Sumitomo Electric Industries, Ltd.
Part No. : SLM1213 Series
Document No. : HUW0025078-01C
Date of issue : January 16, 2002

Technical Specification

of

1.3μm directly modulated DFB Laser Diode Module integrated with LD Driver IC for 10Gbps Transmission

SLM1213 series

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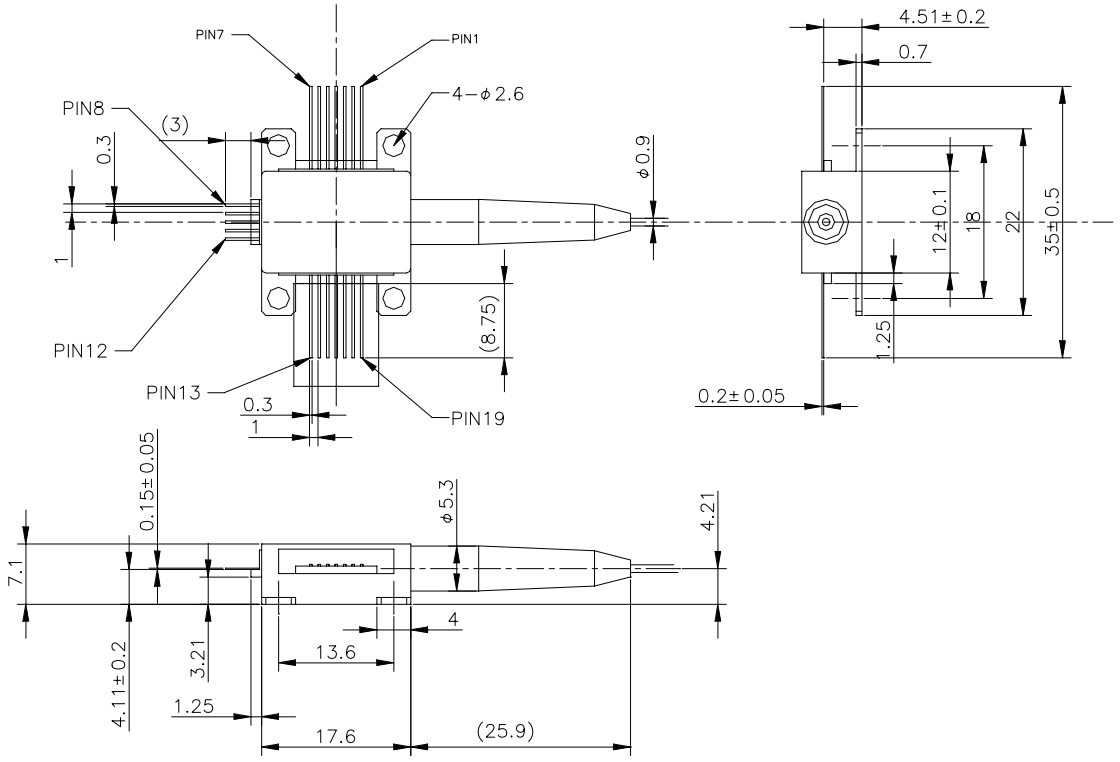
1. General

SLM1213 series are 1.3µm single-mode light sources for 9.95Gb/s & 10.66Gb/s data transmission up to 6.6ps/nm(2km).

1.3µm DFB laser diode chip and LD driver IC are integrated in a 14pin+5pin small butterfly package. An InGaAs monitor PD are also mounted on this small package. 10Gb/s differential signal is fed through the co-planar transmission line which located at the rear side of the package.

2. Package dimension and pin assignment

(unit : mm, tolerance : ±0.15 unless otherwise noted)



Pin No.	Function	Pin No.	Function	Pin No.	Function
1	Case Ground	8	Case Ground	13	PD Cathode
2	Vb	9	D_{IN}	14	PD Anode
3	Vb,mon	10	Case Ground	15	Vref2
4	Vss	11	$\overline{D_{IN}}$	16	Vss
5	NUC(*1)	12	Case Ground	17	Vm,mon
6	Case Ground			18	Vm
7	Vref1			19	Case Ground

Note *1 No User Connection.

3. Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Tstg	-40	85	°C
Operating case temperature	Tc	0	75	°C
PD reverse current	IrP	–	2	mA
PD reverse voltage	VrP	–	15	V
Driver IC supply voltage	Vss	-6.0	0.5	V
Data input(average DC)	D_{IN}, $\overline{D_{IN}}$	-0.54	0.54	V
Modulation current control voltage	Vm	Vss-0.5	Vss+2.5	V
Bias current control voltage	Vb	Vss-0.5	Vss+3.5	V
Reference bias voltage1	Vref1	Vss-0.5	+0.5	V
Reference bias voltage2	Vref2	Vss-0.5	+0.5	V
Package mounting screw torque(*2)	Npt	–	0.2	Nm
ESD tolerance (HBM.)	V_{ESD}	-	180	V
Lead soldering temperature	Stemp	–	260	°C
Lead soldering time	Stime	–	10	sec

Note *2 Without buffer materials under the package

4. Electrical and optical characteristics

(Unless otherwise noted, Tc=0~75°C; BOL)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Power	Pop	(*3)	-6	–	-1	dBm
Tracking error	TE	Pf=Pop; Tc=0~75°C Im=const.	-0.5	–	+0.5	dB
Peak wavelength	λp	Pf=Pop; (*3)	1290	–	1330	nm
Side mode suppression ratio	SMSR	Pf=Pop; (*3)	30	–	–	dB
Monitor current	Im	Pf=Pop; (*3)	5	–	100	μA
Monitor dark current	Id	VrP=5V	–	1	10	nA
Monitor capacitance	C	VrP=5V, f=1MHz	–	–	12	pF
Driver IC supply voltage	Vss		-5.5	-5.2	-4.95	V
Driver IC supply current	Iss	(*3)	–	–	300	mA
Modulation amplitude control voltage	Vm		Vss	–	Vss+1	V
Modulation sensing resistor	$R_{m,mon}$	(*4)	2.7	3.0	3.3	Ω
Bias current control voltage	Vb		Vss	–	Vss+2	V
Bias sensing resistor	$R_{b,mon}$	(*4)	2.7	3.0	3.3	Ω
Data input voltage	D_{IN}, $\overline{D_{IN}}$	differential; AC coupled	0.4	-	1.0	V
Reference bias voltage1	Vref1	(*5)	-	-1.0	-	V
Reference bias voltage2	Vref2	(*5)	-	-2.5	-	V
Rise time	Tr	20 to 80%	–	–	40	ps
Fall time	Tf	20 to 80%	–	–	50	ps
Extinction Ratio	Ext	(*3)	6	–	–	dB
Dispersion penalty	Pd	Pf=Pop; (*3);(*6)	–	–	1.0	dB

Note *3 9.95Gbit/s & 10.66Gbit/s, 2^{31}-1NRZ, 50% duty cycle;
Vb,Vm is set to make Pop and Pd within the specification.
Note *4 Modulation and bias current can be monitored as a voltage; V_{mon}-Vss=R_{mon}×current.
Note *5 Vref1 and Vref2 should be applied constant voltage.
Note *6 BER@10^{-12} ; 6.6ps/nm(@peak wavelength) SMF

5. 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
Fiber length	0.8	1.0	1.2	m
Bending radius	40	–	–	mm
Optical connector		(See section 6)		–

6. Ordering information

SLM1213-x

C : SC-PC (Standard)
D : FC-PC
L : LC connector
M : MU connector

7. 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.
- For power up of driver IC, apply valtages to Vss, Vb and Vm simultaneously. For shut down, Vss, Vb and Vm should be turned off simultaneously.
- 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
HUW0025078-01A	Oct.-17-2001	Preliminary	T.Nakabayashi	T.Fujitani	K.Tanida
HUW0025078-01B	Dec.-11-2001	PIN assignment, Im(max) and Rb,mon was revised. Modulation disable input was deleted.	A. Hamakawa	T.Nakabayashi	K.Tanida
HUW0025078-01C	Jan.-9-2002	Preliminary is removed. Vss Din(max), Pop and Precaution are revised. Absolute maximum ratings of Vm, Vb, Vref1, Vref2 and ESD are added.	A. Hamakawa	T.Nakabayashi	K.Tanida