

## Description

This single rectifier is based on a proprietary technology, enabling to achieve the best in class  $V_F/I_R$  trade-off for a given silicon surface.

Packaged in TO-220AB, this device is intended to be used in rectification and freewheeling operations in switch-mode power supplies.

**Table 1. Device summary**

| Symbol      | Value   |
|-------------|---------|
| $I_{F(AV)}$ | 20 A    |
| $V_{RRM}$   | 60 V    |
| $T_j$ (max) | +175 °C |
| $V_F$ (typ) | 0.30 V  |

## Features

- ST proprietary process
- Stable leakage current over reverse voltage
- Low forward voltage drop
- High frequency operation

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)**

| Symbol       | Parameter                               | Value                                     | Unit |
|--------------|---|---|------|
| $V_{RRM}$    | Repetitive peak reverse voltage         | 60  | V    |
| $I_{F(RMS)}$ | Forward rms current                     | 60  | A    |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$ | $T_c = 150\text{ °C}$<br>20               | A    |
| $I_{FSM}$    | Surge non repetitive forward current    | $t_p = 10\text{ ms}$<br>sinusoidal<br>275 | A    |
| $T_{stg}$    | Storage temperature range               | -65 to +175                               | °C   |
| $T_j^{(1)}$  | Maximum operating junction temperature  | 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 (max) | Unit |
|---------------|------------------|-------------|------|
| $R_{th(j-c)}$ | Junction to case | 1.6         | °C/W |

**Table 4. Static electrical characteristics (per diode)**

| Symbol      | Parameter               | Test conditions       |                     | Min. | Typ. | Max. | Unit          |
|-------------|-------------------------|-----------------------|---------------------|------|------|------|---------------|
|             |                         | $T_j$                 | $V_R$               |      |      |      |               |
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$  | $V_R = 45\text{ V}$ |      |      | 125  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 10   | 20   | $\text{mA}$   |
|             |                         | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$     |      |      | 230  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 15   | 30   | $\text{mA}$   |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 5\text{ A}$  |      | 0.36 |      | V             |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 0.30 | 0.35 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 10\text{ A}$ |      | 0.42 | 0.47 |               |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 0.39 | 0.44 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 20\text{ A}$ |      | 0.51 | 0.56 |               |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 0.51 | 0.56 |               |

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:

$$P = 0.32 \times I_{F(AV)} + 0.012 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

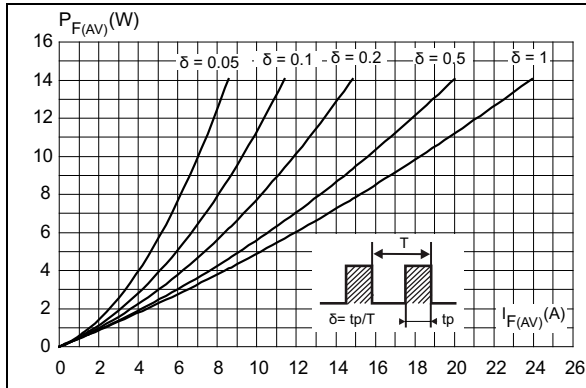


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )

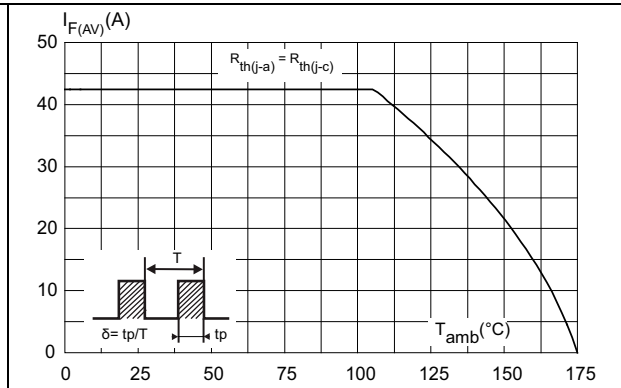


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

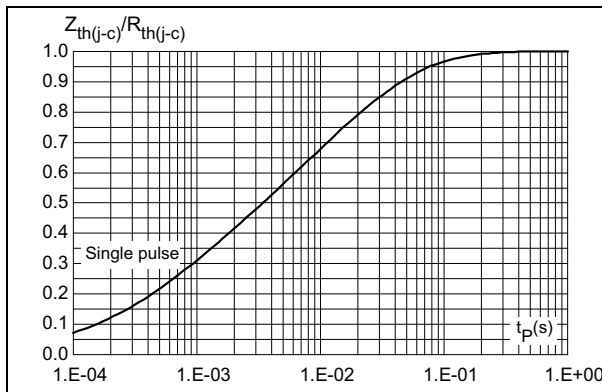


Figure 4. Reverse leakage current versus reverse voltage applied (typical values)

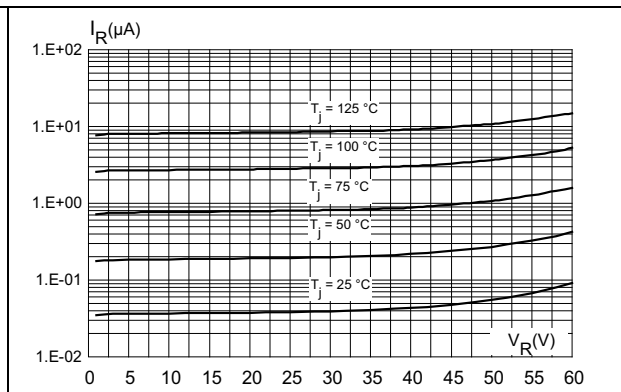


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

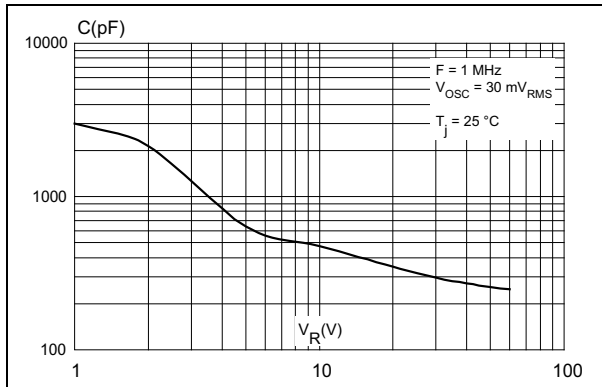
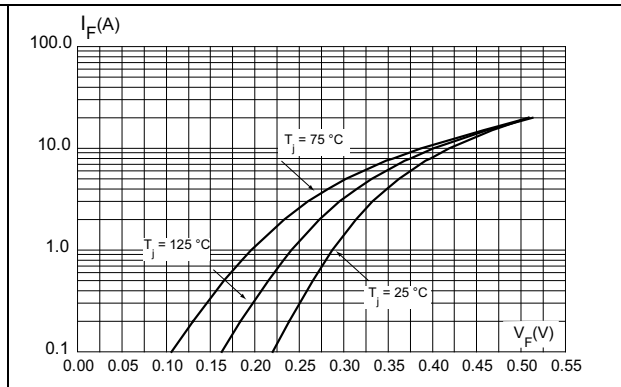


Figure 6. Forward voltage drop versus forward current (typical values)



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 to 1.0 N·m

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Figure 7. TO-220AB dimension definitions

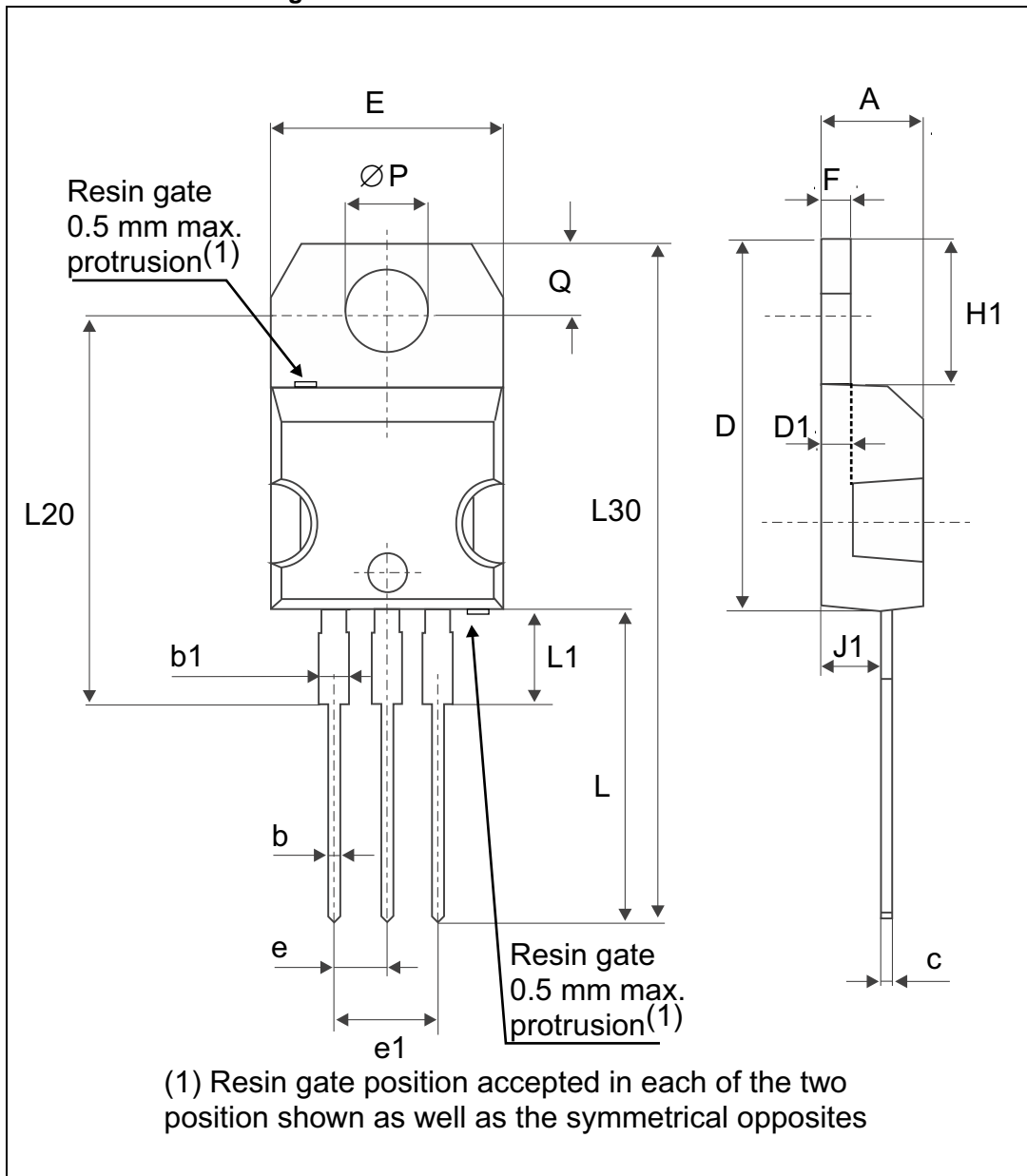


Table 5. TO-220AB dimension values

| Ref. | Dimensions  |       |           |       |
|------|-------------|-------|-----------|-------|
|      | Millimeters |       | Inches    |       |
|      | Min.        | Max.  | Min.      | Max.  |
| A    | 4.40        | 4.60  | 0.17      | 0.18  |
| b    | 0.61        | 0.88  | 0.024     | 0.035 |
| b1   | 1.14        | 1.70  | 0.045     | 0.067 |
| c    | 0.48        | 0.70  | 0.019     | 0.027 |
| D    | 15.25       | 15.75 | 0.60      | 0.62  |
| D1   | 1.27 typ.   |       | 0.05 typ. |       |
| E    | 10          | 10.40 | 0.39      | 0.41  |
| e    | 2.40        | 2.70  | 0.094     | 0.106 |
| e1   | 4.95        | 5.15  | 0.19      | 0.20  |
| F    | 1.23        | 1.32  | 0.048     | 0.052 |
| H1   | 6.20        | 6.60  | 0.24      | 0.26  |
| J1   | 2.40        | 2.72  | 0.094     | 0.107 |
| L    | 13          | 14    | 0.51      | 0.55  |
| L1   | 3.50        | 3.93  | 0.137     | 0.154 |
| L20  | 16.40 typ.  |       | 0.64 typ. |       |
| L30  | 28.90 typ.  |       | 1.13 typ. |       |
| ØP   | 3.75        | 3.85  | 0.147     | 0.151 |
| Q    | 2.65        | 2.95  | 0.104     | 0.116 |

### 3 Ordering information

**Table 6. Ordering information**

| Order code  | Marking     | Package  | Weight | Base qty | Delivery mode |
|-------------|-------------|----------|--------|----------|---------------|
| FERD20M60ST | FERD20M60ST | TO-220AB | 1.9 g  | 50       | Tube          |

### 4 Revision history

**Table 7. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 20-Nov-2014 | 1        | Initial release. |

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