

FD4 SERIES LENSES **for OSRAM GOLDEN DRAGON™ LEDs**

- **High efficiency**
- **Available in medium beam**
- **Suitable for MR 16 applications**
- **Patent Pending**

The FD4 Low Profile Quad-lens module is available for Golden dragon LEDs from Osram Optosemiconductor.

The high collection efficiency reaches 85% of the total flux emitted from the LED.

The Quad-lens is a single part, made in PMMA optical grade material, incorporating four optical elements. The design allows easy handling and mechanical fixation, while maintaining high optical efficiency.

Typical applications are:

- Reading lamps
- Signs
- Architectural Lighting
- Street Lights
- Most application where uniformity and high intensity over a wide angle is required



- (1) Golden Dragon is a trademark of Osram OptoSemiconductor. For technical specification on LEDs please refer to the Golden dragon datasheet or visit www.osram-os.com
- (2) Typical beam divergence may change with different color LEDs.

For ordering instructions, please contact

FRAEN CORPORATION

Scott M. Grzenda
80 Newcrossing Road
Reading MA 01867
Phone: 781.205.5300
Fax: 781.942.2426
optics@fraen.com

FRAEN Srl

Dimitri De Gaetano
Via Stelvio, 12
20090 Settimo M (MI) – Italy
Phone: +39-02-335.456.225
Fax: +39 02-335.456.239
info@fraen.com

To find a local distributor, check the Fraen website



General Characteristics

Lens Material	Optical Grade PMMA
Holder Material	PC ABS
Operating Temperature range	-40 deg C / + 80 deg C
Storage Temperature range	-40 deg C / + 80 deg C

Average transmittance in visible spectrum (400 – 700nm) >90%, as measured using 3mm thick Optical Grade PMMA.





Please note that flow lines and weld lines on the external surfaces of the lenses are acceptable if the optical performance of the lens is within the specification described in the section “OPTICAL CHARACTERISTICS”

IMPORTANT NOTE – Lenses handling and cleaning:





Handling: Always use gloves to handle lenses and/or handle the lenses only by the flange. Never touch the outside surfaces of the lenses with fingers; finger oils and contamination will absorb or refract light.

Cleaning: Clean lenses only if necessary. Use only soap and water to clean the surfaces and lenses. Never expose the lenses to alcohol, as it will damage the plastic.

Optical Characteristics

		Typical beam total divergence (degrees)			
Lens Part Number	Type of lens	Blue, green Dragon 	Yellow, amber, red Dragon 	White Dragon Nota 	White ThinGaN Gragon 
FD4-M1-D01-0	Medium beam	17.0	20.0	22.0	22.0

The typical total divergence is the full angle measured where the luminous intensity is half of the peak value. The typical divergence may change with different color LEDs due to different chip size and chip position tolerance.

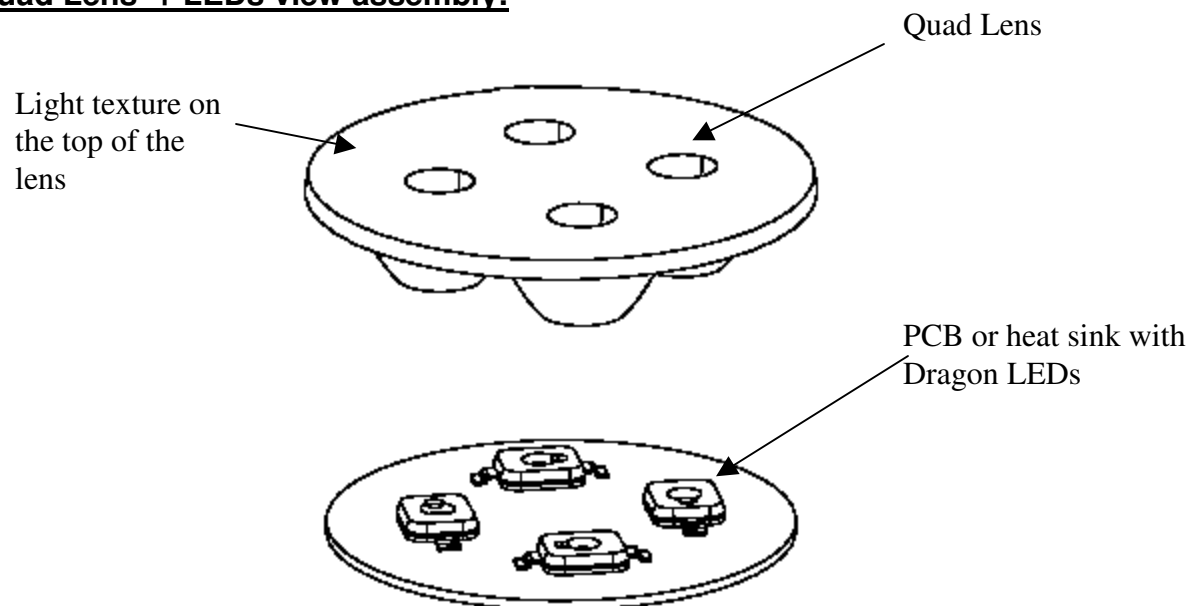
		Typical on axis efficiency (cd/lm)			
Lens Part Number	Type of lens	Blue, green Dragon 	Yellow, amber, red Dragon 	White Dragon Nota 	White ThinGaN Dragon 
FD4-M1-D01-0	Medium beam	4.9	6.4	3.3	5.6

To calculate the on axis intensity, multiply the on axis efficiency of the lens (cd/lm) by the total flux of the Dragon LEDs you use. For more detail on flux binning please check the datasheet of the Golden Dragon LEDs by Osram OS.

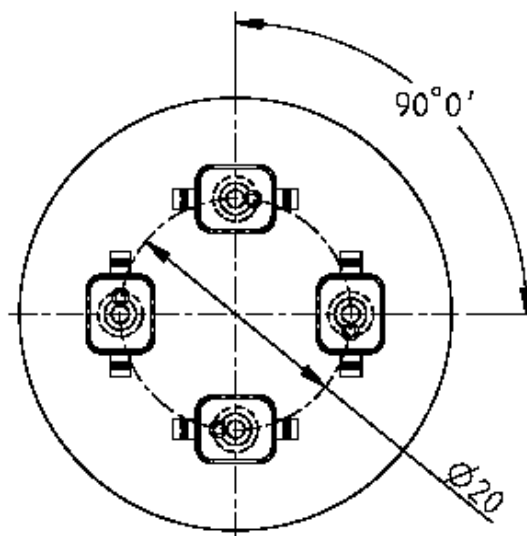
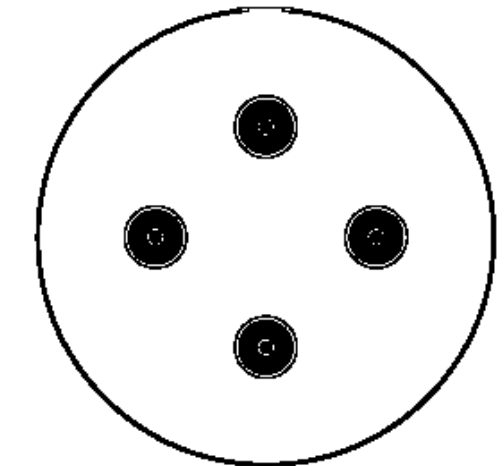
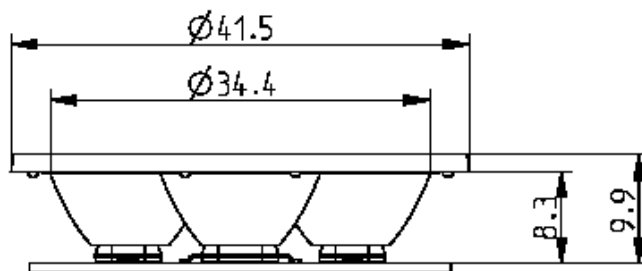
Mechanical Characteristics

For best optical performance (shown above), correct mechanical position of the lens on the LED is critical. To achieve correct lens position on the PCB review the following assembly dimensions and orientation.

Quad Lens + LEDs view assembly:



Lens assembly on LEDs, dimensions on PCB board:



PCB with Dragon
LEDs positions

tolerances: $\pm 0.2\text{mm}$



Ordering part number

FD4-M1-D01-0

Published by Fraen Corporation.

All technical data contained in this document are properties of Fraen Corporation and may change without notice.

Document Revision Record

Rev	Date	Author	Description
00	08-21-2006	S.A.H.	Initial Release
01	08-31-2006	S.A.H.	Added Technical Data