APPROVED		CHARGED
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Specification for 1.48μm/1.51μm DFB LD Module for ITU-T Recommendation G.mcs Optical Supervisory Channel

< FU-68SDF-510M00B/ 510M01B >

MITSUBISHI ELECTRIC CORP.

SPECIFICATION PROPOSAL FU-68SDF-510M00B/ 510M01B

FEATURES

- Input impedance is 25Ω
- Distributed feedback (DFB) Laser Diode
- Emission wavelength is the 1.48μm (-510M00B) and 1.51μm (-510M01B) band
- Single-mode optical fiber pig-tail
- Built-in optical isolator
- Built-in thermal electric cooler
- Butterfly package

1. ABSOLUTE MAXIMUM RATINGS (Tld=25°C)

ITEM		SYMBOL	CONDITION	RATING	UNIT
Laser diode	Optical output power	Pf	CW	15	mW
	Forward current	If	CW	150	mA
	Reverse voltage	Vrl	—	2	V
Photo diode	Reverse voltage	Vrd	—	20	V
	Forward current	Ifd	—	2	mA
Thermo -electric cooler (Note)	Cooler current	Ipe	—	1.3	A
	Cooler voltage	Vpe	—	3.1	V
Operating case temperature		Tc	—	-20 ~ 70	°C
Storage temperature		Tstg	—	-40 ~ 85	°C

Note) Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during TEC operation to avoid the catastrophic damage.

2. ELECTRICAL/OPTICAL CHARACTERISTICS (Tld=25°C, Tc=25°C unless otherwise noted)

ITEM	SYMBOL	CONDITION		MIN	TYP	MAX	UNIT
Threshold current	Ith	CW		-	10	25	mA
Operating current	Iop	CW, Pf=10mW		-	-	100	mA
Operating voltage	Vop	CW, Pf=10mW		-	-	1.8	V
Input impedance	Zin	Pf=10mW		-	25	-	Ω
Light-emission central wavelength	λc	CW, Pf=10mW	-510M00B	1476	1480	1484	nm
			-510M01B	1506	1510	1514	
Central wavelength drift with case temp.	Δλc/ΔTc	Tc=-20~70°C		-1	-	0	pm/°C
Spectral line width	Δf	CW, Pf=10mW		-	-	20	MHz
Side mode suppression ratio	Sr	CW, Pf=10mW		33	40	-	dB
Cut off frequency (-1.5dB optical)	fc	Pf=10mW		2	-	-	GHz
Relative intensity noise	Nr	CW, Pf=10mW @1GHz		-	-155	-145	dB/Hz
Tracking error (Note 1)	Er	Tc=-20~70°C, APC, ATC		-	-	0.5	dB
Differential efficiency	η	CW, Pf=10mW		0.1	-	-	mW/mA
Monitor current	Imon	CW, Pf=10mW, Vrd=5V		0.2	-	2	mA
Optical isolation	Iso	Tc=25°C		35	-	-	dB
		Tc=-20~70°C		23	-	-	
Dark current	Id	Vrd=5V, Tc=-20~70°C		-	-	0.1	μA
Capacitance	Ct	Vrd=5V, f=1MHz		-	-	10	pF

Note 1) Er=max| 10*log(Pf / Pf@25°C)|

3. THERMAL CHARACTERISTICS (Tld=25°C, Tc=-20~70°C)

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Thermistor resistance	Rth	Tld=25℃	9.5	10	10.5	kΩ
B constant of Rth	B	-	-	3950	-	K
Cooling capacity	ΔT	Pf=10mW, Tc=70°C	45	-	-	°C
Cooler current	Ipe	Pf=10mW, Tc=70°C, Tld=25°C	-	0.6	1	A
Cooler voltage	Vpe	Pf=10mW, Tc=70°C, Tld=25°C	-	1.2	2	V

4. FIBER PIGTAIL SPECIFICATIONS

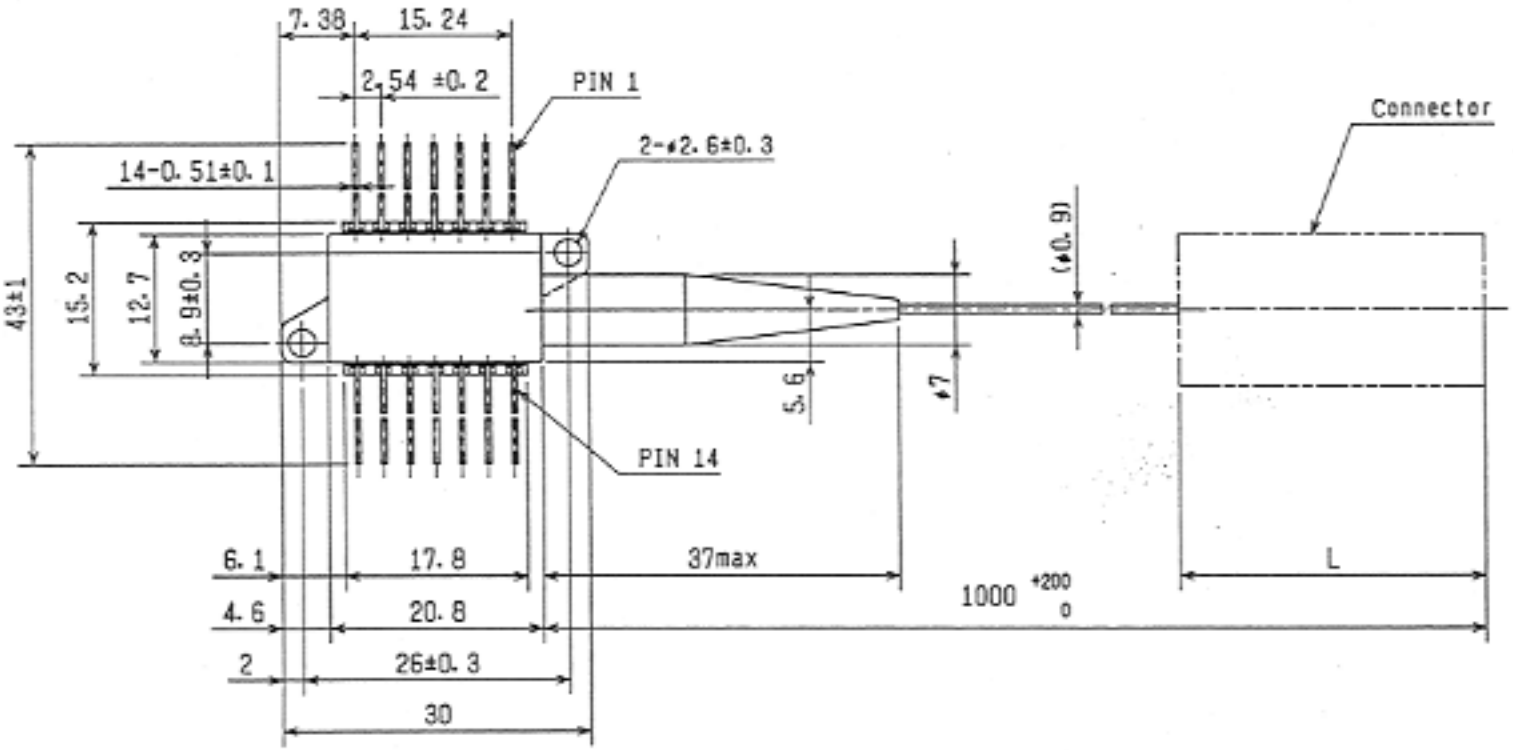
ITEM	SPECIFICATION	UNIT
Type	SM	-
Mode field diameter	9.5±1	μm
Cladding diameter	125±2	μm
Secondary coating outer diameter	0.9±0.1	mm
Connector	(Note 2)	-
Optical return loss of connector	40 (min)	dB

Note 2) See Figure 1.

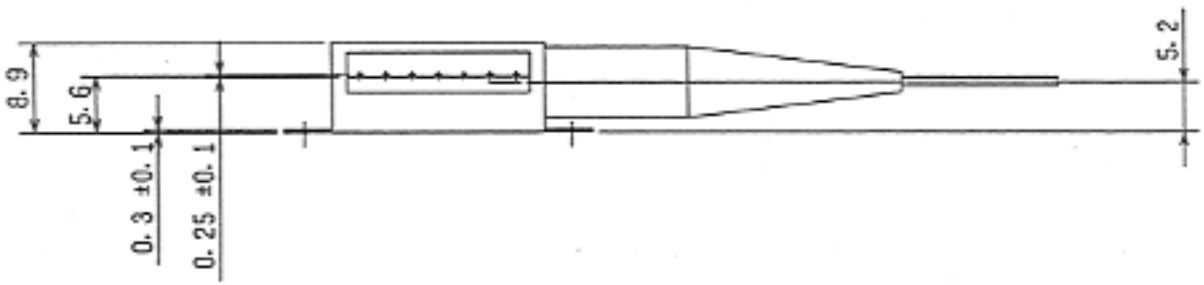
5. DOCUMENTATION (Tld=25°C)

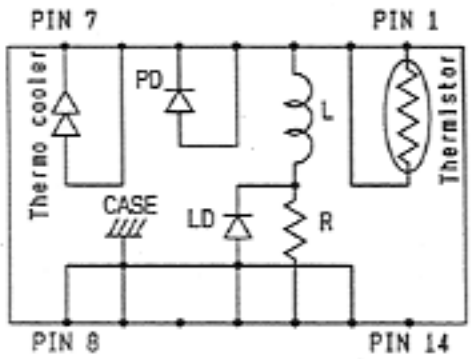
- Fiber output power vs. Laser forward current at Tld=25°C and Tc=-20,25,70°C
- Threshold current (Ith)
- Laser forward current (Iop) at Pf=10mW
- Laser forward voltage (Vop) at Pf=10mW
- Central wavelength (λc) at Pf=10mW
- Monitor current (Imon) at Pf=10mW
- Thermistor resistance (Rth)
- Cooler current (Ipe) at Pf=10mW and Tc=70°C
- Cooler voltage (Vpe) at Pf=10mW and Tc=70°C

NOTES 1. TOLERANCES UNLESS NOTED±0.5 (Unit: mm)



PIN	FUNCTION
1	THERMISTOR
2	THERMISTOR
3	LD BIAS(-)
4	PD ANODE
5	PD CATHODE
6	COOLER ANODE
7	COOLER CATHODE
8	GND
9	GND
10	NC
11	LD ANODE, GND
12	LD RF
13	LD ANODE, GND
14	NC





Connector type	L	Identified type number
No connector	-	FU-68SDF-510MxxB
FC/PC	28.4	FU-68SDF-V510MxxB
SC/PC	34.5	FU-68SDF-W510MxxB

Figure 1. Mechanical definition - FU-68SDF-510M00B/ 510M01B