



## STTH12003TV

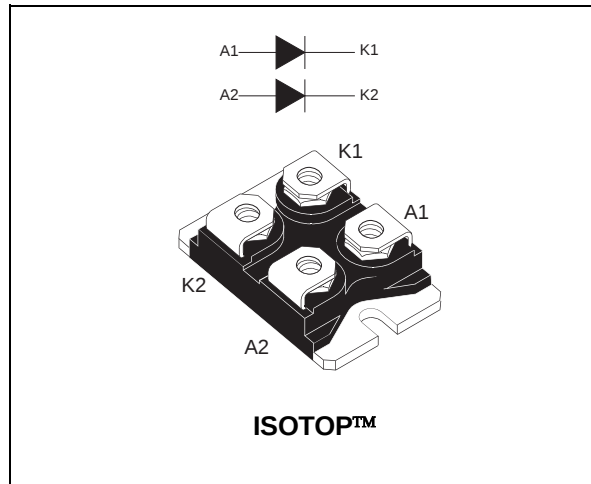
### HIGH FREQUENCY SECONDARY RECTIFIER

#### MAJOR PRODUCT CHARACTERISTICS

|                |          |
|----------------|----------|
| $I_{F(AV)}$    | 2 x 60 A |
| $V_{RRM}$      | 300 V    |
| $T_j (max)$    | 150 °C   |
| $V_F (max)$    | 1 V      |
| $t_{rr} (max)$ | 70 ns    |

#### FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY
- INSULATED PACKAGE: ISOTOP  
Insulated voltage: 2500 V<sub>RMS</sub>  
Capacitance: < 45 pF
- LOW INDUCTANCE AND LOW CAPACITANCE  
ALLOW SIMPLIFIED LAYOUT



#### DESCRIPTION

Dual rectifiers suited for Switch Mode Power Supply and high frequency DC to DC converters.

Packaged in ISOTOP, this device is intended for use in low voltage, high frequency inverters, free wheeling operation, welding equipment and telecom power supplies.

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

| Symbol              | Parameter                              |                                      |                         | Value         | Unit |
|---------------------|----------------------------------------|--------------------------------------|-------------------------|---------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage        |                                      |                         | 300           | V    |
| I <sub>F(RMS)</sub> | RMS forward current                    |                                      |                         | 150           | A    |
| I <sub>F(AV)</sub>  | Average forward current                | T <sub>c</sub> = 85°C<br>δ = 0.5     | Per diode<br>Per device | 60<br>120     | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current   | t <sub>p</sub> = 10 ms    sinusoidal |                         | 600           | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current    | t <sub>p</sub> = 100 μs square       |                         | 5             | A    |
| T <sub>stg</sub>    | Storage temperature range              |                                      |                         | - 55 to + 150 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature |                                      |                         | 150           | °C   |

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**STTH12003TV****THERMAL RESISTANCES**

| Symbol        | Parameter        |                    | Value       | Unit                 |
|---------------|------------------|--------------------|-------------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode<br>Total | 0.8<br>0.45 | $^{\circ}\text{C/W}$ |
| $R_{th(c)}$   |                  | Coupling           | 0.1         |                      |

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               | Tests conditions     |                             | Min. | Typ. | Max. | Unit          |
|------------|-------------------------|----------------------|-----------------------------|------|------|------|---------------|
| $I_R^*$    | Reverse leakage current | $V_R = 300\text{ V}$ | $T_j = 25^{\circ}\text{C}$  |      |      | 120  | $\mu\text{A}$ |
|            |                         |                      | $T_j = 125^{\circ}\text{C}$ |      | 0.12 | 1.2  | mA            |
| $V_F^{**}$ | Forward voltage drop    | $I_F = 60\text{ A}$  | $T_j = 25^{\circ}\text{C}$  |      |      | 1.25 | V             |
|            |                         |                      | $T_j = 125^{\circ}\text{C}$ |      | 0.85 | 1    |               |

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

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

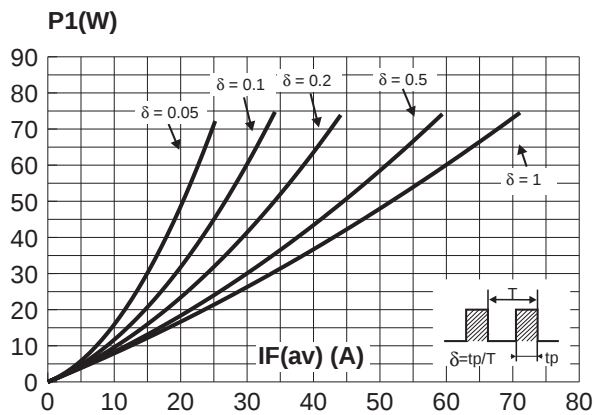
To evaluate the maximum conduction losses use the following equation:

$$P = 0.75 \times I_{F(AV)} + 0.0042 \times I_F^2 (RMS)$$

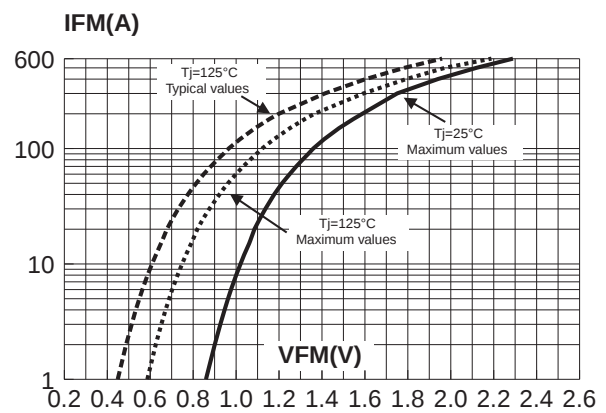
**RECOVERY CHARACTERISTICS**

| Symbol       | Tests conditions                       |                                      |                     | Min.                        | Typ. | Max. | Unit |
|--------------|----------------------------------------|--------------------------------------|---------------------|-----------------------------|------|------|------|
| $t_{rr}$     | $I_F = 0.5\text{ A}$                   | $I_{rr} = 0.25\text{ A}$             | $I_R = 1\text{ A}$  | $T_j = 25^{\circ}\text{C}$  |      | 55   | ns   |
|              | $I_F = 1\text{ A}$                     | $dl_F/dt = -50\text{ A}/\mu\text{s}$ | $V_R = 30\text{ V}$ | $T_j = 25^{\circ}\text{C}$  |      | 70   |      |
| $t_{fr}$     | $I_F = 60\text{ A}$                    | $dl_F/dt = 200\text{ A}/\mu\text{s}$ |                     | $T_j = 25^{\circ}\text{C}$  |      | 600  | ns   |
| $V_{FP}$     | $V_{FR} = 1.1 \times V_F \text{ max.}$ |                                      |                     | $T_j = 25^{\circ}\text{C}$  |      | 5    | V    |
| $S_{factor}$ | $V_{CC} = 200\text{ V}$                | $I_F = 60\text{ A}$                  |                     | $T_j = 125^{\circ}\text{C}$ | 0.3  |      | -    |
| $I_{RM}$     | $dl_F/dt = 200\text{ A}/\mu\text{s}$   |                                      |                     |                             |      | 14   | A    |

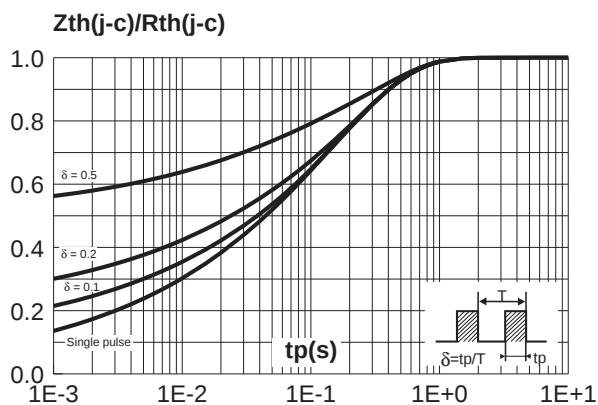
**Fig. 1:** Conduction losses versus average current (per diode).



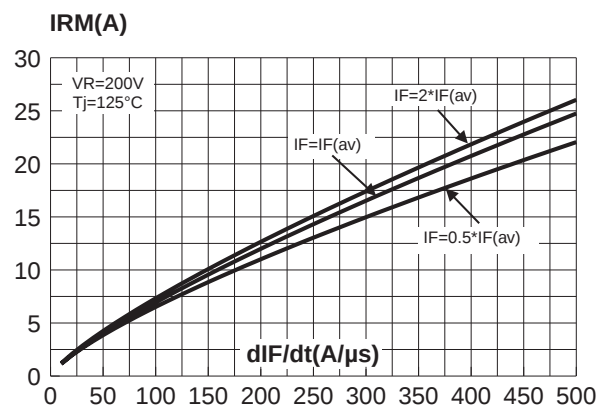
**Fig. 2:** Forward voltage drop versus forward current (per diode).



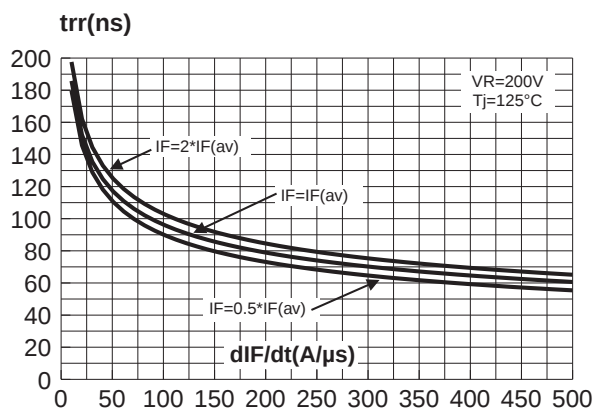
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



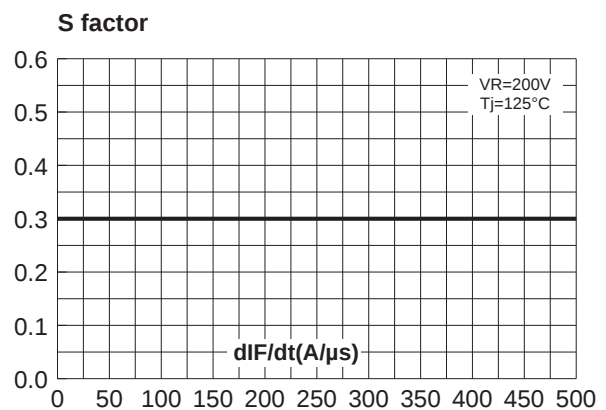
**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence, per diode).



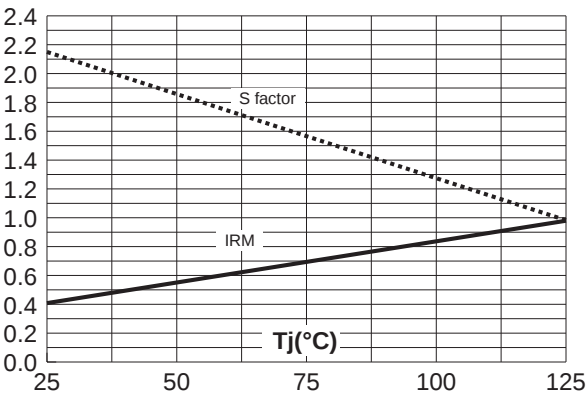
**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence, per diode).



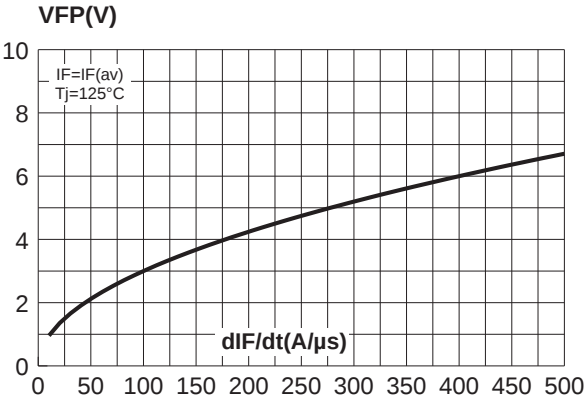
**Fig. 6:** Softness factor ( $t_b/t_a$ ) versus  $dI_F/dt$  (typical values, per diode).



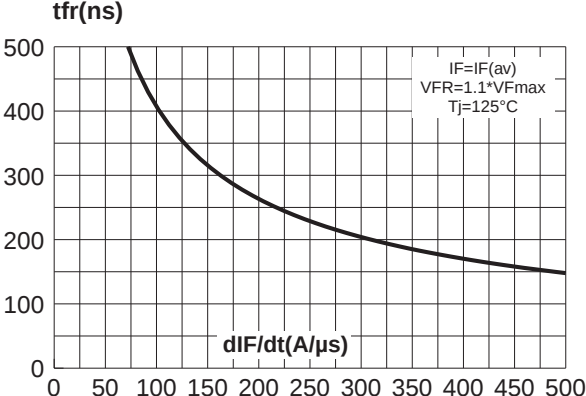
**Fig. 7:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_j = 125^\circ\text{C}$ ).



**Fig. 8:** Transient peak forward voltage versus  $dI_F/dt$  (90% confidence, per diode).



**Fig. 9:** Forward recovery time versus  $dI_F/dt$  (90% confidence, per diode).



**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 code | Marking     | Package | Weight                | Base qty          | Delivery mode |
|---------------|-------------|---------|-----------------------|-------------------|---------------|
| STTH12003TV1  | STTH12003TV | ISOTOP  | 27g<br>without screws | 10<br>with screws | Tube          |

- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N.m.
- Maximum torque value: 1.5 N.m.
- Epoxy meets UL 94,V0

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