Sumitomo Electric Industries, Ltd.
Part No. : SLT544x-xA Series
Document No. : HUW0025005-01C
Date of issue : January 31, 2002

Technical Specification

of

1.5μm Tunable Laser Diode Module

for WDM External Modulation

~ 4 Channels , 10mW ~

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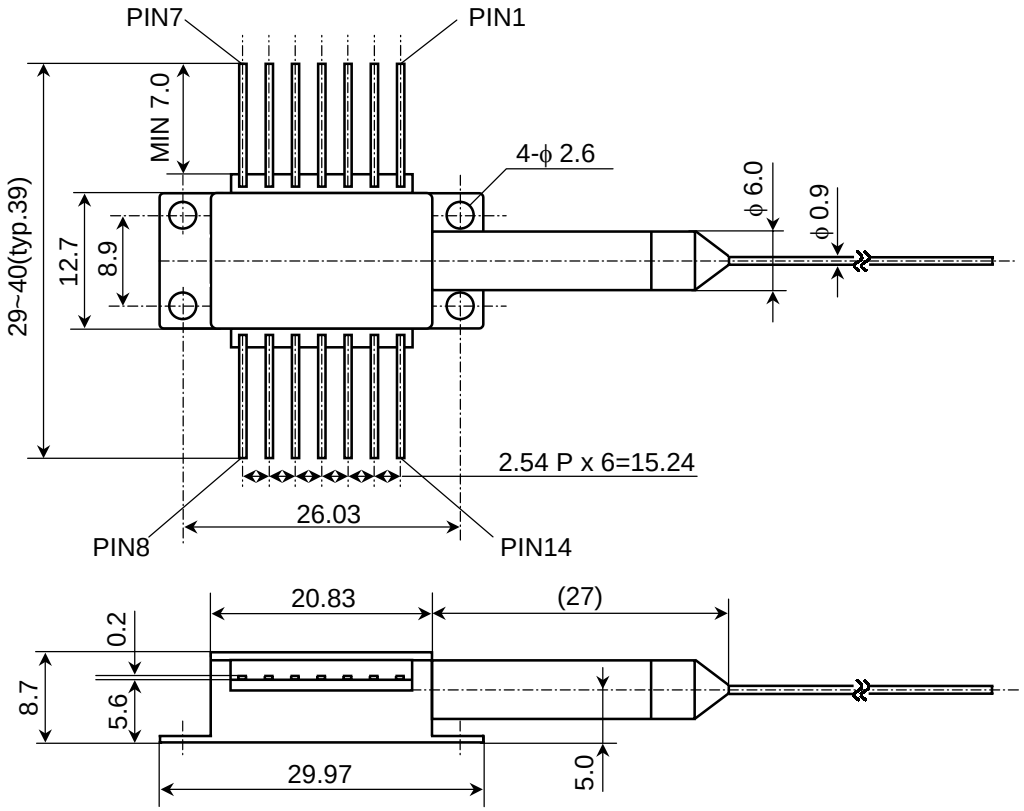
1. General

SLT544x-xA 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. SLT544x-xA can be tuned to 4 adjacent channels of 50GHz spacing by controlling the LD chip temperature. A LD chip 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 : +/-0.15mm unless otherwise noted)



Pin Assignment

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 SLT5441 : Anode pins are connected to case ground
SLT5443 : 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	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	-	2	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_{LD}=10~40°C, BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	Ith	CW	-	-	30	mA
Operating current	Iop	CW, Pf=10mW	-	-	70	mA
Forward voltage	Vf	CW, If=Iop	-	-	2	V
Monitor current	Im	CW, If=Iop, Vrp=5V	25	-	500	μA
Side mode suppression ratio	SMSR	CW, If=Iop	35	-	-	dB
Relative intensity noise	RIN	CW, If=Iop, DC~2.5GHz	-	-	-140	dB/Hz
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,20 years	-	-	0.1(*5)	nm
Line width	Δλ	CW, If=Iop	-	-	10	MHz
Polarization extinction ratio	PER	CW, If=Iop, launched into slow axis	20	-	-	dB

Note *4 Peak wavelength can be set to adjacent 4 channels of 50GHz spacing by tuning the LD temperature during 10 to 40°C. See ordering information (Section 7)

Note *5 Estimated MTTF : 5.9×10^5 hours

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}=10°C, Tc=70°C, Pf=Pop, BOL	-	-	1.2	A
TEC voltage(BOL)	Vc		-	-	2.4	V
TEC current(EOL)	Ic2	T_{LD}=10°C, Tc=70°C, Pf=Pop, EOL	-	-	Icx1.1	A
TEC voltage(EOL)	Vc2		-	-	Vcx1.1	V
Peak wavelength drift with case temperature	Dλp/DTc	CW, If=Iop, Tc=-20 to 70°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	0.8	0.9	1.0	mm
Pigtail length	1.5	2.0	2.5	m
Bending radius	40	-	1	mm
Optical connector	(*6)			-

Note *6 See ordering information (Section 7)

7.Ordering information

Ordering number	Anode pins	Optical connector
SLT5441-CA-xxxx	Case Ground	SC/PC
SLT5443-CA-xxxx	Floating	SC/PC
SLT5441-DA-xxxx	Case Ground	FC/PC
SLT5443-DA-xxxx	Floating	FC/PC

xxxx : Part No. (shown in the following tables)

Table of part number (C-band)

C-band					
Part No.	**Tunable channels**	**Part No.**	**Tunable channels**	**Part No.**	**Tunable channels**
Q620	F620 to F605	**Q465**	F465 to F450	**Q310**	F310 to F295
Q615	F615 to F600	**Q460**	F460 to F445	**Q305**	F305 to F290
Q610	F610 to F595	**Q455**	F455 to F440	**Q300**	F300 to F285
Q605	F605 to F590	**Q450**	F450 to F435	**Q295**	F295 to F280
Q600	F600 to F585	**Q445**	F445 to F430	**Q290**	F290 to F275
Q595	F595 to F580	**Q440**	F440 to F425	**Q285**	F285 to F270
Q590	F590 to F575	**Q435**	F435 to F420	**Q280**	F280 to F265
Q585	F585 to F570	**Q430**	F430 to F415	**Q275**	F275 to F260
Q580	F580 to F565	**Q425**	F425 to F410	**Q270**	F270 to F255
Q575	F575 to F560	**Q420**	F420 to F405	**Q265**	F265 to F250
Q570	F570 to F555	**Q415**	F415 to F400	**Q260**	F260 to F245
Q565	F565 to F550	**Q410**	F410 to F395	**Q255**	F255 to F240
Q560	F560 to F545	**Q405**	F405 to F390	**Q250**	F250 to F235
Q555	F555 to F540	**Q400**	F400 to F385	**Q245**	F245 to F230
Q550	F550 to F535	**Q395**	F395 to F380	**Q240**	F240 to F225
Q545	F545 to F530	**Q390**	F390 to F375	**Q235**	F235 to F220
Q540	F540 to F525	**Q385**	F385 to F370	**Q230**	F230 to F215
Q535	F535 to F520	**Q380**	F380 to F365	**Q225**	F225 to F210
Q530	F530 to F515	**Q375**	F375 to F360	**Q220**	F220 to F205
Q525	F525 to F510	**Q370**	F370 to F355	**Q215**	F215 to F200
Q520	F520 to F505	**Q365**	F365 to F350	**Q210**	F210 to F195
Q515	F515 to F500	**Q360**	F360 to F345	**Q205**	F205 to F190
Q510	F510 to F495	**Q355**	F355 to F340	**Q200**	F200 to F185
Q505	F505 to F490	**Q350**	F350 to F335	**Q195**	F195 to F180
Q500	F500 to F485	**Q345**	F345 to F330	**Q190**	F190 to F175
Q495	F495 to F480	**Q340**	F340 to F325	**Q185**	F185 to F170
Q490	F490 to F475	**Q335**	F335 to F320	**Q180**	F180 to F165
Q485	F485 to F470	**Q330**	F330 to F315	**Q175**	F175 to F160
Q480	F480 to F465	**Q325**	F325 to F310	**Q170**	F170 to F155
Q475	F475 to F460	**Q320**	F320 to F305	**Q165**	F165 to F150
Q470	F470 to F455	**Q315**	F315 to F300	**Q160**	F160 to F145

Table of part number (L-band)

L-band					
Part No.	**Tunable channels**	**Part No.**	**Tunable channels**	**Part No.**	**Tunable channels**
Q155	F155 to F140	**P980**	E980 to E965	**P805**	E805 to E790
Q150	F150 to F135	**P975**	E975 to E960	**P800**	E800 to E785
Q145	F145 to F130	**P970**	E970 to E955	**P795**	E795 to E780
Q140	F140 to F125	**P965**	E965 to E950	**P790**	E790 to E775
Q135	F135 to F120	**P960**	E960 to E945	**P785**	E785 to E770
Q130	F130 to F115	**P955**	E955 to E940	**P780**	E780 to E765
Q125	F125 to F110	**P950**	E950 to E935	**P775**	E775 to E760
Q120	F120 to F105	**P945**	E945 to E930	**P770**	E770 to E755
Q115	F115 to F100	**P940**	E940 to E925	**P765**	E765 to E750
Q110	F110 to F095	**P935**	E935 to E920	**P760**	E760 to E745
Q105	F105 to F090	**P930**	E930 to E915	**P755**	E755 to E740
Q100	F100 to F085	**P925**	E925 to E910	**P750**	E750 to E735
Q095	F095 to F080	**P920**	E920 to E905	**P745**	E745 to E730
Q090	F090 to F075	**P915**	E915 to E900	**P740**	E740 to E725
Q085	F085 to F070	**P910**	E910 to E895	**P735**	E735 to E720
Q080	F080 to F065	**P905**	E905 to E890	**P730**	E730 to E715
Q075	F075 to F060	**P900**	E900 to E885	**P725**	E725 to E710
Q070	F070 to F055	**P895**	E895 to E880	**P720**	E720 to E705
Q065	F065 to F050	**P890**	E890 to E875	**P715**	E715 to E700
Q060	F060 to F045	**P885**	E885 to E870	**P710**	E710 to E695
Q055	F055 to F040	**P880**	E880 to E865	**P705**	E705 to E690
Q050	F050 to F035	**P875**	E875 to E860	**P700**	E700 to E685
Q045	F045 to F030	**P870**	E870 to E855	**P695**	E695 to E680
Q040	F040 to F025	**P865**	E865 to E850	**P690**	E690 to E675
Q035	F035 to F020	**P860**	E860 to E845	**P685**	E685 to E670
Q030	F030 to F015	**P855**	E855 to E840	**P680**	E680 to E665
Q025	F025 to F010	**P850**	E850 to E835	**P675**	E675 to E660
Q020	F020 to F005	**P845**	E845 to E830	**P670**	E670 to E655
Q015	F015 to F000	**P840**	E840 to E825	**P665**	E665 to E650
Q010	F010 to E995	**P835**	E835 to E820	**P660**	E660 to E645
Q005	F005 to E990	**P830**	E830 to E815	**P655**	E655 to E640
Q000	F000 to E985	**P825**	E825 to E810	**P650**	E650 to E635
P995	E995 to E980	**P820**	E820 to E805	**P645**	E645 to E630
P990	E990 to E975	**P815**	E815 to E800	**P640**	E640 to E625
P985	E985 to E970	**P810**	E810 to E795	**P635**	E635 to E620

Table of channel number and frequency (C-band)

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

Table of channel number and frequency (L-band)

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
HUW0025005-01A	Mar./5/2001	Preliminary	T. Kounosu	N. Kushida	K.Tanida
HUW0025005-01B	July/26/2001	Initial issue	N.Kushida	T. Kounosu	K.Tanida
HUW0025005-01C	Jan/31/2002	IfL, Precaution and Condition for RIN are revised. Itherm, Vtherm, VESD and Pigtail length are added.	N.Kushida	T.Kounosu	K.Tanida