ML3110 Series

modulight

EML diode chips for 25 Gb/s NRZ and 50 Gb/s PAM4 digital applications

ML3110 series products are Electro-absorption Modulated Laser (EML) diode chips designed for 25 Gb/s NRZ and 50 Gb/s PAM4 digital applications. They are available in L0...L3 wavelengths as defined by IEEE 802.3 100GBASE-LR4, for applications in fiber-optic transceivers.



Electro-optical Characteristics

The lasers are shipped as an unassembled bare die. The parameters given in the table below are valid for the whole operating temperature range. The parameters are given as measured either for an unmounted laser bar or a chip that is soldered on an Au-plated copper heat sink using AuSn solder. Assembly process may impact the parameter values.

Parameter	Symbol	Min.	Typical	Max.	Unit
Peak Wavelength ▪ ML3110 ▪ ML3111 ▪ ML3112 ▪ ML3113	λ	 1294.53 1299.02 1303.54 1308.09	 1295.56 1300.05 1304.58 1309.14	 1296.59 1301.09 1305.63 1310.19	nm
Side mode suppression ratio [1]	SMSR	35	48	-	dB
Operating Current [1, 2]	I_{OP}	-	-	60	mA
Operating Voltage [1]	V_{OP}	-	1.3	1.6	V
Slope Efficiency [1, 2]	η	0.13	0.19	-	mW/mA
Threshold Current	I_{TH}	-	14	15	mA
Series Resistance [1]	R_S	-	5	-	Ohm
Static Extinction Ratio [3]	DCER	9	-	-	dB
Horizontal/parallel beam divergence (FWHM) [1]	θ_H	-	27	-	°
Vertical/perpendicular beam divergence (FWHM) [1]	θ_V	-	24	-	°
Relative Intensity Noise [4]	$RIN_{20}OMA$	-	-	-130	dB/Hz
Small-signal modulation bandwidth [3]	f_{-3dB}	20	-	-	GHz
Front-to-rear ratio [2, 4]		-	100:1	-	

[1] P_O = 7 mW
[2] EAM unbiased
[3] I = 60 mA, VEA = -2 V
[4] I = 60 mA

Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Operating Case Temperature Range	T_C	45...55 [1]	°C

2026-09-23 -113

Absolute Maximum Ratings

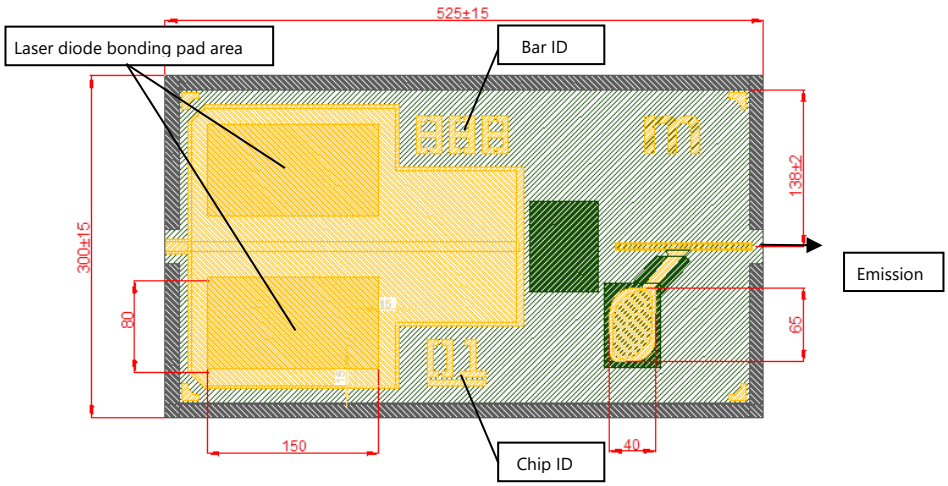
Values should not be exceeded in any conditions to avoid permanent device damage.

Parameter	Symbol	Rating	Unit
LD forward current	I_{FLD}	200	mA
LD reverse voltage	V_{RLD}	2	V
Modulator reverse voltage	V_{FMOD}	-3.5	V
Modulator forward voltage	V_{RMOD}	1	V
Die bonding temperature	T_B	350 (<10s)	°C
LD forward current	V_{FLD}	200	mA
Operating Case Temperature Range	T_C	-20...85 [1]	°C
Storage Temperature Range	T_{ST}	-20...85	°C

[1] A non-condensing environment should be ensured over the useful temperature range.

Mechanical Dimensions

All dimensions in µm
Chip thickness 100±15 µm
Polarity: p-contact (anode) up



Safety Information

- ❑ The laser light emitted from this laser diode is invisible and potentially harmful to the human eye. Avoid eye and skin 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 ensure 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, not to present device performance.

Handling

- ❑ Laser chips are sensitive both mechanically and electrically. Extreme care should be taken when handling the bare dies, in order to avoid any damage to laser facets and waveguide area.
- ❑ Products are subject to the risks normally associated with sensitive electronic devices including static discharge, transients, and overload. Please ensure ESD protection prior to handling the products.



- ❑ Electrostatic discharge may cause direct or latent damage to laser diodes. During laser handling, precautions for handling electrostatically sensitive devices must be observed. Please store the product in its original package until used.

Liability note

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RoHS compliance

The product complies with EU RoHS 2 (Directive 2011/65/EU) and China RoHS II (Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products)

2026-09-23 -1r3