# Test Data Sheet

**EO-Li6M3**

S/N: 

**High-Q, resonant electro-optic phase modulator**

- tunable resonance frequency

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### RF properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance frequency: $f_0$ (^1)</td>
<td>199 - 278</td>
<td>MHz</td>
</tr>
<tr>
<td>Preset frequency: $f_{\text{set}}$ (^1)</td>
<td>228</td>
<td>MHz</td>
</tr>
<tr>
<td>Bandwidth: $\Delta \nu$</td>
<td>1.2</td>
<td>MHz</td>
</tr>
<tr>
<td>Quality factor: $Q$</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Required RF power for 1 rad @ 671 nm (^2)</td>
<td>21.5</td>
<td>dBm</td>
</tr>
<tr>
<td>max. RF power: $RF_{\text{max}}$ (^3)</td>
<td>1</td>
<td>W</td>
</tr>
</tbody>
</table>

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### Optical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO crystal</td>
<td>MLN</td>
</tr>
<tr>
<td>Aperture</td>
<td>3x3</td>
</tr>
<tr>
<td>Wavefront distortion (633nm)</td>
<td>$\lambda/4$</td>
</tr>
<tr>
<td>max. optical intensity (671nm)</td>
<td>&lt;10</td>
</tr>
<tr>
<td>AR coating (R&lt;0.5%)</td>
<td>380 - 700</td>
</tr>
</tbody>
</table>

\(^1\) at 24.3°C  \(^2\) with 50Ω termination  \(^3\) no damage with $RF_{\text{in}} < 2W$
### Measured modulation

![Graph showing measured modulation](image)

- Wavelength: $\lambda_{\text{use}}$ = 671 nm
- Resonance frequency: $f_0$ = 228 MHz
- Modulation: $\beta$ = 1.0 rad
- RF power: $U$ = 7.5 V
- $P_{\text{dBm}}$ = 21.5 dBm
- $P_W$ = 140 mW
- $U_n$ = 23.5 V
- Modulation efficiency: $\beta/U$ = 0.19 rad/V

**Note:** After turn on, the resonance frequency might drift slightly with applied rf power. Please compensate by tuning the rf drive frequency until steady-state.

### Expected modulation

<table>
<thead>
<tr>
<th>Wavelength</th>
<th>$\lambda_{\text{use}}$</th>
<th>671 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance frequency</td>
<td>$f_0$</td>
<td>228 MHz</td>
</tr>
<tr>
<td>Modulation</td>
<td>$\beta$</td>
<td>1.0 rad</td>
</tr>
<tr>
<td>RF power</td>
<td>$U$</td>
<td>7.5 V</td>
</tr>
<tr>
<td></td>
<td>$P_{\text{dBm}}$</td>
<td>21.5 dBm</td>
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<tr>
<td>Modulation efficiency</td>
<td>$\beta/U$</td>
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</tr>
</tbody>
</table>

### Test setup

- Laser
- EOM
- OSA
- PD
- Oscilloscope

![Test setup diagram](image)
Resonance characteristics

- 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

Attention!!

Tuning performance

- $f_0_{\text{min}} \rightarrow f_1 \rightarrow 199 \rightarrow f_2 \rightarrow 278 \rightarrow f_0$
- $f_1 < f_2$
- Max. number of turns $N_{\text{max}} = 18$
- Incr. frequency shift $\Delta f = \sim 4$ MHz/turn
- Tuning orientation $ccw$ $f_0 \uparrow$

Attention: No upper stop!!

- 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
**Package drawing**

**Note 1:** mounting screws (M4x0.7) must not exceed 5mm 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