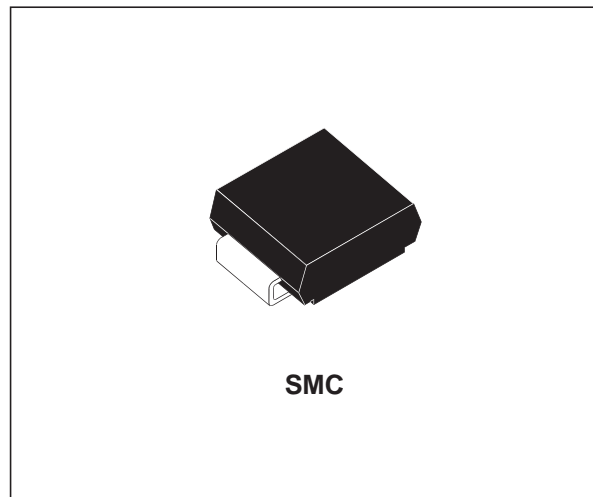


HIGH EFFICIENCY ULTRAFAST DIODE
MAIN PRODUCT CHARACTERISTICS

| | |
|-----------------------------|---------------|
| I_{F(AV)} | 3A |
| V_{RRM} | 200 V |
| T_j (max) | 175 °C |
| V_F (max) | 0.75 V |
| t_{rr} (max) | 35 ns |

FEATURES AND BENEFITS

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature


DESCRIPTION

The STTH302S, which is using ST's new 200V planar technology, is specially suited for switching mode base drive & transistor circuits.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.

ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | Value | Unit |
|--------------------|--|-----------------------------------|--------------|-------------|
| V _{RRM} | Repetitive peak reverse voltage | | 200 | V |
| I _{F(AV)} | Average forward current | T _I = 107°C δ = 0.5 | 3 | A |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms Sinusoidal | 100 | A |
| T _{stg} | Storage temperature range | | - 65 + 175 | °C |
| T _j | Maximum operating junction temperature | | 175 | °C |

THERMAL PARAMETERS

| Symbol | Parameter | Maximum | Unit |
|----------------------|------------------|----------------|-------------|
| R _{th(j-l)} | Junction to lead | 20 | °C/W |

STTH302S

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|------------|-------------------------|---------------------------|--------------------|------|------|------|---------------|
| I_R^* | Reverse leakage current | $T_j = 25^\circ\text{C}$ | $V_R = V_{RRM}$ | | | 3 | μA |
| | | $T_j = 125^\circ\text{C}$ | | | 4 | 75 | |
| V_F^{**} | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 3\text{ A}$ | | | 0.95 | V |
| | | $T_j = 125^\circ\text{C}$ | $I_F = 3\text{ A}$ | | 0.66 | 0.75 | |

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

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

To evaluate the maximum conduction losses use the following equation :

$$P = 0.60 \times I_{F(AV)} + 0.05 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|----------|--------------------------|--------------------------|--|------|------|------|------|
| t_{rr} | Reverse recovery time | $T_j = 25^\circ\text{C}$ | $I_F = 1\text{ A}$ $I_{rr} = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$ | | | 35 | ns |
| t_{fr} | Forward recovery time | $T_j = 25^\circ\text{C}$ | $I_F = 3\text{ A}$ $dI_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | 70 | | ns |
| V_{FP} | Forward recovery voltage | $T_j = 25^\circ\text{C}$ | $I_F = 3\text{ A}$ $dI_F/dt = 50\text{ A}/\mu\text{s}$ | | 1.6 | | V |

Fig. 1: Average forward power dissipation versus average forward current.

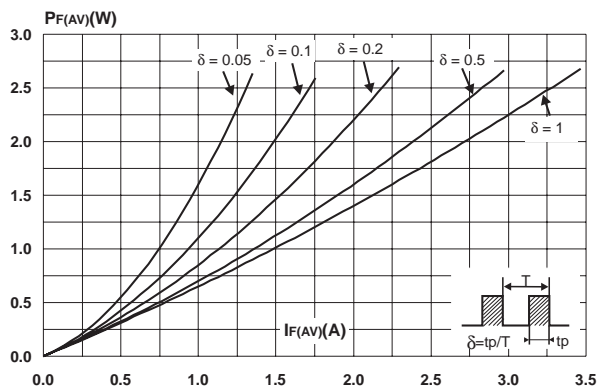


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

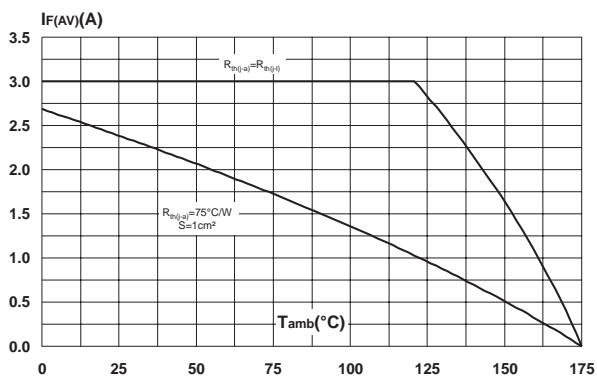


Fig. 3: Relative variation of thermal impedance junction ambient versus pulse duration (Printed circuit board epoxy FR4).

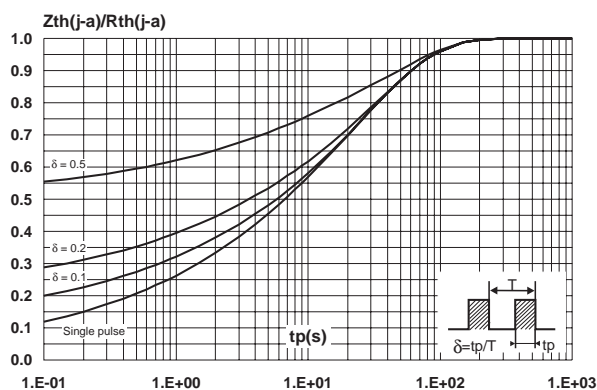


Fig. 4: Forward voltage drop versus forward current.

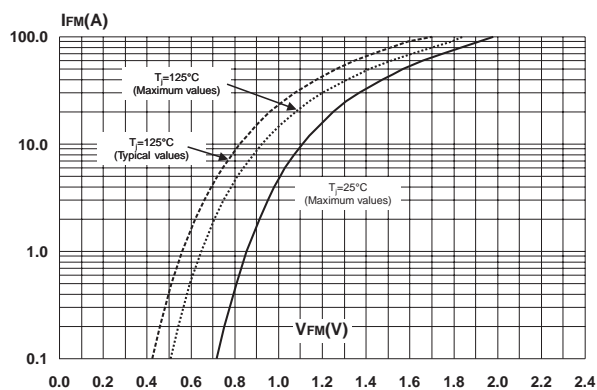


Fig. 5: Junction capacitance versus reverse voltage applied (typical values).

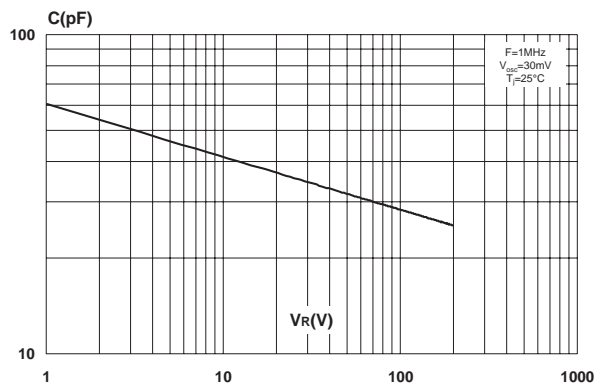


Fig. 6: Reverse recovery time versus di_F/dt (90% confidence).

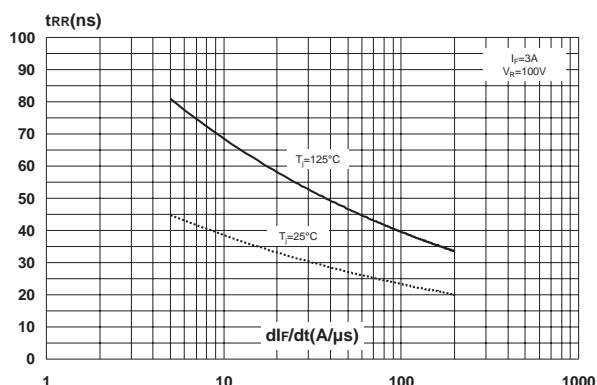


Fig. 7: Peak reverse recovery current versus di_F/dt (90% confidence).

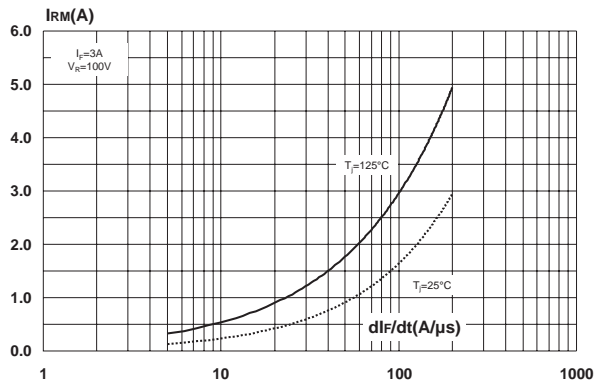


Fig. 8: Reverse recovery charges versus di_F/dt (90% confidence).

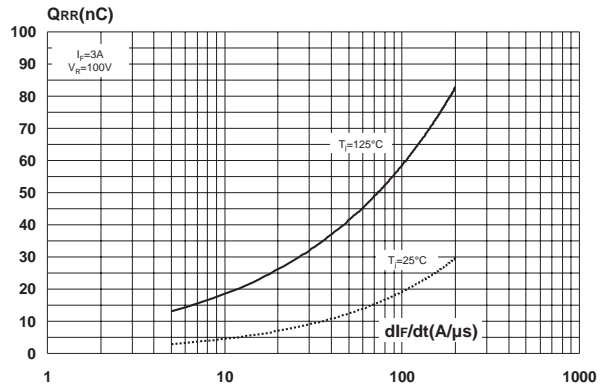


Fig. 9: Relative variations of dynamic parameters versus junction temperature.

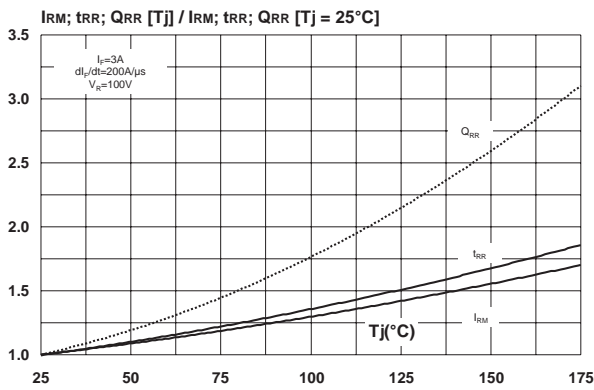
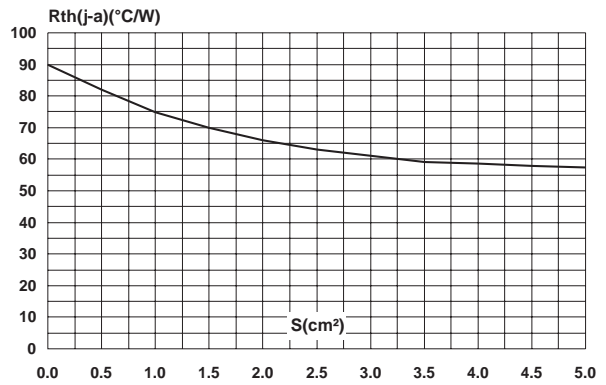
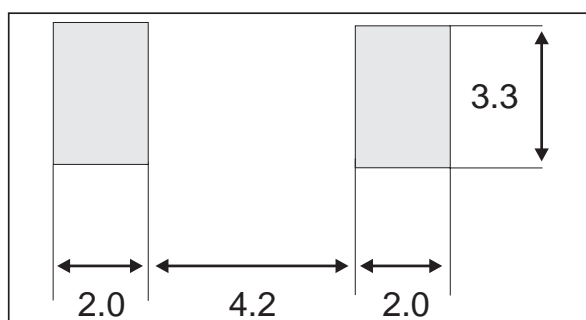


Fig. 10: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e = 35\mu\text{m}$).



PACKAGE MECHANICAL DATA
SMC

| REF. | DIMENSIONS | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.075 | 0.096 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 2.90 | 3.2 | 0.114 | 0.126 |
| c | 0.15 | 0.41 | 0.006 | 0.016 |
| E | 7.75 | 8.15 | 0.305 | 0.321 |
| E1 | 6.60 | 7.15 | 0.260 | 0.281 |
| E2 | 4.40 | 4.70 | 0.173 | 0.185 |
| D | 5.55 | 6.25 | 0.218 | 0.246 |
| L | 0.75 | 1.60 | 0.030 | 0.063 |

FOOTPRINT


| Ordering code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|---------|----------|---------------|
| STTH302S | U32 | SMC | 0.245 g | 2500 | Tape & reel |

- Epoxy meets UL 94,V0

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