**BAT15-04R**

**Reverse series silicon RF Schottky diode pair**

These Infineon RF Schottky diodes are silicon low barrier N-type devices with an integrated guard ring on-chip for over-voltage protection. Their low barrier height, low forward voltage and low junction capacitance make BAT15-04R a suitable choice for mixer and detector functions in applications which frequencies are as high as 12 GHz.

**Feature list**

- Low inductance $L_S = 1.5 \text{ nH (typical)}$
- Low capacitance $C = 0.27 \text{ pF (typical) at 1 MHz}$
- Industry standard SOT23-3 package (2.9 mm x 2.4 mm x 1 mm)
- Pb-free, RoHS compliant and halogen-free

**Product validation**

Qualified for industrial applications according to the relevant tests of JEDEC47/20/22.

**Potential applications**

For mixers and detectors in:

- Satellite systems
- Low noise blocks for Ku bands
- Security systems

**Device information**

<table>
<thead>
<tr>
<th>Table 1 Part information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name / Ordering code</td>
</tr>
<tr>
<td>BAT15-04R / BAT1504RE6152HTSA1</td>
</tr>
</tbody>
</table>

**Attention:** ESD (Electrostatic discharge) sensitive device, observe handling precautions!
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1 Absolute maximum ratings

Table 2 Absolute maximum ratings at $T_A = 25 \degree C$, unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Note or test condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diode reverse voltage</td>
<td>$V_R$</td>
<td>–</td>
<td>4 V</td>
<td></td>
</tr>
<tr>
<td>Forward current</td>
<td>$I_F$</td>
<td>–</td>
<td>110 mA</td>
<td></td>
</tr>
<tr>
<td>Total power dissipation</td>
<td>$P_{TOT}$</td>
<td>–</td>
<td>100 mW</td>
<td>$T_S \leq 77 \degree C , ^1$</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>$T_J$</td>
<td>–</td>
<td>150 °C</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>$T_{OP}$</td>
<td>-55</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{STG}$</td>
<td>-55</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

Attention: Stresses above the maximum values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Exceeding only one of these values may cause irreversible damage to the component.

^1 $T_S$ is the soldering point temperature.
2 Electrical performance in test fixture

2.1 Electrical characteristics

Table 3 Electrical characteristics at $T_A = 25 \, ^\circ\text{C}$, unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Note or test condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown voltage</td>
<td>$V_{BR}$</td>
<td>4 – –</td>
<td>V</td>
<td>$I_R = 10 , \mu\text{A}$</td>
</tr>
<tr>
<td>Forward voltage</td>
<td>$V_F$</td>
<td>0.2 0.25 0.3</td>
<td>V</td>
<td>$I_F = 1 , \text{mA}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 0.35 0.41</td>
<td></td>
<td>$I_F = 10 , \text{mA}$</td>
</tr>
<tr>
<td>Forward voltage matching</td>
<td>$\Delta V_F$</td>
<td>– – 10</td>
<td>mV</td>
<td>$I_F = 1 , \text{mA}$ 1)</td>
</tr>
<tr>
<td>Differential forward resistance</td>
<td>$R_F$</td>
<td>– 8 –</td>
<td>$\Omega$</td>
<td>$I_F = 10 , \text{mA} / 50 , \text{mA}$ 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 12 18</td>
<td>$\Omega$</td>
<td>$I_F = 5 , \text{mA}$</td>
</tr>
<tr>
<td>Capacitance</td>
<td>$C$</td>
<td>– 0.26 0.3</td>
<td>pF</td>
<td>$V_R = 0 , \text{V}, f = 1 , \text{MHz}$</td>
</tr>
<tr>
<td>Inductance</td>
<td>$L_S$</td>
<td>– 1.5 –</td>
<td>nH</td>
<td></td>
</tr>
</tbody>
</table>

1) $\Delta V_F$ is the difference between lowest and highest $V_F$ in a multiple diode component.

2) $R_F = \frac{V_F(50 \, \text{mA}) - V_F(10 \, \text{mA})}{50 \, \text{mA} - 10 \, \text{mA}}$
2.2 Characteristic curves

At $T_A = 25^\circ C$, unless otherwise specified

![Diode capacitance C vs. reverse voltage $V_R$ at frequency $f = 1 MHz$](image1)

**Figure 1** Diode capacitance $C$ vs. reverse voltage $V_R$ at frequency $f = 1 MHz$

![Forward current $I_F$ vs. forward voltage $V_F$](image2)

**Figure 2** Forward current $I_F$ vs. forward voltage $V_F$
Figure 3  Reverse current $I_R$ vs. reverse voltage $V_R$

Note: The curves shown in this chapter have been generated using typical devices but shall not be understood as a guarantee that all devices have identical characteristic curves.
3 Thermal characteristics

Table 4 Thermal resistance

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>Values</th>
<th>Unit</th>
<th>Note or test condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance (junction - soldering point)</td>
<td>$R_{thJS}$</td>
<td>Min. -</td>
<td>725 K/W</td>
<td>$T_S = 77 , ^\circ\text{C}$ 1)</td>
</tr>
</tbody>
</table>

Figure 4 Permissible forward current $I_F$ in DC operation

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1 For $R_{thJS}$ in other conditions refer to the curves in this chapter.
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Thermal characteristics

Figure 5 Thermal resistance $R_{thJS}$ in pulse operation

Figure 6 Permissible forward current ratio $I_{Fmax}/I_{DC}$ in pulse operation
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Package information SOT23-3

4 Package information SOT23-3

Figure 7 Package outline

Figure 8 Foot print

Figure 9 Marking layout example

Figure 10 Tape dimensions
## Revision history

<table>
<thead>
<tr>
<th>Document version</th>
<th>Date of release</th>
<th>Description of changes</th>
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</table>
| 2.0              | 2018-09-28      | • New layout of datasheet  
• Typical values and curves updated to the values of the production (No product or process change behind)  
• Maximum/typical values added |