

BYV34-600

Dual rectifier diode ultrafast

Rev. 01 — 4 October 2007

Product data sheet

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

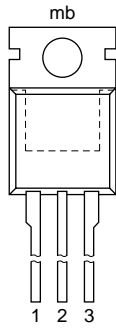
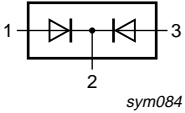
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

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 |  |  |
| 2 | cathode | | |
| 3 | anode 2 | | |
| mb | mounting base; cathode | | |

SOT78 (3-lead TO-220AB)

3. Ordering information

Table 2. Ordering information

| Type number | Package | | Version |
|-------------|----------|---|---------|
| | Name | Description | |
| BYV34-600 | TO-220AB | plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead 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; $\delta = 1.0$; $T_{mb} \leq 138\text{ °C}$ | - | 600 | V |
| $I_{O(AV)}$ | average output current | square waveform; $\delta = 0.5$; $T_{mb} \leq 107\text{ °C}$; both diodes conducting | - | 20 | A |
| I_{FRM} | repetitive peak forward current | $t = 25\text{ }\mu\text{s}$; square waveform; $\delta = 0.5$; $T_{mb} \leq 107\text{ °C}$; 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; per diode; see Figure 1 | - | - | 2.4 | K/W |
| | | with heatsink compound; both diodes conducting | - | - | 1.6 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | 60 | - | K/W |

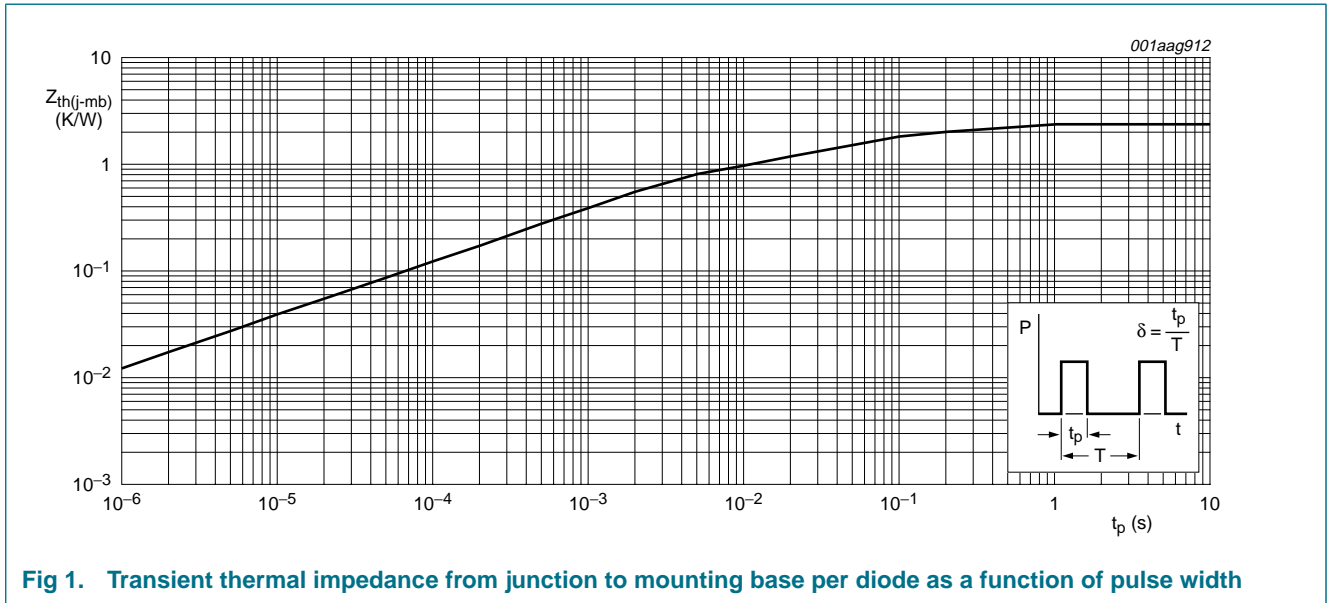


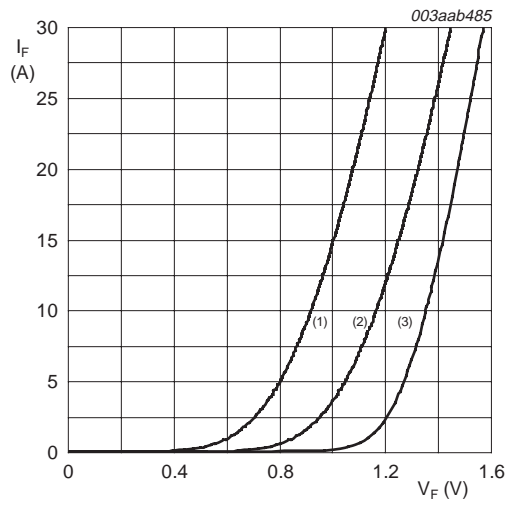
Fig 1. Transient thermal impedance from junction to mounting base per diode as a function of pulse width

6. Characteristics

Table 5. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 10\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; see Figure 2 | - | 0.92 | 1.16 | V |
| | | $I_F = 20\text{ A}$; see Figure 2 | - | 1.07 | 1.48 | V |
| I_R | reverse current | $V_R = 600\text{ V}$ | - | 10 | 50 | μA |
| | | $V_R = 600\text{ V}$; $T_j = 100\text{ }^\circ\text{C}$ | - | 0.2 | 0.6 | mA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 2\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 20\text{ A}/\mu\text{s}$; see Figure 3 | - | 40 | 70 | nC |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; see Figure 3 | - | 50 | 60 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 10\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 100\text{ }^\circ\text{C}$; see Figure 3 | - | 3 | 5 | A |
| V_{FR} | forward recovery voltage | $I_F = 10\text{ A}$; $di_F/dt = 10\text{ A}/\mu\text{s}$; see Figure 4 | - | 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

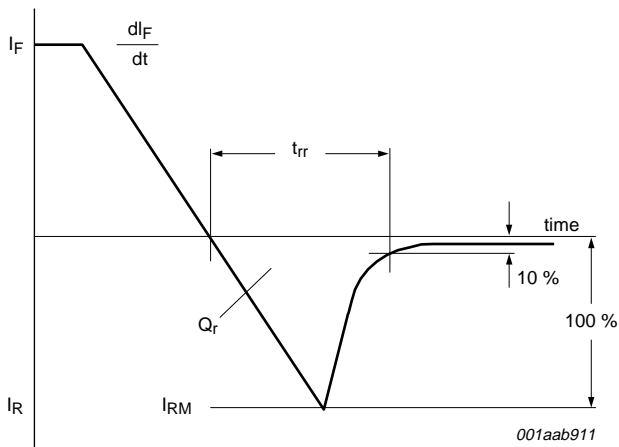


Fig 3. Reverse recovery definitions

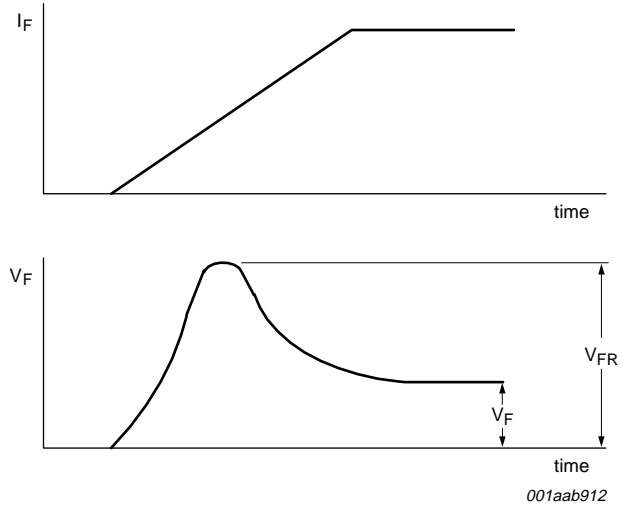
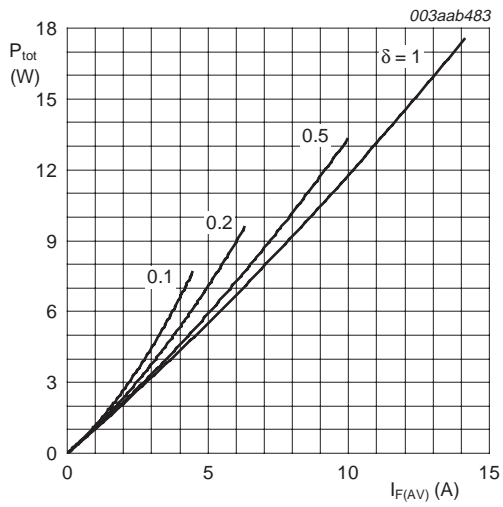
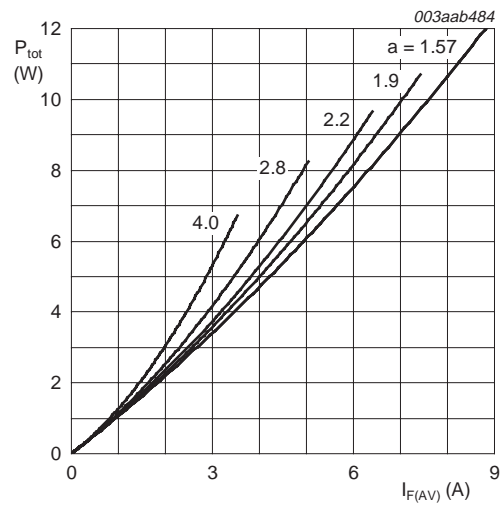


Fig 4. Forward recovery definitions



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

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



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

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

7. Package outline

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

SOT78

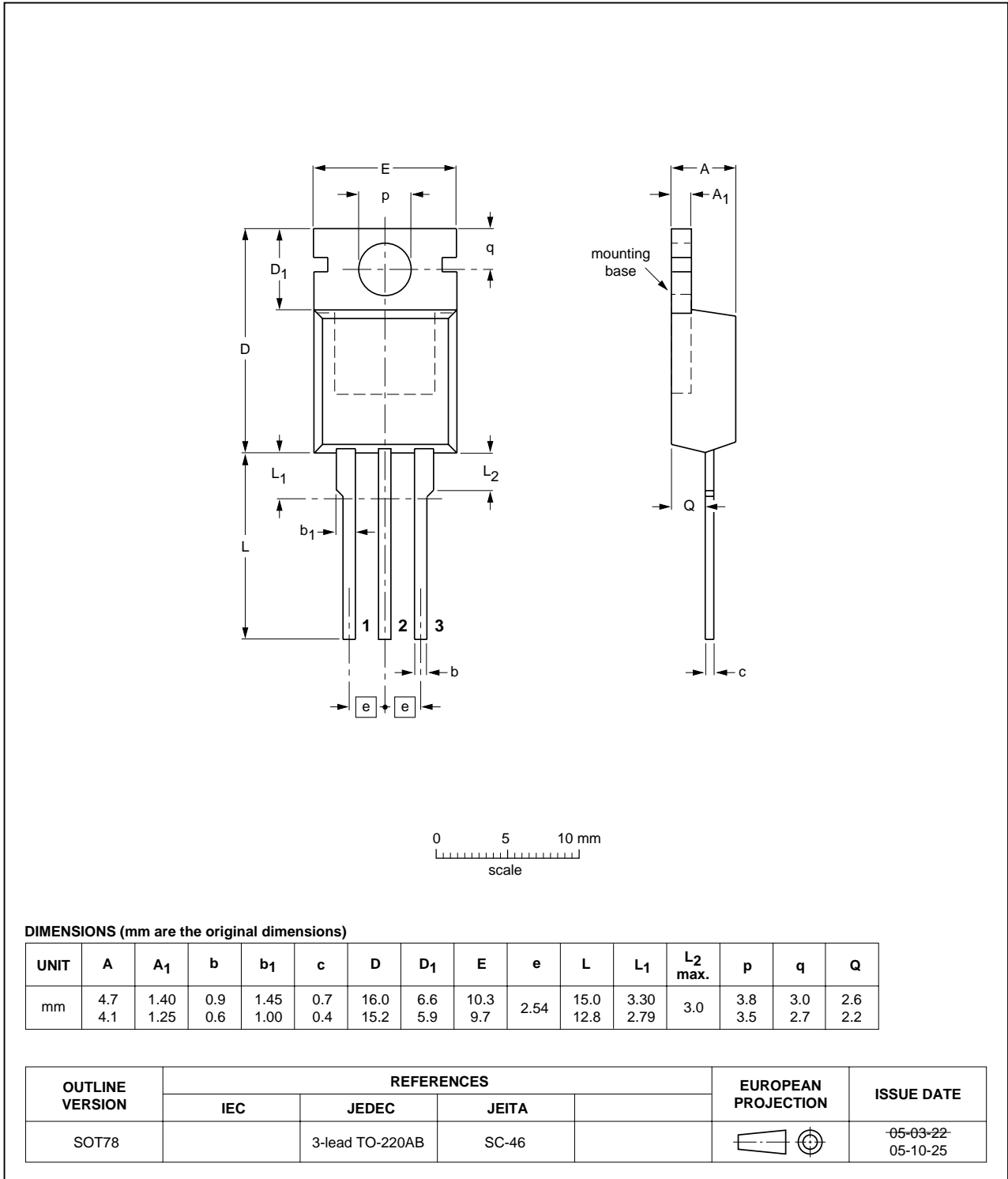


Fig 7. Package outline SOT78 (3-lead TO-220AB)

8. Revision history

Table 6. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-------------|--------------|--------------------|---------------|------------|
| BYV34-600_1 | 20071004 | Product data sheet | - | - |

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9.1 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. |
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| 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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