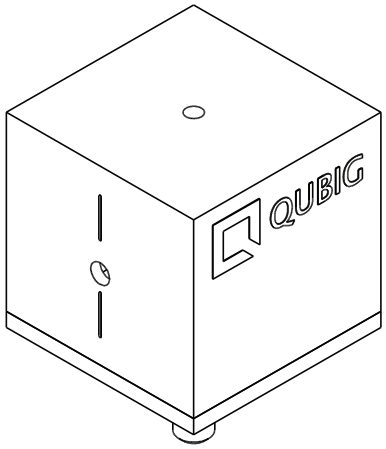
QUBIG

Empowering Laser Technologies

Test Data Sheet

EO-T412L3
S/N:

Resonant electro-optic phase modulator
with
- tunable resonance frequency



RF properties	Value	Unit
Resonance frequency: f_0 [1]	346 - 487	MHz
Preset frequency: f_{set} [1]	412	MHz
Bandwidth: Δν	2.8	MHz
Quality factor: Q	150	
Required RF power for 1rad @ 1436nm [2]	30.8	dBm
max. RF power: RF_{max} [3]	3	W

Optical properties		
EO crystal	LN	
Aperture	3x3	mm^2
Wavefront distortion (633nm)	λ/6	nm
recommended max. optical intensity (1436nm)	<5	W/mm^2
AR coating (R<0.5%)	1.0 - 1.7	um

[1] at 24.3°C [2] with 50Ω termination [3] no damage with RF_{in} < 5W

Measured modulation

Fig. 1: Oscilloscope trace

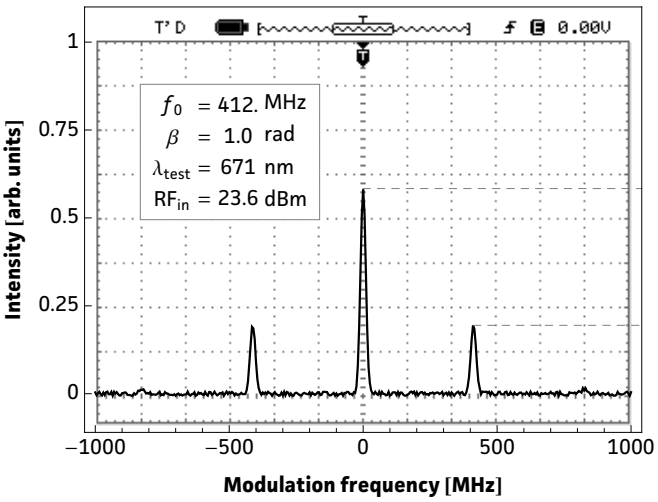


Fig. 2: Carrier/sideband ratio

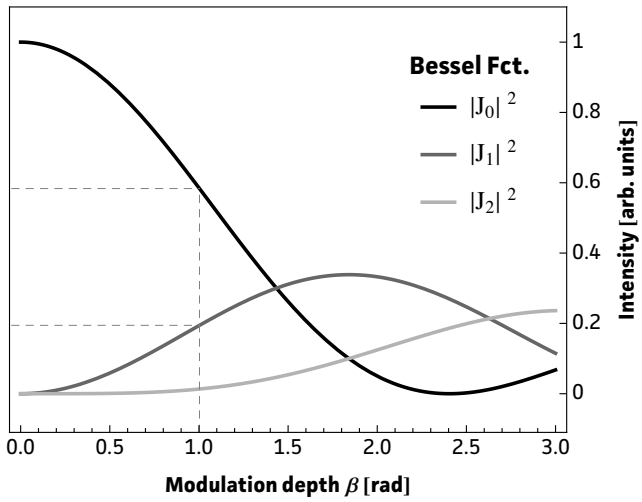


Table 1: Expected modulation

$\beta = 1$ rad	unit	λ_1	λ_2
λ	nm	**671**	**1436**
P	dBm	23.6	30.8
P	W	0.23	1.21
U	V_p	4.8	11.
U_π	V_p	15.	34.5
β / U	rad / V	0.21	0.09

Fig.1: Recorded oscilloscope 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 ß.

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 ß 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 (ß=1rad) provided in the table.

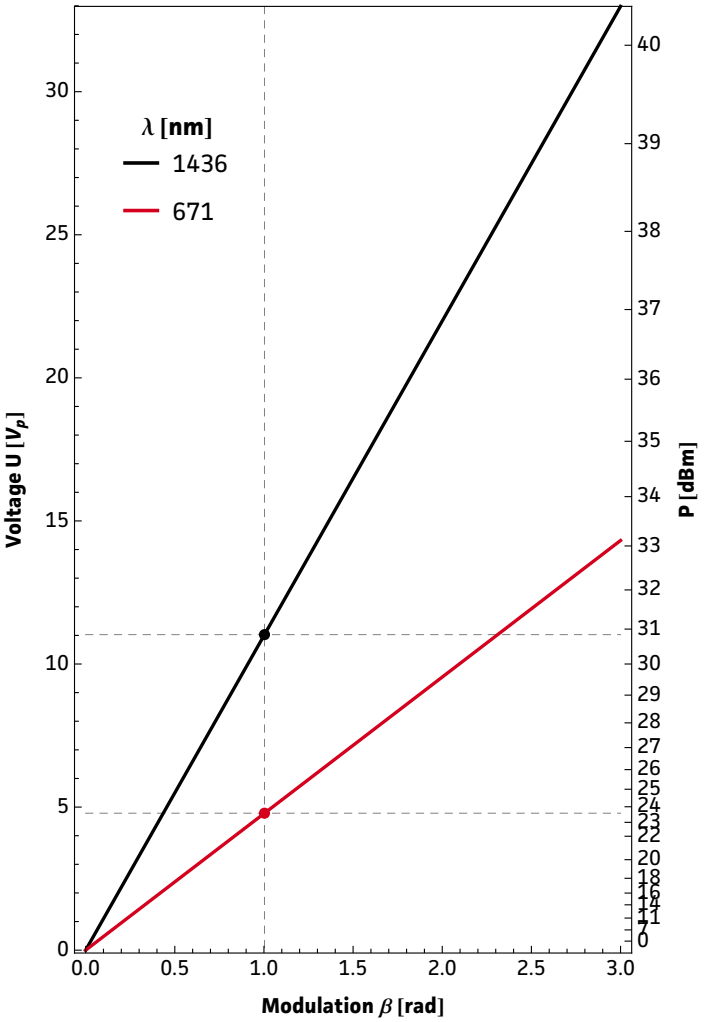
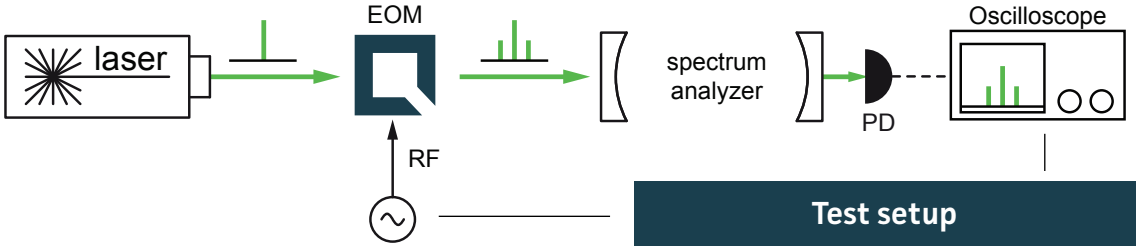
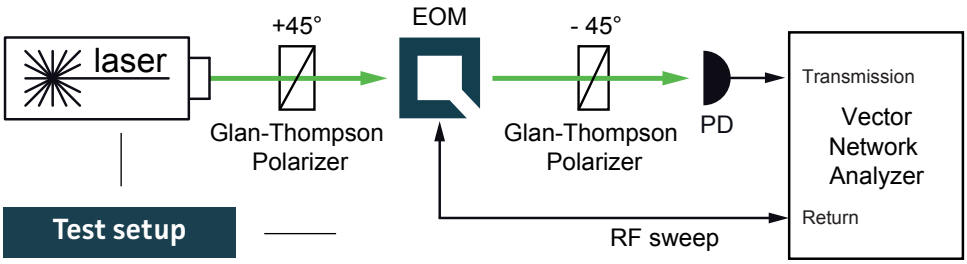


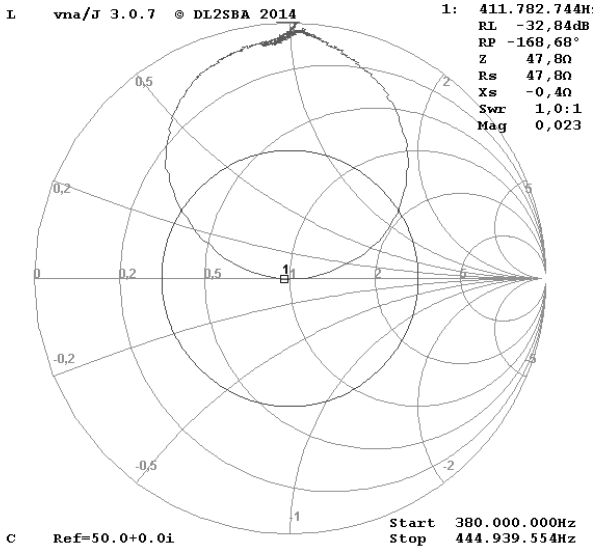
Fig. 3: RF–signal amplitude vs. modulation depth

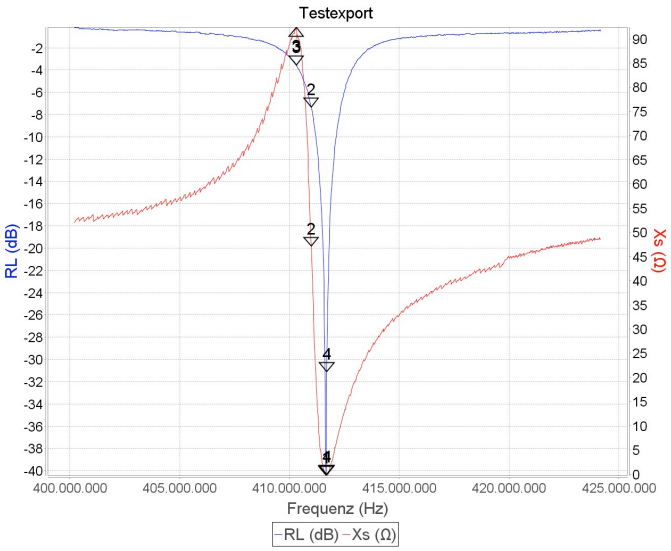


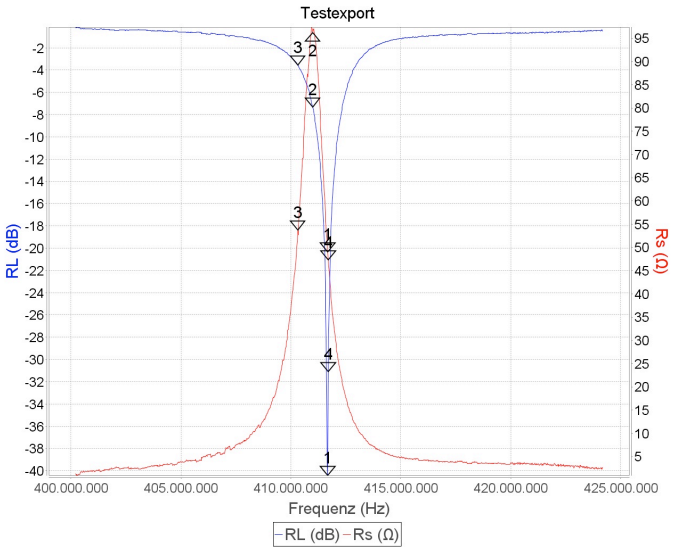
Resonance characteristics



Test setup

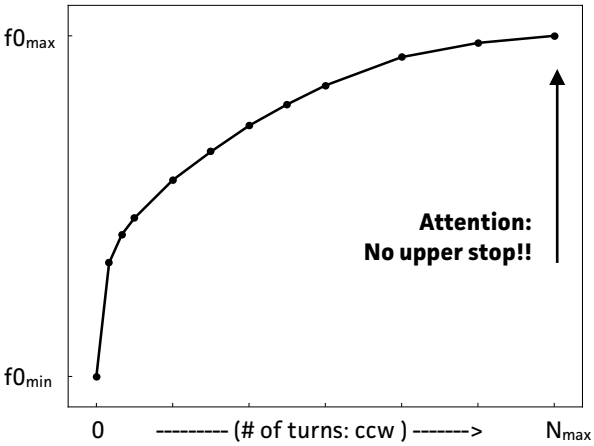






Tuning performance

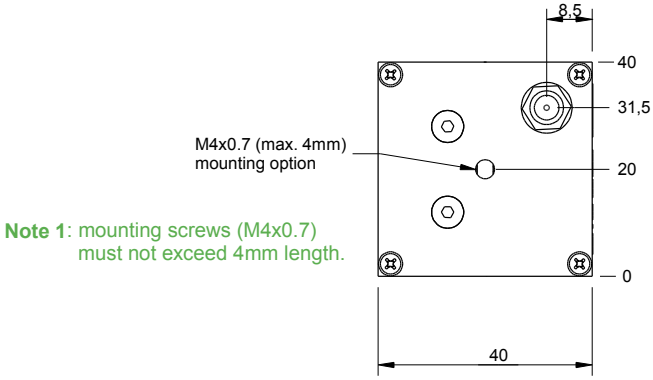
MAX resonance frequency	f_0 max	487	MHz
MIN resonance frequency	f_0 min	346	MHz
number of turns	N_{max}	10	
counter clock-wise turns ↗	higher f_0 ↑		
clock-wise turns ↘	lower f_0 ↓		



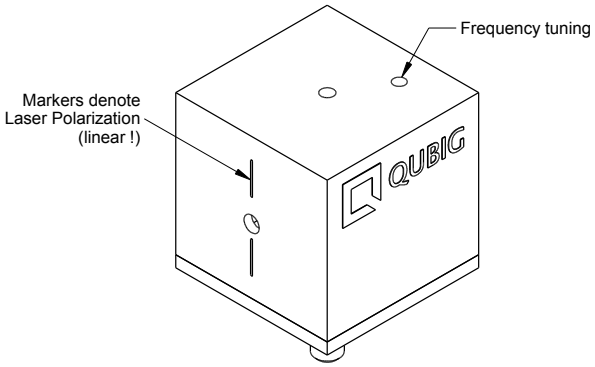
Handling instructions

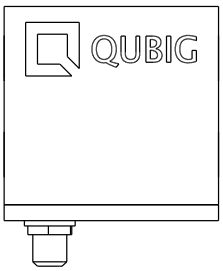
- Input laser polarisation must be orthogonally aligned with respect to the cooling fins
- Please handle device carefully. Avoid shock. Don't drop.
- After turn on the resonance frequency might drift slightly with applied rf power. Please compensate by tuning the rf drive frequency until steady-state (~min).

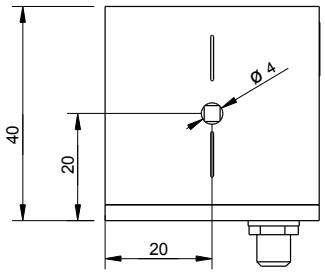
Package drawing



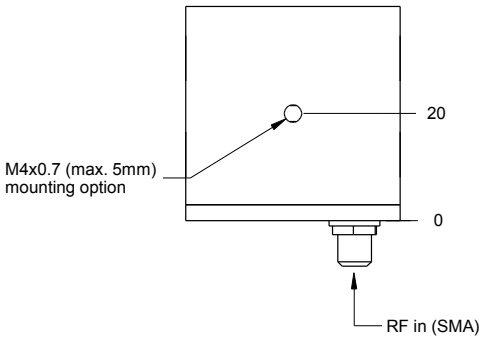
Note 1: mounting screws (M4x0.7) must not exceed 4mm length.

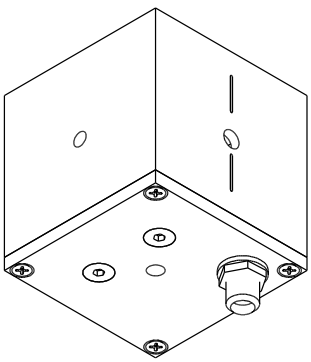


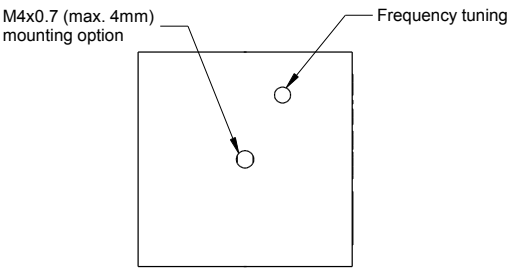




Note 2: crystal aperture is 3x3mm.







Attention!!!

Housing is hermetically sealed.
No use serviceable parts inside.
Screws must not be loosened!
Crystal will be damaged otherwise.

Tested by:

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