BYV29F, BYV29X series
Rectifier diodes
ultrafast

Product specification  October 2018
Rectifier diodes ultrafast  BYV29F, BYV29X series

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

SYMBOL

QUICK REFERENCE DATA
- \( V_R = 300 \, V/400 \, V/500 \, V \)
- \( V_F \leq 1.03 \, V \)
- \( I_{F(AV)} = 9 \, A \)
- \( t_r \leq 60 \, ns \)

GENERAL DESCRIPTION
Ultra-fast epitaxial rectifier diodes intended for use in switched mode power supply output rectification, electronic lighting ballasts and high frequency switching circuits in general.

The BYV29F series is supplied in the SOD100 package.
The BYV29X series is supplied in the SOD113 package.

PINNING

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode (k)</td>
</tr>
<tr>
<td>2</td>
<td>anode (a)</td>
</tr>
<tr>
<td>tab</td>
<td>isolated</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{RRM} )</td>
<td>Peak repetitive reverse voltage</td>
<td>( T_{hs} \leq 138^\circ C^1 )</td>
<td>-300</td>
<td>-500</td>
<td>V</td>
</tr>
<tr>
<td>( V_R )</td>
<td>Continuous reverse voltage</td>
<td></td>
<td>-300</td>
<td>400</td>
<td>V</td>
</tr>
<tr>
<td>( I_{F(AV)} )</td>
<td>Average forward current(^2)</td>
<td>( T_{hs} \leq 90^\circ C ); ( T_{stg} \leq 150^\circ C )</td>
<td>-</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td>( I_{FSM} )</td>
<td>Non-repetitive peak forward current</td>
<td>( t = 10 , ms ); ( t = 8.3 , ms )</td>
<td>-</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>( T_{stg} )</td>
<td>Storage temperature</td>
<td>( V_{RRM(max)} ) with reapplied</td>
<td>-40</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>( T_J )</td>
<td>Operating junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
</tbody>
</table>

1 \( T_{hs} \) de-rating for thermal stability.
2 Neglecting switching and reverse current losses
### ISOLATION LIMITING VALUE & CHARACTERISTIC

\( T_{hs} = 25 \, ^\circ\text{C} \) unless otherwise specified

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{isol} )</td>
<td>Peak isolation voltage from all terminals to external heatsink</td>
<td>SOD100 package; R.H. ( \leq 65% ); clean and dustfree</td>
<td>-</td>
<td>-</td>
<td>1500</td>
<td>V</td>
</tr>
<tr>
<td>( V_{isol} )</td>
<td>R.M.S. isolation voltage from all terminals to external heatsink</td>
<td>SOD113 package; ( f = 50\text{-}60 , \text{Hz} ); sinusoidal waveform; R.H. ( \leq 65% ); clean and dustfree</td>
<td>-</td>
<td>-</td>
<td>2500</td>
<td>V</td>
</tr>
<tr>
<td>( C_{isol} )</td>
<td>Capacitance from pin 2 to external heatsink</td>
<td>( f = 1 , \text{MHz} )</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>pF</td>
</tr>
</tbody>
</table>

### THERMAL RESISTANCES

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R_{th , j-hs} )</td>
<td>Thermal resistance junction to heatsink with heatsink compound</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.5</td>
<td>K/W</td>
</tr>
<tr>
<td>( R_{th , j-a} )</td>
<td>Thermal resistance junction to ambient without heatsink compound in free air.</td>
<td>-</td>
<td>-</td>
<td>55</td>
<td>-</td>
<td>K/W</td>
</tr>
</tbody>
</table>

### ELECTRICAL CHARACTERISTICS

\( T_{j} = 25 \, ^\circ\text{C} \) unless otherwise stated

<table>
<thead>
<tr>
<th>SYMBOL</th>
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<th>CONDITIONS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_F )</td>
<td>Forward voltage ( I_F = 8 , A; T_j = 150, ^\circ\text{C} )</td>
<td>-</td>
<td>-</td>
<td>0.90</td>
<td>1.03</td>
<td>V</td>
</tr>
<tr>
<td>( I_R )</td>
<td>Reverse current ( V_R = V_{RRM} ) ( V_R = V_{DDM}; T_j = 100 , ^\circ\text{C} )</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>50</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td>( Q_s )</td>
<td>Reverse recovery charge ( I_R = 2 , A ) to ( V_R \geq 30 , V ); ( dl/dt = 20 , A/\mu\text{s} )</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>0.35</td>
<td>mA</td>
</tr>
<tr>
<td>( t_{rr} )</td>
<td>Reverse recovery time ( I_F = 1 , A ) to ( V_R \geq 30 , V ); ( dl/dt = 100 , A/\mu\text{s} )</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>60</td>
<td>ns</td>
</tr>
<tr>
<td>( I_{rrm} )</td>
<td>Peak reverse recovery current ( I_F = 10 , A ) to ( V_R \geq 30 , V ); ( dl/dt = 50 , A/\mu\text{s} ); ( T_j = 100 , ^\circ\text{C} )</td>
<td>-</td>
<td>-</td>
<td>4.0</td>
<td>5.5</td>
<td>A</td>
</tr>
<tr>
<td>( V_{fr} )</td>
<td>Forward recovery voltage ( I_F = 10 , A ); ( dl/dt = 10 , A/\mu\text{s} )</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
<td>-</td>
<td>V</td>
</tr>
</tbody>
</table>
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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 $a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$.

Fig.5. Maximum $t_{rr}$ at $T_j = 25^\circ C$ and $100^\circ C$

Fig.6. Maximum $I_{rrm}$ at $T_j = 25^\circ C$ and $100^\circ C$. 
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Fig. 7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

Fig. 8. Maximum $Q_s$ at $T_j = 25 \degree C$

Fig. 9. Transient thermal impedance $Z_{th j-hs} = f(t_p)$

October 2018
MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

Fig.10. 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".
### MECHANICAL DATA

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 'full pack'

**SOD113**

![Diagrams](image)

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

<table>
<thead>
<tr>
<th>Unit</th>
<th>A</th>
<th>A₁</th>
<th>b</th>
<th>b₁</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>Hₑ</th>
<th>j(3)</th>
<th>k(3)</th>
<th>L</th>
<th>L₁(1)</th>
<th>L₂</th>
<th>m</th>
<th>P</th>
<th>Q</th>
<th>q</th>
<th>T(4)</th>
<th>w</th>
<th>z(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>max</td>
<td>4.6</td>
<td>2.9</td>
<td>0.9</td>
<td>1.1</td>
<td>0.7</td>
<td>15.8</td>
<td>10.3</td>
<td>2.7</td>
<td>0.6</td>
<td>14.4</td>
<td>3.3</td>
<td>5.08</td>
<td>19.0</td>
<td>0.5</td>
<td>6.5</td>
<td>3.2</td>
<td>2.8</td>
<td>2.6</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>nom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>min</td>
<td>4.0</td>
<td>2.5</td>
<td>0.7</td>
<td>0.9</td>
<td>0.4</td>
<td>15.2</td>
<td>9.7</td>
<td></td>
<td>1.7</td>
<td>0.4</td>
<td>13.5</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
<td>6.3</td>
<td>3.0</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**
1. Terminals are uncontrolled within zone L₁.
2. z is depth of T.
3. Dot lines area designs may vary.
4. Eject pin mark is for reference only.

**References**
- IEC
- JEDEC
- JEITA

**European projection**
- **07.06.08**
- **15.08.28**

**Issue date**
- **06.08.08**
- **15.08.28**

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October 2018

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Rev 1.500
Legal information

Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
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</table>

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[2] The term "short data sheet" is explained in section "Definitions".
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