

MITSUBISHI LASER DIODES
ML9XX11 SERIES

InGaAsP—MQW—DFB LASER DIODES

TYPE
NAME

ML976H11F

DESCRIPTION

ML9XX11 series are MQW*—DFB** laser diodes emitting light beam around 1550nm.

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

The ML976H11F are hermetically sealed devices having the photodiode for optical output monitoring.

*MQW : Multiple Quantum Well

**DFB: Distributed Feedback

FEATURES

- Low threshold current (typical 10mA)
- Stable single transverse mode oscillation
- High-side mode suppression ratio : typical 40dB
($T_c = -40$ to $+85^\circ\text{C}$)
- High speed pulse response (rise/fall time typical 0.2nsec)
- Excellent temperature characteristics

APPLICATION

Wide temperature range digital transmission system

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
Po	Light output power	CW	6	mW
VRL	Reverse Voltage (Laser diode)	—	2	V
VRD	Reverse Voltage (Photodiode)	—	20	V
IFD	Forward current (Photodiode)	—	2	mA
Tc	Case temperature	—	-40~+85	°C
Tstg	Storage temperature	—	-40~+100	°C

ELECTRICAL/OPTICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$)

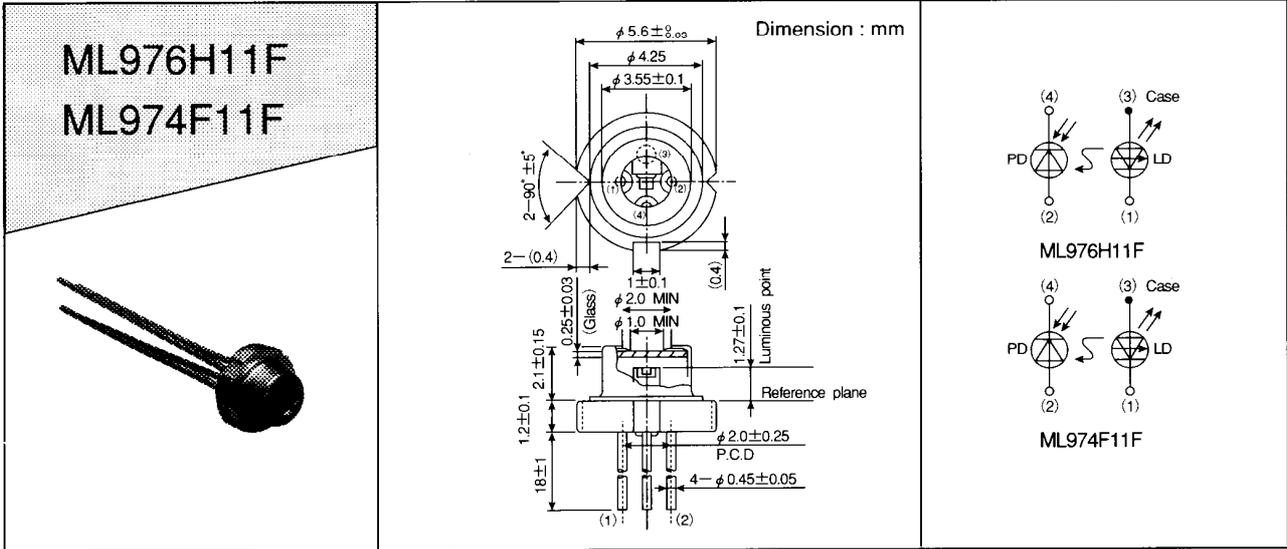
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Ith	Threshold current	CW	—	10	30	mA
IOP	Operating current	CW, Po = 5mW	—	30	60	mA
VOP	Operating voltage	CW, Po = 5mW	—	1.2	1.8	V
η	Slope efficiency	CW, Po = 5mW	0.15	0.25	—	mW/mA
λ_P	Peak wavelength	CW, Po = 5mW	1530	1550	1570	nm
$\theta_{//}$	Beam divergence angle (parallel)	CW, Po = 5mW	—	25	35	deg.
θ_{\perp}	Beam divergence angle (perpendicular)	CW, Po = 5mW	—	35	45	deg.
Im	Monitoring output current (Photodiode)	CW, Po = 5mW, VRD = 1V, RL* = 10 Ω	—	0.2	—	mA
tr,tf	Rise and fall time	IF = Ith, Po = 5mW, 10~90%	—	0.2	0.4	ns
SMSR	Side mode suppression ratio	CW, Po = 5mW, -40~+85°C	30	40	—	dB

*RL : Load resistance of photodiode

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OUTLINE DRAWINGS



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TYPICAL CHARACTERISTICS

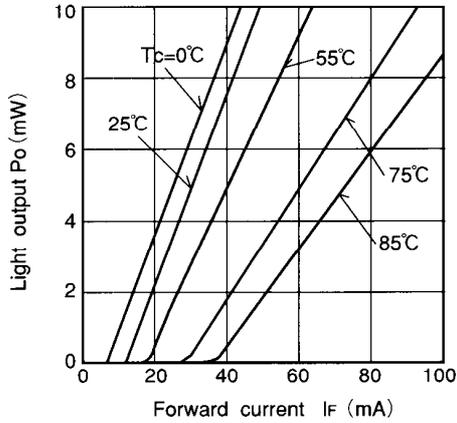


Fig.1 Light output vs. forward current

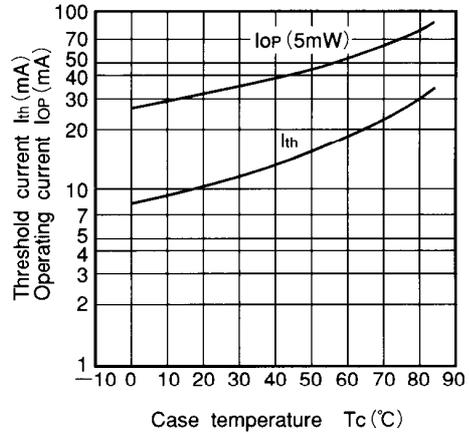


Fig.2 Temperature dependence of lth and lop

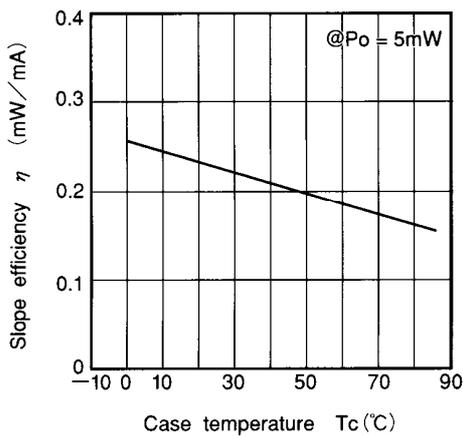


Fig.3 Temperature dependence of slope efficiency

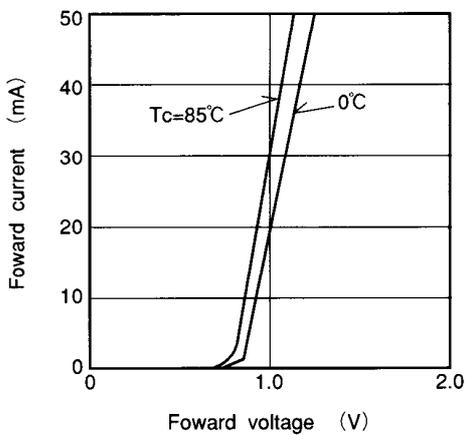


Fig.4 Forward current vs. voltage

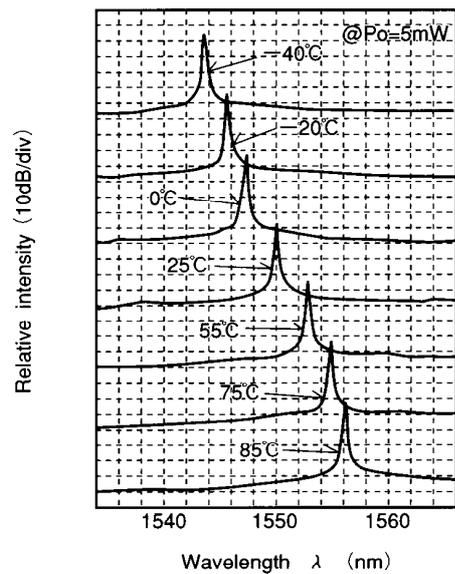


Fig.5 Spectrum

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TYPICAL CHARACTERISTICS

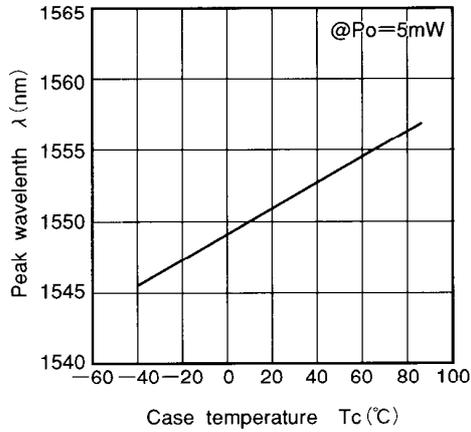


Fig.6 Temperature dependence of peak wavelength

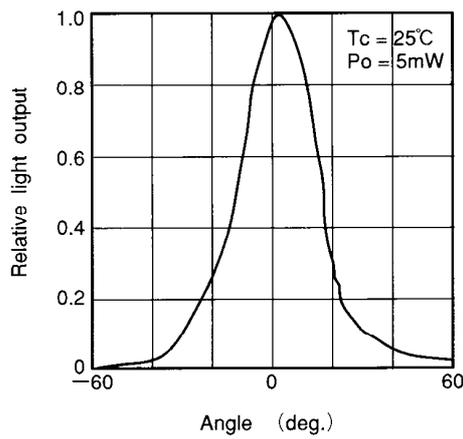


Fig.7-1 Far field pattern $\theta //$

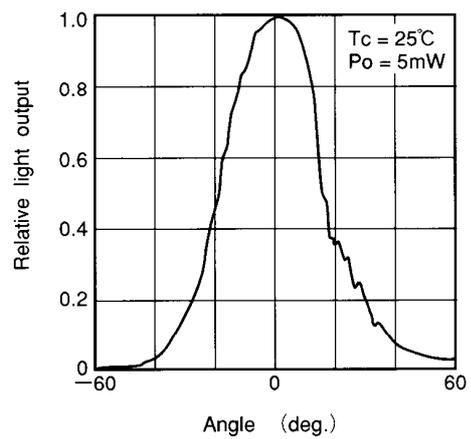


Fig.7-2 Far field pattern $\theta \perp$

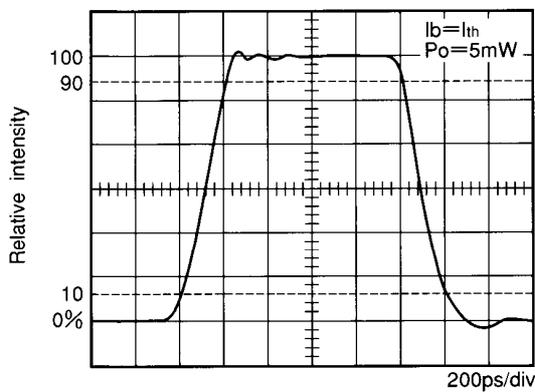


Fig.8 Pulse response waveform

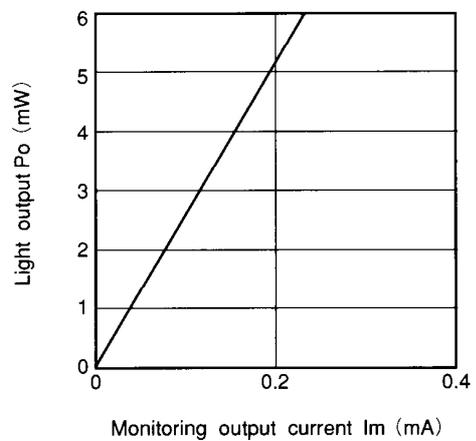


Fig.9 Light output vs. monitoring output current