

## 1. Product profile

### 1.1 General description

Ultrafast, dual common cathode, epitaxial rectifier diode in a SOT78 (TO-220AB) plastic package.

### 1.2 Features

- Fast switching
- Soft recovery characteristic
- Low switching loss
- Low thermal resistance
- Low forward voltage drop
- High thermal cycling performance

### 1.3 Applications

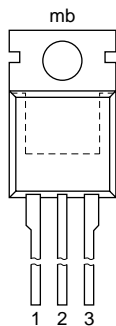
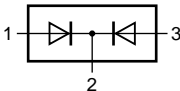
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

### 1.4 Quick reference data

- $V_{RRM} \leq 600 \text{ V}$
- $V_F \leq 1.16 \text{ V}$
- $I_{O(AV)} \leq 20 \text{ A}$
- $t_{rr} \leq 60 \text{ ns}$

## 2. Pinning information

Table 1. Pinning

| Pin | Description            | Simplified outline   | Symbol   |
|-----|------------------------|--|--|
| 1   | anode 1                |  | <br><i>sym084</i> |
| 2   | cathode                |  |  |
| 3   | anode 2                |  |  |
| mb  | mounting base; cathode |  |  |
|     |                        | SOT78 (3-lead TO-220AB)  |  |

### 3. Ordering information

**Table 2. Ordering information**

| Type number | Package  |   |         |
|-------------|----------|---|---------|
|             | Name     | Description   | Version |
| BYV34-600   | TO-220AB | plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead<br>TO-220AB | SOT78   |

### 4. Limiting values

**Table 3. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol      | Parameter                           | Conditions   | Min | Max  | Unit |
|-------------|-------------------------------------|--|-----|------|------|
| $V_{RRM}$   | repetitive peak reverse voltage     |  | -   | 600  | V    |
| $V_{RWM}$   | crest working reverse voltage       |  | -   | 600  | V    |
| $V_R$       | reverse voltage                     | square waveform; $\delta = 1.0$ ;<br>$T_{mb} \leq 138\text{ °C}$   | -   | 600  | V    |
| $I_{O(AV)}$ | average output current              | square waveform; $\delta = 0.5$ ;<br>$T_{mb} \leq 107\text{ °C}$ ; both diodes conducting                  | -   | 20   | A    |
| $I_{FRM}$   | repetitive peak forward current     | $t = 25\text{ }\mu\text{s}$ ; square waveform; $\delta = 0.5$ ;<br>$T_{mb} \leq 107\text{ °C}$ ; per diode | -   | 20   | A    |
| $I_{FSM}$   | non-repetitive peak forward current | $t = 10\text{ ms}$ ; sinusoidal waveform; per diode  | -   | 120  | A    |
|             |                                     | $t = 8.3\text{ ms}$ ; sinusoidal waveform; per diode   | -   | 132  | A    |
| $T_{stg}$   | storage temperature                 |  | -40 | +150 | °C   |
| $T_j$       | junction temperature                |  | -   | 150  | °C   |

### 5. Thermal characteristics

**Table 4. Thermal characteristics**

| Symbol         | Parameter   | Conditions   | Min | Typ | Max | Unit |
|----------------|---|--|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | with heatsink compound;<br>per diode; see <a href="#">Figure 1</a> | -   | -   | 2.4 | K/W  |
|                |   | with heatsink compound;<br>both diodes conducting                  | -   | -   | 1.6 | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient       | in free air  | -   | 60  | -   | K/W  |

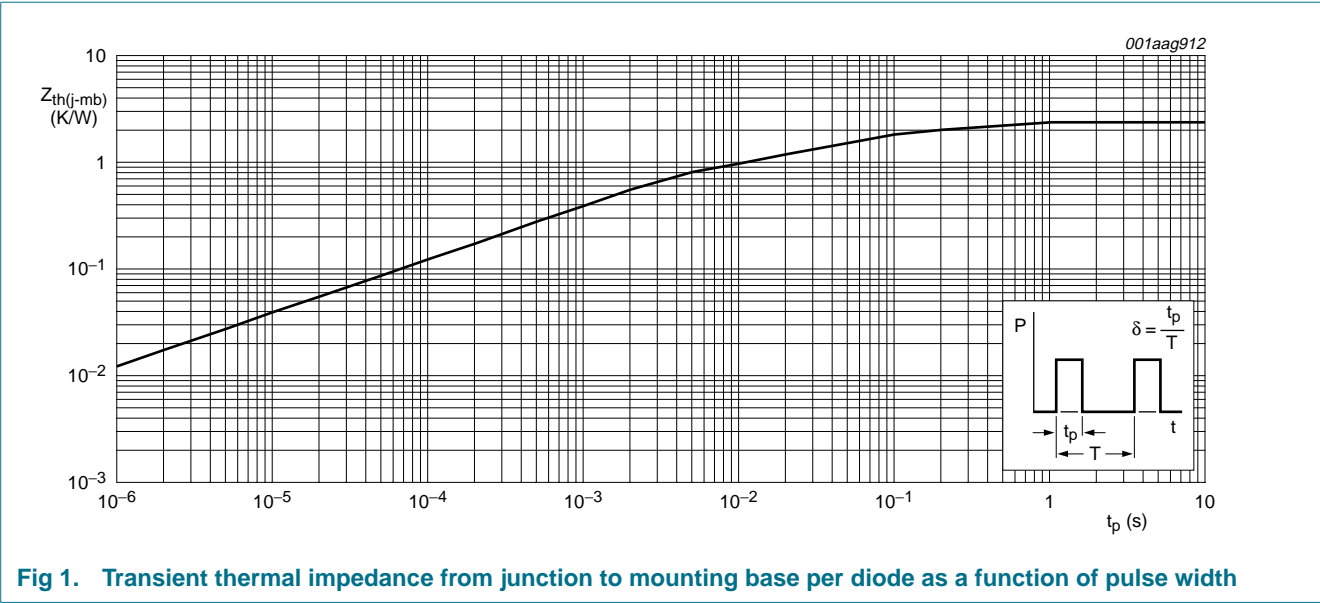
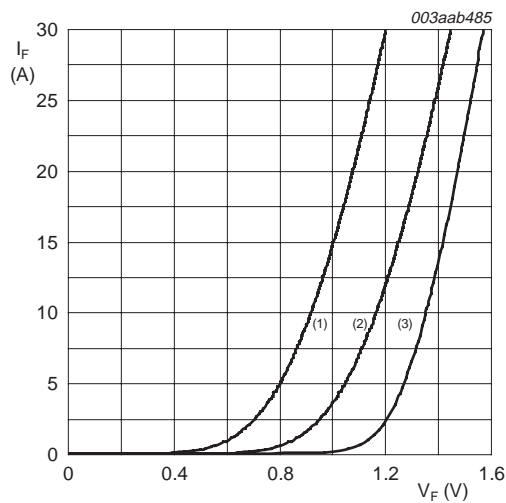


Fig 1. Transient thermal impedance from junction to mounting base per diode as a function of pulse width

6. Characteristics

Table 5. Characteristics  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

| Symbol                  | Parameter                     | Conditions   | Min | Typ  | Max  | Unit |
|-------------------------|-------------------------------|--|-----|------|------|------|
| Static characteristics  |                               |  |     |      |      |      |
| V <sub>F</sub>          | forward voltage               | I <sub>F</sub> = 10 A; T <sub>j</sub> = 150 °C; see <a href="#">Figure 2</a>   | -   | 0.92 | 1.16 | V    |
|                         |                               | I <sub>F</sub> = 20 A; see <a href="#">Figure 2</a>  | -   | 1.07 | 1.48 | V    |
| I <sub>R</sub>          | reverse current               | V <sub>R</sub> = 600 V   | -   | 10   | 50   | μA   |
|                         |                               | V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C  | -   | 0.2  | 0.6  | mA   |
| Dynamic characteristics |                               |  |     |      |      |      |
| Q <sub>r</sub>          | recovered charge              | I <sub>F</sub> = 2 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 20 A/μs; see <a href="#">Figure 3</a>                           | -   | 40   | 70   | nC   |
| t <sub>rr</sub>         | reverse recovery time         | I <sub>F</sub> = 1 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 100 A/μs; see <a href="#">Figure 3</a>                          | -   | 50   | 60   | ns   |
| I <sub>RM</sub>         | peak reverse recovery current | I <sub>F</sub> = 10 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 100 °C; see <a href="#">Figure 3</a> | -   | 3    | 5    | A    |
| V <sub>FR</sub>         | forward recovery voltage      | I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 10 A/μs; see <a href="#">Figure 4</a>   | -   | 3.2  | -    | V    |



- (1)  $T_j = 150\text{ }^{\circ}\text{C}$ ; typical values
- (2)  $T_j = 150\text{ }^{\circ}\text{C}$ ; maximum values
- (3)  $T_j = 25\text{ }^{\circ}\text{C}$ ; maximum values

Fig 2. Forward current as a function of forward voltage

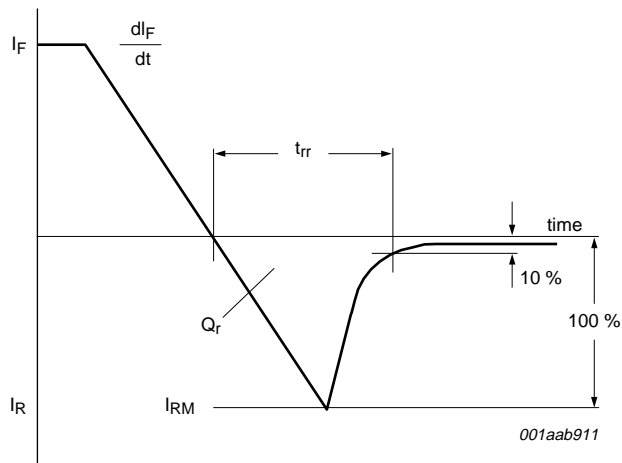


Fig 3. Reverse recovery definitions

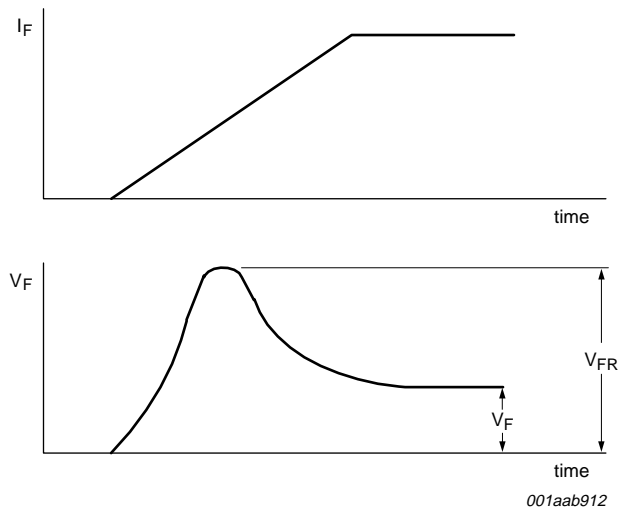
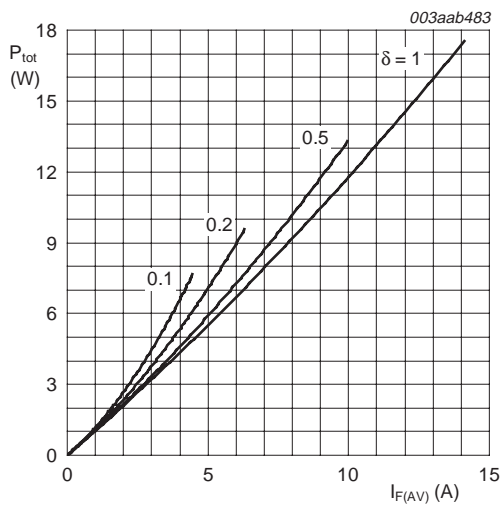
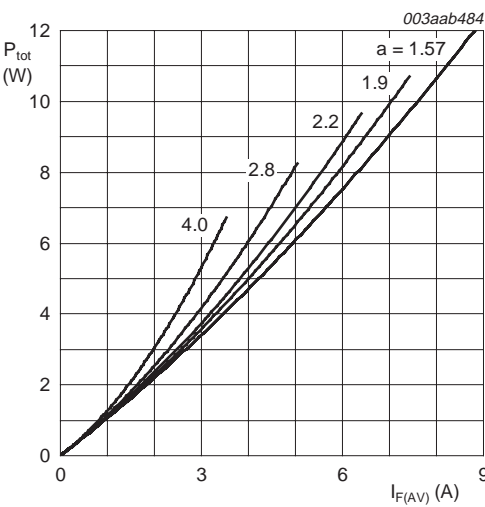


Fig 4. Forward recovery definitions



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$

Fig 5. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode



$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$

Fig 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values; per diode

7. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78

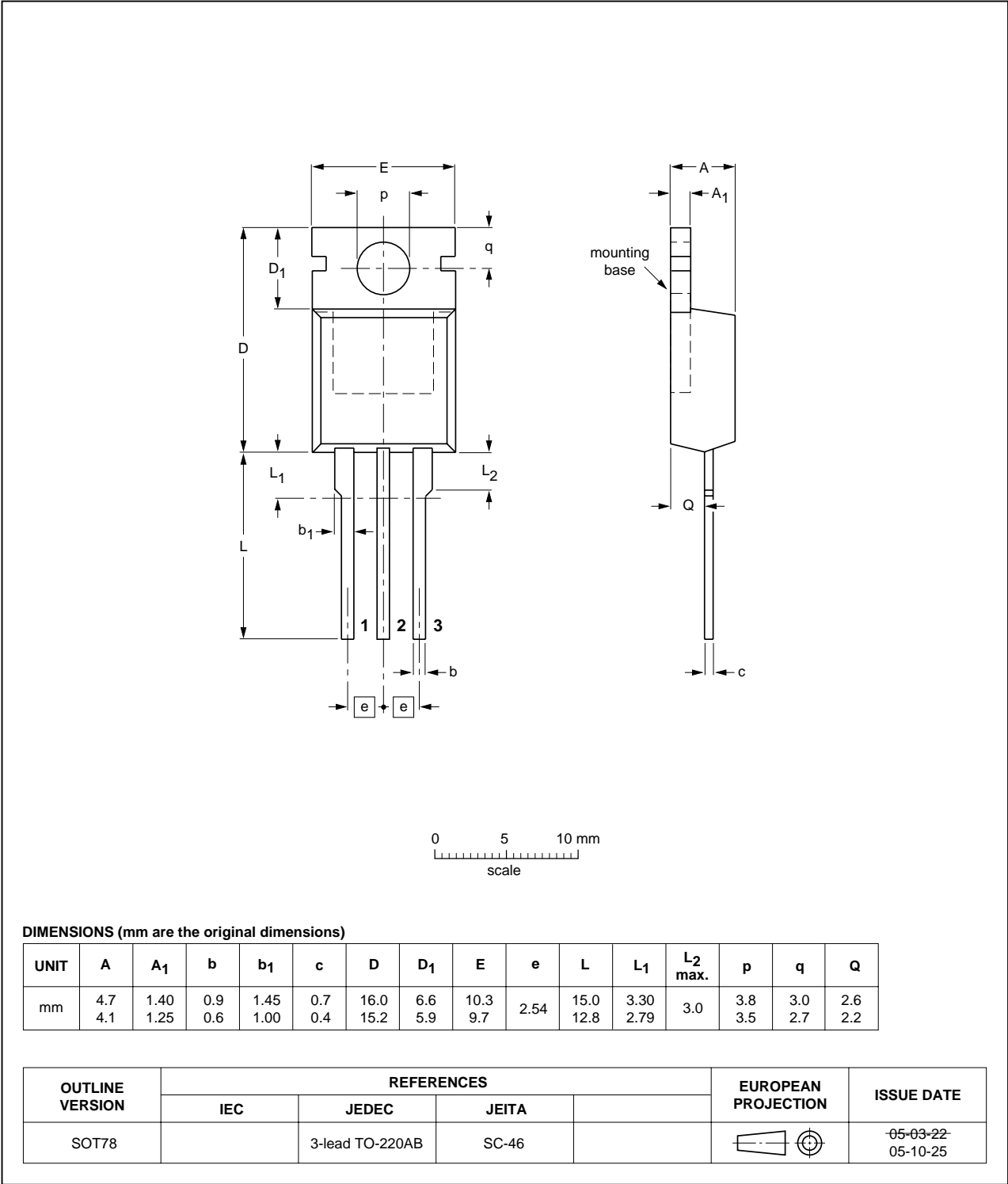


Fig 7. Package outline SOT78 (3-lead TO-220AB)

## 8. Revision history

Table 6. Revision history

| Document ID   | Release date                            | Data sheet status  | Change notice | Supersedes  |
|---------------|---|--------------------|---------------|-------------|
| BYV34-600 V.2 | 20180928                                | Product data sheet | -             | BYV34-600_1 |
| Modification: | Change from NXP version to WeEn Version |                    |               |             |
| BYV34-600_1   | 20071004                                | Product data sheet | -             | -           |

## 9. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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