

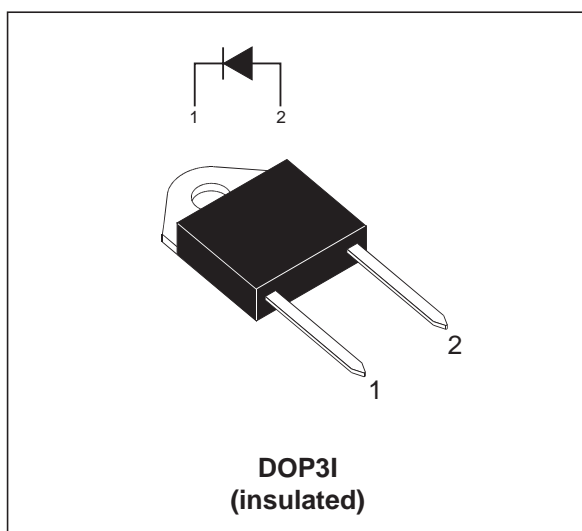
Tandem 600V HYPERFAST BOOST DIODE

MAJOR PRODUCTS CHARACTERISTICS

| | |
|----------------|--------|
| $I_{F(AV)}$ | 30 A |
| V_{RRM} | 600 V |
| $T_j(max)$ | 150 °C |
| $V_F(max)$ | 2.4 V |
| $I_{RM}(typ.)$ | 6.7 A |
| $t_{rr}(typ.)$ | 25 ns |

FEATURES AND BENEFITS

- ESPECIALLY SUITED AS BOOST DIODE IN CONTINUOUS MODE POWER FACTOR CORRECTORS AND HARD SWITCHING CONDITIONS
- DESIGNED FOR HIGH di_F/dt OPERATION. HYPERFAST RECOVERY CURRENT TO COMPETE WITH SiC DEVICES. ALLOWS DOWNSIZING OF MOSFET AND HEATSINKS
- INTERNAL CERAMIC INSULATED DEVICES WITH EQUAL THERMAL CONDITIONS FOR BOTH 300V DIODES
- INSULATION (2500V_{RMS}) ALLOWS PLACEMENT ON SAME HEATSINK AS MOSFET FLEXIBLE HEATSINKING ON COMMON OR SEPARATE HEATSINK.
- STATIC AND DYNAMIC EQUILIBRIUM OF INTERNAL DIODES ARE WARRANTED BY DESIGN
- PACKAGE CAPACITANCE: C=16pF



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_F/dt .

ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | Value | Unit |
|--------------|--|---|----------|------|
| V_{RRM} | Repetitive peak reverse voltage | | 600 | V |
| $I_{F(RMS)}$ | RMS forward current | | 32 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10 \text{ ms}$ sinusoidal | 180 | A |
| I_{peak} | Peak current waveform | $\delta = 0.15$ $T_c = 120^\circ\text{C}$ | 50 | A |
| T_{stg} | Storage temperature range | | -65 +150 | °C |
| T_j | Maximum operating junction temperature | | + 150 | °C |

THERMAL AND POWER DATA

| Symbol | Parameter | Test conditions | Value | Unit |
|---------------|-------------------------------------|-----------------|-------|------|
| $R_{th(j-c)}$ | Junction to case thermal resistance | | 1.3 | °C/W |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Tests Conditions | Min. | Typ. | Max. | Unit |
|------------|-------------------------|---------------------|---------------------------|------|------|---------------|
| I_R^* | Reverse leakage current | $V_R = V_{RRM}$ | $T_j = 25^\circ\text{C}$ | | 40 | μA |
| | | | $T_j = 125^\circ\text{C}$ | | 60 | |
| V_F^{**} | Forward voltage drop | $I_F = 30\text{ A}$ | $T_j = 25^\circ\text{C}$ | | 3.6 | V |
| | | | $T_j = 150^\circ\text{C}$ | | 1.95 | |

Pulse test : * $t_p = 100\text{ ms}$, $\delta < 2\%$

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

To evaluate the maximum conduction losses use the following equation :

$$P = 1.7 \times I_{F(AV)} + 0.023 I_{F(RMS)}^2$$

DYNAMIC CHARACTERISTICS

| Symbol | Parameter | Tests Conditions | Min. | Typ. | Max. | Unit | |
|----------|----------------------------------|---|---------------------------|------|------|------|----|
| t_{rr} | Reverse recovery time | $I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$ | $T_j = 25^\circ\text{C}$ | | 25 | ns | |
| | | $I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$ | | | | | 45 |
| I_{RM} | Reverse recovery current | $V_R = 400\text{ V}$ $I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ | $T_j = 125^\circ\text{C}$ | | 6.7 | 8.5 | A |
| S | Reverse recovery softness factor | | | | 0.3 | | - |
| Q_{rr} | Reverse recovery charges | | | | 145 | | nC |

TURN-ON SWITCHING CHARACTERISTICS

| Symbol | Parameter | Tests Conditions | Min. | Typ. | Max. | Unit |
|----------|---|--|------|------|------|------|
| t_{fr} | Forward recovery time | $I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_F\text{ max}$ | | | 400 | ns |
| V_{FP} | Transient peak forward recovery voltage | $I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ | | | 6 | V |

Fig. 1: Conduction losses versus average current.

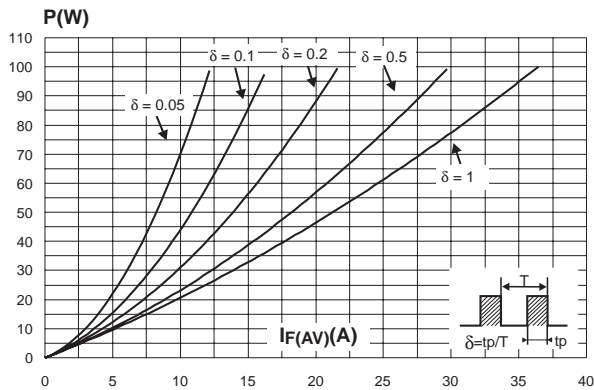


Fig. 2: Forward voltage drop versus forward current.

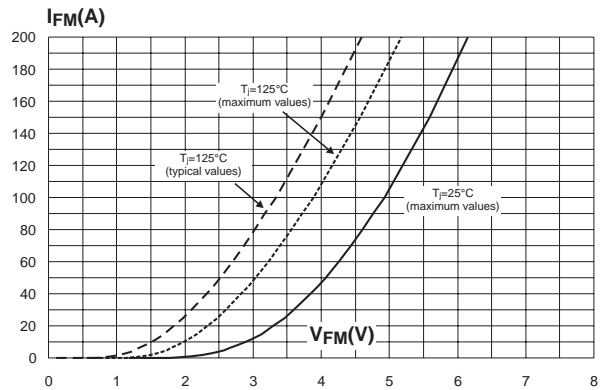


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

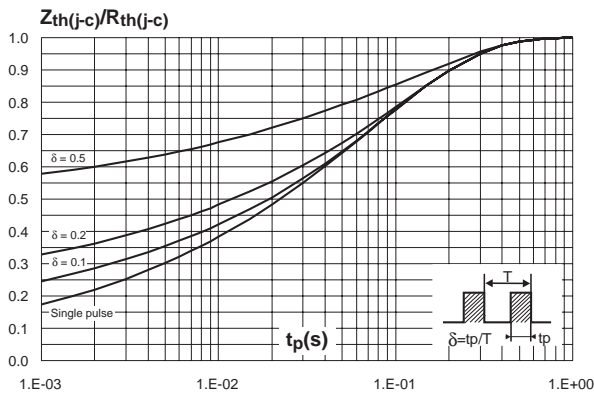


Fig. 4: Peak reverse recovery current versus di_F/dt (typical values).

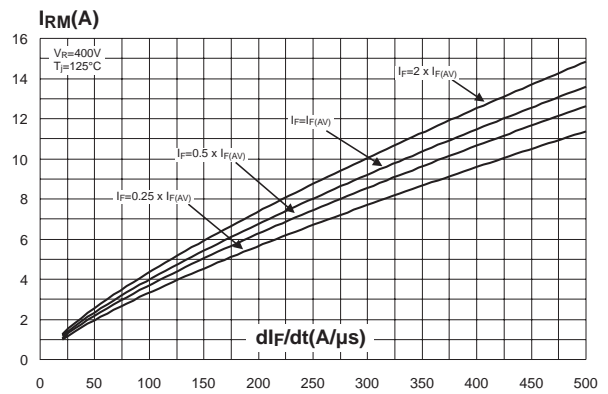


Fig. 5: Reverse recovery time versus di_F/dt (typical values).

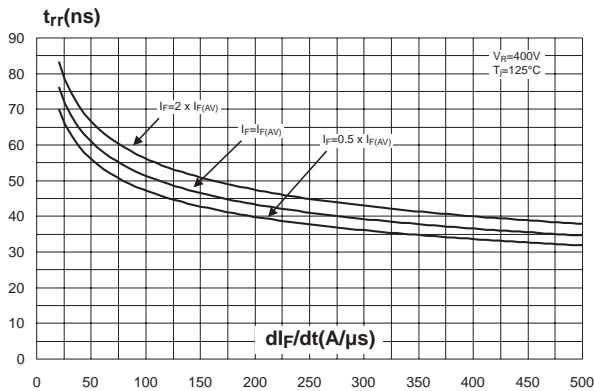


Fig. 6: Reverse recovery charges versus di_F/dt (typical values).

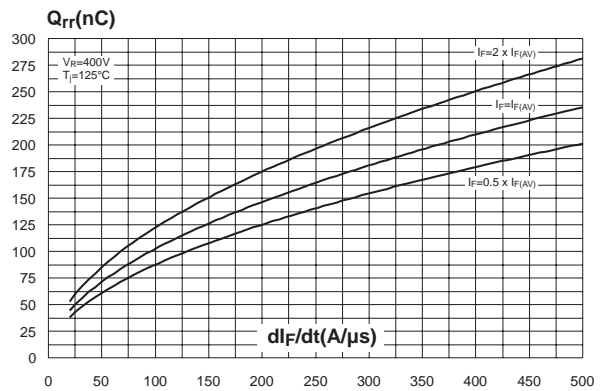


Fig. 7: Reverse recovery softness factor versus di_F/dt (typical values).

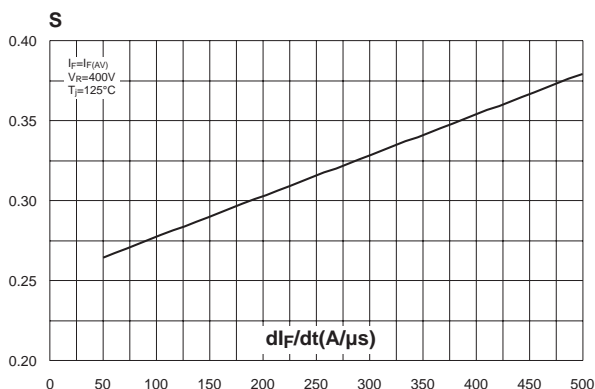


Fig. 8: Relative variation of dynamic parameters versus junction temperature (reference: $T_J = 125^\circ C$).

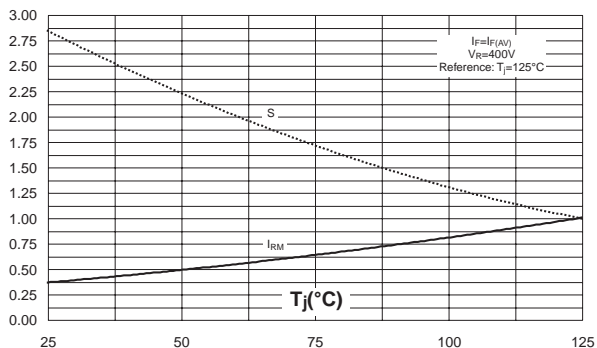


Fig. 9: Transient peak forward voltage versus di_F/dt (typical values).

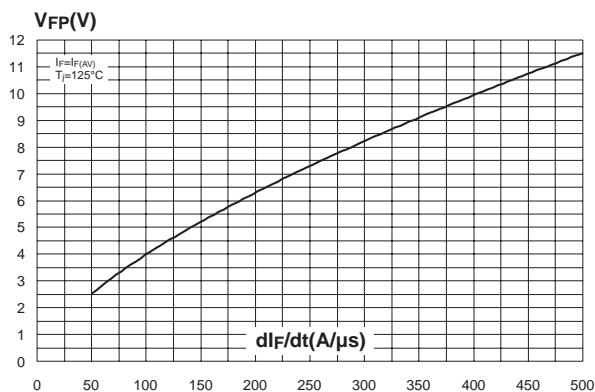


Fig. 10: Forward recovery time versus di_F/dt (typical values).

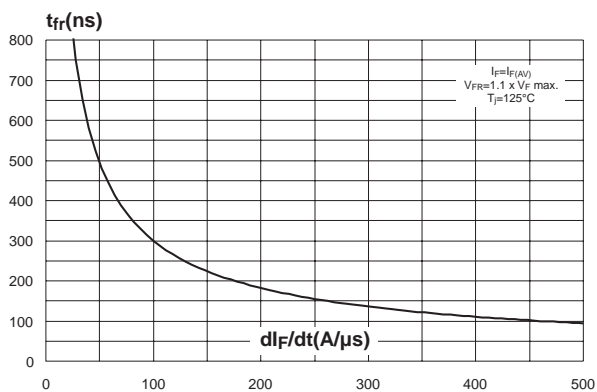
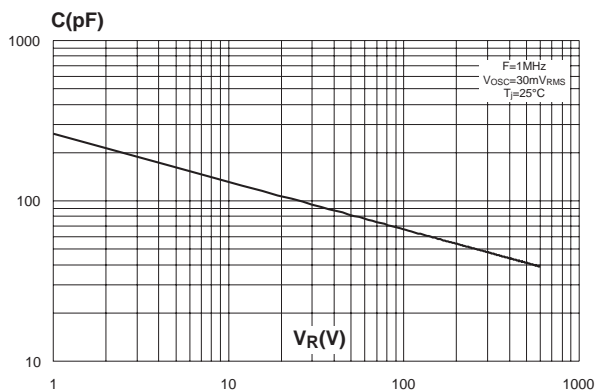


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).



PACKAGE MECHANICAL DATA
 DOP3I

| REF. | DIMENSIONS | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.4 | 4.6 | 0.173 | 0.181 |
| B | 1.45 | 1.55 | 0.057 | 0.061 |
| C | 14.35 | 15.60 | 0.565 | 0.614 |
| D | 0.5 | 0.7 | 0.020 | 0.028 |
| E | 2.7 | 2.9 | 0.106 | 0.114 |
| F | 15.8 | 16.5 | 0.622 | 0.650 |
| G | 20.4 | 21.1 | 0.815 | 0.831 |
| H | 15.1 | 15.5 | 0.594 | 0.610 |
| K | 3.4 | 3.65 | 0.134 | 0.144 |
| L | 4.08 | 4.17 | 0.161 | 0.164 |
| N | 10.8 | 11.3 | 0.425 | 0.444 |
| P | 1.20 | 1.40 | 0.047 | 0.055 |
| R | 4.60 typ. | | 0.181 typ. | |

| Ordering code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|-------------|---------|---------|----------|---------------|
| STTH3006DPI | STTH3006DPI | DOP3I | 4.46 g. | 30 | Tube |

- Epoxy meets UL94,V0

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