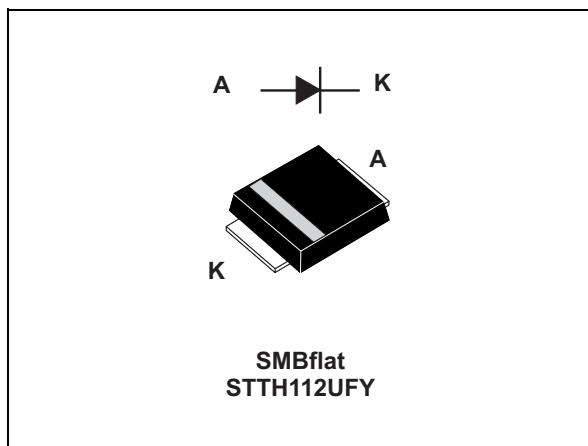


## Automotive high voltage ultrafast rectifier

Datasheet - production data



### Features

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- AEC-Q101 qualified
- ECOPACK<sup>®</sup>2 compliant component

### Description

The STTH112-Y, which is using ST's new 1200 V planar technology, is especially suited for switching mode base drive and transistor circuits.

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

**Table 1. Device summary**

| Symbol        | Value  |
|---------------|--------|
| $I_{F(AV)}$   | 1 A    |
| $V_{RRM}$     | 1200 V |
| $T_J(max)$    | 175 °C |
| $V_F(typ)$    | 1.1 V  |
| $T_{rr}(typ)$ | 53 ns  |

# 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 |                                        | 1200         | V    |
| $I_{F(AV)}$ | Average forward current         | $T_L = 135\text{ °C}$ , $\delta = 0.5$ | 1            | A    |
| $I_{FSM}$   | Forward Surge current           | $t_p = 8.3\text{ ms}$                  | 18           | A    |
| $T_{stg}$   | Storage temperature range       |                                        | -65 to + 175 | °C   |
| $T_j^{(1)}$ | Operating temperature range     |                                        | -40 to + 175 | °C   |

1.  $\frac{dP_{Tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

| Symbol        | Parameter        | Value | Unit |
|---------------|------------------|-------|------|
| $R_{th(j-l)}$ | Junction to lead | 20    | °C/W |

**Table 4. Static electrical characteristics**

| Symbol      | Parameter               | Tests conditions      |                    | Min. | Typ. | Max. | Unit          |
|-------------|-------------------------|-----------------------|--------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$    |      |      | 5    | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                    |      | 1    | 50   |               |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 1\text{ A}$ |      |      | 1.9  | V             |
|             |                         | $T_j = 150\text{ °C}$ |                    |      | 1.10 | 1.55 |               |

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

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.25 \times I_{F(AV)} + 0.30 I_F^2(RMS)$$

**Table 5. Dynamic electrical characteristics**

| Symbol   | Parameter                | Tests conditions     |                                                                                     | Min. | Typ. | Max. | Unit |
|----------|--------------------------|----------------------|-------------------------------------------------------------------------------------|------|------|------|------|
| $t_{rr}$ | Reverse recovery time    | $T_j = 25\text{ °C}$ | $I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$<br>$I_R = 1\text{ A}$               |      | 53   | 75   | ns   |
| $t_{fr}$ | Forward recovery time    | $T_j = 25\text{ °C}$ | $I_F = 1\text{ A}$ , $dI_F/dt = 50\text{ A}/\mu\text{s}$<br>$V_{FR} = 4.5\text{ V}$ |      |      | 500  |      |
| $V_{FP}$ | Forward recovery voltage |                      |                                                                                     |      | 20   | 30   | V    |

Figure 1. Average forward power dissipation versus average forward current

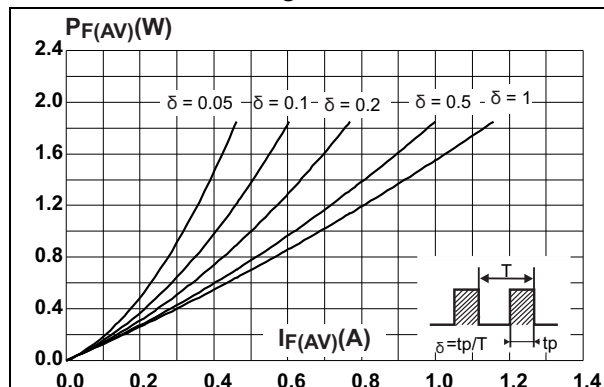


Figure 2. Forward voltage drop versus forward current (typical values)

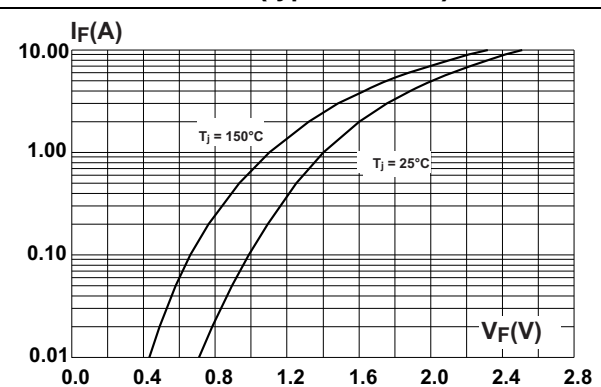


Figure 3. Forward voltage drop versus forward current (maximum values)

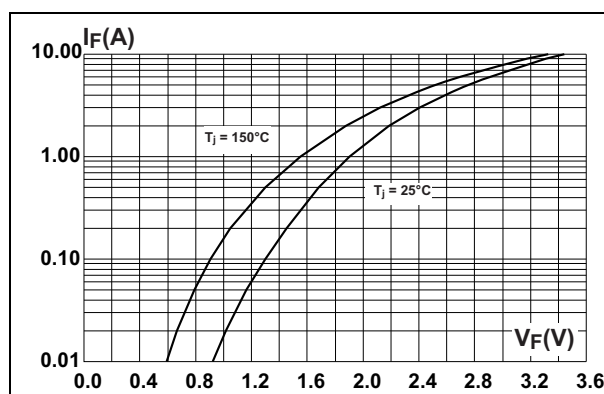


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

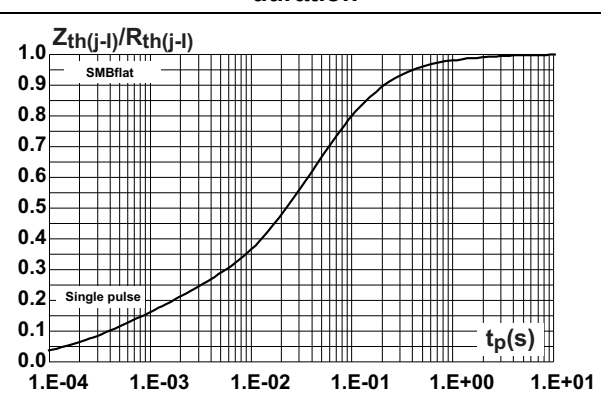


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

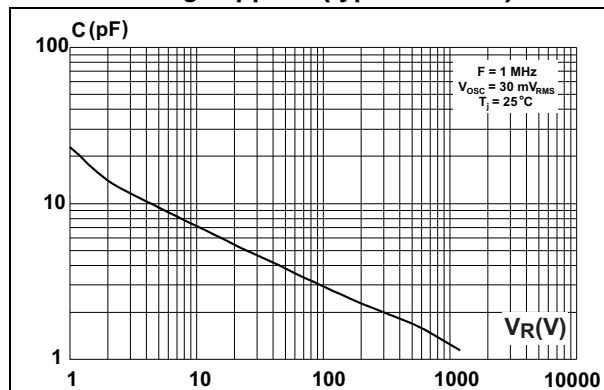
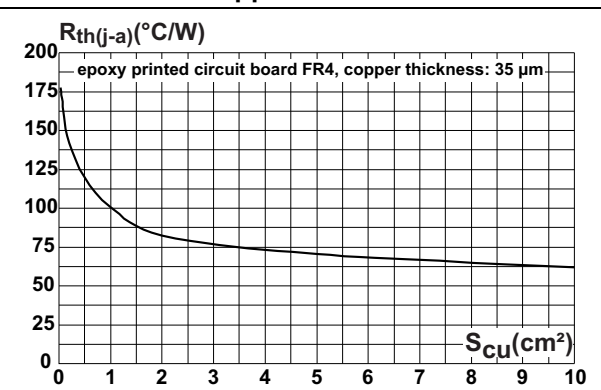


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead



## 2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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

Figure 7. SMBflat dimensions definitions

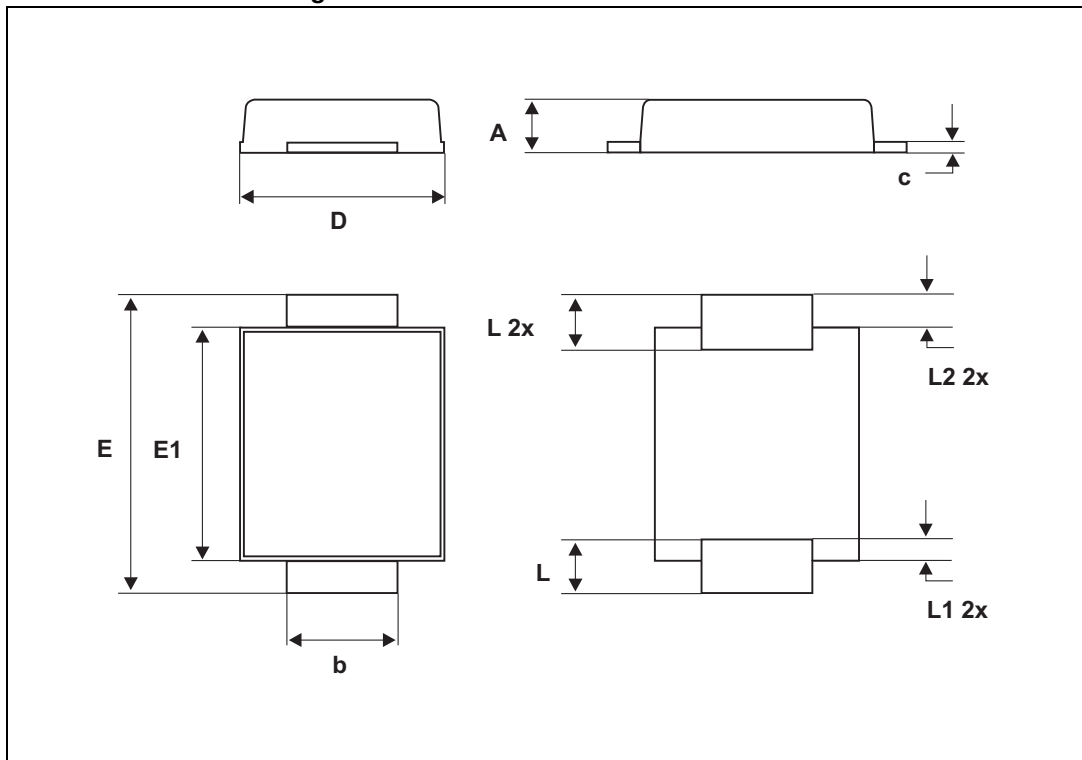
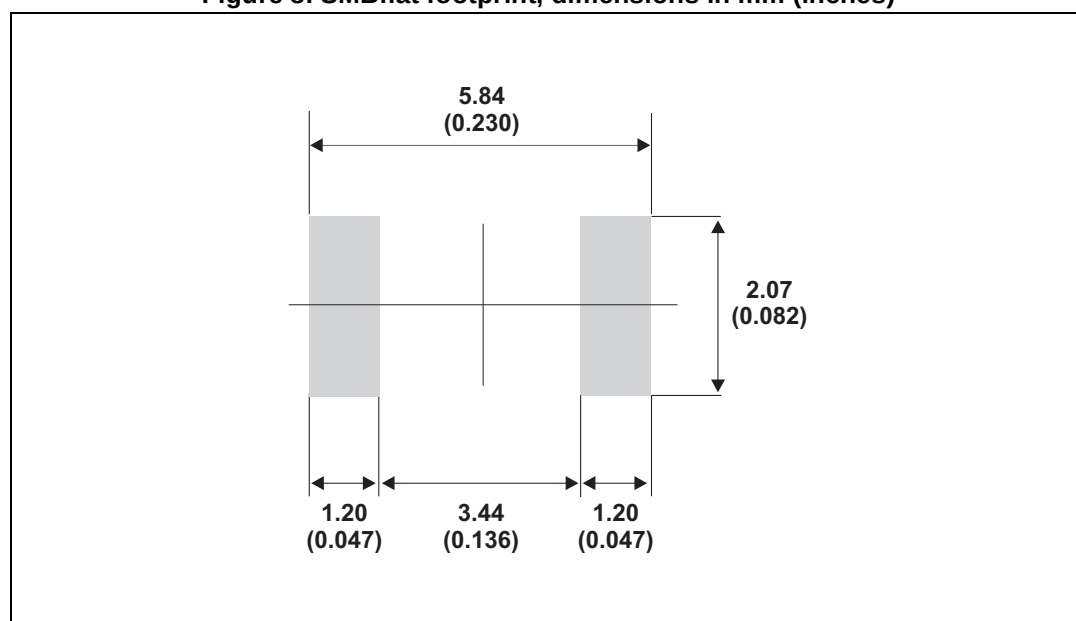


Table 6. SMBflat dimension values

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 0.90        |      | 1.10 | 0.035  |       | 0.043 |
| b    | 1.95        |      | 2.20 | 0.077  |       | 0.087 |
| c    | 0.15        |      | 0.40 | 0.006  |       | 0.016 |
| D    | 3.30        |      | 3.95 | 1.30   |       | 0.156 |
| E    | 5.10        |      | 5.60 | 0.200  |       | 0.220 |
| E1   | 4.05        |      | 4.60 | 0.189  |       | 0.181 |
| L    | 0.75        |      | 1.50 | 0.029  |       | 0.059 |
| L1   |             | 0.40 |      |        | 0.016 |       |
| L2   |             | 0.60 |      |        | 0.024 |       |

Figure 8. SMBflat footprint, dimensions in mm (inches)



### 3 Ordering information

Table 7. Ordering information

| Order codes | Marking | Package | Weight | Base qty | Delivery mode |
|-------------|---------|---------|--------|----------|---------------|
| STTH112UFY  | F112Y   | SMBflat | 50 mg  | 5000     | Tape and reel |

### 4 Revision history

Table 8. Document revision history

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 04-Feb-2014 | 1        | Initial release. |

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