

# RIO PLANEX™ Series 1064nm

## Narrow Linewidth External Cavity Laser

**Data Sheet**  
**July 2019**

- Single longitudinal mode
- Center wavelength: 1061nm-1067nm
- Narrow linewidth, long coherence length
- Low phase noise
- Wavelength tunability
- Very low RIN
- Excellent SMSR
- Excellent wavelength stability over life and temperature
- Low sensitivity to vibration and acoustic noise
- CW, modulated and pulsed operations
- Small form factor, 14 pin butterfly
- Low power dissipation
- SMF and PM fiber pigtail options
- Telecordia GR-468 qualified platform
- RoHS compliant



### Description

The RIO019X-X-XX-X devices are high-performance cost effective External Cavity Laser (ECL). The design is based on RIO's proprietary planar technology (**PLANEX™**) and consists of a gain chip and a planar lightwave circuit including waveguides with Bragg gratings, forming a laser cavity with significant advantages.

**PLANEX™ laser combines high performance, comparable with long cavity fiber lasers, with the low cost, simplicity, small size and reliability of semiconductor lasers.**

PLANEX™ laser is an ideal source for seeding of high power fiber and solid-state lasers, second harmonic generation and optical parametric oscillators, spectroscopy and other industrial and scientific applications, coherent Doppler LIDAR, metrology and optical sensing.

Lasers are available with various wavelength and output power options.

### Applications

- Seeding of fiber and solid-state lasers
- Second Harmonic Generation (SHG)
- Optical Parametric Oscillators (OPOs)
- LIDAR
- Laser Spectroscopy
- Metrology

## Absolute Maximum Ratings

Operation of the device beyond these maximum conditions may degrade device performance, lead to device failure, shorten product lifetime, and invalidates the device warranty.

Parameter	Min	Max	Unit
Storage temperature	- 40	+ 85	°C
Laser diode reverse voltage		2	V
Laser diode forward current		150	mA
Monitor diode reverse voltage		15	V
Monitor diode forward current		25	mA
TEC current		1.5	A
TEC voltage		4.0	V
Fiber bend radius	35		mm
Tensile strength, fiber to the package		5	N

ESD-susceptibility Note: Store the product in its original package at a dry, clean place until final use. Unpacking the laser diode should be done at electrostatic safe work station (EPA). During device installation, ESD protection must be maintained.

## Optical and Electrical Specifications

At recommended TEC set temperature  $T_s$  and bias current  $I_b$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
TEC set Temperature	$T_{set}$	Specified for every laser	15		50	°C
Output Power	$P_{out}$	CW	see ordering information page			mW
Threshold current	$I_{th}$	@ $T_{set}$		35	50	mA
Laser Bias Current	$I_b$	CW, $P_{out}$		100	140	mA
Laser Forward Voltage	$V_f$	CW, @ 100mA		3	3.5	V
Center Wavelength <sup>1</sup>	$\lambda$		1061		1067	nm
Side Mode Suppression Ratio	SMSR	CW, at specified $P_{out}$	50			dB
Wavelength vs. TEC Temperature	$d\lambda/dT$	$T_{set} \pm 1^\circ\text{C}$		14		pm/°C
Wavelength tunability <sup>2</sup>	$\Delta\lambda_T$	via TEC temperature change	20 <sup>3</sup>			pm
Relative Intensity Noise	RIN	$\geq 1\text{kHz}$		-135		dB/Hz
Polarization Extinction Ratio <sup>4</sup>	PER	For PM option, polarization and connector key aligned to slow axis	17	20		dB
Monitor bias voltage	$V_R$	Cathode positive to anode	4.75	5	5.25	V
Monitor diode current	$I_{mc}$	$P_{out}$	0.15		1.5	mA
Monitor diode dark current	$I_{md}$	$V_R = 5\text{V}$			5	nA
Input Impedance	$Z_0$			25		Ohm
Optical Isolation	ISO		23			dB

1. Customized wavelength and setting tolerance are available. See ordering information.
2. Phase continuous wavelength tuning by changing TEC temperature. Some performance parameters will change over tuning range. Contact RIO for additional information.
3. Tuning range is not symmetric around center wavelength, 20pm range is +7pm to -13pm as a minimum
4. With PM-fiber PANDA option. See ordering information page

## Linewidth Specifications

At recommended TEC set temperature  $T_s$  and bias current  $I_b$ ,

Parameter	Symbol	Conditions	Grade 1	Grade 3	Unit
Spectral Linewidth,	$\Delta\lambda_L$	FWHM <sup>1</sup>	$\leq 15$	$\leq 5$	kHz
Phase Noise	PN	Typical, @ 10 Hz	-	74	$\mu\text{rad}/\text{rt}(\text{Hz})\text{-m}$
		Typical, @ 200 Hz	-	13	

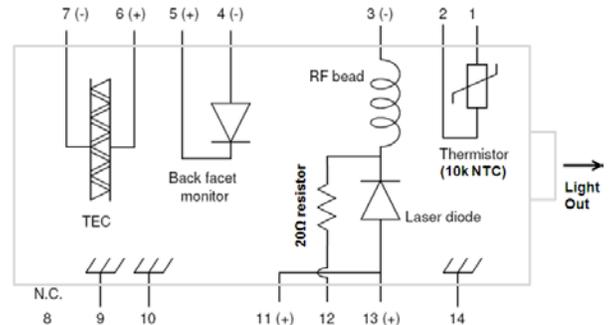
1. Values based on Lorentzian linewidth model.

## Thermal Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating temperature range (case)	$T_c$		+5		+50	°C
TEC current	$I_{TEC}$	$T_{CASE} = 50^{\circ}C, T_s$			0.8	A
TEC voltage	$V_{TEC}$	$T_{CASE} = 50^{\circ}C, T_s$			2.5	V
Thermistor resistance	$R_t$	At 25 °C		10		k $\Omega$
Constant of thermistor	$\beta$			3950		K
TEC power dissipation	$W_0$	$T_{CASE} = 5 \text{ to } 50^{\circ}C, T_s$		1.0	2.0	W

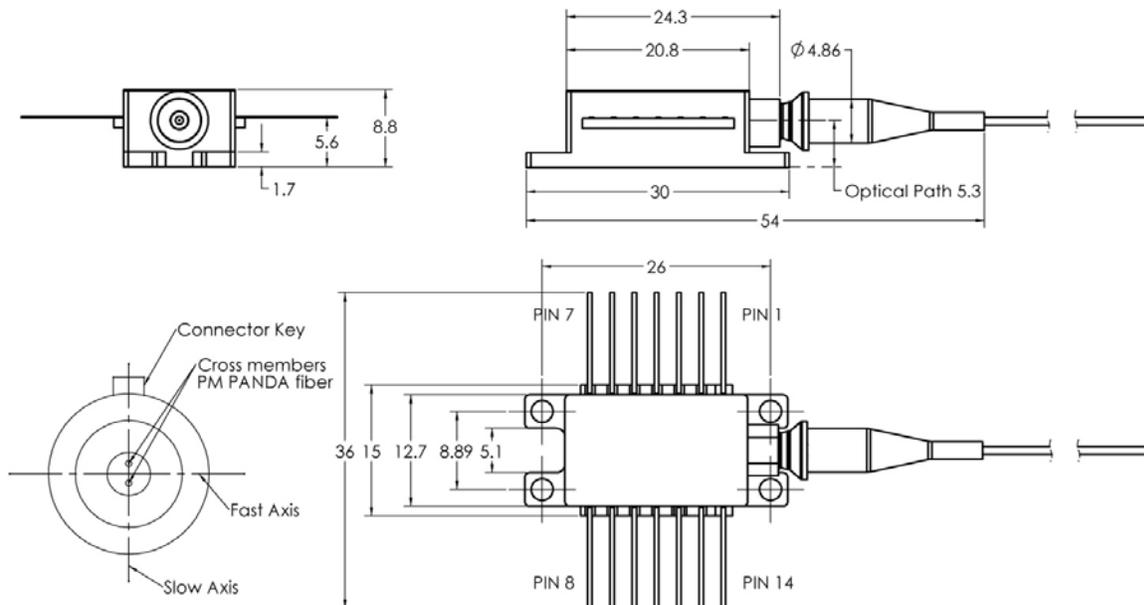
## Pin-Out and Electrical Diagram

Pin	Description	Pin	Description
1	Thermistor	8	Not connected
2	Thermistor	9	Package
3	Laser Cathode DC Bias (-)	10	Package
4	Photo Diode Anode (-)	11	Laser Anode (+)
5	Photo Diode Cathode (+)	12	Cathode (RF input)
6	TEC +	13	Laser Anode (+)
7	TEC -	14	Package



## Mechanical Diagram

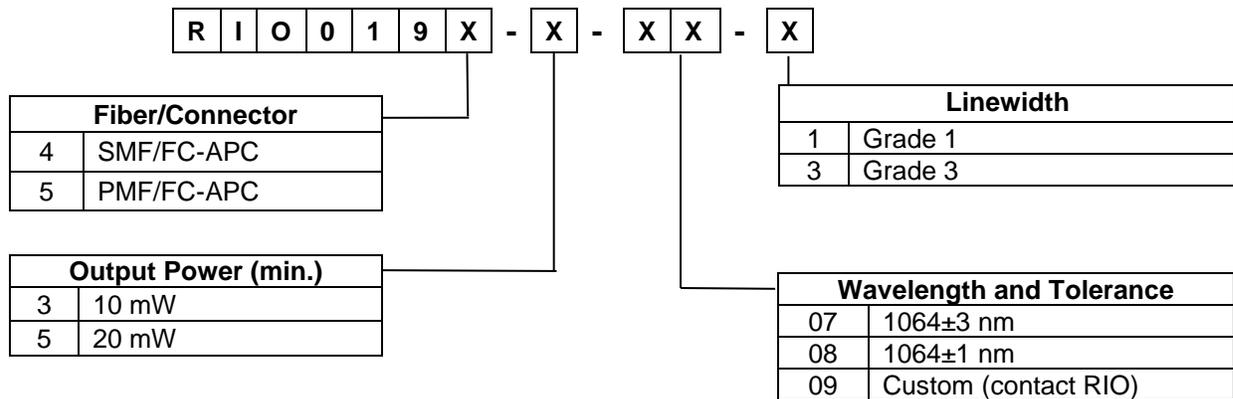
Units: mm



Pigtail options (FC/APC connector):

- HI 1060 SMF, 900  $\mu$ m loose tube, 1 m
- SM98 PMF PANDA, 900  $\mu$ m loose tube, 1m, key aligned to slow axis

## Ordering Information



## Laser Safety Information

The PLANEX laser is classified as FDA/CDRH Class IIIb laser products per CDRH, 21 CFR 1040 laser safety requirements, and complies as Class 3B laser product per international standard IEC 60825-1, 2014.

<div style="border: 1px solid black; border-radius: 50%; width: 100%; height: 100%; background-color: #ccc; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-weight: bold; font-size: 1.2em;">DANGER</span> </div> <p style="margin: 5px 0;"><b>INVISIBLE LASER RADIATION</b> AVOID DIRECT EXPOSURE TO BEAM</p> <div style="text-align: center; margin: 5px 0;"> <span style="display: inline-block; width: 100%; height: 2px; background-color: red; margin-top: 5px;"></span> </div> <p style="margin: 5px 0; font-size: 0.8em;">             OUTPUT POWER: 50 mW max              WAVELENGTH: 1.0 μm              BEAM DIVERGENCE AT FIBER              OUTPUT: 0.23 rad              CLASS IIIb LASER, CDRH, 21 CFR 1040              CLASS 3B LASER, IEC60825-1         </p>	<p style="text-align: center; font-weight: bold; font-size: 0.8em;">LASER APERTURE</p> <div style="text-align: center; margin: 5px 0;"> </div> <p style="text-align: center; margin: 5px 0; font-size: 0.8em;"> <b>AVOID EXPOSURE</b>              Invisible laser radiation is emitted from end of fiber or connector         </p>
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