



Modulight, Inc.

Document type:		Document number:	Version:	
Product specification		TBD	A1	
Document name:				
ML1212 SERIES TECHNICAL SPECIFICATION				
Author:	Reviewer:	Approver:	Release date:	Pages:
Sippe	Savpe	Uuspe	26-Aug-04	6

TECHNICAL SPECIFICATION

ML1212

1 OVERVIEW

Modulight's ML1212 series are reliable high-performance Fabry-Pérot (FP) laser diodes in 5.6 mm TO-cans with narrow spectral linewidth and exceptionally good high-temperature performance. The lasers emit single transverse mode at 1310 nm wavelength. The hermetically sealed can package includes a reliable InGaAs monitor photodiode for feedback loop.

ML1212 series have been designed for digital optical communication networks with up to 2.5 Gb/s modulation speeds. Products are available with flat window cap, ball lens cap or a specially designed low-profile cap with only 4.05 mm height and aspheric lens for high single-mode fiber coupling efficiency for demanding small form factor transceiver applications.

2 ORDERING INFORMATION

	Cap type	Pin layout
ML1212	Aspherical lens	3
ML1213	Ball lens	3
ML1214	Flat lens	2
ML1215	Flat lens	3
ML1247	Aspherical lens	1
ML1248	Aspherical lens	2
ML1249	Ball lens	1
ML1250	Ball lens	2
ML1251	Flat lens	1

3 ELECTRO-OPTICAL CHARACTERISTICS ^{1,2}

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Rated optical power ³	P_R	7	-	-	mW	-40-85°C
Threshold current ⁴	I_{th}	-	9	18	mA	25°C
		-	20	-		85°C
Operating current	I_{op}	-	21 [23]	32 [35]	mA	25°C, $P_{op} = 5$ mW
		-	37 [39]	-		85°C, $P_{op} = 5$ mW
Operating voltage	V_{op}	-	1.1	1.6	V	-40-85°C, $P_{op} = 5$ mW
Serial resistance ⁵	R_s	-	6	-	Ω	25°C, $P_{op} = 5$ mW
Slope efficiency ⁵	η	0.30 [0.2]	0.40 [0.34]	-	W/A	25°C, $P_{op} = 5$ mW
		-	0.29 [0.25]	-		85°C, $P_{op} = 5$ mW
Central wavelength	λ_c	1290	1310	1330	nm	25°C, $P_{op} = 5$ mW
		1260	-	1355		-40-85°C, $P_{op} = 5$ mW

¹ All temperatures refer to case temperature, T_c

² Where indicated, values in brackets [] apply for ball lens cap type, values in parenthesis () apply for aspheric lens cap type

³ Kink-free, demonstrated reliability

⁴ 2nd derivative method

⁵ $P_{HI} = 1$ mW, $P_{LO} = 7$ mW



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Spectral width ⁶	$\Delta\lambda$	-	0.85	2	nm	25 °C, P _{op} = 5 mW
Temperature shift of wavelength	$\partial\lambda/\partial T$	-	0.46	-	nm/K	-40-85 °C, P _{op} = 5 mW
Perpendicular beam divergence angle (FWHM) ⁷	θ_{\perp}	-	38 [9] (-)	-	deg	25 °C, P _{op} = 5 mW
Parallel beam divergence angle (FWHM) ⁷	θ_{\parallel}	-	21 [8.2] (-)	-	deg	25 °C, P _{op} = 5 mW
Modulation bandwidth	f _{-3dB}	6	7.5	-	GHz	25 °C, I _{op} = I _{th} + 16 mA
		4	5	-		85 °C, I _{op} = I _{th} + 16 mA
Monitor current	I _m	200 [300]	400 [500]	600 [700]	μA	25 °C, P _{op} = 5 mW
Monitor dark current	I _d	-	0.1	1.0	μA	25 °C, V _{RPD} = 5 V
Monitor capacitance	C _m	-	5	10	pF	f = 1 MHz, V _{RPD} = 5 V
Tracking error	γ	-1	-	1	dB	I _m = constant, P _o = 5mW@25 °C
Focal length ⁸	D _f	[6.00] (3.87)	[6.10] (3.97)	[6.20] (4.07)	mm	25 °C, P _{op} = 5 mW
Fiber coupling efficiency		-	[12] (45)	-	%	Single-mode fiber

4 ABSOLUTE MAXIMUM RATINGS⁹

Parameter	Symbol	Rating	Unit
Optical output power	P _{op}	20	mW
LD reverse voltage	V _{RLD}	2	V
LD forward current	I _{FLD}	200	mA
PD reverse voltage	V _{RPD}	20	V
PD forward current	I _{FDP}	10	mA
Lead soldering temperature (<10 s)	T _{SLD}	260	°C
Operating case temperature	T _c	-40-85 °C	°C
Storage temperature	T _{STG}	-40-85 °C	°C

⁶ RMS, -20 dB

⁷ Full Width at Half Maximum

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

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



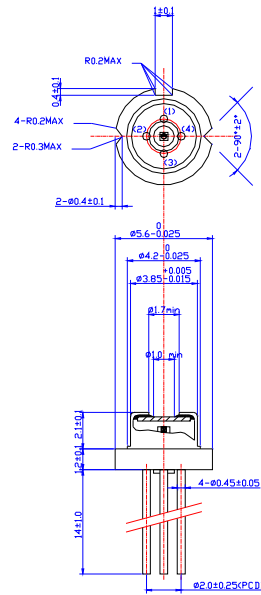
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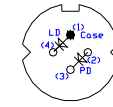
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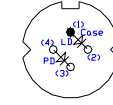
5 MECHANICAL SPECIFICATION – ML1251, ML1214, ML1215



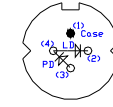
Bottom view pin layout



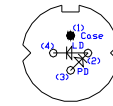
Pin layout 1



Pin layout 2

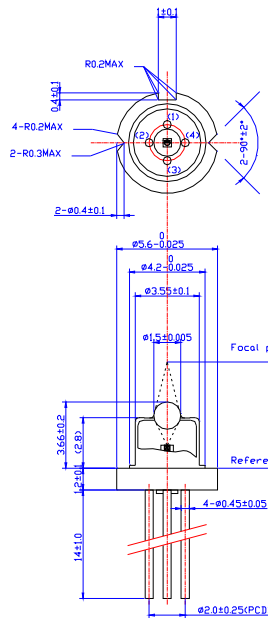


Pin layout 3

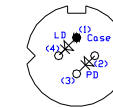


Pin layout 4

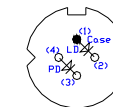
6 MECHANICAL SPECIFICATION – ML1249, ML1250, ML1213



Bottom view pin layout



Pin layout 1



Pin layout 2



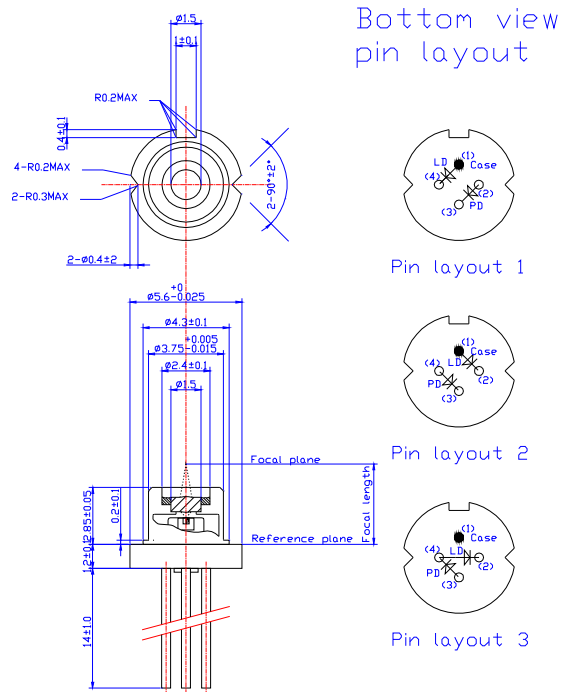
Pin layout 3



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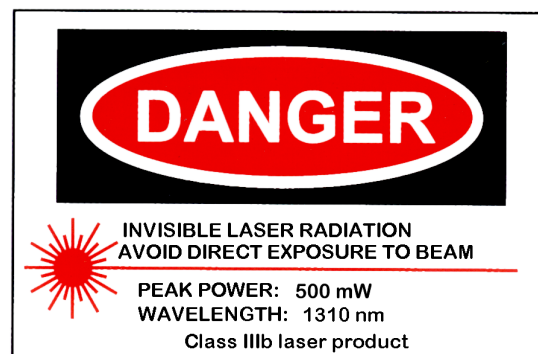
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7 MECHANICAL SPECIFICATION – ML1247, ML1248, ML1212



8 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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9 LIABILITY NOTE

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