QUBIG

Empowering Laser Technologies

Test Data Sheet

PM9 - VIS

(EO-T1650M3-VIS)

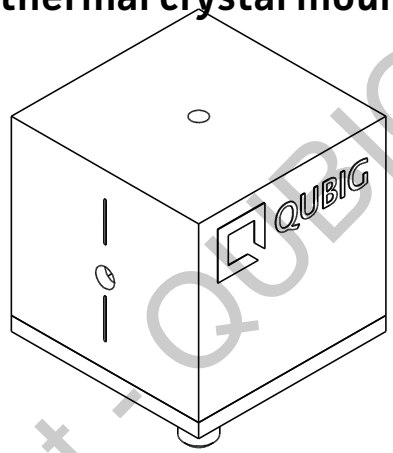
S/N:

Resonant electro-optic phase modulator

with

- tunable resonance frequency

- thermal crystal mount



RF properties	Value	Unit
Resonance frequency: f_0 [1]	1.52 - 1.74	GHz
Preset frequency: f_{set} [1]	1650	MHz
Bandwidth: Δν	5.5	MHz
Quality factor: Q	300	
Required RF power for 1rad @ 640nm [2]	28.2	dBm
max. RF power: RF_{max} [3]	2	W

Optical properties		
EO crystal	MLN	
Aperture	3x3	mm^2
Wavefront distortion (633nm)	λ/4	nm
recommended max. optical intensity (369nm)	<1	W/mm^2
AR coating (R_{avg}<0.5%)	370 - 800	nm

[1] at 22.3°C [2] with 50Ω termination [3] no damage with RF_{in} < 5W

Measured modulation

Fig. 1: Oscilloscope trace

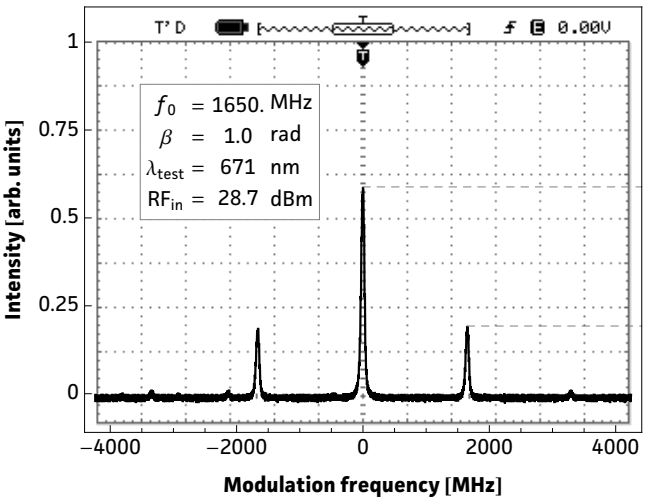


Fig. 2: Carrier/sideband ratio

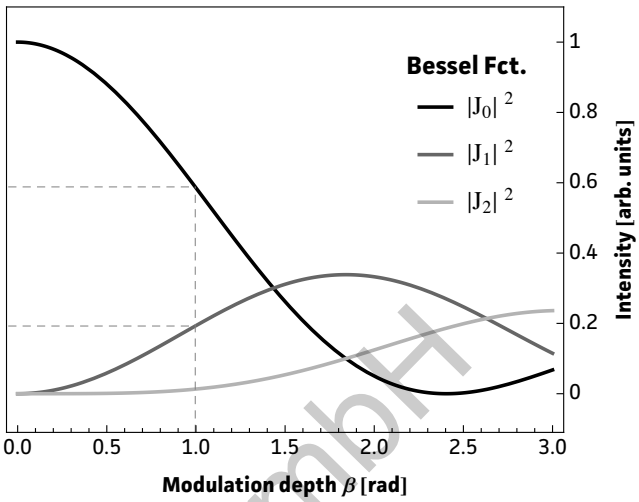


Table 1: Expected modulation

$\beta = 1$ rad	unit	λ_1	λ_2
λ	nm	**640**	**671**
P	dBm	28.2	28.7
P	mW	667	746
U	V_p	8.2	8.6
U_π	V_p	25.7	27.2
β / U	rad / V	0.12	0.12

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.

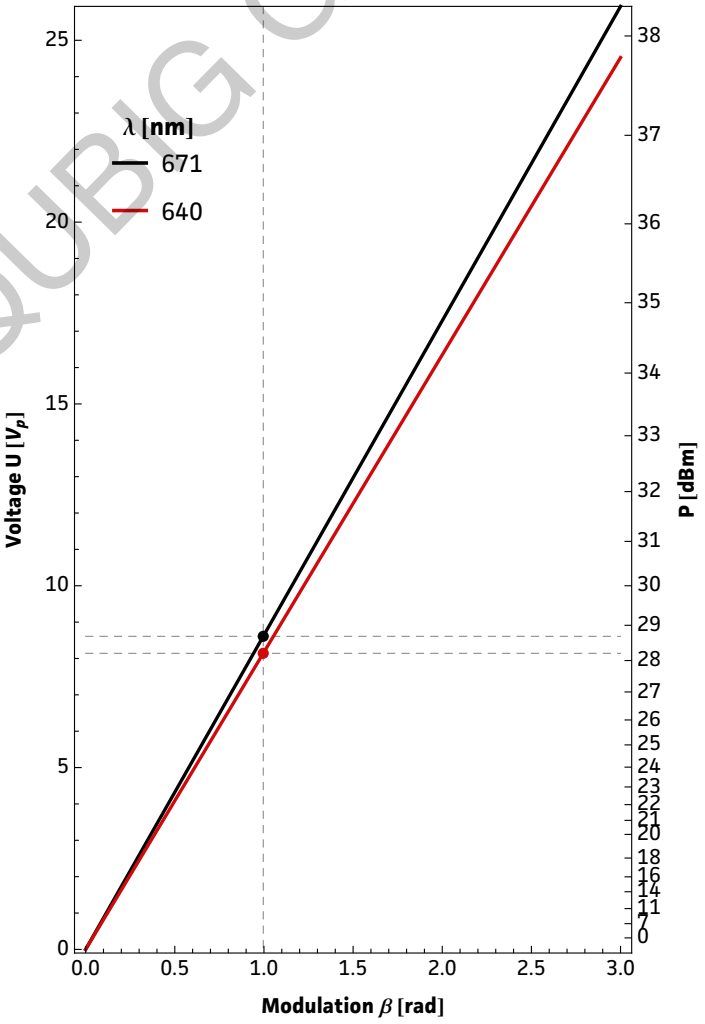
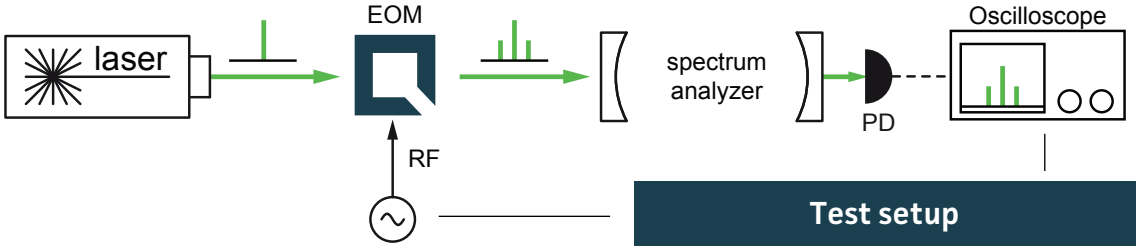
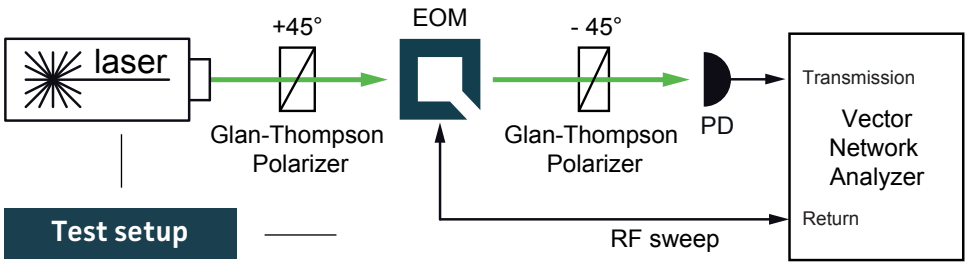
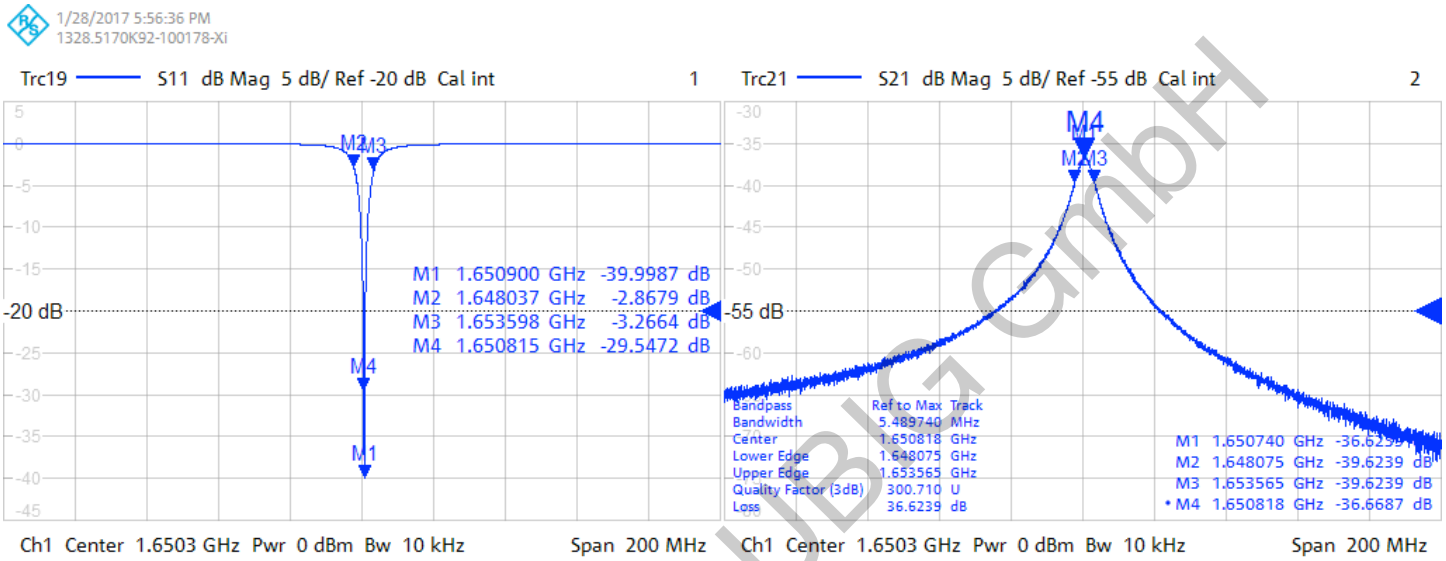


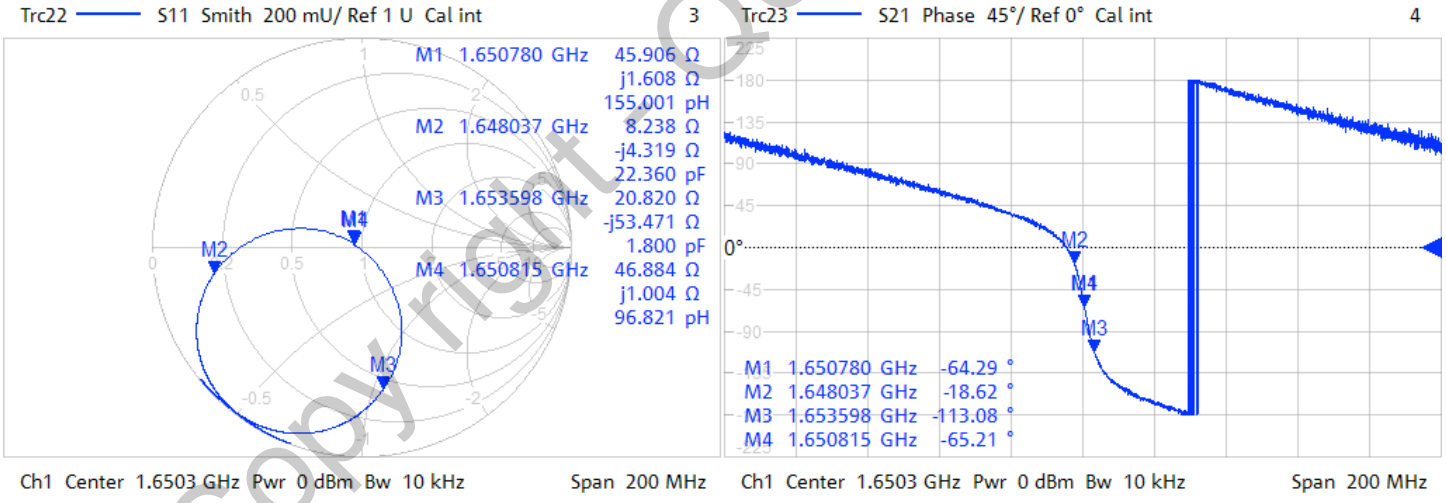
Fig. 3: RF–signal amplitude vs. modulation depth



Resonance characteristics

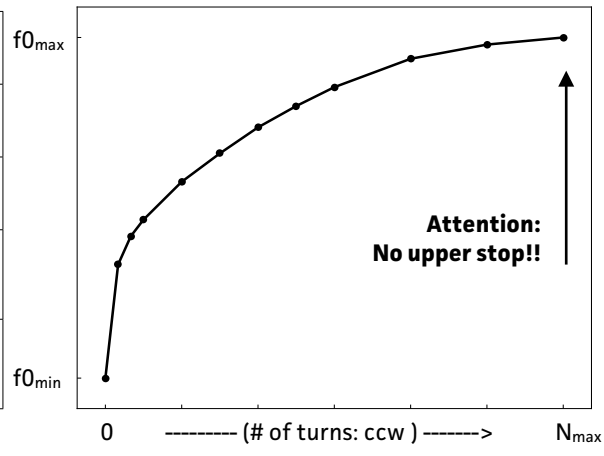






Tuning performance

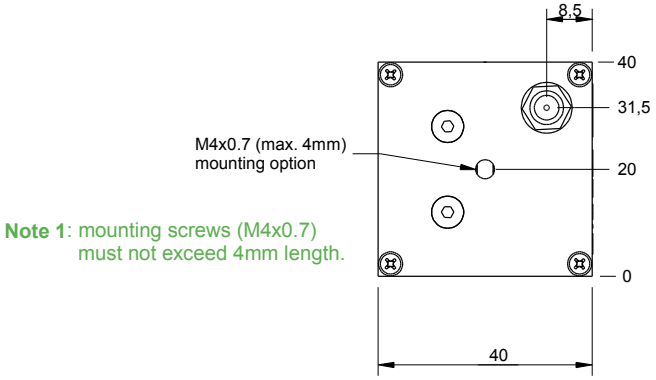
MAX resonance frequency	f_0 max	1.74	MHz
MIN resonance frequency	f_0 min	1.52	MHz
number of turns	N_{max}	5	
counter clock-wise turns ↗	higher f_0 ↑		
clock-wise turns ↘	lower f_0 ↓		



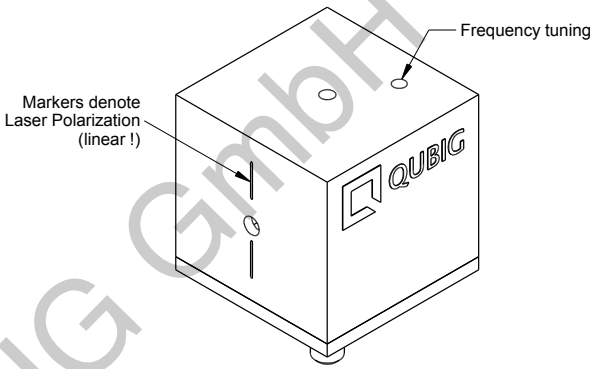
Handling instructions

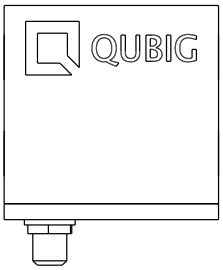
- Input laser polarization must be aligned with respect to the white markers on the housing
- Please handle device carefully. Avoid shock. Don't drop.
- After turn on the resonance frequency might drift slightly with applied RF power. Please compensate by tuning the RF drive frequency until steady-state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

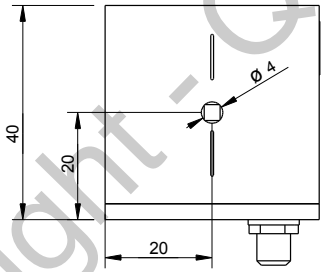
Package drawing



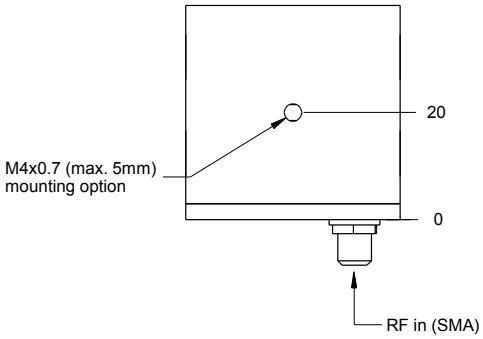
Note 1: mounting screws (M4x0.7) must not exceed 4mm length.

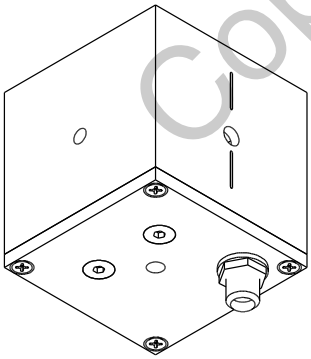


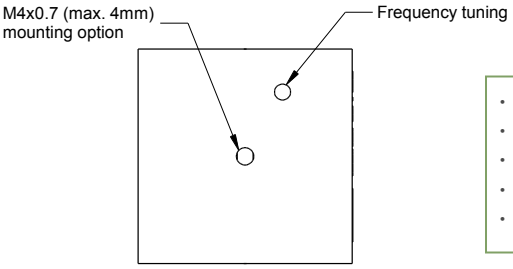




Note 2: crystal aperture is 3x3mm.







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

Tested by:

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