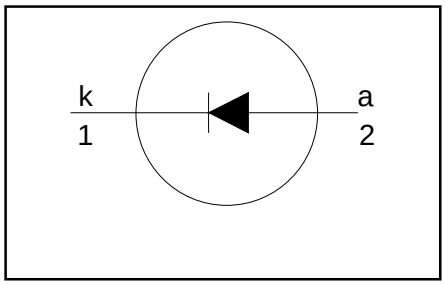
# Rectifier diodes ultrafast

# BYR29F series

## FEATURES

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

## SYMBOL




## QUICK REFERENCE DATA

$V_R$ = 500 V/ 600 V/ 700 V / 800 V

$V_F \leq 1.5$ V

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

$t_{rr} \leq 75$ ns

## GENERAL DESCRIPTION

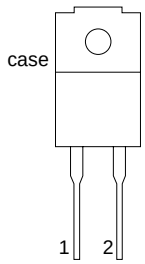
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYR29F series is supplied in the conventional leaded SOD100 package.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |
| tab | isolated |

## SOD100




## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | **BYR29F** | | **-500** | **-600** | **-700** | **-800** | |
| $V_{RRM}$ | Peak repetitive reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_R$ | Continuous reverse voltage | $T_{hs} \leq 136$ ˚C | - | 500 | 600 | 700 | 800 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C | - | 8 | | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C | - | 16 | | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 60 | | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 66 | | | | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | | ˚C |

**1** Neglecting switching and reverse current losses

## ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 25 ˚C unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | Repetitive peak voltage from both terminals to external heatsink | R.H. ≤ 65% ; clean and dustfree | - | | 1500 | V |
| $C_{isol}$ | Capacitance from cathode to external heatsink | f = 1 MHz | - | 12 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 5.5 | K/W |
| | | without heatsink compound | - | - | 7.2 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air. | - | 55 | - | K/W |

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage | $I_F$ = 8 A; $T_j$ = 150˚C | - | 1.07 | 1.50 | V |
| | | $I_F$ = 20 A | - | 1.75 | 1.95 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 1.0 | 10 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.1 | 0.2 | mA |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A to $V_R \geq$ 30 V; $dI_F/dt$ = 20 A/µs | - | 150 | 200 | nC |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 60 | 75 | ns |
| $I_{rrm}$ | Peak reverse recovery current | $I_F$ = 10 A to $V_R \geq$ 30 V; $dI_F/dt$ = 50 A/µs; $T_j$ = 100 ˚C | - | - | 6 | A |
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 5.0 | - | V |

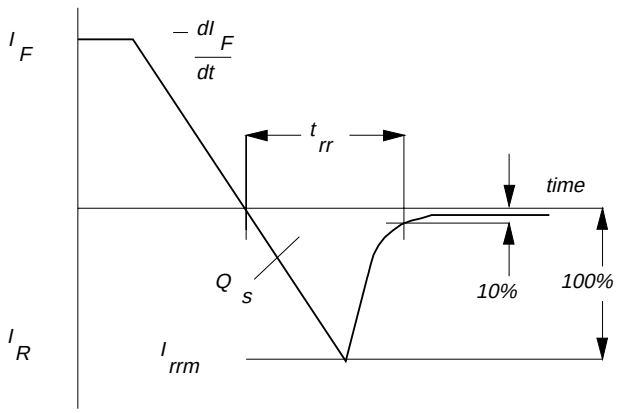



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

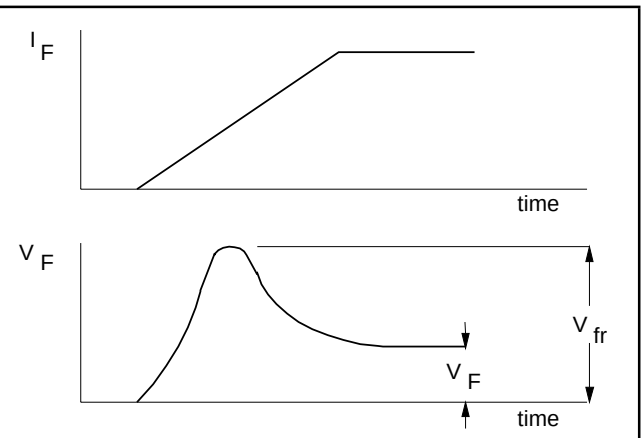



*Fig.2. Definition of $V_{fr}$*

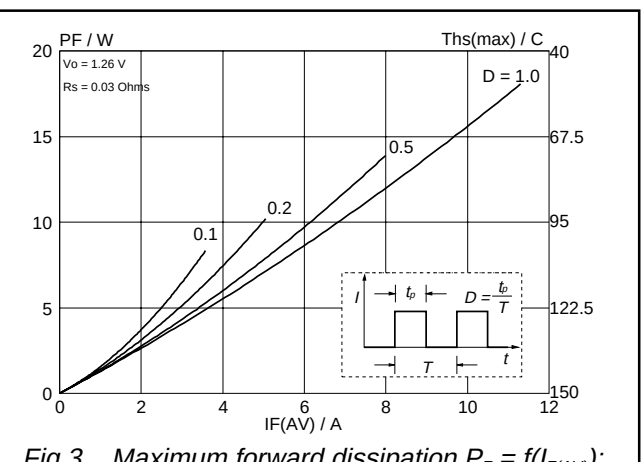



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

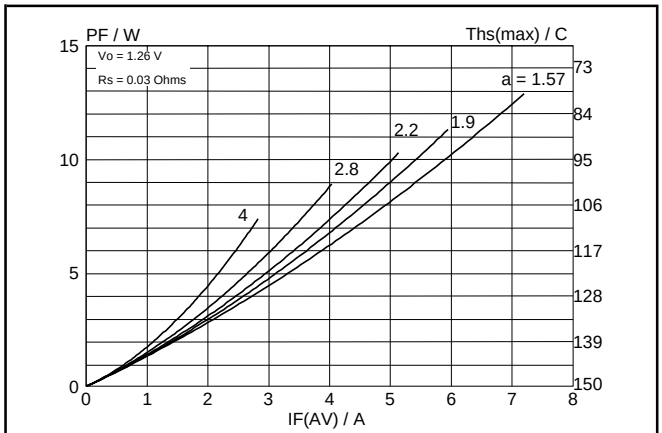



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

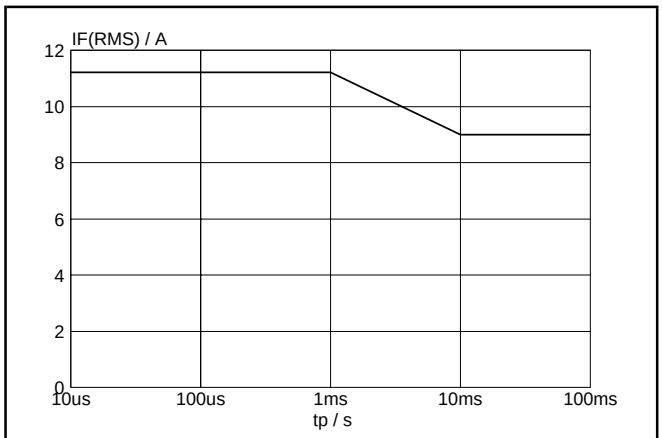



*Fig.5. Maximum permissible rms current $I_{F(RMS)}$ versus pulse width.*

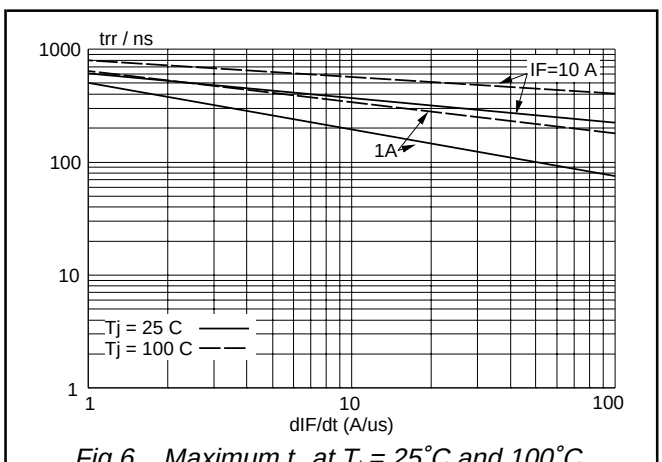



*Fig.6. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C.*

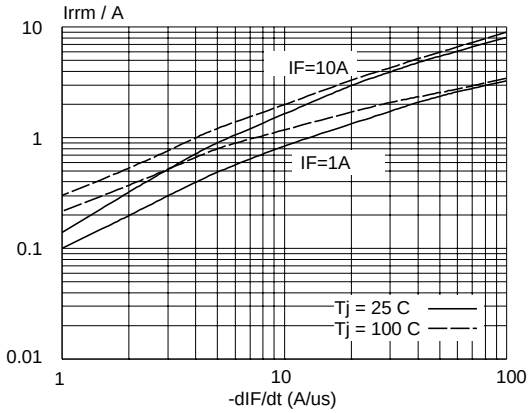



*Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.*

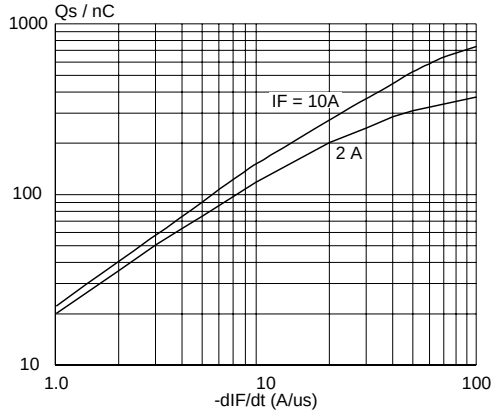



*Fig.9. Maximum $Q_s$ at $T_j$ = 25˚C*

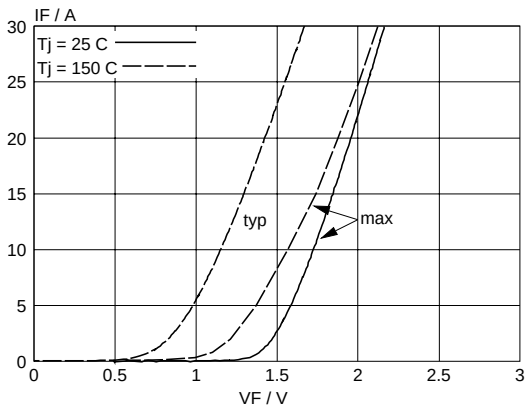



*Fig.8. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

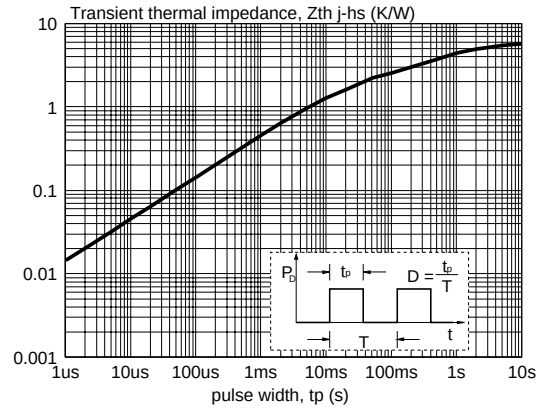



*Fig.10. Transient thermal impedance $Z_{th} = f(t_p)$*

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

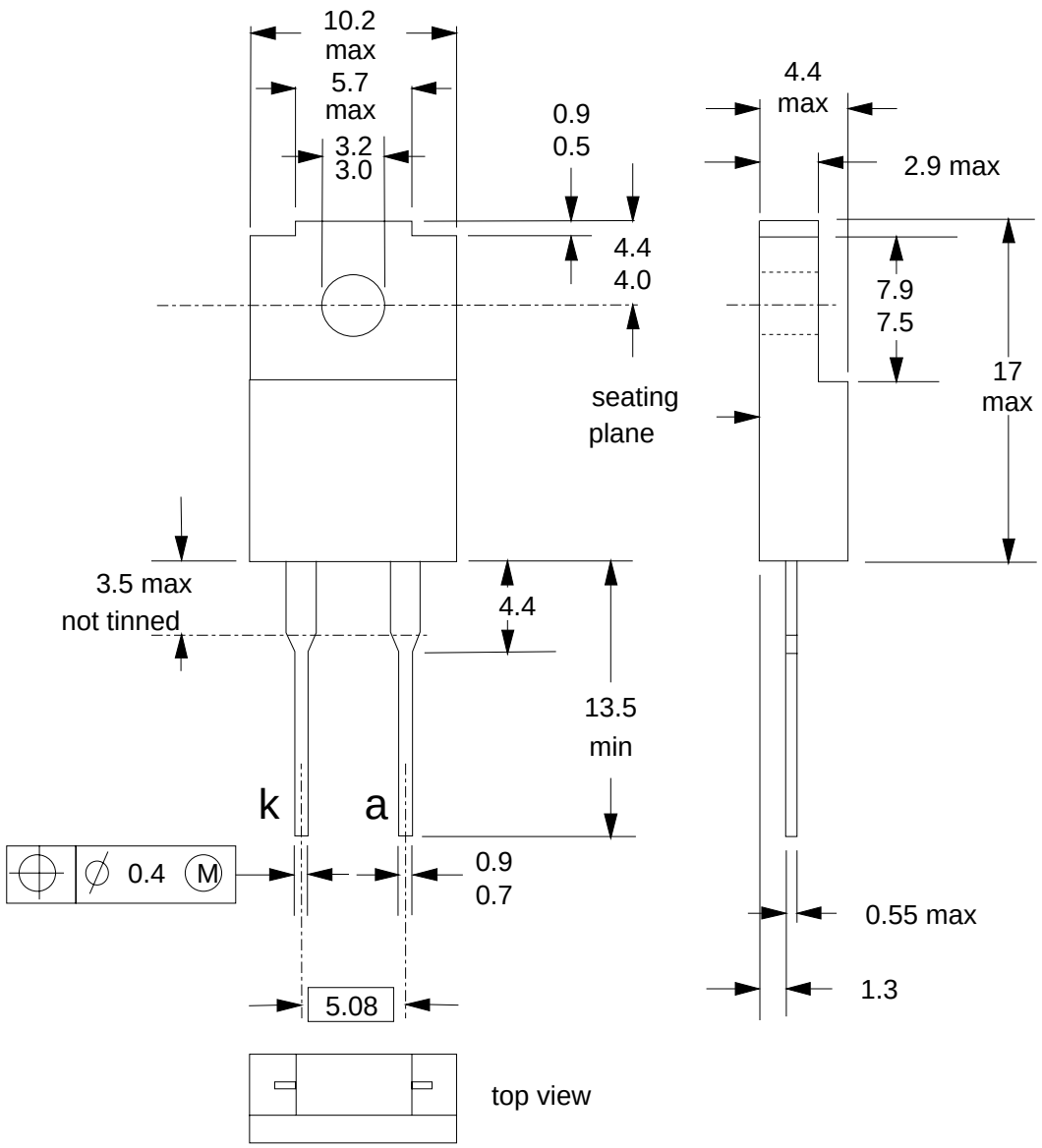



*Fig.11. SOD100; The seating plane is electrically isolated from all terminals.*

**Notes**
1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## DEFINITIONS

| **Data sheet status** | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| **Limiting values** | |
| Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| **Application information** | |
| Where application information is given, it is advisory and does not form part of the specification. | |
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## LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.