Sumitomo Electric Industries, Ltd.
Part No. : SLV5416 series
Document No. : HUW 0225048-01B
Date of issue : Feb. 14, 2003

Technical Specification

of

1.5μm DFB Laser Diode Module for DWDM Analog Forward-Path or Return-Path Application

SLV5416 series

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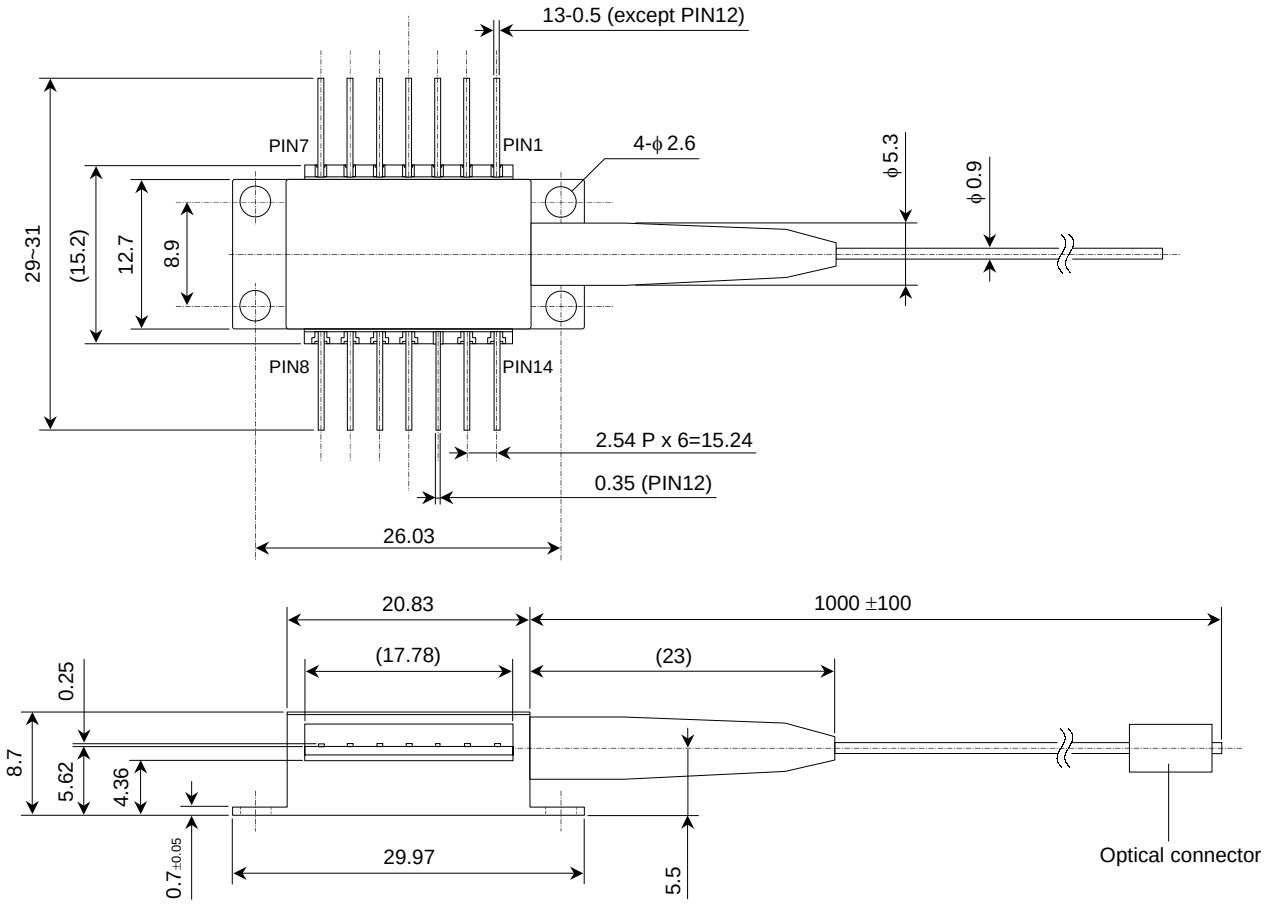
1. General

SLV5416 series are 1.5µm dense wavelength division multiplexing (DWDM) laser modules designed for analog applications. They are suited for either quadrature amplitude modulation (QAM) narrowcast forward path or QAM trunk line return path applications.

An InGaAsP/InP MQW DFB laser diode chip is mounted on a 14 pin butterfly package integrated with an optical isolator, an InGaAs monitor PD, a thermo-electric cooler and a single mode fiber pigtail.

2. Package dimension and pin assignment

(unit : mm, tolerance : ±0.15 unless otherwise noted)



Pin No.	Function	Pin No.	Function
1	Thermistor	14	NC
2	Thermistor	13	Case Ground
3	LD Cathode (DC)	12	LD Cathode (RF)
4	Monitor PD Anode	11	LD Anode (Case Ground)
5	Monitor PD Cathode	10	NC
6	TEC Anode	9	Case Ground
7	TEC Cathode	8	Case Ground

3. Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Tstg	-40	85	°C
Operating case temperature	Tc	-40	85	°C
LD forward current	IfL	–	150	mA
LD reverse voltage	VrL	–	2	V
PD reverse current	IrP	–	2	mA
PD reverse voltage	VrP	–	15	V
Thermistor current	Itherm	–	0.5	mA
Thermistor voltage	Vtherm	–	5	V
TEC current	Ic	–	1.4	A
Electro static Discharge (ESD) (*1)	VESD	–	500	V
Package mounting screw torque(*2)	Npt	–	0.2	Nm
Lead soldering temperature	Stemp	–	260	°C
Lead soldering time	Stime	–	10	sec
RF input power	Prf	–	62	dBmV

Note *1 A human-body model (HBM, C=100pF, R=1.5kΩ) is employed.
Note *2 Without buffer materials under the package

4. Electrical and optical characteristics

(Unless otherwise noted, T_{LD}=29~41°C, BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	Ith	CW	–	10	30	mA
Bias current	Ib	CW	–	–	120	mA
Optical power	Pop	If=Iop	(*3)	–	–	mW
Slope efficiency	Se	CW, If=Ith+20mA ~ Ith+60mA	0.1	–	–	W/A
Forward voltage	Vf	CW, If=Iop	–	–	2	V
Monitor current	Im	CW, If=Iop, VrP=5V	50	–	500	μA
Monitor dark current	Id	VrP=5V	–	1	30	nA
Monitor capacitance	C	VrP=5V, f=1MHz	–	–	20	pF
Input impedance	Zin	–	–	25	–	Ω
Frequency range	Fr	Return Path	5	–	210	MHz
		Forward Path	40	–	860	
Frequency response	-	5-210MHz and 40-860MHz, If=60mA	–	+/-0.5	–	dB
RF return loss	RL	5-210MHz and 40-860MHz, If=60mA	–	>16	–	dB
Relative intensity noise	RIN	If=Ith+70mA	–	<-155	–	dB/Hz
Composite second order	CSO	If=Iop, OMI=10%, (*4), (*5)	–	–	-50	dBc
Composite triple beat	CTB	If=Iop, OMI=10%, (*4), (*6)	–	–	-60	dBc
Adiabatic chirp	AC	If=60mA, f=500MHz	100	–	200	MHz/mA
Peak wavelength	λp	CW, If=Iop	–	(*3)	–	nm
Peak wavelength drift with case temperature	Dλ	CW, If=60mA from -40 to 85°C	–	–	0.04	nm
Side mode suppression ratio	SMSR	CW, If=Iop	30	–	–	dB
Optical return loss	ORL	Tc	40	–	–	dB

Note *3 See ordering information (Section 7)
Note *4 8ch loading; 559.25, 565.25, 571.25, 577.25, 583.25, 589.25, 595.25, 601.25MHz. Transmission of 40km SM fiber.
Note *5 Measured at 42MHz.
Note *6 Measured at 559.25MHz, 583.25 MHz and 601.25MHz.

5. Thermal characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Thermistor resistance	Rth	T_{LD}=35°C	6.1	6.6	7.1	kΩ
Thermistor B const.	B	25°C／75°C	3800	3900	4000	K
TEC current	Ic	T_{LD} =29°C, Tc =85°C	–	–	1.0	A
TEC voltage	Vc	If=60mA, BOL	–	–	2.0	V
TEC current (EOL)	Ic2	T_{LD} =29°C, Tc =85°C	–	–	1.1	A
TEC voltage (EOL)	Vc2	If=60mA, EOL	–	–	2.2	V

6. Fiber specification

Parameter	Min.	Typ.	Max.	Unit
Fiber type	Single mode fiber			–
Mode field diameter	8.5	9.5	10.5	μm
Cladding diameter	122	125	128	μm
Outer jacket diameter	–	0.9	–	mm
Bending radius	40	–	–	mm
Optical connector	See ordering information (Section 7)			–

7. Ordering information

SLV5416-xx-Fxxx

	Optical Connector
C	SC-PC
D	FC-PC
Q	SC-Angled PC
X	No connector

ChannelNo. (Peak Wavelength) shown in the table below

	Optical Power(Pop)
A	6mW
B	8mW
C	10mW

Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)
F620	196.2	1527.99	F390	193.9	1546.12
F610	196.1	1528.77	F380	193.8	1546.92
F600	196.0	1529.55	F370	193.7	1547.72
F590	195.9	1530.33	F360	193.6	1548.51
F580	195.8	1531.12	F350	193.5	1549.32
F570	195.7	1531.90	F340	193.4	1550.12
F560	195.6	1532.68	F330	193.3	1550.92
F550	195.5	1533.47	F320	193.2	1551.72
F540	195.4	1534.25	F310	193.1	1552.52
F530	195.3	1535.04	F300	193.0	1553.33
F520	195.2	1535.82	F290	192.9	1554.13
F510	195.1	1536.61	F280	192.8	1554.94
F500	195.0	1537.40	F270	192.7	1555.75
F490	194.9	1538.19	F260	192.6	1556.56
F480	194.8	1538.98	F250	192.5	1557.36
F470	194.7	1539.77	F240	192.4	1558.17
F460	194.6	1540.56	F230	192.3	1558.98
F450	194.5	1541.35	F220	192.2	1559.79
F440	194.4	1542.14	F210	192.1	1560.61
F430	194.3	1542.94	F200	192.0	1561.42
F420	194.2	1543.73	F190	191.9	1562.23
F410	194.1	1544.53	F180	191.8	1563.05
F400	194.0	1545.32	F170	191.7	1563.86

8. Precaution

Class 3B in the radiation safety standard applies to all versions of this product. Mishandling may result in hazardous laser radiation exposure.

Refer to the document IRO-D01002 in terms of the usage of this product and safety precautions.

REVISION RECORD

Document No.	Date	Description	Incorporated by	Checked by	Approved by
HUW0225048-01A	Jan./20/2003	<Preliminary>	A.Hamakawa	T. Kounosu	M. Yoshimura
HUW0225048-01B	Feb./14/2003	Connector types are added. Q: SC-Angled PC X: No connector Absolute maximum ratings is revised IfL 200->150mA	H.Koseki	T.Kounosu	M. Yoshimura