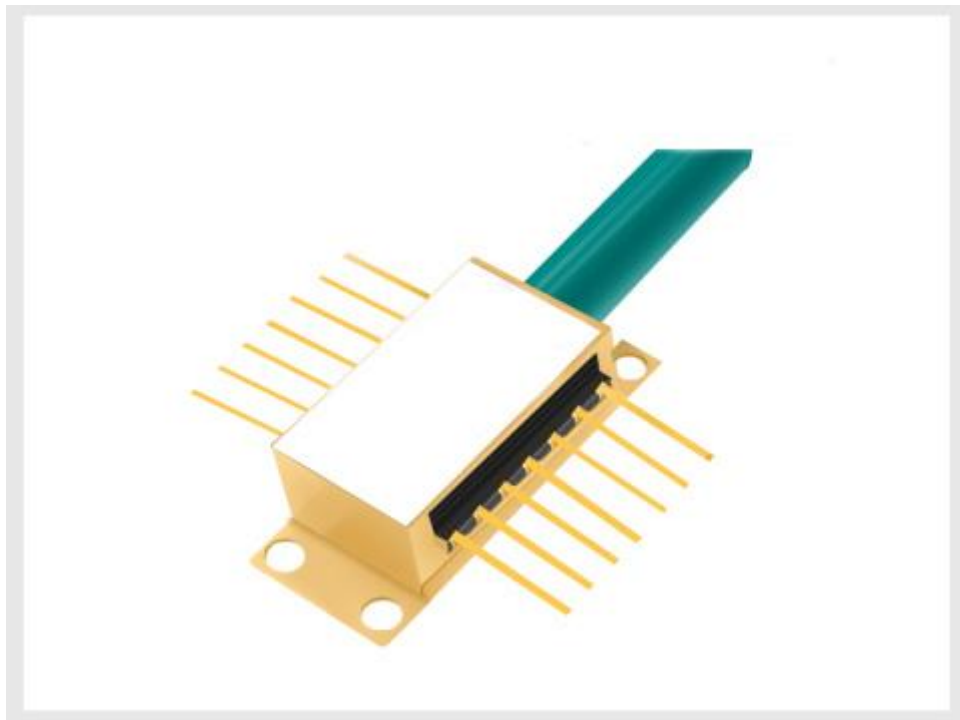


# 1053nm 30mW SM Narrow Linewidth Laser Diodes



## ● Product Description

Single frequency FBG-stabilized laser diode module designed for optical measurement and communication. The laser is packaged in Butterfly package with monitor photodiode and thermo-electric cooler (TEC). Module is pigtailed with 0.5-0.9 m of single mode or polarization maintaining (optional) fiber and connectorized by FC/APC connector.

## ● Product features

Optical output: 30mW; Narrow linewidth ( $\Delta\nu < 1\text{MHz}$ ); Wavelength: 1053nm

@ 25 °C ; SMor PMFiber ( $\varnothing 0.9\text{mm}$ ) ; FC-APC connector ; 14-pin butterfly package; Internal monitor PD and TEC; Low power consumption

## ● Part Number

MP-NL-1053-A-A81-SA

## ● Application area

Coherent Optical Communication | High-Precision Fiber Optic Sensing |

LiDAR | Optical Metrology & Spectroscopy | Microwave Photonics

## ● Core parameters

| Wavelength | Output Power | Fiber Type |
|------------|--------------|------------|
| 1053nm     | 30mW         | SM         |

## ● General Parameters

### Optical and Electrical Characteristics

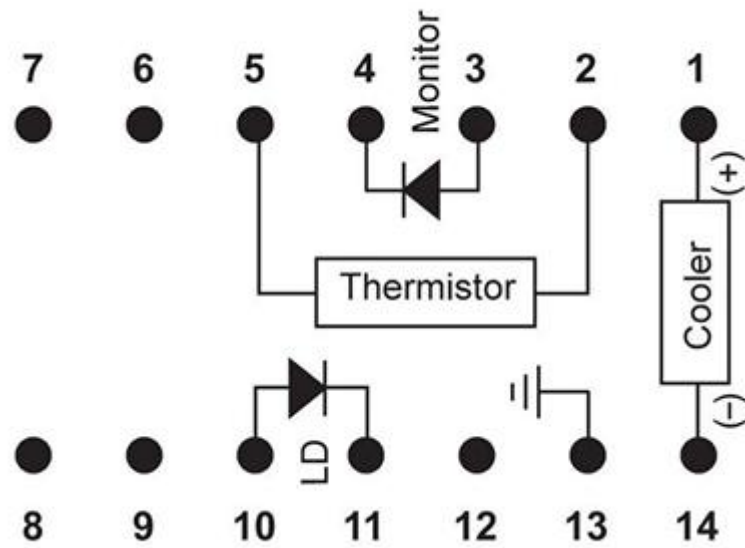
| Parameter                                | Symbol                   | Test condition                         | Min. | Typ.  | Max. | Unit    |
|------------------------------------------|--------------------------|----------------------------------------|------|-------|------|---------|
| Optical Power                            | $P_f$                    | CW                                     | 20   | 30    |      | mW      |
| Pulsed Optical Power                     | $P_{fp}$                 | Pulse, $\tau=10\mu s$ ,<br>$D=1\%$     |      | 40    |      | mW      |
| Threshold Current                        | $I_{th}$                 |                                        | 15   | 20    | 30   | mA      |
| Forward Current                          | $I_f$                    | $P_f$                                  |      | 150   | 200  | mA      |
| Pulsed Forward Current                   | $I_{fp}$                 | $P_{fp}$ , $\tau=10\mu s$ ,<br>$D=1\%$ |      | 300   |      | mA      |
| Forward Voltage                          | $V_f$                    | $P_f$                                  |      |       | 2.5  | V       |
| Center Wavelength                        | $\lambda_c$              | $P_f$                                  | 1052 | 1053  | 1054 | nm      |
| Spectral Width                           | $\Delta\lambda_c$        | $P_f$                                  |      |       | 1    | MHz     |
| Side Mode Suppression Ratio              |                          | SMSR                                   | 30   |       |      | dB      |
| Single-Frequency Continuous Tuning Range | $\Delta f$               |                                        | 1    |       |      | GHz     |
| Current Tuning                           | $\Delta\lambda/\Delta I$ |                                        |      | 0.001 |      | nm/mA   |
| Temperature Tuning                       | $\Delta\lambda/\Delta T$ |                                        |      | 0.08  |      | nm/°C   |
| Monitor Current                          | $I_m$                    | $P_f$                                  | 20   |       | 500  | $\mu A$ |

|                                |       |                              |     |    |      |            |
|--------------------------------|-------|------------------------------|-----|----|------|------------|
| PD Dark Current                | $I_d$ | $V_{rd}=5V$                  |     |    | 0.1  | $\mu A$    |
| TEC Current                    | $I_t$ | $I_t$                        |     |    | 1.4  | A          |
| TEC Voltage                    | $V_t$ | TC=70°C                      |     |    | 2.7  | V          |
| Thermal Resistance             | $R_0$ | T=25°C, B=3900<br>$\pm 100K$ | 9.5 | 10 | 10.5 | k $\Omega$ |
| Extinction Ratio<br>(PM fiber) | $X_p$ | $P_f$                        | 20  |    |      | dB         |

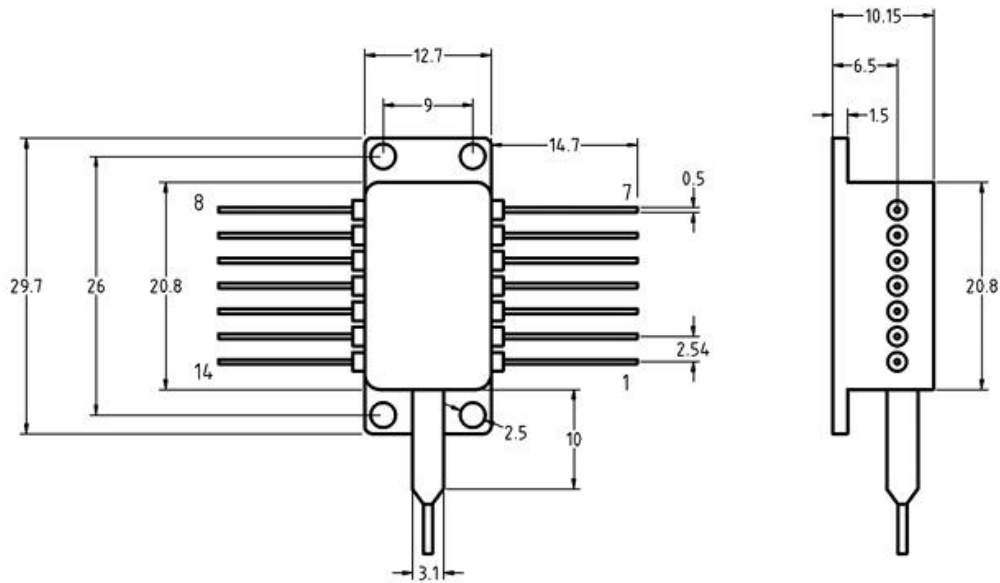
#### Absolute maximum ratings:

| Parameter                          | Symbol   | Rating | Unit |
|------------------------------------|----------|--------|------|
| Forward Current                    | $I_f$    | 300    | mA   |
| Reverse Voltage                    | $V_f$    | 1.8    | V    |
| PD Reverse Voltage                 | $V_{rd}$ | 7      | V    |
| Minimum Operation Case Temperature | $T_{ol}$ | -40    | °C   |
| Maximum Operation Case Temperature | $T_{oh}$ | 70     | °C   |
| Minimum Storage Temperature        | $T_{si}$ | -40    | °C   |
| Maximum Storage Temperature        | $T_{sh}$ | 70     | °C   |
| TEC Current                        | $I_t$    | 1.5    | A    |

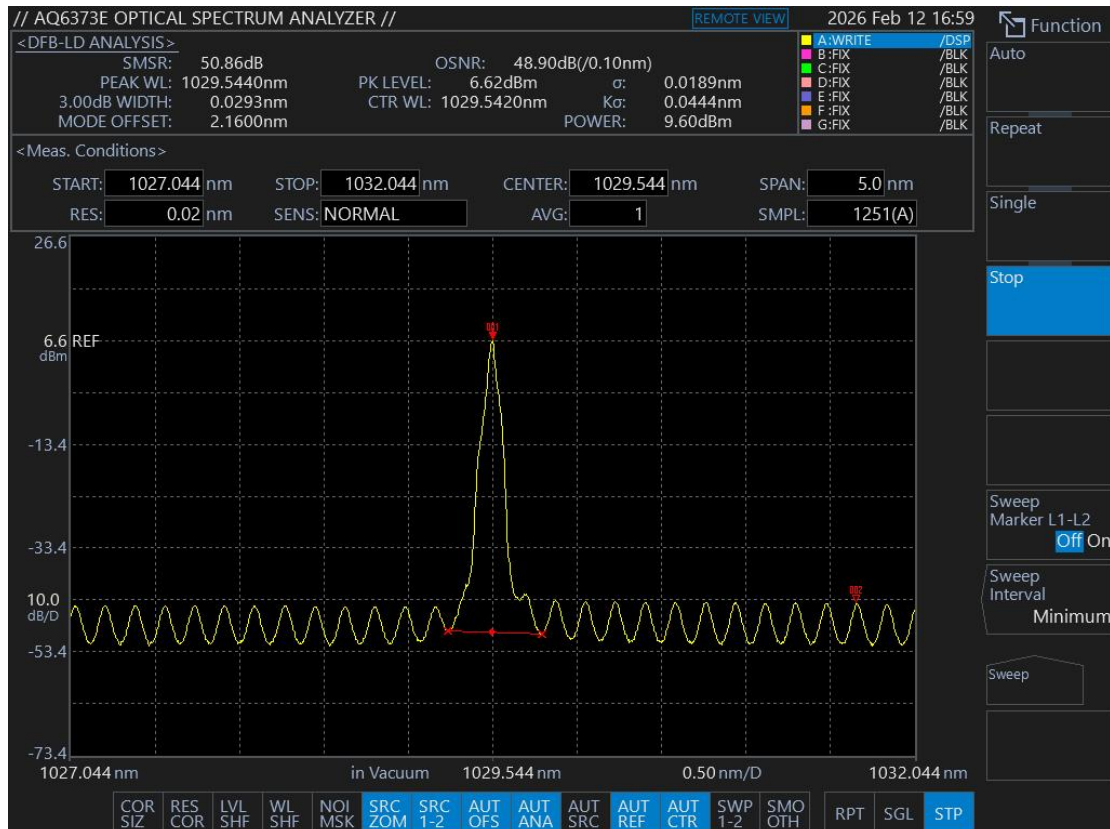
## Pin definition



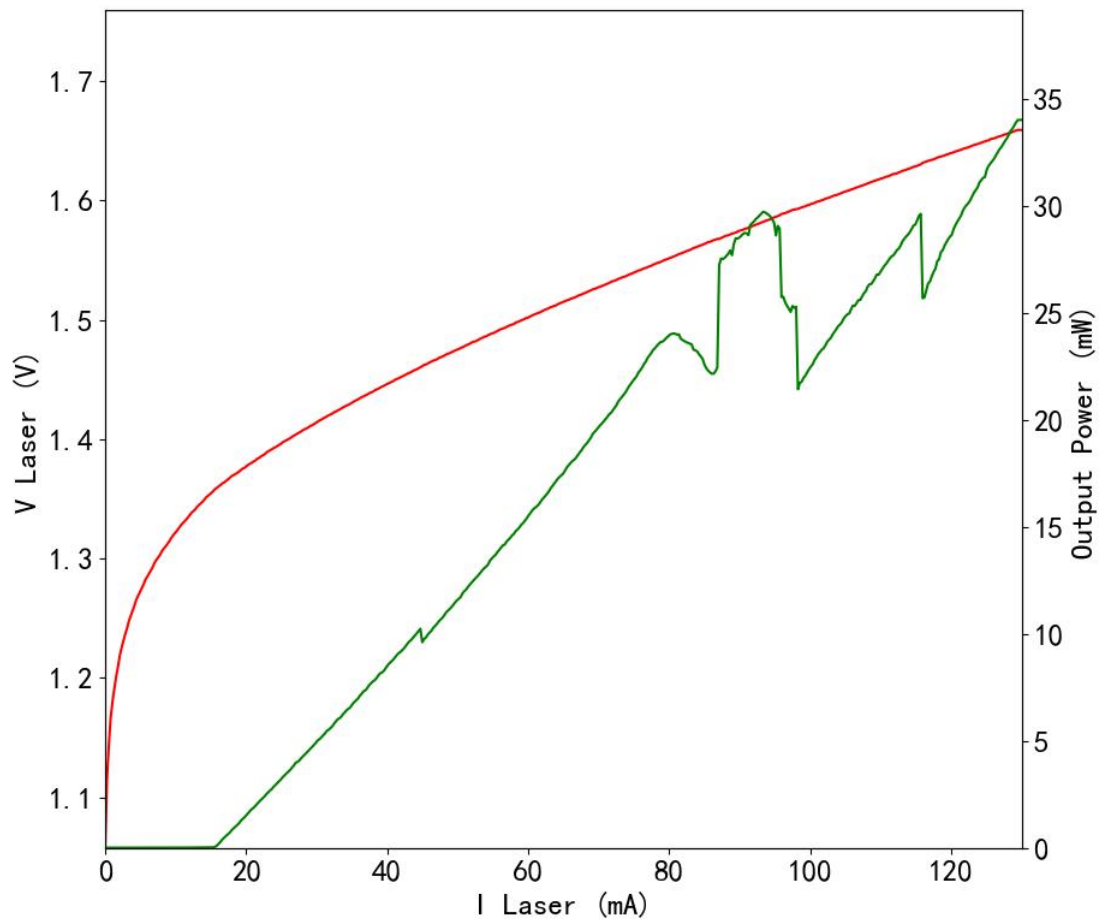
| None PZT Bulit inside |               |    |                 |
|-----------------------|---------------|----|-----------------|
| NO                    | Parameter     | NO | Parameter       |
| 1                     | Cooler anode+ | 8  | NC              |
| 2                     | Thermistor    | 9  | NC              |
| 3                     | PD anode-     | 10 | LD anode+       |
| 4                     | PD cathode+   | 11 | LD cathode-     |
| 5                     | Thermistor    | 12 | NC              |
| 6                     | NC            | 13 | Case            |
| 7                     | NC            | 14 | Cooler cathode- |



## Spectrum

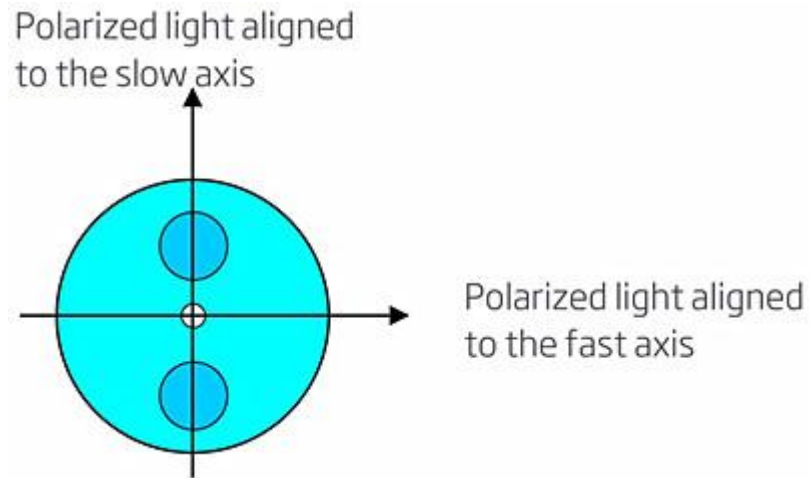


## L-I-V Curve



## Fiber Pigtail Specifications

| Parameters                     | Description                 |
|--------------------------------|-----------------------------|
| Fiber Type                     | SM fiber                    |
| Jacket Type                    | 900μm loose tube            |
| Pigtail Length                 | 1.0±0.1m                    |
| Connector Type                 | FC/APC                      |
| PM fiber Connector Orientation | Please see the right figure |



**Note: The PM fiber and the connector key are aligned to the slow axis, fast axis is blocked**