

# ML9XX11, ML9XX16, ML9XX22 SERIES

Notice : Some parametric limits are subject to change

InGaAsP DFB LASER DIODES

**TYPE  
NAME**

**ML925B11F / ML925B16F / ML925B22F  
ML920J11S / ML920J16S / ML920J22S  
ML925J11F / ML925J16F / ML925J22F  
ML920L11S / ML920L16S / ML920L22S**

## DESCRIPTION

ML9XX11, ML9XX16 and ML9XX22 series are DFB (Distributed Feedback) laser diodes emitting light beam with emission wavelength of 1470 ~ 1610 nm.

They are well suited for light source in long distance digital transmission application of coarse WDM.

They are hermetically sealed devices with the photo diode for optical output monitoring.

## APPLICATION

- ~1.25Gbps digital transmission system
- Coarse WDM application

## FEATURES

- Homogeneous grating (AR/HR facet coating) structure DFB
- Wide temperature range operation ( 0 to 85°C )
- Low threshold current (typical 8mA)
- High speed response (typical 0.1nsec)
- 8 wavelength with 20nm space at 1470 ~ 1610nm
- φ5.6mm TO-CAN package
- Flat window cap, or Aspherical lens cap

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
P <sub>o</sub>	Light output power	CW	10	mW
I <sub>f</sub>	Forward current (Laser diode)	---	150	mA
V <sub>RL</sub>	Reverse voltage (Laser diode)	---	2	V
V <sub>RD</sub>	Reverse voltage (Photo diode)	---	20	V
I <sub>FD</sub>	Forward current (Photo diode)	---	2	mA
T <sub>c</sub>	Case temperature	---	0 to +85	°C
T <sub>stg</sub>	Storage temperature	---	-40 to +100	°C

## ELECTRICAL/OPTICAL CHARACTERISTICS (T<sub>c</sub>=25°C otherwise specified)

[ Flat window cap ; ML925B11F/ML925B16F/ML925B22F/ ML920J11S/ML920J16S/ML920J22S ]

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I <sub>th</sub>	Threshold current	CW	---	8	15	mA
		CW, T <sub>c</sub> =85°C	---	30	50	
I <sub>op</sub>	Operation current	CW, P <sub>o</sub> =5mW	---	25	40	mA
		CW, P <sub>o</sub> =5mW, T <sub>c</sub> =85°C	---	60	80	
V <sub>op</sub>	Operating voltage	CW, P <sub>o</sub> =5mW	---	1.1	1.5	V
η	Slope efficiency	CW, P <sub>o</sub> =5mW	0.20	0.28	---	mW/mA
λ <sub>p</sub>	Peak wavelength	CW, P <sub>o</sub> =5mW	<*>			nm
θ <sub>//</sub>	Beam divergence angle (parallel)	CW, P <sub>o</sub> =5mW	---	25	35	deg.
θ <sub>⊥</sub>	Beam divergence angle (perpendicular)	CW, P <sub>o</sub> =5mW	---	35	45	deg.
SMSR	Side mode suppression ratio	CW, P <sub>o</sub> =5mW T <sub>c</sub> = 0 to +85°C	35	40	---	dB
t <sub>r,tf</sub>	Rise and Fall time	I <sub>b</sub> =I <sub>th</sub> , 20-80% <*>	---	0.1	0.2	ns
I <sub>m</sub>	Monitoring output current (PD)	CW, P <sub>o</sub> =5mW	0.05	0.2	---	mA
I <sub>d</sub>	Dark current (PD)	V <sub>RD</sub> =5V	---	---	0.1	μA
C <sub>t</sub>	Capacitance (PD)	V <sub>RD</sub> =5V	---	10	20	pF

<\*> Except influence of the 18mm lead.

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## ELECTRICAL/OPTICAL CHARACTERISTICS (Tc=25°C otherwise specified)

[Aspherical lens cap ; ML925J11F/ML925J16F/ML925J22F/ ML920L11S/ML920L16S/ ML920L22S]

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Ith	Threshold current	CW	---	8	15	mA
		CW, Tc=85°C	---	30	50	
Iop	Operation current	CW, Po=5mW	---	25	40	mA
		CW, Po=5mW, Tc=85°C	---	60	80	
Vop	Operating voltage	CW, Po=5mW	---	1.1	1.5	V
η	Slope efficiency	CW, Po=5mW	0.20	0.28	---	mW/mA
λp	Peak wavelength	CW, Po=5mW	<*>			nm
SMSR	Side mode suppression ratio	CW, Po=5mW Tc= 0 to +85°C	35	40	---	dB
Pf	Fiber coupling power	CW, Po=5mW, SMF	1.5	2.0	---	mW
Df	Focal length	CW, Po=5mW, SMF	6.5	7.5	8.5	mm
tr,tf	Rise and Fall time	Ib=Ith, 20-80% <*>	---	0.1	0.2	ns
Im	Monitoring output current (PD)	CW, Po=5mW	0.05	0.2	---	mA
Id	Dark current (PD)	V <sub>RD</sub> =5V	---	---	0.1	μA
Ct	Capacitance (PD)	V <sub>RD</sub> =5V	---	10	20	pF

<\*> Except influence of the 18mm lead.

<\*> Peak wavelength

Type	Symb ol	Test condition	Limits			Unit
			Min.	Typ.	Max.	
ML925B16F-04 / ML920J16S-04 / ML925J16F-04 / ML920L16S-04	λp	CW Po=5mW Tc=25°C	1467	1470	1473	nm
ML925B16F-05 / ML920J16S-05 / ML925J16F-05 / ML920L16S-05			1487	1490	1493	
ML925B11F-04 / ML920J11S-04 / ML925J11F-04 / ML920L11S-04			1507	1510	1513	
ML925B11F-05 / ML920J11S-05 / ML925J11F-05 / ML920L11S-05			1527	1530	1533	
ML925B11F-06 / ML920J11S-06 / ML925J11F-06 / ML920L11S-06			1547	1550	1553	
ML925B22F-04 / ML920J22S-04 / ML925J22F-04 / ML920L22S-04			1567	1570	1573	
ML925B22F-05 / ML920J22S-05 / ML925J22F-05 / ML920L22S-05			1587	1590	1593	
ML925B22F-06 / ML920J22S-06 / ML925J22F-06 / ML920L22S-06			1607	1610	1613	

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## OUTLINE DRAWINGS

<p><b>ML925B11F</b>  <b>ML925B16F</b>  <b>ML925B22F</b>  <b>ML920J11S</b>  <b>ML920J16S</b>  <b>ML920J22S</b></p>	<p style="text-align: center;">Dimension : mm</p> <p>Top View: <math>\phi 5.6^{+0}_{-0.03}</math>, <math>\phi 4.25</math>, <math>Y</math>, <math>X</math>, <math>2-90^\circ</math>, <math>(0.25)</math>, <math>(1)</math>, <math>(2)</math>, <math>(3)</math>, <math>(4)</math>, <math>1 \pm 0.1</math>.</p> <p>Side View: <math>\phi 3.55 \pm 0.1</math>, <math>\phi 2.0 \text{ Min.}</math>, <math>\phi 1.0 \text{ Min.}</math>, <math>0.25 \pm 0.03</math> (Glass), <math>2.1 \pm 0.15</math>, <math>1.2</math>, <math>\pm 0.1</math>, <math>18 \pm 1</math>, <math>1.27 \pm 0.03</math> (Emitting Facet), <math>1.27</math> (Reference Plane), <math>\phi 2.0 \pm 0.25</math> (P.C.D.), <math>4-\phi 0.45 \pm 0.05</math>, <math>(1)</math>, <math>(2)</math>.</p>	<p>ML925B11F, ML925B16F, ML925B22F</p> <p>ML920J11S, ML920J16S, ML920J22S</p> <p>Pin Connection (Top view)</p>
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<p><b>ML925J11F</b>  <b>ML925J16F</b>  <b>ML925J22F</b>  <b>ML920L11S</b>  <b>ML920L16S</b>  <b>ML920L22S</b></p>	<p style="text-align: center;">Dimension : mm</p> <p>Top View: <math>\phi 5.6^{+0}_{-0.03}</math>, <math>\phi 4.3</math>, <math>Y</math>, <math>X</math>, <math>2-90^\circ</math>, <math>(0.25)</math>, <math>(1)</math>, <math>(2)</math>, <math>(3)</math>, <math>(4)</math>, <math>1 \pm 0.1</math>.</p> <p>Side View: <math>\phi 3.75 \pm 0.1</math>, <math>Z</math>, <math>3.97 \pm 0.15</math>, <math>(7.51)</math>, <math>1.27 \pm 0.03</math> (Emitting Facet), <math>1.27</math> (Reference Plane), <math>\pm 0.1</math>, <math>18 \pm 1</math>, <math>\phi 2.0 \pm 0.25</math> (P.C.D.), <math>4-\phi 0.45 \pm 0.05</math>, <math>(1)</math>, <math>(2)</math>.</p>	<p>ML925J11F, ML925J16F, ML925J22F</p> <p>ML920L11S, ML920L16S, ML920L22S</p> <p>Pin Connection (Top view)</p>
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