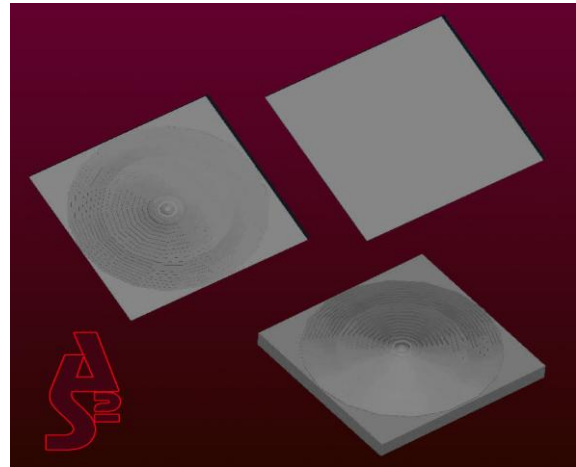




DC-6132

Silicon Micromachined Diffractive Infrared Lens

General Description: The DC-6132 is a *low cost* lens specifically designed for Long Wave Infrared thermopile detector applications. Up to now the low cost alternative to a conventional infrared optic has been a High Density Polyethylene (HDPE) Fresnel Lens. Although low cost and simple to manufacture HDPE has a restricted operating/storage temperature range, low transmission and is susceptible to UV degradation and chemical attack. The DC-6132 is manufactured out of silicon using modern semiconductor processing techniques. Because it is silicon an optical coating can also be incorporated providing increased transmission and wavelength selectivity. The DC-6132 is ideal for high volume OEM thermopile applications due to its flat square structure. The lens can be mounted in conventional TO-5 style caps using most modern pick and place presentations. This includes direct wafer pickup, waffle pack and tape&reel. Although the DC-6132 is a fast optic ($F\# = 1$) it has been optimized to provide good off-axis performance for thermopile and pyroelectric array applications.

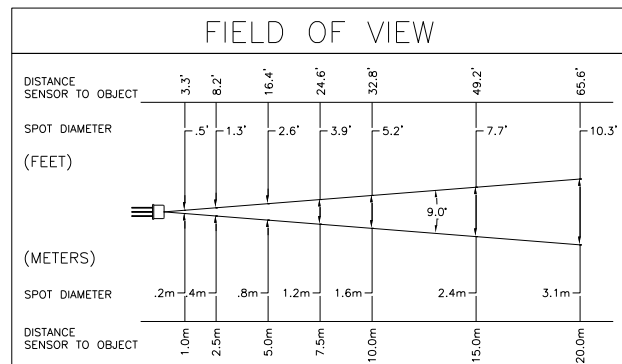


Engineering Considerations: Unlike a conventional Fresnel lens a diffractive lens uses constructive interference to bring the incoming LWIR radiation into common focus. The typical width of the blur circle at prime focus for a point source at infinity is approximately $200\mu\text{m}$ (FWHM). The large blur circle as compared to the diffraction limit of a conventional lens is due to the large chromatic aberration inherent in a diffractive lens. Ideally the DC-6132 is designed to operate with detector geometries that are about $400\mu\text{m}$ or greater

Applications: Excellent for battery operated test equipment, security systems, climate control, industrial temperature monitoring, consumer appliances, automotive, food service and preparation, medical, clinical and bio-tech.

Highlights:

- *Integrates into detector package*
- *Low Cost*
- *Simplify System*
- *Good Off-Axis Performance*
- *Available in TO-5 and TO-18 packages*
- *Long Wave IR Pass-Band*
- *Low F Number*
- *High Temperature Operation*
- *Not Susceptible to UV Degradation*
- *Rugged*
- *OEM Quantities Available*
- *Custom Designs Available*



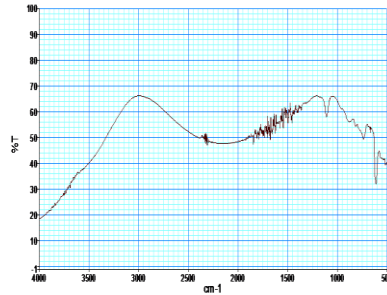
Above Field of View For 0.61mm Detector Size



Engineering Graphs

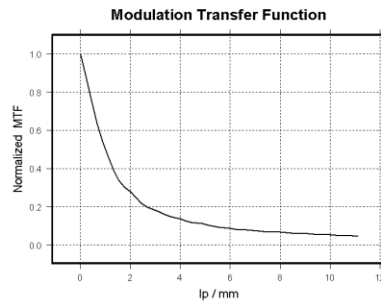
Lens Transmission

The DC-6132 is designed to operate in a broad range across the IR region with average lens transmission >55% from 3.0 to 15.5 μ m.

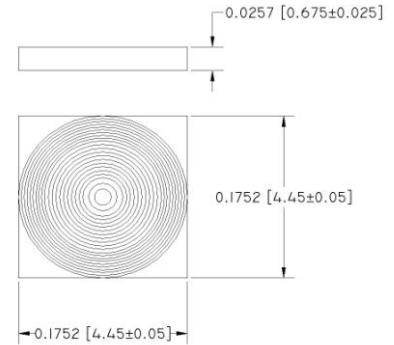


Typical On-Axis Modulation Transfer Function

The MTF for the DC-6132 is much narrower than the MTF of a conventional lens due to large chromatic aberration. Therefore the DC-6132 must be used with appropriate detector sizes ($\geq 400\mu$ m)



Physical Dimensions XIX



Dimension	In	Tol	mm	Tol
Length	0.175	0.002	4.45	0.05
Width	0.175	0.002	4.45	0.05
Thickness	0.026 5	0.001	0.675	0.025

Optical and Mechanical Characteristics

At Specified Free Air Temperature

PARAMETER	SYMBOL	TEST CONDITIONS	Min.	Typ.	Max.	Unit
Optical						
F Number	F#			1		
Back Focal Length	bfl	Etched Side Toward Detector		4.4		mm
Back Focal Length	bfl	Etched Side Toward Object		4.2		mm
Effective Aperture	Ao	Diameter of Active Area		4.4		mm
Point Spread Function	psf	Full Width Half Maximum		200		mm
Wavelength Passband		See Engineering Graphs				
Mechanical						
Material	Si	Semiconductor Grade Silicon				
Operating/Storage Temperature	T		-40		125	°C
Coating Adhesion		Meets MIL-M-13508				
Coating Hardness		Meets MIL-M-13508				