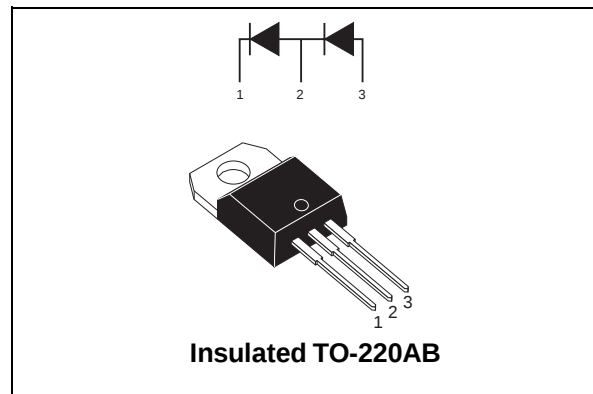


## TURBOSWITCH™ Tandem 600V ULTRA-FAST BOOST DIODE

### MAJOR PRODUCTS CHARACTERISTICS

|                              |                          |
|------------------------------|--------------------------|
| <b>I<sub>F(AV)</sub></b>     | <b>8 A</b>               |
| <b>V<sub>RRM</sub></b>       | <b>600 V (in series)</b> |
| <b>T<sub>j</sub> (max)</b>   | <b>150 °C</b>            |
| <b>V<sub>F</sub> (max)</b>   | <b>2.6 V</b>             |
| <b>I<sub>RM</sub> (typ.)</b> | <b>4 A</b>               |



### FEATURES AND BENEFITS

- ESPECIALLY SUITED AS BOOST DIODE IN CONTINUOUS MODE POWER FACTOR CORRECTORS AND HARD SWITCHING CONDITIONS.
- DESIGNED FOR HIGH DI/DT OPERATION.
- ULTRA-FAST RECOVERY CURRENT TO COMPETE WITH GaAs DEVICES. SIZE DIMINUTION OF MOSFET AND HEATSINKS ALLOWED.
- INTERNAL CERAMIC INSULATED PACKAGE ALLOWS FLEXIBLE HEATSINKING ON COMMON OR SEPARATE HEATSINK.
- MATCHED DIODES FOR TYPICAL PFC APPLICATION WITHOUT VOLTAGE BALANCE NETWORK.
- INSULATED VERSION: :  
Insulated voltage = 2500 V<sub>(RMS)</sub>  
Capacitance = 7 pF

### DESCRIPTION

The TURBOSWITCH "H" is an ultra high performance diode composed of two 300V dice in series. TURBOSWITCH "H" family drastically cuts losses in the associated MOSFET when run at high di<sub>F</sub>/dt.

### ABSOLUTE RATINGS (limiting values for both diodes in series)

| Symbol              | Parameter                              |                       | Value    | Unit |
|---------------------|----------------------------------------|-----------------------|----------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage        |                       | 600      | V    |
| I <sub>F(RMS)</sub> | RMS forward current                    |                       | 14       | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current   | tp = 10 ms sinusoidal | 80       | A    |
| T <sub>stg</sub>    | Storage temperature range              |                       | -65 +150 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature |                       | + 150    | °C   |

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## THERMAL AND POWER DATA

| Symbol        | Parameter                                    | Test conditions                                                     | Value | Unit |
|---------------|----------------------------------------------|---------------------------------------------------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case thermal resistance          | Per diode                                                           | 5     | °C/W |
| $R_{th(c)}$   |                                              | Coupling                                                            | 0.2   |      |
| $R_{th(j-c)}$ | Junction to case thermal resistance          | Total                                                               | 2.6   |      |
| $P_1$         | Conduction power dissipation for both diodes | $I_{F(AV)} = 8\text{ A}$ $\delta = 0.5$<br>$T_c = 80^\circ\text{C}$ | 27    | W    |

## STATIC ELECTRICAL CHARACTERISTICS (for both diodes)

| Symbol     | Parameter               | Tests Conditions   |                           | Min. | Typ. | Max. | Unit          |
|------------|-------------------------|--------------------|---------------------------|------|------|------|---------------|
| $I_R^*$    | Reverse leakage current | $V_R = V_{RRM}$    | $T_j = 25^\circ\text{C}$  |      |      | 10   | $\mu\text{A}$ |
|            |                         |                    | $T_j = 125^\circ\text{C}$ |      | 15   | 100  |               |
| $V_F^{**}$ | Forward voltage drop    | $I_F = 8\text{ A}$ | $T_j = 25^\circ\text{C}$  |      |      | 3.6  | V             |
|            |                         |                    | $T_j = 125^\circ\text{C}$ |      | 2.1  | 2.6  |               |

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 :

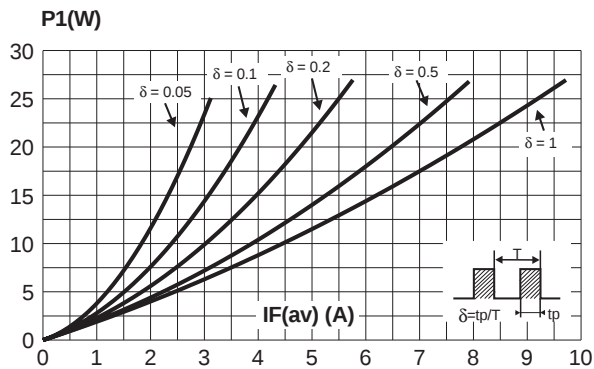
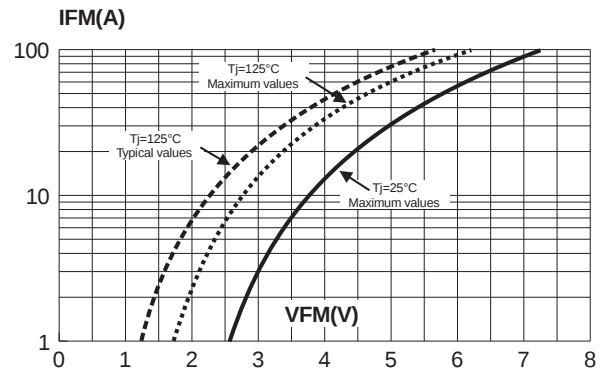
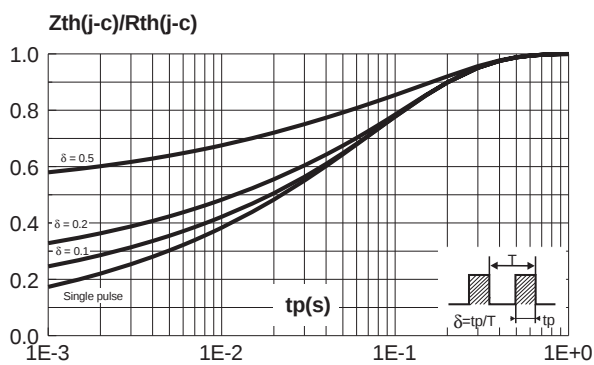
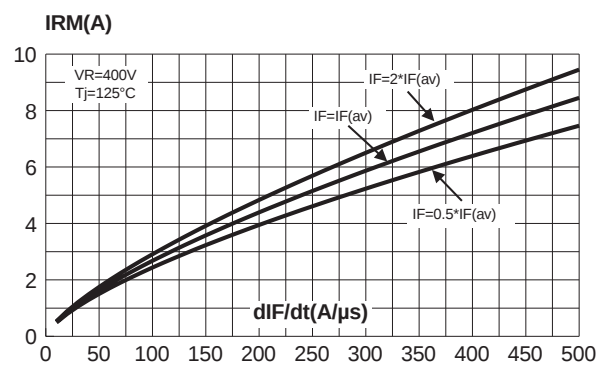
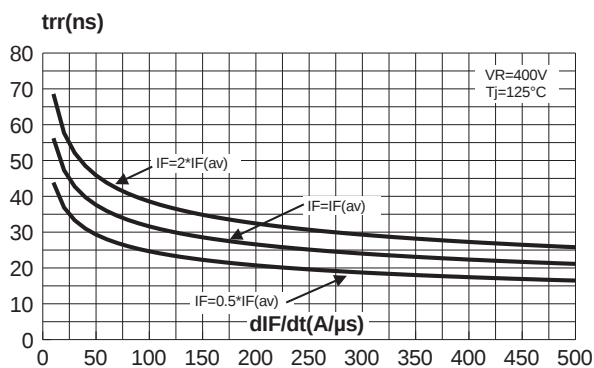
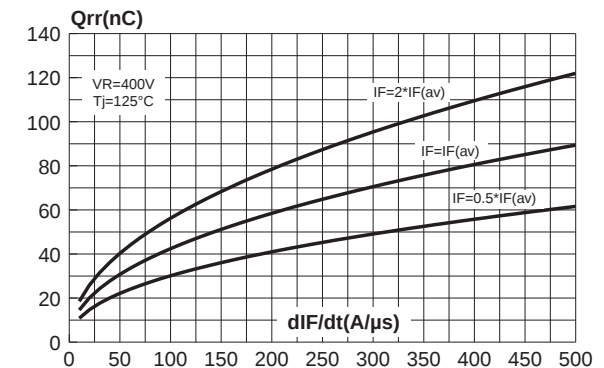
$$P = 1.8 \times I_{F(AV)} + 0.1 I_F^2 (RMS)$$

## RECOVERY CHARACTERISTICS

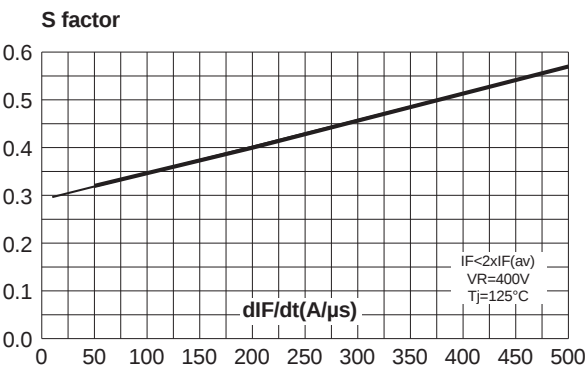
| Symbol       | Tests Conditions                                                              |                                      |                     | Min.                      | Typ. | Max. | Unit |
|--------------|-------------------------------------------------------------------------------|--------------------------------------|---------------------|---------------------------|------|------|------|
| $t_{rr}$     | $I_F = 0.5\text{ A}$                                                          | $I_{rr} = 0.25\text{ A}$             | $I_R = 1\text{ A}$  | $T_j = 25^\circ\text{C}$  | 13   |      | ns   |
|              | $I_F = 1\text{ A}$                                                            | $dI_F/dt = -50\text{ A}/\mu\text{s}$ | $V_R = 30\text{ V}$ |                           |      | 30   |      |
| $I_{RM}$     | $V_R = 400\text{ V}$ $I_F = 8\text{ A}$ $dI_F/dt = -200\text{ A}/\mu\text{s}$ |                                      |                     | $T_j = 125^\circ\text{C}$ | 4    | 5.5  | A    |
| $S_{factor}$ |                                                                               |                                      |                     |                           | 0.4  |      | -    |

## TURN-ON SWITCHING CHARACTERISTICS

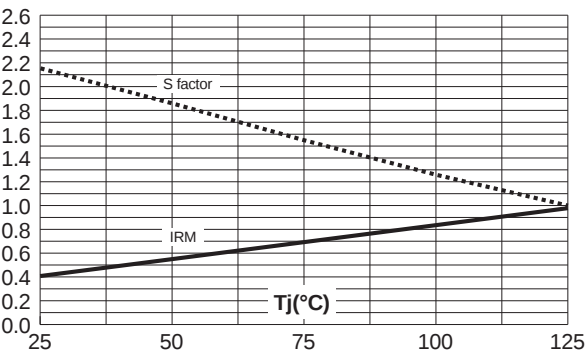
| Symbol   | Tests Conditions                                                                                      |  |                          | Min. | Typ. | Max. | Unit |
|----------|-------------------------------------------------------------------------------------------------------|--|--------------------------|------|------|------|------|
| $t_{fr}$ | $I_F = 8\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ ,<br>measured at $1.1 \times V_F \text{ max}$ |  | $T_j = 25^\circ\text{C}$ |      |      | 200  | ns   |
| $V_{FP}$ | $I_F = 8\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$                                               |  | $T_j = 25^\circ\text{C}$ |      |      | 7    | V    |

**Fig. 1:** Conduction losses versus average current.**Fig. 2:** Forward voltage drop versus forward current.**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).**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).**Fig. 6:** Reverse charges versus  $dI_F/dt$  (90% confidence).

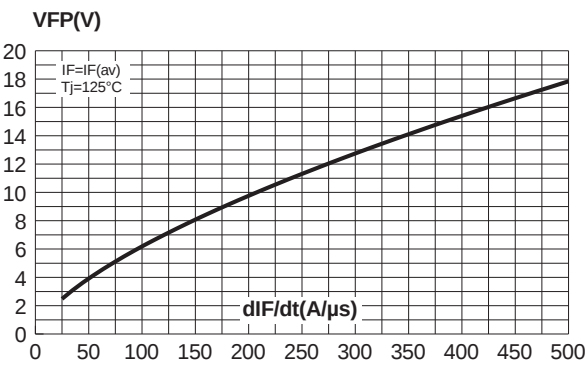
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



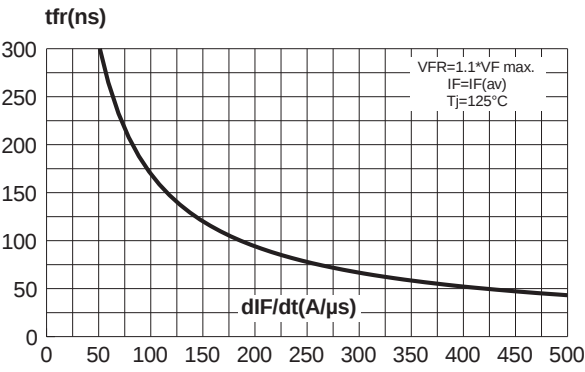
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_j = 125^\circ C$ ).

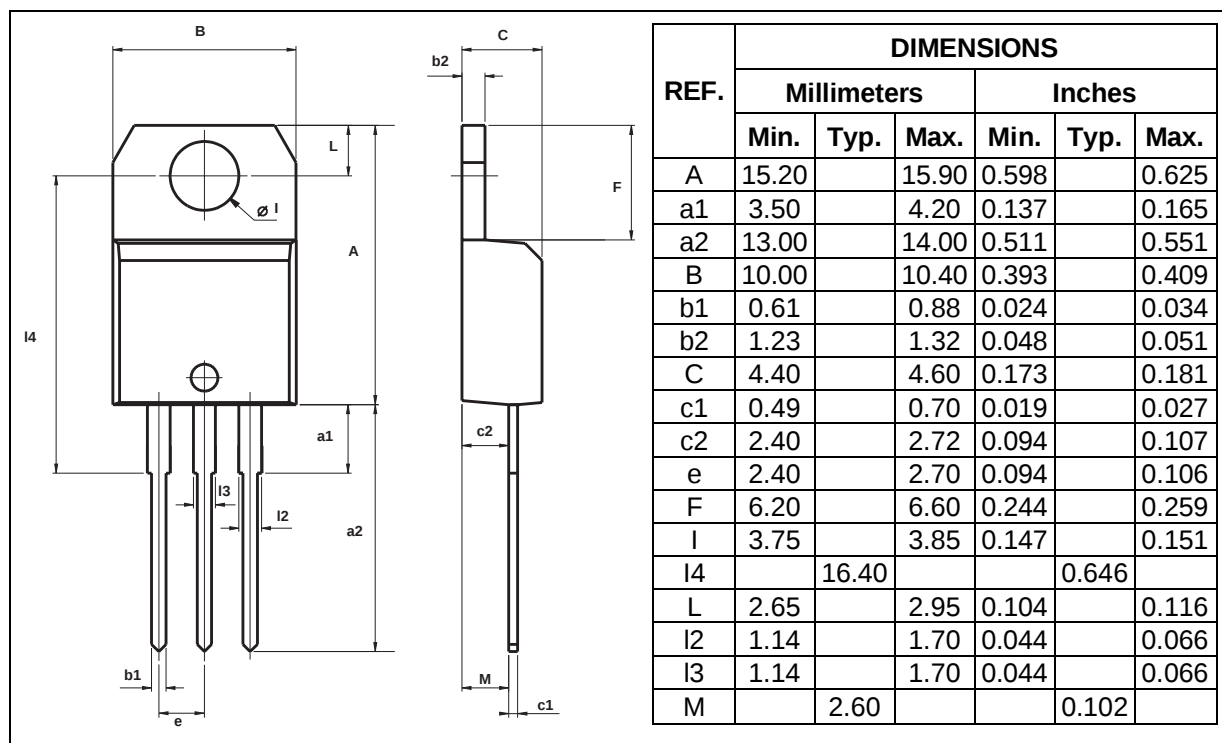


**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



**PACKAGE MECHANICAL DATA**  
**TO-220AB**


| Ordering code | Marking    | Package  | Weight | Base qty | Delivery mode |
|---------------|------------|----------|--------|----------|---------------|
| STTH806TTI    | STTH806TTI | TO-220AB | 2.3 g. | 50       | Tube          |

- Cooling method: C
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1 N.m.
- Epoxy meets UL94,V0

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