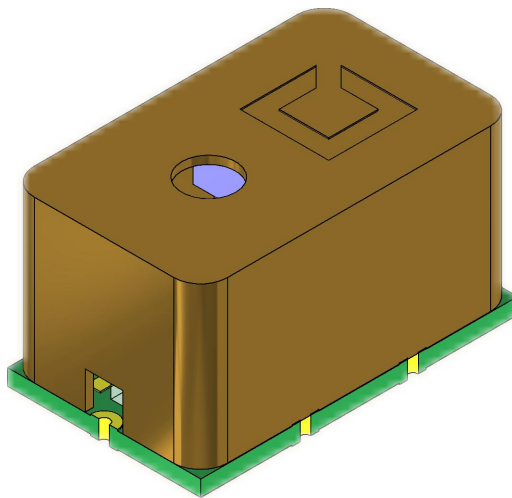


Test Data Sheet

Surface-Mount, Resonant Electro Optic Phase Modulator with Wedged Facet and Evaluation board



RF properties	Value	Unit
Resonance frequency: f_0 ¹⁾	10	MHz
Return Loss	< -10	dB
Bandwidth: Δv	1	MHz
Quality factor: Q	10	
Required RF Power for 1 rad @ 633 nm ²⁾	24	dBm
max. RF power: RF_{max} ³⁾	1	W

Optical properties		
Aperture	1.33x1.33	mm ²
Wavefront distortion (633nm)	$\lambda/6$	nm
recommended optical intensity (421nm)	< 0.2	W/mm ²
AR coating (R<1%)	400-650	nm
wedged facets	0°/1°	

¹⁾ at 22°C ²⁾ with 50Ω termination ³⁾ no damage with $RF_{in} < 1.5W$

Measured modulation

Fig. 1: Oscilloscope trace

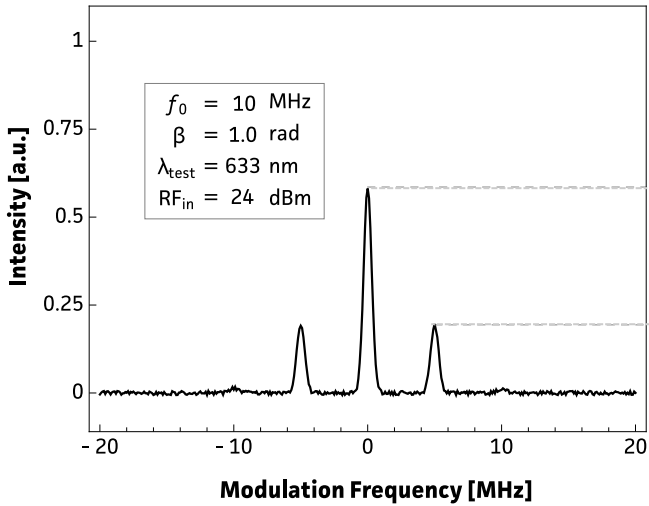


Fig.2: Carrier Sideband Ratio

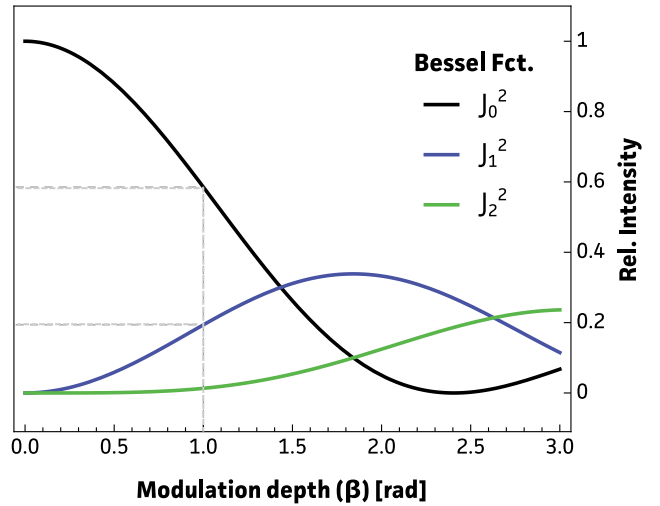


Table 1: Expected modulation

$\beta = 1 \text{ rad}$		Unit	λ_1	λ_2	λ_3
λ	nm		421	532	633
P	dBm		20.5	22.5	24
P	mW		110	176	250
U	V_p		3.3	4.2	5
U_π	V_p		10.4	13.2	15.7
β/U	rad/V		0.3	0.24	0.2

Fig.1: Recorded trace retrieved from a test setup as illustrated below.

Fig.2: Squared absolute values of first-kind Bessel functions vs. modulation depth. Vertical lines reveal the ratio between the carrier J_0^2 and the i th. sideband J_i^2 at a specific β .

Fig.3: Dependency between RF amplitude and modulation depth for different wavelengths. Points on the curve allow to retrieve either the required RF amplitude for a specific / desired β or the max. achievable modulation depth for a given / available RF power.

Table 1: Expected RF-Amplitude / Power values and conversion factors for the required wavelength at the reference modulation depth of 1 rad. Note: Experimentally recorded modulation depth displayed in Fig.1 might vary from the respective values ($\beta=1 \text{ rad}$) provided in the table.

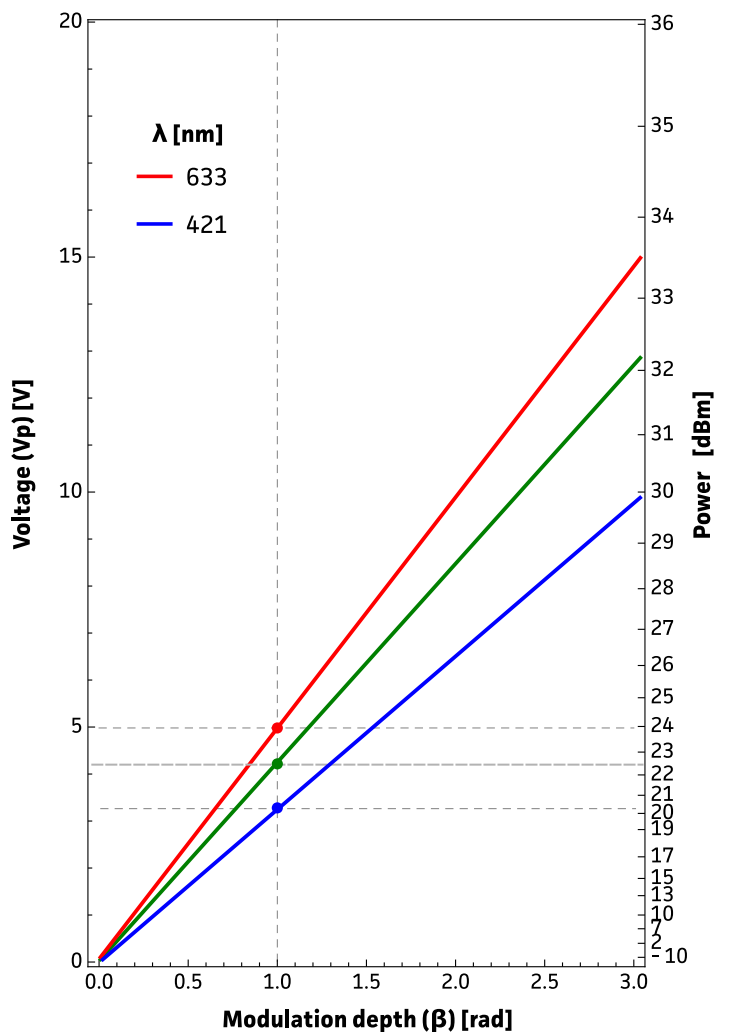
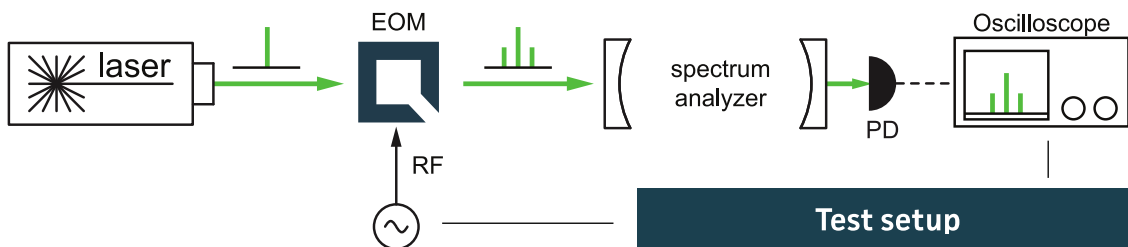


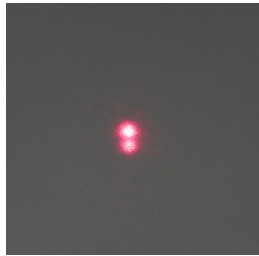
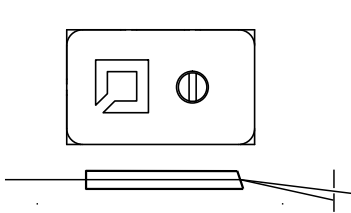
Fig. 3: RF- signal amplitude vs. modulation depth



Handling instructions

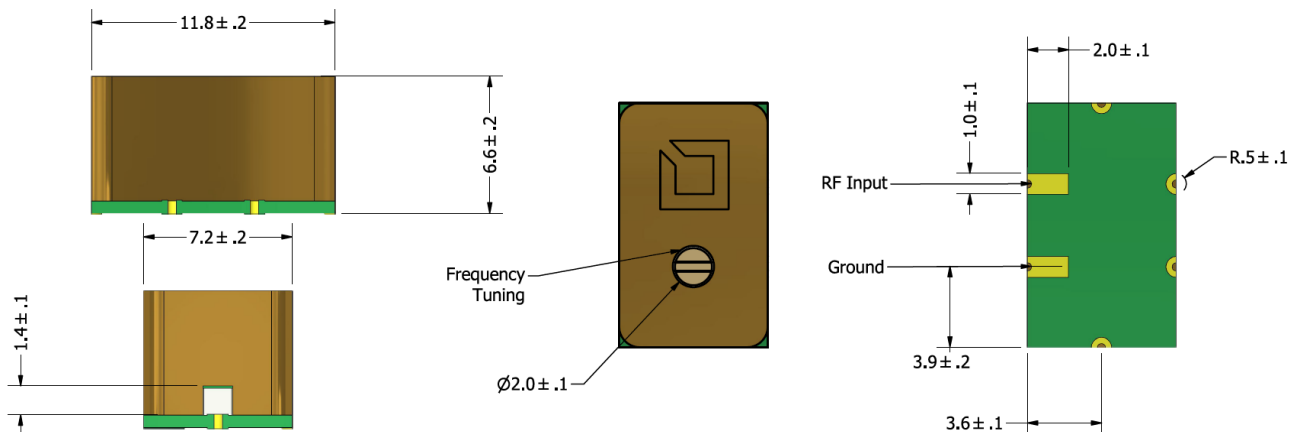
- Input laser polarization must be aligned with respect to the white markers on the housing
- Please handle device carefully. Avoid shock. Don't drop.
- After turn on the resonance frequency might drift slightly with applied RF power. Please compensate by tuning the RF drive frequency until steady-state (~min).
- Slight angle adjustment can reduce unwanted residual amplitude modulation (RAM)

Alignment



- Align the EOM in such a way, that the laser hits the unwedged surface perpendicular (AOI = 90°). The orientation of the crystal is pictured on the label on the EOM.
 - The wedge deflects the beam and splits it up into different polarisations.
 - Optimize the input polarisation by minimizing the optical power in the higher deflected spot.
- When it is impossible to remove the signal completely you have to block it with an iris to achieve minimum residual amplitude modulation (RAM). (Also see: Optics Letters Vol. 41, Issue 14, pp. 3331-3334 (2016), <https://doi.org/10.1364/OL.41.003331>)

Package drawing



Attention!!

- use only supplied tuning tool
- actuate tuner carefully
- do not apply too much pressure or torque
- keep tuning tool coaxial
- tuner might not be perfectly orthogonal to box

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