CORNING

Varioptic® Lenses

Marketing Datasheet

Corning® Varioptic® A-16F Variable Focus Lens

Overview

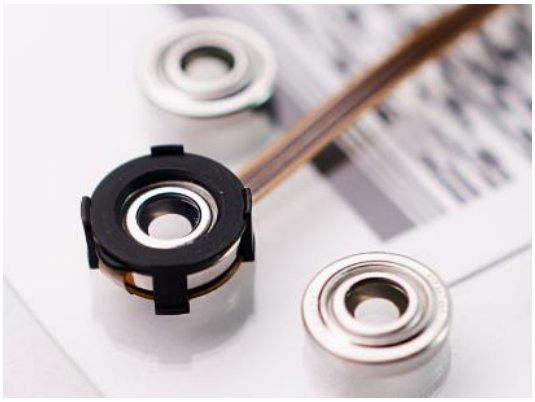
The Corning® Varioptic® A-16F variable focus lens is based on Corning's breakthrough adjustable lens technology, allowing variable focus with absolutely no moving parts. Its low power consumption, high shock resistance, and fast focus ability make it used in auto focus and continuous auto focus applications in portable devices, where it will deliver outstanding performance, as well as in laser applications, where it will enable variable focus control. For more information on this lens, please refer to the A-16F Technical Data Sheet (TEDS).

Ordering Information

- **Corning® Varioptic® A-16F0 variable focus lens:** has anti-reflective (AR) coatings optimized in the visible range
- **Corning® Varioptic® A-16F1 variable focus lens:** has AR coatings optimized in near infrared range
- **Corning® Varioptic® A-16F9 variable focus lens:** has no AR coatings
- **Corning® Varioptic® A-16FX-P31 variable focus lens**: Packaged A-16FX – 6-pin, 0.5 mm pitch straight flex cable (X=0,1,9)

Performance Summary

- 20 diopters dynamic range
- Low wave front error, 20 nm typical
- Low power consumption: 20 mW typical, including driver



Applications

Corning Varioptic A-16F liquid lenses have been used in:

- Barcode readers
- Machine vision
- Industrial endoscopes
- …

Contents

ESD

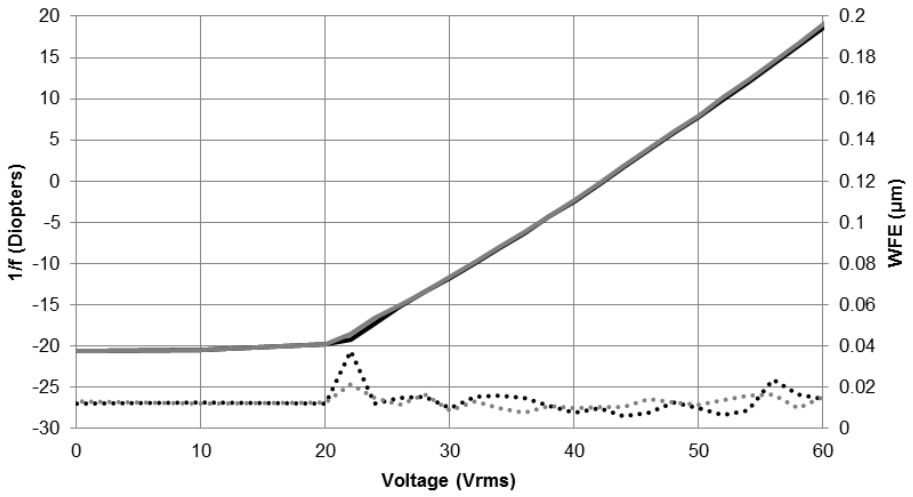
Opto-Electrical Performance

@25°C, @635 nm unless otherwise stated.

Parameter	*Unit*	*Symbol*	*Typ*	*Notes*
Aperture size	mm	$Ø_e$	1.6	(1)
Low optical power	m^{-1}	P_L	-5	
Voltage for P_L	V	V_L	36.5	
High optical power	m^{-1}	P_H	+15	
Voltage for P_H	V	V_H	54.5	
Optical power @ 0V	m^{-1}	P_o	-20	
Wave Front Error, rms	nm	WFE_{rms}	20	(2) ; (4)
Voltage @ 0 diopter	V	V_{0D}	42	(4)
Slope	$(m.V)^{-1}$	S	1.1	(3) ; (4)
Transmission @ 587 nm	%	T_{587}	97	

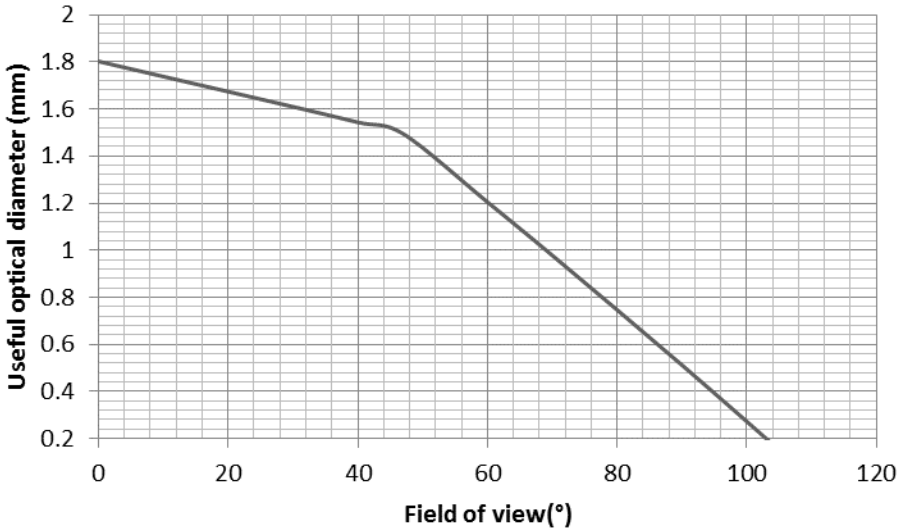
Notes:

(1) Pupil size on the bottom part of the lens. For more details, please refer to the “Optical Design Information” section.
(2) Measured on pupil size and on [P_L;P_H] – WFE is mainly astigmatism.
(3) Parameter is compiled on [P_L;P_H].
(4) Parameter measured with a 2 V sampling.



Field of View

The diagram below indicates the half field of view of the A-16F0 depending on the clear aperture.



Electrical Specifications

Parameter	*Unit*	*Symbol*	*Min*	*Typ*	*Max*	*Notes*
Capacitance	pF	C		95		
Q Factor	-	Q		34		
AC input Voltage, rms	V	V_{rms}			70	

It is recommended that the lens be used only with a qualified driver.

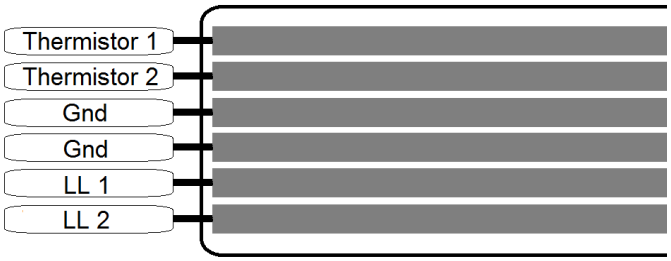
For laboratory tests, a square signal can be applied using a laboratory function generator, providing that the signal contains no DC voltage. Use of DC voltage or DC/AC voltage combinations will lead to abnormal behavior and limited lifetime of the adjustable lens.

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.

Electrical Contact for A-16FX-P31



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

- 525590652 from Molex
- 5034800600 from Molex

FPC-A-31 is populated with a 0402 thermistor (Reference: ERTJ0ES104F from Panasonic).

Temperature Range

Parameter		Unit	Min	Typ	Max	Notes
Operating temperature range		°C	-20°C	25	+60°C	(1)
Storage temperature range		°C	-40°C	25	+85°C	

Note:

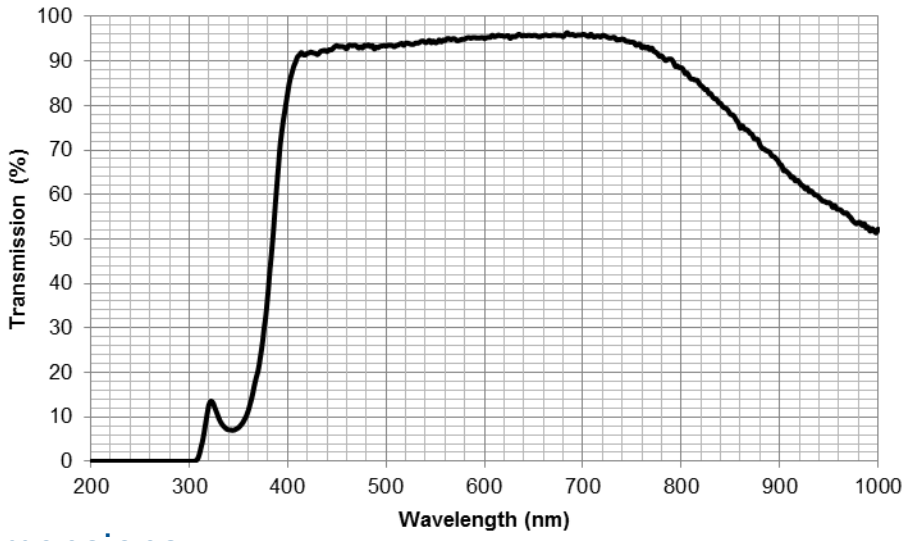
(1) -30°C to 85°C under evaluation

Remarks:

- Corning Varioptic Lenses are not designed to be soldered. For electrical connection, please refer to the application notes.
- Storage above maximum storage temperature will reduce lifetime of the lens. Temporary or permanent damage may occur if the maximum temperature is exceeded.

Transmission Performance

The two outer surfaces of the glass windows of the lenses have anti-reflective (AR) coatings. These AR coatings have been optimized in the visible range.



Mechanical Dimensions

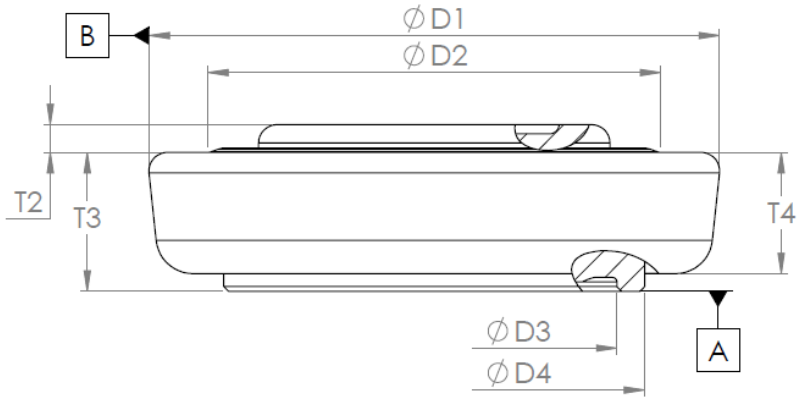
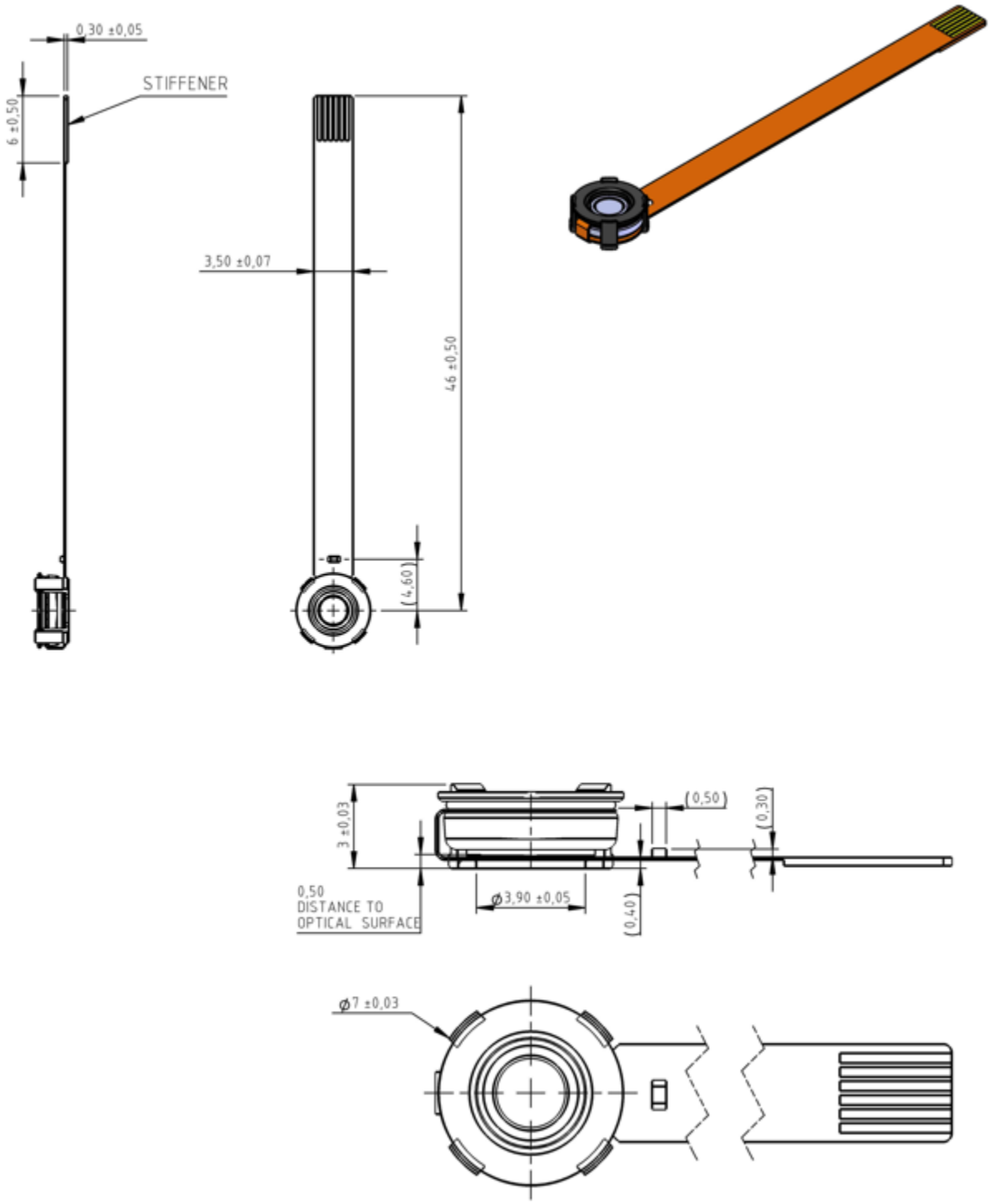


Figure 1 Mechanical Dimensions

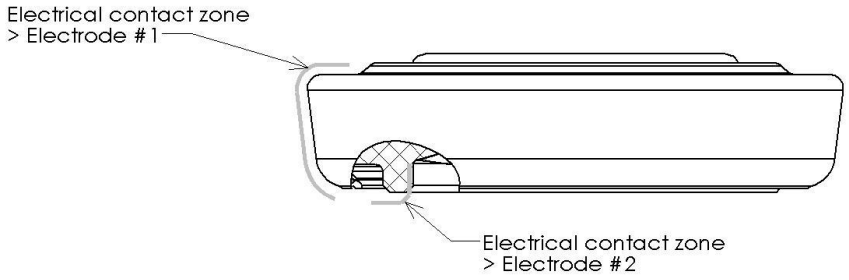
Parameter	Unit	Symbol	Min	Typ	Max
External diameter	mm	D1	6.11	6.18	6.24
Inside interface diameter	mm	D2		4.90	
Inside electrode diameter	mm	D3		3.75	
Outside electrode diameter	mm	D4		4.55	
Thickness, front area	mm	T2		0.22	
Thickness, flat to bottom	mm	T3	1.58	1.66	1.74
Thickness, flat to cap edge	mm	T4		1.36	

A-16FX-P31



Integration of A-16F

Electrical connection is done like a coin battery on the top and bottom parts of the lens. Locations of electrical contact are shown in the drawing below:



A 5 Ω max contact resistance is recommended for appropriate electrical connection.

For more details about electrical connection, please check the application notes related to Corning Varioptic Lenses.

Traceability of A-16F

All adjustable lenses are marked with a batch number and serial number.

* Unlike above picture, A-16F will have a metal color. Clear aperture of attached picture is 2.5 mm.