

# FU-624SHL-4M21/4M22/8M21/8M22

1.55  $\mu$ m LD MODULE WITH SINGLEMODE FIBER PIGTAIL

## DESCRIPTION

Module type FU-624SHL-XXMXX has been developed for coupling a singlemode optical fiber and a 1.55  $\mu$ m wavelength InGaAsP LD (Laser diode). FU-624SHL-XXMXX is suitable to light source for measuring instruments.(especially, OTDR)

## FEATURES

- High optical output power
- Emission wavelength is in 1.55  $\mu$ m band
- Built-in thermal electric cooler
- Dual-in-line package

## APPLICATION

OTDR

## ABSOLUTE MAXIMUM RATINGS (T<sub>LD</sub> = 25°C)

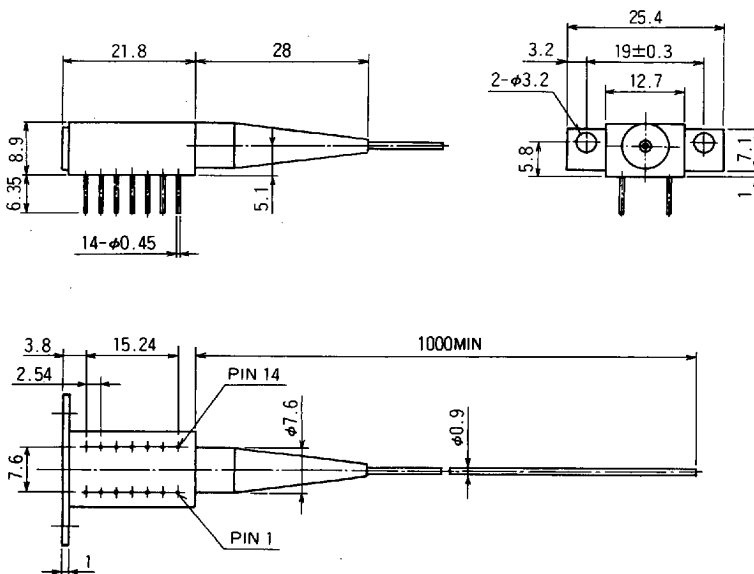
| Parameter                  |                 | Symbol           | Conditions     | Rating      | Unit |
|----------------------------|-----------------|------------------|----------------|-------------|------|
| Laser diode                | Reverse voltage | V <sub>RL</sub>  | —              | 2           | V    |
|                            | Forward current | I <sub>FL</sub>  | Pulse (Note 1) | 1           | A    |
| Cooler                     | Voltage         | V <sub>pem</sub> | —              | 2.4         | V    |
|                            | Current         | I <sub>pem</sub> | —              | 1.2         | A    |
| Operating case temperature |                 | T <sub>c</sub>   | —              | − 20 ~ + 65 | °C   |
| Storage temperature        |                 | T <sub>stg</sub> | —              | − 40 ~ + 70 | °C   |

Note 1. Pulse condition : Pulse width  $\leq 10 \mu$ s, Duty ratio  $\leq 1\%$

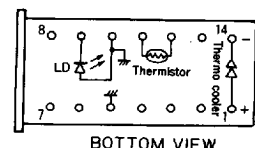
2. Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during TEC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

## OUTLINE DIAGRAM

(Unit : mm)



| PIN | FUNCTION         |
|-----|------------------|
| 1   | COOLER ANODE     |
| 2   | NC               |
| 3   | NC               |
| 4   | NC               |
| 5   | LASER ANODE, GND |
| 6   | NC               |
| 7   | NC               |
| 8   | NC               |
| 9   | LASER CATHODE    |
| 10  | LASER ANODE, GND |
| 11  | THERMISTOR       |
| 12  | THERMISTOR       |
| 13  | NC               |
| 14  | COOLER CATHODE   |



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## 1.55 μm LD MODULE WITH SINGLEMODE FIBER PIGTAIL

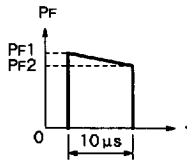
### CHARACTERISTICS (T<sub>LD</sub> = 25 °C, T<sub>C</sub> = 25 °C, Unless otherwise noted)

| Parameter                                    |                             | Symbol                          | Test conditions                                    | Limits                     |      |      |                            |      |      | Unit |
|----------------------------------------------|-----------------------------|---------------------------------|----------------------------------------------------|----------------------------|------|------|----------------------------|------|------|------|
|                                              |                             |                                 |                                                    | FU-624SHL-4M2X<br>(Note 4) |      |      | FU-624SHL-8M2X<br>(Note 4) |      |      |      |
|                                              |                             |                                 |                                                    | Min.                       | Typ. | Max. | Min.                       | Typ. | Max. |      |
| Threshold current                            |                             | I <sub>th</sub>                 | —                                                  | —                          | 30   | 50   | —                          | 30   | 50   | mA   |
| Operating current                            |                             | I <sub>OP</sub>                 | Pulse (Note 1)                                     | 500                        | 700  | 900  | 500                        | 700  | 900  | mA   |
| Operating voltage                            |                             | V <sub>OP</sub>                 | I <sub>F</sub> = I <sub>OP</sub> , Pulse (Note 1)  | —                          | —    | 5    | —                          | —    | 5    | V    |
| Optical output power from fiber end (Note 4) |                             | P <sub>F</sub>                  | I <sub>F</sub> = I <sub>OP</sub> , Pulse (Note 1)  | 40                         | —    | —    | 80                         | —    | —    | mW   |
| -XM21                                        | Central wavelength (Note 4) | λ <sub>c</sub>                  | I <sub>F</sub> = I <sub>OP</sub> , Pulse (Note 1)  | 1540                       | 1550 | 1560 | 1540                       | 1550 | 1560 | nm   |
| -XM22                                        |                             |                                 |                                                    | 1530                       | 1550 | 1570 | 1530                       | 1550 | 1570 |      |
| Spectral width (RMS)                         |                             | Δλ                              | I <sub>F</sub> = I <sub>OP</sub> , Pulse (Note 1)  | —                          | —    | 15   | —                          | —    | 15   | nm   |
| Pulse droop (Note 3)                         |                             | ΔP <sub>F</sub>                 | I <sub>F</sub> = I <sub>OP</sub> , Pulse (Note 1)  | —                          | —    | 20   | —                          | —    | 20   | %    |
| Rise and fall time                           |                             | t <sub>r</sub> , t <sub>f</sub> | I <sub>B</sub> = I <sub>th</sub> , 10~90% (Note 2) | —                          | 1    | 2    | —                          | 1    | 2    | ns   |

Note 1. Pulse condition : Pulse width ≤ 10 μs, Duty ratio ≤ 1 %

2. I<sub>b</sub> : Bias current (LD)

$$3. \Delta P_F = \frac{P_{F1} - P_{F2}}{P_{F1}} \times 100$$



| Type number    | P <sub>F</sub> (25 °C) | λ <sub>c</sub> (25 °C) |
|----------------|------------------------|------------------------|
| FU-624SHL-4M21 | 40mW(min)              | 1310 ± 10nm            |
| FU-624SHL-4M22 |                        | 1310 ± 20nm            |
| FU-624SHL-8M21 | 80mW(min)              | 1310 ± 10nm            |
| FU-624SHL-8M22 |                        | 1310 ± 20nm            |

### THERMAL CHARACTERISTICS (T<sub>LD</sub> = 25 °C, T<sub>C</sub> = - 20 ~ + 65 °C)

| Parameter                           | Symbol          | Test conditions         | Limits |      |      | Unit |
|-------------------------------------|-----------------|-------------------------|--------|------|------|------|
|                                     |                 |                         | Min.   | Typ. | Max. |      |
| Thermistor resistance               | R <sub>th</sub> | T <sub>LD</sub> = 25 °C | 9      | 10   | 11   | kΩ   |
| B constant of thermistor resistance | B               | —                       | —      | 3950 | —    | K    |
| Cooking capacity                    | ΔT              | T <sub>LD</sub> = 65 °C | 40     | —    | —    | °C   |
| Cooler current                      | I <sub>pe</sub> | ΔT = 40 °C              | —      | 0.6  | 1    | A    |
| Cooler voltage                      | V <sub>pe</sub> | ΔT = 40 °C              | —      | 1.6  | 2    | V    |

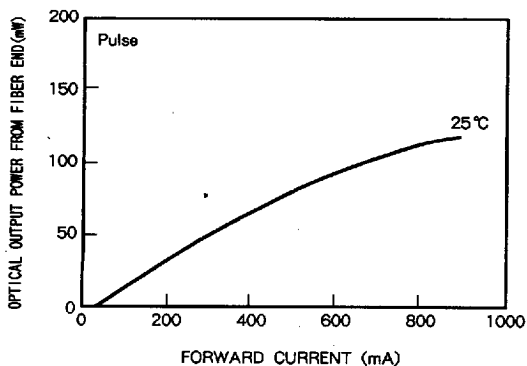
### OPTICAL-FIBER SPECIFICATIONS

| Parameter       | Limits   | Unit |
|-----------------|----------|------|
| Type            | SM       | —    |
| Mode field dia. | 10 ± 1   | μm   |
| Cladding dia.   | 125 ± 2  | μm   |
| Jacket dia.     | 0.9 typ. | mm   |

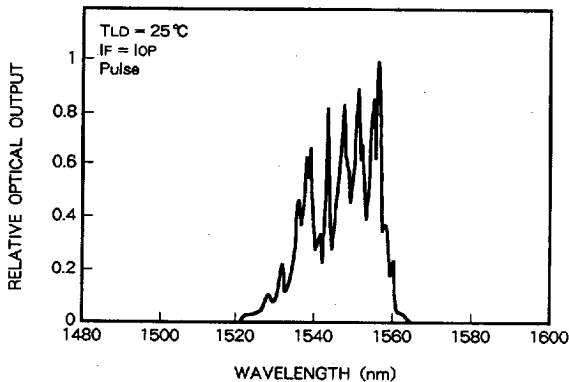
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## TYPICAL CHARACTERISTICS



FORWARD CURRENT (PULSE) VS. OPTICAL OUTPUT POWER



LIGHT-EMISSION SPECTRUM