

Actively Cooled Diode Laser Stack, qcw

SPL QNxx No Optics

SPL QYxx Fast-Axis Collimation



Preliminary Data

Features

- Uncollimated (QN-series) or fast-axis collimated radiation (QY-series)
- Modular stack of 1 cm bars actively cooled, for qcw operation
- Highly reliable strained layer InGa(Al)As/GaAs material with MTTF > 10000 h
- Low thermal resistance using mini coolers
- Flexible stack design, integration of up to 60 bars
- Optional alternative bar-to-bar spacing values available
- Bar replacement capability for repair / upgrade
- Low smile (< 1 μm), and low mechanical tolerances
- Coolant inlet/outlet at bottom/side
- Extendable to two-dimensional stacks, TN, TY resp.

Applications

- Pumping of solid state lasers (Nd: YAG, Yb: YAG, ...)
- Direct industrial applications (soldering, surface treatment, marking, ...)
- Heating, illumination
- Medical and printing applications

Safety Advices

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 "Safety of laser products".

Type	Wavelength ¹⁾	Ordering Code
SPL QN81	808 nm	on request
SPL QN94	940 nm	on request
SPL QN98	975 nm	on request
SPL QY81	808 nm	on request
SPL QY94	940 nm	on request
SPL QY98	975 nm	on request

¹⁾ Other wavelengths in the range of 780 nm ... 980 nm are available on request.

Maximum Ratings ($T_A = 20\text{ °C}$ mount temperature)

Parameter	Symbol	Values		Unit
		min.	max.	
Number of bars	n	2	60	–
Output power (quasi continuous-wave) per bar ¹⁾ ($t_p \leq 150\text{ }\mu\text{s}$, duty cycle $\leq 1\%$)	P_{qcw}	80	120	W
Operating temperature ²⁾	T_{op}	– 10	+ 60	°C
Storage temperature ²⁾	T_{stg}	– 40	+ 85	°C
Max. coolant pressure	P_{max}	–	5	bar

¹⁾ Optical power is measured by coupling into an integrating sphere.

²⁾ Condensation must be avoided.

Diode Characteristics ($T_A = 20\text{ °C}$ mount temperature)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Output power, qcw per bar ¹⁾	P_{op}	—	100	120	W
Emission wavelength ²⁾	λ_{peak}	— — —	808 940 975	— — —	nm
Spectral width (FWHM) ²⁾	$\Delta\lambda$	—	4	—	nm
Threshold current, qcw-type	$I_{th, qcw}$	—	22	24	A
808 nm		—	15	16	
940 nm		—	13	15	
Differential efficiency ¹⁾	$\Delta P / \Delta I$	—	1.1	—	W/A
808 nm		—	0.9	—	
940 nm		—	0.9	—	
975 nm					
Fast-axis collimation efficiency into beam divergence	QY-series η_{col}	—	93	—	%
Operating current, qcw-type ²⁾	$I_{op, qcw}$	—	120	—	A
Operating voltage (per bar) ¹⁾²⁾	V_{op}	—	1.8	—	V
Overall efficiency	QN-Series η	40	45	—	%
Beam divergence (half angle) ³⁾⁴⁾	QN-Series $\theta_{\perp} \times \theta_{\parallel}$ QY-Series	—	$30^{\circ} \times 5^{\circ}$	—	deg.
		—	$0.5 \times 5^{\circ}$	—	
Thermal resistance	R_{th}	—	0.5	—	K/W
Temperature coefficient of operating current ¹⁾	$\Delta I_{op} / I_{op} \Delta T$	—	0.5	—	%/K
Temperature coefficient of wavelength ¹⁾	$\Delta\lambda / \Delta T$	—	0.27	—	nm/K
Coolant flow rate (per bar)	dV/dT	0.35	0.5	—	l/min
Pressure drop ⁴⁾	ΔP	—	1.5	—	bar

¹⁾ Depending on emission wavelength.

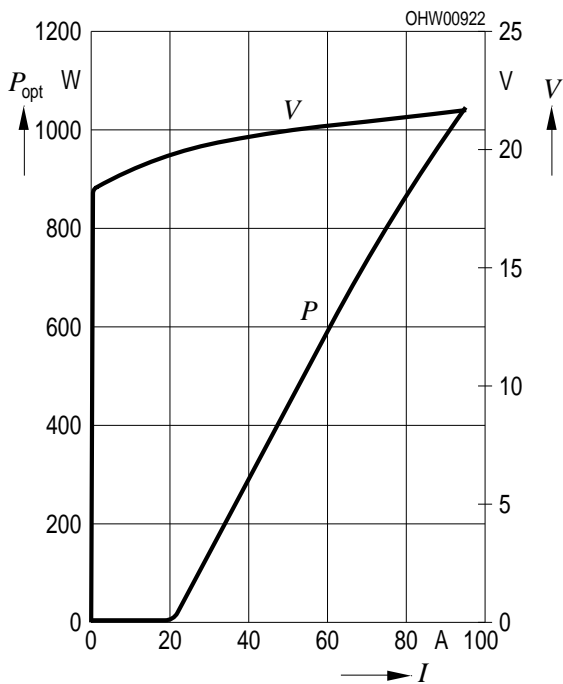
²⁾ Standard operating conditions refer to 100 W qcw optical output power at 20 °C. Optical power measurements refer to an integrating sphere.

³⁾ Far field divergence refers to half angle at $1/e^2$ relative intensity.

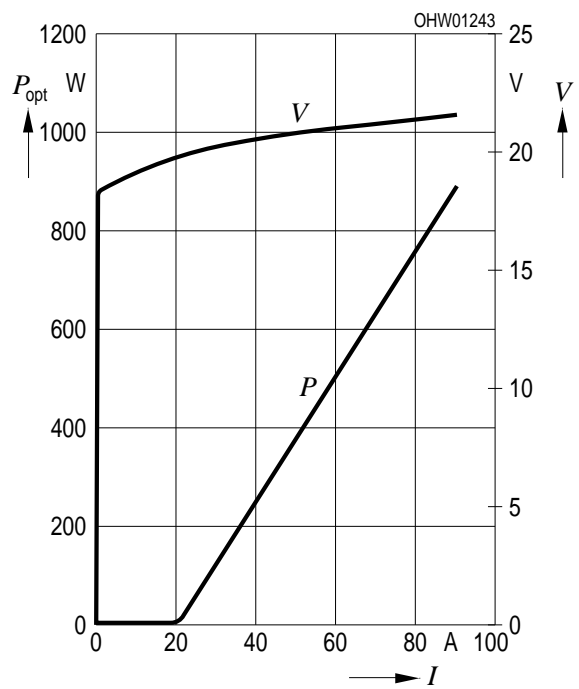
⁴⁾ Depending on number of bars.

Optical Characteristics ($T_A = 20\text{ }^{\circ}\text{C}$ mount temperature)

Radiant Power P_{opt} vs. I_F
qcw-device, 12 bars, SPL QNxx

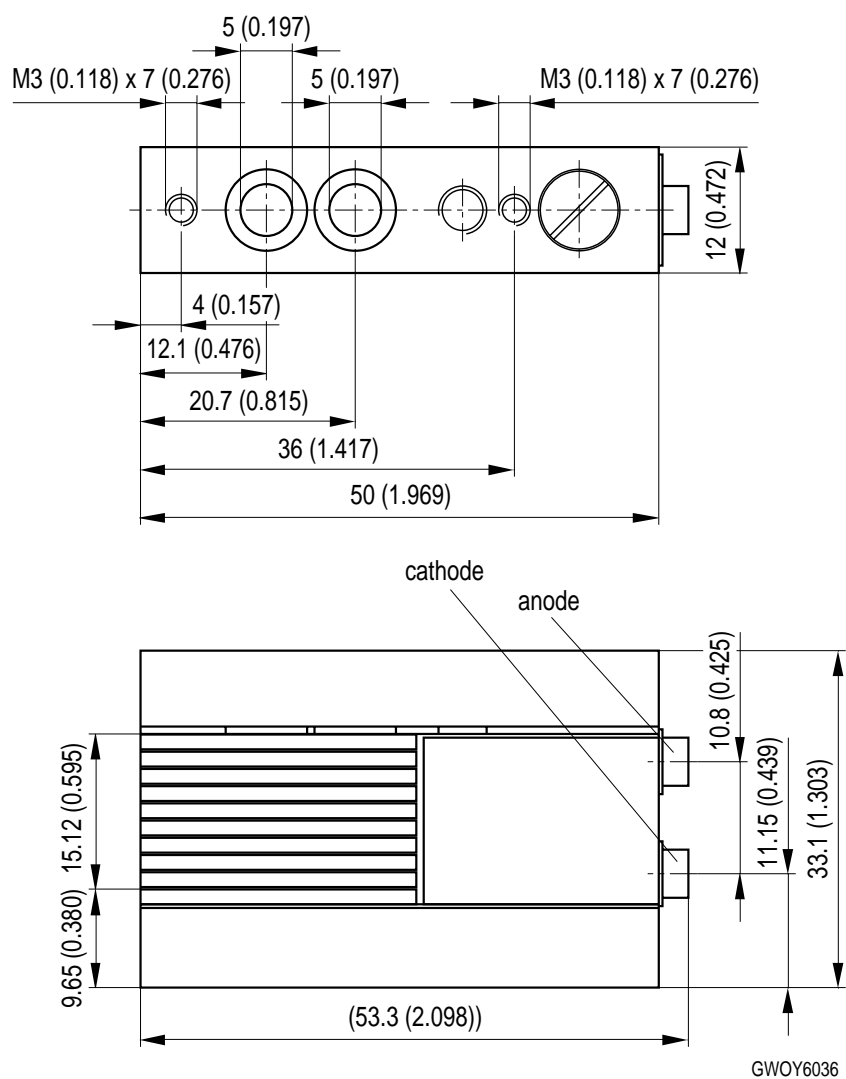


Radiant Power P_{opt} vs. I_F
qcw-device, 12 bars, SPL QYxx



Package Outlines

SPL QNxx



Dimensions are specified as follows: mm (inch).



For safety, unpacking, handling, mounting and operating issues, please carefully read our “**Notes For Operation II**”.