C-band 28GBaud InP Mach-Zehnder-Modulator

General Description
The Indium-Phosphide Mach-Zehnder-Modulator is ideally suited for optical transport applications within the C-band. It features a unique traveling-wave-electrode design, resulting in slow roll-off and zero chirp.

Applications
28GBaud OOK, 4PAM, 2PSK, ODB

Features
- C-band operations (1527-1568nm)
- Traveling-wave-electrode design with zero chirp
- Adjustable \( V_\pi \)
- Small foot print (6.2 x 0.385 x 0.2mm)
- AR-coated facets with spot size converter for efficient optical coupling

Operating Conditions / Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical wavelength</td>
<td>nm</td>
<td>1527</td>
<td>1550</td>
<td>1568</td>
</tr>
<tr>
<td>Optical input power</td>
<td>dBm</td>
<td>10</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Chip temperature</td>
<td>°C</td>
<td>40</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Bias voltage VDC</td>
<td>V</td>
<td>-10</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Parameter | Symbol | Unit | Typ | Comments |
---|--------|------|-----|----------|
Insertion loss | IL | dB | 5 | @ max. transmission, 1550nm |
Extinction ratio (DC) | ER | dB | >20 |
3dB EO cut-off frequency | \( f_{3dB} \) | GHz | 22 |
Bias voltage | VDC | V | 5 |
Phase voltage | P1 | V | -3 | quadrature point |
\( V_\pi \) | V | 2.0 | |

Performance

Small signal response (S21 eo)  
\( V_\pi = f (VDC) \)
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General Instructions / Precautions
An InP-Mach-Zehnder-Modulator contains several semiconductor-p-i-n junctions, a faulty DC-operation will result in an irreversible damage of the device. Please use the electric circuit diagram for correct DC-wiring. Don’t exceed maximum values for Phase- and VDC-voltages. VDC has to be always positive, referenced against GND. Phase voltages has to be always negative, referenced against VDC. Use voltage sources with integrated current limiter.

Limits: VDC : 3 mA, Phase: 1 mA.

The use of an external temperature controller is highly recommended, otherwise the operating point is not stable over time.

Connections / Specifications
- Optical coupling: SSMF with tapered fiber / lense recommended
- Contact-pad material: Au
- DC-pad dimensions: 85 x 85μm
- RF-pitch: 100μm, external 50Ω needed for RF-operation

Device diagram

Electric circuit diagram

Chip layout / dimensions [μm]

Chip photo

Part Number
- Chip: MZM_D_C_22_19

HHI reserves the right to change specifications without any prior notice at any time