

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 STTH110, 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.

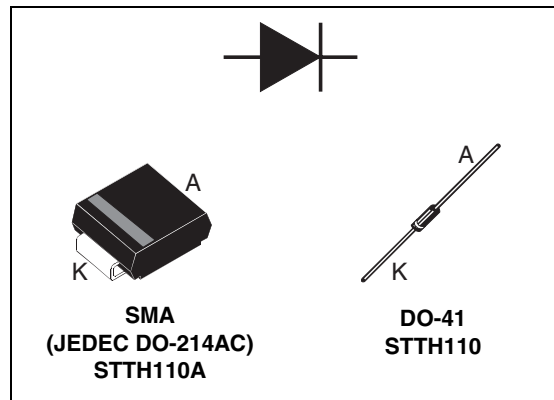


Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 1000 V |
| $T_j(max)$ | 175 °C |
| $V_F(max)$ | 1.42 V |

1 Characteristics

Table 2. Absolute ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|-------------|--|-------|--------------------------------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | | 1000 | V | |
| $V_{(RMS)}$ | Voltage rms | | 700 | V | |
| $I_{F(AV)}$ | Average forward current | SMA | $T_L = 110\text{ °C}$ $\delta = 0.5$ | 1 | A |
| | | DO-41 | $T_L = 125\text{ °C}$ $\delta = 0.5$ | 1 | |
| I_{FSM} | Forward Surge current $t = 8.3\text{ ms}$ | SMA | | 18 | A |
| | | DO-41 | | 20 | |
| 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 | 45 | |
| $R_{th(j-a)}$ | Junction to ambient | Lead length = 10 mm | 110 | |

Table 4. Static Electrical Characteristics

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|--------|-------------------------|-----------------------|-----------------------|------|------|------|---------------|
| I_R | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = 1000\text{ V}$ | | | 10 | μA |
| | | $T_j = 125\text{ °C}$ | | | | 50 | |
| V_F | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$ | | | 1.7 | V |
| | | $T_j = 125\text{ °C}$ | | | 0.98 | 1.42 | |

To evaluate the conduction losses use the following equation:

$$P = 1.20 \times I_{F(AV)} + 0.225 I_{F(RMS)}^2$$

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 | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$, $dI_F/dt = 50\text{ A/ms}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | | 300 | ns |
| V_{FP} | Forward recovery voltage | | | | | | 18 |

Figure 1. Conduction losses versus average current

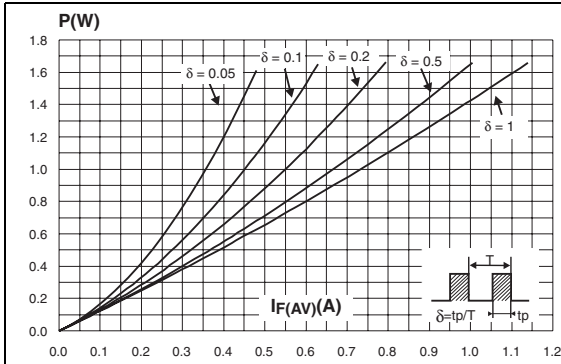


Figure 2. Forward voltage drop versus forward current

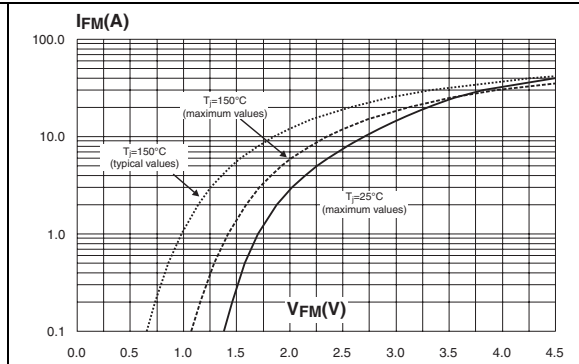


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-41)

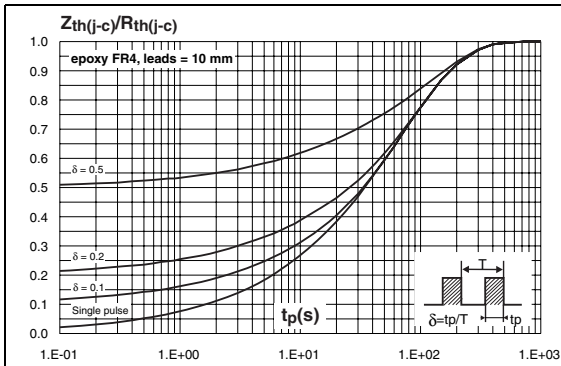


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4) (SMA)

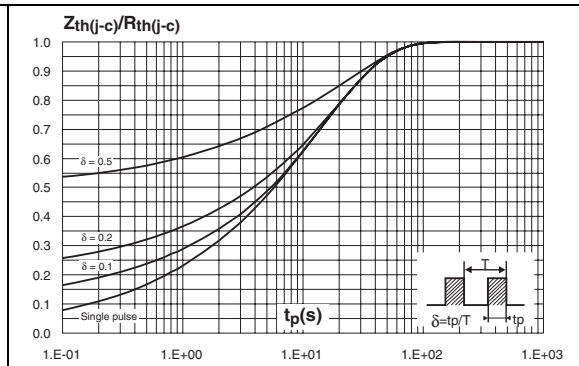


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (DO-41)

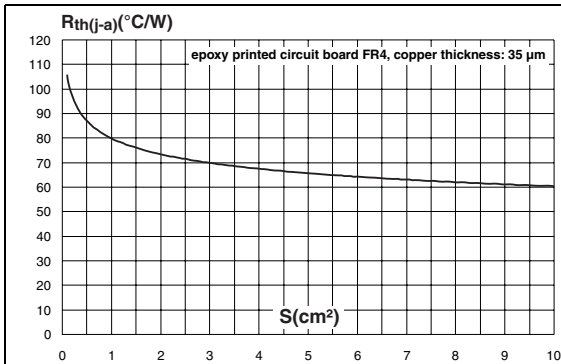
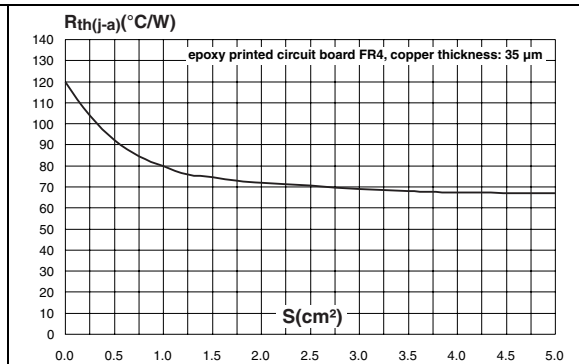


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead (SMA).



2 Package information

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

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. SMA dimensions

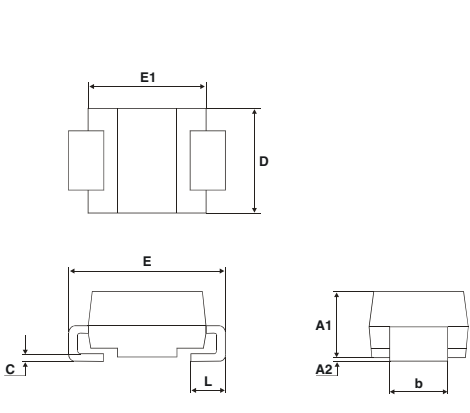
|  | Dimensions | | | | |
|--|------------|-------------|-------|--------|-------|
| | Ref. | Millimeters | | Inches | |
| | | Min. | Max. | Min. | Max. |
| | A1 | 1.90 | 2.45 | 0.075 | 0.094 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 | |
| b | 1.25 | 1.65 | 0.049 | 0.065 | |
| c | 0.15 | 0.40 | 0.006 | 0.016 | |
| 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)

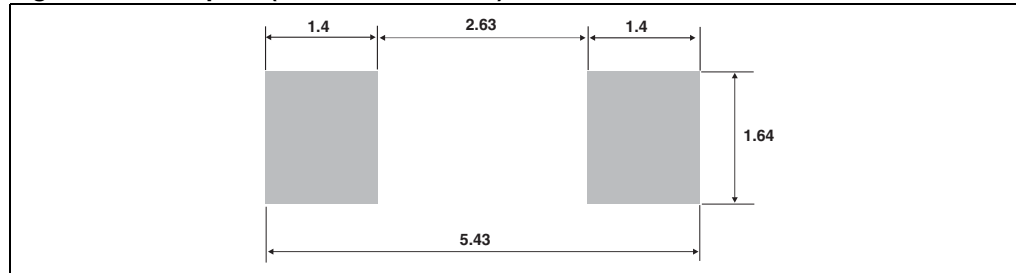
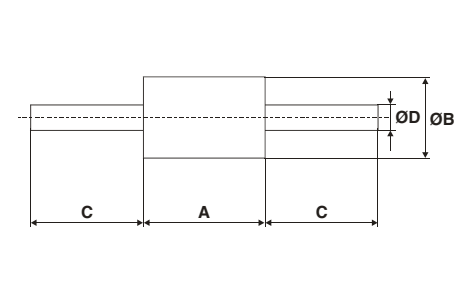


Table 7. DO-41 (plastic) package dimensions

|  | Dimensions | | | | |
|---|------------|-------------|-------|--------|-------|
| | Ref. | 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 |
|------------|---------|---------|---------|----------|---------------|
| STTH110 | STTH110 | DO-41 | 0.34 g | 2000 | Ammopack |
| STTH110A | H10 | SMA | 0.068 g | 5000 | Tape and reel |
| STTH110RL | STTH110 | DO-41 | 0.34 g | 5000 | Tape and reel |

4 Revision history

Table 9. Document revision history

| Date | Revision | Changes |
|--------------|----------|-------------------------------------|
| Jan-2003 | 1 | Last update. |
| 30-Sept-2009 | 2 | Updated table 7 package dimensions. |

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com