NECSEL™ RGB NOVALUM

Necsel-NovaLum-1200 Specifications Document

Date: June 30, 2016
Version: Preliminary

1. Introduction

These specifications are for the Necsel NovaLum 1200 package

COLOR	SYMBOL	MIN	LIMITS TYP	MAX	UNIT
RED [1,2]	λ_m	630	638	644	nm
GREEN [1,2]	λ_m	518	525	528	nm
BLUE [1,2]	λ_m	459	465	472	nm

[1] Minimum and maximum wavelengths are where spectral energy can exist
[2] Wavelength can be anywhere inside the given spectral range, for example, blue wavelength may be 459nm-462nm only

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2. Operating Characteristics

ITEM	LASER PERAMETER	SYMBOL	LIMITS MIN	TYP	MAX	UNIT
Red Laser						
1	Operating Power (CW average) at 25°C[9]	P_{op}	2500	2500	-	mW
2	Operating Power D65 White Balance at 25°C[7]	P_{D65}	-	2500	-	mW
3	Output Power Stability[3]	-	-	-	2	%PP
4	Operating Temperature (Red thermistor)[4]	$T_{Themistor}$	0	25	30	°C
5	Peak Wavelength[5]	λ_m		See Section 1		nm
6	Wavelength Temperature Coefficient[6]	-	-	0.2	-	nm/°C
7	Recommended Drive Conditions[12]					
7a	Operating Voltage	V_{op}	-	11.5	13.5	V
7b	Threshold Current	I_{th}	-	.200	.250	A
7d	Operating Current[8]	I_{op}	-	0.80	0.85	A
7e	Operating Current at D65	I_{D65}	-	0.80	-	A
7f	Allowable Reverse Voltage	V_R	-	-	2	V
Green Laser						
1	Operating Power (CW average) at 25°C[9]	P_{op}	1500	1600	-	mW
2	Operating Power D65 White Balance at 25°C[7]	P_{D65}	-	1500	-	mW
3	Output Power Stability[3]	-	-	-	2	%PP
4	Operating Temperature (Green thermistor)[4]	$T_{Themistor}$	0	25	35	°C
5	Peak Wavelength[5]	λ_m		See Section 1		nm
6	Wavelength Temperature Coefficient[6]	-	-	0.06	-	nm/°C

7	Recommended Drive Conditions[12]					
7a	Operating Voltage	V_{op}	8	9.6	12.0	V
7b	Threshold Current	I_{th}	.150	.300	.500	A
7d	Operating Current[8]	I_{op}	-	1.7	1.8	A
7e	Operating Current at D65	I_{D65}	-	1.7	-	A
7f	Allowable Reverse Current	I_R	-	-	.085	A
Blue Laser						
1	Operating Power (CW average)[9]	P_{op}	1200	1400	-	mW
2	Operating Power D65 White Balance at 25°C[7]	P_{D65}	-	1200	-	mW
3	Output Power Stability[3]	-	-	-	2	%PP
4	Operating Temperature(Green thermistor)[4]	$T_{Themistor}$		25	35	°C
5	Peak Wavelength[5]	λ_m	See Section 1			nm
6	Wavelength Temperature Coefficient[6]	-	-	0.06	-	nm/°C
7	Recommended Drive Conditions[12]					
7a	Operating Voltage	V_{op}	3.7	4.1	4.8	V
7b	Threshold Current	I_{th}	.300	.430	.550	A
7d	Operating Current[8]	I_{op}	-	-	1.6	A
7e	Operating Current at D65	I_{D65}	-	1.3	-	A
7f	Allowable Reverse Current	I_R	-	-	.085	A
9	**Fiber-Coupled Specifications**					
9a	Fiber Core Diameter	-	-	400	-	µm
9b	Connector Type	-	SMA-905			-
9c	Numerical Aperture	-	-	0.22	-	NA

[3] The output stability is dominated by the temperature stability of the laser cooling system and the current stability of the laser power supply..

[4] Thermistors are located inside the module near the red and green lasers.

[5] Peak wavelength measured at $T_{Thermistor}$ = 25°C +/- 3C at typical drive current.

[6] Wavelength temperature coefficient is an approximate measurement over the operating temperature range.

[7] Approximate D65 white balanced power level at 25°C Red thermistor, any increase in temperature will decrease the lumen value. Based on wavelengths of 638nm, 525nm, and 465nm.

[8] Absolute maximum drive condition.

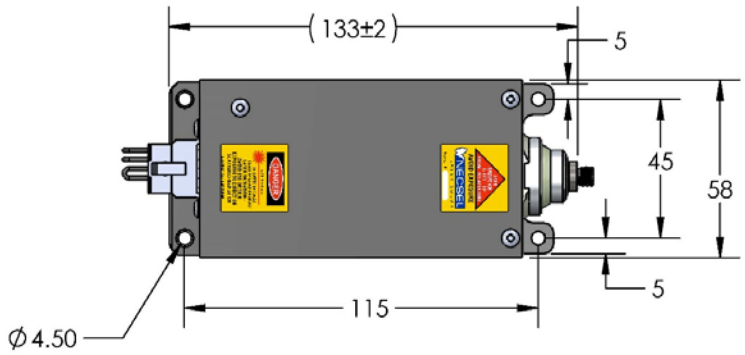
3. Reliability Items

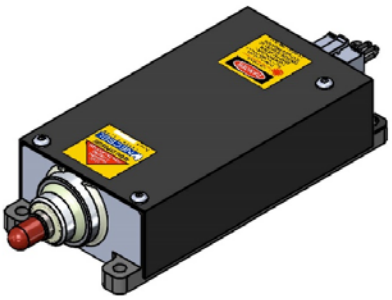
ITEM	CHARACTERISTICS	CONDITION	MIN	TYP	MAX	UNIT
1	Expected product lifetime[10]	$T_{Thermistor}$ = 25°C	-	20,000	-	hrs
2	Low Temperature Storage[11]	-40°C	-	-	72	hrs
3	High Temperature Storage	85°C	-	-	1000	hrs
4	Mechanical Shock (MIL-STD-883E, Method 2002.4, 5 times each 6 axes)	1 msec, half sine	-	-	500	G peak accel.
5	Vibration (MIL-STD-883E, Method 2007.3, 4 min/cy, 4 cy/axis)	20-2000-20 Hz	-	-	20	G peak accel.
6	Humidity[11] (45C/85%,non-condensing)	Non-operating	-	-	1000	hrs
7	Temperature Cycling[11] (MIL-STD-883E, Method 1010.7: 50 cycles, >10C/min ramp, <12.5 min transfer, >10 min dwell)	Non-operating	-40	-	85	°C

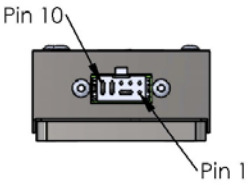
[9] Powers listed are guaranteed at 25°C with a 3m long, 400um, 0.22NA glass/glass fiber with centration of +/- 10um and AR coating of <1% residual reflection per end..
[10] Specified time represents MTTF (Mean Time to Failure), Normal Operating Conditions, Constant Current. Failure is defined as 50% power degradation.
[11] Non-condensing atmosphere
[12] Anti-static precautions must be observed at all times when handling the laser. When not in use, the provided shorting clip must be installed.

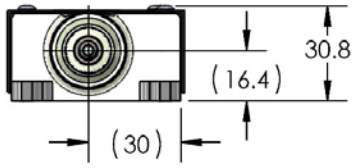
4. Mechanical Specifications

Molex Micro-Fit 10 circuit header 430451012	
PIN	DESCRIPTION
1	Red thermistor
2	Red laser +ve
3	Red laser -ve
4	Green laser -ve
5	Blue laser -ve
6	Red thermistor
7	Green thermistor
8	Green thermistor
9	Green laser +ve
10	Blue laser +ve



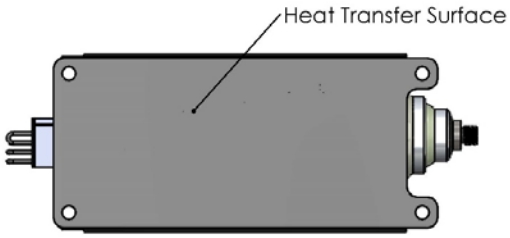






NOTES: UNLESS OTHERWISE SPECIFIED.

1. Power connector shorting block shown in all vie
2. Connector dust cover shown only in isometric vi



This device is very sensitive to electrical discharge (ESD). Proper precautions must be taken.

Please avoid scratches at the bottom surface of the device. They can increase the thermal resistance of the device then mounting to a heatsink and therefore might result in reduced optical output power, wall-plug efficiency and long term stability.

5. ESD Handling

Diode lasers are electrostatic sensitive devices. Thus, their handling requires strict precautions against electrostatic charges. Every person and each tool that might get into contact with the diode laser must be continuously ESD protected. Therefore, the devices should only be handled in ESD protected areas (EN 100 015 former CECC 000 15).

Basics for protection against statics

- Grounding: Grounding systems shall be used to ensure that devices, personnel and any other conductors are at the same electrical potential.
- Protection: To avoid exposure to static charges, keep components and modules separated during storage and transit. By protecting against exposure to statically charged objects and electric fields, potential damage to laser components is minimized. As statically charged insulators cannot be discharged by grounding. It is advisable to eliminate non-conductive plastic material and other type of insulator from the working place, transit and storage areas.
- Neutralization: Neutralization is the process to discharge insulators. This happens naturally through the process of ionization. Ions are charged particles that are always present in the atmosphere in form of atoms, molecules or groups of molecules like water drops. The use of an ionizer generates billions of ions into the air and enables the static charge on insulator to leak away.
- Prevention: Prevention can be the most effective and important personal contribution to eliminate damage caused by ESD. Please find below a set of guidelines:

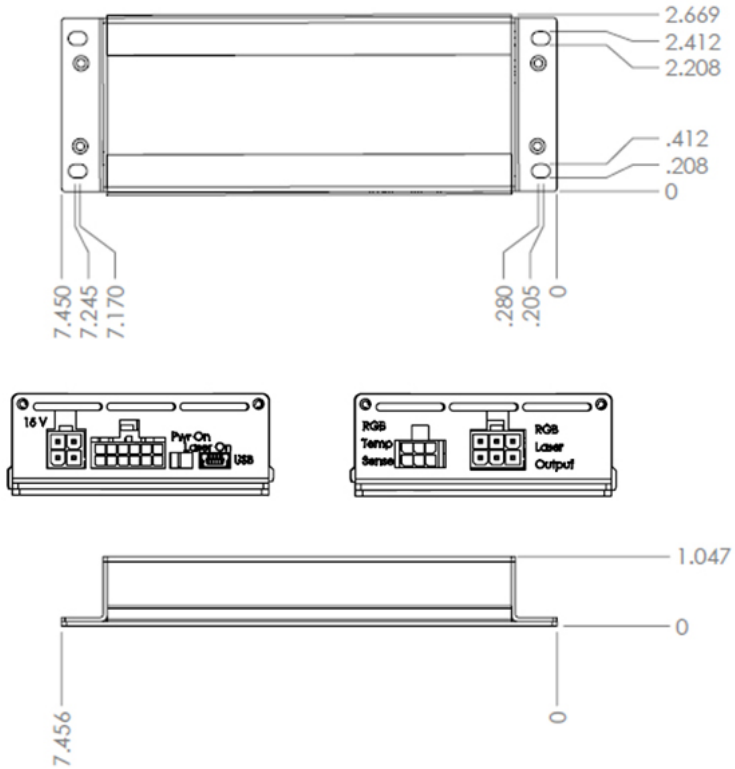
    1. Always keep work areas clean and tidy. Remove unwanted objects, especially those made of non-conductive plastic materials.
    2. When transferring components from one person to another, both should be grounded or at the same voltage potential.
    3. Avoid that the laser components or modules come into contact with any insulating material.
    4. Never enter a static-proof work area without taking the appropriate precautions.
    5. Always be aware of these rules when working with devices that can be damaged by electrostatic discharges.

5. RGB NovaLum Developer's Kit

A. Developer's Kit Contents

The Developer's kit includes the Necsel Intelligent Controller, connection cables, USB cable, power supply, and a Windows GUI.

B. Mechanical Specifications (all dimensions are in inches



6. Typical Performance Data

A. Power versus current for RGB colors