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High voltage ultrafast rectifier

Features

- Low forward voltage drop
- High reliability
- High surge current capability
- Soft switching for reduced EMI disturbances
- Planar technology

Description

The STTH108, which is using ST ultrafast high voltage planar technology, is specially suited for free-wheeling, clamping, snubbing, demagnetization in power supplies and other power switching applications.

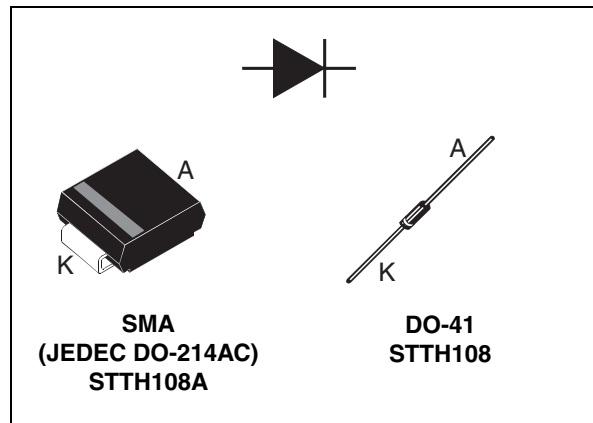


Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 800 V |
| T_j (max) | 175 °C |
| V_F (max) | 1.25 V |

1 Characteristics

Table 2. Absolute ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|-------------|--|---------------------|--------------------------------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | | 800 | V | |
| $V_{(RMS)}$ | Voltage rms | | 560 | V | |
| $I_{F(AV)}$ | Average forward current | SMA | $T_L = 110\text{ °C}$ $\delta = 0.5$ | 1 | A |
| | | DO-41 | $T_L = 130\text{ °C}$ $\delta = 0.5$ | | |
| I_{FSM} | Forward Surge current | $t = 8.3\text{ ms}$ | SMA | 20 | A |
| | | | DO-41 | 25 | |
| T_{stg} | Storage temperature range | | -50 to + 175 | °C | |
| T_j | Maximum operating junction temperature | | 175 | °C | |

Table 3. Thermal resistance

| Symbol | Parameter | | Value | Unit | |
|---------------|---------------------|---------------------|-------|------|------|
| $R_{th(j-l)}$ | Junction to lead | | SMA | 30 | °C/W |
| | | Lead length = 10 mm | DO-41 | 45 | |
| $R_{th(j-a)}$ | Junction to ambient | Lead length = 10 mm | DO-41 | 110 | |

Table 4. Static electrical characteristics

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|--------|-------------------------|-----------------------|----------------------|------|------|------|---------------|
| I_R | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = 800\text{ V}$ | | | 5 | μA |
| | | $T_j = 125\text{ °C}$ | | | 1 | 50 | |
| V_F | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$ | | | 1.65 | V |
| | | $T_j = 125\text{ °C}$ | | | 0.89 | 1.25 | |

To evaluate the conduction losses use the following equation:

$$P = 1.05 \times I_{F(AV)} + 0.20 I_F^2(RMS)$$

Table 5. Dynamic electrical characteristics

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|----------|--------------------------|----------------------|--|------|------|------|------|
| t_{rr} | Reverse recovery time | $T_j = 25\text{ °C}$ | $I_F = 0.5\text{ A}$, $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$ | | | 75 | ns |
| t_{fr} | Forward recovery time | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$, $di_F/dt = 50\text{ A/ms}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | | 200 | ns |
| V_{FP} | Forward recovery voltage | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$, $di_F/dt = 50\text{ A/ms}$ | | | 12 | V |

Figure 1. Conduction losses versus average current

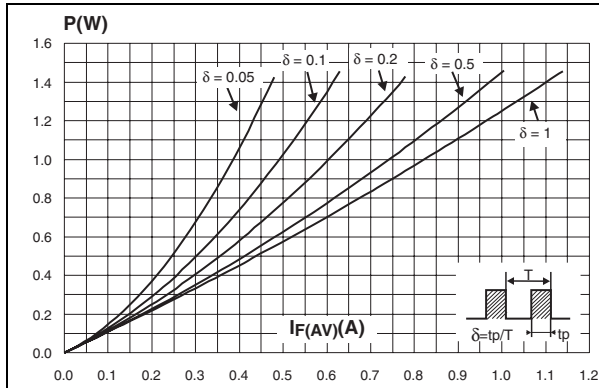


Figure 2. Forward voltage drop versus forward current

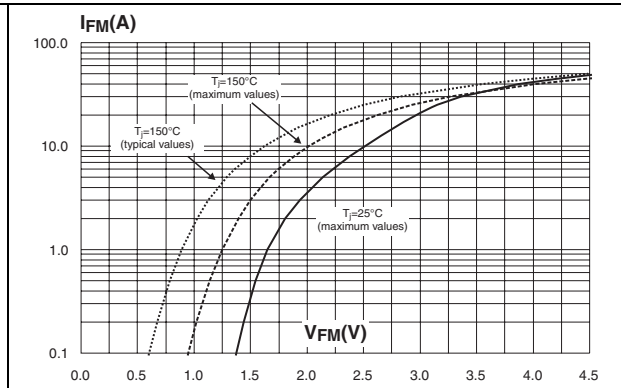


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-41)

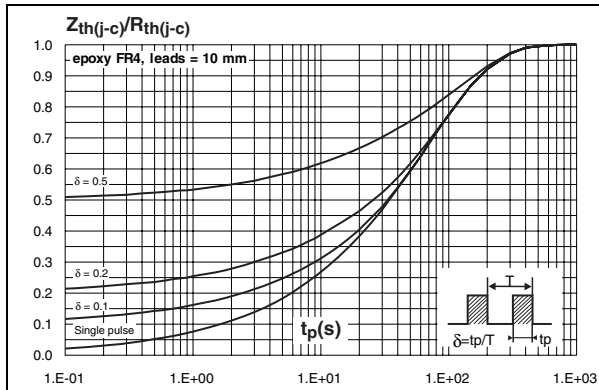


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4) (SMA)

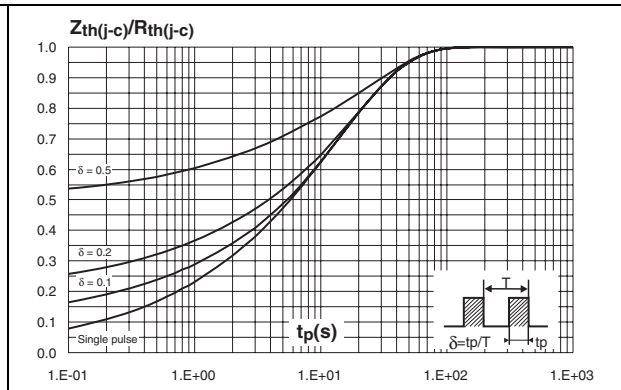


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (DO-41)

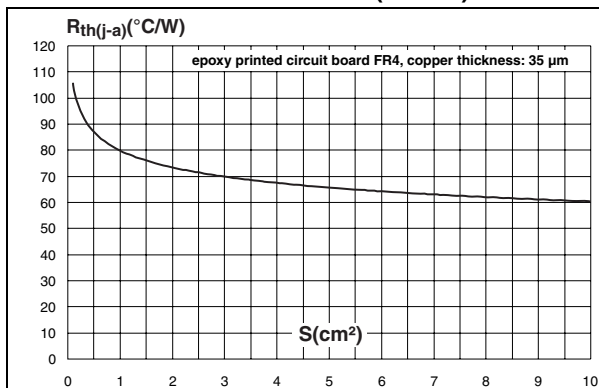
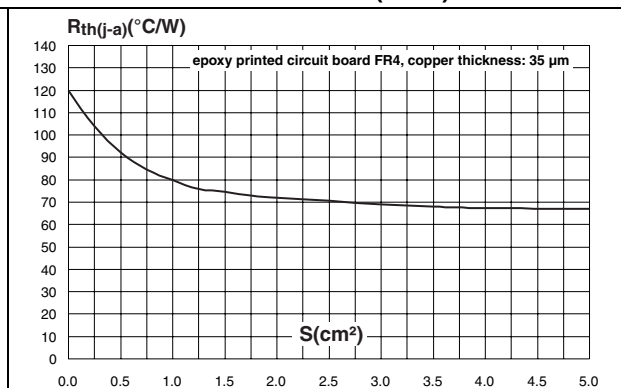


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead (SMA)



2 Package information

- Epoxy meets UL 94, V0
- Band indicates cathode
- Bending method (DO-41): see Application note AN1471

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Table 6. SMA dimensions

| Ref. | Dimensions | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.075 | 0.094 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 1.25 | 1.65 | 0.049 | 0.065 |
| c | 0.15 | 0.40 | 0.006 | 0.016 |
| D | 2.25 | 2.90 | 0.089 | 0.114 |
| E | 4.80 | 5.35 | 0.189 | 0.211 |
| E1 | 3.95 | 4.60 | 0.156 | 0.181 |
| L | 0.75 | 1.50 | 0.030 | 0.059 |

Figure 7. Footprint (dimensions in mm)

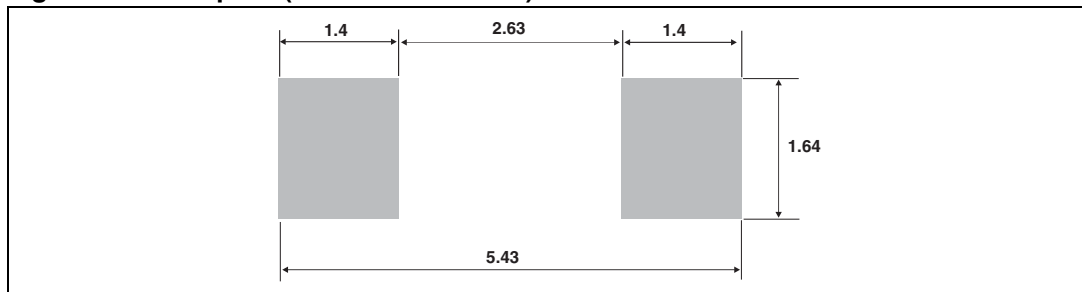


Table 7. DO-41 (plastic) package dimensions

| Ref. | Dimensions | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.07 | 5.20 | 0.160 | 0.205 |
| B | 2.04 | 2.71 | 0.080 | 0.107 |
| C | 25.4 | | 1 | |
| D | 0.71 | 0.86 | 0.028 | 0.034 |

3 Ordering information

Table 8. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|---------|----------|---------------|
| STTH108 | STTH108 | DO-41 | 0.34 g | 2000 | Ammopack |
| STTH108A | H08 | SMA | 0.068 g | 5000 | Tape and reel |
| STTH108RL | STTH108 | DO-41 | 0.34 g | 5000 | Tape and reel |

4 Revision history

Table 9. Document revision history

| Date | Revision | Changes |
|-------------|----------|-------------------------------------|
| Jan-2003 | 2 | Last update. |
| 30-Sep-2009 | 3 | Updated table 7 package dimensions. |

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