DATA SHEET

BYV79E series
Rectifier diodes
ultrafast, rugged

Product specification
September 2018
Rectifier diodes
ultrafast, rugged

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

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

The BYV79E series is supplied in the conventional leaded SOD59 (TO220AC) package.

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>VRM</td>
<td>Peak repetitive reverse voltage</td>
<td>BYV79E -150 -200</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRM</td>
<td>Crest working reverse voltage</td>
<td>-150 200</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VR</td>
<td>Continuous reverse voltage</td>
<td>-150 200</td>
<td>V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| IFAV   | Average forward current
\[ \delta = 0.5; T_{mb} \leq 120{\circ}C \] | -14 | A |
| IFRM   | Repetitive peak forward current
\[ t = 25 \mu s; \delta = 0.5; T_{mb} \leq 120{\circ}C \] | -28 | A |
| IFSM   | Non-repetitive peak forward current
\[ t = 10 \text{ ms}; t = 8.3 \text{ ms} \] | -150 160 | A |
| IRRM   | Repetitive peak reverse current
\[ t = \text{reapplied } V_{RWM(max)} \] | -0.2 | A |
| IRSM   | Non-repetitive peak reverse current | -0.2 | A |
| Tstg   | Storage temperature | -40 150 | °C |
| Tj     | Operating junction temperature | -40 150 | °C |

1. Neglecting switching and reverse current losses.

ESD LIMITING VALUE

<table>
<thead>
<tr>
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<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
</table>
| VC     | Electrostatic discharge capacitor voltage | Human body model;
\[ C = 250 \text{ pF}; R = 1.5 \text{ k}\Omega \] | - | 8 | kV |
### THERMAL RESISTANCES

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
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<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{th,j-mb}$</td>
<td>Thermal resistance junction to mounting base</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>K/W</td>
<td></td>
</tr>
<tr>
<td>$R_{th,j-a}$</td>
<td>Thermal resistance junction to ambient</td>
<td>-</td>
<td>60</td>
<td>-</td>
<td>K/W</td>
<td></td>
</tr>
</tbody>
</table>

### STATIC CHARACTERISTICS

$T_j = 25 \, ^\circ C$ unless otherwise stated

<table>
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<tr>
<th>SYMBOL</th>
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<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>Forward voltage</td>
<td>$I_F = 14 , A; T_j = 150 , ^\circ C$</td>
<td>-</td>
<td>0.83</td>
<td>0.90</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 14 , A$</td>
<td>-</td>
<td>0.95</td>
<td>1.05</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 50 , A$</td>
<td>-</td>
<td>1.2</td>
<td>1.4</td>
<td>V</td>
</tr>
<tr>
<td>$I_R$</td>
<td>Reverse current</td>
<td>$V_R = V_{RWM}; T_j = 100 , ^\circ C$</td>
<td>-</td>
<td>0.5</td>
<td>1.3</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = V_{RWM}$</td>
<td>-</td>
<td>5</td>
<td>50</td>
<td>μA</td>
</tr>
<tr>
<td>$Q_{s}$</td>
<td>Reverse recovery charge</td>
<td>$I_F = 2 , A; V_R \geq 30 , V; -dI_F/dt = 20 , A/μs$</td>
<td>-</td>
<td>6</td>
<td>15</td>
<td>nC</td>
</tr>
<tr>
<td>$t_{rr1}$</td>
<td>Reverse recovery time</td>
<td>$I_F = 1 , A; V_R \geq 30 , V$</td>
<td>-</td>
<td>20</td>
<td>30</td>
<td>ns</td>
</tr>
<tr>
<td>$t_{rr2}$</td>
<td>Reverse recovery time</td>
<td>$I_F = 0.5 , A$ to $I_R = 1 , A$; $I_{rec} = 0.25 , A$</td>
<td>-</td>
<td>13</td>
<td>22</td>
<td>ns</td>
</tr>
<tr>
<td>$V_{fr}$</td>
<td>Forward recovery voltage</td>
<td>$I_F = 1 , A$; $dI_F/dt = 10 , A/μs$</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>V</td>
</tr>
</tbody>
</table>
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**Fig. 1.** Definition of $t_{rr}$, $Q_s$, and $I_{rm}$

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

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

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

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

**BYV79E series**

September 2018

Rev 1.300
Fig. 7. Maximum $t_r$ at $T_j = 25 ^\circ C$.

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

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

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

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

WeEn Semiconductors

Product specification

Rectifier diodes ultrafast, rugged

BYV79E series

September 2018

Rev 1.300
MECHANICAL DATA

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Unit</th>
<th>A</th>
<th>A₁</th>
<th>b</th>
<th>b⁽¹⁾</th>
<th>c</th>
<th>D</th>
<th>D₁</th>
<th>E</th>
<th>e</th>
<th>H</th>
<th>L</th>
<th>P</th>
<th>Q</th>
<th>q</th>
</tr>
</thead>
<tbody>
<tr>
<td>max</td>
<td>mm</td>
<td>4.7</td>
<td>1.40</td>
<td>0.95</td>
<td>1.7</td>
<td>0.65</td>
<td>15.8</td>
<td>6.8</td>
<td>10.30</td>
<td>6.08</td>
<td>16.25</td>
<td>15.0</td>
<td>3.80</td>
<td>2.6</td>
<td>2.9</td>
</tr>
<tr>
<td>nom</td>
<td>mm</td>
<td>4.3</td>
<td>1.15</td>
<td>0.70</td>
<td>1.3</td>
<td>0.45</td>
<td>15.6</td>
<td>6.4</td>
<td>9.65</td>
<td>(REF)</td>
<td>15.70</td>
<td>12.5</td>
<td>3.65</td>
<td>2.2</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Note
1. Protruded dambar are included in the dimension.

Outline version | References | European projection | Issue date
SOD59          | 2-lead TO-220AC | sod59_po             | 09-08-25           |

September 2018  5  Rev 1.300
Legal information

Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
</tr>
</thead>
<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>
</tr>
</tbody>
</table>

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