Sumitomo Electric Industries, Ltd.
Part No. : SLT5416 Series
Document No. : HUW 0025055-01D
Date of issue : March 29, 2002

Technical Specification

of

1.5μm DFB Laser Diode Module for WDM Direct Modulation

SLT5416 series

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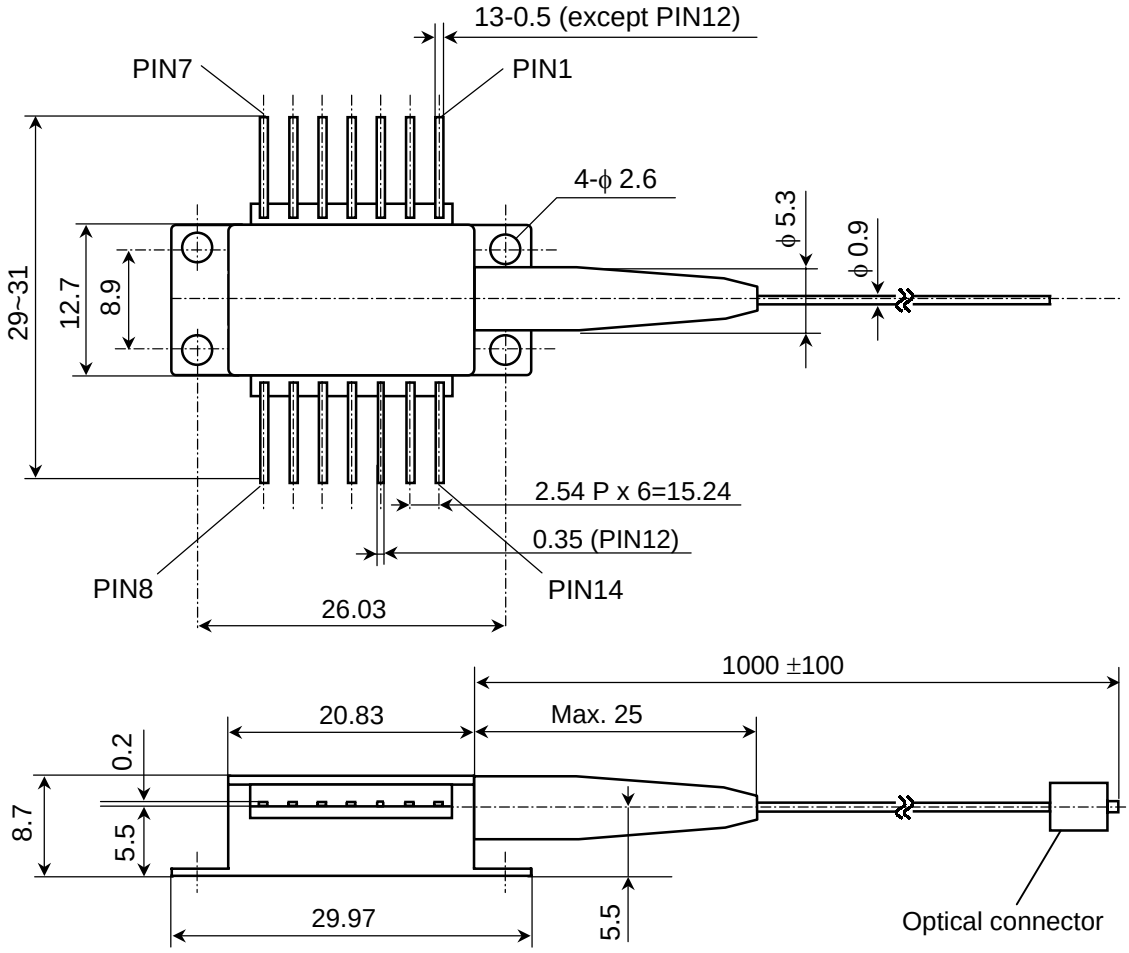
1. General

SLT5416 series are 1.5µm InGaAsP/InP MQW DFB laser diode modules designed for a direct modulation optical source of WDM (Wavelength Division Multiplexing) application.
A 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	-20	70	°C
LD forward current	IfL	–	200	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

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}=19~31°C, BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	Ith	CW	–	10	25	mA
Operating current	Iop	CW, Pf=Pop	–	–	(*3)	mA
Slope efficiency	Se	CW, Pf=0~Ppeak (*4)	(*3)	–	–	W/A
Forward voltage	Vf	CW, Pf=Ppeak (*4)	–	–	2	V
Monitor current	Im	CW, Pf=Pop	15	–	500	μA
Monitor dark current	Id	VrP=5V	–	1	10	nA
Monitor capacitance	C	VrP=5V, f=1MHz	–	–	12	pF
Input impedance	Zin	–	–	25	–	Ω
Bandwidth	BW	-3dB, Pf=Pop	4.0	–	–	GHz
RF input reflection	S11	Pf=Pop, f=DC~3GHz (*5)	–	–	-8	dB
Rise time	Tr	20 to 80%, Pk-Pk	–	–	120	ps
Fall time	Tf	20 to 80%, Pk-Pk	–	–	120	ps
Peak wavelength	λp	CW, Pf=Pop	–	(*3)	–	nm
Spectral width (modulated)	$\Delta\lambda_{20}$	Pop=1mW, 5mW, -20dB, (*6)	–	–	0.4	nm
		Pop=10mW, -20dB, (*6)	–	–	0.5	nm
	$\Delta\lambda_{3}$	Pf=Pop, -3dB, (*6)	–	–	0.2	nm
Peak wavelength drift	Dλ	CW, Pf=Pop, 25years	–	–	0.1	nm
Side mode suppression ratio	SMSR	CW, Pf=Pop	35	–	–	dB
Optical Isolation	ISO	Tc=-20~70°C	25	–	–	dB
Dispersion penalty	Pd	(*3), (*6), (*7)	–	–	2	dB

Note *3 See ordering information (Section 7)
Note *4 Ppeak = 2 × Pop
Note *5 50Ω measurement system
Note *6 2.48832Gbit/s, PRBS 2^{23}-1 NRZ, 50% duty cycle, Extinction Ratio=9dB
Note *7 Pf=Pop; BER@10^{-10}

5. Thermal characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Thermistor resistance	Rth	T_{LD}=25°C	9.5	10	10.5	kΩ
Thermistor B const.	B	25°C／75°C	3800	3900	4000	K
TEC current	Ic	T_{LD} =19°C, Tc =70°C Pf=Pop, BOL	–	–	1.0	A
TEC voltage	Vc		–	–	2.0	V
TEC current (EOL)	Ic2	T_{LD} =19°C, Tc =70°C Pf=Pop, EOL	–	–	1.1	A
TEC voltage (EOL)	Vc2		–	–	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

SLT5416-xxx-xxxx

	Optical Connector
C	SC-PC (Standard)
D	FC-PC

Channel No.(Peak Wavelength) shown in the table below

	Pop	$Iop_{(max)}$	$Se_{(min)}$
P	1mW	60mA	0.03 W/A
A	5mW	60mA	0.15 W/A
B	10mW	80mA	0.17 W/A

	Dispersion Performance (*8)
A	1600 ps/nm
B	2400 ps/nm
C	3200 ps/nm (Under planning)
A	1600 ps/nm

Note *8 1600ps/nm@1500nm corresponds to 80km transmission with G.654 fiber according to ITU-T Recommendation G.957.

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

E.g. **SLT5416-CAB-F340** is a 5mW 1550.12nm device with SC-PC connector for use in a 2400ps/nm transmission application.

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
HUW0025055-01A	Sept./28/2001	<Preliminary>	N.Kushida	T.Kounosu	K.Tanida
HUW0025055-01B	Dec./05/2001	Drawing of nose and PIN12 are revised. Ic and Vc at EOL are revised.	N.Kushida	T.Kounosu	K.Tanida
HUW0025055-01C	Mar./14/2002	S11 and optical isolation are added. Im, Tr ,Tf, IfL, Spectral width, definition of dispersion and Precaution are revised. Part number rule is revised.	A. Hamakawa	T.Kounosu N.Kushida	K.Tanida
HUW0025055-01D	Mar./29/2002	<Initial issue> Itherm, Vtherm and VESD are added in absolute max. ratings. Bandwidth is added. Spectral width at –20dB is revised.	N.Kushida	T.Kounosu	K.Tanida