

MITSUBISHI LASER DIODES
ML9XX15 SERIES

InGaAsP DFB-LD with EA modulator

**TYPE
NAME**

ML9XX15

DESCRIPTION

ML9XX15 series are DFB (Distributed Feedback) laser diodes with a monolithically integrated EA (Electro-Absorption) modulator emitting light beam around 1550nm.

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

FEATURES

- 1550nm DFB laser diode
- Integrated EA modulator
- High-speed response (2.5Gb/s)
- High-side mode suppression ratio (typical 40dB)
- Low driving voltage (typical/2Vpp@Ex=12dB)

APPLICATION

Long - distance (~300km) / High bit-rate (2.5Gb/s) digital transmission system

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
I _F	Laser forward current (LD)	CW	200	mA
V _{RL}	Laser forward voltage (LD)	—	2	V
V _{EA}	Modulator voltage	—	0~-3	V
T _C	Case temperature	—	+20~+30	°C
T _{stg}	Storage temperature	—	-40~+100	°C

ELECTRICAL/OPTICAL CHARACTERISTICS (T_C = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I _{th}	Threshold current	CW, V _{mod} = 0V	—	20	30	mA
I _{OP}	Operating current	CW, P _O = 3mW, V _{mod} = 0V	—	90	150	mA
V _{OP}	Operating voltage	CW, P _O = 3mW, V _{mod} = 0V	—	1.5	2.0	V
η	Slope efficiency	CW, P _O = 3mW, V _{mod} = 0V	—	0.04	—	mW/mA
λ _P	Peak wavelength	CW, P _O = 3mW, V _{mod} = 0V	1530	1550	1570	nm
θ _∥	Beam divergence angle (parallel)	CW, P _O = 3mW, V _{mod} = 0V	—	30	—	deg.
θ _⊥	Beam divergence angle (perpendicular)	CW, P _O = 3mW, V _{mod} = 0V	—	35	—	deg.
P _m	Monitoring output	CW, P _O = 3mW, V _{mod} = 0V	—	1.0	—	mW
f _c	Cutoff frequency	CW, P _O = 3mW, V _{mod} = -1V	4.0	6.0	—	GHz
Ex	Extinction ratio	CW, P _O = 3mW, V _{mod} = -2.0V	10	12	—	dB
t _r , t _f	Rise and fall time	2.48832Gb/s, NRZ, PRBS ²³ -1	—	—	125	psec
SMSR	Side mode suppression ratio	mark ratio = 50%	30	40	—	dB
Δλ ₋₂₀	Spectrum width (20dB down)	I _f = I _{OP} , V _{PP} = 2.0V	—	—	0.25	nm
PP	Power penalty	ditto 1.3 μm ZDF350km @BER = 10 ⁻¹⁰	—	0.0	—	dB

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TYPICAL CHARACTERISTICS

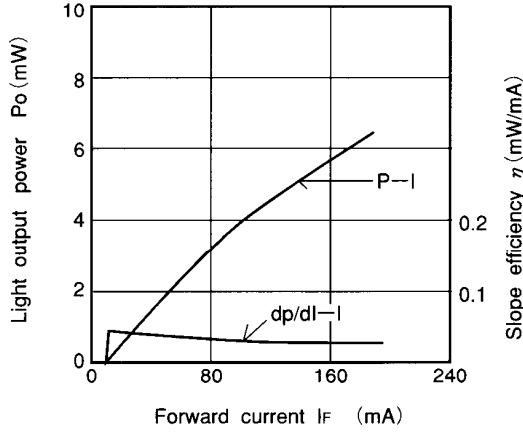


Fig.1 Light output vs. forward current

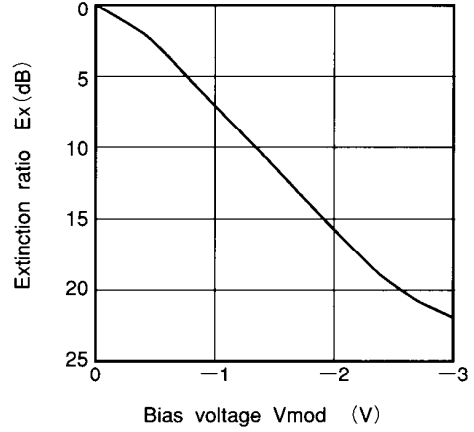


Fig.2 Extinction characteristics (DC)

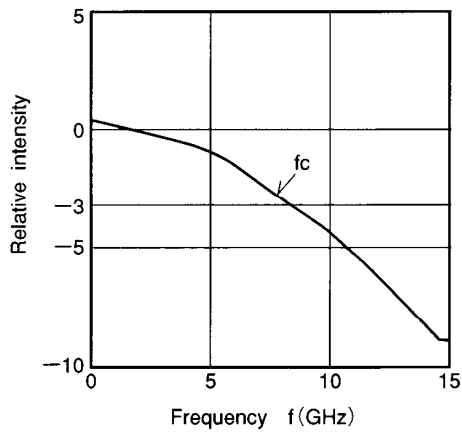


Fig.3 Frequency characteristics

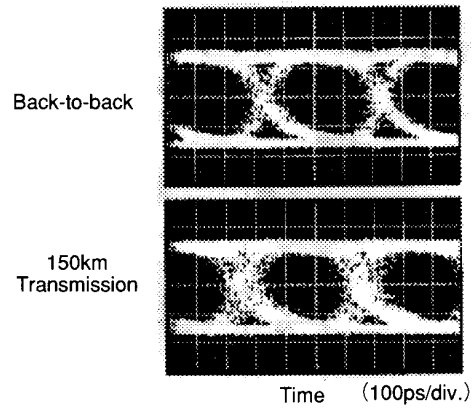


Fig.4 Waveform

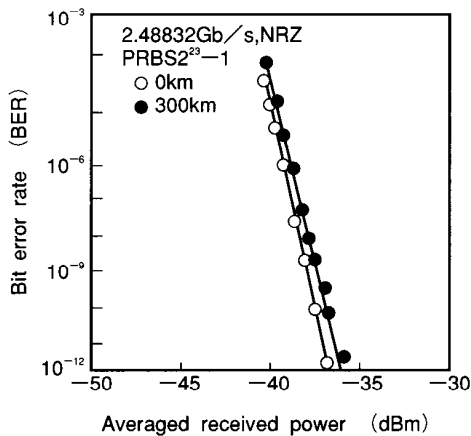


Fig.5 BER characteristics