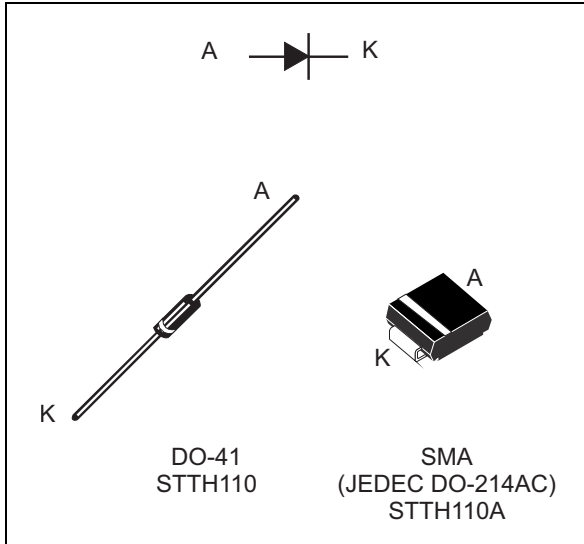


High voltage ultrafast rectifier

Datasheet - production data



Description

The STTH110, which is using ST ultrafast high voltage planar technology, is especially 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 |

Features

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

1 Characteristics

Table 2. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

| 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 | DO-41 | |
| $R_{th(j-a)}$ | Junction to ambient | Lead length = 10 mm | DO-41 | |

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 |
| | | $T_j = 150\text{ °C}$ | | | 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

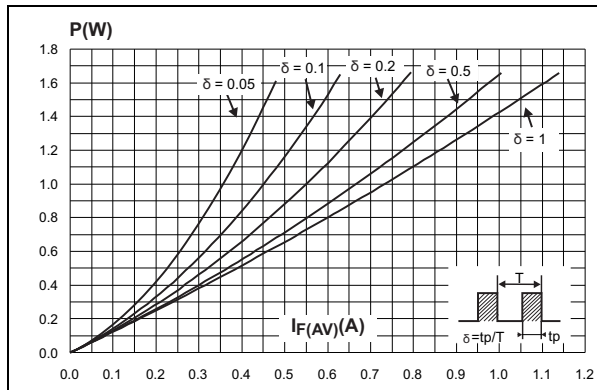


Figure 2. Forward voltage drop versus forward current (typical values)

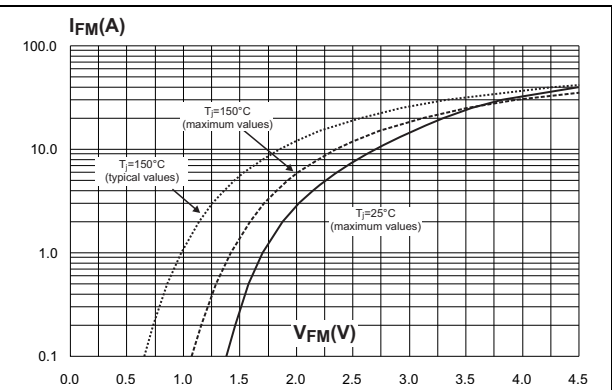


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-41)

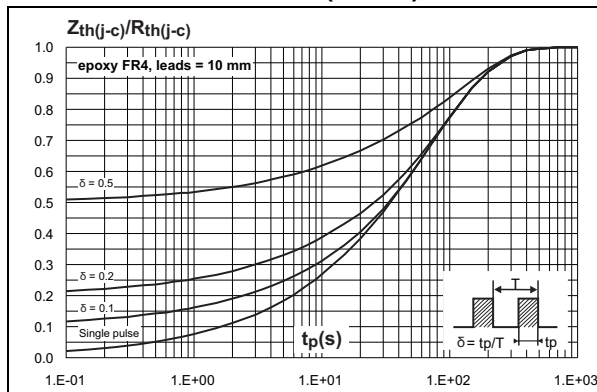


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (SMA)

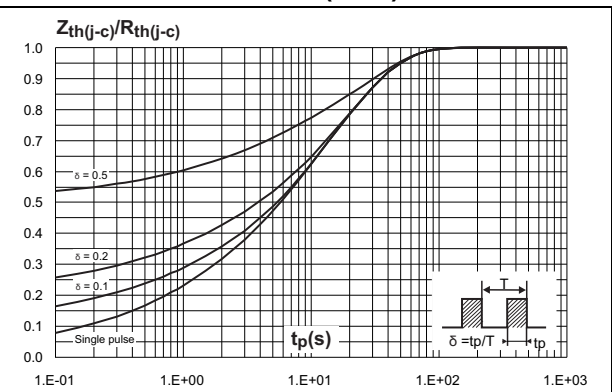


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (DO-41)

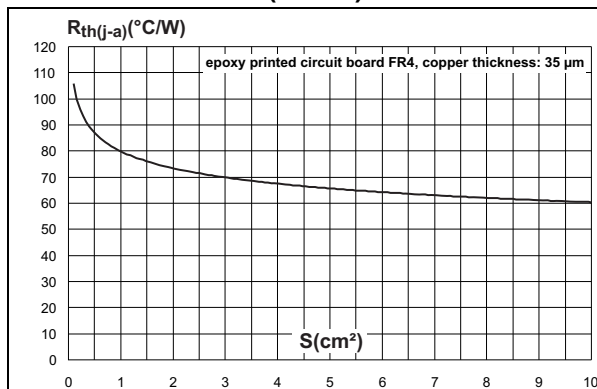
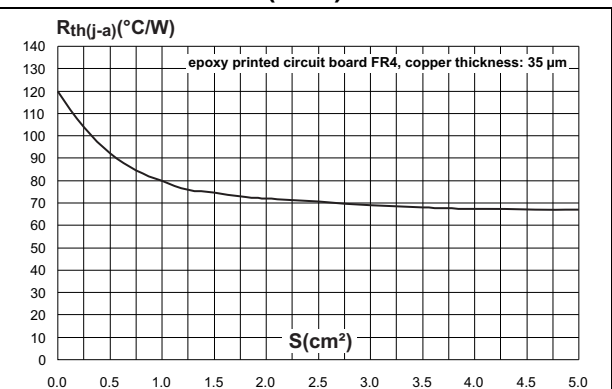


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead (SMA)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- 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.

Figure 7. SMA dimensions definitions

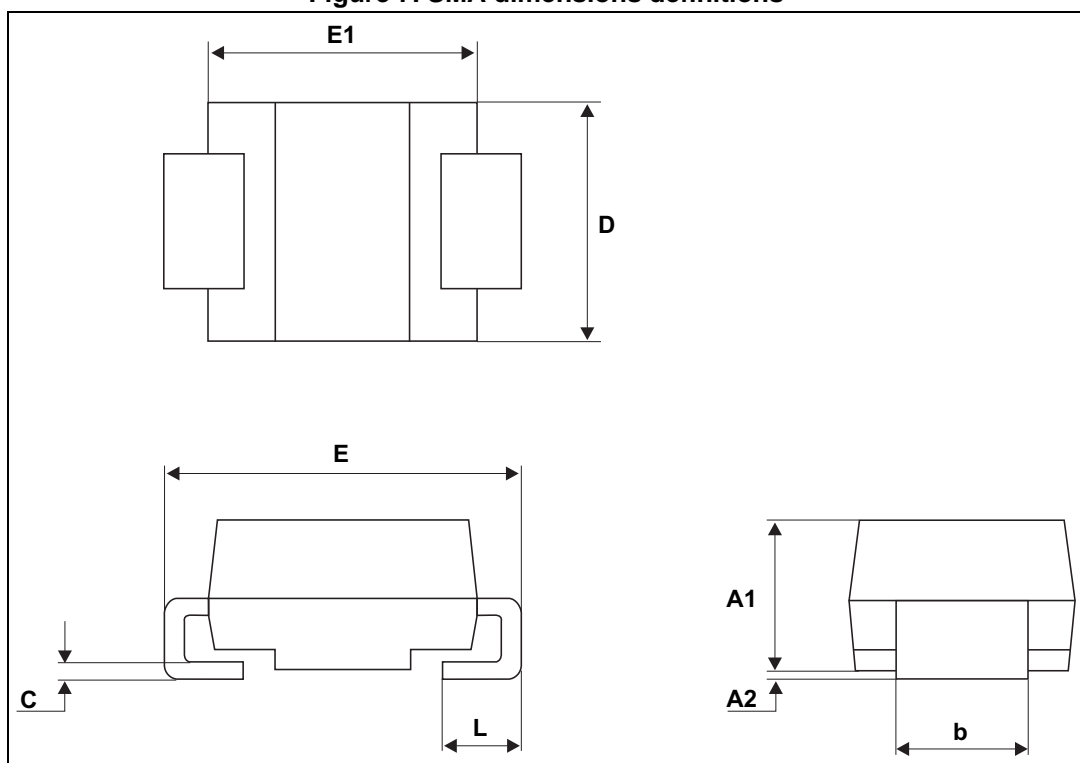


Table 6. SMA dimension values

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | 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 8. SMA footprint, dimensions in mm (inches)

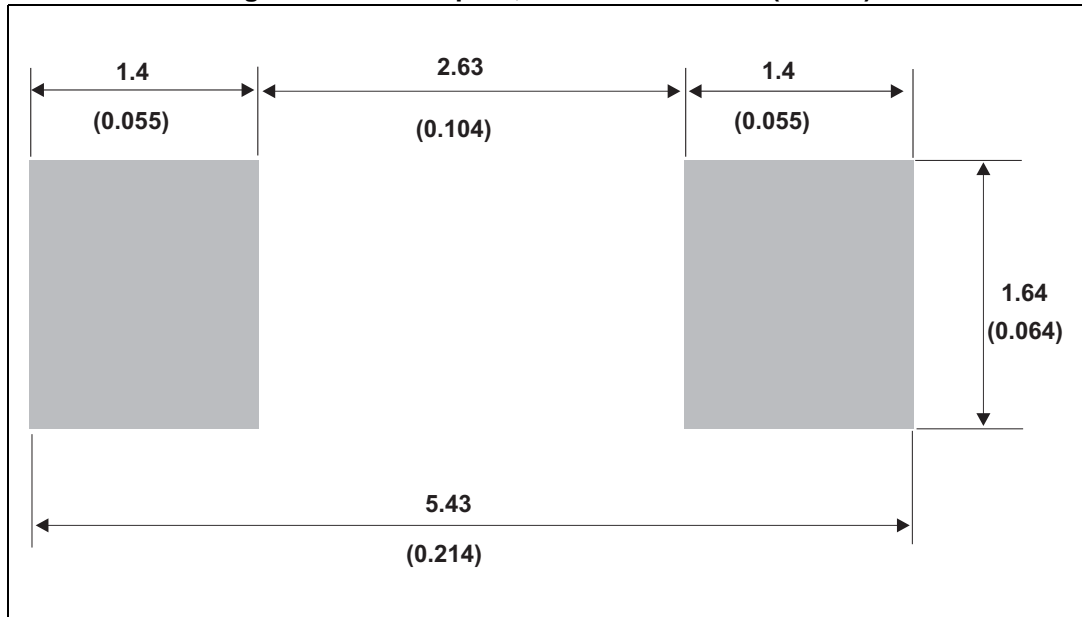


Figure 9. DO-41 (plastic) dimensions definitions

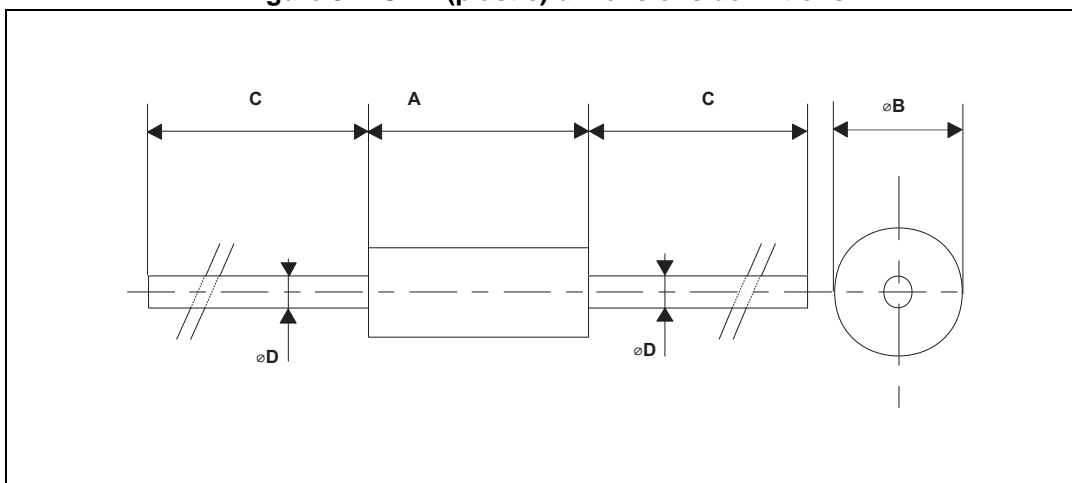


Table 7. DO-41 (plastic) dimension values

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | 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 codes | 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 13" |
| STTH110RL | STTH110 | DO-41 | 0,34 g | 5000 | Tape and reel 13" |

4 Revision history

Table 9. Document revision history

| Date | Revision | Changes |
|--------------|----------|-----------------------------------|
| Jan-2003 | 1 | Initial release. |
| 30-Sept-2009 | 2 | Updated Table 8 . |
| 20-Dec-2013 | 3 | Updated Table 4 . |

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.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

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.

© 2013 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

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[STTH110](#) [STTH110A](#) [STTH110RL](#)