

laser diode bars G-stack : FAC lens assembly

The distance between the bars within a G-type stack of laser diode bars or “pitch”, is typically between 0.4 and 1.8 mm. This pitch is only nominal value of the average diode laser bar spacings and by no means a constant precise value. Typically, the tolerance on bar spacing is about 50 μm .

The term pitch somehow implies the parallelism of the bars, but the measurements reveal that this is not the case. Therefore, making cylindrical lens array for the fast axis collimation with constant pitch and good parallelism between the lenses might not be the best solution after all. The mismatch between the real-world laser diode bar stack and the cylindrical lens array with parallel lenses and constant pitch would lead to increased overall beam divergence.

To solve this problem, Doric Lenses Inc. has developed a procedure of making FAC lens arrays that match 3D geometry of specific laser diode bar stack. The pattern of emitters that makes up the laser diode bar stack is measured and digitized data is used to fabricate corresponding lens holder. Typically, we use standard **doric™ gradient-index cylindrical lenses** to populate the lens array holder as they are least sensitive to lateral misalignment and focusing errors, but other **doric™ acylindrical FAC lenses** could be used as well. The irregularities in the geometry of the laser diode stack are replicated within the fast axis lens array, and consequently, the mismatch between the stack and lens array is significantly reduced. With this new technology, initially developed for space applications, it is possible to align each fast axis collimating lens with corresponding diode bar position in a single step. The holder is designed to be glued on the stack, or to be bolted to the heatsink. Material of the holder is selected to match thermal expansion of the heatsink material and therefore to provide passive athermal collimation.

Our FAC lens array assembly is designed to be used in combination with an optional laser machined phaseplate that will correct minor residual phase distortion present after collimation, and then achieve diffraction-limited performances.

WEBCODE:		D162-xxx
DRAWING		
 		
SPECIFICATIONS	SYMBOL	VALUE
Operation Wavelength	λ_0	400 – 1600 nm
Diode bars stack package		G type
Number of bars	N	up to 25
Pitch between bars	p	0.4 to 2.0 mm
Lens position accuracy	Δ	maximum < 10 microns in x, y, z typical value < 5 microns in x, y, z
Overall divergence (FAC only)	DIV	< 50 mrad (3 degree) *full angle containing 90% of power
Overall divergence (FAC + phase correction)	DIV	< 5 mrad *full angle containing 90% of power
All specifications are customized upon request contact us for more details		