

Sumitomo Electric Industries, Ltd.
Part No. : SLW541A series
Document No. : HUW0825002-01A
Date of issue : May 14, 2008



Technical Specification

of

**1.47-1.61 μ m DFB Laser Diode Module
for wireless communication system application**

SLW541A series

RoHS Compliant

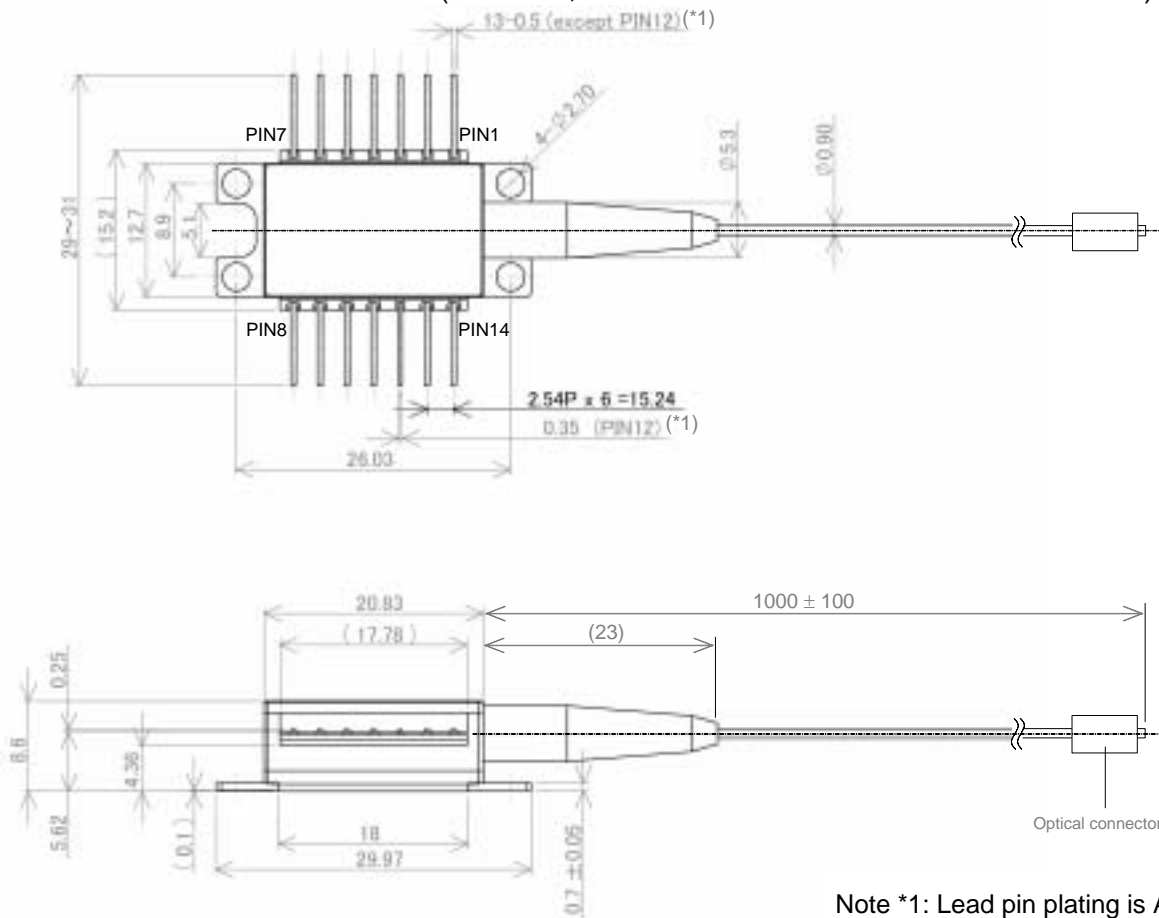
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1. General

SLW541A series are 1.47 to 1.61um InGaAsP/InP MQW DFB laser diode modules designed for analog direct modulation optical source of wireless communication system application. A laser diode chip is mounted on a 14 pin butterfly package integrated with an optical isolator (the content is less than 1000ppm), 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)



Note *1: Lead pin plating is Au over Ni.

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	–	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(*2)	Ic	–	1.4	A
Electro static Discharge (ESD) (*3)	VESD	–	500	V
Package mounting screw torque (*4)	Npt	–	0.2	Nm
Lead soldering temperature	Stemp	–	260	°C
Lead soldering time	Stime	–	10	sec

Note *2 TEC should be properly feedback controlled by monitoring submount temperature using a thermistor, so that neither submount nor case temperature exceeds the maximum storage temperature. Exceeding the maximum storage temperature could cause deterioration of module performance.

Note *3 A human-body model (HBM, C=100pF, R=1.5kΩ) is employed.

Note *4 Without buffer materials under the package

4. Electrical and optical characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Threshold current	I _{th}	CW	–	8	25	mA
Operating current	I _{op}	CW, P _f =5mW	–	40	60	mA
		CW, P _f =10mW	–	60	80	
Slope efficiency	S _e	CW, P _f =0 to 5mW	0.13	0.15	–	W/A
		CW, P _f =0 to 10mW	0.15	0.18	–	
Forward voltage	V _f	CW, P _f =P _{op}	–	–	2	V
Monitor current	I _m	CW, P _f =P _{op}	15	–	800	μA
Monitor dark current	I _d	V _{rP} =5V	–	1	30	nA
Monitor capacitance	C	V _{rP} =5V, f=1MHz	–	–	20	pF
Tracking error	TE	P _f =P _{op} , T _c = -20 to 70°C I _m =const	-0.5	–	0.5	dB
Input impedance	Z _{in}	–	–	25	–	Ω
Bandwidth	S ₂₁	-3dB, P _f =P _{op}	3	–	–	GHz
RF input reflection	S ₁₁	P _f =P _{op} , f=DC to 2.5GHz, (*6)	–	–	-8	dB
Peak wavelength	λ _p	CW, P _f =P _{op}	λ _p -3	λ _p (*5)	λ _p +3	nm
Spectral width	Δλ	P _f =P _{op} , -3dB	–	–	0.2	nm
Peak wavelength drift	Dλ	CW, P _f =P _{op} , 25years	–	–	0.1	nm
Side mode suppression ratio	SMSR	CW, P _f =P _{op}	35	–	–	dB
Optical Isolation	ISO	T _c =-20 to 70°C	25	–	–	dB
3 rd Inter Modulation Distortion	IMD3	P _f =P _{op} , (*7)	–	-60	–	dBc
Relative Intensity Noise	RIN	200MHz to 2.5GHz, (*8)	–	-155	–	dB/Hz

(Unless otherwise noted, T_{LD}=25°C, BOL)

Note *5 See ordering information (Section 7)

Note *6 50Ω measurement system

Note *7 RF input level: +3dBm/tone, 2 tone(f1=2140MHz, f2=2145MHz), Zero link loss

Note *8 Zero link loss

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} =25°C, T _C =70°C	–	–	1.0	A
TEC voltage	Vc	Pf=Pop, BOL	–	–	2.0	V
TEC current (EOL)	Ic2	T _{LD} =25°C, T _C =70°C	–	–	1.1	A
TEC voltage (EOL)	Vc2	Pf=Pop, 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	30	–	–	mm
Optical connector	See ordering information (Section 7)			–

7. Ordering information

S L W 5 4 1 A - x x - x x x

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

	Peak Wavelength λp
470	1470 nm
490	1490 nm
10	1510 nm (Standard)
30	1530 nm (Standard)
50	1550 nm (Standard)
70	1570 nm (Standard)
590	1590 nm
610	1610 nm

	Pop
A	5mW
B	10mW

E.g. **SLW541A-QB-10** is a 10mW 1510nm device with SC/APC connector.

8. Precaution

FDA/CDRH Class 3B laser product. This device has been classified with the FDA/CDRH under accession number 0120675. Class 3B in the radiation safety standard applies to all versions of this product. Mishandling may result in hazardous laser radiation exposure.

9. Handling

9-1. Store and operate this product within the rated parameters described in the specification.

9-2. This product is subject to damage by static electricity.

- * When touching this product, properly ground (10^6 to $10^8 \Omega$ order) your body to prevent the deterioration of product performance by electrostatic damage.
- * Do not use this product where a strong electromagnetic field is present.
- * Implement appropriate anti-static measures when storing or handling this product.
- * When installing this product, properly ground the floor, worktable, soldering iron, and other contacting surfaces or tools.
- * Do not handle the LD module by their leads.

9-3. Electrical surge, excessive current, etc. may deteriorate the properties of this product.

- * Use this product within the maximum rated voltage/current.
- * Securely connect the lead of this product to the probe of the power supply so as not to cause a surge. A surge occurring at the contact probe may deteriorate the laser diode.

9-4. The mounting flange requires proper handling because it is made of deformable material (copper).

10. Mounting

10-1. Recommended soldering condition by soldering iron.

- * Peak temperature: 380°C or less (at lead part)
- * Time: 3 seconds or less

Solder after mounting the module on the heat sink.

10-2. Dissipation of Heat

Be sure to install a heat sink at the bottom of the package. Passing an electric current without installing a heat sink may deteriorate or break the product.

10-2-1. Type of Heat Sink to Install

- 1) Recommended material:
Use aluminum, copper, or other materials with good heat-dissipation characteristics.
- 2) Roughness and flatness of the mounting surface:
We recommend a heat sink, the mounting surface of which has roughness of 0.8 μm or less and flatness of 15 μm or less.

10-2-2. Mounting on the heat sink

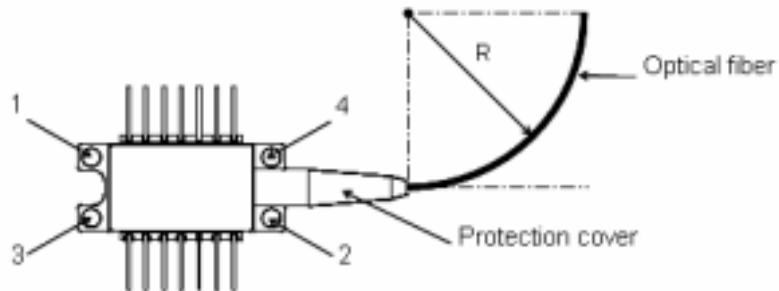
1) Using heat-dissipating grease

We recommend that heat-dissipating grease be applied between the product and the heat sink. Do not insert a heat-dissipating sheet or other elastic materials between this product and the heat sink. Using an elastic material may deteriorate the initial characteristics or reliability of the product. If using the heat-dissipating sheet or other elastic materials, adjust the torque and confirm the normal operating before using.

2) Fixing the product with screws

Using a torque screwdriver, tighten the screws in the order of 1→2→3→4 as shown figure below. Recommended torque is 0.15Nm or less.

Be extra careful not to touch the optical parts (optical fiber, protection cover) of this product with the torque screwdriver or screws. Touching the optical parts may shift the light axis and lower the optical output.



10-2-3. Handling fiber-pigtail and optical connector

- *Before operating this product, be sure to clean the connector ends. Residual dirt may burn and stick to the connector ends, which may lower the optical output.
- *Do not apply excessive impact or vibration to the optical fiber pigtail, as it may break the fiber or lower optical output.
- *Keep the bending radius more than 30mm.
- *Avoid the contact of the circuit board and optical parts (Protection cover).

11. We will not guarantee the performance, reliability, and other characteristics of this product if it is used under strong vibrations, such as on a moving vehicle.

12. Operate and store this product in a proper environment so as not to cause condensation, which could result in deterioration or breakage of the product.

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13. RoHS Compliancy

On January 27, 2003, the European Parliament and the Council of the European Union issued the directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

Member States shall ensure that, from July 1, 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Applications listed in the Annex are exempted.

This product is compliant with RoHS 6/6 directive with exemptions “Lead in glass of cathode ray tubes, electronic components and fluorescent tubes” and “Lead as an alloying element in steel containing up to 0.35 % lead by weight, aluminium containing up to 0.4 % lead by weight and as a copper alloy containing up to 4 % lead by weight”.

REVISION RECORD

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HUW0825002-01A	May /14/2008	Initial issue.	N. Fukushima	T. Takagi M. Ito	H. Michikoshi

Sumitomo Electric reserves the right to change the technical specifications without notice at any time.