | 100 | |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 30\text{ A}$ | - | 1.00 | 1.10 | V |
| | | $T_j = 150\text{ °C}$ | | - | 0.88 | 0.97 | |

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:

$$P = 0.75 \times I_{F(AV)} + 0.0073 \times I_{F(RMS)}^2$$

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 in a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

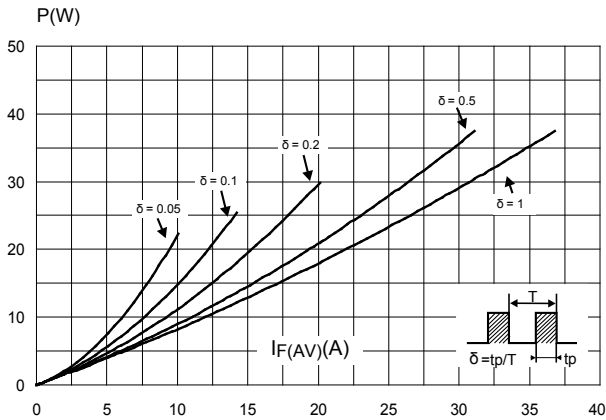


Figure 2. Forward voltage drop versus forward current (typical values)

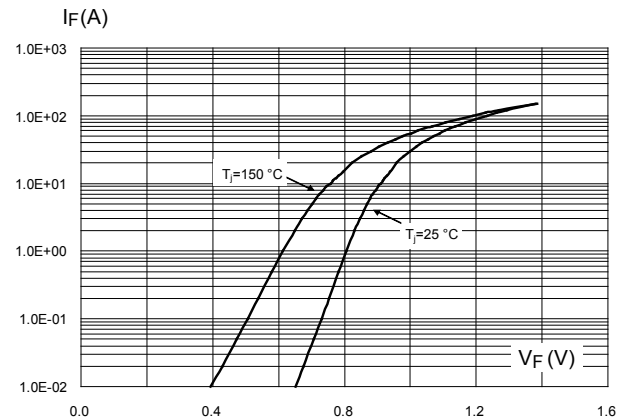


Figure 3. Forward voltage drop versus forward current (maximum values)

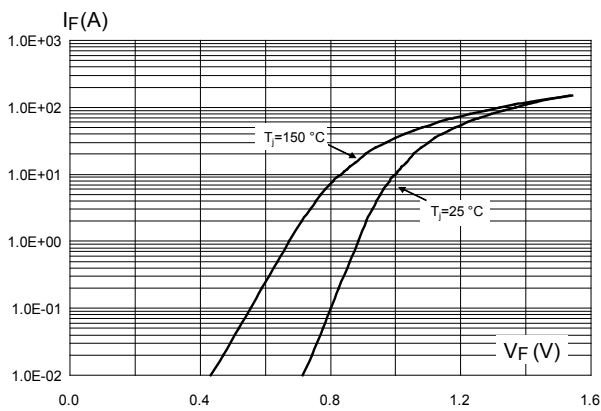


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

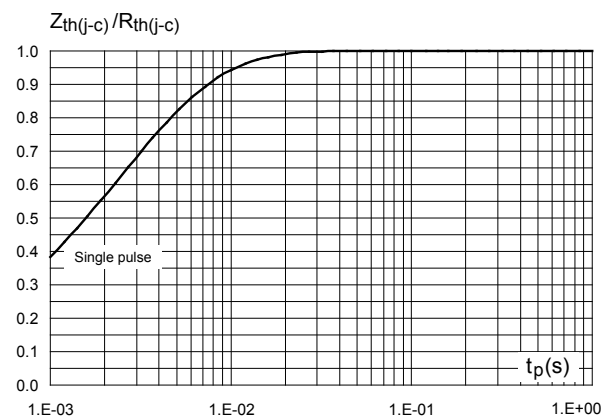


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

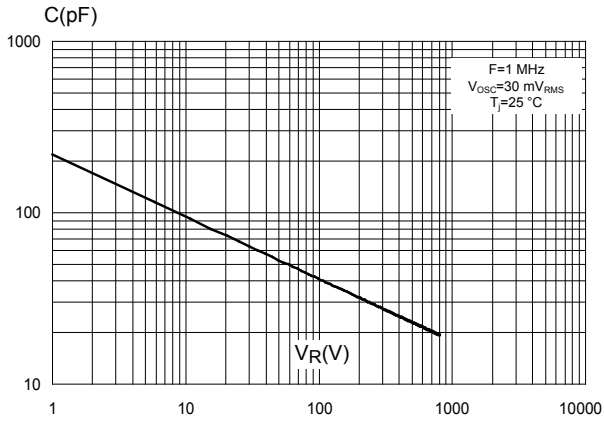


Figure 6. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

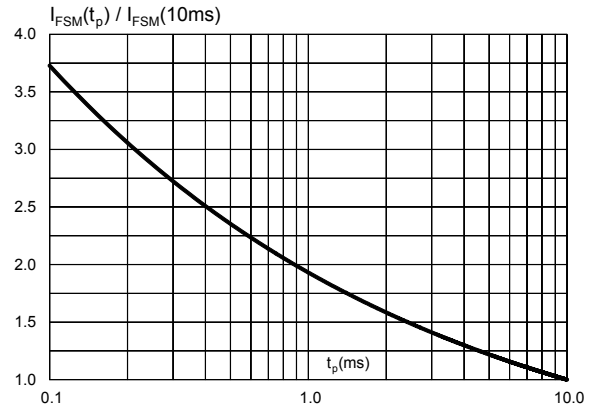


Figure 7. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)

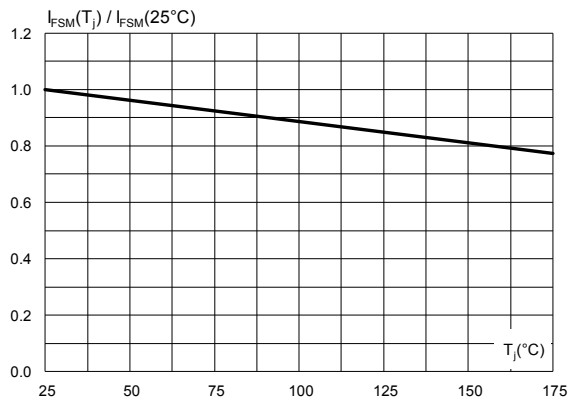
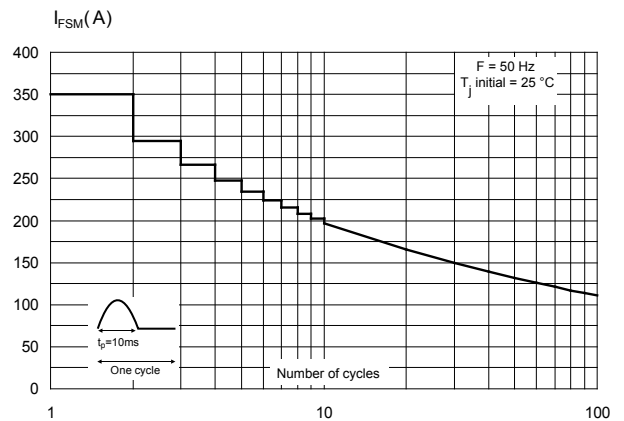


Figure 8. Non repetitive surge peak forward current versus number of cycles



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 DO-247 package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m (DO-247)
- Maximum torque value: 1.0 N·m (DO-247)

Figure 9. DO-247 package outline

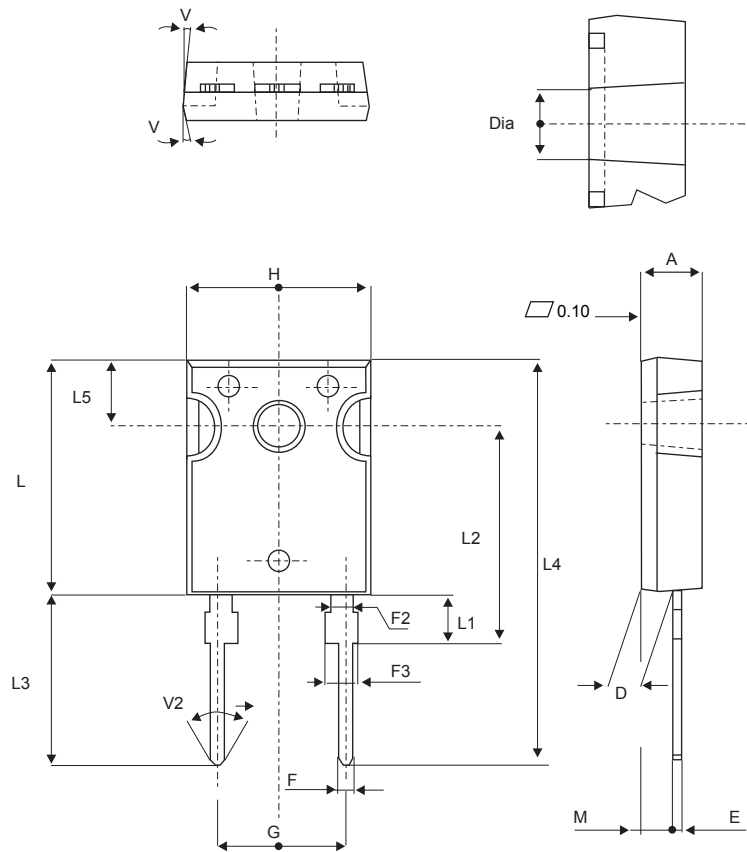


Table 4. DO-247 package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.85 | 5.15 | 0.191 | 0.203 |
| D | 2.20 | 2.60 | 0.086 | 0.102 |
| E | 0.40 | 0.80 | 0.015 | 0.031 |
| F | 1.00 | 1.40 | 0.039 | 0.055 |
| F2 | 2.00 typ. | | 0.078 typ. | |
| F3 | 2.00 | 2.40 | 0.078 | 0.094 |
| G | 10.90 typ. | | 0.429 typ. | |
| H | 15.45 | 15.75 | 0.608 | 0.620 |
| L | 19.85 | 20.15 | 0.781 | 0.793 |
| L1 | 3.70 | 4.30 | 0.145 | 0.169 |
| L2 | 18.50 typ. | | 0.728 typ. | |
| L3 | 14.20 | 14.80 | 0.559 | 0.582 |
| L4 | 34.60 typ. | | 1.362 typ. | |
| L5 | 5.50 typ. | | 0.216 typ. | |
| M | 2.00 | 3.00 | 0.078 | 0.118 |
| V | 5° | | 5° | |
| V2 | 60° | | 60° | |
| Dia. | 3.55 | 3.65 | 0.139 | 0.143 |

2.2 D²PAK high voltage package information

Figure 10. D²PAK high voltage package outline

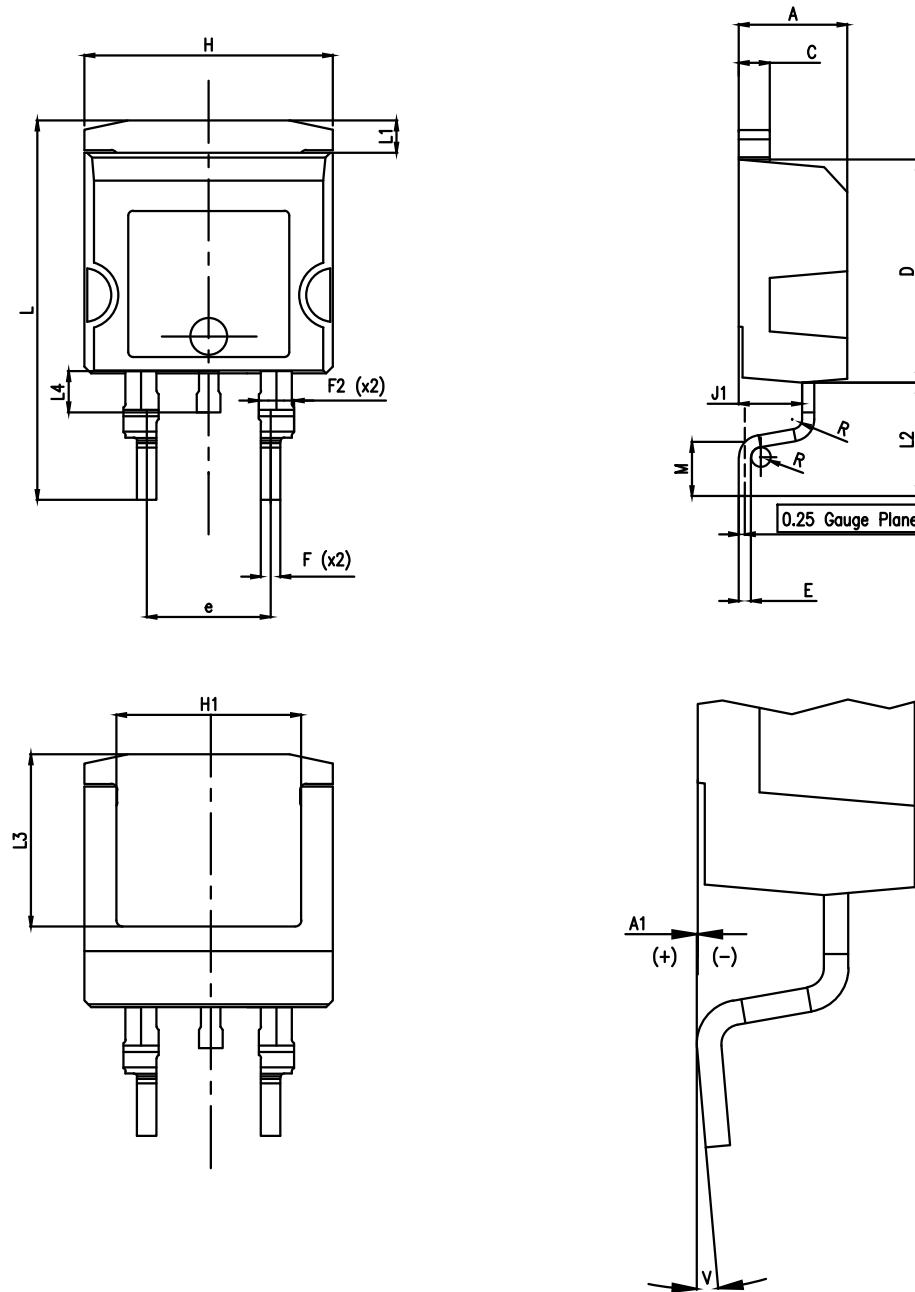
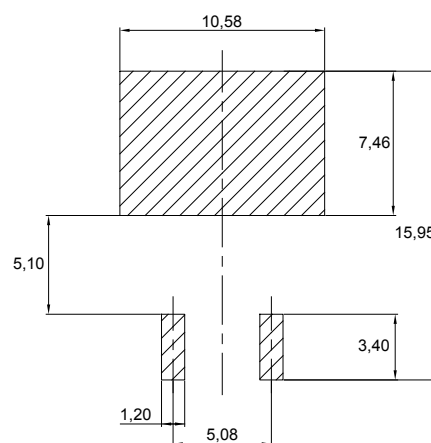


Table 5. D²PAK high voltage package mechanical data

| Ref. | Dimensions | | |
|------|------------|------|-------|
| | Min. | Typ. | Max. |
| A | 4.30 | | 4.70 |
| A1 | 0.03 | | 0.20 |
| C | 1.17 | | 1.37 |
| D | 8.95 | | 9.35 |
| e | 4.98 | | 5.18 |
| E | 0.50 | | 0.90 |
| F | 0.78 | | 0.85 |
| F2 | 1.14 | | 1.70 |
| H | 10.00 | | 10.40 |
| H1 | 7.40 | | 7.80 |
| J1 | 2.49 | | 2.69 |
| L | 15.30 | | 15.80 |
| L1 | 1.27 | | 1.40 |
| L2 | 4.93 | | 5.23 |
| L3 | 6.85 | | 7.25 |
| L4 | 1.5 | | 1.7 |
| M | 2.6 | | 2.9 |
| R | 0.20 | | 0.60 |
| V | 0° | | 8° |

Figure 11. D²PAK high voltage footprint in mm



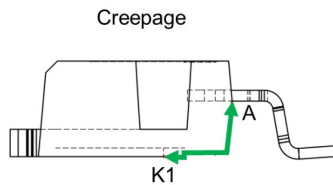
2.2.1 Creepage distance between anode and cathode

Table 6. Creepage distance between anode and cathode

| Symbol | Parameter | | Value | Unit |
|--------------------|--|-----------------------|-------|------|
| Cd _{A-K1} | Minimum creepage distance between A and K1 (with top coating) | D ² PAK HV | 5.38 | mm |
| Cd _{A-K2} | Minimum creepage distance between A and K2 (without top coating) | | 3.48 | |

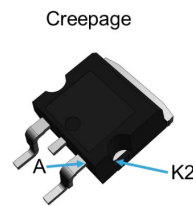
Note: D²PAK HV creepage distance (anode to cathode) = 5.38 mm min. (refer to IEC 60664-1)

Figure 12. Creepage with top coating



Minimum distance between A & K1 = 5.38 mm (with top coating)

Figure 13. Creepage without top coating



Minimum distance between A & K2 = 3.48 mm (without top coating)

3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|----------------|------------|-----------------------|--------|-----------|---------------|
| STBR3008WY | STBR3008WY | DO-247 | 4.4 g | 30 | Tube |
| STBR3008G2Y-TR | BR3008G2Y | D ² PAK HV | 1.48 g | 1000 | Tape and reel |

Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 17-Jul-2019 | 1 | First issue. |
| 13-May-2020 | 2 | Added D ² PAK HV package information. |

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