MITSUBISHI LASER DIODES

ML9XX12 SERIES

InGaAsP—MQW—DFB LASER DIODES

TYPE NAME ML99212

DESCRIPTION

ML9XX12 series are MQW*—DFB** laser diodes emitting light beam around 1550nm.

They are well suited for light source in longdistance digital transmission systems.

The ML99212 are specially designed for fiber modules and mount on flat open packages.

Rear output can be used for automatic power control of the laser.

* MQW : Multiple Quantum Well

** DFB: Distributed Feedback

FEATURES

- Well suitable for 2.5Gb/s digital transmission with 1.3 μm normal fiber 100km
- Low threshold current (typical 20mA)
- Stable single transverse mode oscillation
- High-side mode suppression ratio (typical 40dB)
- High speed pulse response (rise/fall time typical 0.1nsec)
- Small spectrum width (typical 0.1nnm) (20dB down)

APPLICATION

Long-distance (100km) /High bit-rate (2.5Gb/s) digital transmission system

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
P_O	Light output power	CW	12	mW
V_{RL}	Reverse Voltage (Laser diode)	—	2	V
T_C	Case temperature	—	+20~+30	℃
T_{stg}	Storage temperature	—	−40~+100	℃

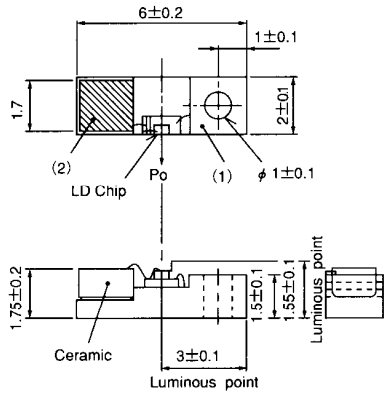
ELECTRICAL/OPTICAL CHARACTERISTICS (T_C = 25℃)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{th}	Threshold current	CW	—	20	40	mA
I_{OP}	Operating current	CW,P_O = 10mW	—	60	90	mA
V_{OP}	Operating voltage	CW,P_O = 10mW	—	1.2	1.8	V
η	Slope efficiency	CW,P_O = 10mW	—	0.25	—	mW/mA
λ_P	Peak wavelength	CW,P_O = 10mW	1530	1550	1570	nm
$\theta_{//}$	Beam divergence angle (parallel)	CW,P_O = 10mW	—	30	45	deg.
$\theta_{\perp}$	Beam divergence angle (perpendicular)	CW,P_O = 10mW	—	40	50	deg.
P_m	Monitoring output	CW,P_O = 10mW	—	0.5	—	mW
fc	Cutoff frequency	CW,P_O = 10mW,−3dB	3.0	4.5	—	GHz
fr	Resornance frequency	extinction ratio = 10%,modulation current = 40mA	8	12	—	GHz
tr,tf	Rise and fall time	extinction ratio = 10%,modulation current = 40mA,10~90%	—	0.1	0.2	ns
SMSR	Side mode suppression ratio	extinction ratio = 10%,modulation current 40mA	30	40	—	dB
$\triangle\lambda_{-20}$	Spectrum width (−20dB full width)	2.48832Gb/s,NRZ	—	0.1	—	nm
P_P	Power penalty	extinction ratio = 10%,modulation current = 40mA 2.48832Gb/s,NRZ 1.3 μm normal fiber 100km @BER = 10^{-10}	—	0.5	—	dB

OUTLINE DRAWINGS

ML99212

Dimension : mm



(Chip carrier type)

TYPICAL CHARACTERISTICS

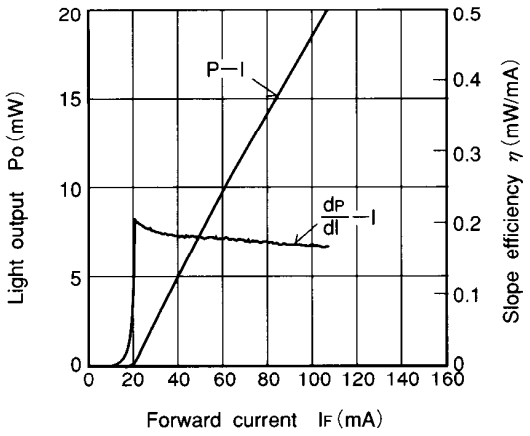


Fig.1 Light output vs. forward current

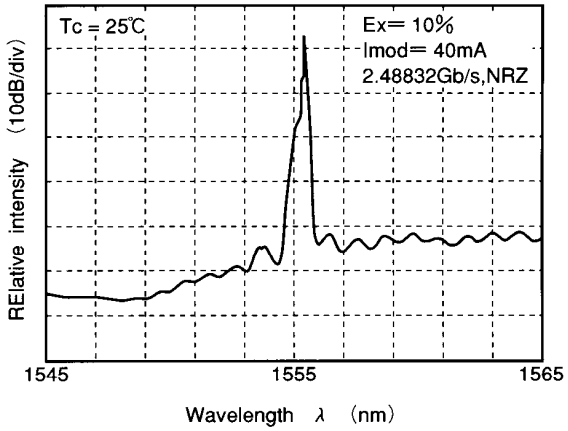


Fig.2 Spectrum under 2.5Gb/s modulation

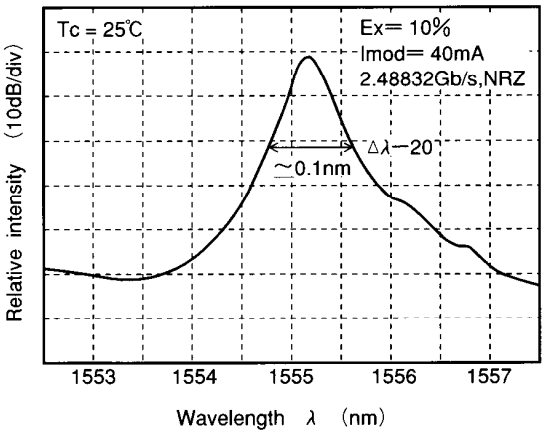


Fig.3 Spectrum width under 2.5Gb/s modulation

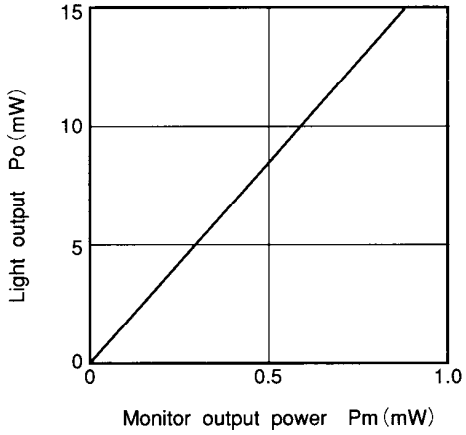


Fig.4 Light output vs. monitoring output power

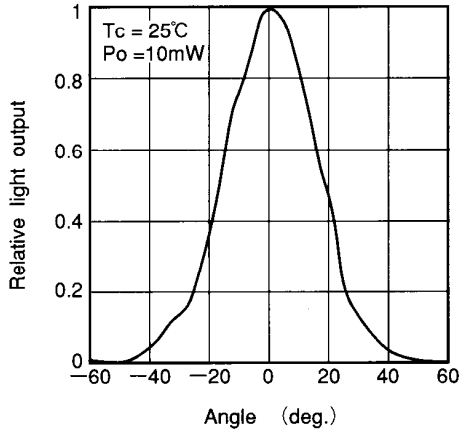


Fig.5-1 Far field pattern θ //

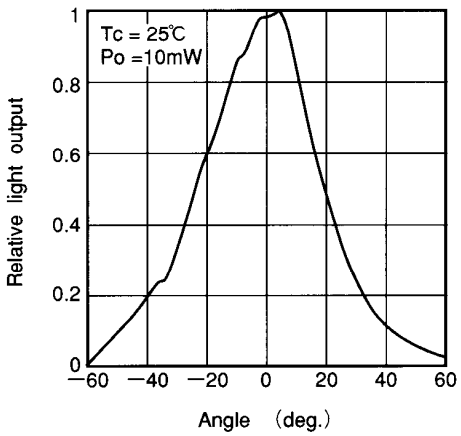


Fig.5-2 Far field pattern θ ⊥

TYPICAL CHARACTERISTICS (Cont.)

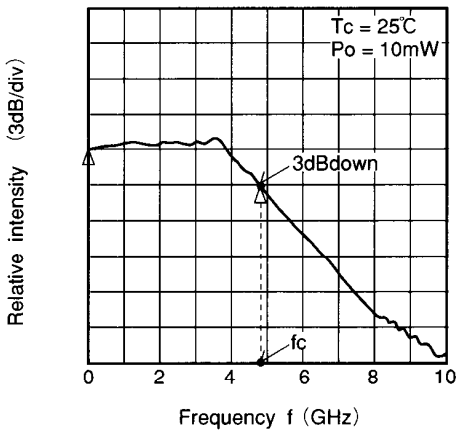


Fig.6 Frequency characteristics

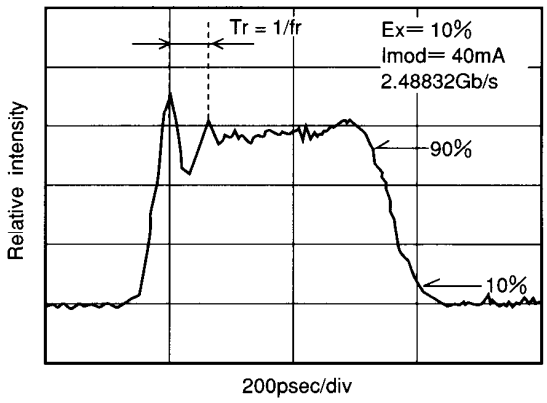


Fig.7 Pulse respose ／Resornance frequency

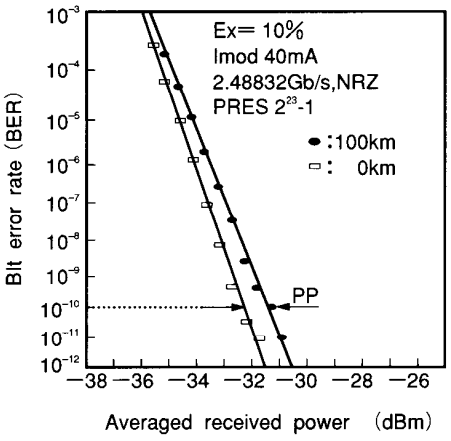


Fig.8 Transmission characteristics