

## 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

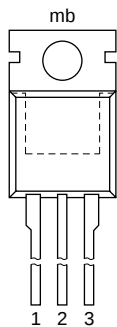
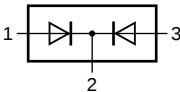
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

### 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>sym084 |
| 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

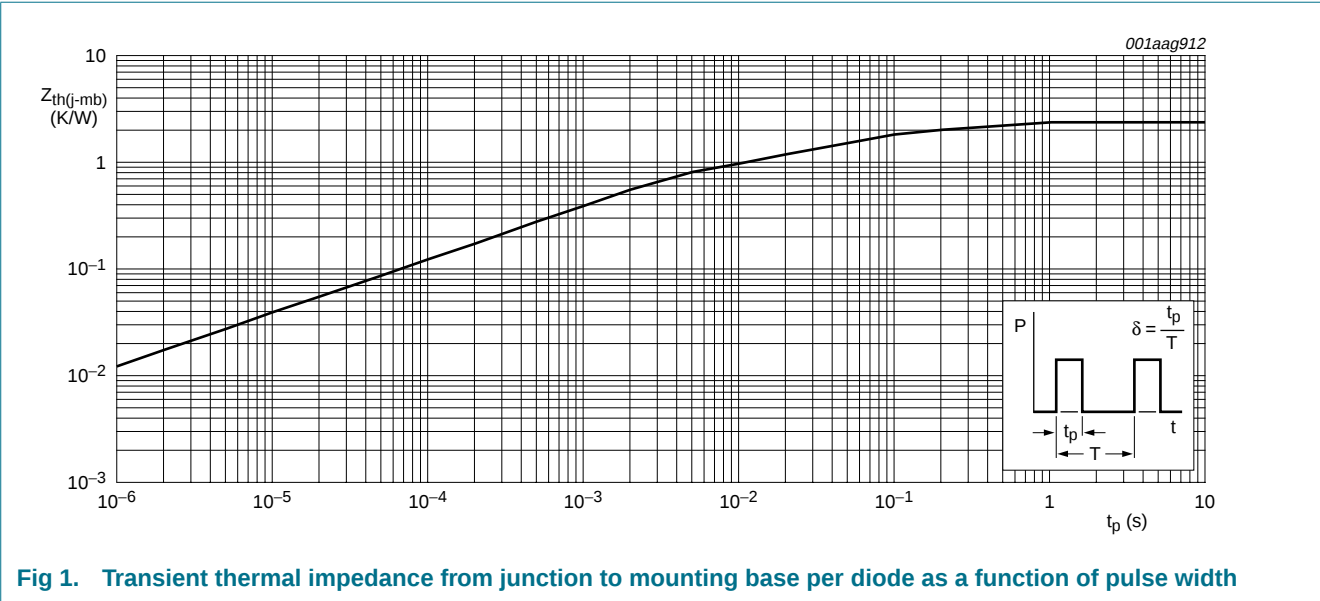
In accordance with the Absolute Maximum Rating System (IEC 60134).

| 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>$T_{mb} \leq 138\text{ }^{\circ}\text{C}$                                           | -   | 600  | V                  |
| $I_{O(AV)}$ | average output current              | square waveform; $\delta = 0.5$ ;<br>$T_{mb} \leq 107\text{ }^{\circ}\text{C}$ ; both diodes conducting                  | -   | 20   | A                  |
| $I_{FRM}$   | repetitive peak forward current     | $t = 25\text{ }\mu\text{s}$ ; square waveform; $\delta = 0.5$ ;<br>$T_{mb} \leq 107\text{ }^{\circ}\text{C}$ ; 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 | $^{\circ}\text{C}$ |
| $T_j$       | junction temperature                |                                                                                                                          | -   | 150  | $^{\circ}\text{C}$ |

### 5. Thermal characteristics

**Table 4.** Thermal characteristics

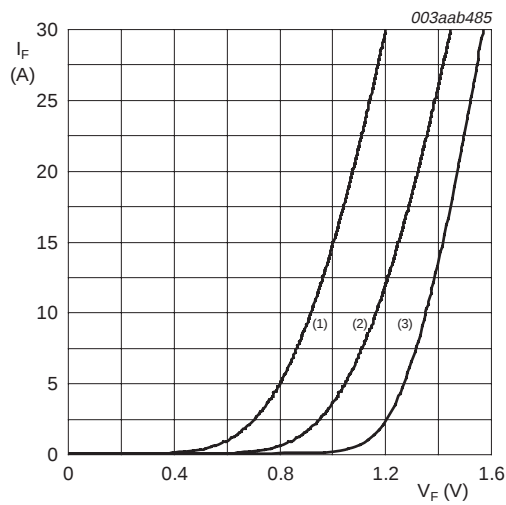
| Symbol         | Parameter                                         | Conditions                                                         | Min | Typ | Max | Unit |
|----------------|---------------------------------------------------|--------------------------------------------------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | 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  |



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

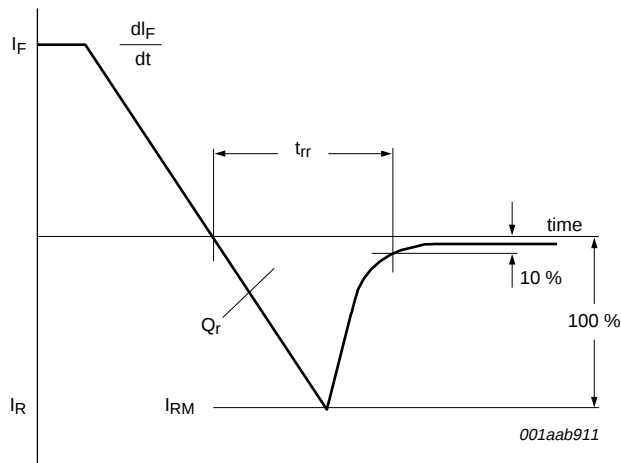


Fig 3. Reverse recovery definitions

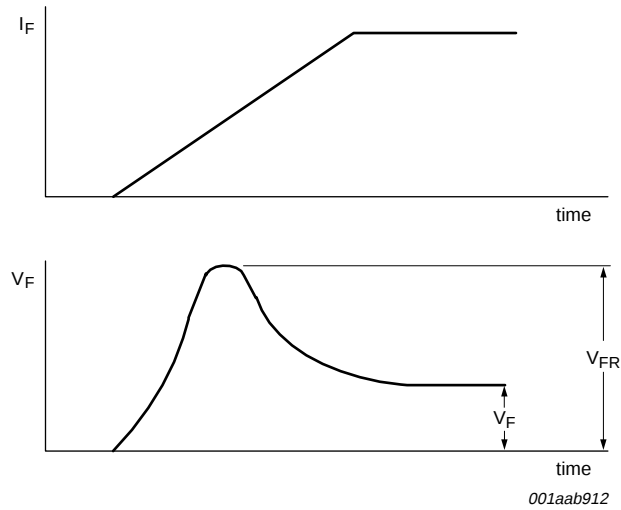
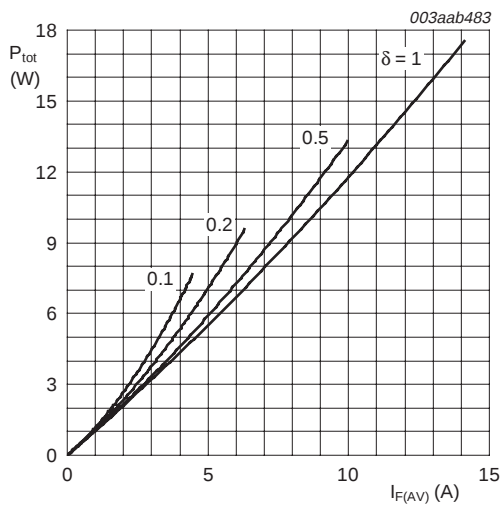
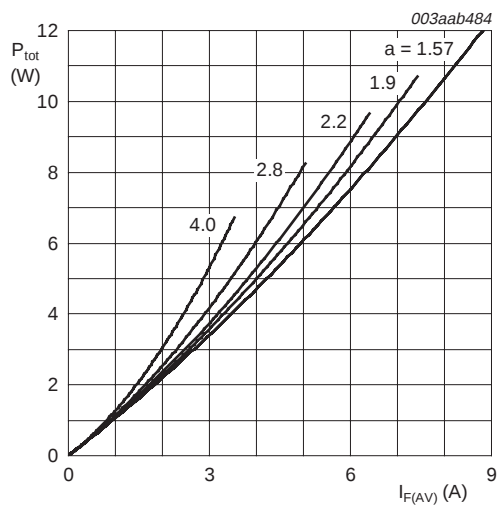


Fig 4. Forward recovery definitions



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

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

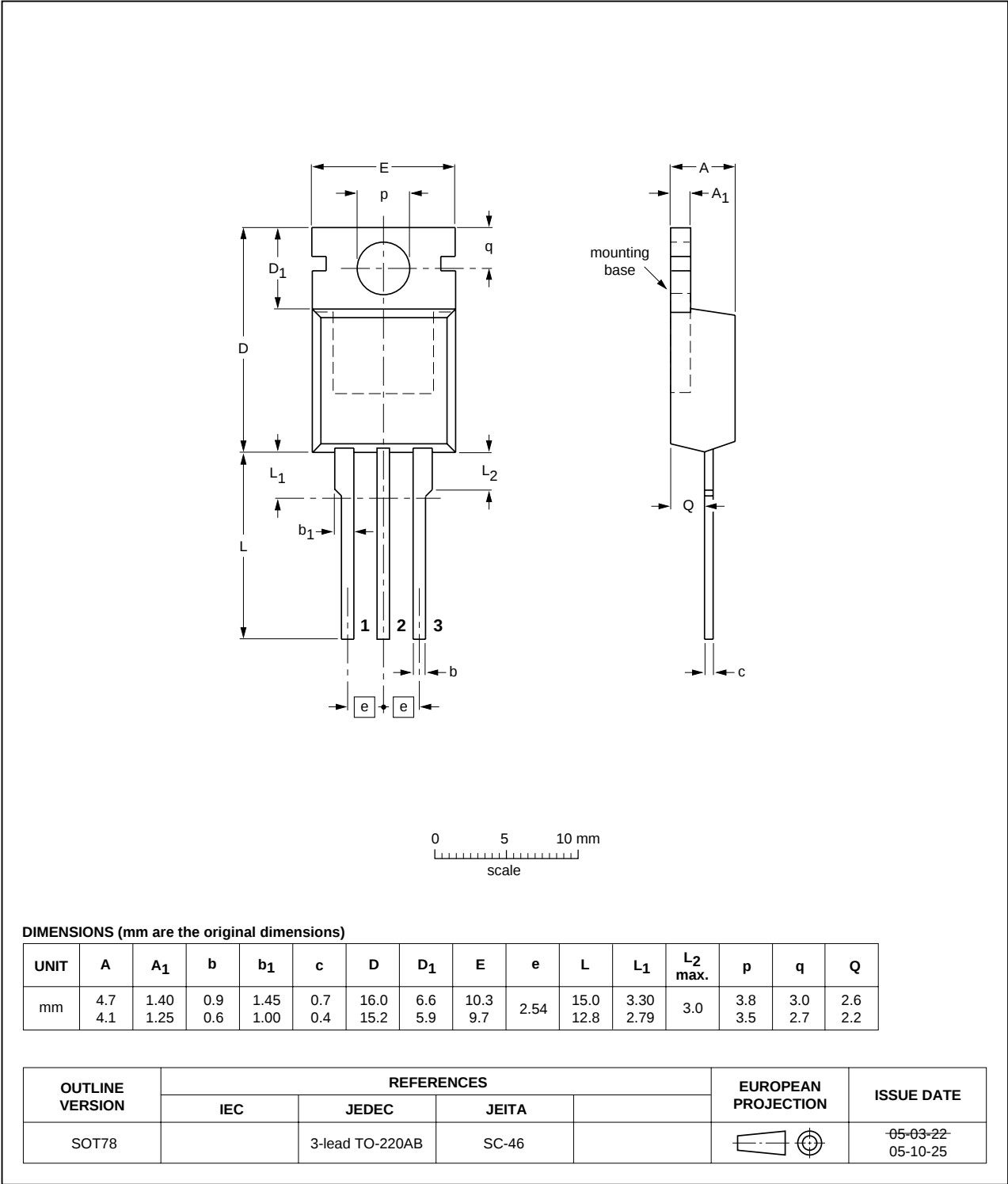


Fig 7. Package outline SOT78 (3-lead TO-220AB)

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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.ween-semi.com>.

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