

PFL.M12.A136.x - 13.6mm MLens® M12/S-Mount Tunable Lens

 **poLight**
Product Data Sheet
DSO-070 Rev. 1



M12 13.6mm MLens® M12/S-Mount Tunable Lens

General Description

poLight MLens® products are a family of tunable focus objective lenses designed to enable variable focus functionality in a standard M12/S-Mount form factor. Each lens is self contained, incorporating advanced drive and control electronics, EEPROM and temperature sensing with a common FPC connector format and pinout across all devices to enable simple evaluation, selection and swapping of lenses. Each lens requires only power supply and i²c communication from the host platform to enable focus tuning.

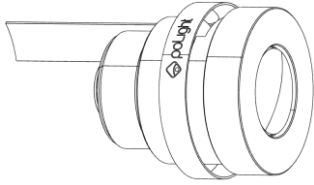
Key Characteristics

- Self-contained focusing system
- Ultra-low power consumption (<6mW)
- Focus from infinity to macro
- Fast focus response
- Designed for stable performance over temperature
- Constant FoV while focusing
- Interchangeable with other MLens

Potential Applications

- Machine Vision cameras
- AI/Smart cameras
- Security and streaming cameras
- Symbology and barcode readers





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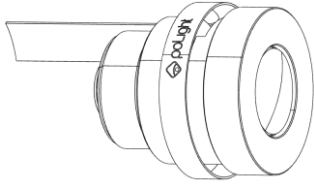
MLens® family devices are an objective lenses family with focus tunable lenses in a standard M12/S-Mount form factor. Each lens contains a custom designed precision rigid lens system combined with poLight TLens® electro tunable lens. TLens® is widely used in industrial, consumer and XR products where typically poLight works with OEMs to design full custom optics incorporating the TLens element. MLens products are designed as standard part, “off the shelf” products to allow machine vision and board camera customers to access the same performance benefits provided by TLens, without having to design a full custom lens.

Each MLens product is designed to fit into standard M12x0.5mm (S-Mount) threaded lensholders widely used in board camera applications. The family shares common mechanical and electrical interface allowing end

users and installers to select or change lenses easily.

MLens products are fully integrated electro-optical systems. In addition to the lens elements, each MLens contains poLight’s proprietary TLens drive and control IC, a EEPROM and a temperature sensor that can be accessed by the host system over the same i2c interface that controls the lens focus. The temperature sensor and EEPROM are not required for MLens operation but are provided for convenience of system integration and potential further use. Electrical connection is via a four pin FPC that is designed to allow flexible placement of the mating connector on the host board and accommodate any potential rotational position of the lens after initial focusing.

An evaluation kit is available that allows simple control of the MLens via a USB interface.



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Specification

1. Mechanical specification		
1	Iris type	Fixed
2	Total Track Length (mm)	Ref to Mechanical Interface §
3	Flange Back Length (mm) ¹	Ref to Mechanical Interface §
4	Maximum diameter (mm)	17.1
5	Mounting thread	S-Mount (M12 x 0.5)
2. Optical specifications		
1	Maximum sensor format	Up to 1/3"
2	Nominal imager resolution	3.2 MP
3	Focal Length (mm)	13.6
4	F-Number	4
5	Maximum Image Circle (mm)	6.2
6	Field of view (°)	25.7° (at 6.2mm image circle)
7	Distortion (%)	<1
8	IR cut filter (optional)	650nm IR cutoff coating
3. Electro optical specifications		
1	Typical working distance (mm) ^{2,3}	200 – 2000
2	Focus response time ⁴	<5 ms
4. Operating conditions		
1	Operating temperature	0°C ~ +75°C
2	Maximum Relative humidity	85%
5. Absolute maximum ratings		
1	Storage temperature	-10°C ~ +80°C
2	Power supply (Vdd) range	3.2V ~ 3.6V

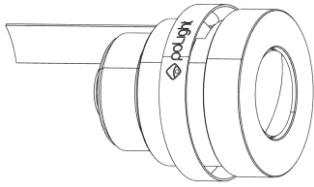
¹Distance from the rear surface of the barrel to the image plane (including sensor cover glass of 0.5mm)

²Optimum focus is obtained by adjusting the lens BFL to maximize sharpness on a target at 2 meters, while applying a voltage to the TLens (Factory DAC value stored in EEPROM and accessible via I²C)

³Working distance range can be tuned by fine tuning lens BFL.

⁴The time for the optical system to go from 10% to 90% of its final target

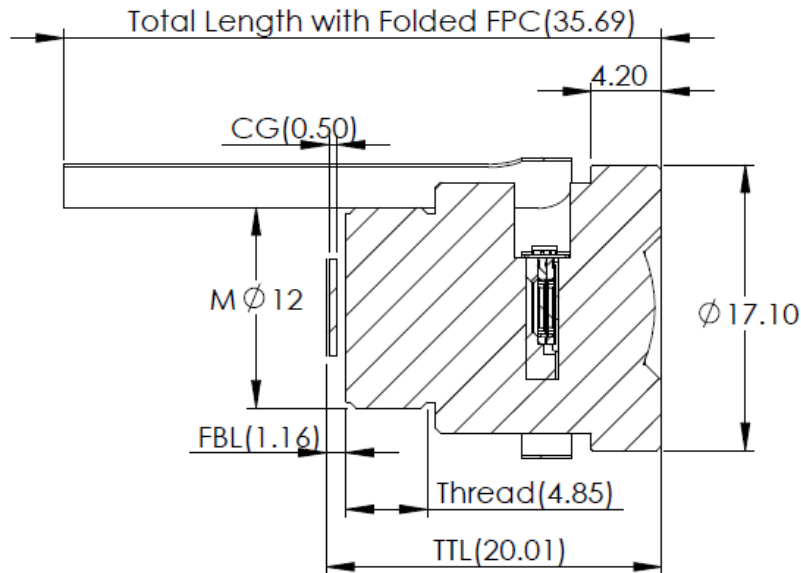




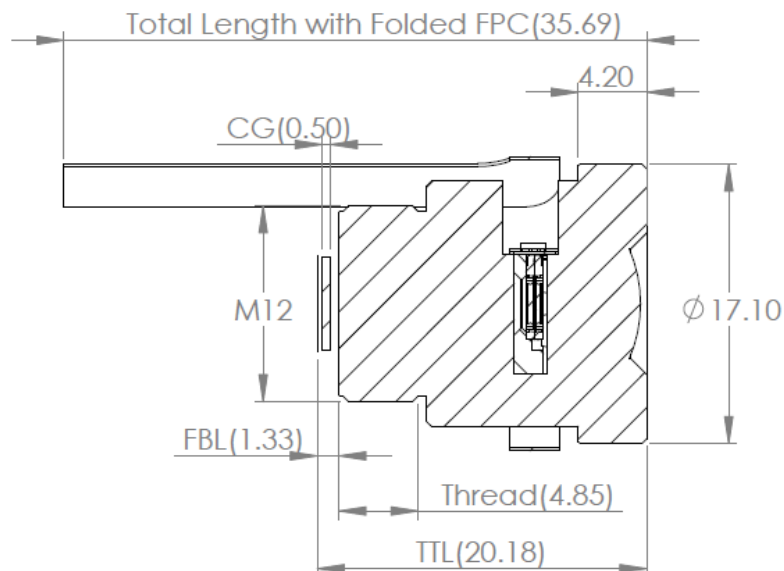
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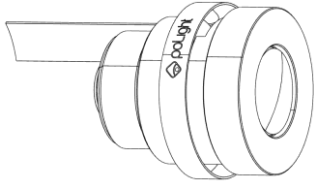
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Mechanical interface(PFL.M12.A136.0 without IR cut filter)



Mechanical interface(PFL.M12.A136.1 with IR cut filter)



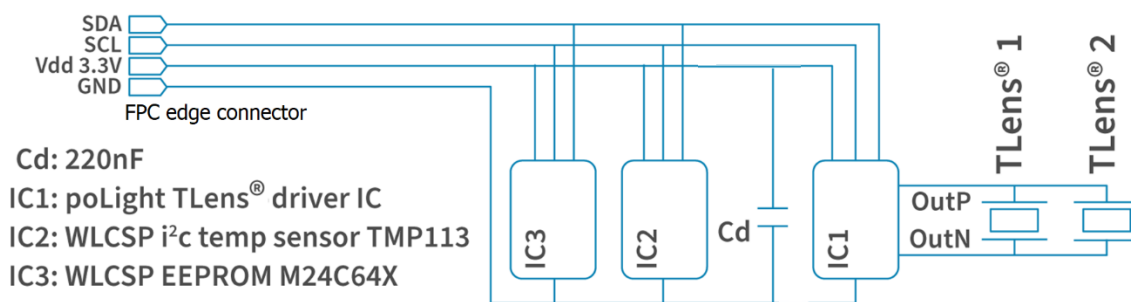


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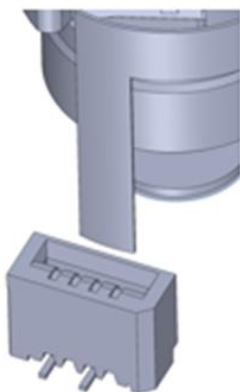
Electrical Interface

Each MLens product contains all the electronics required for a complete, self-contained, tunable focus system. The poLight TLens driver IC, TMP113AIYBGR (Texas Instrument) Digital Temperature Sensor and M24C64X-FCU8T (STMicroelectronics) 64-Kbit EEPROM are accessed via the same i²c bus. Working distance adjustment is performed by sending i²c command to poLight TLens driver IC. The temperature sensor and EEPROM are not mandatory for MLens operation but are provided for convenience of system integration and potential further use.



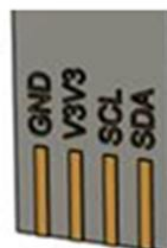
Pinout and Mating connector

MLens devices are intended to mate with MOLEX brand 1.0mm pitch, non-ZIF "Easy-On" FPC connector PCB receptacle e.g. part 528080470, 528520470 or 527930470. Pinout is as shown below (vertical connector 528080470 shown)

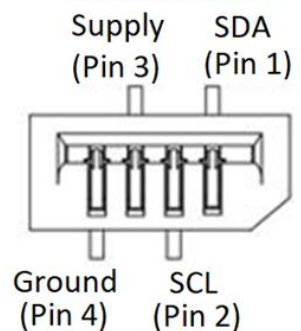


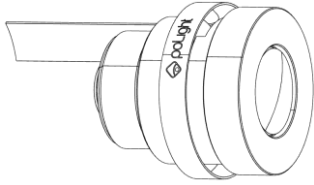
Intended PCB receptacle:
Molex 1.0mm pitch, non-
ZIF "Easy-On" FPC
connector e.g.:
528080470,
528520470,
527930470

FPC Edge
Connector:



Vertical connector
528080470:





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Optical Model and CAD

The Zemax optical model and 3D mechanical files can be provided on demand.

Restrictions of Hazardous Substances

TLens is RoHS compatible, according to RoHS exemption number 7(c)-I. The exemption refers to the Pb embedded in PZT material.

Ordering Information

PFL.M12.XYYY.Z Where X is a variant type, YYY is focal length, Z=0 is without IRCF, Z=1 is with IRCF

Part Number	Description
PFL.M12.A136.0	M12 13.6mm MLens without IR cut filter
PFL.M12.A136.1	M12 13.6mm MLens including IR cut filter
PEK.M12.00	Evaluation Kit, USB interface and software application

poLight ASA reserves the right to alter without notice the datasheet, hereunder but not limited to the specification, design, price or conditions of supply of the product.

