# EYP-RWS-0780-00080-1500-TOV01-0000

Revision 0.50

2019-04-26

## SINGLE FREQUENCY LASER DIODES
## Stabilized Ridge Waveguide Laser

### General Product Information

| Product | Application |
|---|---|
| 780 nm Wavelength Stabilized Laser | Metrology |
| with hermetic 8-Pin TO Package (RoHS compliant) | Interferometry |
| including Monitor Diode, Thermoelectric Cooler and Thermistor | |

### Absolute Maximum Ratings

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Storage Temperature | $T_S$ | °C | -40 | | 85 | Stress in excess of one of the Absolute Maximum Ratings may damage the laser. Please note that a damaging optical power level may occur although the maximum current is not reached. These are stress ratings only, and functional operation at these or any other conditions beyond those indicated under Recommended Operational Conditions is not implied. |
| Operational Temperature at Case | $T_C$ | °C | -20 | | 75 | |
| Operational Temperature at Laser Chip | $T_{LD}$ | °C | 0 | | 50 | |
| Forward Current | $I_F$ | mA | | | 200 | |
| Reverse Voltage | $V_R$ | V | | | 2 | |
| Output Power | $P_{opt}$ | mW | | | 100 | |
| TEC Current | $I_{TEC}$ | A | | | 1.2 | |
| TEC Voltage | $V_{TEC}$ | V | | | 1.3 | |

### Recommended Operational Conditions

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Operational Temperature at Case | $T_{case}$ | °C | -20 | | 65 | |
| Operational Temperature at Laser Chip | $T_{LD}$ | °C | 15 | | 45 | measured by integrated Thermistor |
| Forward Current | $I_F$ | mA | | | 180 | |
| Output Power | $P_{opt}$ | mW | 20 | | 80 | |

### Characteristics at $T_{LD}$ = 25° C at BOL

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Center Wavelength | $\lambda_C$ | nm | 778 | 780 | 783 | |
| Selectable Linewidth | $\Delta\lambda$ | pm | | | 0.1 | single mode operation (see p. 4) |
| Overall Linewidth | $\Delta\lambda$ | nm | | | 0.2 | multi mode operation (see p. 4) |
| Temperature Coefficient of Wavelength | $d\lambda / dT$ | nm / K | | 0.06 | | |
| Current Coefficient of Wavelength | $d\lambda / dI$ | nm / mA | | 0.003 | | |
| Sidemode Supression Ratio | SMSR | dB | 30 | 45 | | under single mode condition |



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### Characteristics at $T_{LD}$ = 25° C at BOL cont'd

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Laser Current @ $P_{opt}$ = 80 mW | $I_{LD}$ | mA | | | 180 | |
| Slope Efficiency | $\eta$ | W / A | 0.6 | 0.8 | 1.1 | |
| Threshold Current | $I_{th}$ | mA | | | 70 | |
| Divergence parallel (FWHM) | $\Theta_{\parallel}$ | ° | | 8 | | parallel to Pin 1 - Pin 6 plane (see p. 3) |
| Divergence perpendicular (FWHM) | $\Theta_{\perp}$ | ° | | 21 | | perpendicular to Pin 1 - Pin 6 plane (see p. 3) |

### Monitor Diode

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Monitor Detector Responsivity | $I_{mon}$ / $P_{opt}$ | µA/mW | tbd | | tbd | $U_R$ = 5 V |

### Thermoelectric Cooler

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Current | $I_{TEC}$ | A | | tbd | | $P_{opt}$ = 80 mW, $\Delta T$ = 20 K |
| Voltage | $U_{TEC}$ | V | | tbd | | $P_{opt}$ = 80 mW, $\Delta T$ = 20 K |
| Power Dissipation (total loss at case) | $P_{loss}$ | W | | tbd | | $P_{opt}$ = 80 mW, $\Delta T$ = 20 K |
| Temperature Difference | $\Delta T$ | K | | | tbd | $P_{opt}$ = 80 mW, $\Delta T$ = \|Tcase - TLD\| |

### Thermistor (Standard NTC Type)

| Parameter | Symbol | Unit | min | typ | max | Measurement Conditions / Comments |
|---|---|---|---|---|---|---|
| Resistance | R | kΩ | | 10 | | $T_{LD}$ = 25° C |
| Beta Coefficient | $\beta$ | | | tbd | | $R_1 / R_2 = e^{\beta (1/T_1 - 1/T_2)}$ at $T_{LD}$ = 0° … 50° C |
| Steinhart & Hart Coefficient A | A | | | tbd | | $1/T = A + B(\ln R) + C(\ln R)^3$ |
| Steinhart & Hart Coefficient B | B | | | tbd | | T: temperature in Kelvin |
| Steinhart & Hart Coefficient C | C | | | tbd | | R: resistance at T in Ohm |

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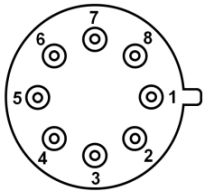
### Pin Assignment

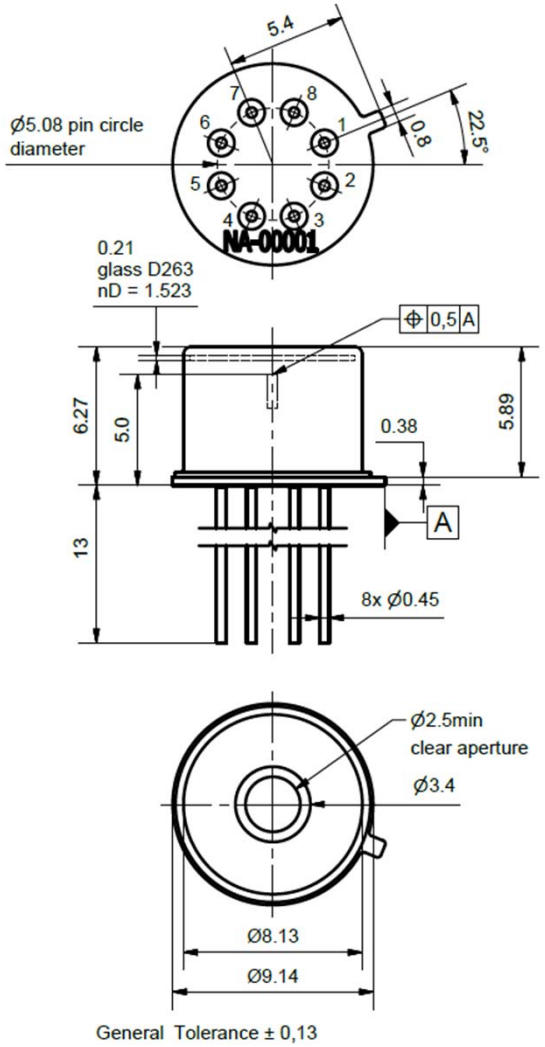
| | | | |
|---|---|---|---|
| 1 | Laser Diode Anode | 5 | Thermistor |
| 2 | Laser Diode Cathode | 6 | Thermistor |
| 3 | Thermoelectric Cooler (-) | 7 | Photo Diode Anode |
| 4 | Thermoelectric Cooler (+) | 8 | Photo Diode Cathode |

All 8 pins are isolated from case.




bottom view

### Package Drawings

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## SINGLE FREQUENCY LASER DIODES
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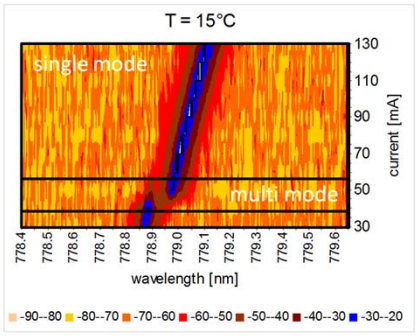
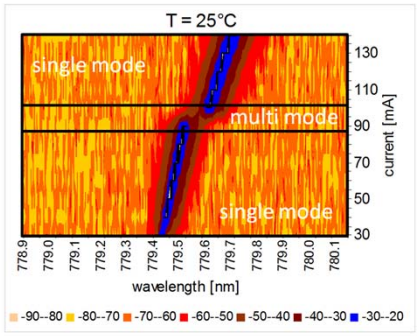
### Typical Measurement Results

Spectral maps at 15° C and 25° C




The spectral maps show the power spectral density at different operating modes. The graphs illustrate that the laser exhibits single and multi mode behavior under different operational conditions. The spectral maps may differ from part to part. Single mode operation can be achieved by selecting the appropriate laser current and temperature.

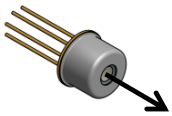
### Unpacking, Installation and Laser Safety

Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use. During device installation, ESD protection has to be maintained.

The RWS laser is sensitive against optical feedback, so an optical isolator may be required in order to avoid any disturbance of the emission spectrum. Operating at moderate temperatures on proper heat sinks will contribute to a long lifetime of the diode.

Avoid direct and/or indirect exposure to the free running beam. Collimating and focussing the free running beam with optics as common in optical instruments will increase threat to the human eye.

Performance figures, data and any illustrative material provided in this specification are typical and must be specifically confirmed in writing by eagleyard Photonics before they become applicable to any particular order or contract. In accordance with the eagleyard Photonics policy of continuous improvement specifications may change without notice.





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