

EXC250018-00

EXC-0760-0800-0840-0880-15-0208130

Combi-4 SLED 14-pin Butterfly Module 170nm

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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_{SLED} = 25°C)

Parameter	Symbol	Cond.	Min	Typ	Max	Unit
Combined Wavelengths: SLED A SLED B SLED C SLED D	λ_A λ_B λ_C λ_D			760 800 840 880		nm
Operating current: SLED B1,B2 ¹ SLED C SLED D	$I_{op, B1,B2}$ $I_{op, C}$ $I_{op, D}$			115 120 205	130 130 210	mA
Total power ex-fiber	P_{tot}	$I_{op,max}$	12	15		mW
3dB center wavelength	λ_c	$I_{op,max}$	825	830	835	nm
3dB bandwidth	BW_{3dB}	$I_{op,max}$	155	165		nm
10dB bandwidth	BW_{10dB}	$I_{op,max}$	180	190		nm
Polarization extinction ratio	PER	$I_{op,max}$	13	18		dB
Secondary peak suppression 0.3-4.0mm ²	$SPSR_{4mm}$	$I_{op,max}$	35			dB
Secondary peak suppression 4-8mm ³	$SPSR_{8mm}$	$I_{op,max}$	30			dB
Monitor PD current ⁴	I_{MPD}	$I_{op,max}$	100	250	400	μA
Monitor PD bias voltage	V_{MPD}		0		-10	V
Power stability ⁵	ΔP_{tot}	$I_{op,max}$			3	%

Table 1: Electrical-optical characteristics

¹ SLED A (760nm) and SLED B (800nm) are internally wired in series and can therefore only be driven with one and the same current through pins 8 and 9. 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.

⁵ Power change at 25°C case temperature, measured over 1h continuous operation

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 B1,B2 SLED C SLED D	$I_{F, B1,B2}$ $I_{F, C}$ $I_{F, D}$			140 140 220	mA
Reverse voltage: SLED B1,B2 SLED C SLED D	$V_{R, B1,B2}$ $V_{R, C}$ $V_{R, D}$			-4.0 -2.0 -2.0	V
Forward voltage: SLED B1,B2 SLED C SLED D	$V_{F, B1,B2}$ $V_{F, C}$ $V_{F, D}$			5.0 2.5 3.0	V
Operating temperature	T_{op}	$I_{F,max}$	-20	65	°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 ⁶		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

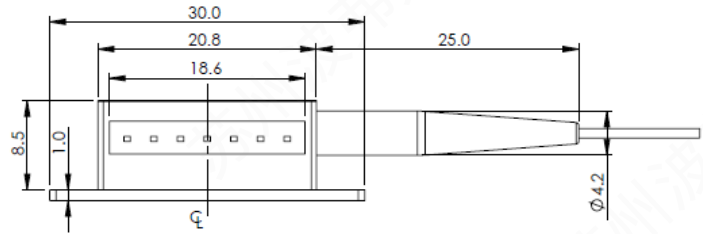
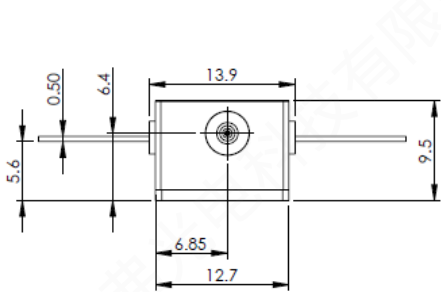
The produced Module is required to meet all operating conditions specified in Table 3, Electro-Optical Performance Specifications after being subjected to the following screening tests:

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 ≥ 5°C/min 10 cycles	MIL-STD-883, Method 1010

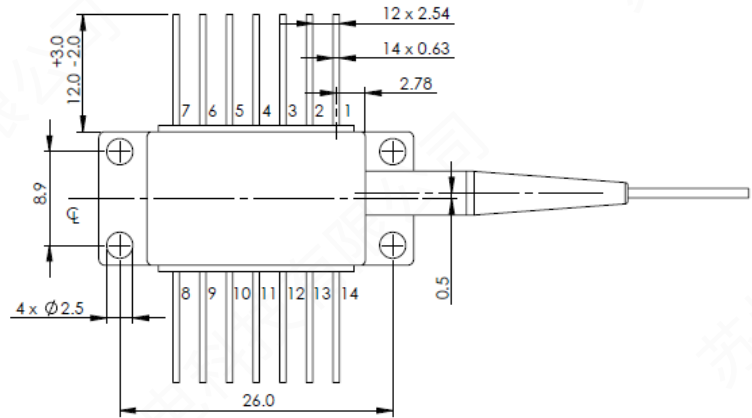
Table 3: Screening tests

⁶ 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 B1,B2 ANODE (+)
2	NC	9	SLED B1,B2 CATHODE (-)
3	MONITOR DIODE ANODE (+)	10	SLED C ANODE (+)
4	MONITOR DIODE CATHODE (-)	11	SLED C 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	SM 5/125 Corning HI780
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:

EXC250018-00

Description of technical code:

E	X	C	-	0	7	6	0	-	0	8	0	0	-	0	8	4	0	-	0	8	8	0	-	1	5	-	0	2	0	8	1	3	0			
				Wavelength B1				Wavelength B2				Wavelength C				Wavelength D				Total output power			Package			Fiber			Connector			MPD			Option	

10. REVISION HISTORY

Revision History				
Rev.	Description	ECN	Date	Released
0.1	Preliminary version EXC250018-00	-	12.10.2020	SGL
0.2	New BTF housing	-	03.11.2020	SGL
0.3	Change SLED nomenclature; updated drive current	-	06.11.2020	SGL
0.4	Change SLED nomenclature		07.05.2021	SGL