

LE7602-S

Laser Diode Module

Preliminary Product Disclaimer

This preliminary data sheet is provided to assist you in the evaluation of functional samples of the products that are under development and for which a reliability test has not been completed. Until Hitachi, Ltd. releases these products for general sales, Hitachi, Ltd. reserves the right to change prices, features, functions, specifications, capabilities and release schedule.

FEATURES

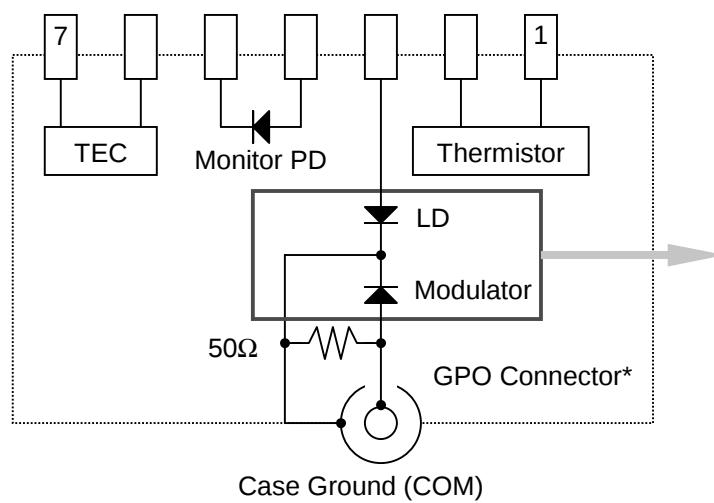
- **10 Gbit/s operation at 1.55 μm wavelength**
- **Monolithically integrated external modulator**
- **For use up to 20 km (400 ps/nm)**
- **Low modulation voltage: 2.6 V**
- **Operating temperature range from 0 to 70°C**
- **Built-in optical isolator**
- **Low profile 7-pin butterfly package with GPO high frequency connector***

DESCRIPTION

General

The LE7602-L is a 1.55 μm DFB laser diode module with a monolithically integrated external modulator. It enables short-reach transmissions up to 20 km at 10 Gbit/s. The module is housed in a 7-pin butterfly package with 50 Ω GPO HF connector* and contains a TE cooler, a thermistor, a monitor photo diode and an optical isolator.

Block Diagram



*GPO is a trademark registered by Gilbert Engineering Co., Inc.

PERFORMANCE SPECIFICATIONS

Table 1. Absolute Maximum Ratings

No.	Item	Min	Max	Unit	Conditions
1	Laser Diode Reverse Voltage	-	2	V	CW
2	Laser Diode Forward Current	-	150	mA	CW
3	Optical Output Power	-	10	mW	CW
4	Modulator Reverse Voltage	-	10	V	
5	Modulator Forward Voltage	-	1	V	
6	Monitor Diode Reverse Voltage	-	10	V	
7	Monitor Diode Forward Voltage	-	1	V	
8	Storage Temperature	-40	+85	°C	Case Temperature
9	Operating Temperature	0	+70	°C	Case Temperature
10	TEC Cooler Current	-	1.6	A	
11	Soldering Temperature	-	260	°C	10 s

Table 4. Electrical and Optical Characteristics (T_c=0 to 70°C, T_{LD}=25°C)

No.	Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
1	Fiber Output Power	P _f	-4	-	-	dBm	Modulated average output (Note 1)
2	Peak Wavelength	λ _p	1,530	-	1,563	nm	Note 1
3	Side-mode Suppression Ratio	S _r	35	-	-	dB	Note 1
4	Dispersion Penalty	P _d	-	-	2	dB	@400 ps/nm fiber (Notes 1 and 2)
5	Optical Rise/Fall Times	tr/tf	-	45	50	ps	10-90% (Note 1)
6	RF Extinction Ratio	ER	8.2			dB	Notes 1 and 3
7a	Modulation Voltage	V _{mod}	-	-	2.6	V _{pp}	ER=8.2 dB (Note 1)
7b	Offset Voltage	V _{MARK}	-0.7	-	-0.2	V	DC offset to modulator (Note 1)
8	Input Impedance	Z _{in}	-	50	-	Ω	I _F = 0 mA
9	RF Input Return Loss	S ₁₁	10	-	-	dB	I _F , V _{MARK} , f=10 GHz
10	Small Signal Bandwidth	S ₂₁	10	-	-	GHz	3 dB down, I _F , V _{MARK}
11	LD Threshold Current	I _{th}	5	-	30	mA	CW
12	LD Operating Current	I _F	50	-	100	mA	BOL
13	Laser Forward Voltage	V _F	-	-	1.8	V	CW, I _F
14	Monitor PD Current	I _m	40	-	1,000	μA	CW, I _F , V _{RP} =5 V
15	Monitor PD Dark Current	I _d	-	-	0.5	μA	CW, I _F , V _{RP} =5 V
16	Thermistor Resistance	R _{th}	-	9.99	-	kΩ	T _{LD} =25°C
17	Thermistor B Constant	B	3,800	3,900	4,000	K	
18	TE Cooler Voltage	V _c			2.0	V	ΔT (T _c -T _{LD}) =
19	TE Cooler Current	I _c			1.3	A	45°C, CW, I _F

Note 1. 10 Gbit/s, PBRs=2³¹-1 NRZ, Mark Density 50%, I_F,
V_{MARK}: a certain point between -0.2 V and -0.7 V
V_{mod}: a certain point between 1 V and 2.6 V (peak to peak)

Note 2. Measured by the Hitachi transmission test set using a single mode fiber with a total dispersion of 400 ps/nm at 1550 nm.

Note 3. The 4th order Bessel-Thompson filter (f_c=7.5 GHz) inserted

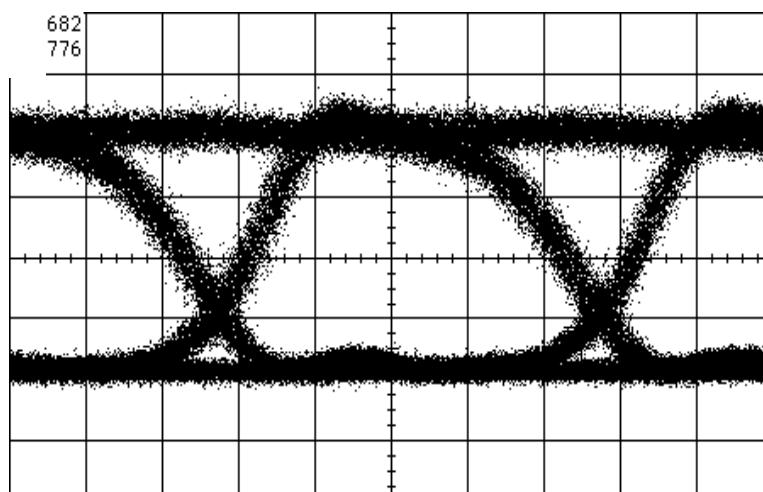


Fig. 1 Typical Optical Output Waveform 9.95 Gbit/s Unfiltered

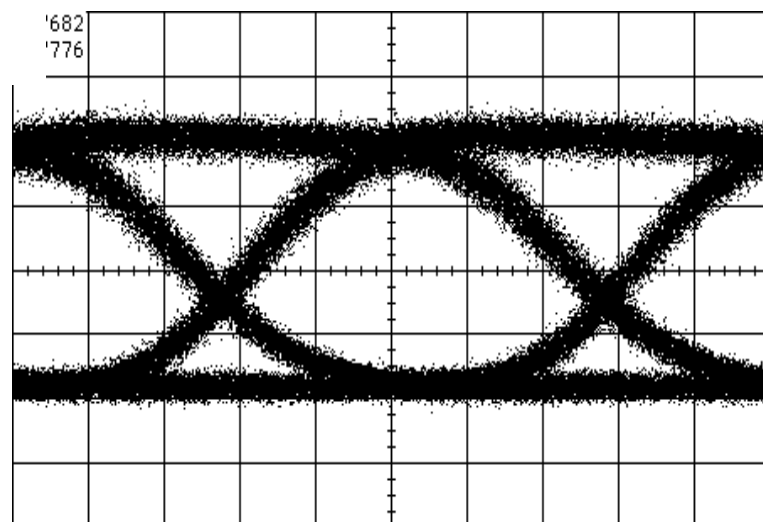


Fig. 2 Typical Optical Output Waveform 9.95 Gbit/s Filtered

Table 5. Pin Configuration

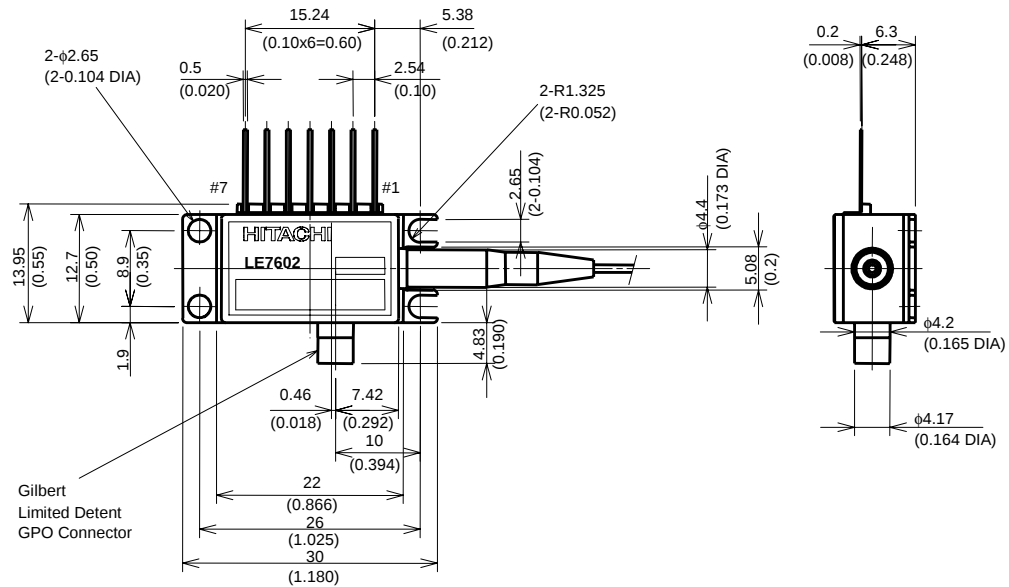
Pin #	Description	Remarks
1	Thermistor	
2	Thermistor	
3	LD Anode	
4	Monitor PD Anode	
5	Monitor PD Cathode	
6	TE Cooler (+)	
7	TE Cooler (-)	

Mechanical Dimensions

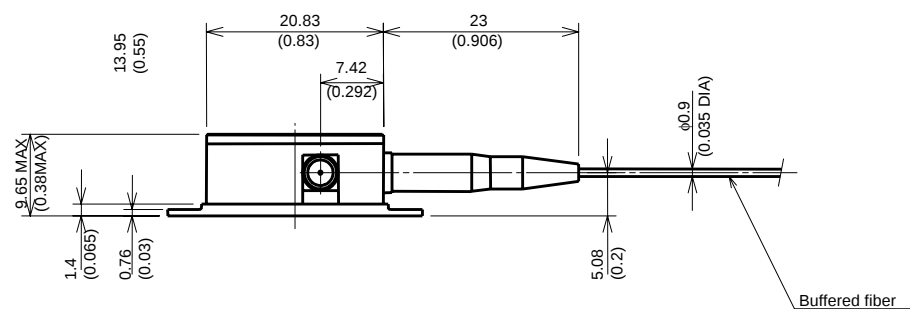
Dimensions: mm (inches)

Tolerance : ± 0.5 mm

- Top view



- Side view



USER INFORMATION

Handling Precautions

CAUTION: Take proper electrostatic-discharge (ESD) precautions while handling these devices. These devices are sensitive to ESD.

Laser Safety

This product complies with IEC 60825-1 Class 1.

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Document Category: Product Specifications (Data Sheet)

Revision: 0.1 (June 2000)

Product Name: LE7602-S

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Revision History

Rev.	Date	Page/Line/Fig/Table	Modification	Note
0.0	March 21, 2000			
0.1	June 16, 2000	-	Totally revised	