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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



NV4V31MF

Data Sheet

Blue-Violet Laser Diode

R08DS0045EJ0100

405 nm Blue-Violet Laser Light Source

Rev.1.00

Mar xx, 2012

DESCRIPTION

The NV4V31MF is a blue-violet laser diode with a wavelength of 405 nm. A newly developed LD chip structure achieves a high optical power output of 175 mW (CW) at up to 85°C. The NV4V31MF can provide excellent linearity from low to high output at high temperatures, and reduces the unevenness of beam divergence.

FEATURES

- High optical output power $P_o = 175 \text{ mW @CW}$
- Peak emission wavelength $\lambda_p = 405 \text{ nm TYP.}$
- Wide operating temperature range $T_C = -5 \text{ to } +85^\circ\text{C}$
- $\phi 3.8 \text{ mm}$ small CAN package

APPLICATIONS

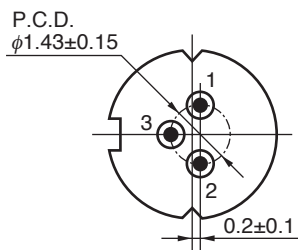
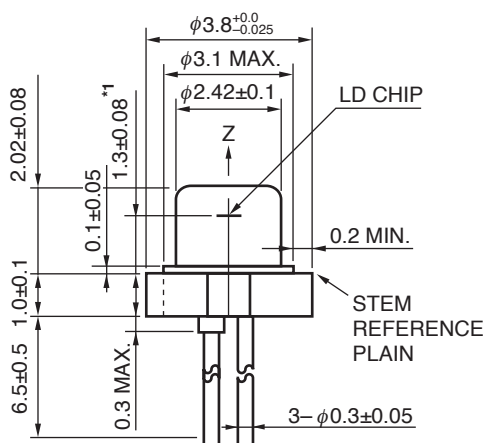
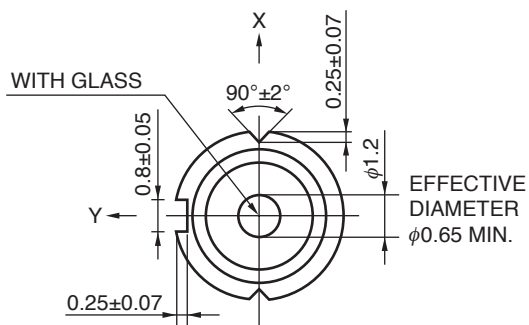
- Blue-violet laser light source



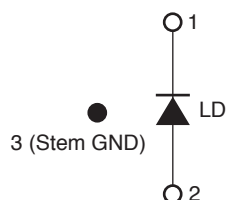
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PACKAGE DIMENSIONS (UNIT: mm)



BOTTOM VIEW



PIN CONNECTIONS

- Remarks**
1. Cap glass thickness: 0.25±0.03 mm
Cap glass refractive index: 1.53 (λ = 405 nm)
 2. Position accuracy of the LD chip based on the center of stem
Δx = ±80 μm
Δy = ±80 μm
Δz = ±80 μm (*1)

<R>

ORDERING INFORMATION

Part Number	Order Number	Rank	Package
NV4V31MF	NV4V31MF-A	GV	Tray Packaging (250 p/Tray)
		KV	Individual Packaging (for small samples)

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Optical Output Power (CW)	P_o	180	mW
Optical Output Power (pulse) *1	P_p	360	mW
Reverse Voltage of LD	V_R	2	V
Operating Case Temperature	T_C	-5 to +85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +85	$^\circ\text{C}$

Note: *1. Pulse condition: $PW \leq 50 \text{ ns}$, $Duty \leq 50\%$ **RECOMMENDED OPERATING CONDITIONS ($T_C = 25^\circ\text{C}$, unless otherwise specified)**

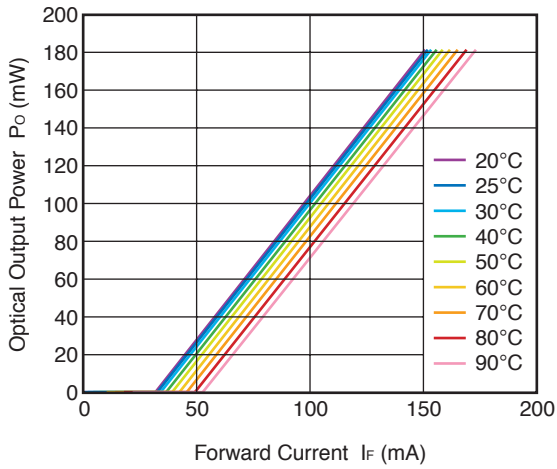
Parameter	Symbol	MAX.	Unit
Optical Output Power (CW)	P_o	175	mW

ELECTRO-OPTICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

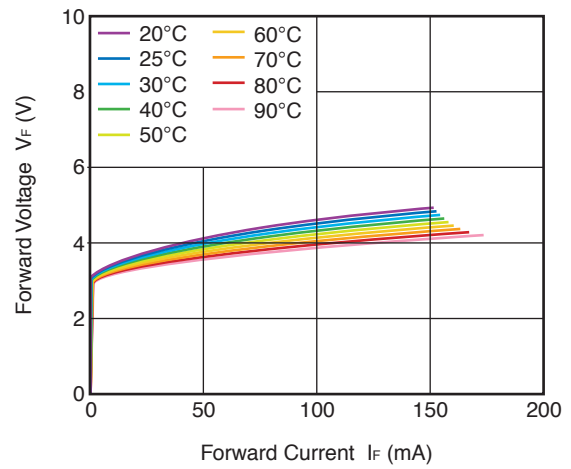
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	I_{th}	CW		35	55	mA
Operating Current	I_{op}	CW, $P_o = 175 \text{ mW}$		150	200	mA
Optical Voltage	V_{op}	CW, $P_o = 175 \text{ mW}$		5.0	6.5	V
Slope Efficiency	η_d	CW, $P_o = 20 \text{ mW}, 175 \text{ mW}$	1.1	1.55		W/A
Peak Wavelength	λ_p	CW, $P_o = 175 \text{ mW}$	400	405	415	nm
Beam Divergence (lateral)	θ_l	CW, $P_o = 175 \text{ mW}$	6	9	12	deg.
Beam Divergence (vertical)	θ_\perp		15	20	25	
Position Accuracy Angle (lateral)	$\Delta\theta_l$	CW, $P_o = 175 \text{ mW}$	-3	0	3	deg.
Position Accuracy Angle (vertical)	$\Delta\theta_\perp$		-3	0	3	

<R> **TYPICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)**

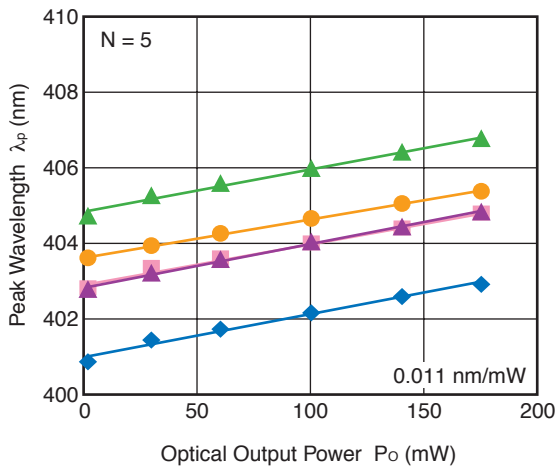
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



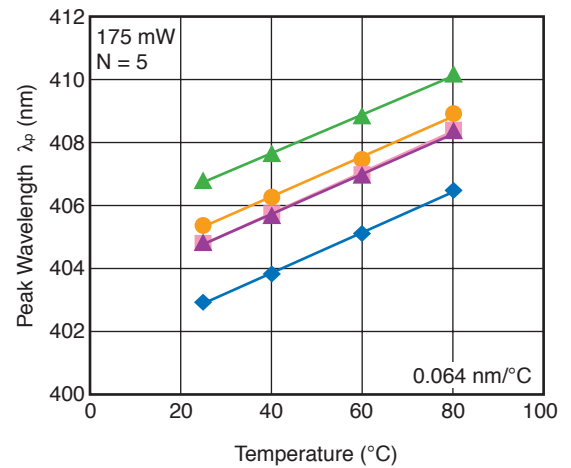
FORWARD VOLTAGE vs. FORWARD CURRENT



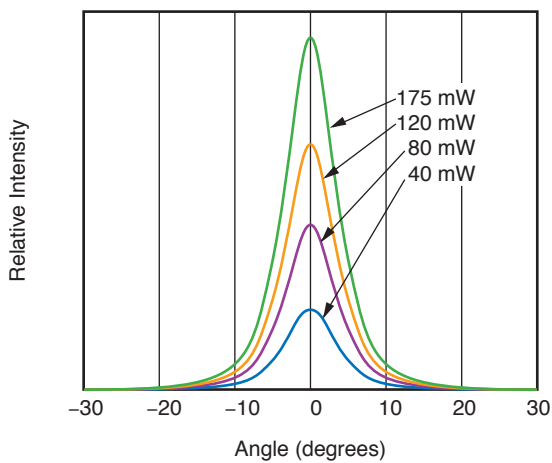
POWER DEPENDENCE OF DIFFERENTIAL EFFICIENCY



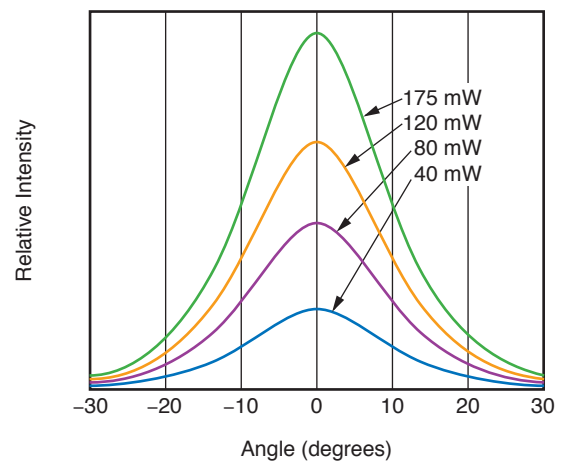
TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY



FFP (LATERAL)

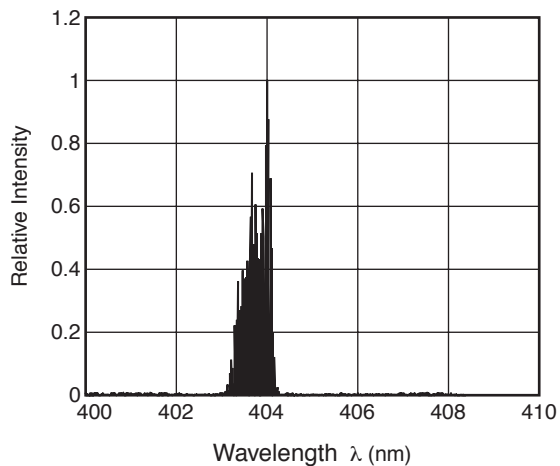


FFP (VERTICAL)

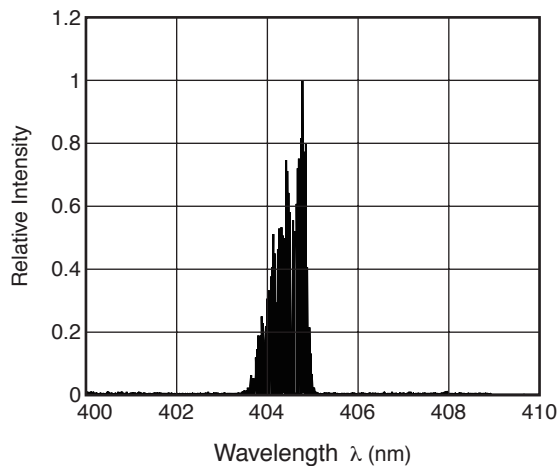


Remark The graphs indicate nominal characteristics.

Wavelength Spectrum (100 mW)



Wavelength Spectrum (175 mW)



Remark The graphs indicate nominal characteristics.

NOTES ON HANDLING (UNIT: mm)

1. Recommended soldering conditions

- Peak Temperature 350°C or below
- Time 3 seconds or less
- Soldering of leads should be made at the point 2.0 mm from the root of the lead
- This device cannot be mounted using reflow soldering.

2. Usage cautions

(1) Take the following steps to ensure that the device is not damaged by static electricity.

- Wear an antistatic wrist strap when soldering the device.
We recommend a strap with a 1 MΩ resistor.
- Make sure that the work table and soldering iron are grounded.
- Make sure that the soldering iron does not leak.

(2) Do not subject the package to undue stress.

The package has a tensile strength of 1N.

Do not exceed this rating. Also, avoid bending the leads as much as possible.

If the leads must be bent, bend them only once, making sure to anchor the base of the lead.

(3) Do not allow the glass window of the package to become scratched or dirty.


Also, do not subject the glass window to external force.

(4) Be sure to attach a heat sink to sufficiently dissipate heat.

(5) Use the device as soon as possible after opening the aluminum moisture barrier bag.

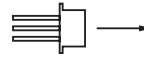
SAFETY INFORMATION ON THIS PRODUCT

DANGER



VISIBLE LASER RADIATION
 AVOID DIRECT EXPOSURE TO BEAM
 OUTPUT POWER 450 mW MAX
 WAVELENGTH 400 to 420 nm
 CLASS IIIb LASER PRODUCT

SEMICONDUCTOR LASER



AVOID EXPOSURE-Visible
 Laser Radiation is emitted from
 this aperture

Warning	Laser Beam	<p>A laser beam is emitted from this diode during operation. If the laser beam or its reflection enters your eye, it may cause injury to the eye or loss of eyesight. (Note that, depending on the wavelength of the beam, the laser beam might not be visible.)</p> <ul style="list-style-type: none"> • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
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Revision History	NV4V31MF Data Sheet
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Rev.	Date	Description	
		Page	Summary
0.01	Sep 08, 2011	–	First edition issued
1.00	Mar xx, 2012	Throughout	Preliminary Data Sheet -> Data Sheet
		p.3	Modification of ORDERING INFORMATION
		p.4, 5	Addition of TYPICAL CHARACTERISTICS

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