



**HawkEye Technologies, LLC**  
Your **Source** for **Infrared**

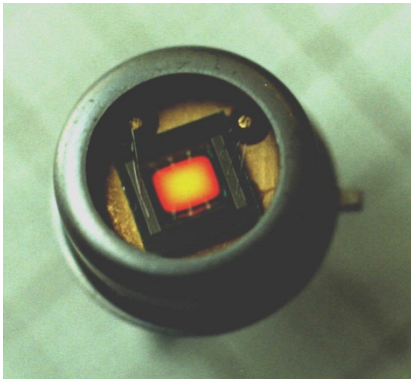
**181 Research Drive, #8**  
**Milford, CT 06460**  
**Phone: 203-878-6892**  
**Fax: 203-878-7462**

[www.hawkeyetechnologies.com](http://www.hawkeyetechnologies.com)

## Infrared Source Series 5x

- Wide spectral output
- Fast response
- High pulse rate
- High modulation depth
- High efficiency – low power consumption
- Long life and cost effective
- Custom design – many package options

The HawkEye IR-5x Series is a MEMS technology pulsable infrared emitter. This source is based on patented technology, utilizing a thin film resistor of diamond-like nanostructured amorphous carbon. Due to its low thermal mass, the IR-5x Series can be pulsed at frequencies up to 100+ hertz with good modulation depth (contrast between the on and off states).



The HawkEye IR-50 pulsed infrared emitter in a TO5 header uses a micromachined source chip with a thin, high-emissivity membrane shown schematically below.





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## Operational Characteristics for the IR-5x Series

<b>Active Area</b>	1.7 mm x 1.7 mm
<b>Resistance</b>	50 ohms (nominal) in the hot state
<b>Typical Operating Temperature</b>	450°C to 750°C
<b>Drive Voltage at 750°C</b>	6.7 volts +/- 0.4 volts
<b>Frequency at 50% Modulation Depth (25% Duty Cycle)</b>	100 Hz
<b>Spectral Range</b>	1 to 20 microns
<b>Emissivity</b>	0.8 (in the range of 2 to 14 microns)

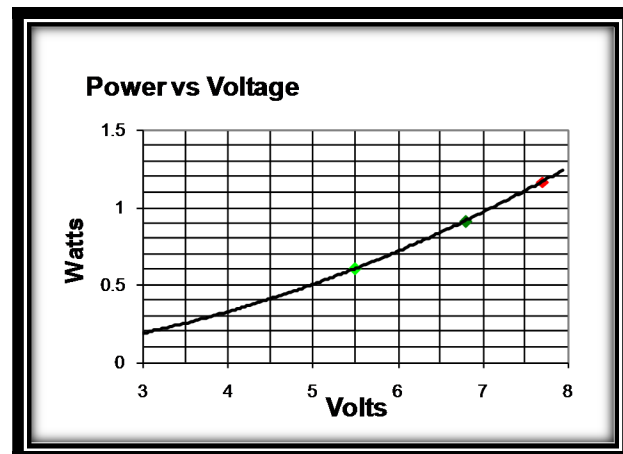
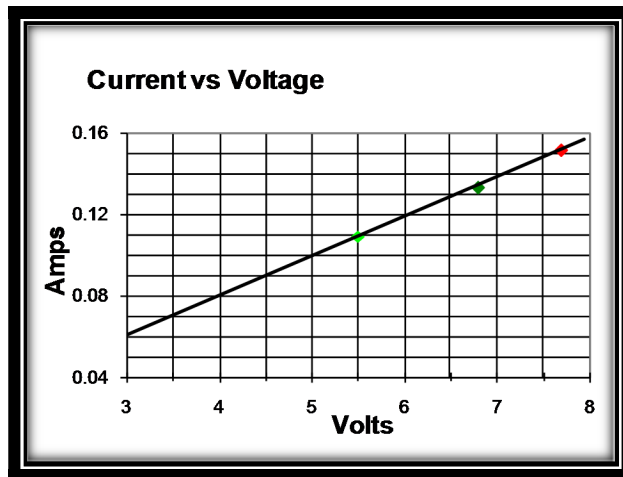
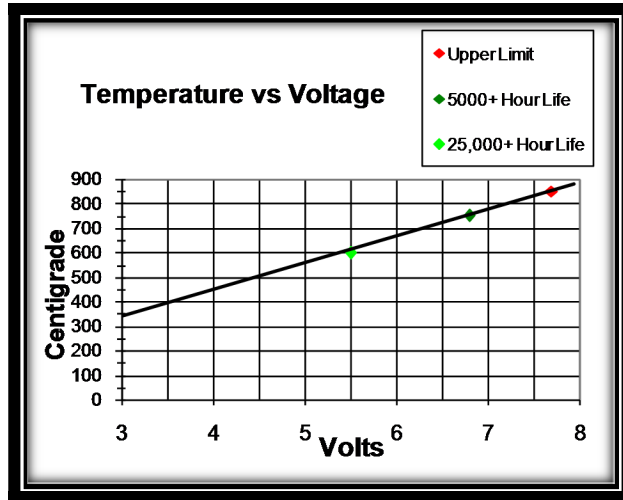


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## HawkEye IR-5x Engineering Data Charts





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## Typical Operating Parameters

	Typical Levels			
<b>Temperature</b>	<b>450</b>	<b>600</b>	<b>750</b>	degrees centigrade
<b>Voltage</b>	4.0	5.5	6.7	Volts (AC or DC)
<b>Current</b>	80	110	134	mAmps
<b>Power Input</b>	0.32	0.60	0.90	Watts
<b>Estimated Life</b>	100,000	40,000	5,000	hours of operation (10 hertz at 50% duty cycle)

**Note:** The operating parameters assume an infrared source operating without a radiator and at ambient temperature and pressure. A rectangular voltage pulsed at a frequency of 10 hertz and with a duty cycle of 50% is used for heating. If a longer duty cycle (or steady-state operation) is used, lower power levels are recommended in order to achieve the desired temperature. Also, proportionately shorter lifetime would be expected.



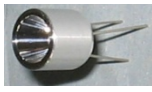



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## Comparison of IR-5x Series Models

	IR-50	IR-55	IR-56	IR-57	Units/Notes
					
<b>Length</b>	0.170	0.646	0.360	1.000	inches
<b>Diameter</b>	0.360	0.495	0.400	1.000	inches
<b>Package</b>	TO-5 with Cap	parabolic optic	parabolic optic	elliptical optic	
<b>Normalized On-Axis Output at 1 inch</b>	1	15	11	NA	
<b>Normalized Angular Output--FWHM</b>	100°	15°	20°	NA	



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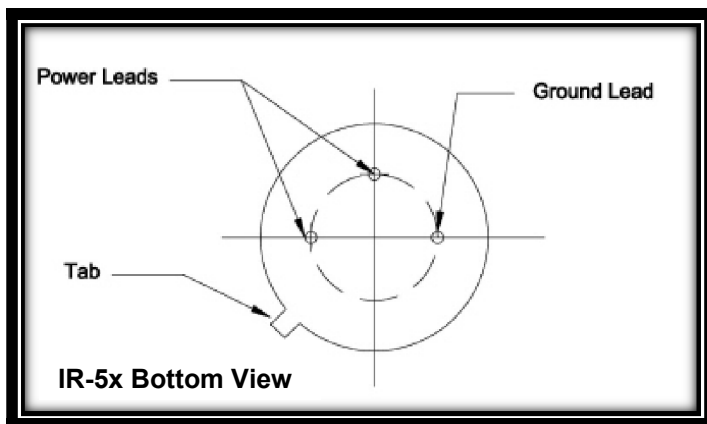
## Operational Guidelines - Infrared Source Series 5x

The HawkEye IR-5x Series utilizes a thin thermoresistive film of conducting amorphous (diamond-like) carbon. Infrared radiation is the result of heating this film by passing an electric current through it.

The maximum temperature of the film should not exceed 750°C in continuous operation. A faint red luminescence of the film is observed during operation at temperatures near 750°C. Short term heating up to 850°C is possible but will reduce the lifetime of the unit.

The operating parameters assume an infrared source operating without a radiator and at ambient temperature and pressure. A rectangular voltage pulsed at a frequency of 10 hertz and with a duty cycle of 50% is used for heating.

Two power leads and a ground are provided per the sketch below. The IR-50 emitter is to be powered through the two power leads. Bi-polar drive voltage may be used. The Case Ground Lead is not required under normal operation.





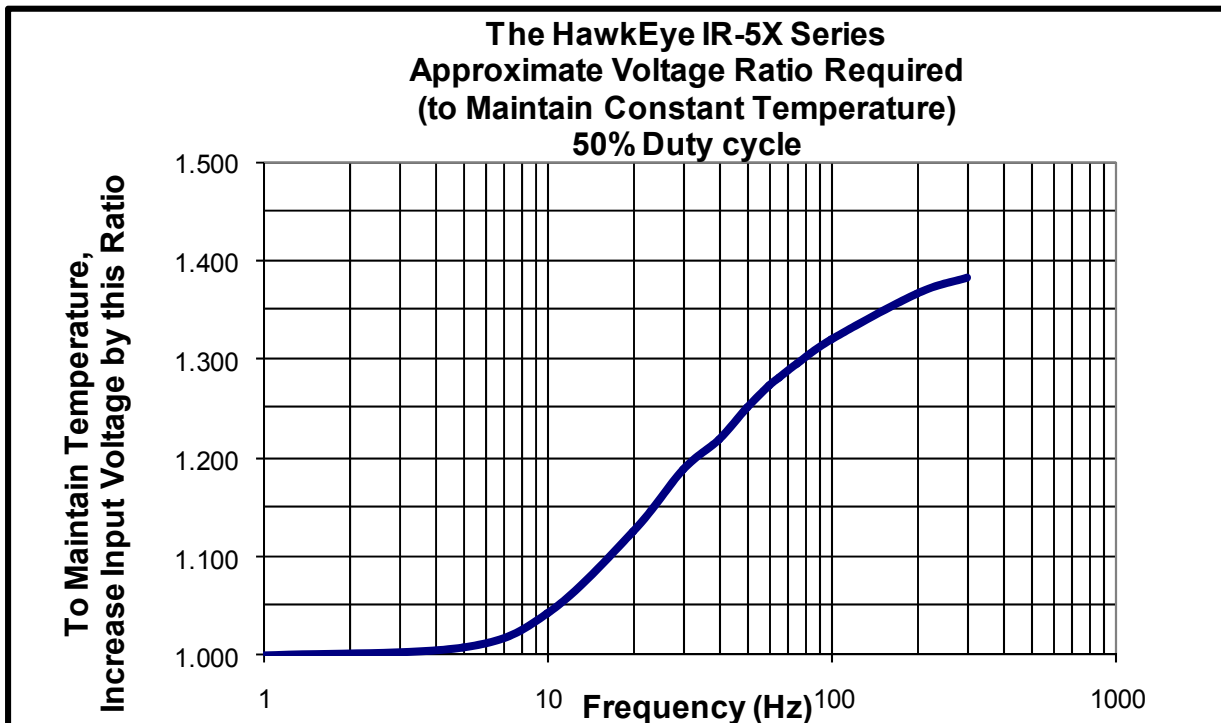
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The HawkEye IR-5x Series is the perfect solution for an application that requires fast electrical modulation. However, it can also be used in a steady state (dc) mode. In applications where steady state power is used (or if used with electrical modulation but with a duty cycle of greater than 50%), it is recommended that the nominal input power specifications be reduced in order to avoid overheating of the membrane.

On the other hand, by reducing the length of the heating pulse or by increasing the frequency of modulation, the membrane will not have sufficient time to reach the desired temperature. In this case, the pulsed power can be increased to allow the temperature to be maintained. The chart below shows the factor by which the voltage can be increased as frequency is increased. This chart reflects a 50% duty cycle.





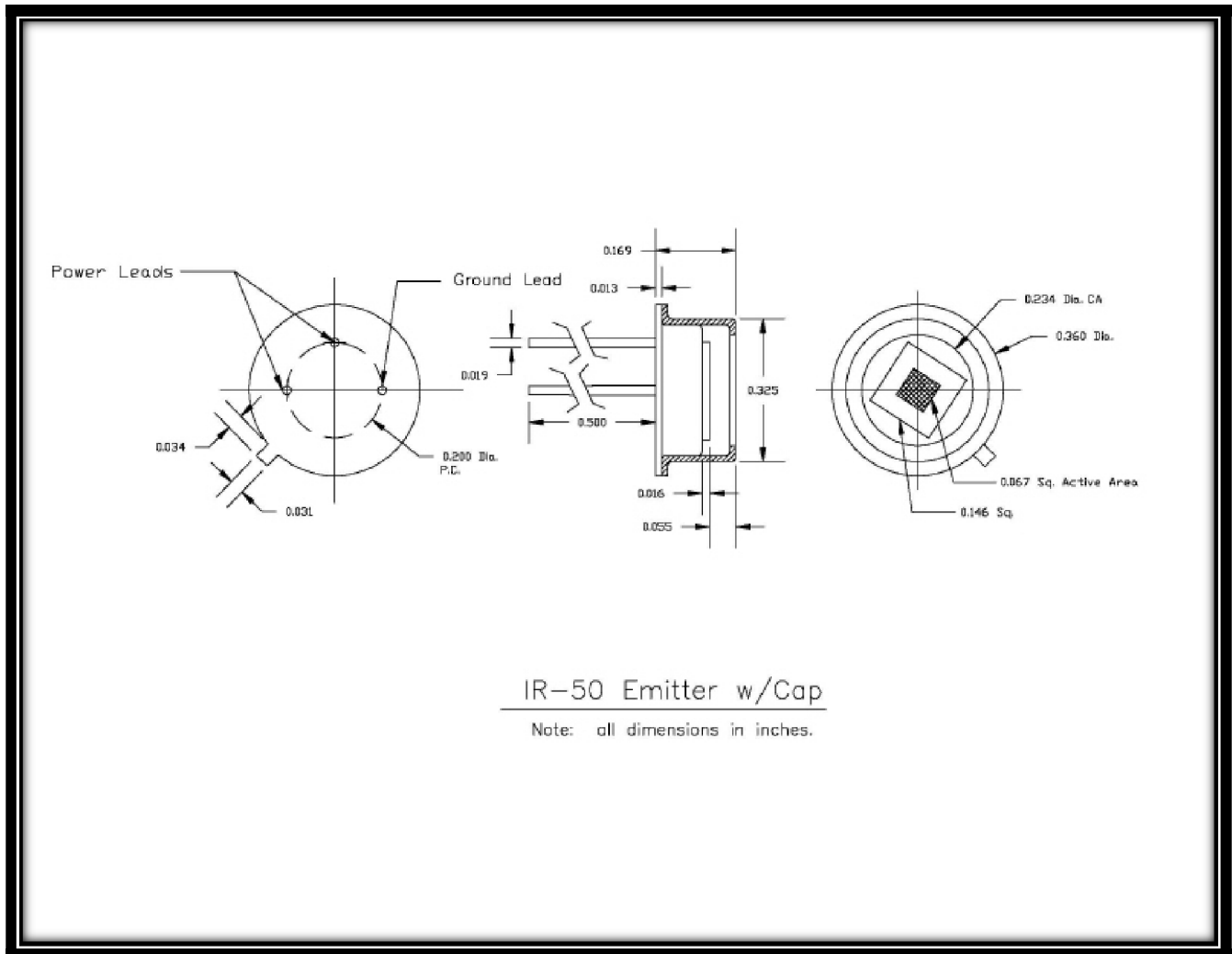
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## HawkEye IR-50

The IR-50, mounted in a TO-5 base with a windowless cap provides the smallest package and gives the widest output energy beam. FWHM (full width at half max) for the IR-50 is 100°, as demonstrated in the Normalized Angular Output Chart on page 12.







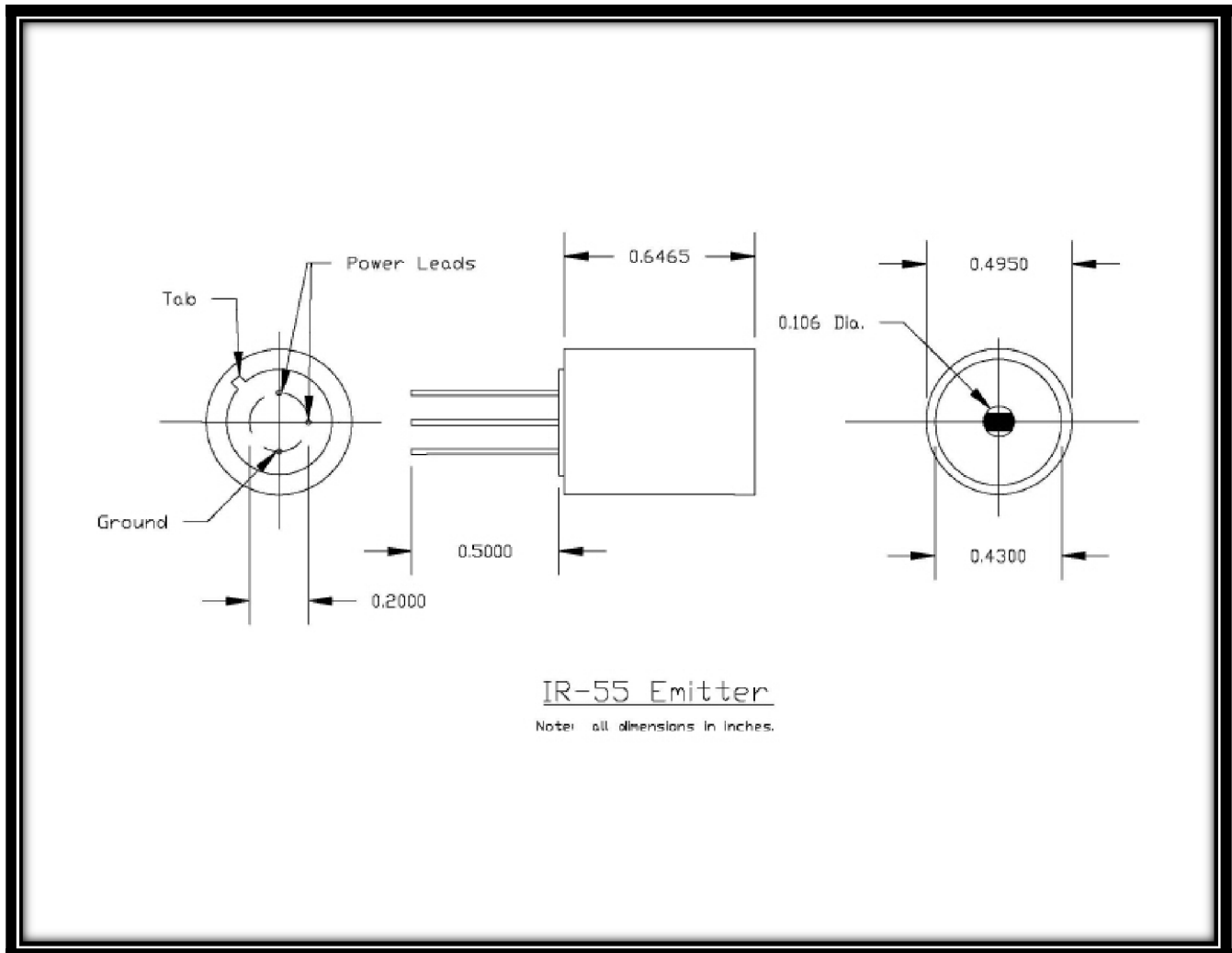
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## HawkEye IR-55

The IR-55 utilizes a collimated HawkEye Optic to provide more than 12x the on-axis output. The package is 0.5 inches in diameter and 0.65 inches long. FWHM (full width at half max) for the IR-55 is 15°. See the Normalized Angular Output Chart on page 12.





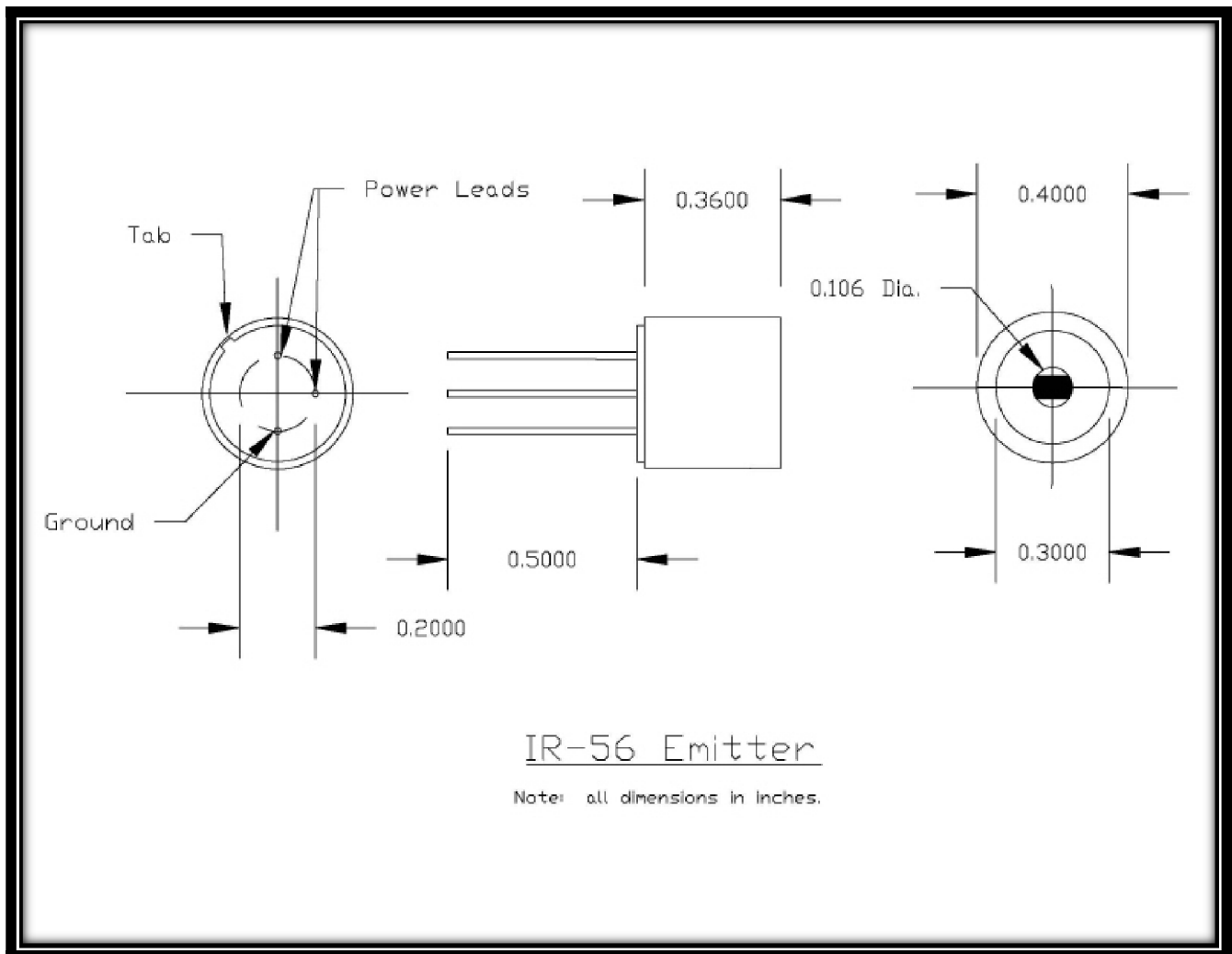
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## HawkEye IR-56

The IR-56 is built upon the same technology as the IR-55, but has just 36% of the IR-55 size. The package is 0.40 inches in diameter and 0.36 inches long. And yet it delivers 50% to 75% of the IR-55 on-axis output energy. FWHM (full width at half max) for the IR-56 is 20°. See the Normalized Angular Output Chart on page 12.





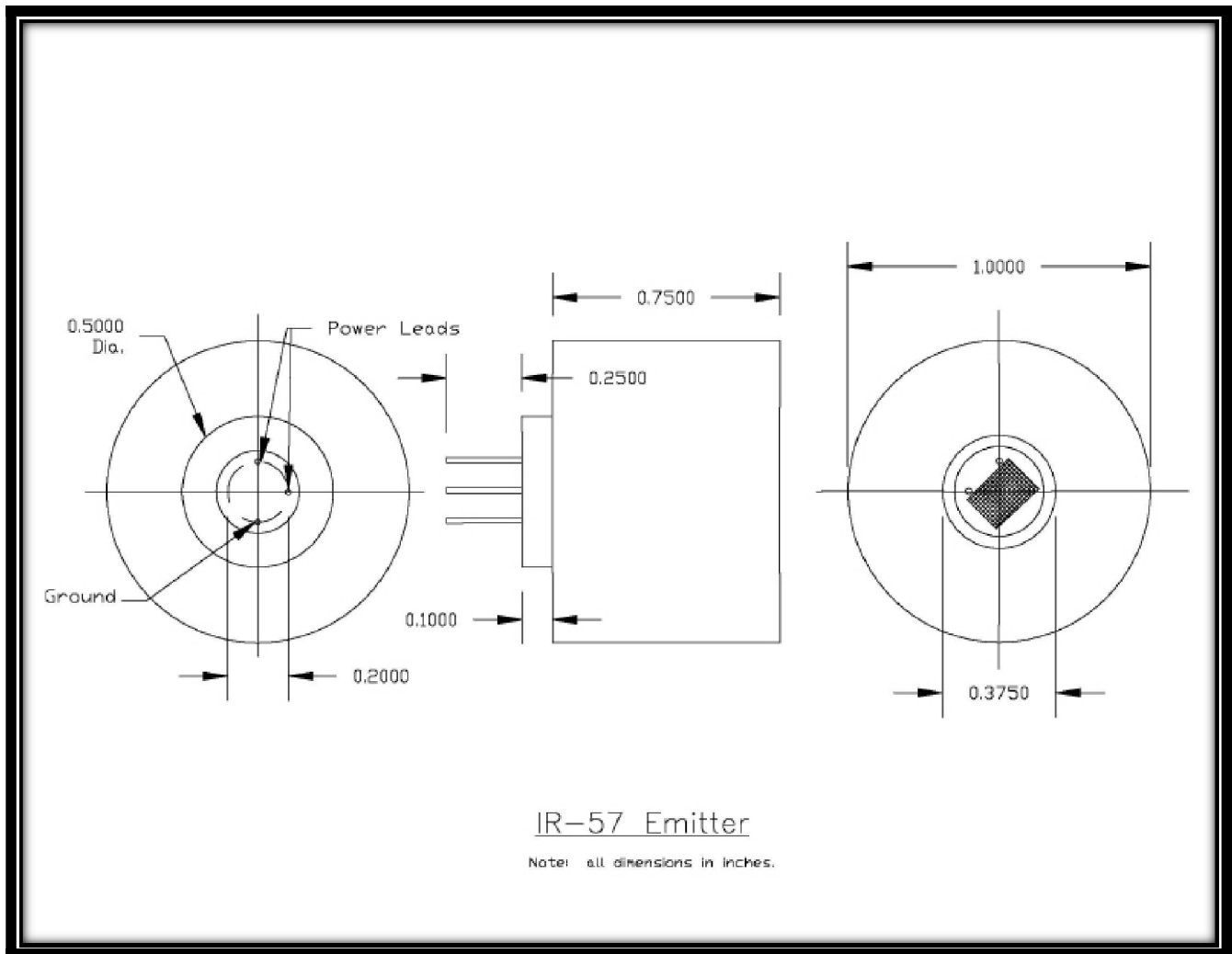
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## HawkEye IR-57

The HawkEye Technologies IR-57 utilizes a highly efficient elliptical optic to capture and focus the energy of the HawkEye IR-50 Pulsable Emitter. The unit is one inch in diameter and has an external focal point that is  $\frac{1}{2}$  inch in front of the clear aperture.



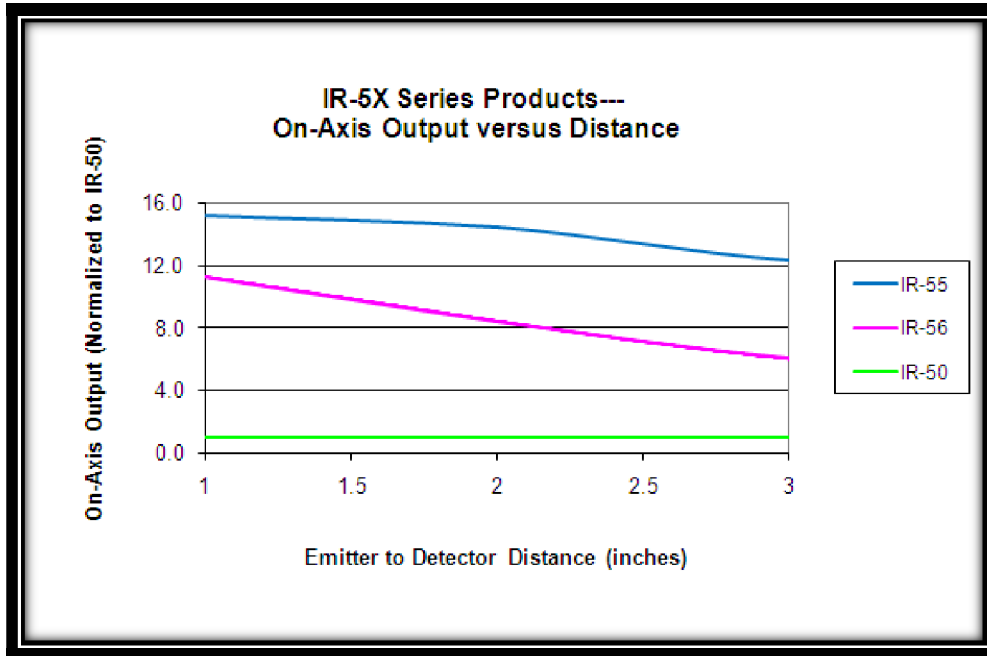


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## Normalized On-Axis Output



## Normalized Angular Output

