

DATA SHEET

BYW29EB, BYW29ED series
Rectifier diodes
ultrafast, rugged

Product specification

November 1998



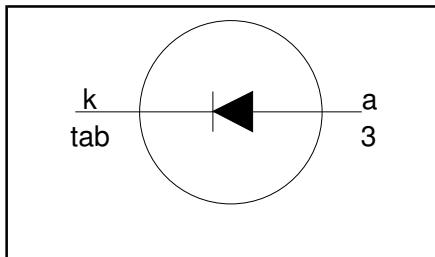
Rectifier diodes ultrafast, rugged

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FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

| |
|---------------------------------------|
| $V_R = 150 \text{ V} / 200 \text{ V}$ |
| $V_F \leq 0.895 \text{ V}$ |
| $I_{F(AV)} = 8 \text{ A}$ |
| $I_{RRM} = 0.2 \text{ A}$ |
| $t_{rr} \leq 25 \text{ ns}$ |

GENERAL DESCRIPTION

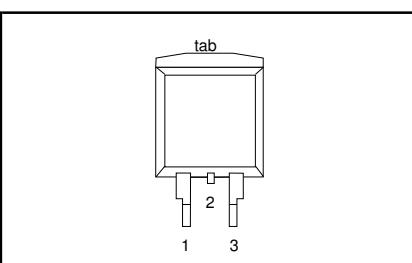
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYW29EB series is supplied in the SOT404 surface mounting package.
The BYW29ED series is supplied in the SOT428 surface mounting package.

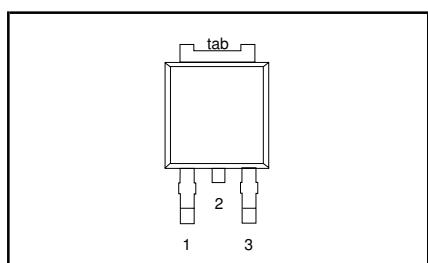
PINNING

| PIN | DESCRIPTION |
|-----|----------------------|
| 1 | no connection |
| 2 | cathode ¹ |
| 3 | anode |
| tab | cathode |

SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|---|--|--------|-------------|------------------|
| V_{RRM} | Peak repetitive reverse voltage | BYW29EB/ BYW29ED | - | -150 150 | -200 200 |
| V_{RWM} | Working peak reverse voltage | | - | 150 | 200 |
| V_R | Continuous reverse voltage | | - | 150 | 200 |
| $I_{F(AV)}$ | Average rectified forward current | square wave; $\delta = 0.5$; $T_{mb} \leq 128 \text{ }^\circ\text{C}$ | - | 8 | A |
| I_{FRM} | Repetitive peak forward current | square wave; $\delta = 0.5$; $T_{mb} \leq 128 \text{ }^\circ\text{C}$ | - | 16 | A |
| I_{FSM} | Non-repetitive peak forward current | $t = 10 \text{ ms}$ $t = 8.3 \text{ ms}$ sinusoidal; with reapplied $V_{RRM(max)}$ | - - | 80 88 | A |
| I_{RRM} | Peak repetitive reverse surge current | $t_p = 2 \mu\text{s}$; $\delta = 0.001$ | - | 0.2 | A |
| I_{RSM} | Peak non-repetitive reverse surge current | $t_p = 100 \mu\text{s}$ | - | 0.2 | A |
| T_j | Operating junction temperature | | - | 150 | $^\circ\text{C}$ |
| T_{sta} | Storage temperature | | -40 | 150 | $^\circ\text{C}$ |

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

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ESD LIMITING VALUE

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|--------|---|---|------|------|------|
| V_c | Electrostatic discharge capacitor voltage | Human body model; $C = 250 \text{ pF}$; $R = 1.5 \text{ k}\Omega$ | - | 8 | kV |

THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|--|---|------|------|------|------|
| $R_{th j-mb}$ | Thermal resistance junction to mounting base | | - | - | 2.7 | K/W |
| $R_{th j-a}$ | Thermal resistance junction to ambient | SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board | - | 50 | - | K/W |

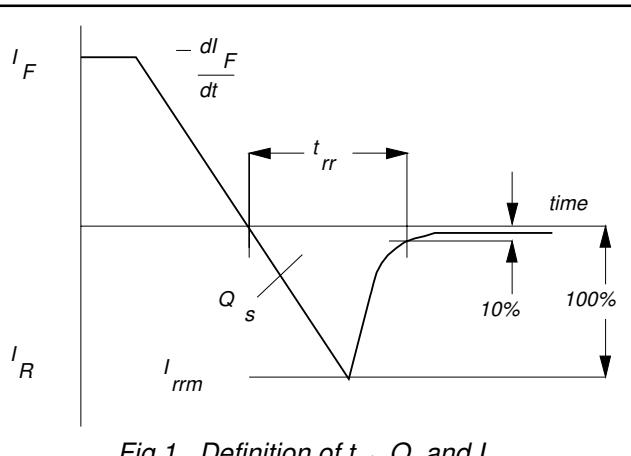
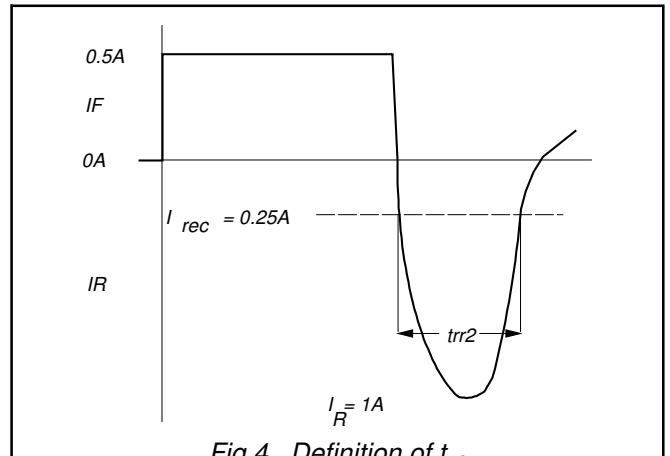
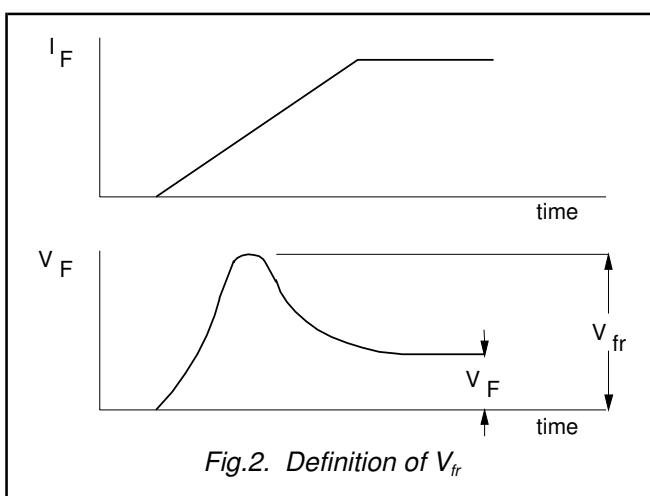
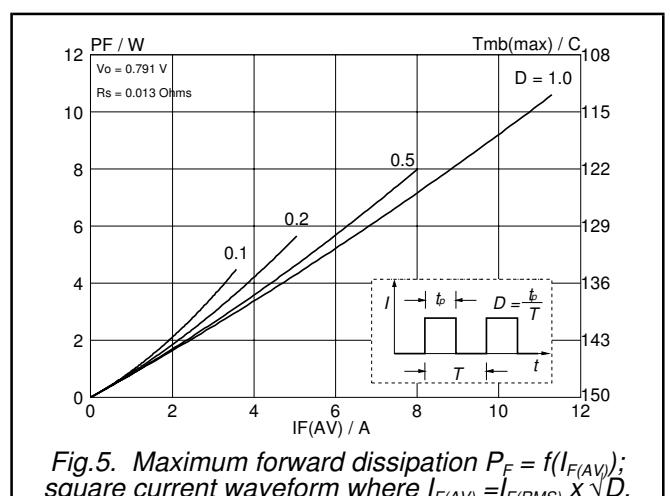
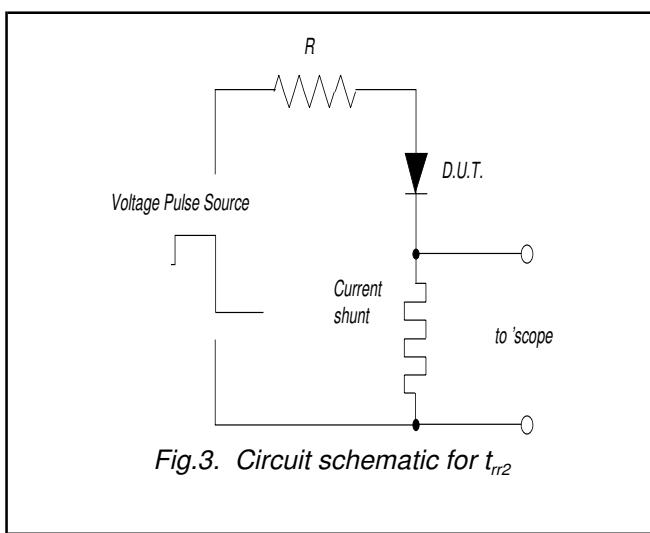
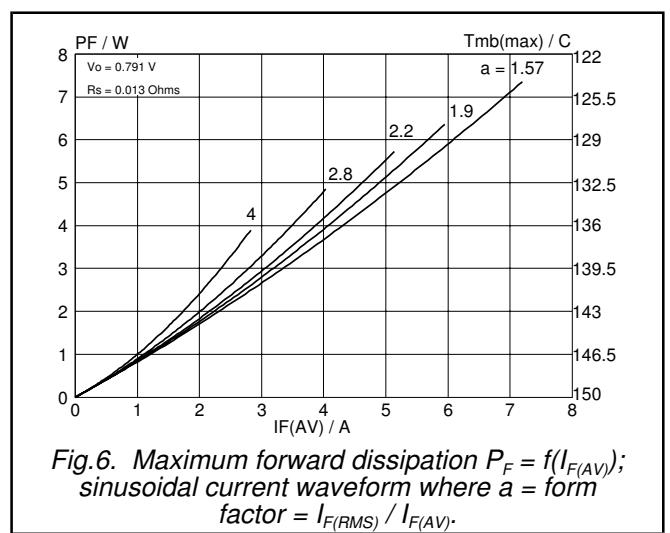
ELECTRICAL CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------|--------------------------|---|------|------|-------|---------------|
| V_F | Forward voltage | $I_F = 8 \text{ A}; T_j = 150^\circ\text{C}$ $I_F = 8 \text{ A}$ $I_F = 20 \text{ A}$ | - | 0.8 | 0.895 | V |
| I_R | Reverse current | $V_R = V_{RWM}$ $V_R = V_{RWM}; T_j = 100^\circ\text{C}$ | - | 0.92 | 1.05 | V |
| Q_{rr} | Reverse recovered charge | $I_F = 2 \text{ A}; V_R \geq 30 \text{ V}; -dI_F/dt = 20 \text{ A}/\mu\text{s}$ | - | 1.1 | 1.3 | V |
| t_{rr1} | Reverse recovery time | $I_F = 1 \text{ A}; V_R \geq 30 \text{ V}; -dI_F/dt = 100 \text{ A}/\mu\text{s}$ | - | 2 | 10 | μA |
| t_{rr2} | Reverse recovery time | $I_F = 0.5 \text{ A} \text{ to } I_R = 1 \text{ A}; I_{rec} = 0.25 \text{ A}$ | - | 0.2 | 0.6 | mA |
| V_{fr} | Forward recovery voltage | $I_F = 1 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}$ | - | 4 | 11 | nC |
| | | | - | 20 | 25 | ns |
| | | | - | 15 | 20 | ns |
| | | | - | 1 | - | V |

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Fig.1. Definition of t_{rr1} , Q_s and I_{rrm} Fig.4. Definition of t_{rr2} Fig.2. Definition of V_{fr} Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.Fig.3. Circuit schematic for t_{rr2} Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where $a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$.

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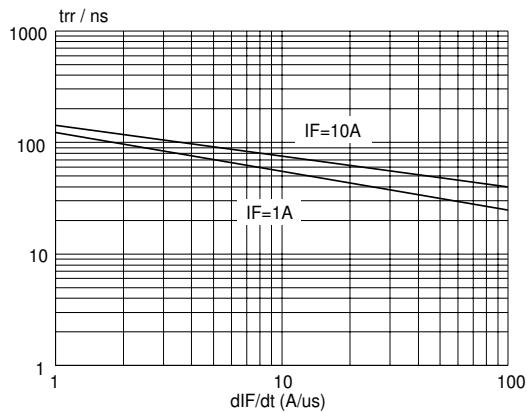


Fig.7. Maximum t_{rr} at $T_j = 25^\circ C$.

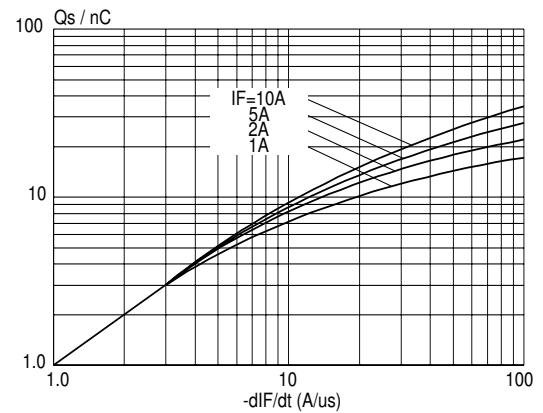


Fig.10. Maximum Q_s at $T_j = 25^\circ C$.

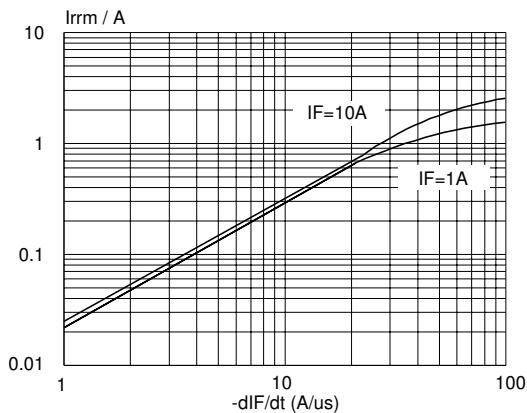


Fig.8. Maximum I_{rrm} at $T_j = 25^\circ C$.

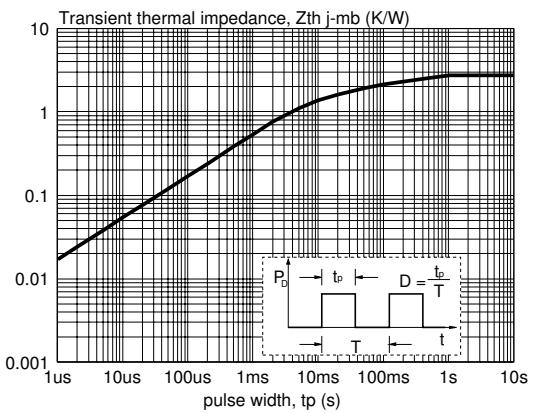


Fig.11. Transient thermal impedance; $Z_{th\ j\cdot mb} = f(t_p)$.

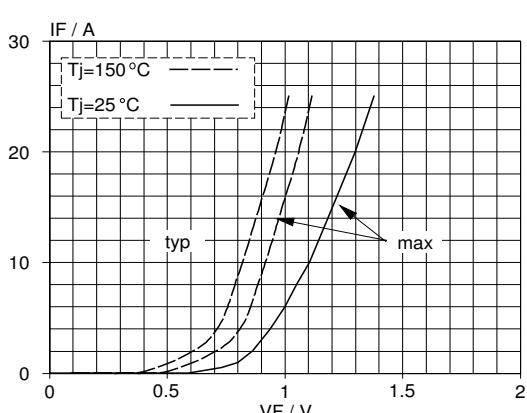


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

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MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

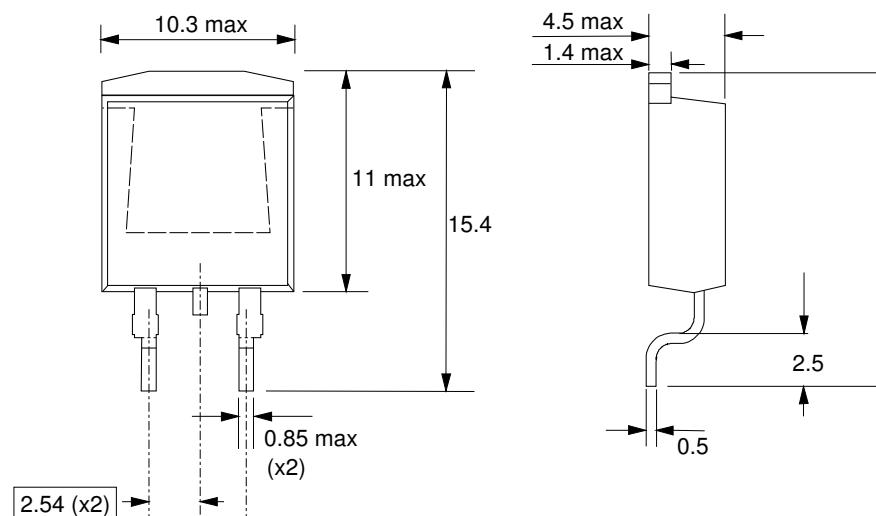


Fig.12. SOT404 : centre pin connected to mounting base.

MOUNTING INSTRUCTIONS

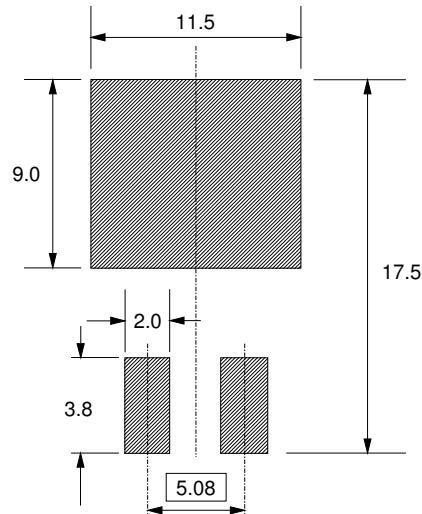
Dimensions in mm

Fig.13. SOT404 : soldering pattern for surface mounting.

Notes

1. Epoxy meets UL94 V0 at 1/8".

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MECHANICAL DATA

Dimensions in mm

Net Mass: 1.1 g

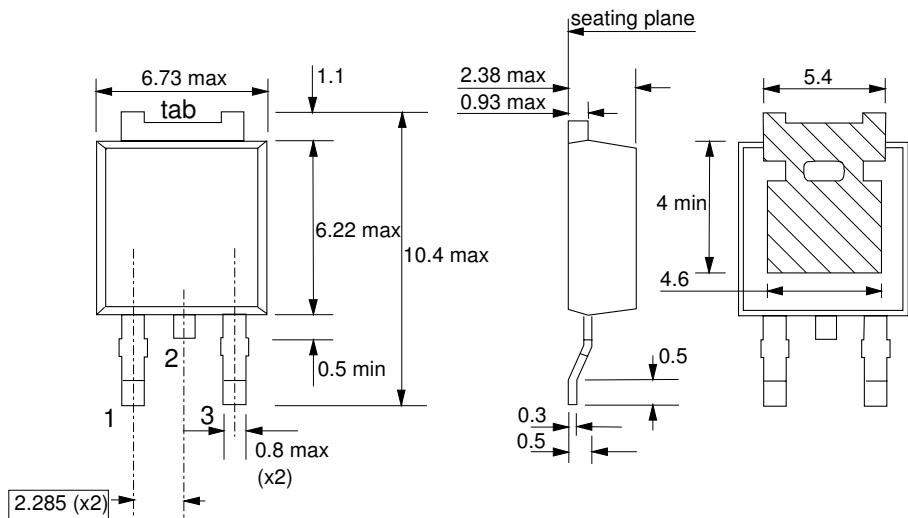


Fig.14. SOT428 : centre pin connected to tab.

MOUNTING INSTRUCTIONS

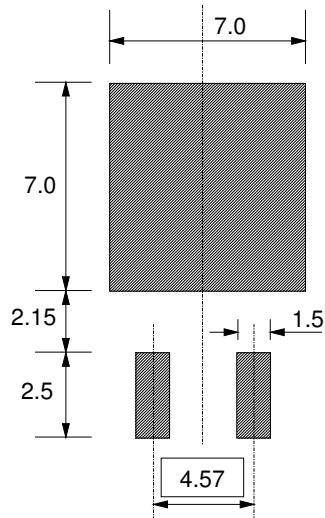
Dimensions in mm

Fig.15. SOT428 : minimum pad sizes for surface mounting.

Notes

1. Plastic meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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