

Laser Chips

**High Power Multi-Mode and Single Mode Laser Chips
Up to 7 Watt of CW Output Power
1305nm to 1650nm
Custom Wavelengths Available**

SemiNex delivers the highest available power at infrared wavelengths between 13xx and 17xx nm. When necessary we will further optimize the design of our InP laser chips to meet our customers' specific optical and electrical performance needs. Diodes, bars and packages are tested to meet customer and market performance demands. Typical results and packaging options are shown. Contact Frankfurt Laser Company for additional details or to discuss your specific requirements.

Features

- High Output Power
- High Dynamic Power Range
- High Efficiency



Applications

- Medical Lasers
- LIDAR
- Free Space Communications
- Targeting / Range Finding
- Military / Aerospace

Specifications Multi-Mode Laser Chips

| | Symbol | CHP-103 | CHP-132 | CHP-188 | CHP-105 | CHP-108 | CHP-113 | CHP-124 | CHP-190 | CHP-191 | Units |
|----------------------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------------|
| Optical | | | | | | | | | | | |
| Wavelength | λ_c | 1310 | 1320 | 1350 | 1470 | 1480 | 1532 | 1550 | 1625 | 1650 | nm (± 20) |
| Output Power* | P_o | 6.2 | 6.2 | 6.2 | 5.0 | 5 | 4.2 | 4.2 | 3.5 | 3.2 | watts |
| Chip Cavity Length | | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | μm (± 10) |
| Emitter Width | W | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | μm |
| Emitter Height | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | μm |
| Spectral Width | $\Delta\lambda$ | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | nm 3dB |
| Slope Efficiency | η_o | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.35 | 0.35 | 0.3 | 0.22 | W/A |
| Fast Axis Div. | θ_{perp} | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | deg FWHM |
| Slow Axis Div. | θ_{parallel} | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | deg FWHM |
| Electrical | | | | | | | | | | | |
| Power conversion Eff | η | 0.27 | 0.27 | 0.27 | 0.21 | 0.21 | 0.18 | 0.18 | 0.15 | 0.13 | |
| Threshold Current | I_{th} | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | A |
| Operating Current | I_{op} | 16 | 16 | 16 | 14 | 14 | 14 | 14 | 14 | 14 | A |
| Operating Voltage | V_{op} | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | V |
| Series Resistance | R_s | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | ohm |
| Mechanical | | | | | | | | | | | |
| Weight | | | | | | | | | | | <0.01 g |
| Operating Temp. | | | | | | | | | | | 10 to 30 °C |
| Storage Temp. | | | | | | | | | | | -20 to 80 °C |

Specified values are rated at a constant heat sink temperature of 20°C

| | Symbol | CHP-106 | CHP-107 | CHP-162 | CHP-121 | CHP-123 | Units |
|----------------------|----------------------------|---------|---------|---------|---------|---------|----------------------------|
| Optical | | | | | | | |
| Wavelength | λ_c | 1475 | 1488 | 1540 | 1550 | 1568 | nm (± 20) |
| Output Power* | P_o | 3.7 | 7.0 | 5.6 | 2.5 | 5.6 | watts |
| Chip Cavity Length | | 1500 | 2500 | 2500 | 1500 | 2500 | μm (± 10) |
| Emitter Width | W | 95 | 180 | 180 | 95 | 180 | μm |
| Emitter Height | H | 1 | 1 | 1 | 1 | 1 | μm |
| Spectral Width | $\Delta\lambda$ | 15 | 15 | 15 | 15 | 15 | nm 3dB |
| Slope Efficiency | η_o | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | W/A |
| Fast Axis Div. | θ_{perp} | 28 | 28 | 28 | 28 | 28 | deg FWHM |
| Slow Axis Div. | θ_{parallel} | 9 | 9 | 9 | 9 | 9 | deg FWHM |
| Electrical | | | | | | | |
| Power conversion Eff | η | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 | |
| Threshold Current | I_{th} | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | A |
| Operating Current | I_{op} | 14 | 14 | 14 | 14 | 14 | A |
| Operating Voltage | V_{op} | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | V |
| Series Resistance | R_s | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | ohm |
| Mechanical | | | | | | | |
| Weight | | | | | | | <0.01 g |
| Operating Temp. | | | | | | | 10 to 30 °C |
| Storage Temp. | | | | | | | -20 to 80 °C |

Specified values are rated at a constant heat sink temperature of 20°C

Specifications Single Mode Laser Chips

| | Symbol | CHP-156 | CHP-131 | CHP-176 | CHP-179 | CHP-115 | CHP-144 | CHP-127 | CHP-155 | Units |
|-----------------------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------------|
| Optical | | | | | | | | | | |
| Wavelength | λ_c | 1305 | 1310 | 1315 | 1550 | 1550 | 1625 | 1630 | 1650 | nm (± 20) |
| Power | P_o | 720 | 590 | 590 | 400 | 400 | 300 | 300 | 450 | mW |
| Emitter Width | W | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | μm (± 10) |
| Emitter Height | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | μm (nom) |
| Cavity Length | L | 1.5 | 1.25 | 1.25 | 1.5 | 1.25 | 1.25 | 1.25 | 1.25 | mm |
| Spectral Width | $\Delta\lambda$ | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | nm 3dB |
| Slope Efficiency | η_o | 0.5 | 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.35 | W/A |
| Fast Axis Div. | θ_{perp} | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | deg FWHM* |
| Slow Axis Div. | θ_{parallel} | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | deg FWHM* |
| Electrical | | | | | | | | | | |
| Power Conversion Eff. | η | 29 | 14 | 14 | 14 | 11 | 9 | 9 | 9 | Min* |
| Threshold Current | I_{th} | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | mA* |
| Operating Current | I_{op} | 1.3 | 1.2 | 1.2 | 1.2 | 1.8 | 1.6 | 1.6 | 1.6 | A* |
| Operating Voltage | V_{op} | 2.6 | 3.6 | 3.6 | 3.6 | 2.7 | 2.7 | 2.7 | 2.7 | V* |
| Series Resistance | R_s | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | ohm* |
| Mechanical | | | | | | | | | | |
| Weight | | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | g |
| Operating Temp. | | 10 to 30 | 10 to 30 | 10 to 30 | 10 to 30 | 10 to 30 | 10 to 30 | 10 to 30 | 10 to 30 | $^{\circ}\text{C}$ |
| Storage Temp. | | -20 to 80 | -20 to 80 | -20 to 80 | -20 to 80 | -20 to 80 | -20 to 80 | -20 to 80 | -20 to 80 | $^{\circ}\text{C}$ |

*CW As measured on a C-Mount with Indium solder
Specified values are rated at a constant heat sink temperature of 20 $^{\circ}\text{C}$

Specifications Single Mode Laser Chips Long Cavity

| | Symbol | CHP-177 | CHP-194 | CHP-122 | CHP-184 | CHP-128 | Units |
|-----------------------|----------------------------|---------|---------|-----------|---------|---------|----------------------------|
| Optical | | | | | | | |
| Wavelength | λ_c | 1320 | 1532 | 1555 | 1630 | 1650 | nm (± 20) |
| Power* | P_o | 800 | 600 | 600 | 450 | 450 | mW |
| Emitter Width | W | 5 | 4 | 4 | 4 | 4 | μm (± 10) |
| Emitter Height | H | 1 | 1 | 1 | 1 | 1 | μm (nom) |
| Cavity Length | L | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | mm |
| Spectral Width | $\Delta\lambda$ | 15 | 15 | 15 | 15 | 15 | nm 3dB |
| Slope Efficiency | η_o | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | W/A |
| Fast Axis Div. | θ_{perp} | 30 | 30 | 30 | 30 | 30 | deg FWHM* |
| Slow Axis Div. | θ_{parallel} | 13 | 13 | 13 | 13 | 13 | deg FWHM* |
| Electrical | | | | | | | |
| Power Conversion Eff. | η | 14 | 14 | 14 | 14 | 14 | Min* |
| Threshold Current | I_{th} | 50 | 50 | 50 | 50 | 50 | A* |
| Operating Current | I_{op} | 1.8 | 1.8 | 1.8 | 1.6 | 1.6 | A* |
| Operating Voltage | V_{op} | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | V* |
| Series Resistance | R_s | 1 | 1 | 1 | 1 | 1 | ohm* |
| Mechanical | | | | | | | |
| Weight | | | | <0.01 | | | g |
| Operating Temp. | | | | 10 to 30 | | | $^{\circ}\text{C}$ |
| Storage Temp. | | | | -20 to 80 | | | $^{\circ}\text{C}$ |

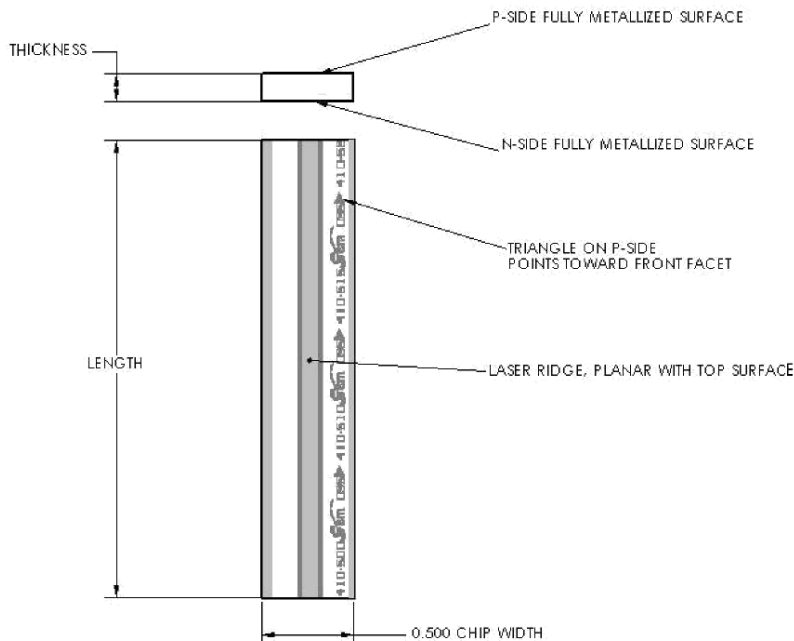
*CW As measured on a C-Mount with Indium solder
Specified values are rated at a constant heat sink temperature of 20 $^{\circ}\text{C}$

Specifications Pulsed Laser Chips

| | Symbol | CHP-148 | CHP-149 | CHP-125 | CHP-150 | CHP-152 | CHP-151 | Units |
|-----------------------|--------------------------|--|---------|----------------|---------|------------|---------|--------------------|
| Parameters | | | | | | | | |
| Output Power* | P_o | 9.0 | 16.0 | 15.0 | 25.0 | 20.0 | 30.0 | watts |
| Cavity Length | CL | 2500 | 2500 | 1250 | 2500 | 1250 | 2500 | μm |
| Emitter Width | W | 50 | 95 | 180 | 180 | 350 | 350 | μm |
| Emitter Height | H | 1 | 1 | 1 | 1 | 1 | 1 | μm |
| Operating Current | I_{op} | 40 | 50 | 35 | 100 | 50 | 100 | A |
| Threshold Current | I_{th} | 0.5 | 1.0 | 1.0 | 2.0 | 2.0 | 2.5 | A |
| Operating Voltage | V_{op} | <i>Depends on packing type and pulse conditions - expect 3.0 to 8.0 volts.</i> | | | | | | V |
| Specifications | | Min | | Typical | | Max | | |
| Peak Wavelength | λ_c | 1530 | | 1550 | | 1580 | | nm (± 20) |
| Spectral Width | $\Delta\lambda$ | 15 | | | | 20 | | nm 3dB |
| Temperature Coeff. | $\Delta\lambda/\Delta T$ | | | 0.55 | | | | nm/C |
| Fast Axis Diverg. | θ_{perp} | | | 30 | | | | deg FWHM |
| Slow Axis Diverg. | $\theta_{parallel}$ | | | 10 | | | | deg FWHM |
| Pulse Width | PW | | | 150 | | | | ns |
| Duty Cycle | DC | | | 0.1 | | | | % |
| Mechanical | | | | | | | | |
| Weight | | | | <0.01 | | | | g |
| Operating Temp. | | | | 10 to 30 | | | | $^{\circ}\text{C}$ |
| Storage Temp. | | | | -20 to 80 | | | | $^{\circ}\text{C}$ |

*Pulsed as measured on a C-Mount with Indium solder - P-Side Down
Specified values are rated at a constant heat sink temperature of 20°C

Packaging



| CHIP ATTRIBUTES | |
|-----------------|--------------------------------------|
| APERTURE WIDTH | $\pm 3\mu$ |
| CHIP WIDTH | 500 μm $\pm 3\mu\text{m}$ |
| THICKNESS | 160 μm $\pm 3\mu\text{m}$ |
| CAVITY LENGTH | $\pm 3\mu\text{m}$ |

| P METALLIZATION | | |
|-----------------|----------------|-----------|
| MATERIAL | THICKNESS (nm) | TOLERANCE |
| Ti | 50 | ± 10 |
| Pt | 125 | ± 25 |
| Av | 250 | ± 50 |

| N METALLIZATION | | |
|-----------------|----------------|-----------|
| MATERIAL | THICKNESS (nm) | TOLERANCE |
| Ti | 30 | ± 10 |
| Pt | 125 | ± 25 |
| Av | 400 | ± 40 |

Typical Performance

