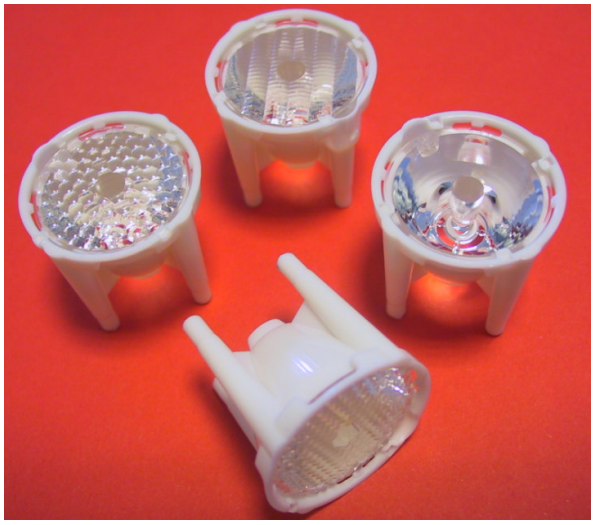
FSG SERIES LENSES
for SEOUL SEMICONDUCTOR Z-POWER P3™ LEDs

- **High efficiency**
- **Available in 4 different beams**
- **Patent Pending**



The FSG series offers a complete range of lenses especially designed for the Seoul Semiconductor LED : Z-Power P3 ™.
www.seoulsemiconductor.com

A software-optimized aspheric profile combined with front shaped micro-lens arrays enable the generation of four different lens models: narrow beam, medium beam, wide beam, and elliptical pattern (2).

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

Each of these lenses is available assembled with Fraen's Lens Holder. The holder assures the proper relative placement between the lens and the Z-Power (P3 series) ™ LED. Heat staking the four legs of the holder to the customer's PCB or heat sink provides excellent optical and mechanical assembly (see Fraen Application Note FAN01-EN (at www.fraensrl.com).

Typical applications are:

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

(1) Z-Power is a trademark of Seoul Semiconductor. For technical specification on LEDs please refer to the Z-Power datasheet or visit www.seoulsemiconductor.com
(2) Typical beam divergence may change with different color LEDs.

For ordering instructions, please contact

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To find a local distributor, check the Fraen website.

Website: www.fraensrl.com

General Characteristics

Lens Material	Optical Grade PMMA
Holder Material	Transparent PC
Operating Temperature range	-40deg C / + 80 deg C
Storage Temperature range	-40deg 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 Total Divergence * (deg)			
Lens Part Number	Type of lens	Blue LEDs	Green LEDs	Red LEDs	White LEDs
FSG-HNB1-SSP3-z	Narrow beam	10.0	10.0	9.5	13.0
FSG-HMB1-SSP3-z	Medium beam	22.0	21.5	21.0	22.5
FSG-HWB1-SSP3-z	Wide beam	47.0	46.5	45.5	44.5
FSG-HEB1-SSP3-z	Elliptical beam	**22.0 * 12.0**	**22.0 * 12.0**	**21.0 * 11.0**	**22.0 * 12.0**

Typical total divergence is the full angle measured where luminous intensity is half of peak intensity value. Typical divergence varies with LED color due to different chip size and chip position tolerance.

		Typical on-axis Efficiency (cd/lm)			
Lens Part Number	Type of lens	Blue LEDs (14.2 lm)	Green LEDs (60.2 lm)	Red LEDs (41.9 lm)	White LEDs (45.4 lm)
FSG-HNB1-SSP3-z	Narrow beam	12.8	18.9	14.4	12.7
FSG-HMB1-SSP3-z	Medium beam	2.8	4.4	2.9	3.9
FSG-HWB1-SSP3-z	Wide beam	0.8	1.3	0.8	1.4
FSG-HEB1-SSP3-z	Elliptical beam	5.7	8.6	5.8	6.2

To calculate on-axis intensity, multiply on-axis efficiency of lens (cd/lm) by the total flux of the Z-Power LED used. For more detail on flux binning please check the Z-Power LED datasheet at http://www.seoulsemiconductor.com/
Luminous intensity depends on the flux binning and tolerances of the LEDs. Please refer to the LEDs datasheet for more details on flux binning and mechanical tolerances.

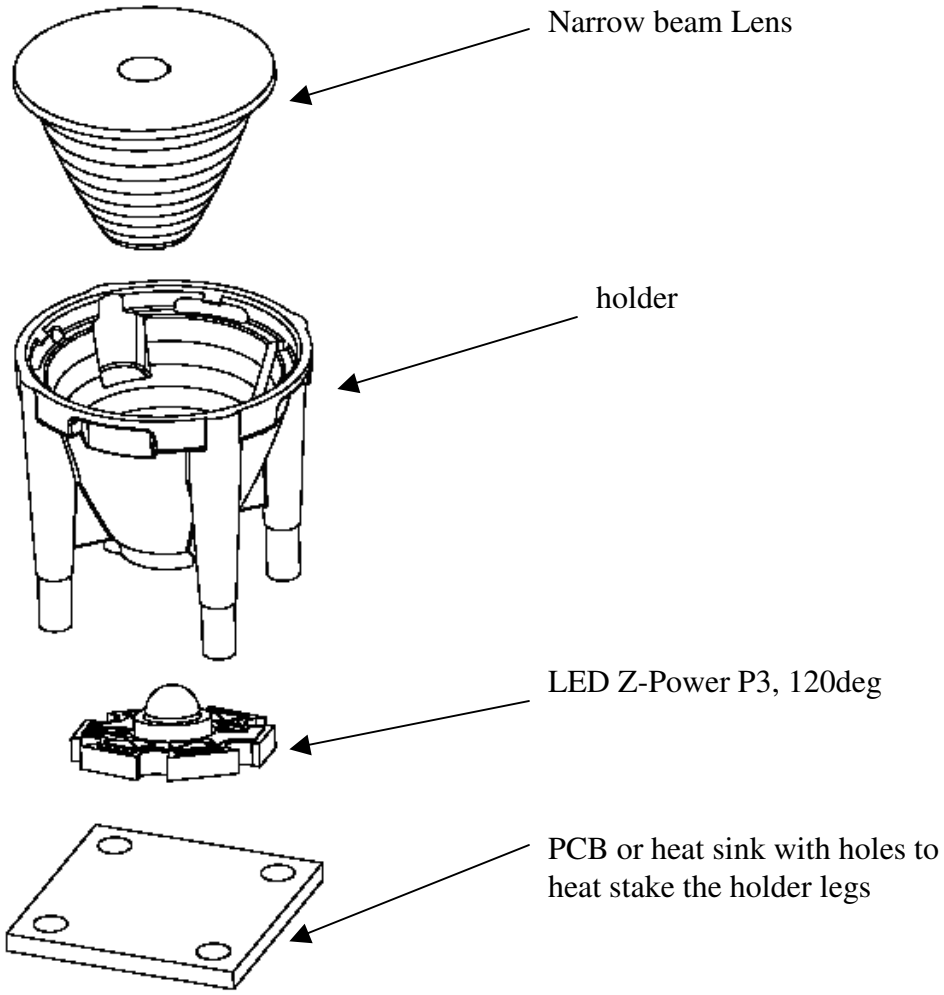
Mechanical Characteristics

IMPORTANT - Assembly information:

For best optical performance (shown above), correct mechanical position of the lens on the LED is critical.

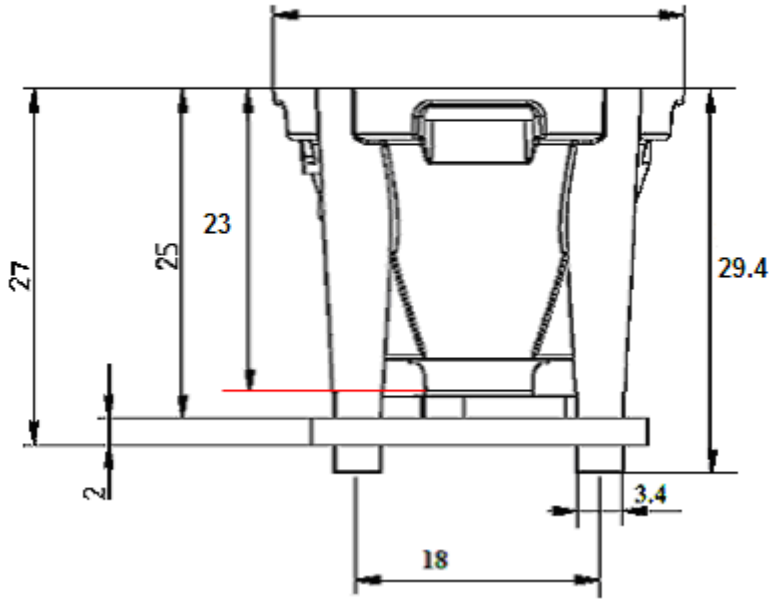
To achieve correct lens position on the LED, the lens must be used either a holder, or spacer ring

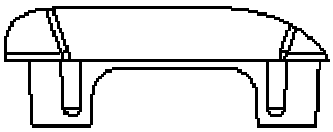
Lens + holder assembly view:



Lens + holder assembly dimensions :

with standard holder = 30,5mm
with MR11 holder = 34,9mm



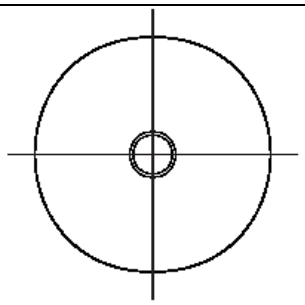
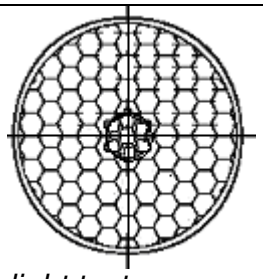
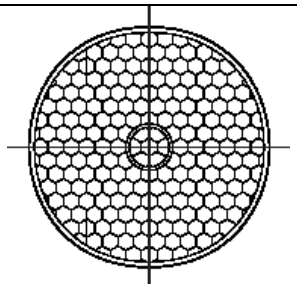
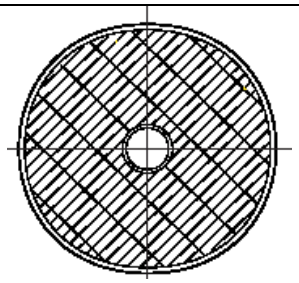


Detail of bottom level of the holder

Dimensions tolerance is +/-0.2mm

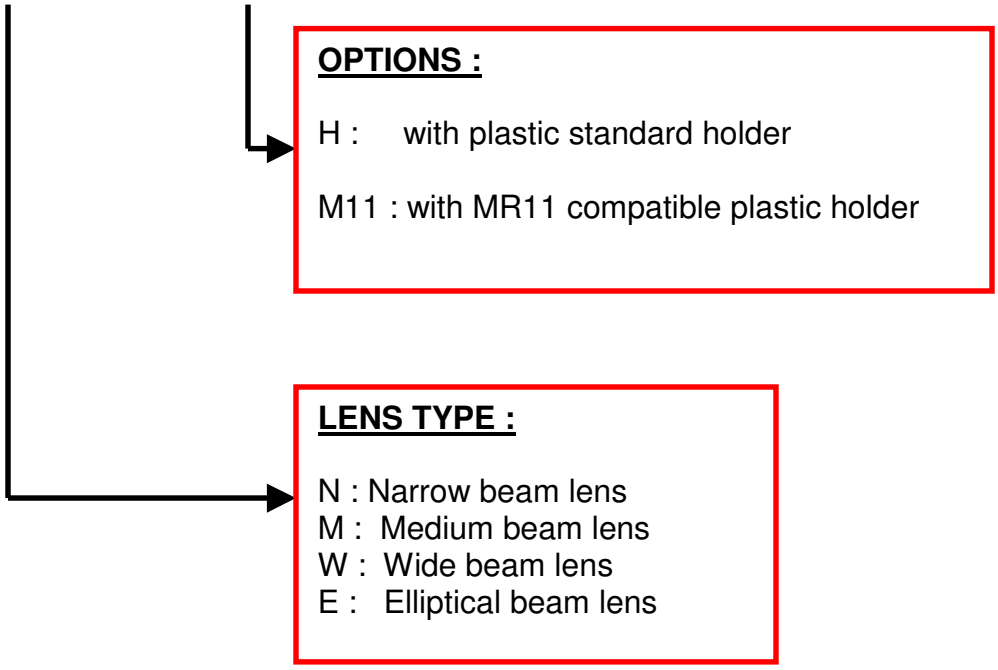
The outside mechanical dimensions of all the lenses (Narrow, Medium, Wide and Elliptical beam) are the same for the different beams, except the top of the lens.

The lenses can be identified by their **top view**:

Narrow Beam lens: FSG-HNB1-SSP3-z	Medium Beam lens: FSG-HMB1-SSP3-z	Wide beam lens: FSG-HWB1-SSP3-z	Elliptical lens: FSG-HEB1-SSP3-z
	 *light texture on microlens*		
Flat surface	2.6mm hexagonal shaped microlens array	1.7mm hexagonal shaped microlens array	1.0 x 3.7mm rectangular shaped microlens array

Ordering part numbers

FSG-HxB1-SSP3-z



Document Revision Record

Rev	Date	Author	Description
00	08-21-06	S.A.H.	Initial Release
01	08-23-06	S.A.H.	Lens Data added