Exalos Balanced Receiver | EBR

**Applications**
- Optical Coherence Tomography
- Optical Delay Measurements
- Spectroscopy
- Heterodyne Detection

**Product Features**
- Adjustable Bandwidth (60-380 MHz)
- Ultra-Low Noise
- Electrically-Switchable Gain (high/low gain selection via TTL signals)
- Well-matched Photodiodes to achieve high common-mode rejection
- Two Monitor Outputs (DC-400 kHz)
- Compact OEM form factor
- Single +5V power supply

**Description**

The Exalos optical balanced receiver (EBR) is engineered particularly to support challenging applications such as Optical Coherence Tomography where high signal-to-noise performance is critical. It achieves the lowest noise performance of balanced receivers in this bandwidth range. It features a compact design and a single supply voltage for OEM applications and allows for electrically switching the gain or for continuously adjusting the bandwidth.

**Output Voltage Noise (Oscilloscope Traces)**

Competitor: \(V_{pp} = 15.9 \text{ mV}\)

EXALOS EBR: \(V_{pp} = 13.1 \text{ mV} \ast\)

Scope input: \(V_{pp} = 2.5 \text{ mV}\)

\* The bandwidth of the EBR370003 was set to the Competitor’s bandwidth of \(f_{3dB} = 350 \text{ MHz}\) for this measurement.
**EBR37000x-01 Min and Max Bandwidth**

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Transmission (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>~25</td>
</tr>
<tr>
<td>0.1</td>
<td>~50</td>
</tr>
<tr>
<td>1</td>
<td>~55</td>
</tr>
<tr>
<td>10</td>
<td>~60</td>
</tr>
<tr>
<td>100</td>
<td>~65</td>
</tr>
<tr>
<td>1000</td>
<td>~67</td>
</tr>
</tbody>
</table>

**EBR37000x-01 Series Detector Responsivity**

<table>
<thead>
<tr>
<th>Wavelength [nm]</th>
<th>Responsivity [A/W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>400–1050</td>
<td>0.55³</td>
</tr>
<tr>
<td>500–1700</td>
<td>0.75–1.0⁴</td>
</tr>
<tr>
<td>800–1700</td>
<td>1.0–1.1⁵</td>
</tr>
</tbody>
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**EBR**

- **Transimpedance Gain**: HIGH = 10×10³; LOW = 10×10¹ V/A
- **Gain Bandwidth (3 dB)**: DC – 380 MHz
- **Gain Flatness**: 5 dB
- **Common Mode Rejection Ratio**: >25 dB
- **CW Saturation Power**: -4 dBm
- **Max. Electrical Output Signal**: 1.8 V
- **Photodiode Option**:
  - Silicon
  - SWL-InGaAs
  - InGaAs
- **Wavelength Range**:
  - 400–1050 nm
  - 500–1700 nm
  - 800–1700 nm
- **Photodiode Responsivity**:
  - 0.55³ A/W at 840 nm
  - 0.75–1.0⁴ A/W at 1060 nm
  - 1.0–1.1⁵ A/W at 1310 nm
- **Noise Floor**: -140 dBm/Hz
- **Overall Output Voltage Noise**: 0.8 mV_{rms}
- **Minimum NEP (DC-100 MHz)**: 5 pW/√Hz

**Operating Conditions**

- **Operating temperature**: -20 to +65 °C
- **Supply voltage**: 5.0 (4.90 to 5.20) V
- **Dimension**: 64 x 46 x 30 mm
- **Optical Connector**: FC/APC

**Notes:**

1. Electrically-switchable gain with TTL signals: HIGH = 5×10³ @ 50 Ω termination; LOW = 5×10¹ @ 50 Ω termination
2. Electro-optical bandwidth is continuously adjustable from 60 MHz to 380 MHz; other ranges available on request
3. Typical photodiode responsivity of 0.55 A/W at 840 nm, lower at other wavelengths
4. Typical photodiode responsivity of 0.40 A/W at 840 nm, 0.75 A/W at 1060 nm, 0.85 A/W at 1310 nm, 1.0 A/W at 1550 nm
5. Typical photodiode responsivity of 0.40 A/W at 1060 nm, 1.0 A/W at 1310 nm, 1.1 A/W at 1550 nm
6. Output voltage noise at 350 MHz; smaller at lower bandwidth, e.g. 0.4 mV_{rms} at 200 MHz

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**Ordering Information**

- **Part Number**: EBR370001-01: DC-coupled standard silicon photodiodes, best for 400-900 nm
- **Part Number**: EBR370002-01: AC-coupled standard silicon photodiodes, best for 400-900 nm
- **Part Number**: EBR370003-01: DC-coupled short-wavelength enhanced [SWL] InGaAs photodiodes, best for 900-1600 nm
- **Part Number**: EBR370004-01: AC-coupled short-wavelength enhanced [SWL] InGaAs photodiodes, best for 900-1600 nm
- **Part Number**: EBR370005-01: DC-coupled standard InGaAs photodiodes, best for 1100-1600 nm
- **Part Number**: EBR370006-01: AC-coupled standard InGaAs photodiodes, best for 1100-1600 nm