EXS210167-02

SLED Butterfly λ=840nm

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1. SCOPE

1.1 PURPOSE

The purpose of this document is to specify the electro-optical performance and dimensions of superluminescent light emitting diode (SLED).

1.2 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 DOCUMENT

- EXS-WI-0001 Visual Inspection Criteria SLED Chip on Submount Procedure
- MIL STD 883 C method.
- Bellcore GR-468-CORE.

3. ELECTRO-OPTICAL PERFORMANCE (T_{SLED} = 25°C)

Parameter	Symbol	Cond.	Min	Typ	Max	Unit
Operating Current*	I_{op}		100		180	mA
Power in SMF	P_o	I_{op}	8		12	mW
Center Wavelength	λ_c	I_{op}	830	840	850	nm
Bandwidth FWHM		I_{op}	51	55	58	nm
Secondary coherence peak suppression†	SPSR	I_{op}	26			dB
Monitor PD Current‡	I_{MPD}	I_{op}	0.8		2.5	mA
Monitor PD Bias Voltage	V_{bias}		0		-12	V
Monitor PD Time Delay**	t_{PLH}, t_{PHL}	I_{op} $V_{PD\text{-}Bias}$			0.5	µs
Peak-to-valley ratio (spectral flatness)		I_{op}			2.0	dB
Peak-to-peak ratio		I_{op}			0.4	dB
Min. 10dB wavelength		I_{op}	800			nm
Min. 40dB wavelength		I_{op}	785			nm
ASE Ripple (Residual Spectral depth modulation)		I_{op}			0.2	dB

* Iop corresponds to the SLED drive current at which the peak-to-peak ratio is less than ±0.4dB.

† SPSR is the difference in dB (on a 10-log scale) of the DC peak and the amplitude of the largest secondary peak of the coherence function over an imaging range of 3.5 mm in air (OPD 7.0 mm). The coherence function is calculated through a Fourier transform of the optical spectrum, measured from 770 nm to 920 nm (150 nm span) with a sampling bandwidth of max. 20 pm (optical resolution) and an oversampling factor of at least 2.0 (max. numerical resolution 10 pm), and resampled with equidistant steps in the frequency domain (k-space).

‡ Measurement conditions: MPD bias voltage 0 Volts, termination resistance 10 Ohm or less

** The time delay for the rising and falling edge of the MPD current signal relative to the pulsed injection current, both measured at 50% of the corresponding HIGH values, should not exceed 0.5 microseconds. Measurement conditions: MPD bias voltage -5V, termination resistance 500±50 Ohm.

4. THERMAL PERFORMANCE

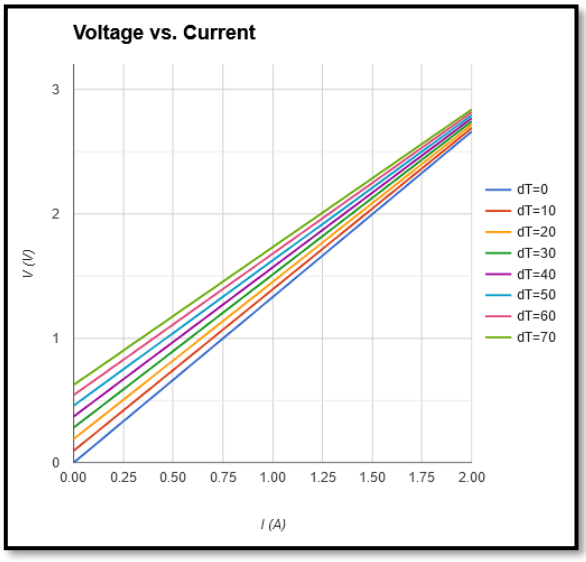
Parameter	Symbol	Cond.	Min	Max	Unit
Thermistor Resistance	R_{th}	25°C	10 ± 1%		KΩ
Thermistor constant	β		3950 ± 40		K
Storage temperature	T_{stg}		-40	85	°C
Operating temperature	T_{op}	$I_{F,max}$	-20	65	°C

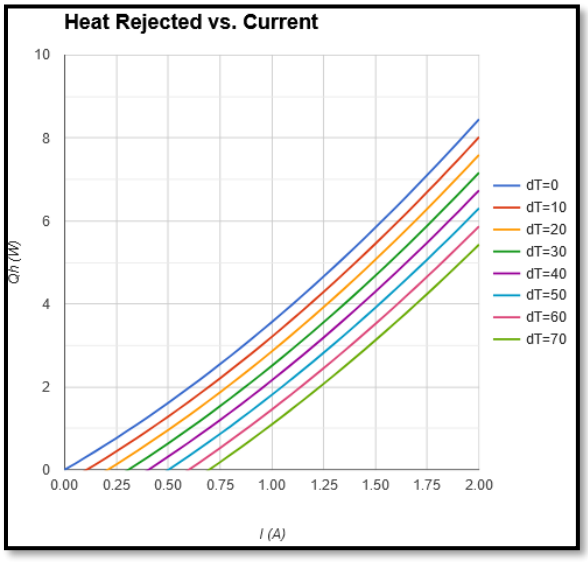
5. ABSOLUTE MAXIMUM RATINGS

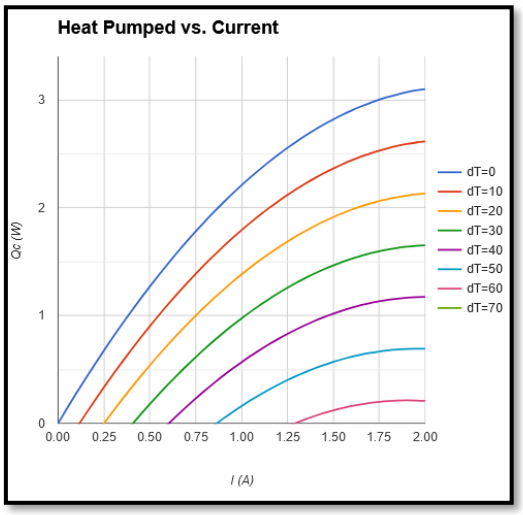
Stresses beyond the absolute maximum ratings may cause permanent damage to the device.
Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter	Symbol	Cond.	Min	Max	Unit
Forward current	I_F			220	mA
Reverse voltage	V_R			-2	V
Forward voltage	V_F	$I_{F,max}$		2.5	V
Storage humidity		<30°C >30°C	5	95 85	% r.h. % r.h.
Lead soldering temperature				260	°C
Lead soldering duration				10	s
ESD		human b.m		500	V
Thermoelectric cooler voltage	V_{tec}	***		4	V
Thermoelectric cooler current	I_{tec}	***		2	A

*** Data given is for standalone TEC with heat sink temperatures of 50°C and SLED temperatures of 25°C !







6. SCREENING

The produced 840nm SLED Module is required to meet all operating conditions specified in Table 3, Electro-Optical Performance Specifications after being subjected to the following screening tests.

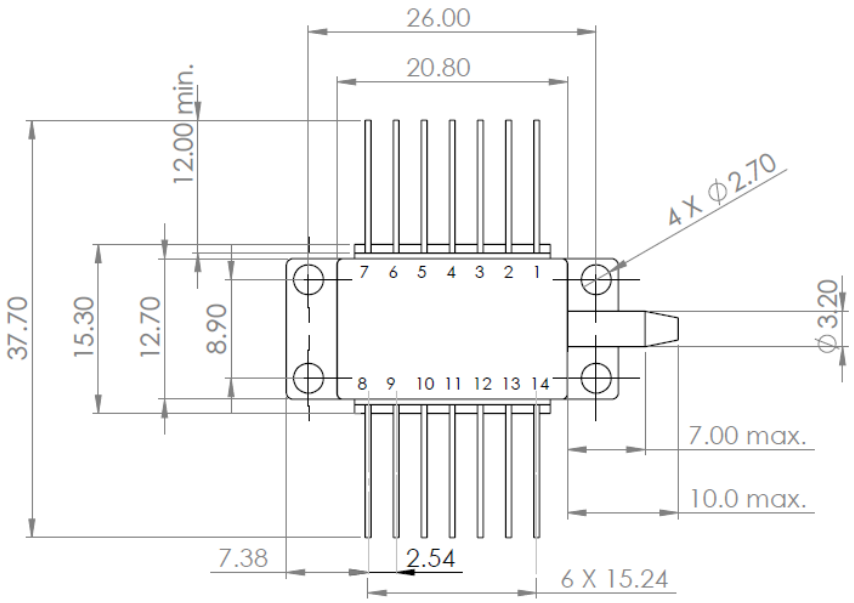
Test Item	Test Conditions	Reference
Seal	Fine: Condition A1 Gross: Condition C	MIL-STD-883, Method 1014 Temperature max 85°C
Temperature Cycling	-40°C to +85°C, ramp rate >= 5°C/min 10 cycles	MIL-STD-883, Method 1010

7. FIBRE AND CONNECTOR

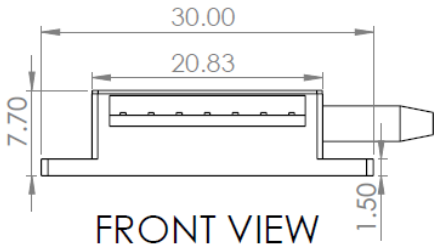
Part	Description
SM Fibre	SM 5/125 Corning HI780
Loose tube secondary coating	900 µm / Yellow
Fiber pigtail length [min]	1 m ± 0.1m
Optical connector	FC/APC Narrow Key (2.0mm)

8. PACKAGE DIMENSIONS [mm]

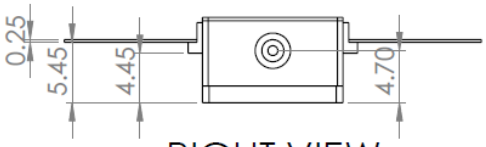
Tolerances : .X ± 0.25 mm
.XX ± 0.05 mm



TOP VIEW



FRONT VIEW



RIGHT VIEW

Butterfly Package			
Pin	**Function**	**Pin**	**Function**
1	**TEC (+)**	**8**	**NC**
2	**THERMISTOR**	**9**	**NC**
3	**MONITOR DIODE ANODE**	**10**	**SLED ANODE (+)**
4	**MONITOR DIODE CATHODE**	**11**	**SLED CATHODE (-)**
5	**THERMISTOR**	**12**	**NC**
6	**NC**	**13**	**CASE GROUND**
7	**NC**	**14**	**TEC (-)**

9. IMPORTANT NOTES

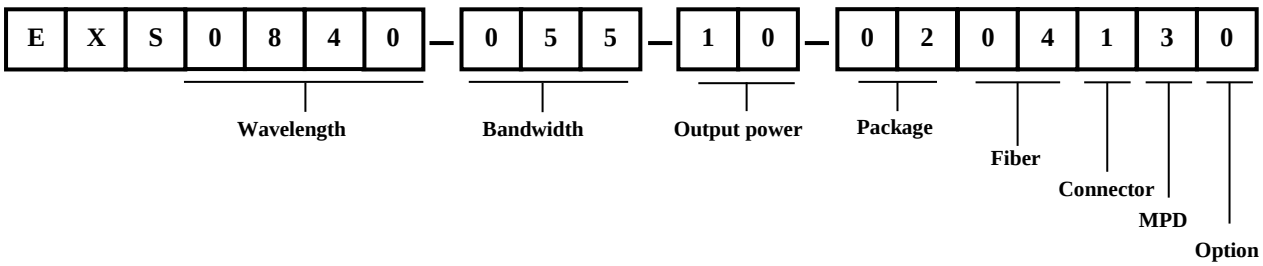
1. Avoid electrostatic discharges, which may destroy the SLED.
2. Never use the SLED module without heat sinking.
3. Adequate eye protection against laser radiation should be used while handling and operating the module.
4. EXALOS declines any responsibility if the device is used in applications where human life may be endangered.
5. Back reflections may influence the output power and spectral characteristics of the SLED. The use of optical isolators and/or angled connectors is recommended. Back reflections of less than -30dB are recommended.
6. Additional information on the product are given in EXS-TR-0856 (latest revision applicable), where the point below are described:
    a. Module screening and test procedure
    b. TEC and MPD characteristics
    c. The Measurement Report and the typical performance of the module
    d. The Lifetime at chip level
    e. The shipping box
    f. The RoHS compliance

10. ORDERING INFORMATION

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

E	X	S	2	1	0	1	6	7	–	0	2

11.1 TECHNICAL DESCRIPTION



11. REVISION HISTORY

Revision History				
Rev.	**Description**	**ECN**	**Date**	**Released**
1.0	Original version	EC-01391	15.03.2022	Rezzonico
2.0	Updated specification by changing the photodiode to a high-speed sensitivity photodiode and added IMPD ≥ 0.8mA and ≤ 3.5mA at 180mA	EC-01420	18.05.2022	Rezzonico
2.1	Updated output power in SMF ≥ 8mW and ≤ 12mW, Bandwidth ≥ 51nm	EC-01423	31.05.2022	Rezzonico
2.2	Updated specification by changing the max I_{MPD} to ≤ 2.9mA at 180mA	EC-01425	16.06.2022	Rezzonico
2.3	Updated absolute maximum rating of the I_{Fmax} at 220mA instead of 200mA	EC-01458	30.06.2022	Rezzonico
2.4	Updated the heat shrink tubing length and diameter and BW≤59nm. Added spectral flatness, peak-to-peak ratio, TEC, NTC, PD time delay performances. Added the Technical Report reference in the document	EC-01466	10.01.2023	J. Dahdah
2.5	Drawing update with the different views	EC-01505	16.02.2023	J. Dahdah
2.6	Update the maximum bandwidth to 58nm maximum. Update all the drawings and adding the pins numbering	EC-01562	25.09.2023	J. Dahdah