



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 0.5 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-25H0-036-43 auto focus lens module:** 6-pin, 0.5 mm pitch, bent flex cable (FPC-A-43) without IR-cut filter
- **Corning® Varioptic® C-S-25H0-036-43I auto focus lens module:** 6-pin, 0.5 mm pitch, bent flex cable (FPC-A-43) 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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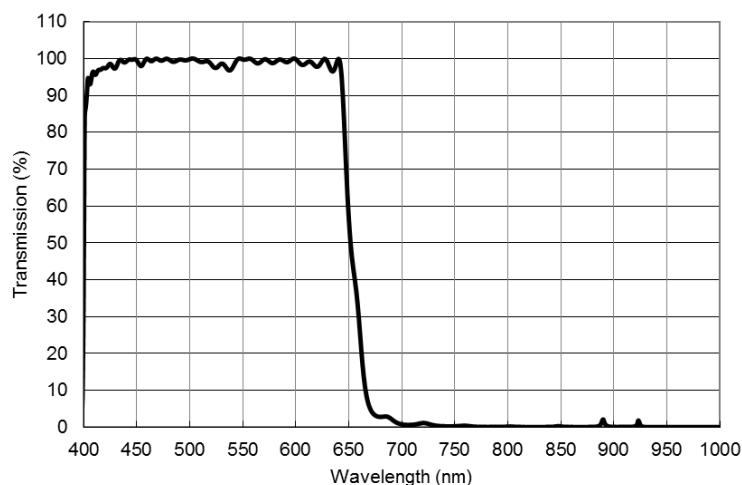
Opto-Electrical Performance

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

<i>Optical Performances at V_{∞}</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Notes</i>
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)
<i>Focus control performances</i>						
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)

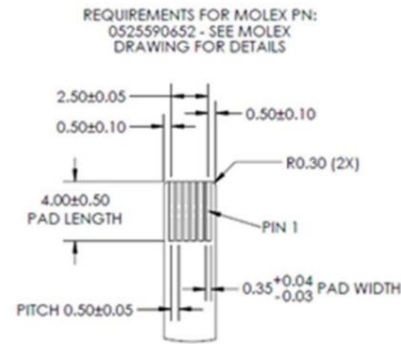
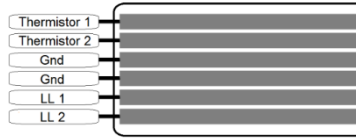
Notes:

- (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 0.5 mm pitch, 6-pin FPC connectors are compatible with the FPC tip:

- 525590652 from Molex
- 5034800600 from Molex

FPC-A-43 is populated with a 0402 thermistor (Reference: ERTJ0ES104F from Panasonic).

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

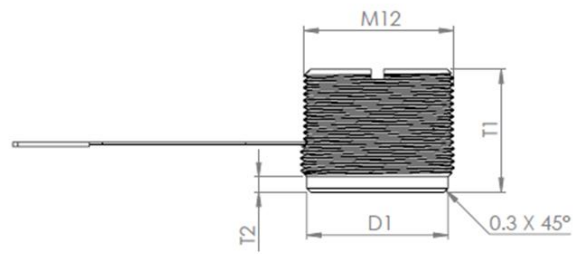
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Temperature	T	-30	..	85	°C	
Storage Temperature	T _{stg}	-40	..	85	°C	
AC Input RMS Voltage	V _{max}			60	V	(1)
Input Voltage Frequency	f		1	5	kHz	(1)

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	

Module Orientation

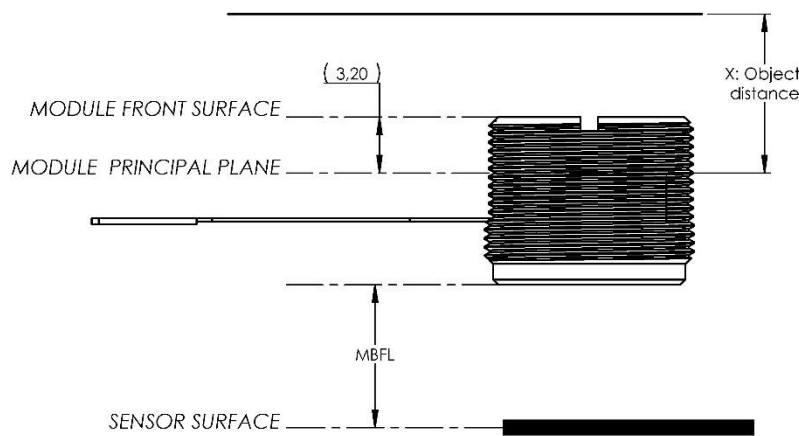


Figure 1: Definition of x and MBFL

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 $\pm 1/8$ 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 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 x_0 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 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.

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