



# STTH20002TV

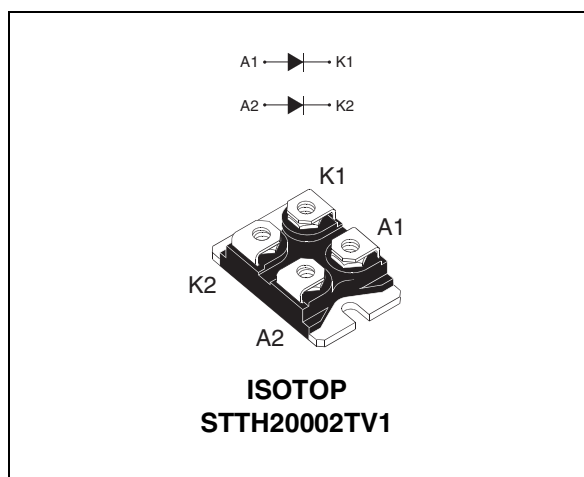
## TURBO 2 ULTRAFast HIGH VOLTAGE RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|                |                 |
|----------------|-----------------|
| $I_{F(AV)}$    | Up to 2 x 120 A |
| $V_{RRM}$      | 200 V           |
| $T_j$          | 150°C           |
| $V_F$ (typ)    | 0.75 V          |
| $t_{rr}$ (typ) | 41 ns           |

### FEATURES AND BENEFITS

- Suited for SMPS
- Very Low Forward Losses
- Low recovery time
- High surge current capability
- Insulated:  
Insulating voltage=2500V<sub>RMS</sub>  
Capacitance = 55pF



### DESCRIPTION

Dual rectifier suited for welding equipment, high power industrial application.  
Packaged in Isotop, this device is intended for use in the secondary rectification of the applications.

### ABSOLUTE RATINGS (limiting values, per diode)

| Symbol              | Parameter                              |                                  |           | Value        | Unit |
|---------------------|----------------------------------------|----------------------------------|-----------|--------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage        |                                  |           | 200          | V    |
| I <sub>F(RMS)</sub> | RMS forward voltage                    |                                  |           | 170          | A    |
| I <sub>F(AV)</sub>  | Average forward current<br>δ = 0.5     | T <sub>c</sub> = 95°C            | Per diode | 100          | A    |
|                     |                                        | T <sub>c</sub> = 80°C            | Per diode | 120          |      |
| I <sub>FSM</sub>    | Surge non repetitive forward current   | t <sub>p</sub> = 10ms sinusoidal |           | 1000         | A    |
| T <sub>stg</sub>    | Storage temperature range              |                                  |           | -55 to + 150 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature |                                  |           | 150          | °C   |

### Order Codes

| Part Number  | Marking      |
|--------------|--------------|
| STTH20002TV1 | STTH20002TV1 |

## THERMAL RESISTANCE

| Symbol        | Parameter        |           | Maximum | Unit                 |
|---------------|------------------|-----------|---------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 0.52    | $^{\circ}\text{C/W}$ |
|               |                  | Total     | 0.31    |                      |
| $R_{th(c)}$   | Coupling         |           | 0.1     | $^{\circ}\text{C/W}$ |

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

## STATIC ELECTRICAL CHARACTERISTICS (per diode)

| Symbol     | Parameter               | Test conditions             |                     | Min. | Typ  | Max. | Unit          |
|------------|-------------------------|-----------------------------|---------------------|------|------|------|---------------|
| $I_R^*$    | Reverse leakage current | $T_j = 25^{\circ}\text{C}$  | $V_R = V_{RRM}$     |      |      | 100  | $\mu\text{A}$ |
|            |                         | $T_j = 125^{\circ}\text{C}$ |                     |      | 80   | 800  |               |
| $V_F^{**}$ | Forward voltage drop    | $T_j = 25^{\circ}\text{C}$  | $I_F = 100\text{A}$ |      |      | 1.05 | V             |
|            |                         |                             | $I_F = 200\text{A}$ |      |      | 1.20 |               |
|            |                         | $T_j = 150^{\circ}\text{C}$ | $I_F = 100\text{A}$ |      | 0.75 | 0.85 |               |
|            |                         |                             | $I_F = 200\text{A}$ |      |      | 1.05 |               |

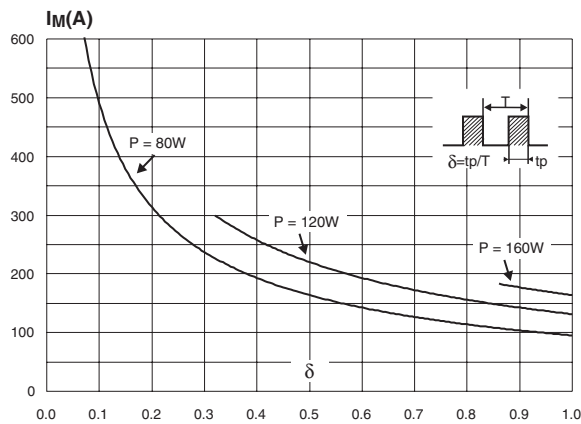
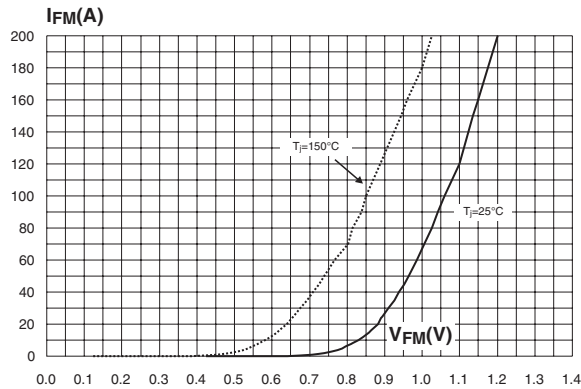
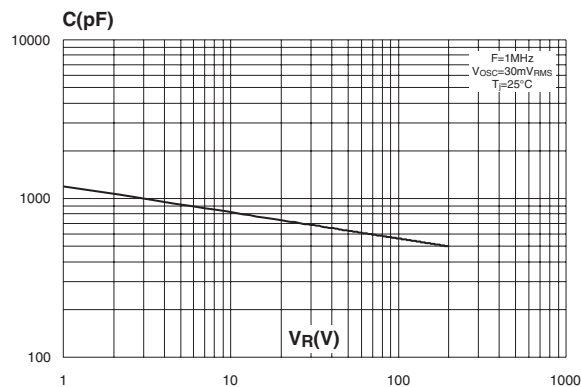
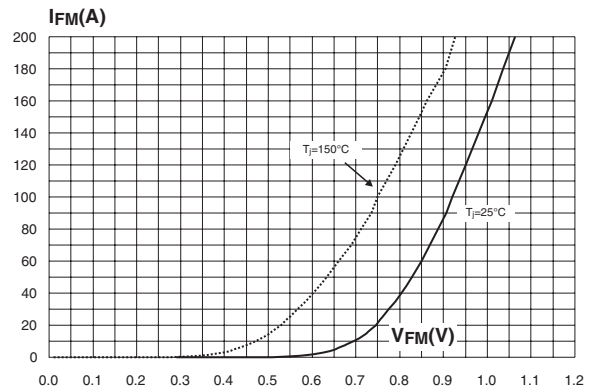
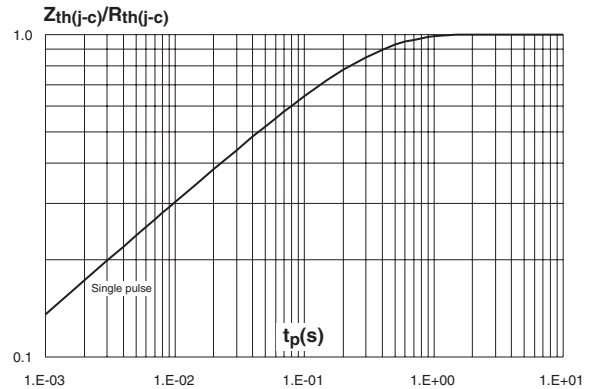
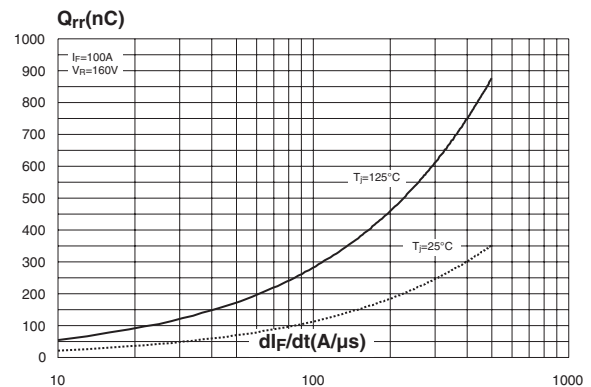
Pulse test: \*  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

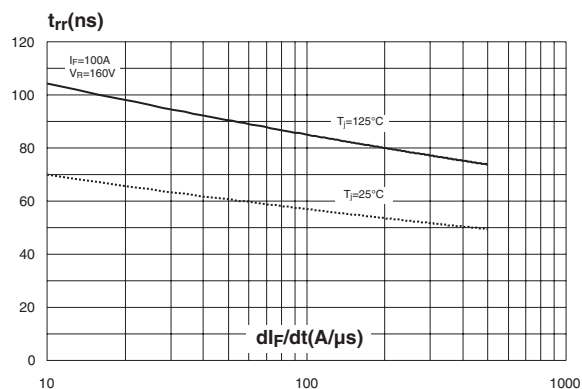
To evaluate the conduction losses use the following equation:  $P = 0.65 \times I_{F(AV)} + 0.002 I_F^2(\text{RMS})$

## DYNAMIC CHARACTERISTICS (per diode)

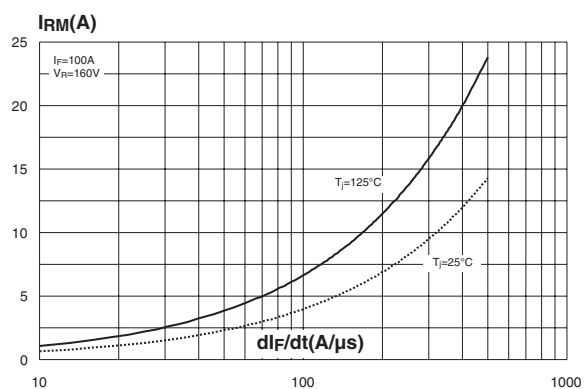
| Symbol   | Parameter                | Test conditions             |                                                                                             | Min. | Typ  | Max. | Unit |
|----------|--------------------------|-----------------------------|---------------------------------------------------------------------------------------------|------|------|------|------|
| $t_{rr}$ | Reverse recovery time    | $T_j = 25^{\circ}\text{C}$  | $I_F = 1\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$<br>$V_R = 30\text{V}$               |      | 41   | 50   | ns   |
| $I_{RM}$ | Reverse recovery current | $T_j = 125^{\circ}\text{C}$ | $I_F = 100\text{A}$ $V_R = 160\text{V}$<br>$di_F/dt = 200 \text{ A}/\mu\text{s}$            |      | 11.5 | 15   | A    |
| $t_{fr}$ | Forward recovery time    | $T_j = 25^{\circ}\text{C}$  | $I_F = 100\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$<br>$V_{FR} = 1.1 \times V_{Fmax}$ |      |      | 800  | ns   |
| $V_{FP}$ | Forward recovery voltage | $T_j = 25^{\circ}\text{C}$  | $I_F = 100\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$                                   |      | 2.5  |      | V    |

**Fig. 1:** Peak current versus duty cycle (per diode).**Fig. 2-2:** Forward voltage drop versus forward current (maximum values, per diode).**Fig. 4:** Junction capacitance versus reverse voltage applied (typical values, per diode).**Fig. 2-1:** Forward voltage drop versus forward current (typical values, per diode).**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.**Fig. 5:** Reverse recovery charges versus  $di_F/dt$  (typical values, per diode).

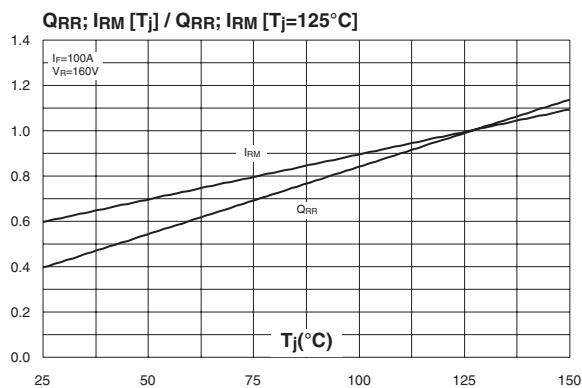
**Fig. 6:** Reverse recovery time versus  $di_F/dt$  (typical values, per diode).



**Fig. 7:** Peak reverse recovery current versus  $di_F/dt$  (typical values, per diode).



**Fig. 8:** Dynamic parameters versus junction temperature.



# **PACKAGE MECHANICAL DATA** **ISOTOP**

| 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 |

## ORDERING INFORMATION

| Ordering type | Marking      | Package | Weight                   | Base qty            | Delivery mode |
|---------------|--------------|---------|--------------------------|---------------------|---------------|
| STTH20002TV1  | STTH20002TV1 | ISOTOP  | 27 g<br>(without screws) | 10<br>(with screws) | Tube          |

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

## REVISION HISTORY

**Table 1:** Revision history

| Date        | Revision | Description of Changes                                    |
|-------------|----------|-----------------------------------------------------------|
| 26-May-2004 | 1        | First issue                                               |
| 13-Jul-2004 | 2        | Figure 6 legend corrected: "Forward" changed to "Reverse" |

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