

### Main product characteristics

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

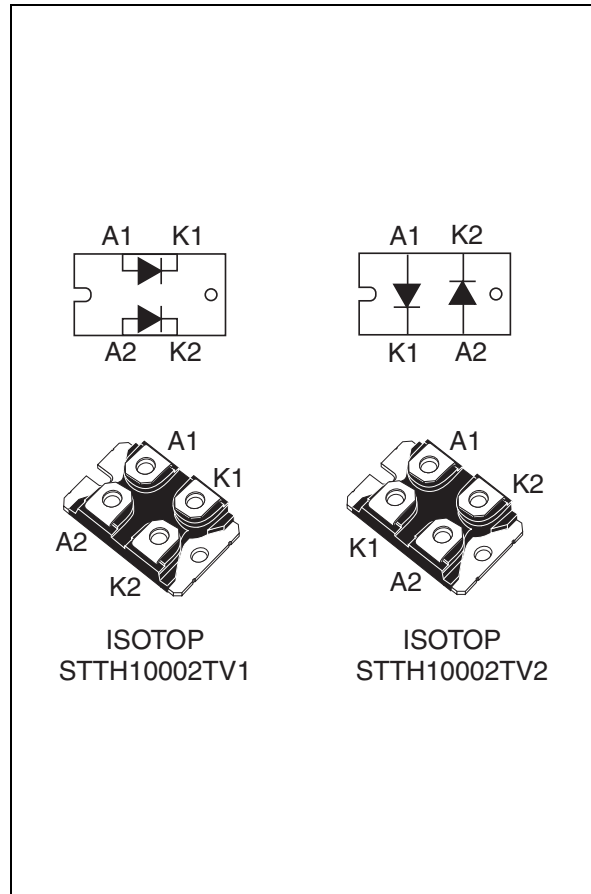
### Features and benefits

- Very low forward losses
- Low recovery time
- High surge current capability
- Insulated
  - Insulating voltage = 2500 V<sub>rms</sub>
  - Capacitance = 45 pF

### 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.



### Order codes

| Part Number  | Marking      |
|--------------|--------------|
| STTH10002TV1 | STTH10002TV1 |
| STTH10002TV2 | STTH10002TV2 |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at  $T_j = 25^\circ \text{C}$ , unless otherwise specified)**

| Symbol       | Parameter                               |                                      | Value        | Unit              |
|--------------|-----------------------------------------|--------------------------------------|--------------|-------------------|
| $V_{RRM}$    | Repetitive peak reverse voltage         |                                      | 200          | V                 |
| $I_{F(RMS)}$ | RMS forward current                     | Per diode                            | 150          | A                 |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$ | Per diode $T_c = 100^\circ \text{C}$ | 50           | A                 |
|              |                                         | Per device $T_c = 95^\circ \text{C}$ |              |                   |
| $I_{FSM}$    | Surge non repetitive forward current    | $t_p = 10 \text{ ms}$ Sinusoidal     | 750          | A                 |
| $T_{stg}$    | Storage temperature range               |                                      | -55 to + 175 | $^\circ \text{C}$ |
| $T_j$        | Maximum operating junction temperature  |                                      | 150          | $^\circ \text{C}$ |

**Table 2. Thermal parameters**

| Symbol        | Parameter        |           | Value | Unit                |
|---------------|------------------|-----------|-------|---------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 1     | $^\circ \text{C/W}$ |
|               |                  | 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 3. Static electrical characteristics**

| Symbol      | Parameter               | Test conditions            |                       | Min. | Typ  | Max. | Unit          |
|-------------|-------------------------|----------------------------|-----------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25^\circ \text{C}$  | $V_R = V_{RRM}$       |      |      | 50   | $\mu\text{A}$ |
|             |                         | $T_j = 125^\circ \text{C}$ |                       |      | 50   | 500  |               |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25^\circ \text{C}$  | $I_F = 50 \text{ A}$  |      |      | 1    | V             |
|             |                         |                            | $I_F = 100 \text{ A}$ |      |      | 1.15 |               |
|             |                         | $T_j = 125^\circ \text{C}$ | $I_F = 100 \text{ A}$ |      | 0.90 | 1.0  |               |
|             |                         |                            | $I_F = 50 \text{ A}$  |      | 0.72 | 0.80 |               |
|             |                         | $T_j = 150^\circ \text{C}$ | $I_F = 50 \text{ A}$  |      | 0.86 | 0.97 |               |
|             |                         |                            | $I_F = 100 \text{ A}$ |      |      |      |               |

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

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

To evaluate the conduction losses use the following equation:

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

Table 4. Dynamic characteristics

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

Figure 1. Peak current versus duty cycle

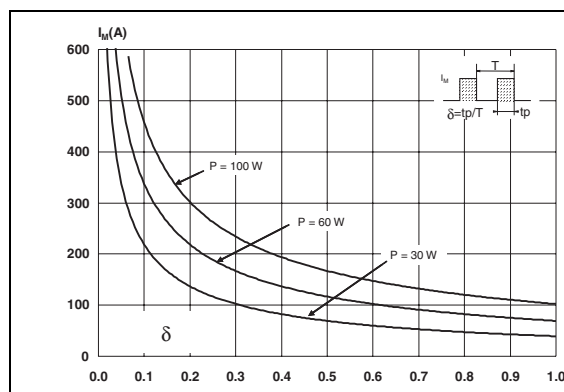


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

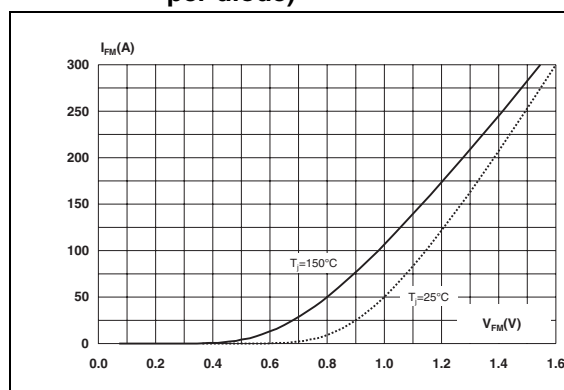


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

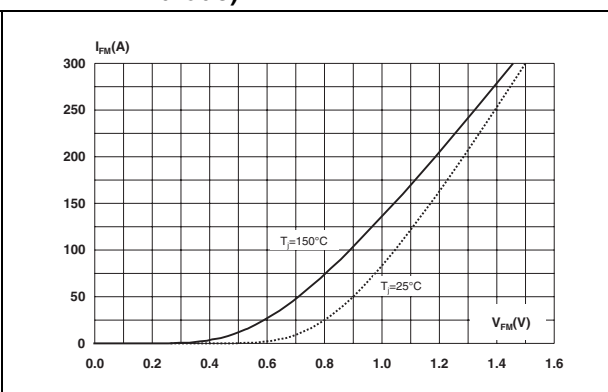
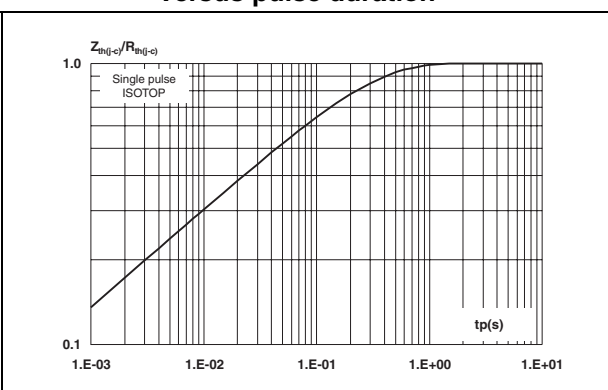
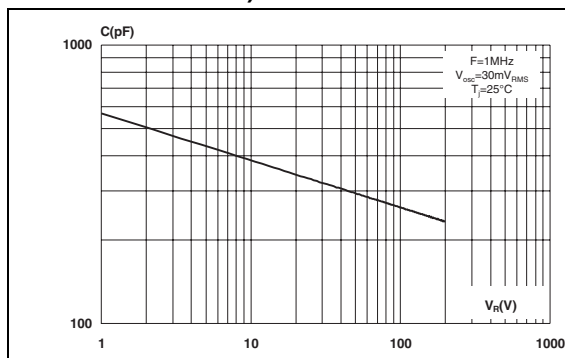


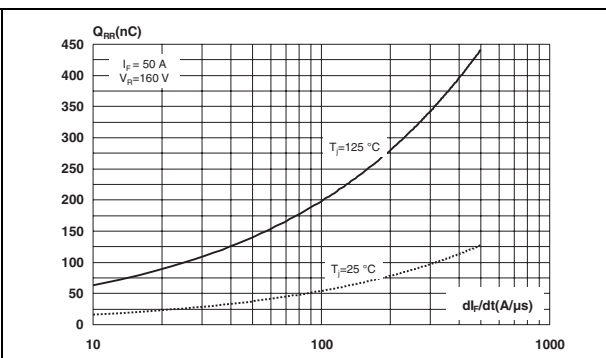
Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration



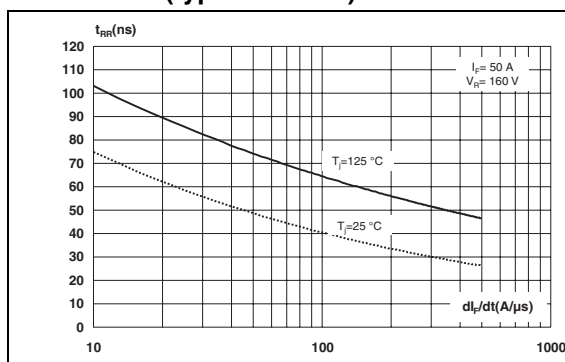
**Figure 5. Junction capacitance versus reverse applied voltage (typical values)**



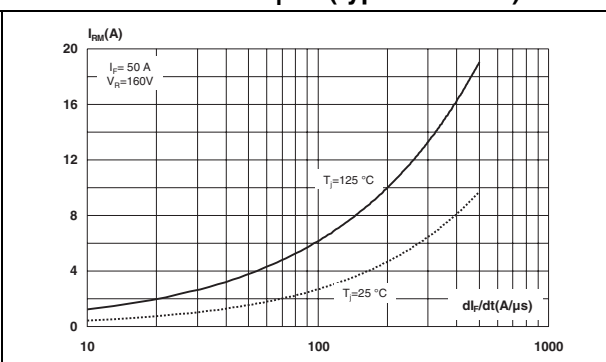
**Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)**



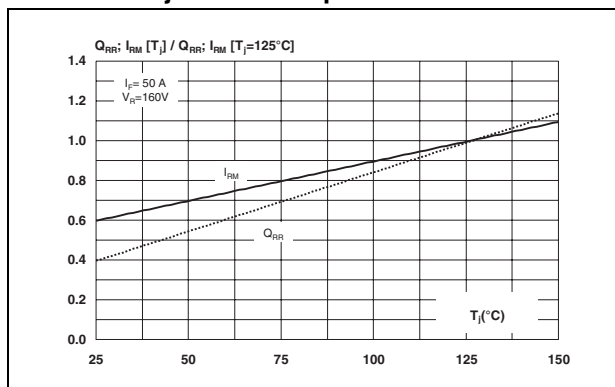
**Figure 7. Reverse recovery time versus  $di_F/dt$  (typical values)**



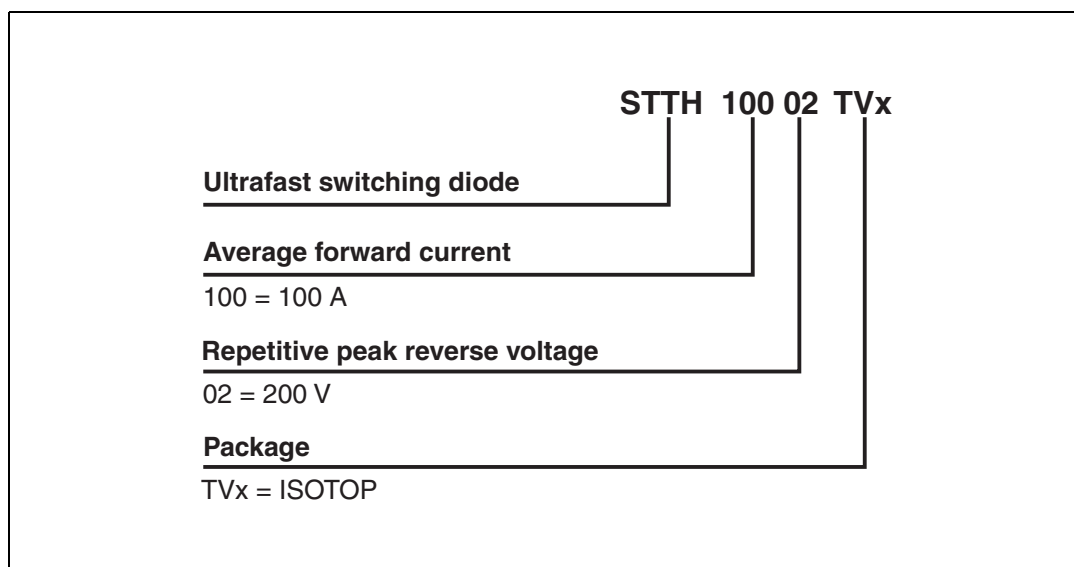
**Figure 8. Peak reverse recovery current versus  $di_F/dt$  (typical values)**



**Figure 9. Dynamic parameters versus junction temperature**



## 2 Ordering information scheme



### 3 Package information

Table 5. 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 |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

## 4 Ordering information

| Part Number  | Marking      | Package | Weight | Base qty | Delivery mode |
|--------------|--------------|---------|--------|----------|---------------|
| STTH10002TV1 | STTH10002TV1 | ISOTOP  | 27 g   | 10       | Tube          |
| STTH10002TV2 | STTH10002TV2 | ISOTOP  | 27 g   | 10       | Tube          |

## 5 Revision history

| Date        | Revision | Description of Changes |
|-------------|----------|------------------------|
| 05-Apr-2006 | 1        | First issue            |

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