

MITSUBISHI LASER DIODES  
**ML9XX11 SERIES**  
InGaAsP DFB LASER DIODES

**TYPE  
NAME**

**ML925B11F/ML920J11S/ML925J11F**

**DESCRIPTION**

ML9XX11 series are DFB (Distributed Feedback) laser diodes emitting light beam around 1550nm. They are well suited for light source in long distance digital transmission systems. ML925B11F / ML920J11S are hermetically sealed devices with the photo diode for optical output monitoring.

**FEATURES**

- Low threshold current (typical 10mA)
- Wide temperature range operation
- High - side mode suppression ratio (typical 40dB)
- High speed response (typical 0.2nsec)
- MQW\* active layer
- FSBH\*\* structure fabricated by MOCVD process  
\* Multiple Quantum Well  
\*\* Facet Selective - growth Buried Hetero structure

**APPLICATION**

Long - distance digital transmission system

**\*\*\*Specification Note**

Type	Operation Temperature Range
ML9XX11-01	Tc=-40 to 85°C
ML9XX11-02	Tc=-20 to 85°C
ML9XX11-03	Tc= 0 to 85°C

**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 (Photo diode)	-	20	V	
IFD	Forward current (Photo diode)	-	2	mA	
Tc	Case temperature	-	-01	-40 to +85	°C
			-02	-20 to +85	
			-03	0 to +85	
Tstg	Storage temperature	-	- 40 to +100	°C	

**ELECTRICAL/OPTICAL CHARACTERISTICS (Tc=25°C)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Ith	Threshold current	CW	-	10	30	mA
Iop	Operation current	CW,Po=5mW	-	20	60	mA
Vop	Operating voltage	CW,Po=5mW	-	1.2	1.8	V
$\eta$	Slope efficiency	CW,Po=5mW	0.15	0.25	-	mW/mA
$\lambda_p$	Peak wavelength	CW,Po=5mW ***Note	1530	1550	1570	nm
$\theta_{//}$	Beam divergence angle (parallel)	CW,Po=5mW	-	25	35	deg.
$\theta_{\perp}$	Beam divergence angle (perpendicular)	CW,Po=5mW	-	35	45	deg.
SMSR	Side mode suppression ratio	CW,Po=5mW ***Note	30	40	-	dB
Im	Monitoring output current	CW,Po=5mW	-	0.2	-	mA
tr,tf	Rise and Fall time	If=Ith,Po=5mW,10 - 90%	-	0.2	0.4	ns



**TYPICAL CHARACTERISTICS**

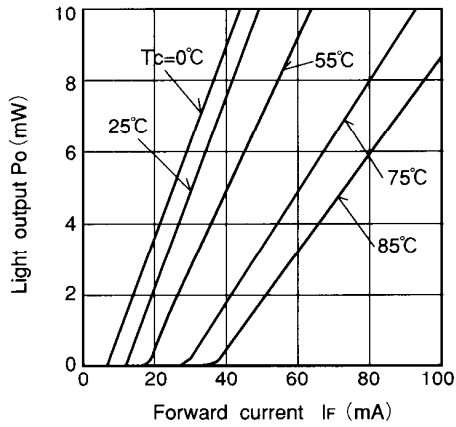


Fig.1 Light output vs. forward current

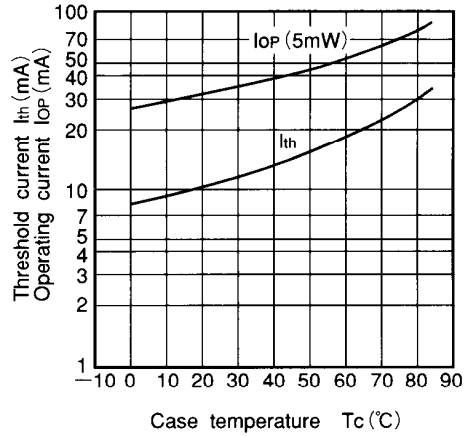


Fig.2 Temperature dependence of  $I_{th}$  and  $I_{op}$

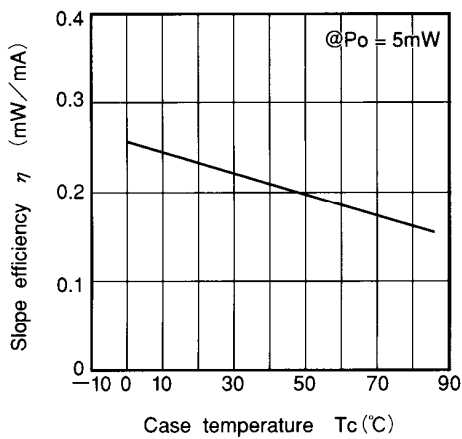


Fig.3 Temperature dependence of slope efficiency

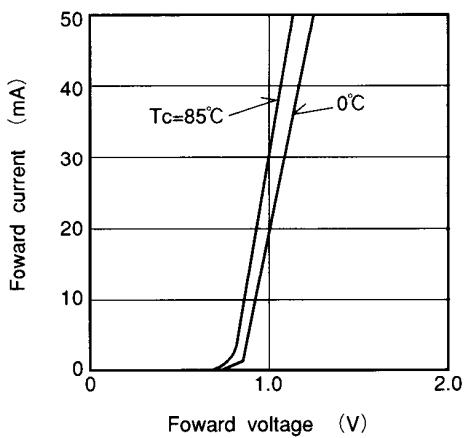


Fig.4 Forward current vs. voltage

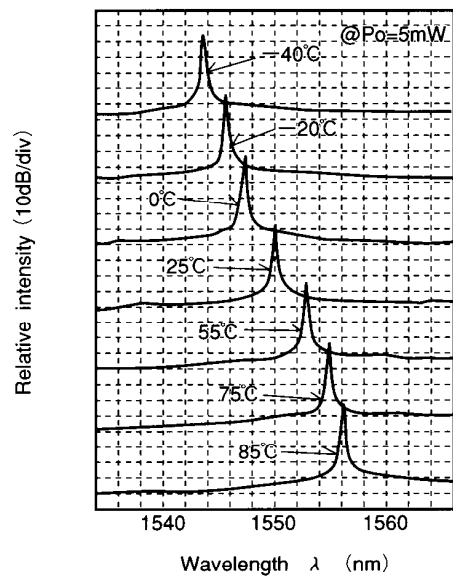


Fig.5 Spectrum

**TYPICAL CHARACTERISTICS**

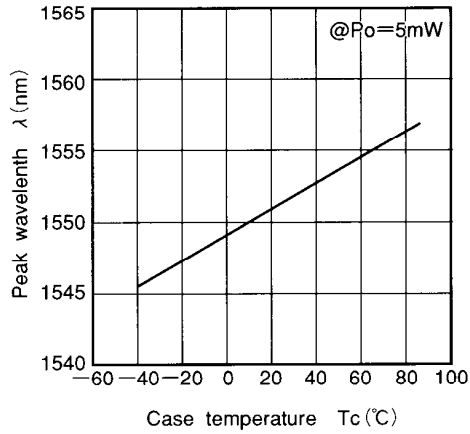


Fig.6 Temperature dependence of peak wavelength

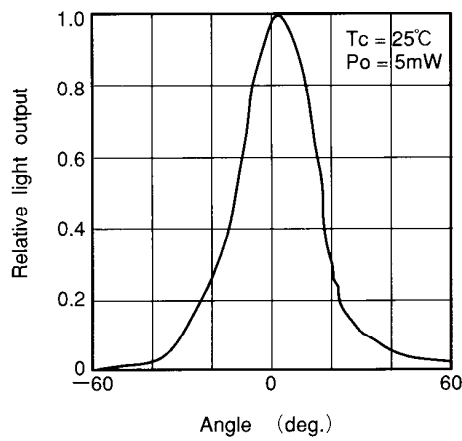


Fig.7-1 Far field pattern  $\theta //$

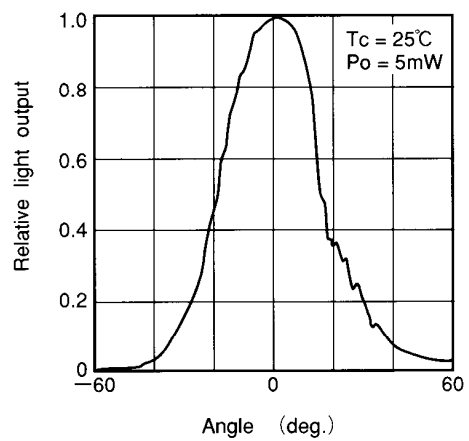


Fig.7-2 Far field pattern  $\theta \perp$

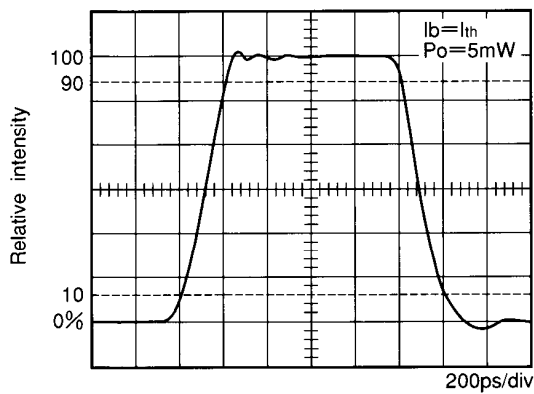


Fig.8 Pulse response waveform

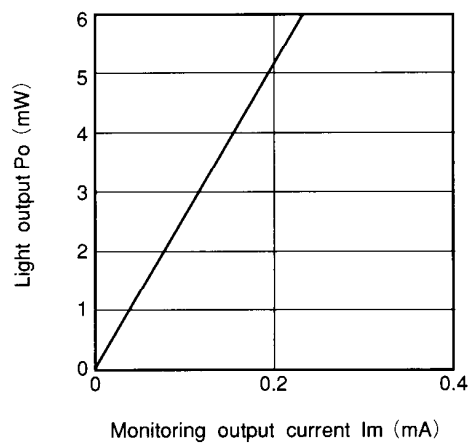


Fig.9 Light output vs. monitoring output current