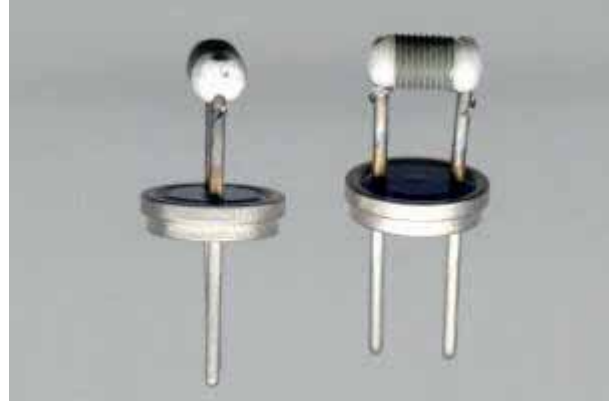


IR-12 8W IR Source, IR-12K 11W IR Source**Features**

This infrared light source is a thermal emitter with an emissivity of ~80%. It is appropriate for use in laboratory or field instrumentation due to its long life and stable properties.

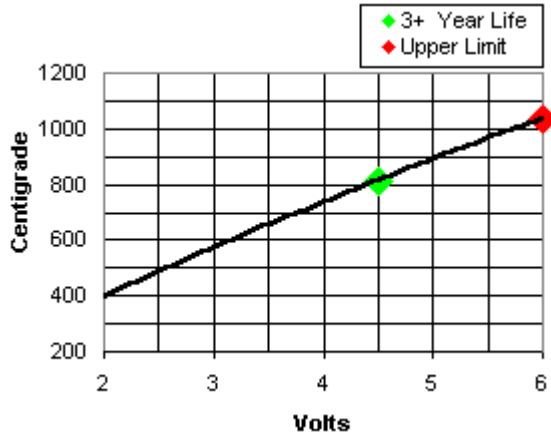
The coiled filament operates at 800°C when powered with 8 watts for the standard IR-12 source or 975°C when powered with 11 watts for the IR-12K. The radiating element is a coiled resistance wire which has a high emissivity in the infrared spectral region. The coil is supported on a cylindrical substrate of alumina, resulting in the windings being electrically insulated from each other. This contributes to a more uniform radiating source. The unit does not require operation in a sealed atmosphere. The header which is fabricated from cold-rolled steel has a diameter of 8.6 mm. The support pins, which are also the power leads, are hermetically sealed in glass.

The IR-12 part uses a high stability wire where as the IR-12K uses Kanthal resistance wire for operation at higher temperatures. Apart from the wire used, the IR-12 and IR-12K are identical.

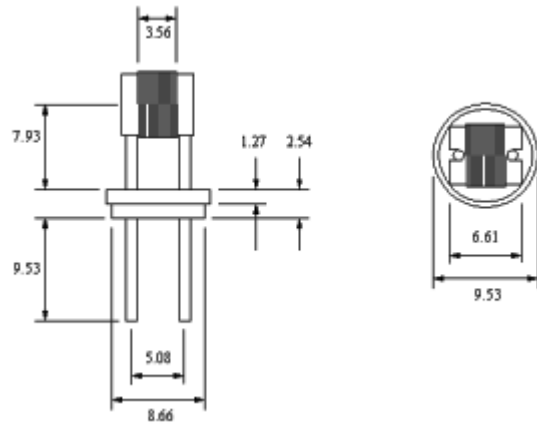
These popular units have been in production since 1980. They are considered rugged and reliable.

Operating Specifications IR-12

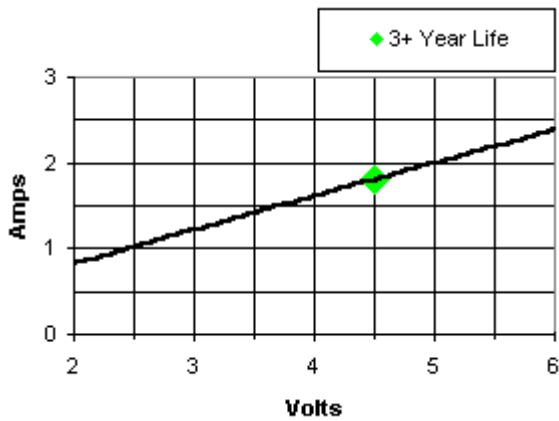
- Voltage: 4.5 Volts (AC or DC)
- Temperature: 800°C
- Current: 1.8 Amps
- Power: 8.0 Watts
- Active area: 3.5 mm x 3.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 825°C, typical



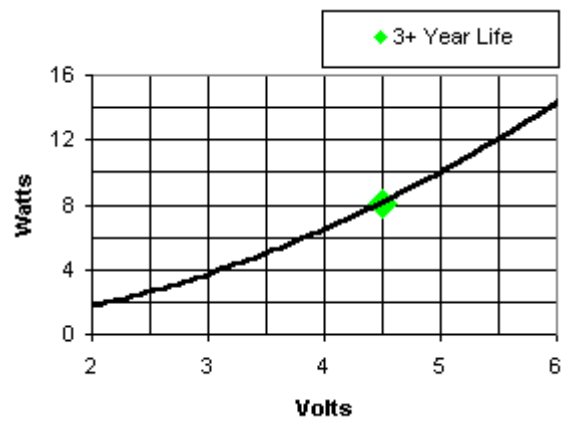
Temperature VS Voltage



Dimension



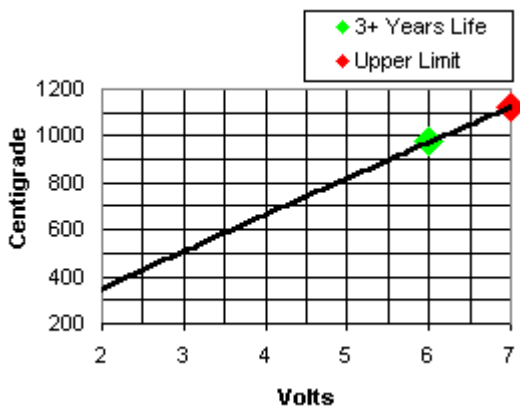
Current VS Voltage



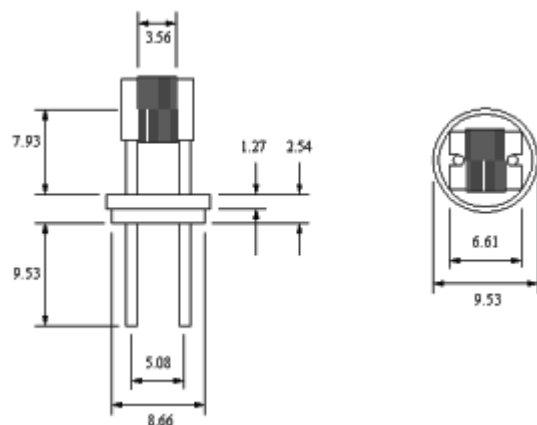
Power VS Voltage

Operating Specifications IR-12K

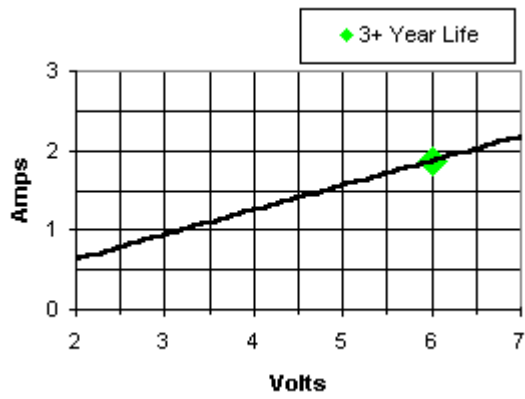
- Voltage: 6 Volts (AC or DC)
- Temperature: 975°C
- Current: 1.8 Amps
- Power: 11.0 Watts
- Active area: 3.5 mm x 3.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 975°C, typical
-



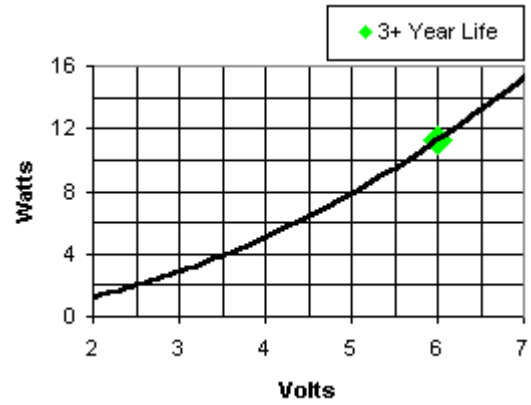
Temperature VS Voltage



Dimension



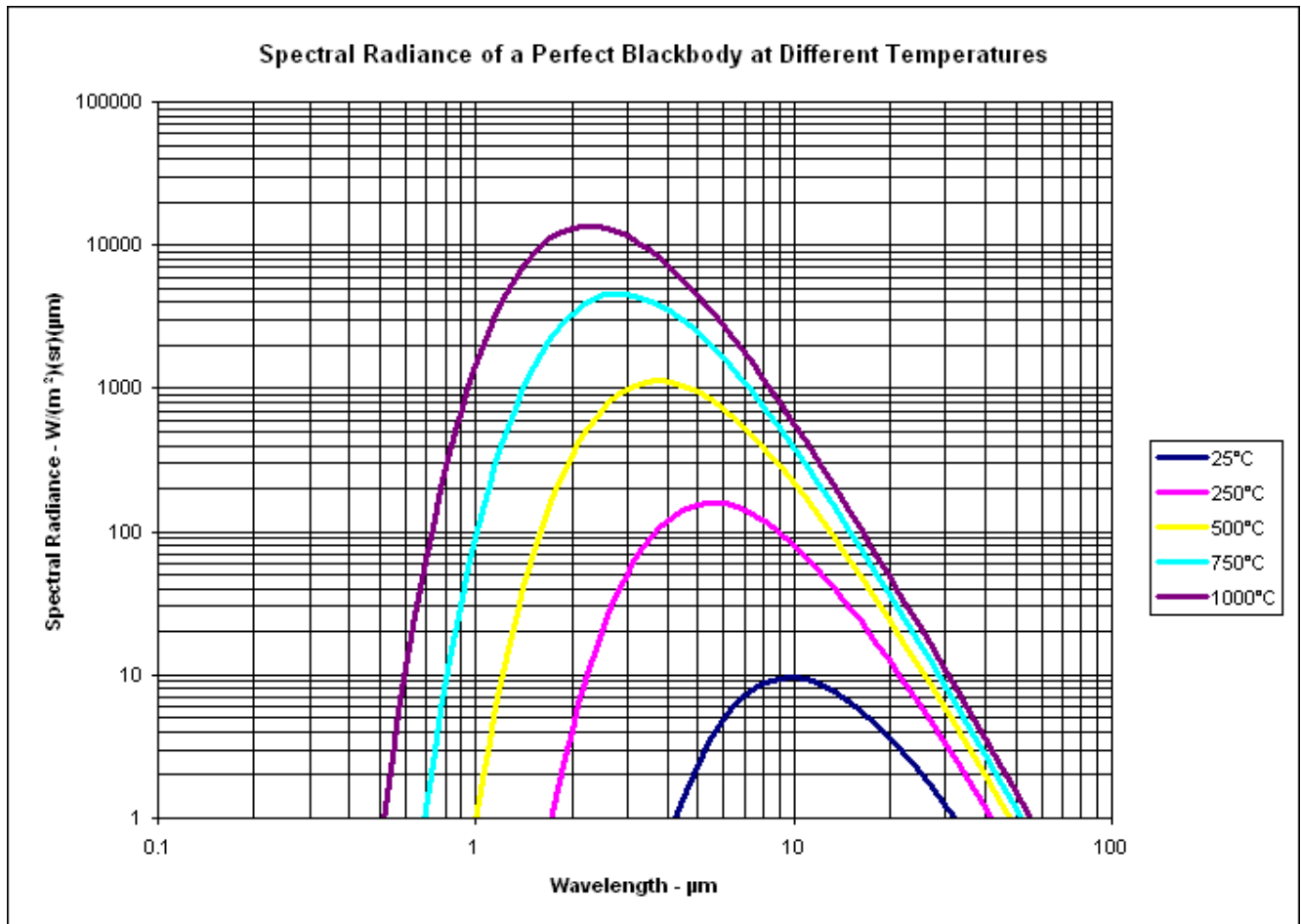
Current VS Voltage



Power VS Voltage

Spectral Radiance

Spectral radiance output for a perfect black body of various temperatures. The IR-12 and IR-12K produce approximately 80% of these figures in the 1µm to 22µm range.



IR-21, IR-21V 4W IR Source, IR-22, IR-22V 3.4W IR Source**Features**

This infrared light source is a thermal emitter with an emissivity of ~80%. It is appropriate for use in laboratory or field instrumentation due to its long life and stable properties.

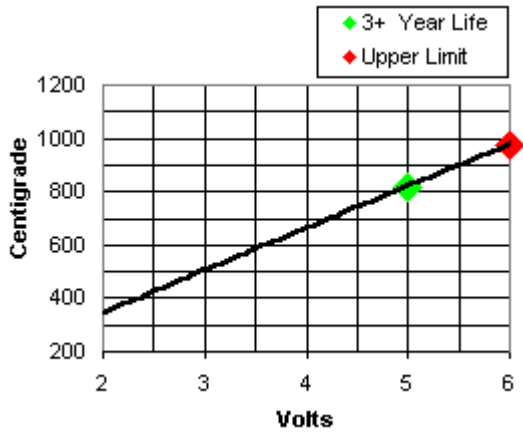
The coiled filament operates at ~800°C when powered with 4 watts for the IR-21 and 3.4 watts for the IR-22. The radiating element is a coiled resistance wire which has a high emissivity in the infrared spectral region. The coil is supported on a cylindrical substrate of alumina. Due to the reduced mass of this unit it can be pulsed at up to 1 hertz with a resultant temperature variation that can be detected though the depth of modulation is small. For better pulsed infrared light source operation please see the IR-40 and IR-50 sources. The unit does not require operation in a sealed atmosphere.

The header is available in two sizes. The larger, IR-21, has an 8.6 mm diameter base. The smaller, IR-22, has a 4 mm diameter base. The support pins, which are also the power leads, are hermetically sealed in glass.

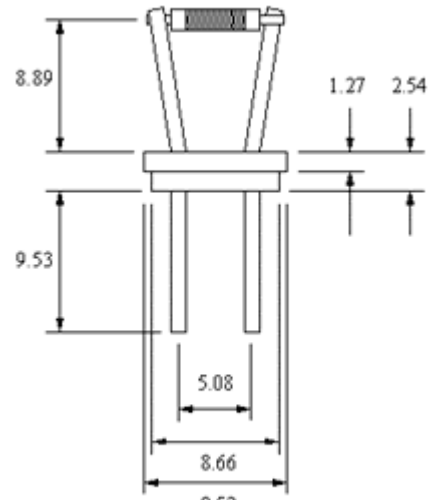
The IR-20 Series is offered in two configurations: the IR-21 and IR-22 have the element mounted horizontally and the IR-21V and IR-22V which have the element mounted vertically.

Operating Specifications IR-21 (horizontal element), IR-21V (vertical elemental)

- Voltage: 5 Volts (AC or DC)
- Temperature: 800°C
- Current: 0.8 Amps
- Power: 4.0 Watts
- Active area: 1.5 mm x 3.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 800°C, typical

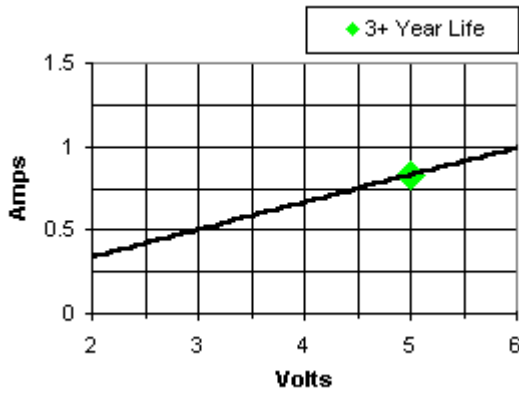


Temperature VS Voltage

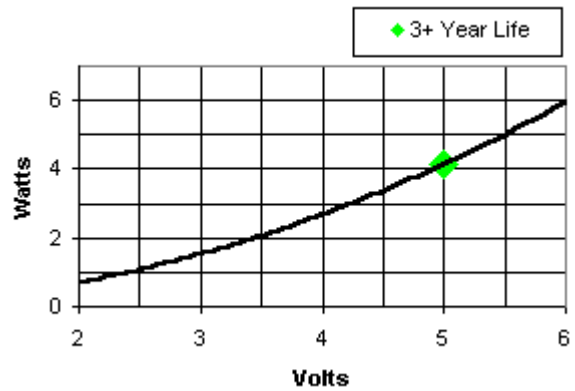


IR-21 Horizontal Mount

Dimension



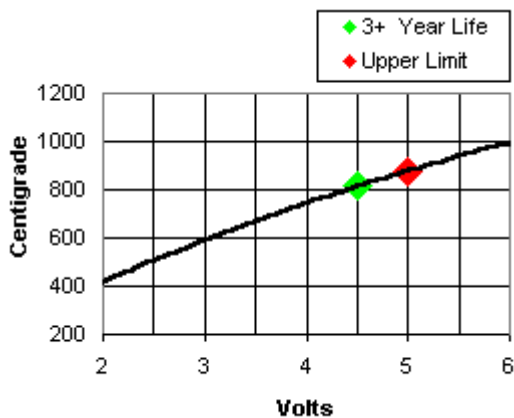
Current VS Voltage



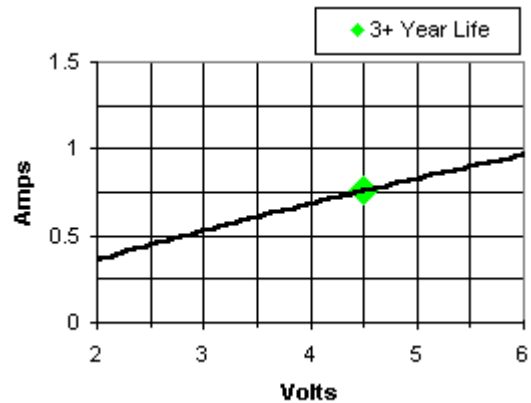
Power VS Voltage

Operating Specifications IR-22 (horizontal element), IR-22V (vertical elemental)

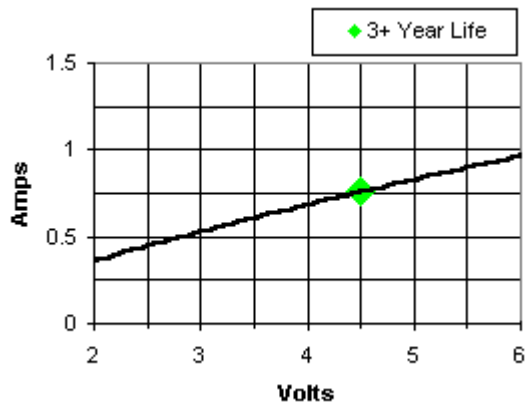
- Voltage: 4.5 Volts (AC or DC)
- Temperature: 800°C
- Current: 0.75 Amps
- Power: 4.0 Watts
- Active area: 1.5 mm x 3.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 800°C, typical



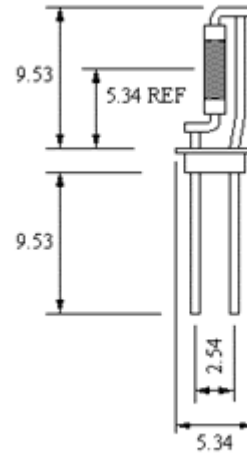
Temperature VS Voltage



Power VS Voltage



Current VS Voltage

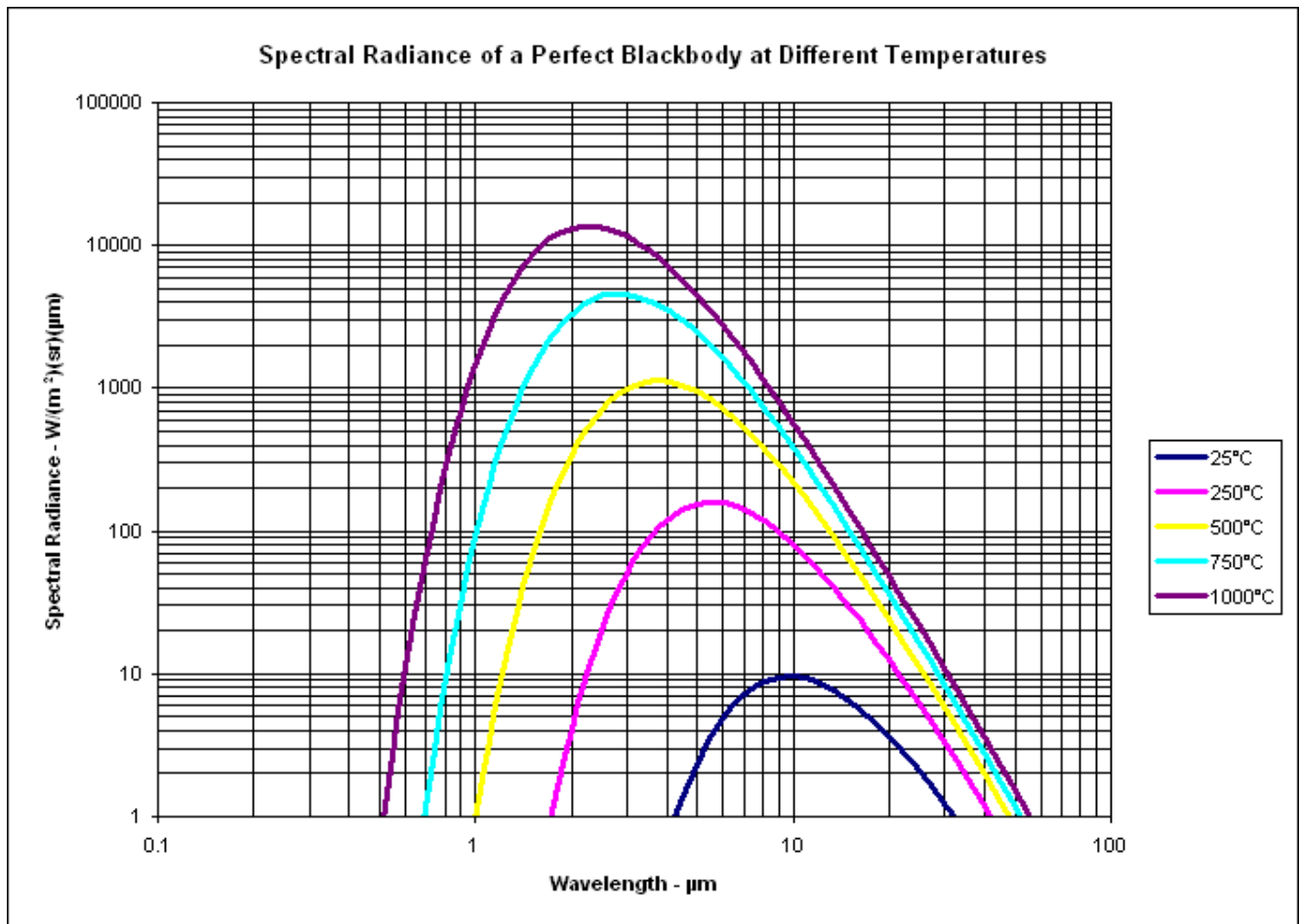


IR-22V Vertical Mount

Dimension

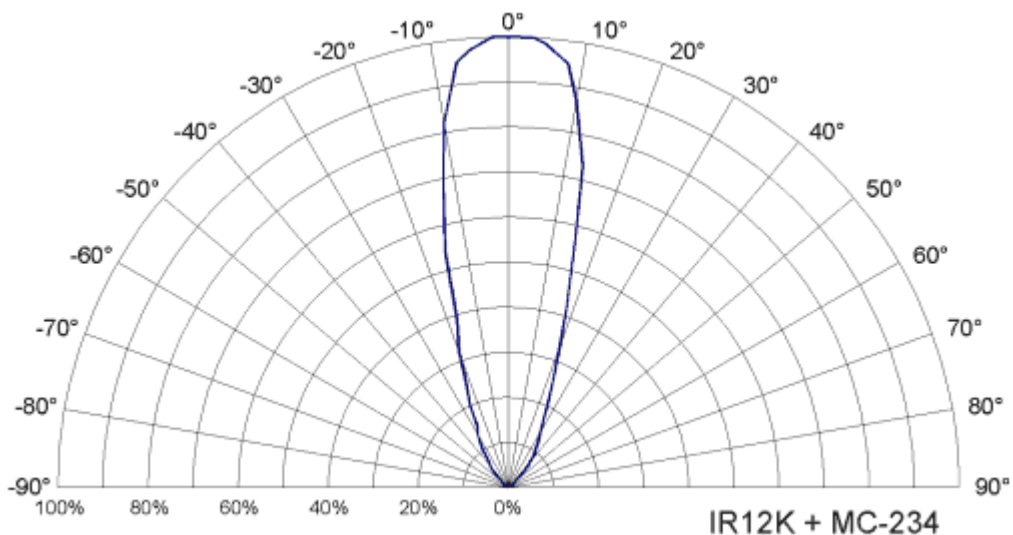
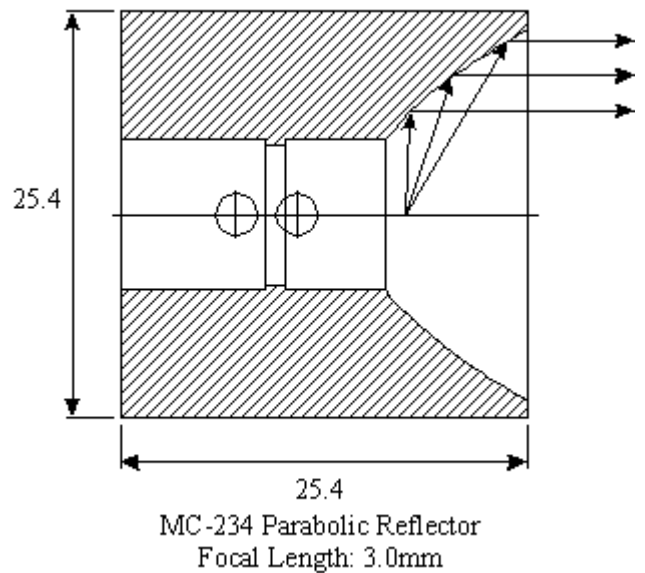
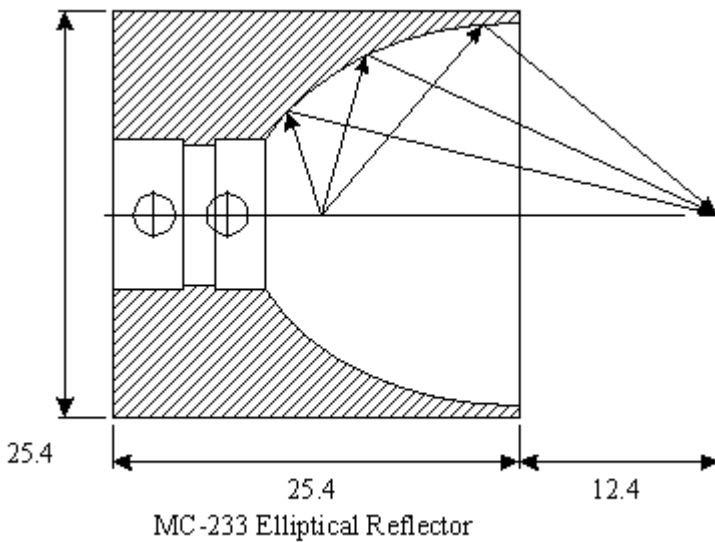
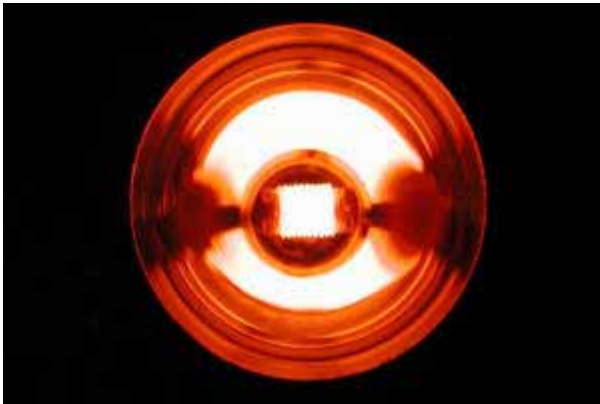
Spectral Radiance

Spectral radiance output for a perfect black body of various temperatures. The IR-21, IR-21V, IR-22 and IR-22V produces approximately 80% of these figures in the 1 μ m to 22 μ m range.



MC-233 Elliptical and MC-234 Parabolic Reflectors

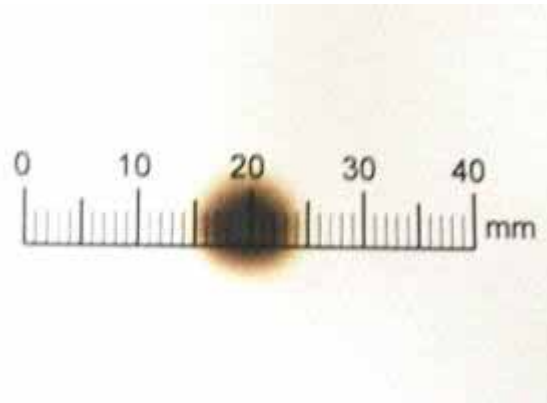
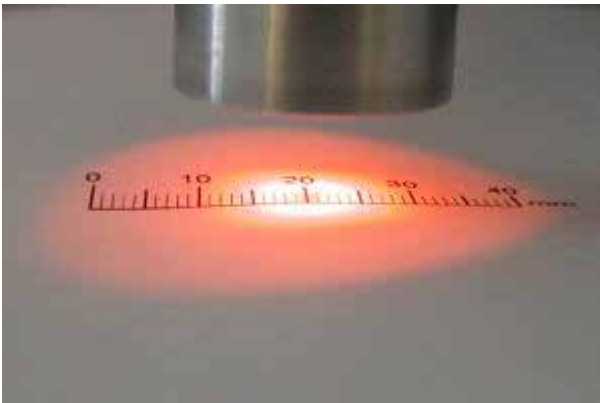
25mm x 25mm (1" x 1") parabolic and elliptical reflectors are available suitable for use with Series 12 and Series 21 range of IR sources. The reflectors are made from machined and polished aluminium (they are not anodised). A grub screw is used to fix the IR source into position.



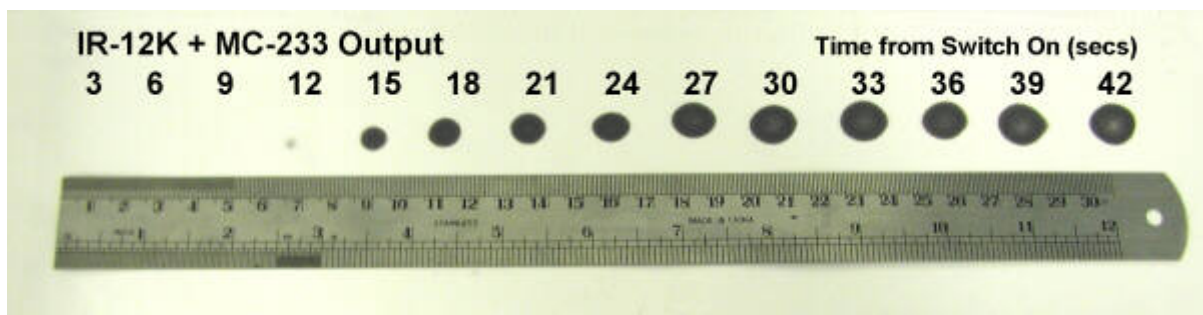
The angular output for a IR-12K with a MC-234 has been tested with a 75mm spacing between the

emitter and the detector. The resulting curve is shown below. The full width at half maximum (FWHM) is approximately 30 degrees.

The combination of the IR-12K and the MC-233 Elliptical reflector creates an output image as shown below. The majority of optical output is concentrated within an approx 8mm circle 12mm from reflector. Please note, the output is easily strong enough to char paper.



By using an IR-12K, an MC-233 elliptical reflector and a piece of fax paper, it is possible to monitor how quickly the IR-12K heats up. Full power is reached approximately 30 seconds from switch on. (Approx 2.5 second exposure at each point.)



MC-233 + IR-12



MC-233 + IR-21



MC-233V + IR-21V



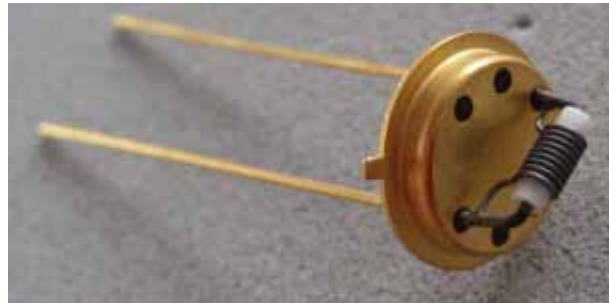
MC-234 + IR-12



MC-234 + IR-21



MC-234V + IR-21V

IR-30 4W TO-5 mounted IR Source**Features**

Scitec Instruments is pleased to announce a new product in its IR Sources range.

The IR-30 is a coil-wound, supported IR Source, mounted on a TO-5 header. It is appropriate for use in laboratory or field instrumentation due to its long life and stable properties.

At steady state, the coiled filament operates at $\sim 950^{\circ}\text{C}$ when powered with 4 watts (2.5 volts, 1.6 amps).

It can be pulsed up to 1 Hz with a larger power input. When operated at 1 hertz, 50% duty cycle with 3.5 volts, 7.1 watts, the output is a well defined saw tooth with approximately 34% modulation depth.

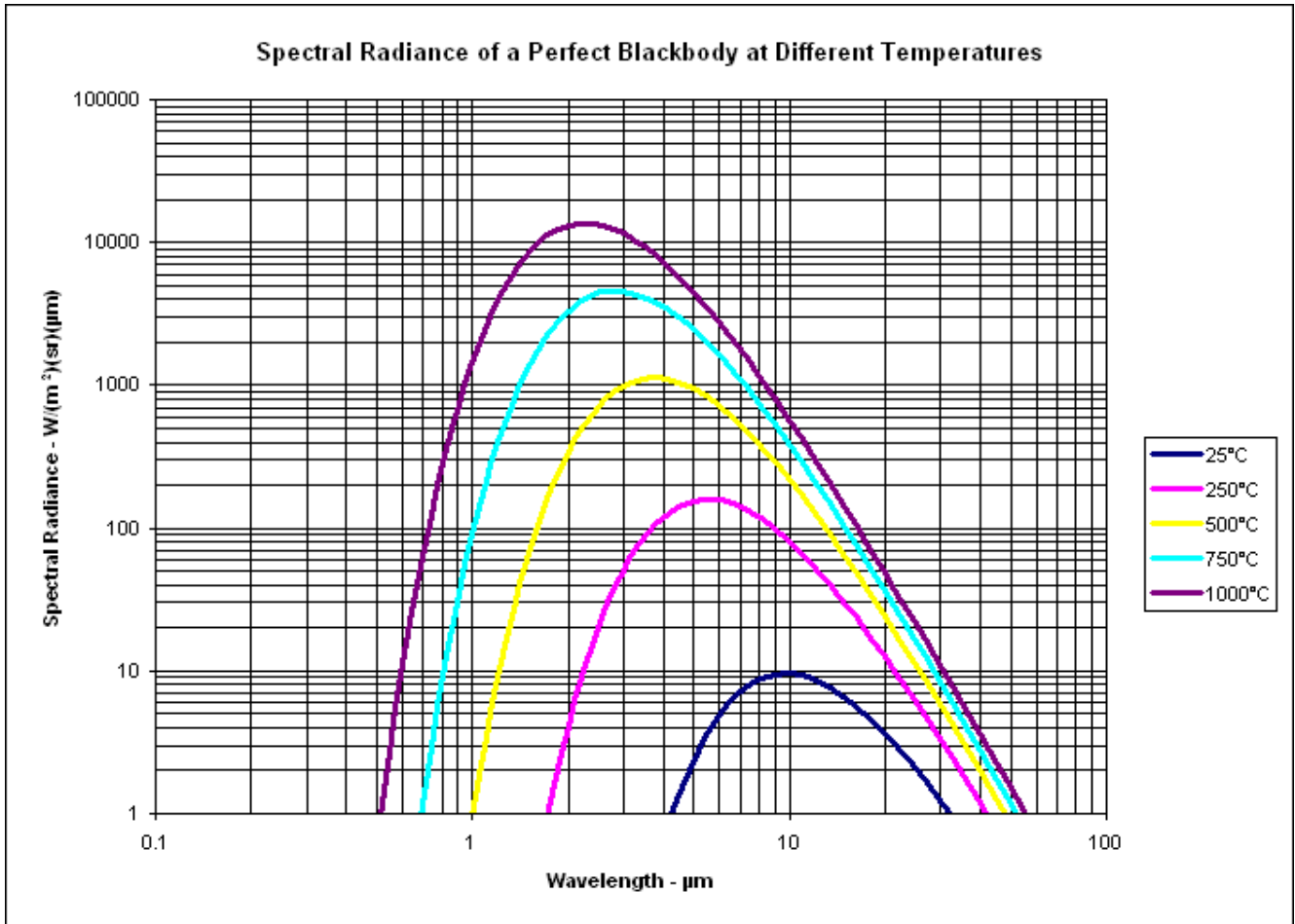
This product could also be coupled with a parabolic or elliptical reflector. Please contact us for more information.

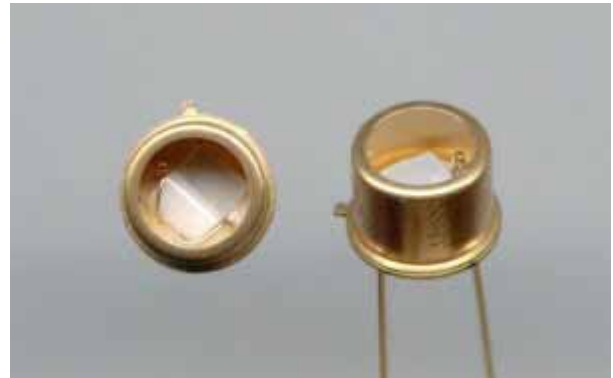
Operating Specifications IR-30

- Voltage: 2.5 Volts (AC or DC)
- Temperature: 950°C
- Current: 1.6 Amps
- Power: 4.0 Watts
- Active area: 1.8 mm x 1.8 mm
- Emissivity: ~ 0.75
- Lifetime: $\sim 25,000$ hours

Spectral Radiance

Spectral radiance output for a perfect black body of various temperatures. The IR-30 produces approximately 75% of these figures in the 1 μ m to 22 μ m range.



IR-40/40NC/40S 4W Thin Film IR Source**IR-42, IR-43/43NC/43S** 1.3W Thin Film IR Source**Features**

This infrared source is a thermal emitter with an emissivity of ~80%. It is appropriate for use in laboratory or field instrumentation due to its long life and stable properties.

These thin film units operate at ~600°C when powered with 4 watts for the IR-40 or 1.2 watts for the IR-43. The radiating element is an approximately 1.5 micron thin film of precision laser trimmed resistance material. The IR-40 element is permanently bonded to a flat substrate of alumina forming a stable platform. This contributes to a uniform radiating source. The unit does not require operation in a sealed atmosphere. The thin film design results in a low mass of radiation material.

The IR-40 unit is attached to a TO-5 header with high temperature cement. This unit is also offered without a cap (as an IR-40NC) and with a cap and sapphire window (as an IR-40S). For alternative mounting, it is also offered attached to a flat, butterfly shaped, steel header (as an IR-42).

The IR-43 unit is free standing on a TO-5 header. It requires less power to achieve the same temperature as the IR-40. Without a directly connected mass to draw off heat, it is more responsive.

Operating Specifications IR-40

- Voltage: 35 Volts (AC or DC)
- Temperature: 600°C
- Current: 115 mA
- Power: 4.0 Watts
- Active area: 3.5 mm x 2.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 600°C, typical

Operating Specifications IR-43

- Voltage: 14 Volts (AC or DC)
- Temperature: 600°C
- Current: 90 mA
- Power: 1.3 Watts
- Active area: 1.5 mm x 1.5 mm
- Emissivity: 0.80
- Lifetime: 3+ years at 600°C, typical

Descriptions

<u>IR-40</u>	4W Thin Film IR Source
<u>IR-40NC</u>	4W Thin Film IR Source, No Cap
<u>IR-40S</u>	4W Thin Film IR Source, Sapphire Window
<u>IR-42</u>	1.3W Thin Film IR Source, Butterfly Shaped, Steel Header
<u>IR-43</u>	1.3W Thin Film IR Source, Free Standing on TO-5 Header
<u>IR-43NC</u>	1.3W Thin Film IR Source, Free Standing on TO-5 Header, No Cap
<u>IR-43S</u>	1.3W Thin Film IR Source, Free Standing on TO-5 Header, Sapphire Window

IR-50, IR-55, IR-56 1W Thin Film IR Source



Overview

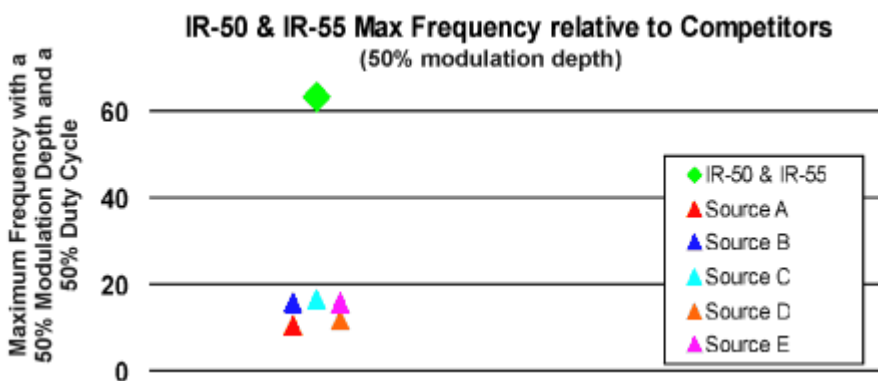
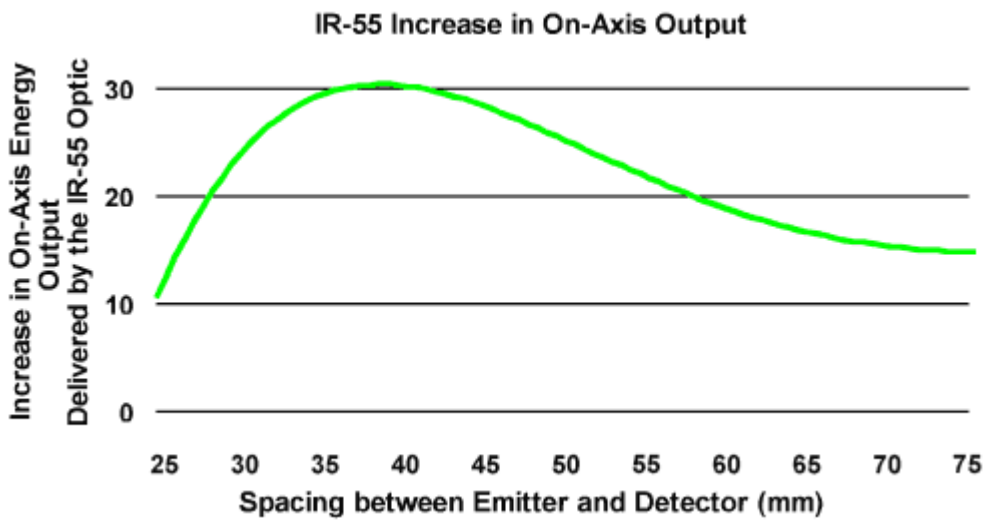
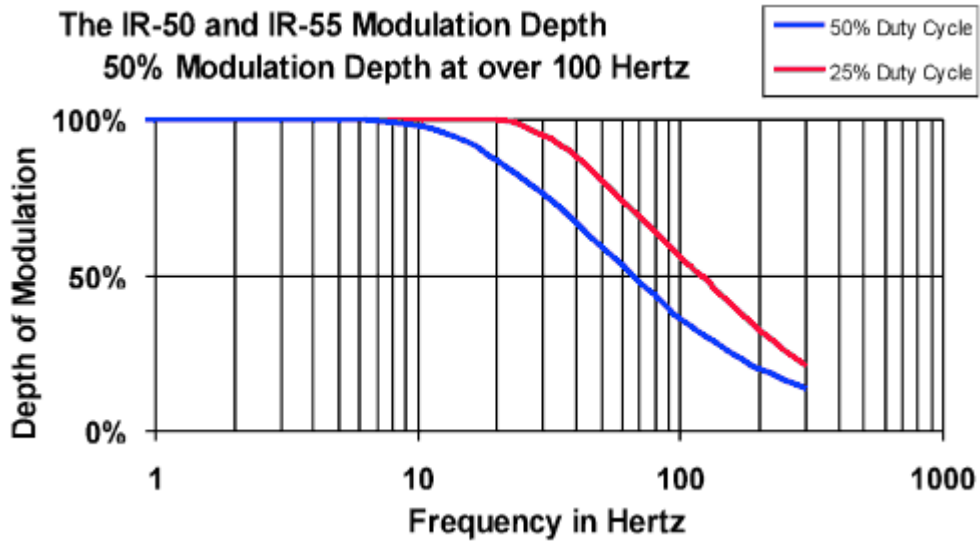
The IR-50 range of broadband infra red lamps is based around a very low thermal mass diamond-like carbon thin film element. Due to the low thermal mass, the infra red lamp can be pulsed at frequencies up to 100Hz with good modulation depth, or contrast between the on and off states. It is therefore suitable for use with quantum detectors like photoconductive PbS and PbSe, which otherwise would require a chopper to avoid excess low frequency "flicker" (1/f) noise.

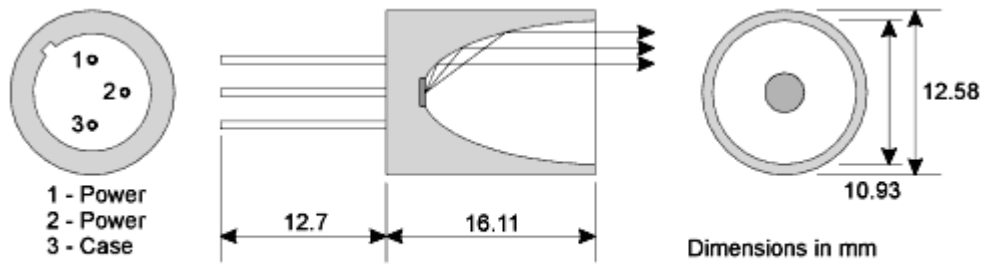
This lamp is significantly better, watt for watt and Hz for Hz, than any competing non-mechanical modulation that technology offers. This new lamp has an active area of approximately 2.9 mm² and is supplied in a TO-5 style package. The normal working range is 500° to 750° C with peak short term heating up to 850° C possible. Calculated lifetime is approximately three years at 600°C.

Three families of parts are available in this range though both use the same element as the emitting infra red lamp.

Operating Specifications IR-50, IR-55, IR-56

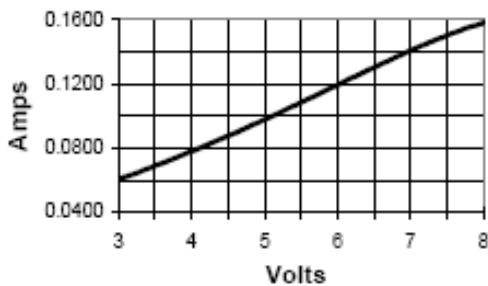
- Voltage: 6.4 volts (AC or DC)
- Temperature: 750°C
- Resistance in the Hot state: 50 ohms, Measured at 5 Hz frequency, 50% duty cycle.
- Current: 135 mA
- Power: 0.9 Watts
- Cooling Time Constant: 11.5 ms
- Heating Time Constant: 35 ms
- Modulation Depth: 50% at 63 Hz, 50% Duty Cycle
- Active area: 1.7 mm x 1.7 mm
- Emissivity: 0.80
- Lifetime: 6+ months at 750°C 10Hz 50% Duty Cycle, typical, 3+ years at 600°C 10Hz 50% Duty Cycle, typical, 8+ years at 450°C 10Hz 50% Duty Cycle, typical (constant operation is approximately half these figures).



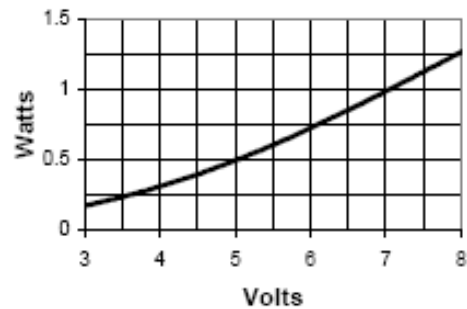


IR-55 Drawing

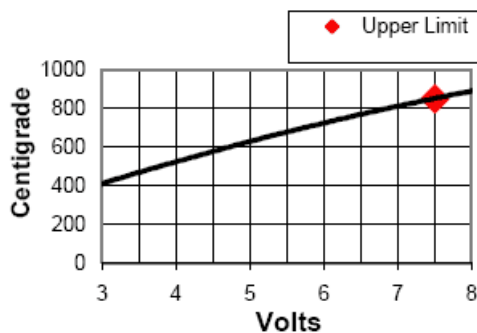
Current vs Voltage



Power vs Voltage



Temperature vs Voltage



Operation above the normal operating point of 750°C and 6.4V will severely reduce the lifetime of the part. Approaching the upper limit runs the risk of blowing the thin film element. Long term operation at 850° is not recommended.

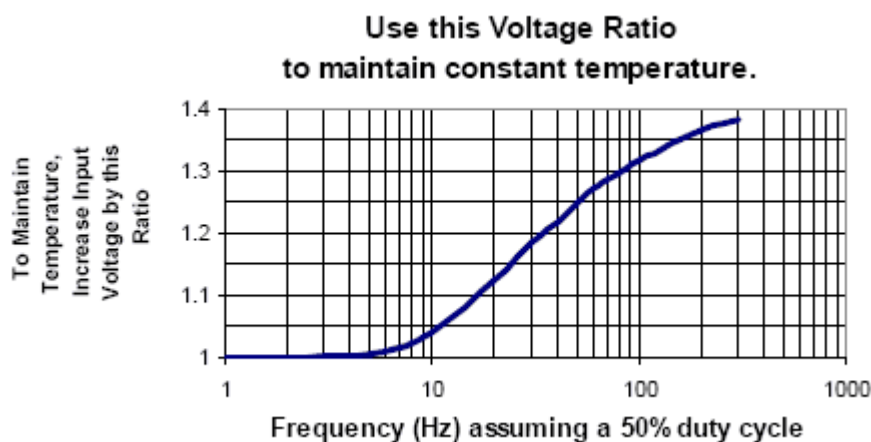
Operating Guidelines

The IR-50 Series utilises a thin thermoresistive conducting film of amorphous (diamond-like) carbon. Infrared radiation is the result of heating this film by passing an electric current through it. Either a constant voltage or a constant current power source is suitable for driving these parts, however it is the temperature of the source that is important.

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

The specifications shown below assume an infrared source operating without a radiator and at ambient temperature and pressure. Operation with a radiator will cause the part to cool and hence the temperature of the part will drop and the drive voltage will need to be increased to compensate. Operating in an enclosed space or a high ambient temperature will generally cause the part to overheat and the drive voltage will need to be reduced to compensate.

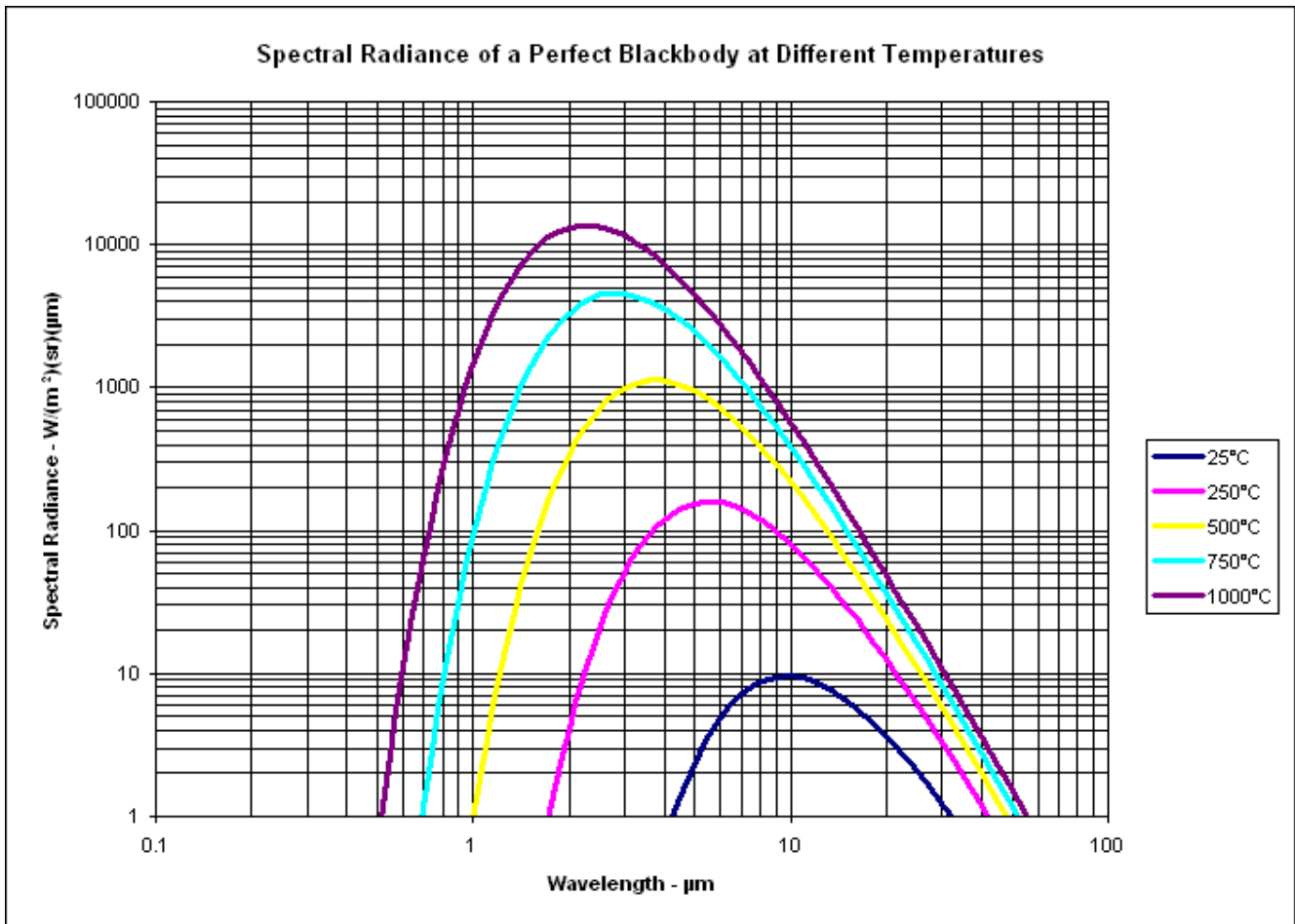
The IR-50 Series is the perfect solution for an application that requires fast electrical modulation. However, it can also be used in a steady state (DC) mode. In applications where steady state power is used (or if used with electrical modulation but with a duty cycle of greater than 50%), it is recommended that the nominal input power specifications not be exceeded 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 750°C. In this case, the pulsed power can be increased to allow 750°C to be maintained. The chart below shows the factor by which the voltage can be increased as frequency is increased. This chart assumes a 50% duty cycle. Use this Voltage Ratio to maintain constant temperature.



Using a 50% duty cycle and the appropriate power factor as determined above, a 50% modulation depth is achievable at modulation frequencies of more than 60 hertz. This modulation depth can be achieved at even higher frequencies (more than 100 hertz) if a 25% duty cycle were used along with a correspondingly higher power factor (sufficient to maintain the membrane temperature at 750°C). Please contact us for assistance in determining the proper power factor for the duty cycle to be used in your application.

Spectral Radiance

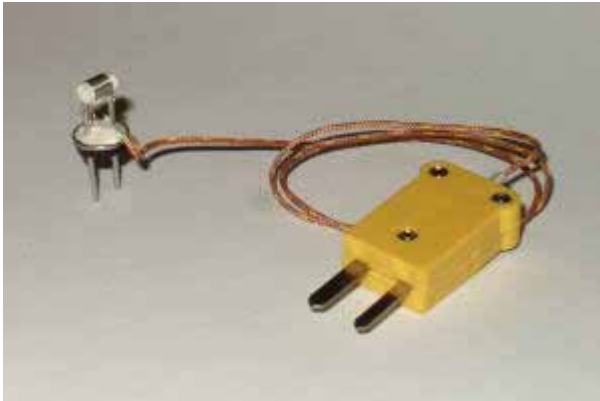
Spectral radiance output for a perfect black body of various temperatures. The IR-50 and IR-55 produces approximately 80% of these figures in the 1µm to 22µm range.



Descriptions

<u>IR-50</u>	Lamp mounted in TO5 style can
<u>IR-50NC</u>	Lamp mounted in TO5 case base but without the top cap
<u>IR-50S</u>	Lamp mounted in TO5 style can with sapphire window
<u>IR-55</u>	Lamp mounted in parabolic reflector (no window)
<u>IR-56</u>	Lamp mounted in parabolic reflector (no window)

IR Source Calibration System



Features

This infrared calibration system consists of a standard Series 12 infrared source, a Type K thermocouple and a digital thermometer.

These units have been used as checks on infrared instruments such as thermometers and cameras. When power is applied to the infrared source the unit heats and the digital thermometer generates a digital read out of the surface temperature. The thermocouple output can also be used as an input to the power supply system to control the source temperature.

Infrared Calibration Source IR-12/TC

The Type K thermocouple sensor is fabricated using special limit error thermocouple wire. The wire is rated at $\pm 1.1^{\circ}\text{C}$. The sensor is applied directly to the coil of the infrared source. High temperature, low-expansion material is used to apply the sensor. The thermocouple is terminated with a standard Type K ANSI miniature plug.

Digital Thermometer /DT

The calibration source can be plugged directly into this unit. The meter accepts all Type K thermocouple probes with ANSI miniconnectors.

Features

- HOLD button to freeze reading
- Switch for readouts in $^{\circ}\text{F}$ and $^{\circ}\text{C}$

- Display has large 1/2" digital characters
- Measurement range: -50°C to 1300°C
- Meter comes with 9 volt battery
- Three and a half digits

Descriptions

IR-12/TC	8 Watt Infrared Source - 800°C with Thermocouple
IR-12K/TC	11 Watt Infrared Source - 975°C with Thermocouple
IR-12/TC/DT	8 Watt Infrared Source - 800°C with Thermocouple and Digital Thermometer Display
IR-12K/TC/DT	11 Watt Infrared Source - 975°C with Thermocouple and Digital Thermometer Display
DT	Digital Thermometer Display only