

Features

- Very low forward losses
- Low recovery time
- High surge current capability
- Insulated package
 - Insulating voltage = 2500 V rms
 - Capacitance = 45 pF
- Complies with UL standards (File ref: E81734)

Description

The STTH10002 is a dual rectifier suited for welding equipment, and high power industrial applications.

Packaged in ISOTOP, this device is intended for use in the secondary rectification of power converters.

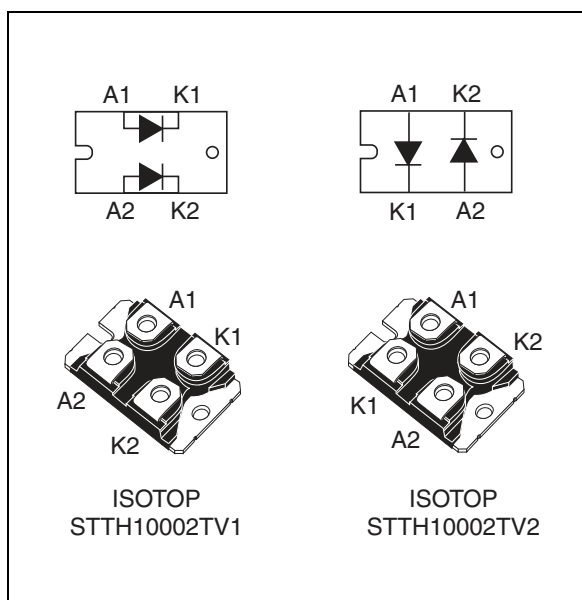


Table 1. Device summary

| | |
|----------------|----------|
| $I_{F(AV)}$ | 2 x 50 A |
| V_{RRM} | 200 V |
| T_j (max) | 150 °C |
| V_F (typ) | 0.72 V |
| t_{rr} (typ) | 30 ns |

1 Characteristics

Table 2. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Parameter | | Value | Unit |
|--------------|---|---------------------------------|--------------|------|
| V_{RRM} | Repetitive peak reverse voltage | | 200 | V |
| $I_{F(RMS)}$ | Forward rms current | Per diode | 150 | A |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$ | Per diode $T_c = 100\text{ °C}$ | 50 | A |
| | | Per device $T_c = 95\text{ °C}$ | | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ sinusoidal | 750 | A |
| T_{stg} | Storage temperature range | | -55 to + 150 | °C |
| T_j | Maximum operating junction temperature | | 150 | °C |

Table 3. Thermal parameters

| Symbol | Parameter | | Value | Unit |
|---------------|------------------|-----------|-------|------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 1 | °C/W |
| | | Total | 0.55 | |
| $R_{th(c)}$ | Coupling | | 0.1 | |

When the two 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 | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | - | - | 50 | μA |
| | | $T_j = 125\text{ °C}$ | | - | 50 | 500 | |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 50\text{ A}$ | - | - | 1 | V |
| | | | $I_F = 100\text{ A}$ | - | - | 1.15 | |
| | | $T_j = 125\text{ °C}$ | $I_F = 100\text{ A}$ | - | 0.90 | 1.0 | |
| | | | $T_j = 150\text{ °C}$ | $I_F = 50\text{ A}$ | - | 0.72 | |
| $I_F = 100\text{ A}$ | - | 0.86 | | 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:

$$P = 0.63 \times I_{F(AV)} + 0.0034 I_{F(RMS)}^2$$

Table 5. Dynamic characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|----------|--------------------------|--|------|------|------|------|
| t_{rr} | Reverse recovery time | $I_F = 1 \text{ A}$, $di_F/dt = -50 \text{ A}/\mu\text{s}$, $V_R = 30 \text{ V}$, $T_j = 25 \text{ }^\circ\text{C}$ | - | 53 | 65 | ns |
| | | $I_F = 1 \text{ A}$, $di_F/dt = -200 \text{ A}/\mu\text{s}$, $V_R = 30 \text{ V}$, $T_j = 25 \text{ }^\circ\text{C}$ | - | 30 | 37 | |
| I_{RM} | Reverse recovery current | $I_F = 50 \text{ A}$, $di_F/dt = 200 \text{ A}/\mu\text{s}$, $V_R = 160 \text{ V}$, $T_j = 125 \text{ }^\circ\text{C}$ | - | 10 | 13 | A |
| t_{fr} | Forward recovery time | $I_F = 50 \text{ A}$, $di_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$, $T_j = 25 \text{ }^\circ\text{C}$ | - | 180 | - | ns |
| V_{FP} | Forward recovery voltage | $I_F = 50 \text{ A}$, $di_F/dt = 200 \text{ A}/\mu\text{s}$, $T_j = 25 \text{ }^\circ\text{C}$ | - | 1.6 | - | V |

Figure 1. Peak current versus duty cycle

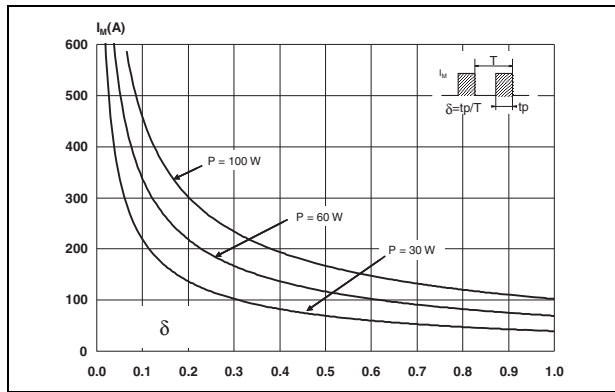


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

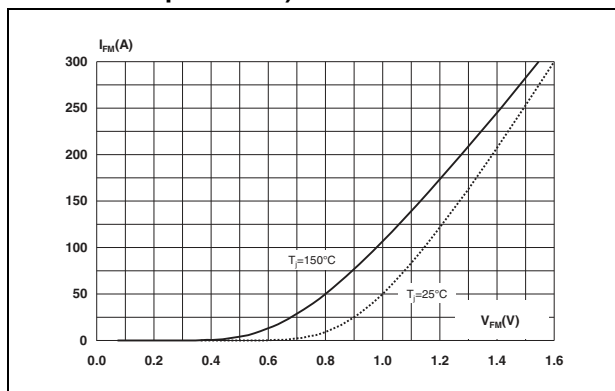


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

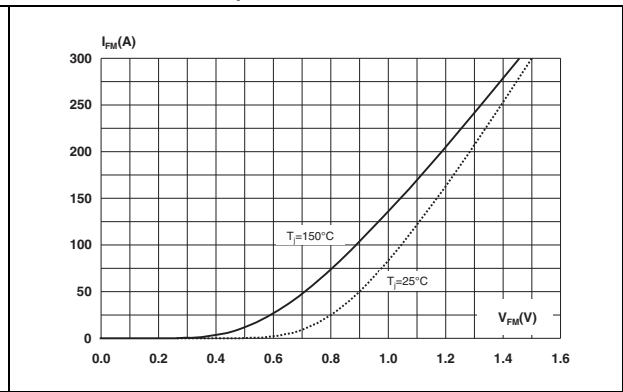


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

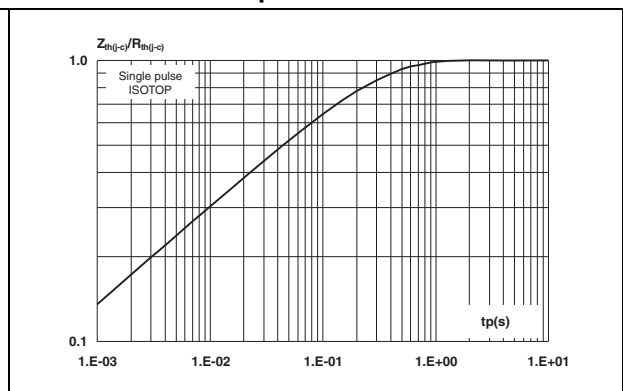


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

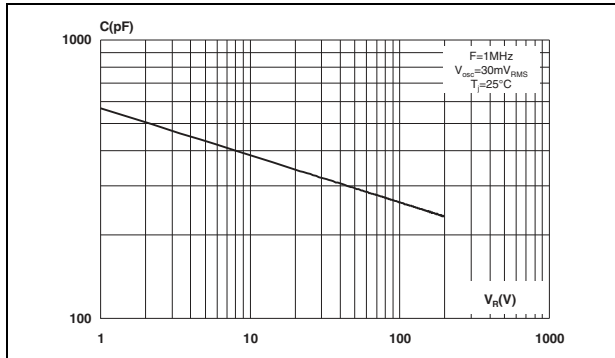


Figure 6. Reverse recovery charges versus di_F/dt (typical values)

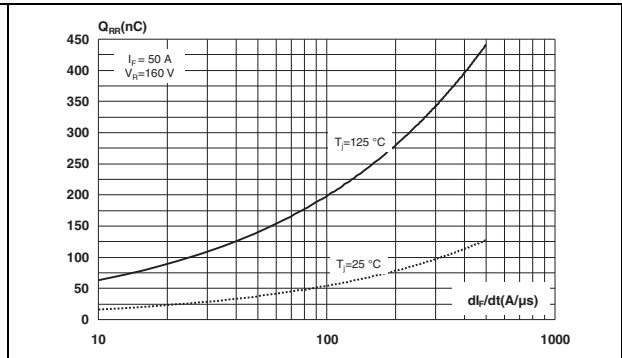


Figure 7. Reverse recovery time versus di_F/dt (typical values)

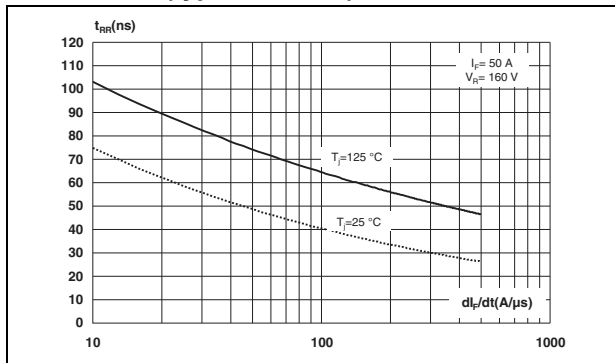


Figure 8. Peak reverse recovery current versus di_F/dt (typical values)

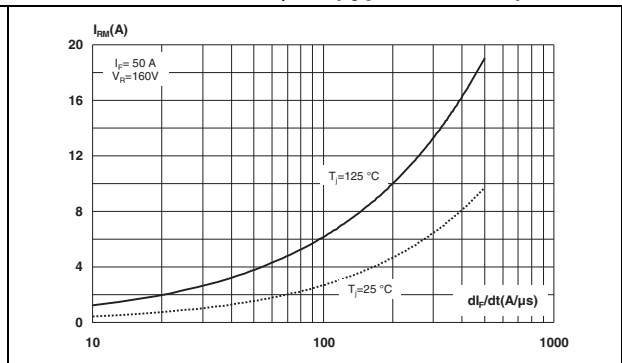
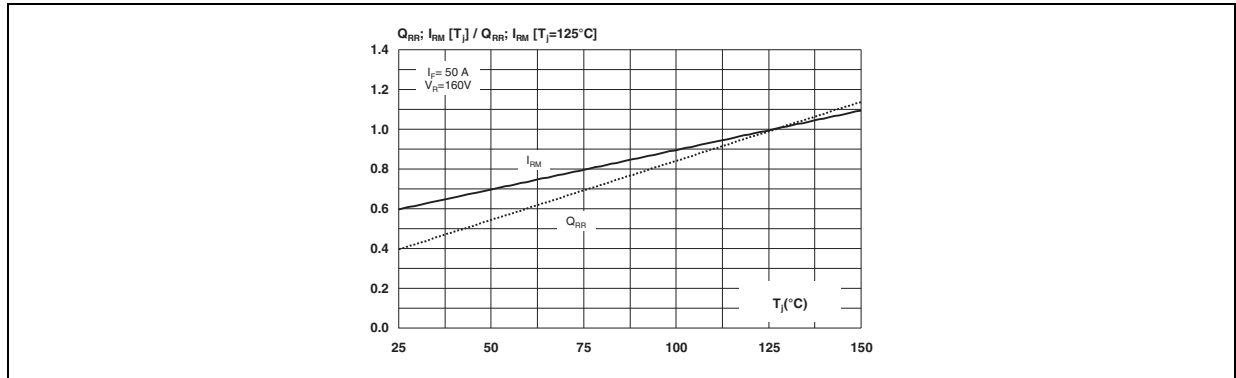
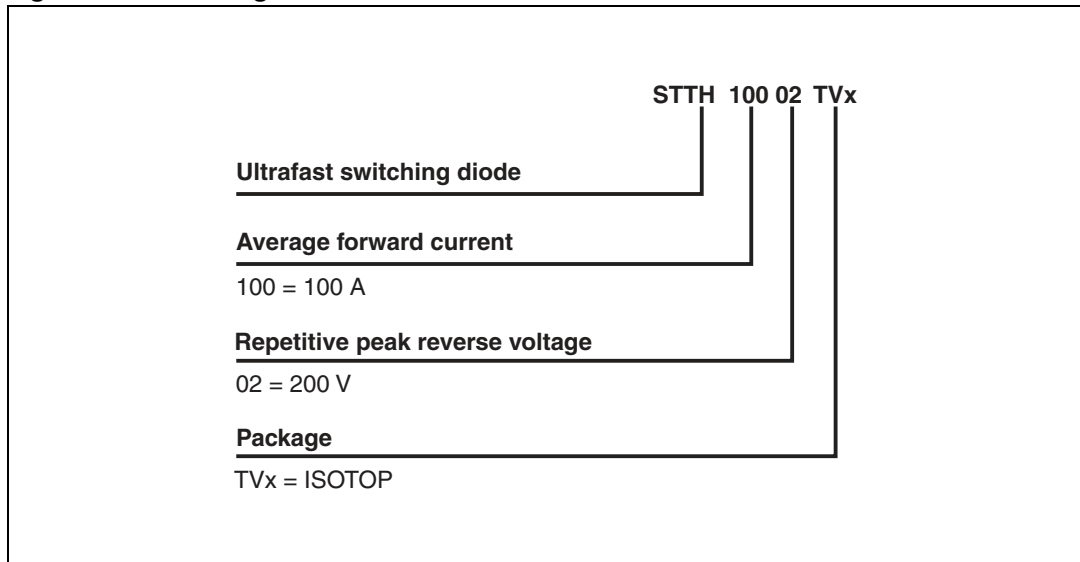


Figure 9. Dynamic parameters versus junction temperature



2 Ordering information scheme

Figure 10. Ordering information scheme



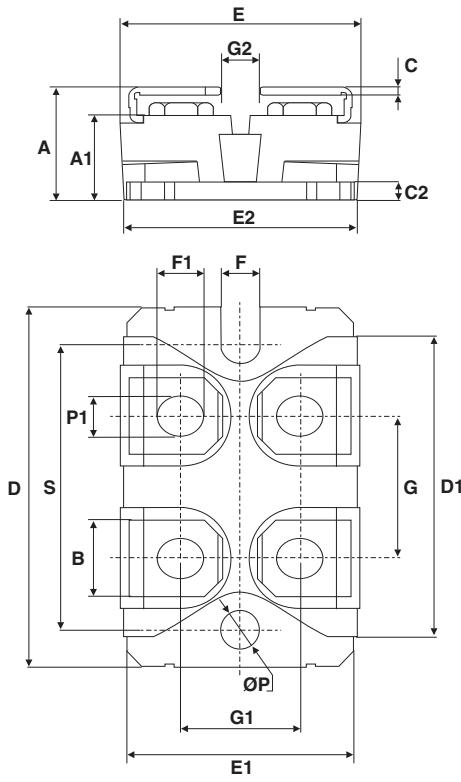
3 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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 6. ISOTOP dimensions

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 11.80 | 12.20 | 0.465 | 0.480 |
| A1 | 8.90 | 9.10 | 0.350 | 0.358 |
| B | 7.8 | 8.20 | 0.307 | 0.323 |
| C | 0.75 | 0.85 | 0.030 | 0.033 |
| C2 | 1.95 | 2.05 | 0.077 | 0.081 |
| D | 37.80 | 38.20 | 1.488 | 1.504 |
| D1 | 31.50 | 31.70 | 1.240 | 1.248 |
| E | 25.15 | 25.50 | 0.990 | 1.004 |
| E1 | 23.85 | 24.15 | 0.939 | 0.951 |
| E2 | 24.80 typ. | | 0.976 typ. | |
| G | 14.90 | 15.10 | 0.587 | 0.594 |
| G1 | 12.60 | 12.80 | 0.496 | 0.504 |
| G2 | 3.50 | 4.30 | 0.138 | 0.169 |
| F | 4.10 | 4.30 | 0.161 | 0.169 |
| F1 | 4.60 | 5.00 | 0.181 | 0.197 |
| P | 4.00 | 4.30 | 0.157 | 0.69 |
| P1 | 4.00 | 4.40 | 0.157 | 0.173 |
| S | 30.10 | 30.30 | 1.185 | 1.193 |



4 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty ⁽¹⁾ | Delivery mode |
|--------------|--------------|---------|--------|-------------------------|---------------|
| STTH10002TV1 | STTH10002TV1 | ISOTOP | 27 g | 10 with screws | Tube |
| STTH10002TV2 | STTH10002TV2 | | | | |

1. This product is supplied with 40 terminal screws and washers for each tube. The screws and washers are supplied in a separate pack with the order.

5 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 05-Apr-2006 | 1 | First issue |
| 23-Oct-2012 | 2 | Added UL file reference. Updated storage temperature range in Table 2 . Added footnote to Table 7 . |

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