



BRILLIANCE

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Datasheet



Integrated Miniature RGB Laserchip "Neptune"

N03-H20-01_IND

Description

Brilliance miniature RGB Neptune laserchip N03-H20-01_IND is the smallest, most robust and most scalable way to work with RGB lasers in projection applications. Neptune offers optimal performance of optical output properties combined with a very small form factor and flexible system integration. Neptune eliminates the cost and optical complexity of conventional laser combining solutions, enabling seamless integration into smart eyewear, automotive, and industrial applications while improving system reliability. This datasheet focuses on **industrial applications**.

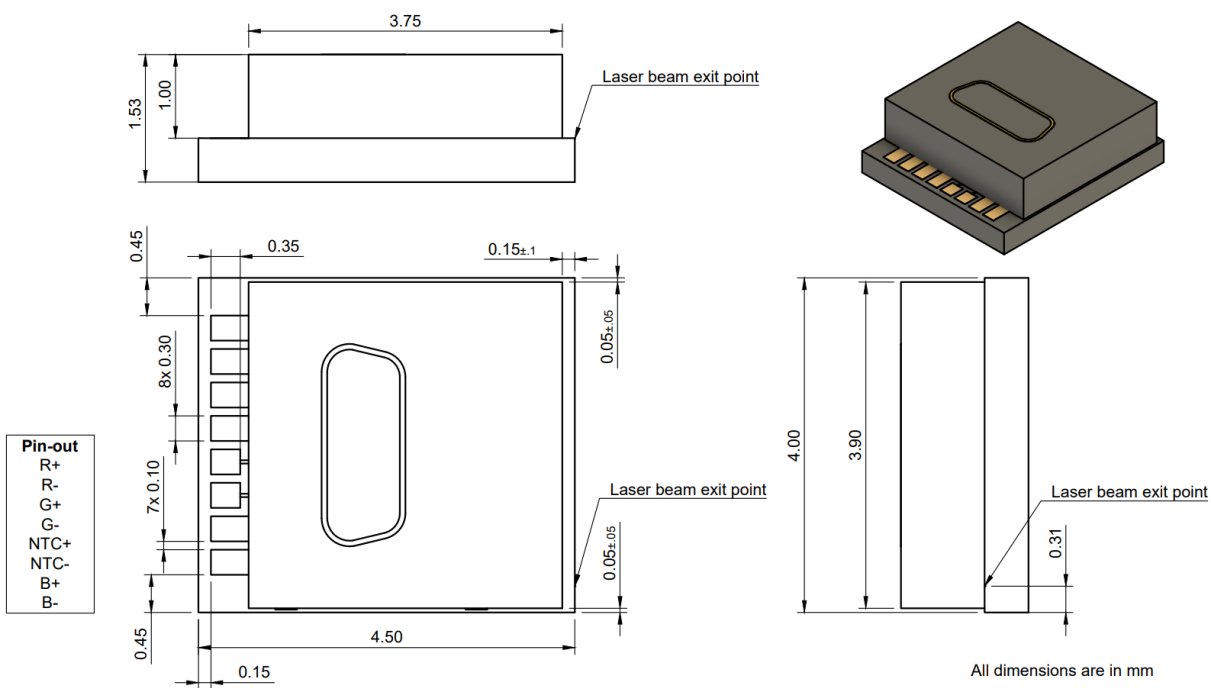


Industrial Applications

- Fluorescence microscopy
- Metrology
- Scanning
- Display and illumination applications (in buildings and non-automotive vehicles)

Features

- Volume: 0.028 cc
- Weight: 50 mg
- Flat NA over wavelength (Ratio 1:1 $\pm$ 5%)
- Ellipticity: 0.95 $\pm$ 5%
- Wavelengths: [639, 520, 450] nm
- Operation environmental temperature: - 10 ~+ 50°C
- Sealed package
- On-chip temperature sensor (NTC)



Characteristics (T_c=25 °C)

Parameter	λ_{typ}	Symbol	Min	Typ	Max	Unit
Peak wavelength	639	λ	634	639	644	nm
Optical output power		P _{opt}	40	95	150	mW
Lumen output		P _{lum}	4.6	10.6	16.8	lm
Luminous efficacy		η_{lum}	-	17.5	-	lm/W
Mode field diameter		MFD	-	3.7	-	μ m
Numerical aperture (x axis)		NA	0.13	0.14	0.15	-
Numerical aperture (y axis)		NA	0.13	0.14	0.15	-
Ellipticity of output		-	-	0.99	-	-
Beam divergence (1/e ²) (x axis)		θ_l	7.5	8.0	8.6	°
Beam divergence (1/e ²) (y axis)		$\theta_{\perp}$	7.5	8.0	8.6	°
Threshold current (T=25 °C)		I _{th}	-	50	60	mA
Operating current (T=25 °C)		I _{op}	-	225	260	mA
Operating voltage (T=25 °C)		V _{op}	-	2.7	3	V
Polarization		P _{TE}	-	TE	-	-
Peak wavelength	520	λ	510	520	530	nm
Optical output power		P _{opt}	30	64	98	mW
Lumen output		P _{lum}	13.5	28.7	44	lm
Luminous efficacy		η_{lum}	-	17.9	-	lm/W
Mode field diameter		MFD	-	3.5	-	μ m
Numerical aperture (x axis)		NA	0.17	0.19	0.21	-
Numerical aperture (y axis)		NA	0.16	0.18	0.20	-
Ellipticity of output		-	-	0.97	-	-
Beam divergence (1/e ²) (x axis)		θ_l	9.8	11.0	12.1	°
Beam divergence (1/e ²) (y axis)		$\theta_{\perp}$	9.2	10.4	11.5	°
Threshold current (T=25 °C)		I _{th}	-	55	80	mA
Operating current (T=25 °C)		I _{op}	-	255	295	mA
Operating voltage (T=25 °C)		V _{op}	-	6.3	7.2	V
Polarization		P _{TE}	-	TE	-	-
Peak wavelength	450	λ	440	450	460	nm
Optical output power		P _{opt}	30	53	75	mW
Lumen output		P _{lum}	0.7	1.2	1.8	lm
Luminous efficacy		η_{lum}	-	2.7	-	lm/W
Mode field diameter		MFD	-	2.2	-	μ m

Numerical aperture (x axis)		NA	0.18	0.20	0.22	
Numerical aperture (y axis)		NA	0.17	0.19	0.21	
Ellipticity of output		-	-	0.93	-	
Beam divergence (1/e ²) (x axis)		$\theta_{\parallel}$	10.4	11.5	12.7	
Beam divergence (1/e ²) (y axis)		$\theta_{\perp}$	9.8	11.0	12.1	
Threshold current (T=25°C)		I_{th}	-	12	30	mA
Operating current (T=25°C)		I_{op}	-	87	120	mA
Operating voltage (T=25°C)		V_{op}	-	5.2	6.5	V
Polarization		P_{TE}	-	TE	-	-
Output pitch	N/A	p		7		μm
White output (D65)	N/A	η_{white}		15	11	lm/W
NTC: Mitsubishi Materials VH05-6D103FC	N/A	R		10K		Ohm

Disclaimer

N03-H20-01_IND is in pre-production stage. Upon finalization and freeze of design and process, some of the specified parameters may change or adjust. This datasheet will be updated accordingly, please check the website for updates.

Maximum Ratings (T_c=25 °C)*

Parameter	λ_{typ}	Symbol	Rating	Unit
LD max. current	640	I	260	mA
LD reverse voltage		V_R	2	V
LD max. current	520	I	295	mA
LD reverse voltage		V_R	2	V
LD max. current	450	I	145	mA
LD reverse voltage		V_R	2	V
Operating temperature	N/A	T _{Oper}	-10 to +50	°C
Storage temperature	N/A	T _{Stor}	-40 to +85	°C

*Ratings regarding the laser diode, excluding losses

Thermal Specifications

To achieve optimal performance, the laserchip temperature must be kept below 35 °C. In typical augmented reality applications, the laserchip operates using pulse-width modulation (PWM) at modulation frequencies in the hundreds of megahertz and a duty cycle of around 20%, for which a passive heat sink is recommended. It is essential to ensure a thermally efficient interface between the laserchip and the heat sink to maintain stable operation. For this interface, we recommend AuSn solder paste or silver paste with high thermal conductivity.

Demo kits

The RGB laserchip is available as a customized assembly mounted on a heatsink or flexible circuit board, for testing or demonstration purposes. Check our website for more information or send inquiries to info@brilliancecrgb.com

Customized Laser Photonics Integrated Circuits (PIC)

Custom versions with additional PIC functionality or adapted MFD and NA are available upon request. Please send inquiries to info@brilliancecrgb.com.

Warning

This product contains Class 3B laser diodes, which can cause eye injury or skin burns upon direct or specular reflection exposure. Proper laser safety procedures must be followed, including the use of appropriate laser safety eyewear rated for the emission wavelength(s). The device should be operated by trained personnel in a controlled environment with adequate safety interlocks and beam enclosures.