# DATA SHEET

## BYW29EB, BYW29ED series
Rectifier diodes
ultrafast, rugged

Product specification

November 1998

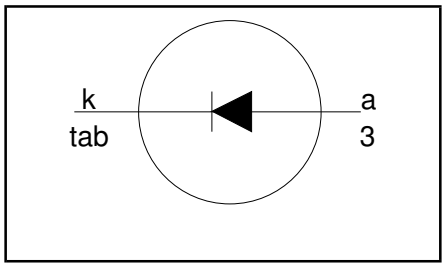
# Rectifier diodes ultrafast, rugged

# BYW29EB, BYW29ED series

## 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 V/ 200 V

$V_F \leq 0.895$ V

$I_{F(AV)}$ = 8 A

$I_{RRM}$ = 0.2 A

$t_{rr} \leq 25$ ns

## GENERAL DESCRIPTION

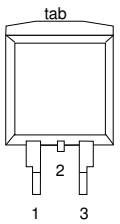
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

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

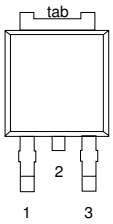
## PINNING

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

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

## ESD LIMITING VALUE

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_C$ | Electrostatic discharge capacitor voltage | Human body model; C = 250 pF; R = 1.5 kΩ | - | 8 | kV |

## THERMAL RESISTANCES

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

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise specified

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

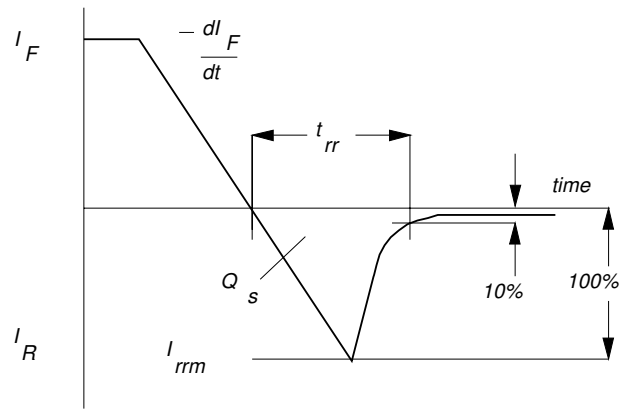



*Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$*

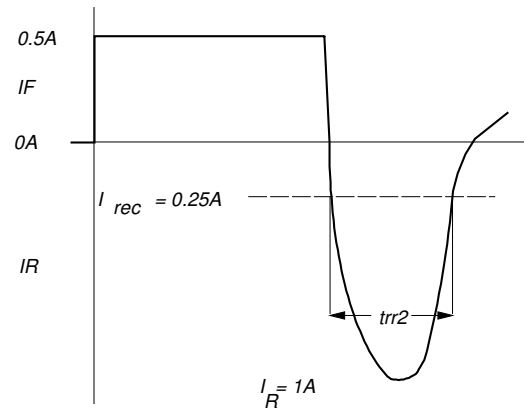



*Fig.4. Definition of $t_{rr2}$*

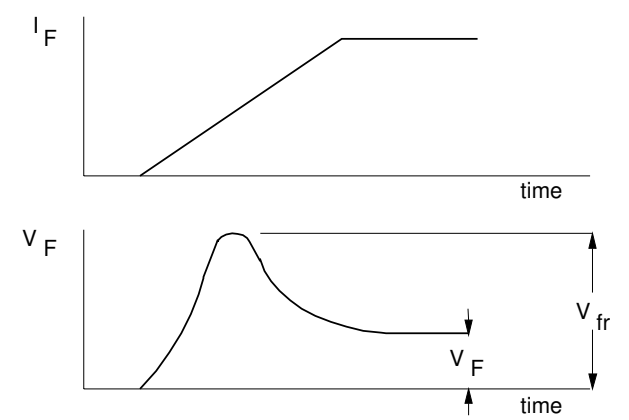



*Fig.2. Definition of $V_{fr}$*

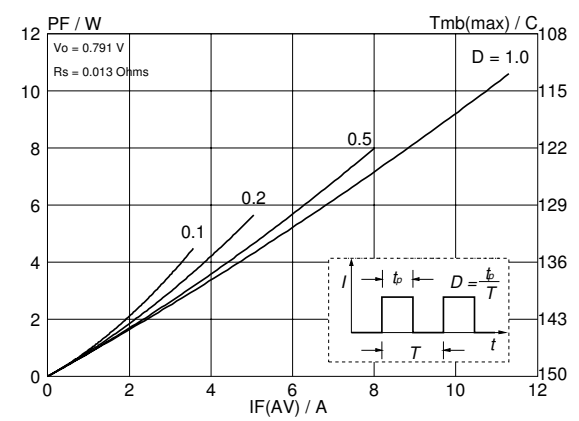



*Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

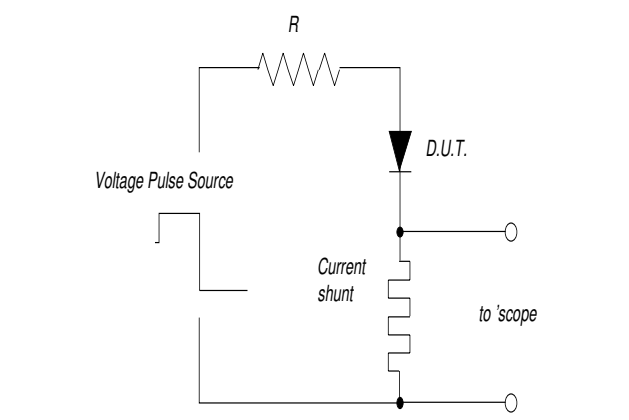



*Fig.3. Circuit schematic for $t_{rr2}$*

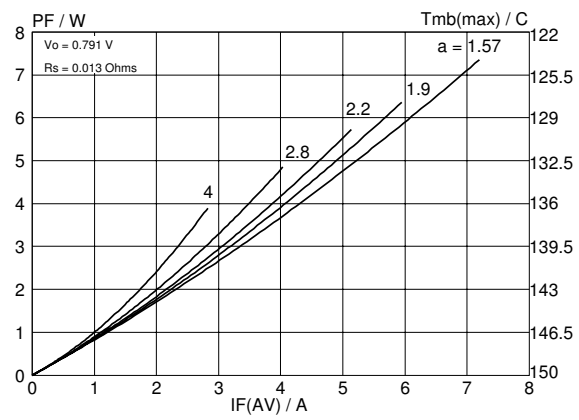



*Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

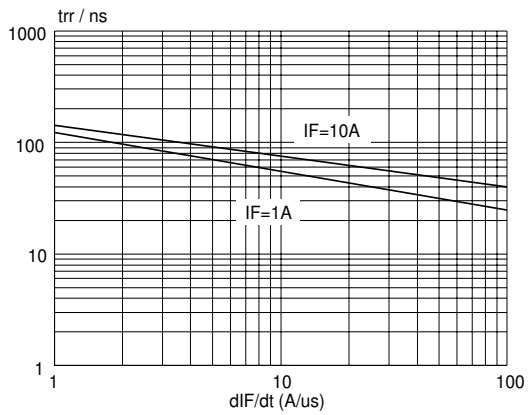



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.*

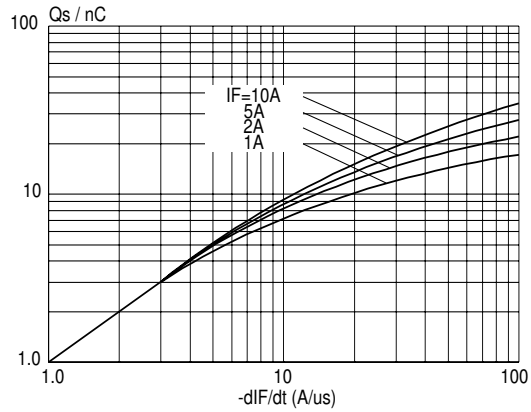



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

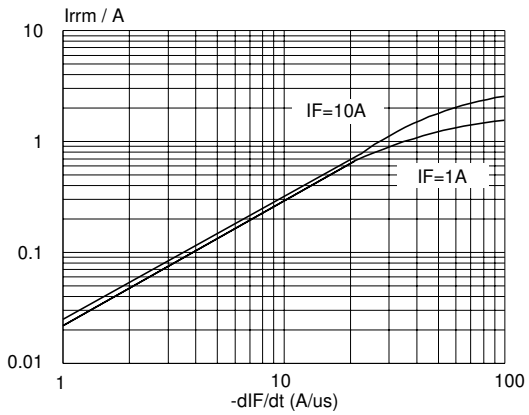



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

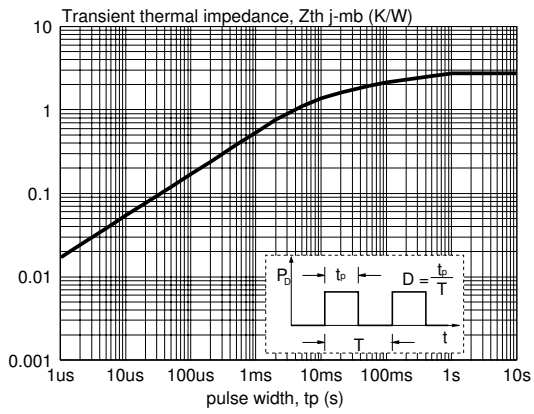



*Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.*

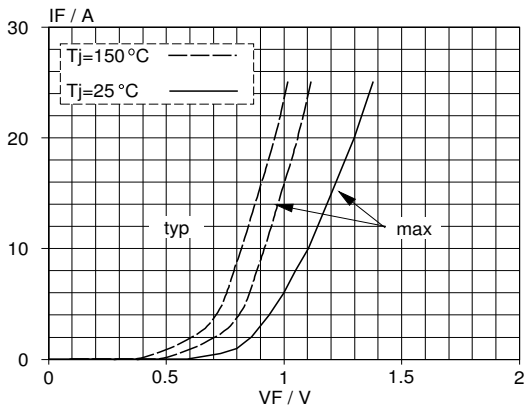



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 1.4 g*

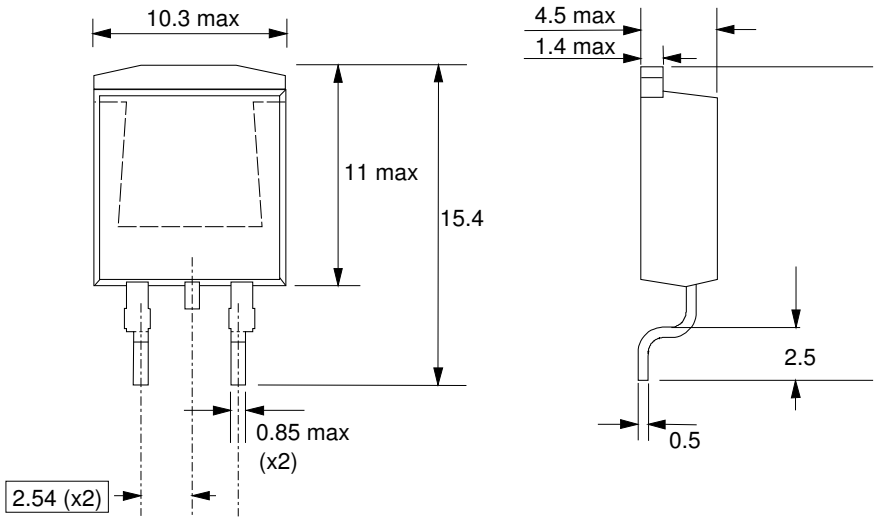



*Fig.12. SOT404 : centre pin connected to mounting base.*

## MOUNTING INSTRUCTIONS

*Dimensions in mm*

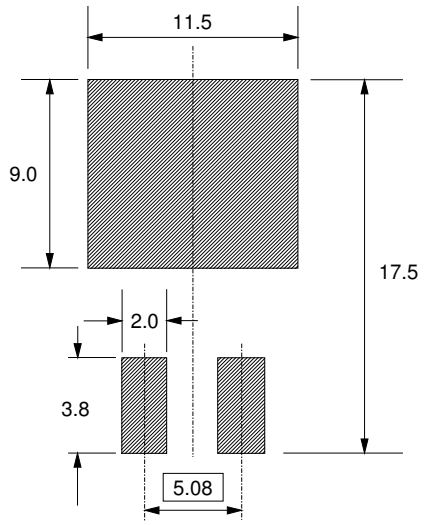



*Fig.13. SOT404 : soldering pattern for surface mounting.*

**Notes**

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

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 1.1 g*

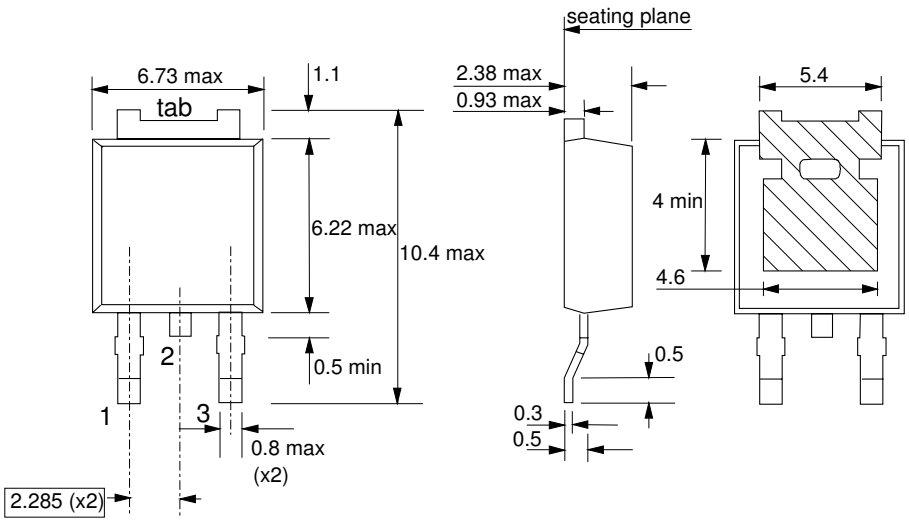



*Fig.14. SOT428 : centre pin connected to tab.*

## MOUNTING INSTRUCTIONS

*Dimensions in mm*

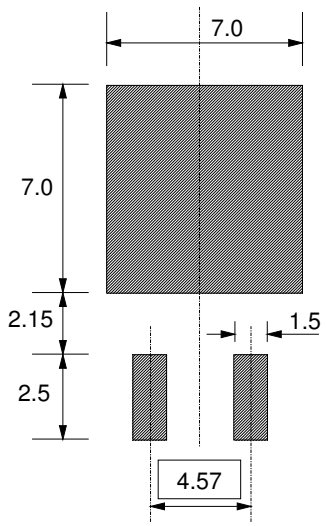



*Fig.15. SOT428 : minimum pad sizes for surface mounting.*

**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. |
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