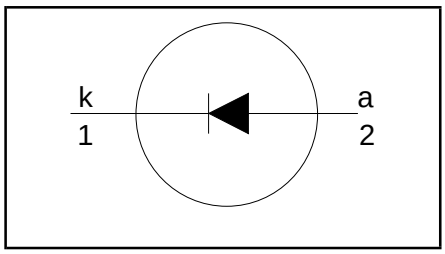
# Rectifier diodes ultrafast

# BYV29-600

## FEATURES

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

## SYMBOL




## QUICK REFERENCE DATA

$V_R$ = 600V

$V_F \leq 1.03$ V

$I_{F(AV)}$ = 9 A

$t_{rr} \leq 60$ ns

## GENERAL DESCRIPTION

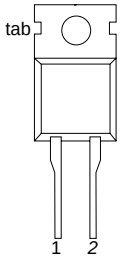
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV29-600 is supplied in the conventional leaded SOD59 (TO220AC) package.

## PINNING

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

## SOD59 (TO220AC)




## 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 | | - | 600 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 600 | V |
| $V_R$ | Continuous reverse voltage | | - | 600 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 120$ ˚C | - | 9 | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 120$ ˚C | - | 18 | A |
| $I_{FSM}$ | Non-repetitive peak forward current. | t = 10 ms | - | 70 | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 77 | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | ˚C |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | | - | - | 2.5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air. | - | 60 | - | K/W |

**1** Neglecting switching and reverse current losses.

## 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 | - | 0.90 | 1.03 | V |
| | | $I_F$ = 8 A | - | 1.05 | 1.25 | V |
| | | $I_F$ = 20 A | - | 1.30 | 1.45 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 2.0 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.1 | 0.35 | mA |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A to $V_R \geq$ 30 V; $dI_F/dt$ = 20 A/µs | - | 40 | 70 | nC |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | 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 | - | 3.0 | 5.5 | A |
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 3.2 | - | V |

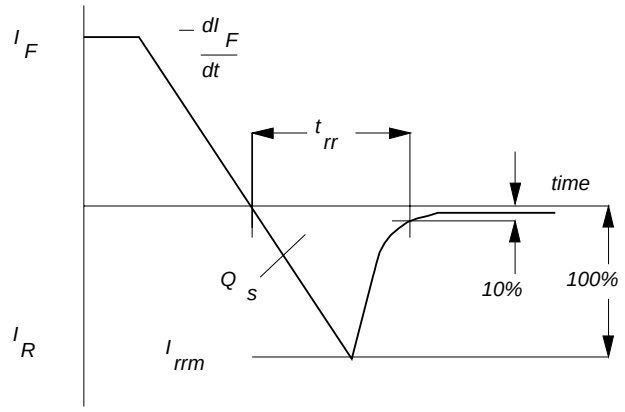



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

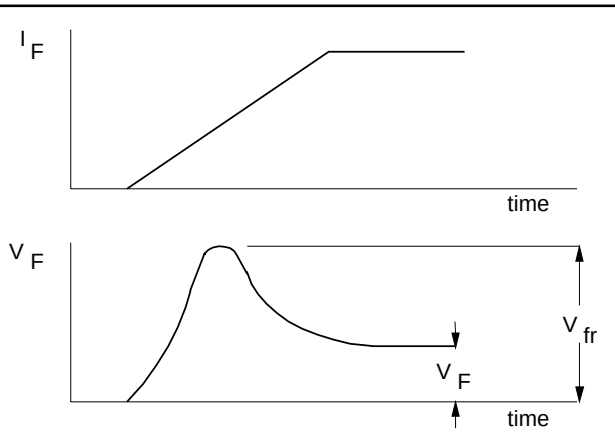



*Fig.2. Definition of $V_{fr}$*

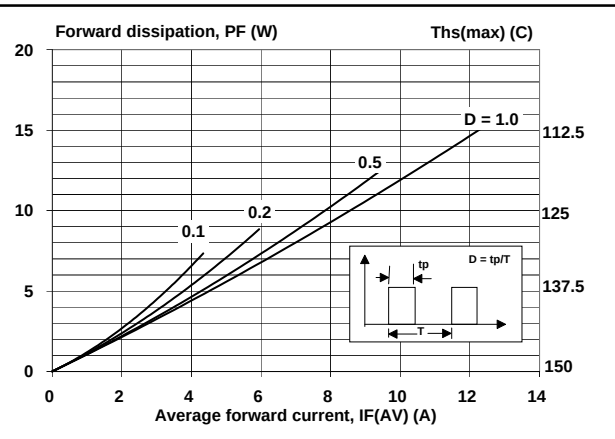



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

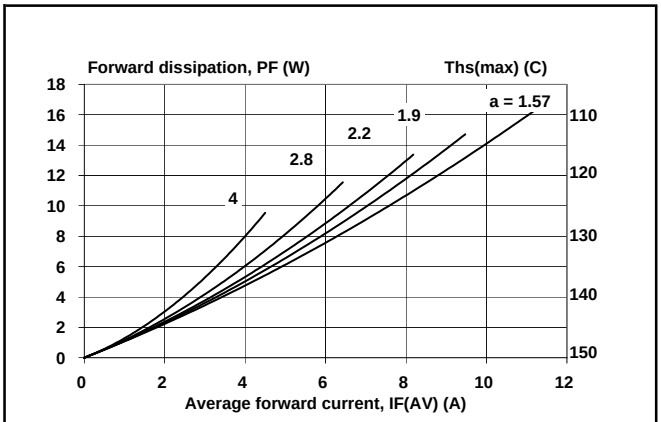



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

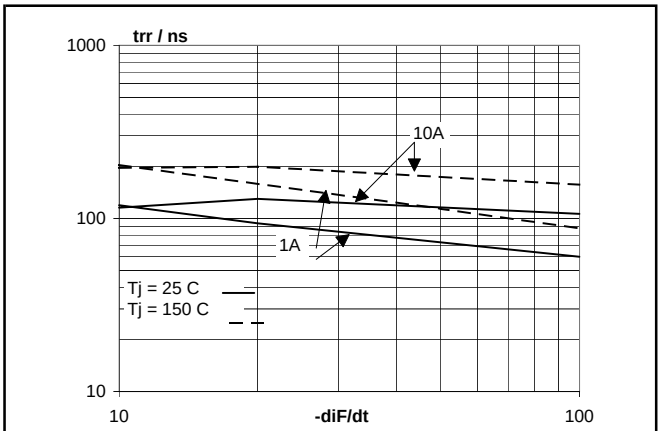



*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C*

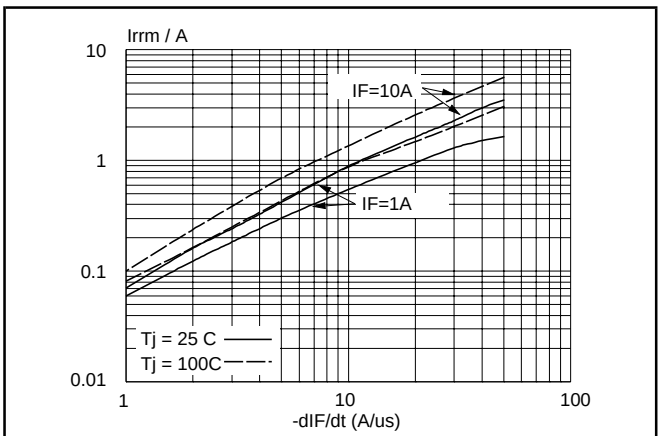



*Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.*

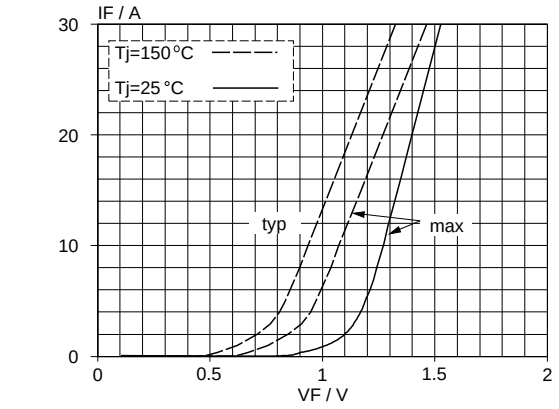



*Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

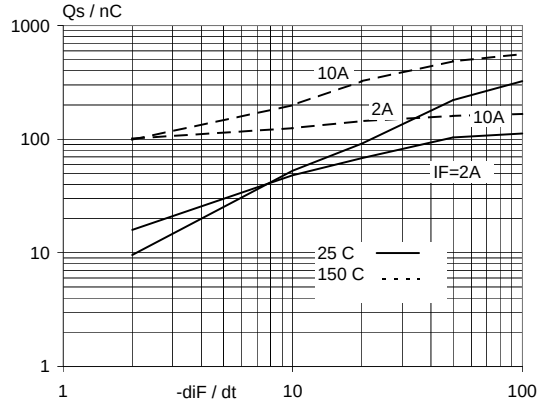



*Fig.9. Maximum $Q_s$ at $T_j$ = 25˚C*

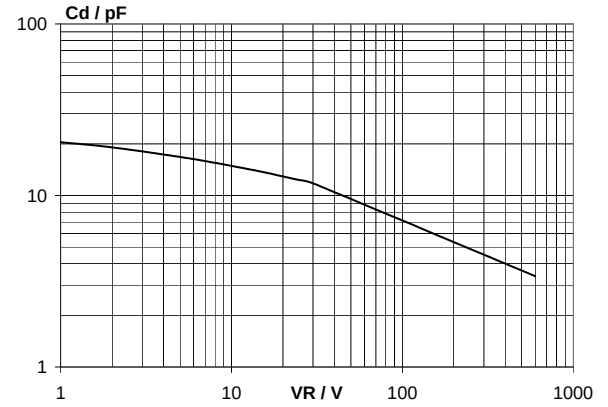



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j$ = 25˚C*

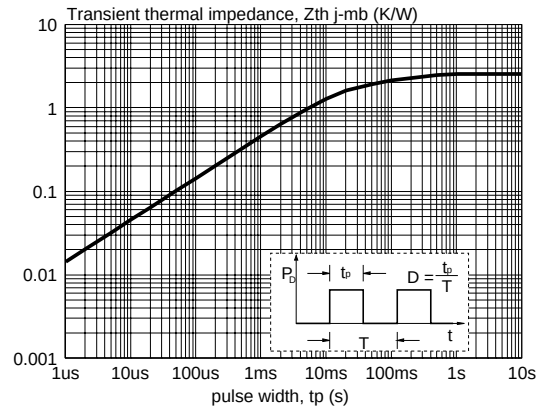


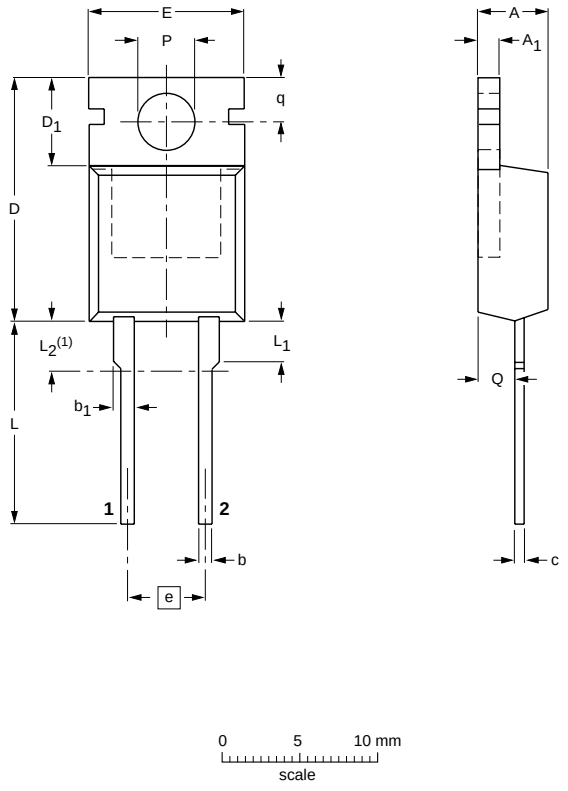

*Fig.10. Transient thermal impedance $Z_{th\ j\text{-}mb} = f(t_p)$*

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

**Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220** **SOD59**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ | b | $b_1$ | c | D | $D_1$ | E | e | L | $L_1$ | $L_2$(1) | P | q | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 4.5<br>4.1 | 1.39<br>1.27 | 0.9<br>0.7 | 1.3<br>1.0 | 0.7<br>0.4 | 15.8<br>15.2 | 6.4<br>5.9 | 10.3<br>9.7 | 5.08 | 15.0<br>13.5 | 3.30<br>2.79 | 3.0 | 3.8<br>3.6 | 3.0<br>2.7 | 2.6<br>2.2 |

**Note**

1. Terminals in this zone are not tinned.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOD59 | | 2-lead TO-220 | | | | 97-06-11 |

*Fig.11. TO220AC; pin 1 connected to mounting base.*

**Notes**

1. Refer to mounting instructions for TO220 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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