QUBIG

Empowering Laser Technologies

Test Data Sheet

PM9 - SWIR

(EO-T1490T3-IR3)

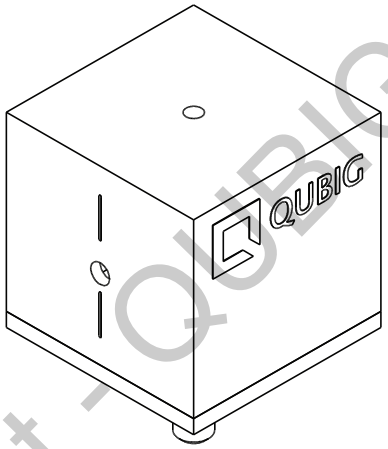
S/N:

Resonant electro-optic phase modulator

with

- tunable resonance frequency

- thermal crystal mount



RF properties	Value	Unit
Resonance frequency: f_0 [1]	1.43 - 1.55	MHz
Preset frequency: f_{set} [1]	~1.49	GHz
Bandwidth: Δν	2.7	MHz
Quality factor (BW): Q	544	
Required RF power for 1rad @ 3µm [2]	43.5	dBm
max. RF power: RF_{max} [3]	10	W

Optical properties		
EO crystal	LT	
Aperture	3x3	mm^2
Wavefront distortion (633nm)	λ/6	nm
recommended max. optical intensity (3µm)	<1	W/mm^2
AR coating (R_{avg}<0.5%)	2500 - 4000	nm

[1] at 22.3°C [2] with 50Ω termination [3] no damage with RF_{in} < 12W

Measured modulation

Fig. 1: Oscilloscope trace

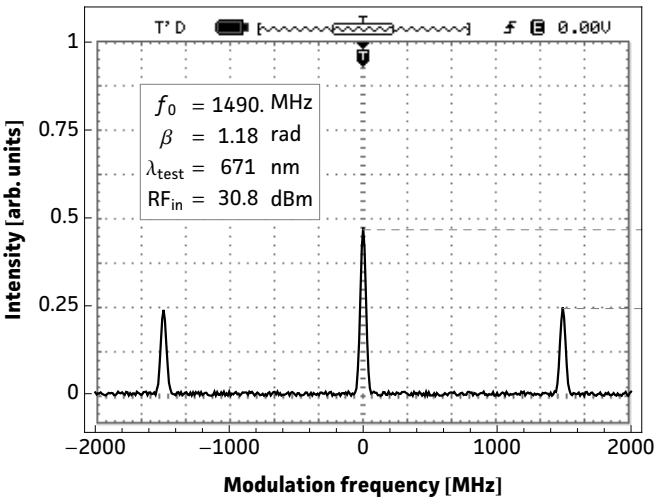


Fig. 2: Carrier/sideband ratio

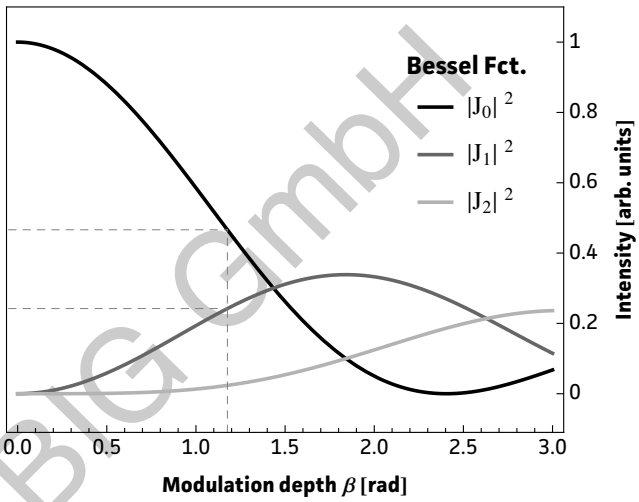


Table 1: Expected modulation

$\beta = 1$ rad	unit	λ_1	λ_2
λ	nm	**671**	**3000**
P	dBm	29.4	43.5
P	W	0.87	22.6
U	V_p	9.3	47.5
U_π	V_p	29.3	149.3
β / U	rad / V	0.11	0.02

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.

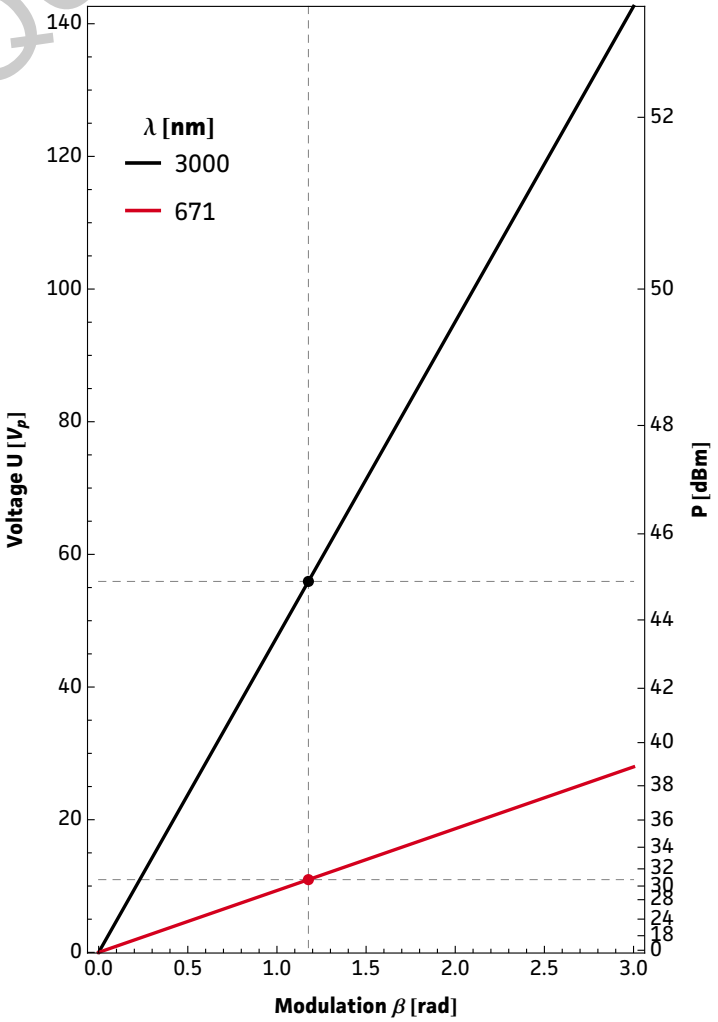
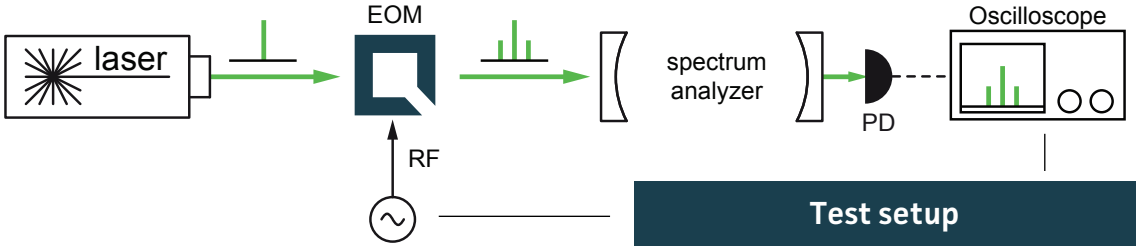
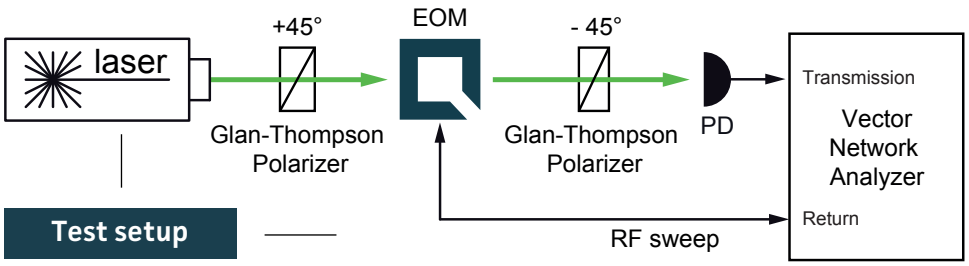
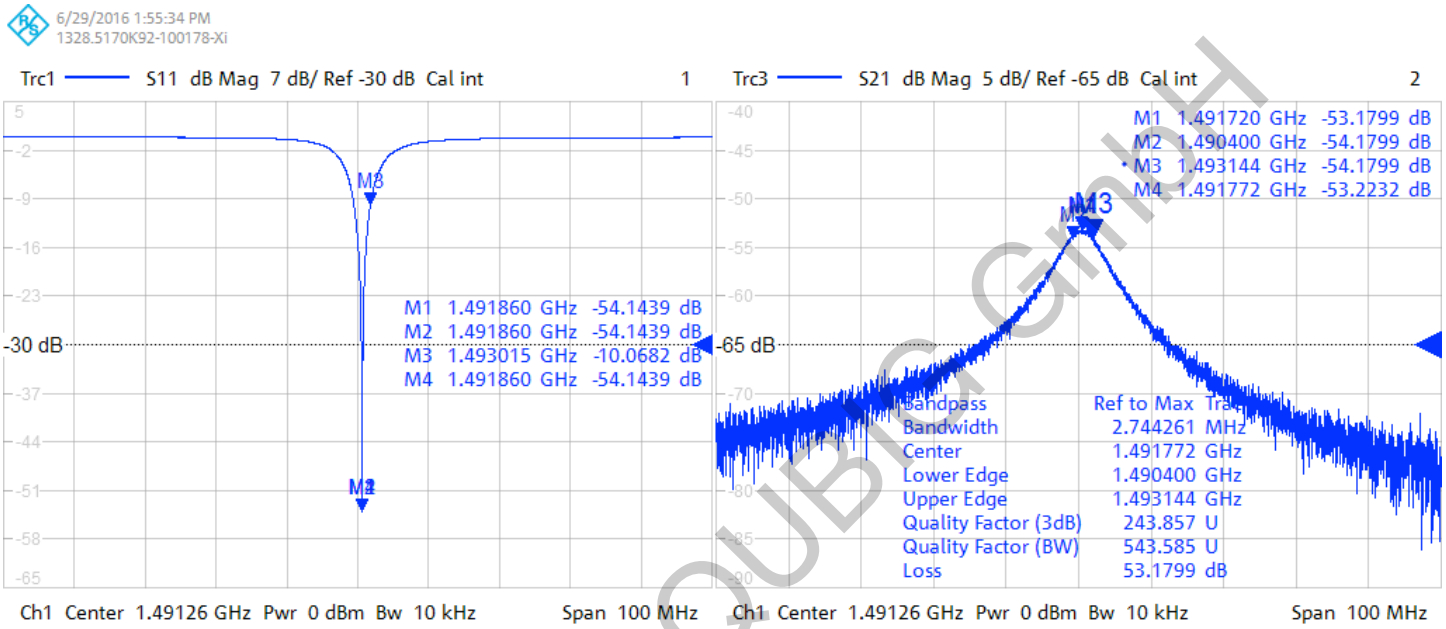


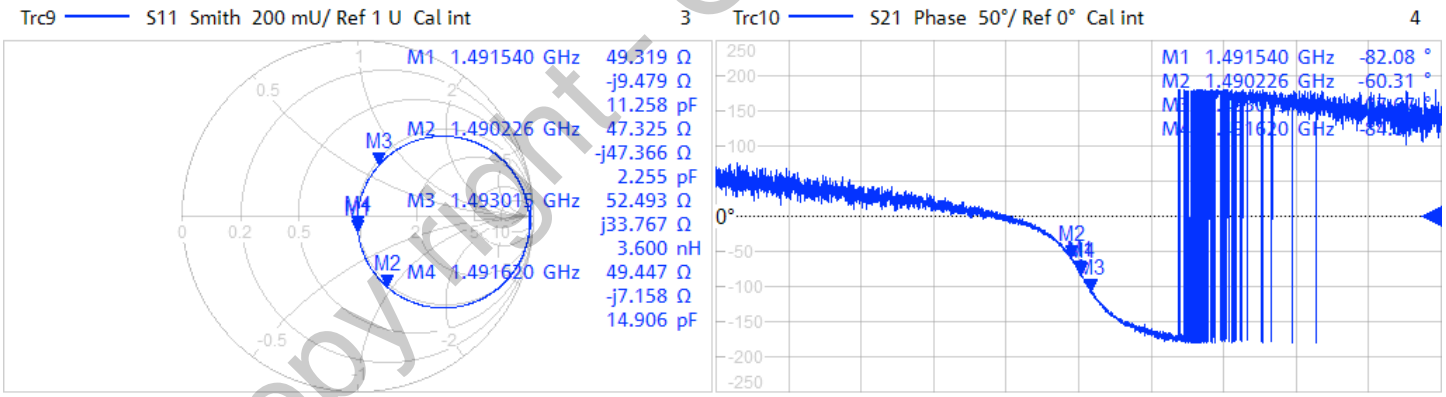
Fig. 3: RF–signal amplitude vs. modulation depth



Resonance characteristics







Tuning performance

MAX resonance frequency	f_0 max	1553	MHz
MIN resonance frequency	f_0 min	1433	MHz
number of turns	N_{max}	6	
counter clock-wise turns ⤴	higher f_0 ↑		
clock-wise turns ⤵	lower f_0 ↓