

Sumitomo Electric Industries, Ltd.  
Part No. : SLT5411/SLT5413 Series  
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## **Technical Specification**

of

**1.5 $\mu$ m DFB Laser Diode Module  
for WDM External Modulation**

**SLT5411/SLT5413 series**

**Sumitomo Electric Industries, Ltd.**

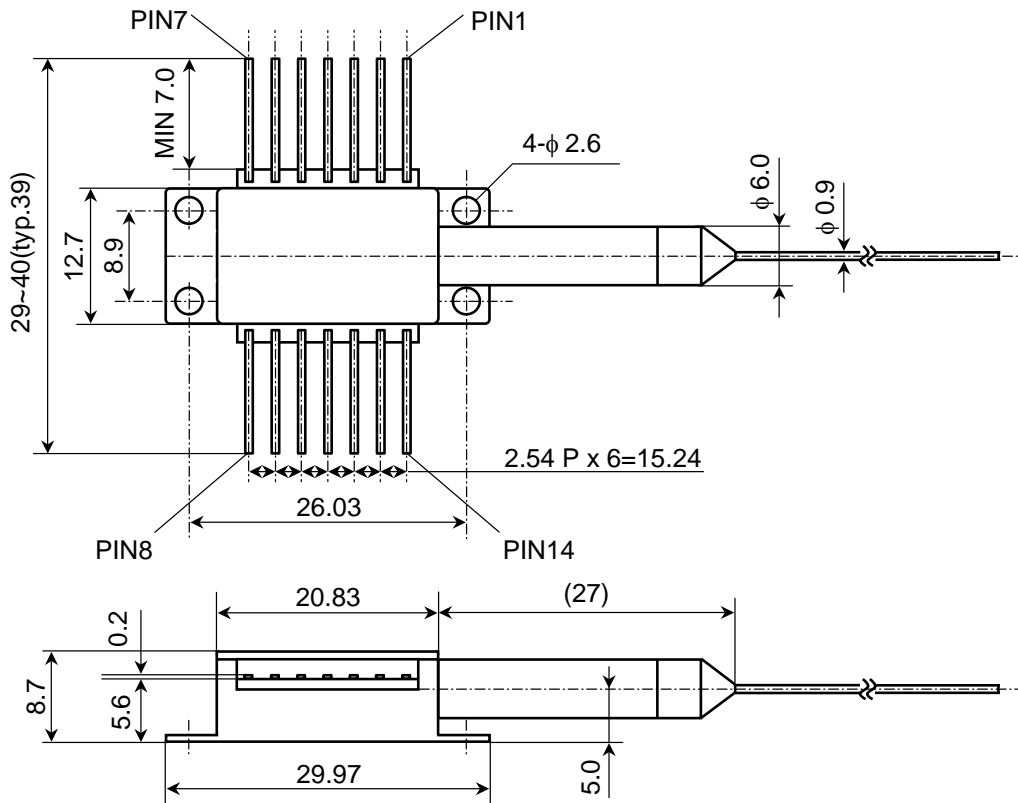
1. General

SLT5411/SLT5413 series are 1.5μm InGaAsP/InP MQW DFB laser diode modules designed for a CW optical source of WDM (Wavelength Division Multiplexing) application used with an external modulator.

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 polarization maintaining (PM) 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	LD Anode (*1)
3	LD Cathode (DC)	12	LD Cathode (RF)
4	Monitor PD Anode	11	LD Anode (*1)
5	Monitor PD Cathode	10	NC
6	TEC Anode	9	Case Ground
7	TEC Cathode	8	Case Ground

Note \*1 SLT5411 : Anode pins are connected to case ground  
 SLT5413 : Anode pins are floated against case ground

### 3. Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Tstg	-40	85	°C
Operating case temperature	Tc	-20	65	°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) (*2)	VESD	–	500	V
Package mounting screw torque(*3)	Npt	–	0.2	Nm
Lead soldering temperature	Stemp	–	260	°C
Lead soldering time	Stime	–	10	sec

Note \*2 A human-body model (HBM, C=100pF, R=1.5kΩ) is employed.

Note \*3 Without buffer materials under the package

### 4. Electrical and optical characteristics

(Unless otherwise noted, T<sub>LD</sub>=19~31°C, BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	Ith	CW	–	10	25	mA
Operating current	Iop	CW A Pf=10mW	–	–	100	mA
		(*4) B Pf=20mW	–	–	120	mA
Forward voltage	Vf	CW, If=Iop	–	–	2	V
Monitor current	Im	CW, If=Iop	50	–	1000	μA
Side mode suppression ratio	SMSR	CW, If=Iop	35	–	–	dB
Relative intensity noise	RIN	CW, If=Iop, DC~2.5GHz	–	–	-140	dB/Hz
Polarization extinction ratio	PER	CW, If=Iop, launched into slow axis	20	–	–	dB
Monitor dark current	Id	VrP=5V	–	1	10	nA
Monitor capacitance	C	VrP=5V, f=1MHz	–	–	12	pF
Peak wavelength	λp	CW, If=Iop	–	(*4)	–	nm
Peak wavelength drift	Dλ	CW, Pf=Pop, 25 years	–	–	0.2	nm
Line width	Δλ	CW, If=Iop	–	–	10	MHz

Note \*4 See ordering information (Section 7)

5. Thermal characteristics

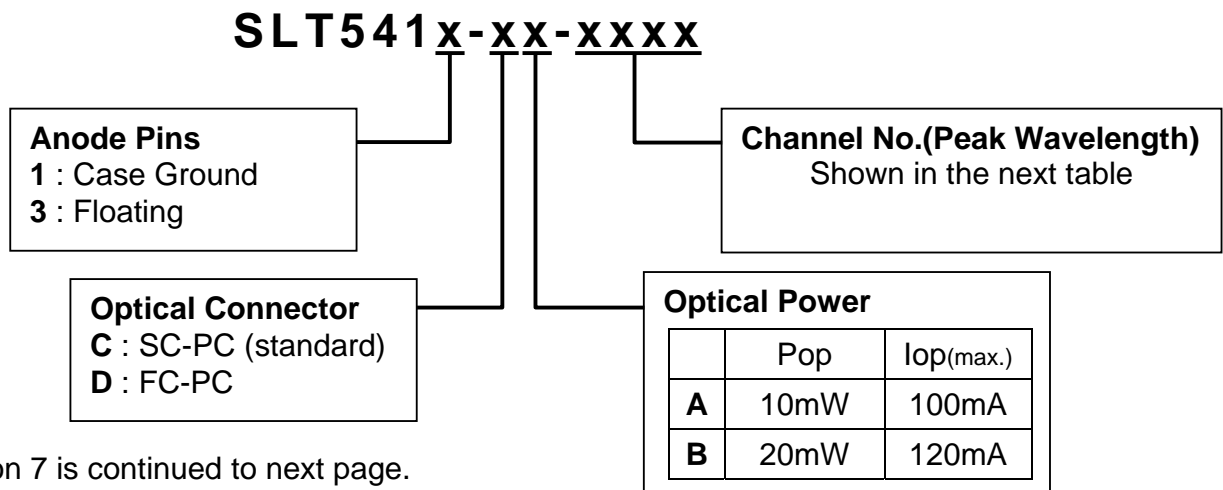
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Thermistor resistance	R <sub>th</sub>	T <sub>LD</sub> =25°C	9.5	10	10.5	kΩ
Thermistor B const.	B	25°C/75°C	3800	3900	4000	K
TEC current	I <sub>c</sub>	T <sub>LD</sub> =19°C, T <sub>c</sub> =65°C Pf=Pop	-	-	1	A
TEC voltage	V <sub>c</sub>	T <sub>LD</sub> =19°C, T <sub>c</sub> =65°C Pf=Pop	-	-	2	V
Peak wavelength drift with case temperature	Dλ <sub>p</sub> /DT <sub>c</sub>	CW, I <sub>f</sub> =I <sub>op</sub> , T <sub>c</sub> =-20 to 65°C	-1	-	1	pm/°C

6. Fiber specification

Parameter	Min.	Typ.	Max.	Unit
Fiber type	Single mode PM fiber			-
Mode field diameter	8.5	9.5	10.5	μm
Cladding diameter	122	125	128	μm
Outer jacket diameter	-	0.9	-	mm
Pigtail length	1.5	2.0	2.5	m
Bending radius	40	-	-	mm
Optical connector	(*5)			-

Note \*5 See ordering information (Section 7)

7. Ordering information



Section 7 is continued to next page.

Channels between 1528 and 1565nm

Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)
F620	196.20	1527.99	F465	194.65	1540.16	F310	193.10	1552.52
F615	196.15	1528.38	F460	194.60	1540.56	F305	193.05	1552.93
F610	196.10	1528.77	F455	194.55	1540.95	F300	193.00	1553.33
F605	196.05	1529.16	F450	194.50	1541.35	F295	192.95	1553.73
F600	196.00	1529.55	F445	194.45	1541.75	F290	192.90	1554.13
F595	195.95	1529.94	F440	194.40	1542.14	F285	192.85	1554.54
F590	195.90	1530.33	F435	194.35	1542.54	F280	192.80	1554.94
F585	195.85	1530.72	F430	194.30	1542.94	F275	192.75	1555.34
F580	195.80	1531.12	F425	194.25	1543.33	F270	192.70	1555.75
F575	195.75	1531.51	F420	194.20	1543.73	F265	192.65	1556.15
F570	195.70	1531.90	F415	194.15	1544.13	F260	192.60	1556.55
F565	195.65	1532.29	F410	194.10	1544.53	F255	192.55	1556.96
F560	195.60	1532.68	F405	194.05	1544.92	F250	192.50	1557.36
F555	195.55	1533.07	F400	194.00	1545.32	F245	192.45	1557.77
F550	195.50	1533.47	F395	193.95	1545.72	F240	192.40	1558.17
F545	195.45	1533.86	F390	193.90	1546.12	F235	192.35	1558.58
F540	195.40	1534.25	F385	193.85	1546.52	F230	192.30	1558.98
F535	195.35	1534.64	F380	193.80	1546.92	F225	192.25	1559.39
F530	195.30	1535.04	F375	193.75	1547.32	F220	192.20	1559.79
F525	195.25	1535.43	F370	193.70	1547.72	F215	192.15	1560.20
F520	195.20	1535.82	F365	193.65	1548.11	F210	192.10	1560.61
F515	195.15	1536.22	F360	193.60	1548.51	F205	192.05	1561.01
F510	195.10	1536.61	F355	193.55	1548.91	F200	192.00	1561.42
F505	195.05	1537.00	F350	193.50	1549.32	F195	191.95	1561.83
F500	195.00	1537.40	F345	193.45	1549.72	F190	191.90	1562.23
F495	194.95	1537.79	F340	193.40	1550.12	F185	191.85	1562.64
F490	194.90	1538.19	F335	193.35	1550.52	F180	191.80	1563.05
F485	194.85	1538.58	F330	193.30	1550.92	F175	191.75	1563.45
F480	194.80	1538.98	F325	193.25	1551.32	F170	191.70	1563.86
F475	194.75	1539.37	F320	193.20	1551.72	F165	191.65	1564.27
F470	194.70	1539.77	F315	193.15	1552.12	F160	191.60	1564.68

Channels between 1565 and 1610nm

Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)
F155	191.55	1565.09	E975	189.75	1579.93	E795	187.95	1595.06
F150	191.50	1565.50	E970	189.70	1580.35	E790	187.90	1595.49
F145	191.45	1565.90	E965	189.65	1580.77	E785	187.85	1595.91
F140	191.40	1566.31	E960	189.60	1581.18	E780	187.80	1596.34
F135	191.35	1566.72	E955	189.55	1581.60	E775	187.75	1596.76
F130	191.30	1567.13	E950	189.50	1582.02	E770	187.70	1597.19
F125	191.25	1567.54	E945	189.45	1582.44	E765	187.65	1597.62
F120	191.20	1567.95	E940	189.40	1582.85	E760	187.60	1598.04
F115	191.15	1568.36	E935	189.35	1583.27	E755	187.55	1598.47
F110	191.10	1568.77	E930	189.30	1583.69	E750	187.50	1598.89
F105	191.05	1569.18	E925	189.25	1584.11	E745	187.45	1599.32
F100	191.00	1569.59	E920	189.20	1584.53	E740	187.40	1599.75
F095	190.95	1570.01	E915	189.15	1584.95	E735	187.35	1600.17
F090	190.90	1570.42	E910	189.10	1585.36	E730	187.30	1600.60
F085	190.85	1570.83	E905	189.05	1585.78	E725	187.25	1601.03
F080	190.80	1571.24	E900	189.00	1586.20	E720	187.20	1601.46
F075	190.75	1571.65	E895	188.95	1586.62	E715	187.15	1601.88
F070	190.70	1572.06	E890	188.90	1587.04	E710	187.10	1602.31
F065	190.65	1572.48	E885	188.85	1587.46	E705	187.05	1602.74
F060	190.60	1572.89	E880	188.80	1587.88	E700	187.00	1603.17
F055	190.55	1573.30	E875	188.75	1588.30	E695	186.95	1603.60
F050	190.50	1573.71	E870	188.70	1588.73	E690	186.90	1604.03
F045	190.45	1574.13	E865	188.65	1589.15	E685	186.85	1604.46
F040	190.40	1574.54	E860	188.60	1589.57	E680	186.80	1604.88
F035	190.35	1574.95	E855	188.55	1589.99	E675	186.75	1605.31
F030	190.30	1575.37	E850	188.50	1590.41	E670	186.70	1605.74
F025	190.25	1575.78	E845	188.45	1590.83	E665	186.65	1606.17
F020	190.20	1576.20	E840	188.40	1591.26	E660	186.60	1606.60
F015	190.15	1576.61	E835	188.35	1591.68	E655	186.55	1607.04
F010	190.10	1577.03	E830	188.30	1592.10	E650	186.50	1607.47
F005	190.05	1577.44	E825	188.25	1592.52	E645	186.45	1607.90
F000	190.00	1577.86	E820	188.20	1592.95	E640	186.40	1608.33
E995	189.95	1578.27	E815	188.15	1593.37	E635	186.35	1608.76
E990	189.90	1578.69	E810	188.10	1593.79	E630	186.30	1609.19
E985	189.85	1579.10	E805	188.05	1594.22	E625	186.25	1609.62
E980	189.80	1579.52	E800	188.00	1594.64	E620	186.20	1610.06

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
HUW9723037-01A	Oct./28/1997	Initial issue	A.Miki	G.Sasaki	T.Fujitani
HUW9723037-01B	Mar./11/1998	Fiber length is revised.	A.Miki	G.Sasaki	T.Fujitani
HUW9723037-01C	June/16/1998	20mW option is added.	A.Miki	T.Fujitani	T.Fujitani
HUW9723037-01D	June/23/1998	Availability of 50GHz spacing is added.	A.Miki	T.Fujitani	T.Fujitani
HUW9723037-01E	July/2/1998	Maximum of Iop is revised. Channel number is added.	A.Miki	T.Fujitani	T.Fujitani
HUW9723037-01F	Jan./7/1999	Package mounting screw torque is added. RIN, SMSR, PER, $\Delta\lambda$ and Channels are revised.	N.Kushida	A.Miki	T.Fujitani
HUW9723037-01G	Mar./12/1999	Channels between 1564nm and 1610nm are added. Nose of PKG is miniaturized. Max. of Storage Temp., Thermistor characteristics are revised. SLT5413(Anode floating) is added.	T.Nakabayashi	A.Miki	T.Fujitani
HUW9723037-01H	Feb./22/2000	PKG drawing is revised. Lead pin length and hole diameter is changed.	T.Nakabayashi	N.Kushida	T.Fujitani
HUW9723037-01I	Mar./8/2001	FC/PC connector specification is added.	T.Kounosu	N.Kushida	K.Tanida
HUW9723037-01J	Jan/31/2002	IfL, Iop and Precaution are revised. Itherm, Vtherm, VESD, Pigtail length and $D\lambda_p/DTC$ are added.	N.Kushida	T.Kounosu	K.Tanida