Sumitomo Electric Industries, Ltd.
Part No. : SLT5416 Series
Document No. : HUW 0025055-01B
Date of issue : December 05, 2001

Preliminary

Technical Specification

of

1.5μm DFB Laser Diode Module for WDM Direct Modulation

SLT5416 series

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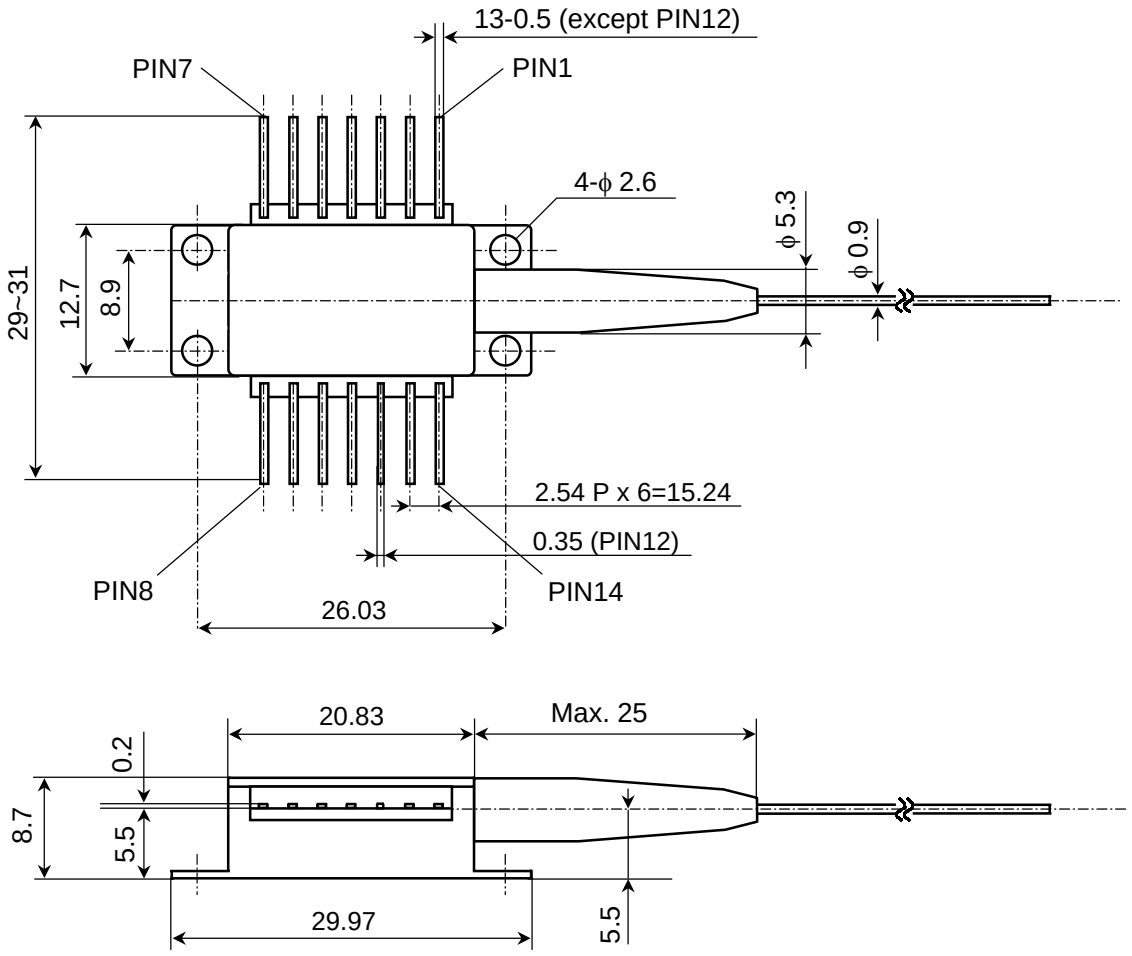
1. General

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

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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	–	150	mA
LD reverse voltage	VrL	–	2	V
PD reverse current	IrP	–	2	mA
PD reverse voltage	VrP	–	15	V
TEC current	Ic	–	1.4	A
Package mounting screw torque(*1)	Npt	–	0.2	Nm
Lead soldering temperature	Stemp	–	260	°C
Lead soldering time	Stime	–	10	sec

Note *1 Without buffer materials under the package

4. Electrical and optical characteristics

(Unless otherwise noted, T_{LD}=19~31°C, Tc=-20~70°C, BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	Ith	CW	–	10	25	mA
Operating current	Iop	CW, Pf=Pop	–	–	(*2)	mA
Slope efficiency	Se	CW, Pf=0~Ppeak(*3)	(*2)	–	–	W/A
Forward voltage	Vf	CW, Pf=Ppeak(*3)	–	–	2	V
Input impedance	Zin	-	–	25	–	Ω
Bandwidth	BW	-3dB, Pf=Pop	3.5	–	–	GHz
Rise time	Tr	20 to 80%	–	–	100	ps
Fall time	Tf	20 to 80%	–	–	100	ps
Monitor current	Im	CW, Pf=Pop	20	–	500	μA
Monitor dark current	Id	VrP=5V	–	1	10	nA
Monitor capacitance	C	VrP=5V, f=1MHz	–	–	12	pF
Peak wavelength	λp	CW, Pf=Pop	–	(*2)	–	nm
Spectral width (modulated)	$\Delta\lambda_{20}$	Pf=Pop, -20dB, (*4)	–	–	0.6	nm
	$\Delta\lambda_{3}$	Pf=Pop, -3dB, (*4)	–	–	0.2	nm
Peak wavelength drift	Dλ	CW, Pf=Pop, 25years	–	–	0.1	nm
Side mode suppression ratio	SMSR	CW, Pf=Pop	35	–	–	dB
Dispersion penalty	Pd	(*4),(*5)	–	–	2	dB

Note *2 See ordering information (Section 7)
Note *3 Ppeak = 2 × Pop
Note *4 2.5Gbit/s, 2^{23}-1NRZ, 50% duty cycle, Extinction Ratio=9dB
Note *5 Pf=Pop; BER@10^{-10}; 1800ps/nm (1mW, 5mW version), 1350ps/nm (10mW version)

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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(BOL)	Ic	T_{LD} =19°C, Tc =70°C Pf=Pop	–	–	1.0	A
TEC voltage(BOL)	Vc	T_{LD} =19°C, Tc =70°C Pf=Pop	–	–	2.0	V
TEC current(EOL)	Ic2	T_{LD} =19°C, Tc =70°C Pf=Pop	–	–	1.1	A
TEC voltage(EOL)	Vc2	T_{LD} =19°C, Tc =70°C Pf=Pop	–	–	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)			–

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7. Ordering information

SLT5416-xx-xxxx

Optical Connector
C : SC-PC
D : FC-PC

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

Optical Power

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

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	–	–	–
F410	194.1	1544.53	–	–	–
F400	194.0	1545.32	–	–	–

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8. Precaution

Radiation emitted by laser devices can be dangerous to the eyes. Avoid eye or skin exposure to direct or scattered radiation.
The modules should be handled in the same manner as ordinary semiconductor devices to prevent the electro-static damages. For safe keeping and carrying, the modules should be packaged with ESD proof material. To assemble the modules on PCB, the workbench, the soldering iron and the human body should be grounded.
To eliminate the ripple noise to supply voltage, a ripple filter should be placed as close to the module as possible.
The stress to the fiber pigtail may cause the damage on the performance. The fiber pigtail may snap off by dropping the module.
Please pay special attention to the atmosphere condition because the dew on the module may cause some electrical damages.
Under such a strong vibration environment as in automobile, the performance and reliability are not guaranteed.

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