

EXC250023-00

EXC-1220-1260-1300-1360-20-0208130

1300nm Combi-4 SLED 14-pin BTF Module 180nm

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Confidentiality: **Confidential**

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1. SCOPE

PURPOSE

The purpose of this document is to specify the electro-optical performance and dimensions of a module with combined superluminescent light emitting diodes (SLEDs).

RESPONSIBILITY

EXALOS is responsible for establishing, implementing and maintaining this procedure. The Quality representative shall ensure that a timely Engineering Change Notice (ECN) is issued in accordance with EXALOS procedure for any changes.

2. REFERENCE DOCUMENTS

- MIL STD 883 C method
- Bellcore GR-468-CORE

3. ELECTRO-OPTICAL PERFORMANCE ($T_{\text{SLED}} = 20^{\circ}\text{C}$)

| Parameter | Symbol | Cond. | Min | Typ | Max | Unit |
|---|--|---------------------|------|------------------------------|-------------------|---------------|
| Combined Wavelengths: SLED B SLED C1 SLED C2 SLED D | λ_B λ_{C1} λ_{C2} λ_D | | | 1360 1300 1260 1220 | | nm |
| Operating current: SLED B SLED C1,C2 ¹ SLED D | $I_{\text{op, B}}$ $I_{\text{op, C1,C2}}$ $I_{\text{op, D}}$ | | | 310 550 330 | 400 550 400 | mA |
| Total power ex-fiber | P_{tot} | $I_{\text{op,max}}$ | 18 | 23 | | mW |
| 3dB center wavelength | λ_c | $I_{\text{op,max}}$ | 1285 | 1300 | 1315 | nm |
| 3dB bandwidth | $BW_{3\text{dB}}$ | $I_{\text{op,max}}$ | 170 | 180 | | nm |
| 10dB bandwidth | $BW_{10\text{dB}}$ | $I_{\text{op,max}}$ | 200 | 210 | | nm |
| Secondary peak suppression 0.3-4.0mm ² | $\text{SPSR}_{4\text{mm}}$ | $I_{\text{op,max}}$ | 25 | 30 | | dB |
| Secondary peak suppression 4-8mm ³ | $\text{SPSR}_{8\text{mm}}$ | $I_{\text{op,max}}$ | 20 | 25 | | dB |
| Polarization extinction ratio | PER | $I_{\text{op,max}}$ | 15 | 25 | | dB |
| Monitor PD current ⁴ | I_{MPD} | $I_{\text{op,max}}$ | 100 | 400 | | μA |
| Monitor PD bias voltage | V_{MPD} | | 0 | | -10 | V |

Table 1: Electrical-optical characteristics

¹ SLED C1 (1300nm) and SLED C2 (1450nm) are internally wired in series and can therefore only be driven with one and the same current through pins 12 and 13. The forward voltage seen on those pins is accumulated from both SLEDs.

² Suppression of residual peaks of the coherence function (point spread function, PSF) on a 10-log vertical scale when plotted versus optical path length difference (OPD) in air from 0.3 mm to 4.0 mm

³ Suppression of residual peaks of the coherence function (point spread function, PSF) on a 10-log vertical scale when plotted versus optical path length difference (OPD) in air from 4.0 mm to 8.0 mm

⁴ Measured with 0V bias voltage on monitor photodiode (PD) and termination resistance of 10-50 Ohm.

4. ABSOLUTE MAXIMUM RATINGS

Stresses beyond the absolute maximum ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

| Parameter | Symbol | Cond. | Min | Max | Unit |
|--|--|-------------------|------|----------------------|------------------|
| Forward current: SLED B SLED C1,C2 SLED D | $I_{F, B}$ $I_{F, C1,C2}$ $I_{F, D}$ | | | 450 600 500 | mA |
| Reverse voltage: SLED B SLED C1,C2 SLED D | $V_{R, B}$ $V_{R, C1,C2}$ $V_{R, D}$ | | | -2.0 -4.0 -2.0 | V |
| Forward voltage: SLED B SLED C1,C2 SLED D | $V_{F, B}$ $V_{F, C1,C2}$ $V_{F, D}$ | | | 2.0 4.0 2.0 | V |
| Operating temperature | T_{op} | $I_{F,max}$ | -20 | 50 | °C |
| Storage temperature | T_{stg} | | -40 | 85 | °C |
| Storage humidity | <30°C >30°C | | 5 | 85 95 | % r.h. % r.h. |
| Thermoelectric cooler voltage | V_{tec} | 50°C ⁵ | | 4.0 | V |
| Thermoelectric cooler current | I_{tec} | 50°C | | 1.8 | A |
| Thermistor Resistance | R_{th} | 25°C | 9.5 | 10.5 | kΩ |
| Thermistor constant | B | | 3892 | | K |
| Lead soldering temperature | | | | 260 | °C |
| Lead soldering duration | | | | 10 | s |
| ESD | | human b.m. | | 500 | V |

Table 2: Absolute maximum ratings

5. SCREENING

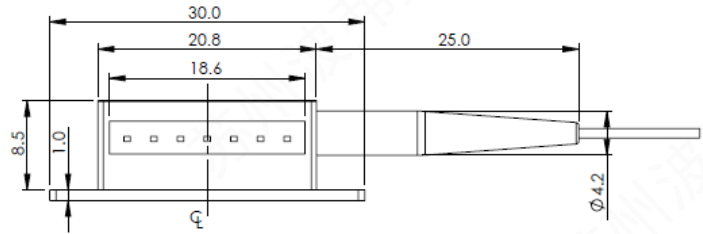
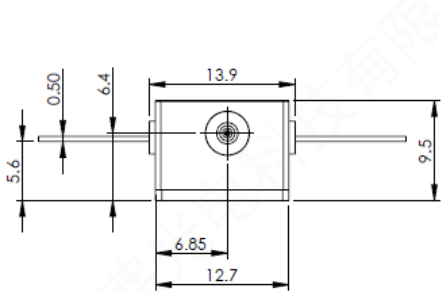
The produced Module is required to meet all operating conditions specified in Table 3, Electro-Optical Performance Specifications after being subjected to the following screening tests:

| Test Item | Test Conditions | Reference |
|---------------------|---|--|
| Seal | Fine: Condition A1 Gross: Condition C | MIL-STD-883, Method 1014 Temperature max 85°C |
| Temperature Cycling | -40°C to +85°C, ramp rate \geq 5°C/min 10 cycles | MIL-STD-883, Method 1010 |

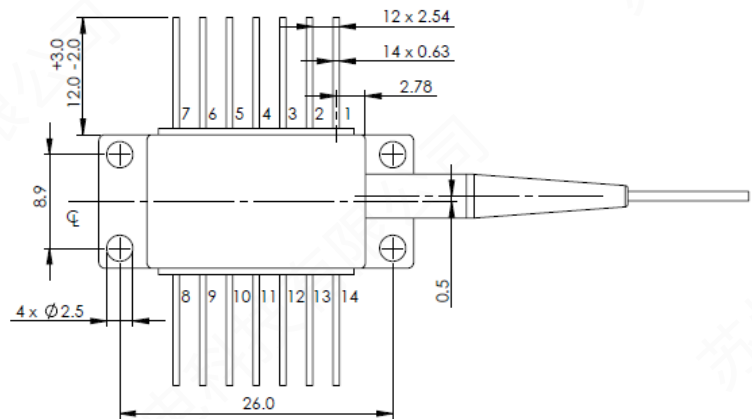
Table 3: Screening tests

⁵ Performance values with hot side temperatures of 50°C (housing base)

6. PACKAGE DIMENSIONS AND PINOUT



NOTES:
 - ALL DIMENSIONS IN MM
 - TOLERANCES:
 - 1 PLACE DECIMAL: $\pm 0.10\text{MM}$
 - 2 PLACE DECIMAL: $\pm 0.10\text{MM}$
 - INTERPRET GEOMETRIES AS:



| Butterfly Package | | | |
|-------------------|---------------------------|-----|------------------------|
| Pin | Function | Pin | Function |
| 1 | TEC (+) | 8 | SLED B ANODE (+) |
| 2 | NC | 9 | SLED B CATHODE (-) |
| 3 | MONITOR DIODE ANODE (+) | 10 | SLED C1,C2 ANODE (+) |
| 4 | MONITOR DIODE CATHODE (-) | 11 | SLED C1,C2 CATHODE (-) |
| 5 | THERMISTOR (+) | 12 | SLED D ANODE (+) |
| 6 | THERMISTOR (-) | 13 | SLED D CATHODE (-) |
| 7 | NC | 14 | TEC (-) |

Table 4: 14pin Butterfly Pinout

7. FIBER AND CONNECTOR

| Part | Description |
|--------------------------------|---------------------------|
| SM Fiber | SMF-28, 9/125 um |
| Tight buffer secondary coating | 900 μm |
| Fiber pigtail length (min.) | 1 m |
| Optical connector | FC/APC Narrow Key (2.0mm) |

8. IMPORTANT NOTES

1. Avoid electrostatic discharges, which may destroy the SLEDs.
2. Never use the SLED module without heat sinking.
3. Adequate eye protection against laser radiation should be used while handling and operating the module.
4. EXALOS declines any responsibility if the device is used in applications where human life may be endangered.
5. Backreflections may influence the output power and spectral characteristics of the SLEDs. An optical return loss of less than -30 dB is recommended.

9. ORDERING INFORMATION

Please use the following **part number** to order product from EXALOS:

EXC250023-00

Description of technical code:

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-----------------|---|---|---|---|------------------|---|---|---|---|------------------|---|---|---|---|-----------------|---|---|---|-----------------------|---|---------|---|-------|-----------|-----|--------|---|---|---|
| E | X | C | - | 1 | 2 | 2 | 0 | - | 1 | 2 | 6 | 0 | - | 1 | 3 | 0 | 0 | - | 1 | 3 | 8 | 0 | - | 2 | 0 | - | 0 | 2 | 0 | 8 | 1 | 3 | 0 |
| | | | | Wavelength D | | | | | Wavelength C2 | | | | | Wavelength C1 | | | | | Wavelength B | | | | Total output power | | Package | | Fiber | Connector | MPD | Option | | | |

10. REVISION HISTORY

| Revision History | | | | |
|------------------|----------------------------------|-----|------------|----------|
| Rev. | Description | ECN | Date | Released |
| 0.1 | Preliminary version EXC250023-00 | - | 05.05.2021 | SGL |
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