

ML9XX31 SERIES

InGaAsP DFB-LASER DIODE WITH EA MODULATOR

Notice: Some parametric limits are subject to change.

**TYPE
NAME**

ML9SM31

DESCRIPTION

ML9XX31 series are DFB (Distributed Feedback) laser diodes with a monolithically integrated EA modulator, suitable light source for 10Gbps or 2.5Gbps application (Single channel / DWDM).
Available wavelengths are from 1530nm to 1565nm with 0.8nm spacing.
ML9SM31 is supplied with the chip-on-carrier type package.

FEATURES

- Available distance
ML9SM31-01 series : 50km(Max) at 10Gbps
ML9SM31-02 series : 700km(Max) at 2.5Gbps
- High extinction ratio (Min. 11dB at 2.5Gbps, Typ. 11dB at 10Gbps)
- High - side mode suppression ratio (Typ. 40dB)
- High speed response (Typ. 30psec)

APPLICATION

2.5Gbps long-haul transmission system
10Gbps transmission system

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
I_F	Forward current (Laser diode)	CW	200	mA
V_{RL}	Reverse voltage (Laser diode)	-	2	V
V_{EA}	Reverse voltage (Modulator)	-	-3	V
T_c	Case temperature	-	+15 to +35	degC
T_{stg}	Storage temperature	-	-40 to +100	degC

ELECTRICAL/OPTICAL CHARACTERISTICS (Tc=25degC)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{th}	Threshold current	CW, Vmod=0V	---	10	30	mA
I_{op}	Operation current	CW, Po=5mW, Vmod=0V	---	60	90	mA
V_{op}	Operating voltage	CW, Po=5mW, Vmod=0V	---	1.2	1.8	V
λ_p	Peak wavelength	CW, If>Iop, Vmod=0V	-0.4	code list	+0.4	nm
$\theta_{//}$	Beam divergence angle (parallel)	CW, Po=5mW, Vmod=0V	---	30	---	deg.
$\theta_{\perp}$	Beam divergence angle (perpendicular)	CW, Po=5mW, Vmod=0V	---	45	---	deg.
P_m	Monitoring output power	CW, Po=5mW, Vmod=0V	---	1.0	---	mW

ML9SM31-01 series for 10Gbps

f_c	Cut off frequency	CW, If>Iop, Vmod=-1V	10	14	---	GHz
t_r, t_f	Rise and fall time (10%-90%)	9.95328Gbps, NRZ, PRBS 223-1	---	30	40	psec
SMSR	Side mode suppression ratio	If>Iop, Vpp=2.5V, Voffset=0 to -1.0V	35	40	---	dB
Ex	Extinction ratio		10	11	---	dB
Pp	Dispersion penalty	ditto SMF 50km @BER=10-10	---	---	2.0	dB

ML9SM31-02 series for 2.5Gbps

f_c	Cut off frequency	CW, If>Iop, Vmod=-1V	4	---	---	GHz
t_r, t_f	Rise and fall time (10%-90%)	2.48832Gbps, NRZ, PRBS 2 ²³ -1	---	---	120	psec
SMSR	Side mode suppression ratio	If>Iop, Vpp=2.5V, Voffset=0 to -1.0V	35	40	---	dB
Ex	Extinction ratio		11	---	---	dB
Pp	Dispersion penalty	ditto SMF 700km @BER=10 ⁻¹⁰	---	---	2.0	dB

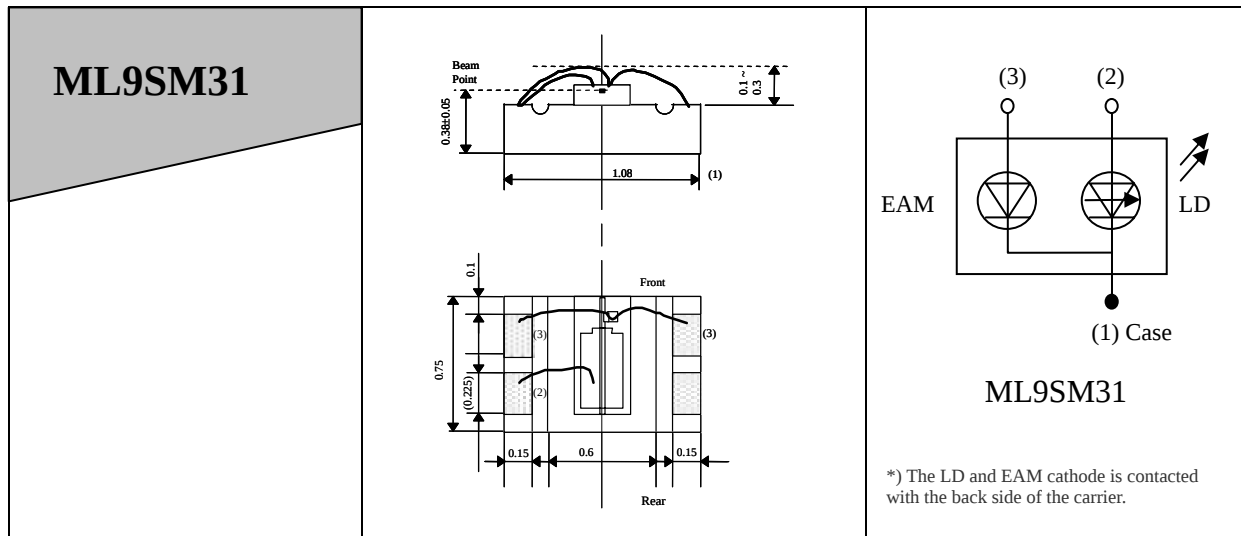


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OUTLINE DRAWINGS



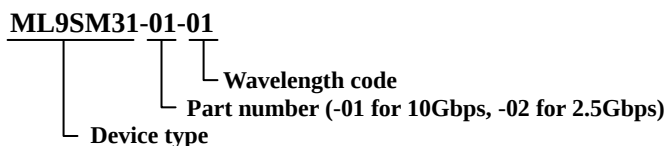
Wavelength code list

Code	Wavelength(nm)
00	1530 to 1565

← non WDM (single channel)

Code	Wavelength(nm)	Code	Wavelength(nm)
01	1529.55	24	1547.72
02	1530.33	25	1548.51
03	1531.12	26	1549.32
04	1531.90	27	1550.12
05	1532.68	28	1550.92
06	1533.47	29	1551.72
07	1534.25	30	1552.52
08	1535.04	31	1553.33
09	1535.82	32	1554.13
10	1536.61	33	1554.94
11	1537.40	34	1555.75
12	1538.19	35	1556.55
13	1538.98	36	1557.36
14	1539.77	37	1558.17
15	1540.56	38	1558.98
16	1541.35	39	1559.79
17	1542.14	40	1560.61
18	1542.94	41	1561.42
19	1543.73	42	1562.23
20	1544.53	43	1563.05
21	1545.32	44	1563.86
22	1546.12	45	1564.68
23	1546.92	46	1565.50

Ordering information



MITSUBISHI
ELECTRIC

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