



Modulight, Inc.

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| ML1216 SERIES TECHNICAL SPECIFICATION | | | | |
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TECHNICAL SPECIFICATION ML1216

1 OVERVIEW

Modulight's ML1216 series are high-performance Fabry-Pérot (FP) laser diodes in 5.6 mm TO-cans. The lasers emit single transverse mode at 1430 nm wavelength. The hermetic TO-can package includes an InGaAs monitor photodiode for feedback loop.

2 ORDERING INFORMATION

| Sales part | Cap type | Pin layout |
|------------|-------------|------------|
| ML1216 | Ball lens | 3 |
| ML1252 | Ball lens | 1 |
| ML1451 | Ball lens | 2 |
| ML1452 | Flat window | 1 |
| ML1453 | Flat window | 2 |
| ML1454 | Flat window | 3 |

3 ELECTRO-OPTICAL CHARACTERISTICS ^{1,2}

| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|---|------------------------------|------|----------------|------|----------|----------------------------------|
| Rated optical power ³ | P_R | 3 | - | - | mW | -40-60 °C |
| Threshold current ⁴ | I_{th} | - | 12 | 18 | mA | 25 °C |
| | | - | 19 | 33 | | 60 °C |
| Operating current | I_{op} | - | 21 [23] | 40 | mA | 25 °C, $P_{op} = 3$ mW |
| | | - | 29 [32] | 60 | | 60 °C, $P_{op} = 3$ mW |
| Operating voltage | V_{op} | - | 1.1 | 1.6 | V | 25 °C, $P_{op} = 3$ mW |
| Serial resistance ⁵ | R_s | - | 6 | - | Ω | 25 °C, $P_{op} = 3$ mW |
| Slope efficiency ⁵ | η | 0.16 | 0.32 [0.27] | - | W/A | 25 °C, $P_{op} = 3$ mW |
| | | 0.12 | 0.29 [0.24] | - | | 60 °C, $P_{op} = 3$ mW |
| Central wavelength | λ_c | 1420 | 1430 | 1450 | nm | 25 °C, $P_{op} = 3$ mW |
| | | 1400 | - | 1470 | | -40-60 °C, $P_{op} = 3$ mW |
| Spectral width ⁶ | $\Delta\lambda$ | - | 0.9 | 4 | nm | 25 °C, $P_{op} = 3$ mW |
| Temperature shift of wavelength | $\partial\lambda/\partial T$ | - | 0.50 | - | nm/K | -40-60 °C, $P_{op} = 3$ mW |
| Perpendicular beam divergence angle (FWHM) ⁷ | θ_{\perp} | - | 36 [10] | - | deg | 25 °C, $P_{op} = 3$ mW |
| Parallel beam divergence angle (FWHM) ⁷ | θ_{\parallel} | - | 21 [10] | - | deg | 25 °C, $P_{op} = 3$ mW |
| Modulation bandwidth | f_{-3dB} | 4 | 7 | - | GHz | 25 °C, $I_{op} = I_{th} + 16$ mA |
| | | 2 | 6 | - | | 60 °C, $I_{op} = I_{th} + 16$ mA |
| Resonance frequency | f_r | - | 5 | - | GHz | 25 °C, $I_{op} = I_{th} + 16$ mA |
| | | - | 4 | - | | 60 °C, $I_{op} = I_{th} + 16$ mA |
| Monitor current | I_m | 100 | 250 [300] | 700 | μ A | 25 °C, $P_{op} = 3$ mW |
| Monitor dark current | I_d | - | 0.1 | 1.0 | μ A | 25 °C, $V_{RPD} = 5$ V |

¹ All temperatures refer to case temperature, T_c

² Where indicated, values in brackets [] apply for ball lens cap type

³ Kink-free, demonstrated reliability

⁴ 2nd derivative method

⁵ $P_{HI} = 1$ mW, $P_{LO} = 3$ mW

⁶ RMS, -20 dB

⁷ Full Width at Half Maximum



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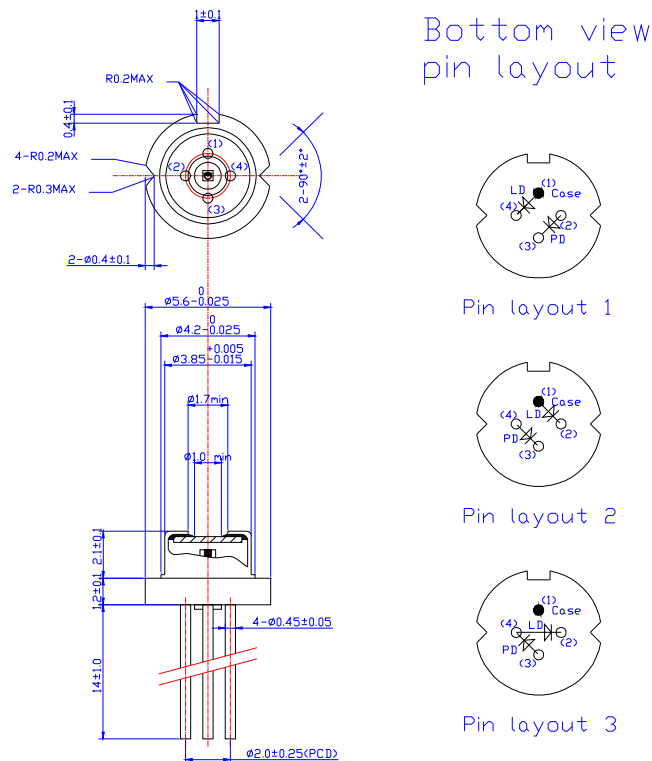
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| | | | | | | |
|---------------------------|----------|----|--------|----|----|--|
| Monitor capacitance | C_m | - | 5 | 10 | pF | $f = 1 \text{ MHz}, V_{RPP} = 5 \text{ V}$ |
| Tracking error | γ | -1 | - | 1 | dB | $I_m = \text{constant}, P_o = 3 \text{ mW@25}^\circ\text{C}$ |
| Focal length ⁸ | D_f | - | [5.95] | - | mm | $25^\circ\text{C}, P_{op} = 3 \text{ mW}$ |
| Fiber coupling efficiency | | - | [7.5] | - | % | Single-mode fiber |

4 ABSOLUTE MAXIMUM RATINGS ⁹

| Parameter | Symbol | Rating | Unit |
|------------------------------------|-----------|-------------------------|------------------|
| Optical output power | P_{op} | 20 | mW |
| LD reverse voltage | V_{RLD} | 2 | V |
| LD forward current | I_{FLD} | 150 | mA |
| PD reverse voltage | V_{RPD} | 20 | V |
| PD forward current | I_{FPD} | 10 | mA |
| Lead soldering temperature (<10 s) | T_{SLD} | 260 | $^\circ\text{C}$ |
| Operating case temperature | T_c | -40-60 $^\circ\text{C}$ | $^\circ\text{C}$ |
| Storage temperature | T_{STG} | -40-85 $^\circ\text{C}$ | $^\circ\text{C}$ |

5 MECHANICAL SPECIFICATION – ML-T-1430-FP-2G5-3-F-X



⁸ Distance from reference plane (see mechanical specification) to focal point. Applicable to ball lens cap type only.

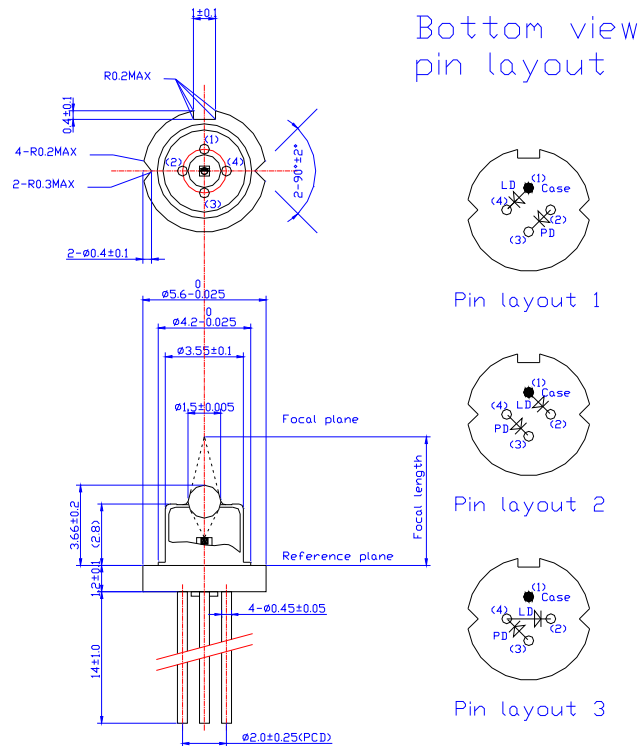
⁹ Operation in excess of any one of these parameters may result in permanent damage.



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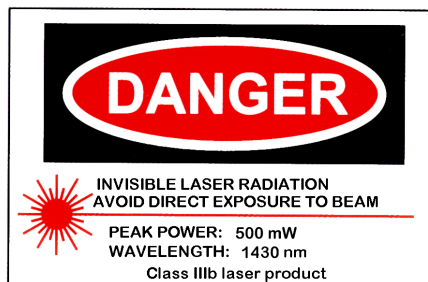
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6 MECHANICAL SPECIFICATION - ML-T-1430-FP-1G-3-B-X



7 SAFETY INFORMATION

- The laser light emitted from this laser diode is invisible and may be harmful to the human eye. Avoid eye exposure to the beam, both direct and reflected.
- Products are subject to the risks normally associated with sensitive electronic devices including static discharge, transients, and overload. Please take care of proper ESD protection prior to handling the products.
- These Modulight products are not intended for use in systems where product malfunction can reasonably be expected to result in personal injury.



Peak power and wavelength are for safety analysis only do not present device performance

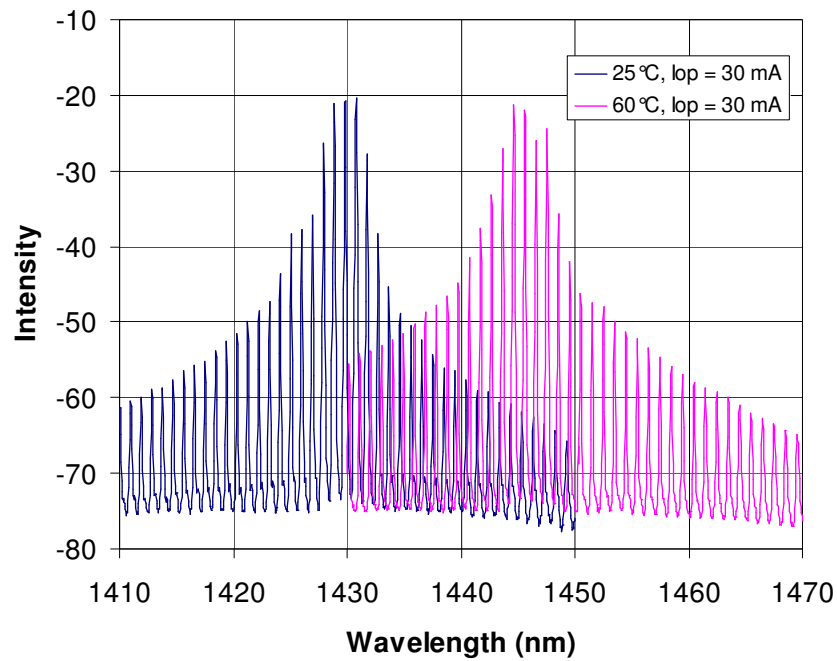


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8 LIABILITY NOTE

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9 TYPICAL PERFORMANCE



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