

# O-band 40GBaud InP Mach-Zehnder-Modulator

## General Description

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

## Applications

40GBaud OOK, 4PAM, 2PSK

## Features

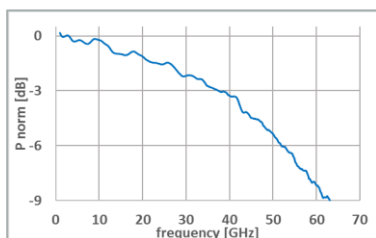
- O-band operations (1280-1340nm)
- High bandwidth
- Traveling-wave-electrode design with zero chirp
- Adjustable  $V\pi$
- Small foot print (8.0 x 0.5 x 0.2mm)
- AR-coated facets with spot size converter for efficient optical coupling

## Operating Conditions / Absolute Maximum Ratings

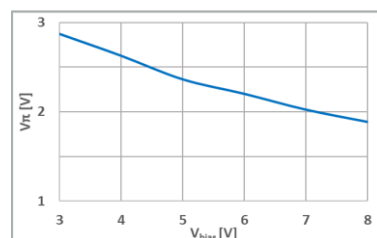
Parameter	Unit	Min	Typ	Max
Optical wavelength	nm	1280	1310	1340
Optical input power	dBm		10	16
Temperature	°C		25	50
Bias voltage $V_{\text{bias}}$	V	3		10
Phase-voltage	V	-10		0

## Performance

Parameter	Symbol	Unit	Typ	Comments
Insertion loss	IL	dB	5.9	@ max. transmission
Extinction ratio (DC)	ER	dB	>20	
3dB EO cut-off frequency	$f_{3\text{dB}}$	GHz	38	
Bias voltage	$V_{\text{bias}}$	V	7	
Phase voltage	P1   P2	V	-3	quadrature point
$V\pi$		V	2.0	@ $V_{\text{bias}} = +7\text{V}$



Small signal response (S21 eo)



$V\pi = f(V_{\text{bias}})$  @ 1310nm

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

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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 Bias-voltages.  $V_{\text{bias}}$  has to be always positive, referenced against GND. Phase voltages has to be always negative, referenced against  $V_{\text{bias}}$ . Use voltage sources with integrated current limiter.

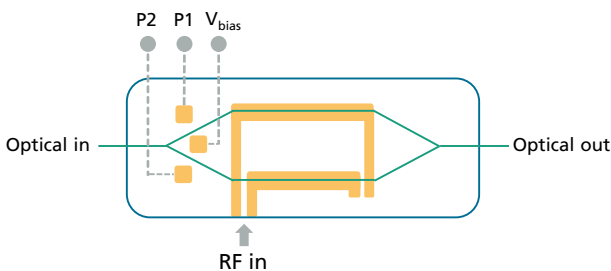
Limits:  $V_{\text{bias}}$  : 3 mA, Phase: 1 mA.

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

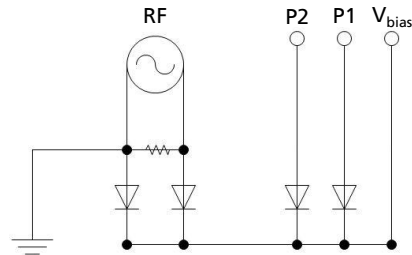
## Connections / Specifications

- Optical coupling: SSMF with tapered fiber / lense recommended
- Contact-pad material: Au
- DC-pad dimensions: 85 x 85 $\mu\text{m}$
- RF-pitch: 100 $\mu\text{m}$ , external 50 $\Omega$  needed for RF-operation

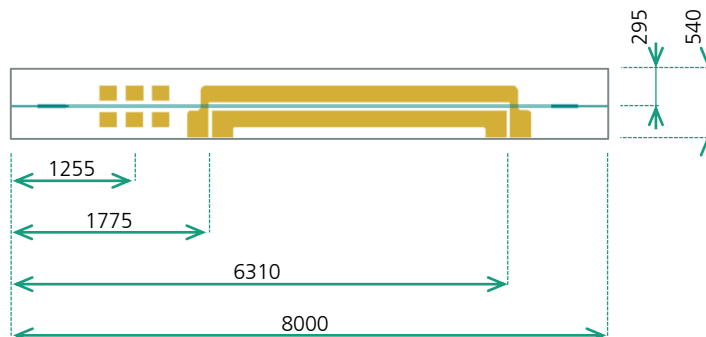
## Device diagram



## Electric circuit diagram



## Chip dimensions [ $\mu\text{m}$ ]



## Part Number

- Chip: MZM\_D\_O\_38\_19

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