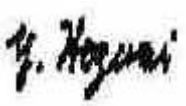
Approved	Approved	Charged
		***H.Koyanagi***

Specification of uncooled DFB-LD module

Module type: FU-645SDF-x1Mxx

(Mitsubishi standard product)

A	B	C	D
	x		
Date		Approved	
20.June.'01		Y.Hozumi	

MITSUBISHI ELECTRIC CORPORATION

* Mitsubishi Electric Corp. reserves the right to change product design and specification without notice.

MITSUBISHI (OPTICAL DEVICES)

FU-645SDF-x1Mxx

1.55 ㎜m UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL (BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

DESCRIPTION

Module type FU-645SDF-x1Mxx is a 1.55µm Uncooled DFB-LD module with single-mode optical fiber.
This module is suitable to a light source for use in 2.5Gb/s digital optical communication systems.

FEATURES

- λ/4 shifted Multi quantum wells (MQW) DFB Laser Diode module
- Input impedance is 25Ω
- Emission wavelength is in 1.55µm band
- High-speed response
- Built-in optical isolator
- Built-in thermistor and bias T
- 8-pin Mini-DIL package with Gull wing leads
- With photodiode for optical output monitor

APPLICATION

High speed transmission systems (~2.5Gb/s)

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power	Pf	CW	6	mW
	Forward current	If	CW	100	mA
	Reverse voltage	Vrl	-	2	V
Photodiode	Reverse voltage	Vrd	-	20	V
	Forward current	Ifd	-	2	mA
Operating case temperature		Tc	-	-5 ~ +70	°C
Storage temperature		Tstg	-	-40 ~ +85	°C

MITSUBISHI (OPTICAL DEVICES)

FU-645SDF-x1Mxx

1.55 ㎛m UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL (BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

ELECTRICAL/OPTICAL CHARACTERISTICS (Tc=-5~70°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold current	Ith	CW, Tc=25°C	-	10	25	mA
		CW	2	-	40	
Optical output power at threshold current	Pth	CW, Ibias=Ith	-	-	50	μW
Operating current	Iop	CW, Pf=2mW, Tc=25°C	-	40	70	mA
		CW, Pf=2mW, Tc=70°C	-	60	90	
Operating voltage	Vop	CW, Pf=2mW, Tc=25°C	-	1.2	1.5	V
		CW, Pf=2mW, Tc=70°C	-	1.6	1.8	
Input impedance	Zin	-	-	25	-	Ω
Optical output power from fiber end	Pf	CW, nominal	-	2	-	mW
Light-emission central wavelength	λc	CW, Pf=1mW	1530	1550	1570	nm
Wavelength temperature coefficient	λct	-	-	0.10	0.12	nm/°C
Spectral width	Δλ	(Note1), -20dB	-	-	0.4	nm
Side mode suppression ratio	Sr	(Note1)	30	45	-	dB
Cutoff frequency (-1.5dB optical)	fc	Pf=1mW	3.5	-	-	GHz
Rise and fall time (10~90%)	tr, tf	(Note1)	-	125	150	psec
Dispersion penalty	Pp	(Note1), +1800ps/nm disp.	-	-	2	dB
Relative intensity noise	Nr	CW, Pf=1mW, f=1GHz	-	-150	-140	dB/Hz
Tracking error (Note 2)	Er	CW, APC(Imon=const.)	-	0.5	1.25	dB
Differential efficiency	η	CW, Tc=25°C	0.06	-	0.1	mW/ mA
		CW	0.036	-	0.15	
Monitor current	Imon	CW, Pf=1mW, Vrd=5V	0.05	-	1	mA
Optical isolation	Iso	-	20	-	-	dB
Dark current (PD)	Id	Vrd=5V	-	-	0.1	μA
Capacitance (PD)	Ct	Vrd=5V, f=1MHz	-	-	10	pF
Thermistor resistance	Rth	Tc=25°C	9.5	10	10.5	kΩ
B constant of Rth	B	-	-	3950	-	K

Note 1) 2.48832Gb/s NRZ, 2^{23}-1, Pf_ave=1mW, Extinction ratio 10dB, optical return loss from the line should be greater than 24dB in order to ensure the specified performance.

Note 2) Er=max|10×log(Pf / Pf@25°C)|

FIBER PIGTAIL SPECIFICATIONS

Parameter	Limits	Unit
Type	SM	-
Mode field diameter	10±1	μm
Cladding diameter	125±2	μm
Secondary coating outer diameter	0.9±0.1	mm
Connector	See Table 1.	-
Optical return loss of connector	40 (min)	dB

MITSUBISHI (OPTICAL DEVICES)

FU-645SDF-x1Mxx

1.55 μm UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL (BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

DOCUMENTATION

- Threshold current (Ith) at Tc=25, 70°C
- Operating current (Iop) at Tc=25, 70°C
- Operating voltage (Vop) at Tc=25°C
- Light-emission central wavelength (λc) at Tc=25°C
- Monitor current (Imon) at Tc=25°C
- Optical output power from fiber end (Pf)

Table 1.

Type number	Connector type	L (Note 3)	Outline diagram
FU-645SDF-1M1B	None (Note 4)	-	(1)
FU-645SDF-V1M1B	FC/PC	28.4	
FU-645SDF-W1M1B	SC/PC	34.5	
FU-645SDF-1M2C	None (Note 4)	-	(2)
FU-645SDF-V1M2C	FC/PC	28.4	
FU-645SDF-W1M2C	SC/PC	34.5	

Note 3) 'L' is defined in OUTLINE DIAGRAMs.

Note 4) There are some cases where a connector for testing is shipped with the product. Then the fiber length not including the connector is more than 1000mm.

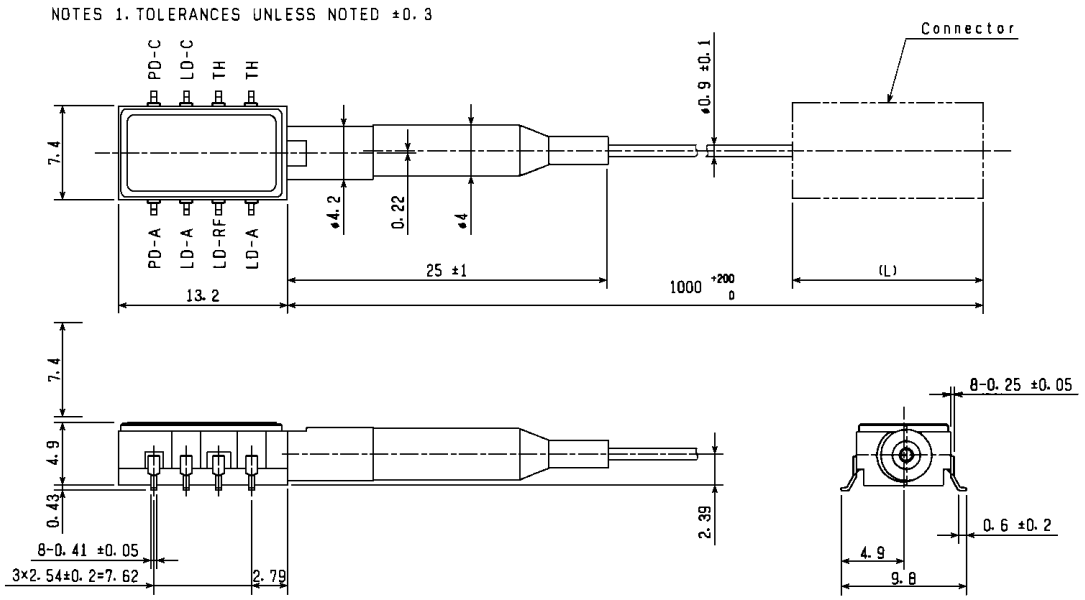
MITSUBISHI (OPTICAL DEVICES)

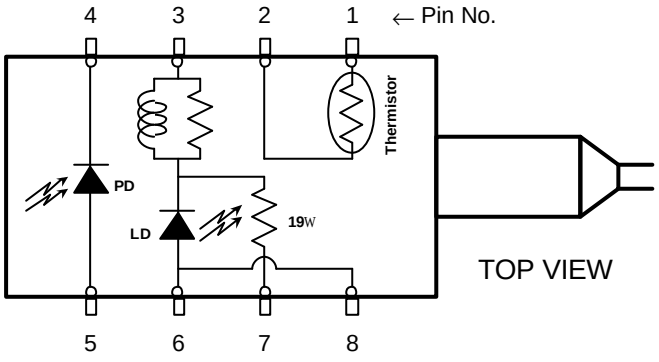
FU-645SDF-x1Mxx

1.55 ㎛m UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL (BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

OUTLINE DIAGRAM (1)

(Unit : mm)





TOP VIEW

PIN	FUNCTION
1	THERMISTOR
2	THERMISTER
3	LD BIAS, CATHODE
4	PD CATHODE
5	PD ANODE
6	LD ANODE
7	LD RF, CATHODE
8	LD ANODE

FU-645SDF-x1M1B

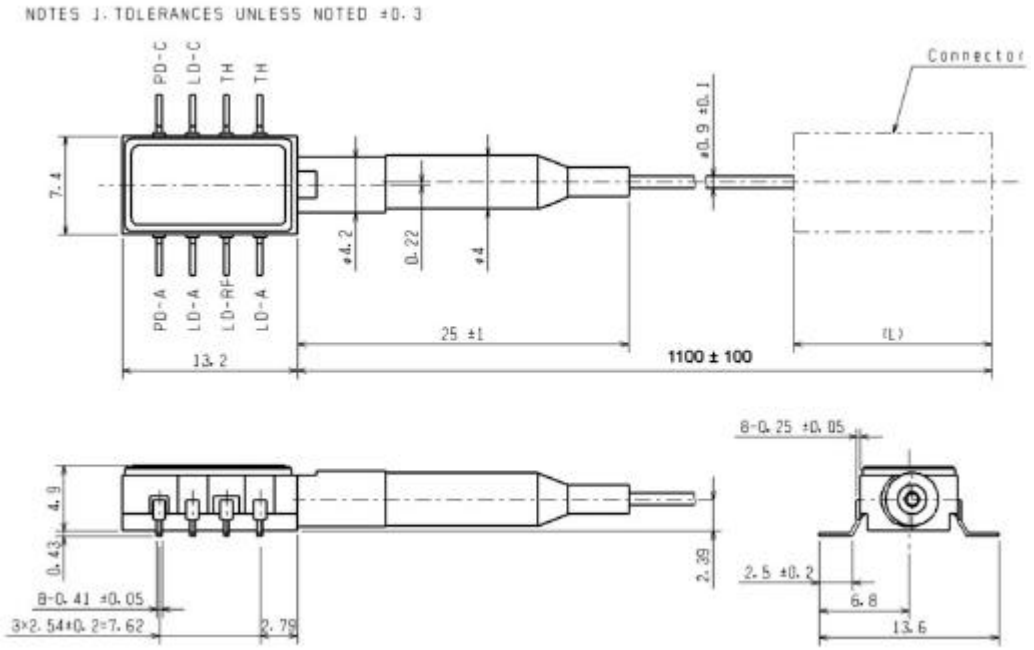
MITSUBISHI (OPTICAL DEVICES)

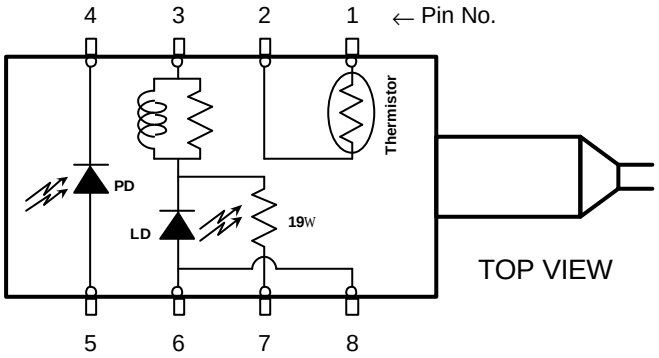
FU-645SDF-x1Mxx

1.55 ㎛m UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL (BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

OUTLINE DIAGRAM (2)

(Unit : mm)





PIN	FUNCTION
1	THERMISTOR
2	THERMISTER
3	LD BIAS, CATHODE
4	PD CATHODE
5	PD ANODE
6	LD ANODE
7	LD RF, CATHODE
8	LD ANODE

FU-645SDF-x1M2C