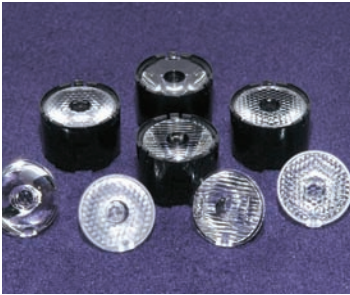




## Innovative Optical Solutions for Maximizing Light

Fraen Corporation's Optical Manufacturing Group (Fraen OMG) develops, designs, and manufactures optical solutions for high-powered LEDs. Fraen is a leading provider of both standard off-the-shelf optical solutions as well as complex, custom-developed systems for our customers.



### Features ▶

- High-efficiency TIR and reflector solutions
- Wide variety of optic types, beam patterns, and sizes for the leading high-powered LEDs
- Illumination data available for luminaire development
- Range of optic mounting features available
- Design methodology allows for customization

### Benefits ▶

- Specialization in custom solutions for complex lighting requirements
- Global manufacturing and sales support
- Refined design and development process
- Prototyping and pre-production capabilities

### Applications ▶

- Architectural lighting
- Street lights
- Portable lighting
- Emergency lighting
- General illumination (MR11, MR16, and downlights)

## Product Specifications ▶

Part Number	Type	LED Type	Distribution Type	Material Type	Distribution Angle (°)	Attachment Method	Optical Holder (V/N)	Max. Operating Temp. (°C)	Markets
FC-N2-XR79-ZZ	Secondary	Cree XR-E 7090 LED	Narrow beam	Optical grade PMMA	8	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FC-M2-XR79-ZZ		Cree XR-E 7090 LED	Medium beam	Optical grade PMMA	21	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FC-W2-XR79-ZZ		Cree XR-E 7090 LED	Wide beam	Optical grade PMMA	29	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FC-E2-XR79-ZZ		Cree XR-E 7090 LED	Elliptical beam	Optical grade PMMA	8 x 44	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FCP-N1-XPE1-ZZ		Cree XP-E LED	Narrow beam	Optical grade PMMA	10	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FCP-M1-XPE1-ZZ		Cree XP-E LED	Medium beam	Optical grade PMMA	21	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FCP-W1-XPE1-ZZ		Cree XP-E LED	Wide beam	Optical grade PMMA	27	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FCP-E1-XPE1-ZZ		Cree XP-E LED	Elliptical beam	Optical grade PMMA	10 x 50	Holder can be glued to PCB	zz=OR or HRF	80	CL FL TR BL SI
FCT3-N2-XR79-ZZZZ		Cree XR-E 7090 LED	Narrow beam	Optical grade PMMA	8	Holder can be glued to PCB	ZZZZ=HRLC or HRCN	80	CL FL TR BL SI
FCT3-M2-XR79-ZZZZ		Cree XR-E 7090 LED	Medium beam	Optical grade PMMA	21	Holder can be glued to PCB	ZZZZ=HRLC or HRCN	80	CL FL TR BL SI
FCT3-W2-XR79-ZZZZ		Cree XR-E 7090 LED	Wide beam	Optical grade PMMA	29	Holder can be glued to PCB	ZZZZ=HRLC or HRCN	80	CL FL TR BL SI
FCG-N1-XR79-ZZ		Cree XR-E 7090 LED	Narrow beam	Optical grade PMMA	6	Holder can be heat staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FCG-M1-XR79-ZZ		Cree XR-E 7090 LED	Medium beam	Optical grade PMMA	28	Holder can be heat staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FCG-W1-XR79-ZZ		Cree XR-E 7090 LED	Wide beam	Optical grade PMMA	50	Holder can be heat staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FCG-E1-XR79-ZZ		Cree XR-E 7090 LED	Elliptical beam	Optical grade PMMA	7 x 45	Holder can be heat staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FC3-N1-XR79-H		Cree XR-E 7090 LED	Narrow beam	Optical grade PMMA	6	Holder can be heat staked to PCB	N	80	CL FL TR BL SI
FC3-M1-XR79-H		Cree XR-E 7090 LED	Medium beam	Optical grade PMMA	28	Holder can be heat staked to PCB	N	80	CL FL TR BL SI
FC3-W1-XR79-H		Cree XR-E 7090 LED	Wide beam	Optical grade PMMA	50	Holder can be heat staked to PCB	N	80	CL FL TR BL SI
FNP-N1-N083-ZZ		Nichia 083 Rigel LED	Narrow beam	Optical grade PMMA	10	Holder can be glued to PCB	zz=OR or HR	80	CL FL TR BL SI
FNP-M1-N083-ZZ		Nichia 083 Rigel LED	Medium beam	Optical grade PMMA	27	Holder can be glued to PCB	zz=OR or HR	80	CL FL TR BL SI
FNP-W1-N083-ZZ	Nichia 083 Rigel LED	Wide beam	Optical grade PMMA	40	Holder can be glued to PCB	zz=OR or HR	80	CL FL TR BL SI	
FNP-E1-N083-ZZ	Nichia 083 Rigel LED	Elliptical beam	Optical grade PMMA	13 x 42	Holder can be glued to PCB	zz=OR or HR	80	CL FL TR BL SI	
FRC-N1-0E2B-0	Reflector	Cree XR 7090 LED	Narrow beam	Ultem	11	Holder can be glued to PCB	N	150	CL FL TR BL SI
FRC-N1-XR79-OR		Cree XR 7090 LED	Narrow beam	PC	7	Holder can be glued to PCB	N	120	CL FL TR BL SI
FRC-N1-MCE-OR		Cree MC-E LED	Narrow beam	PC	13.5	Holder can be glued to PCB	N	120	CL FL TR BL SI
FRC-M1-MCE-OR		Cree MC-E LED	Medium beam	PC	32	Holder can be glued to PCB	N	120	CL FL TR BL SI
FRC-W1-MCE-OR		Cree MC-E LED	Wide beam	PC	45+	Holder can be glued to PCB	N	120	CL FL TR BL SI
FXGR-N1-XR79-OR		Cree XR-E 7090 LED	Narrow beam** Focusing component A	PC	6	See datasheet for mechanical instructions	N	120	CL FL TR BL SI
FXGR-W1-XR79-OR		Cree XR-E 7090 LED	Wide beam** Focusing component B	PC	60	See datasheet for mechanical instructions	N	120	CL FL TR BL SI
FXGL-VN-XR79-OR	Lens	Cree XR-E 7090 LED	Focusing lens	Optical grade PMMA	8-12 degrees	Application specific	N	80	CL FL TR BL SI

### MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE

\*Distribution angle changes with LED color (see product datasheets); FWHM=full beamwidth measured at one-half of peak intensity; some lenses can be ordered either alone, or with a spacer ring, or assembled with a holder; spacers must be ordered separately (when required); OS: lens only; OR: lens only; HS: square flange with holder; HR: round flange with holder; HST: square flange with transparent holder; HRF: round holder with flat bottom; If using FDG lens without holder, a spacer ring (p/n FDS-0S) is required and must be ordered separately. See Fraen datasheet for more details. \*\*Parts must be used with one another in order to obtain the focusing results stated on the datasheet. †Beam angle is estimated from computer simulation

## Innovative Optical Solutions for Maximizing Light

As one of the premier optic providers for high-powered LEDs, Fraen continues to develop leading-edge custom and standard optical components. Fraen has recently developed numerous patent-pending solutions, including optics for architectural lighting, color mixing, entertainment lighting, focusable lighting, and streetlight applications.



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### Applications ▶

- Architectural lighting
- Street lights
- Portable lighting
- Emergency lighting
- General illumination (MR11, MR16, and downlights)



### Product Specifications ▶

Part Number	Type	LED Type	Distribution Type	Material Type	Distribution Angle (°)	Attachment Method	Optical Holder (Y/N)	Max. Operating Temp. (°C)	Markets
FDP-N1-D01-ZZ	Secondary	OSRAM Golden DRAGON	Narrow beam	Optical grade PMMA	13	Holder can be heat-staked to PCB	zz=OS, HS, or HSA	80	CL FL TR BL SI
FDP-M1-D01-ZZ		OSRAM Golden/Platinum DRAGON	Medium beam	Optical grade PMMA	18	Holder can be heat-staked to PCB	zz=OS, HS, or HSA	80	CL FL TR BL SI
FDG-N1-D01-ZZ		OSRAM Golden/Platinum/Diamond DRAGON	Narrow beam	Optical grade PMMA	6.5	Holder can be heat-staked to PCB	zz=OS, HS	80	CL FL TR BL SI
FDG-M1-D01-ZZ		OSRAM Golden/Platinum/Diamond DRAGON	Medium beam	Optical grade PMMA	20.5	Holder can be heat-staked to PCB	zz=OS, HS	80	CL FL TR BL SI
FDG-W1-D01-ZZ		OSRAM Golden/Platinum/Diamond DRAGON	Wide beam	Optical grade PMMA	33.5	Holder can be heat-staked to PCB	zz=OS, HS	80	CL FL TR BL SI
FDG-E1-D01-ZZ		OSRAM Golden/Platinum/Diamond DRAGON	Elliptical beam	Optical grade PMMA	10 x 20	Holder can be heat-staked to PCB	zz=OS, HS	80	CL FL TR BL SI
FD3-N1-D01-H		OSRAM Golden/Platinum DRAGON	Narrow beam	Optical grade PMMA	10	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FD3-M1-D01-H		OSRAM Golden/Platinum DRAGON	Medium beam	Optical grade PMMA	13	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FD4-M1-D01-0		OSRAM Golden/Platinum DRAGON	Medium beam	Optical grade PMMA	21.5	Custom MR 16	N	80	CL FL TR BL SI
FSP-N1-SSP4-ZZ		Seoul Semiconductor z-power P4	Narrow beam	Optical grade PMMA	10	Holder can be heat-staked to PCB	zz=OR or HRF	80	CL FL TR BL SI
FSP-M1-SSP4-ZZ		Seoul Semiconductor z-power P4	Medium beam	Optical grade PMMA	24	Holder can be heat-staked to PCB	zz=OR or HRF	80	CL FL TR BL SI
FSP-W1-SSP4-ZZ		Seoul Semiconductor z-power P4	Wide beam	Optical grade PMMA	38	Holder can be heat-staked to PCB	zz=OR or HRF	80	CL FL TR BL SI
FSP-E1-SSP4-ZZ		Seoul Semiconductor z-power P4	Elliptical beam	Optical grade PMMA	10 x 50	Holder can be heat-staked to PCB	zz=OR or HRF	80	CL FL TR BL SI
FP3-N1-SSP4-H		Seoul Semiconductor z-power P4	Narrow beam	Optical grade PMMA	10	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FP3-M1-SSP4-H		Seoul Semiconductor z-power P4	Medium beam	Optical grade PMMA	24	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FP3-W1-SSP4-H		Seoul Semiconductor z-power P4	Wide beam	Optical grade PMMA	38	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FSG-N1-SSP4-ZZ		Seoul Semiconductor z-power P4	Narrow beam	Optical grade PMMA	6	Holder can be heat-staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FSG-M1-SSP4-ZZ		Seoul Semiconductor z-power P4	Medium beam	Optical grade PMMA	24	Holder can be heat-staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FSG-W1-SSP4-ZZ		Seoul Semiconductor z-power P4	Wide beam	Optical grade PMMA	37	Holder can be heat-staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FSG-E1-SSP4-ZZ		Seoul Semiconductor z-power P4	Elliptical beam	Optical grade PMMA	14 x 32	Holder can be heat-staked to PCB	zz=OR or HR	80	CL FL TR BL SI
FS3-N1-SSP4-H		Seoul Semiconductor z-power P4	Narrow beam	Optical grade PMMA	6	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FS3-M1-SSP4-H		Seoul Semiconductor z-power P4	Medium beam	Optical grade PMMA	24	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FS3-W1-SSP4-H		Seoul Semiconductor z-power P4	Wide beam	Optical grade PMMA	37	Holder can be heat-staked to PCB	N	80	CL FL TR BL SI
FCM-N1-SSP5-Z		Seoul Semiconductor z-power P5	Narrow beam	Optical grade PMMA	17	Holder can be heat-staked to PCB	z=0 or H	80	CL FL TR BL SI
FCM-M1-SSP5-Z		Seoul Semiconductor z-power P5	Medium beam	Optical grade PMMA	32	Holder can be heat-staked to PCB	z=0 or H	80	CL FL TR BL SI
FCM-W1-SSP5-Z		Seoul Semiconductor z-power P5	Wide beam	Optical grade PMMA	42	Holder can be heat-staked to PCB	z=0 or H	80	CL FL TR BL SI
FCM-E1-SSP5-Z	Seoul Semiconductor z-power P5	Elliptical beam	Optical grade PMMA	17 x 40*	Holder can be heat-staked to PCB	z=0 or H	80	CL FL TR BL SI	
FRC-M1-OE2B-0	Reflector	OSRAM 4-chip Ostar LED	Medium beam	Ultem	25	Holder can be glued to PCB	N	150	CL FL TR BL SI
FRC-N1-A3P7-OR		Seoul Semiconductor P7 LED	Narrow beam	PC	15	Holder can be glued to PCB	N	120	CL FL TR BL SI
FRC-M1-A3P7-OR		Seoul Semiconductor P7 LED	Medium beam	PC	29	Holder can be glued to PCB	N	120	CL FL TR BL SI
FRC-W1-A3P7-OR		Seoul Semiconductor P7 LED	Wide beam	PC	45*	Holder can be glued to PCB	N	120	CL FL TR BL SI

#### MARKETS LEGEND

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\*Distribution angle changes with LED color (see product datasheets); FWHM=full beamwidth measured at one-half of peak intensity; some lenses can be ordered either alone, or with a spacer ring, or assembled with a holder; spacers must be ordered separately (when required); OS: lens only; OR: lens only; HS: square flange with holder; HR: round flange with holder; HST: square flange with transparent holder; HRF: round holder with flat bottom; If using FDG lens without holder, a spacer ring (p/n FDS-OS) is required and must be ordered separately. See Fraen datasheet for more details. \*\*Parts must be used with one another in order to obtain the focusing results stated on the datasheet. †Beam angle is estimated from computer simulation

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