CORNING

Varioptic® Lenses

Marketing Datasheet

Corning® Varioptic® C-S-25H0-036 Auto Focus Lens Module

Overview

The Corning® Varioptic® C-S-25H0-036 auto focus lens module integrates a fixed lens module with a Corning® Varioptic® A- 25H0 variable focus lens in an M12x0.5 receptacle (S-mount). The C-S-25H0-036 has an FPC cable and can be connected to a standard 1 mm pitch FPC connector. It can be easily integrated with a standard M12 sensor board. The C-S-module is compatible with imaging sensor formats up to 1/3''. The C-S-module can be controlled by the same driver as the A-25H0. For more information on this module, please refer to the C-S-25H0-036 Technical Datasheet (TEDS).

Ordering Information

- **Corning® Varioptic® C-S-25H0-036-03 auto focus lens module:** 4-pin, 1 mm pitch, bent flex cable (FPC-A-3) without IR-cut filter
- **Corning® Varioptic® C-S-25H0-036-03I auto focus lens module:** 4-pin, 1 mm pitch, bent flex cable (FPC-A-3) with IR-cut filter

Performance Summary

- Effective focal length 3.64 mm
- F number 1.8
- Image circle diameter 5.9 mm
- Focus range 7 cm to infinity

Applications

Corning Varioptic C-S-25H0-036 liquid lens modules have been used in:

- Barcode readers
- Videoconferencing
- Industrial endoscopes
- …

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ESD

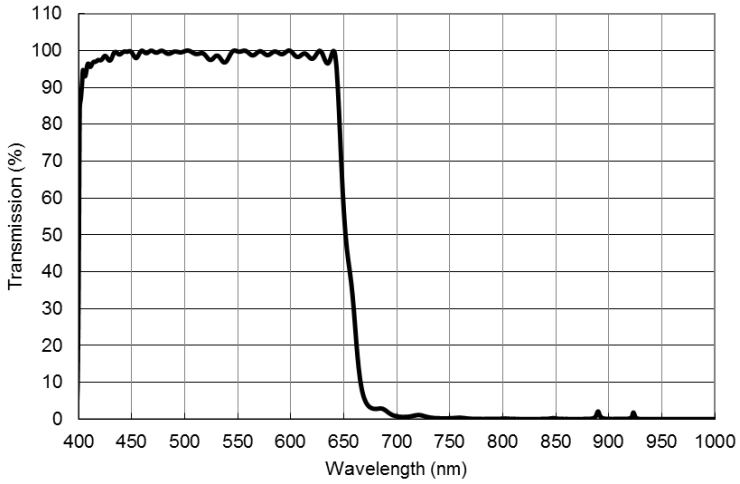
Opto-Electrical Performance

Performances described below are for 25°C and for the lens setting described in the 'Module Setting Recommendations' section of this document.

Optical Performances at V_∞	*Symbol*	*Min*	*Typ*	*Max*	*Unit*	*Notes*
Voltage for infinite focus	V_∞		39.5		V	(1)
Focal length at V_∞	EFL		3.64		mm	
Image circle diameter			5.9		mm	
Corner Chief Ray Angle	CRA			33.7	°	
Mechanical back focal length at V_∞, without IR-cut filter			0.53		mm	
Mechanical back focal length at V_∞, with IR-cut filter			0.59		mm	
F- number	F#		1.8		-	
Diagonal Field of view	DFOV			80.3	°	(2)
IR filter cut-off wavelength	λ_c		650			(5)
Focus control performances						
Focus distance	x	7		∞	cm	(1)
Voltage for x= 7 cm	V_{7cm}		54	60	V	(3); (4)
Slope	S		0.85		m^{-1}/V	(1)

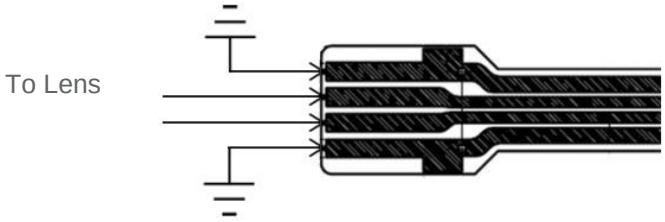
Notes:

(1) For more information on the behavior of the A-25H0 lens with voltage, please refer to the A-25H TEDS.
(2) For a sensor size of 6.1 mm diagonal (1/3").
(3) For shorter focusing distances, see "Module Setting Recommendations".
(4) Refer to figure 2 on page 5.
(5) For 50% transmission. Typical performance of IR cut filter is given below:



Electrical Specifications

Electrical Connection



The following FPC connectors are compatible with the FPC tip:

- SFW4S-2STE9LF from Amphenol FCI
- 04FMN-BTK-A (LF)(SN) from JST

Parameter	*Unit*	*Symbol*	*Min*	*Typ*	*Max*	*Notes*
Capacitance	pF	C		100	150	
Q Factor	-	Q		26		(1)
Current consumption	µA	I_{max}			200	(2)

Notes:

(1) Measured at a frequency of 1 kHz and a voltage of 1 V and 20 V.
(2) Adjustable lens current only – does not include the driver.

Driver

A dedicated compact IC has been designed to drive Corning Varioptic Lenses, namely the Maxim MAX14574. For details, please contact your local sales channel.

Important note:

Corning Varioptic Lenses are sensitive to electrostatic discharge (ESD). Use caution when handling.

Absolute Maximum Ratings

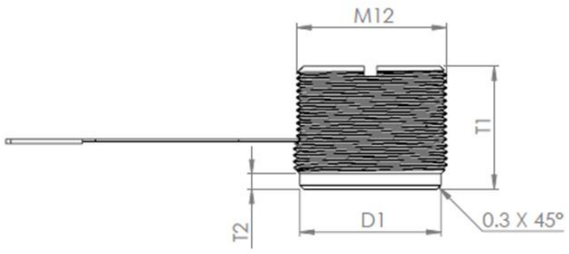
Parameter	*Symbol*	*Min*	*Typ*	*Max*	*Unit*	*Notes*
Operating Temperature	T	-30	..	85	°C	
Storage Temperature	T_{stg}	-40	..	85	°C	
AC Input RMS Voltage	V_{max}			60	V	(1)
Input Voltage Frequency	f		5		kHz	(1)

Notes:

(1) For more information on A-25H0 electrical driving, please refer to the A-25H TEDS.

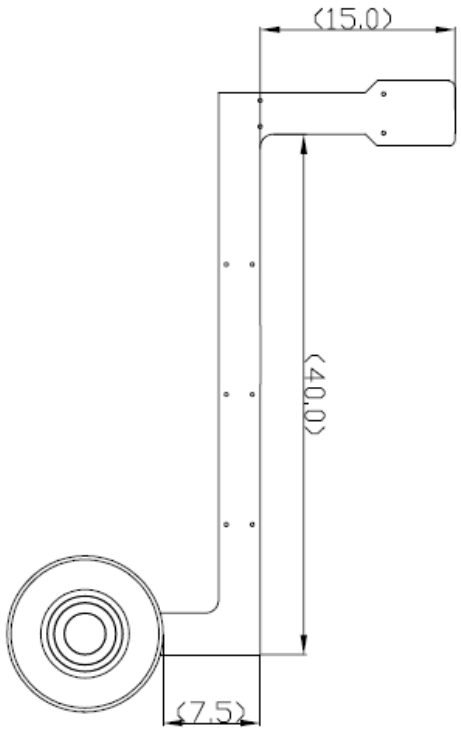
Mechanical Dimensions

Module



Parameter	*Unit*	*Symbol*	*Min*	*Typ*	*Max*	*Notes*
Centering diameter	mm	D1	10.95		11	
Height	mm	T1	9.4	9.6	9.8	
Centering height	mm	T2	1.1	1.2	1.3	

FPC Details



Module Orientation

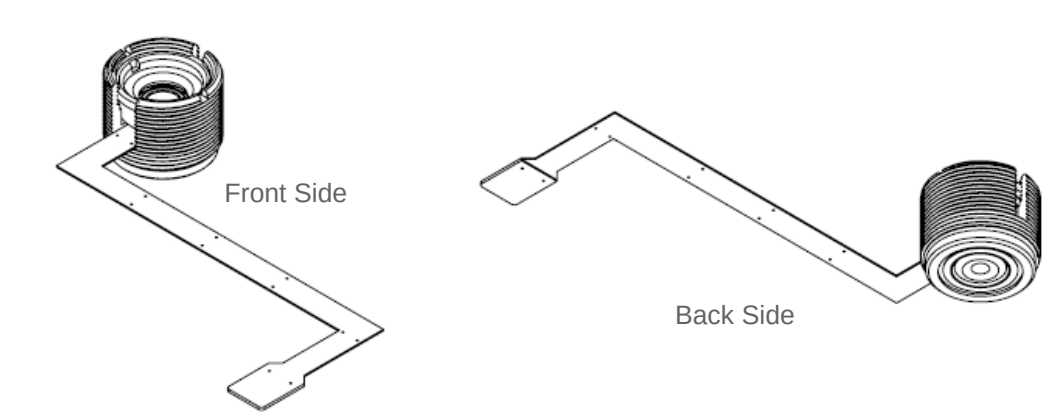


Figure 1: Module 3D view

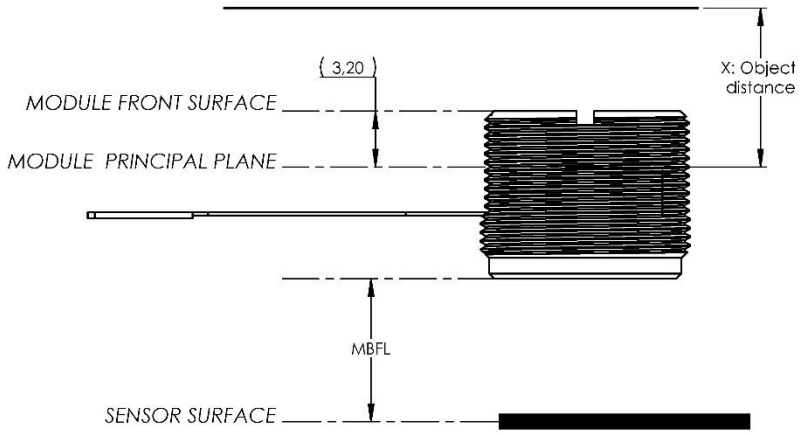


Figure 2: Definition of x and MBFL

Module Setting Recommendations

Use caution when configuring the initial lens module settings. Although the user has complete control over module configuration settings, only a limited number of configurations will provide optimum image quality.

Setting Procedure without Voltage:

Here is a simple procedure to set the C-S-25H0-036 module for a 7 cm to ∞ usage:

1. Set a scene at a distance of at least 5 m from the camera.
2. Insert and slightly screw the C-S-module on the M12 camera lens holder (C-S-module unpowered).
3. The image should be out of focus.
4. Screw the C-S-module clockwise until the center of the image becomes sharp.
5. From this position, screw the C-S-module clockwise an additional 1/2 turn with accuracy of ± 1/8 turn: the image becomes out of focus again.
6. Fix the C-S-module in this position.
7. Power the C-S-module: the infinite focus will be obtained for V_∞ and the focus at a closer position will be obtained by applying a higher voltage, up to V_{max}.

To use the C-S-25H0-036 module for a maximum focus of distance x_0, modify the above steps:

1. Set a scene at a distance of x_0 from the camera.
2. Power the C-S-module: the focus at x_0 will be obtained for V_∞ and the focus at a closer position will be obtained by applying a higher voltage, up to V_{max}.
   With this setting, the minimum object distance is reduced from 7 cm to:

$$\frac{1}{14 + \frac{1}{x_0}}$$

   in meters, with x0 in meters.

Setting Procedure with Voltage:

1. Connect the C-S-module to the driver and adjust the voltage control to 39.5 V_{rms}
2. Turn on the camera and point the camera in the direction of a scene that is at least 5 m from the module, or at a distance of x_0 if using at the maximum focus distance x_0.
3. Screw the C-S-module clockwise until the image becomes sharp.
4. Optional: Block the C-S-module in that position.