

IRS Frequently Asked Questions

This document is a collection of relevant questions about IRS. Topics not included on this document were explained through Product Specifications, Technical and Application Notes.



Q What is the Axetris IR Source?

A Axetris IR sources are micro-machined, electrically modulated thermal infrared emitters featuring true black body radiation characteristics, low power consumption, high emissivity and a long lifetime. The patented design is based on a resistive heating element integrated onto a thin dielectric membrane which is suspended on a micro-machined silicon structure.

The sources are packaged in compact TO-39 cans or SMD packages and are available with protective cap or with reflector. They can be fitted either with Sapphire, CaF₂ or BaF₂ or Germanium windows.

Axetris IR sources are ideally suited for compact IR gas detection modules where a high emissivity, high reliability and low power consumption are key requirements.

Q What are the main advantages and benefits as compared to other IR Sources?

- A**
- True black body radiation
 - Wide wavelength range (2 to 14 μm)
 - High emissivity
 - Fast electrical modulation (no chopper wheel needed)
 - High modulation depth
 - High electrical input to optical output efficiency
 - Low power consumption
 - Long lifetime
 - Rugged MEMS design (passed the requirements of IEC 60721-3-7 Class 7M3, except for BaF₂ and CaF₂ windows)

Q What is the actual design of Axetris MEMS IR Source?

A See illustration **Figure 1**

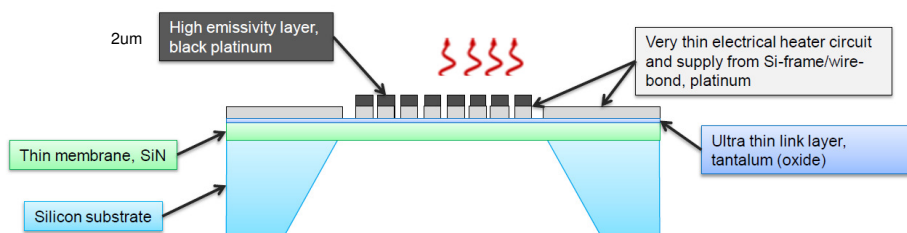


Figure 1 EMIRS200 Design

Q. How is the temperature distributed on the active area?

A. Please refer to image below. Maximum temperature is more focus on the center part of the active area.

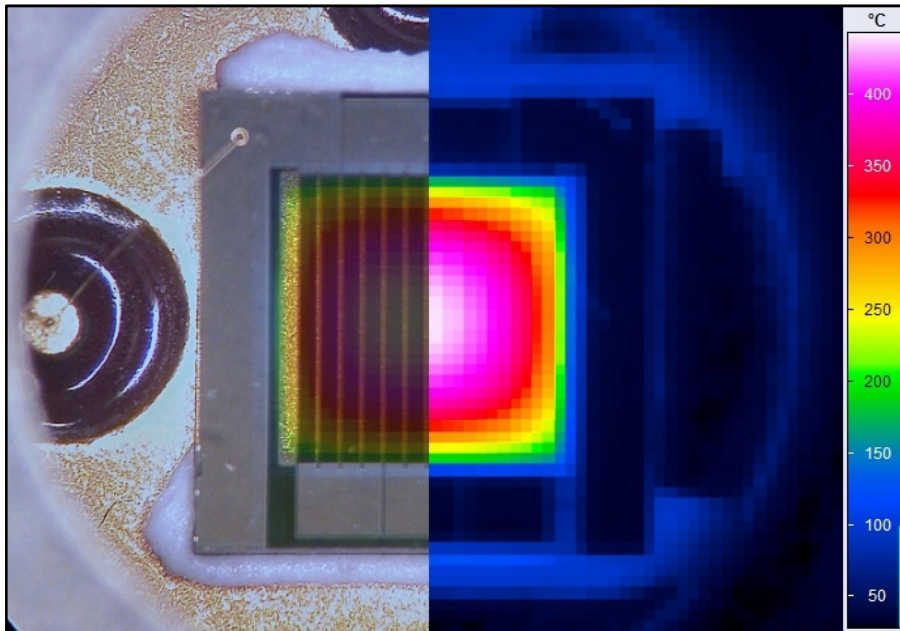
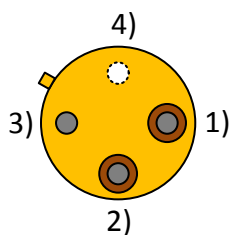


Figure 2 Temperature Distribution

Q. What are the Pin assignments? How to connect the EMIRS200 based on TO-39 correctly?

A.



Bottom-View Pin-assignment example IR-Source

NOTE: The Pin-assignment is dependent from your Ordered Type. Photo on the left is only an example.

Pin	Function	Note
1	Heating resistor Rh	Bidirectional element, Pin is isolated from TO-case
2	Heating resistor Rh	
3	Ground pin	Pin is connected with TO-Case. Not present on each type.
4	Venting Hole	Hole in the TO-Case. Not present on each type.

Figure 3 Pin Assignments

- Q. What is the design of your reflector and how it collects the light from the source?**
A. Our design is based on Winston Cone Design and it is collimating the light from the source.

Q. How to drive your emitter? Recommendation?

- A.** The IR sources can be driven in constant voltage and constant electrical power mode, constant current is not recommended. A drive circuit uses a conventional control loop. The power on the load has to be measured and fed back into the feedback loop. The error amplifier then compares a sample of output power against the reference and drives the output stage to keep them equal. The main part of this circuit is a high-side power and current monitor, which includes the circuitry needed to generate a feedback voltage proportional to the instantaneous load power. The circuit is a low-power, high-side power/current monitor that provides an analog output voltage proportional to the power consumed by a load by multiplying load current and source voltage. [Please refer to the Technical Note for a complete explanation.](#)

Q. Is the behavior of EMIRS200 influenced by ambient temperature?

- A.** The behavior of EMIRS200 can be influenced by ambient temperature. The influence is a combination of the gas volume that is directly in contact with the chip (open package) and the thermal gas interaction with the EMIRS200 package. The second interaction is difficult to predict if the EMIRS200 is integrated in different devices with different conductive/convective properties

Q. What is the best practice to switch On & Off the IRS?

- A.** For application that the IR Source is not constantly in use and often powered off, a special warm-up and cool down cycle should be applied. In case the sensor module is not always powered up, only measurements are carried at irregular intervals, a stand-by mode should be considered. Such implementation would reduce the warm-up time and reduce the time until the system is stabilized.

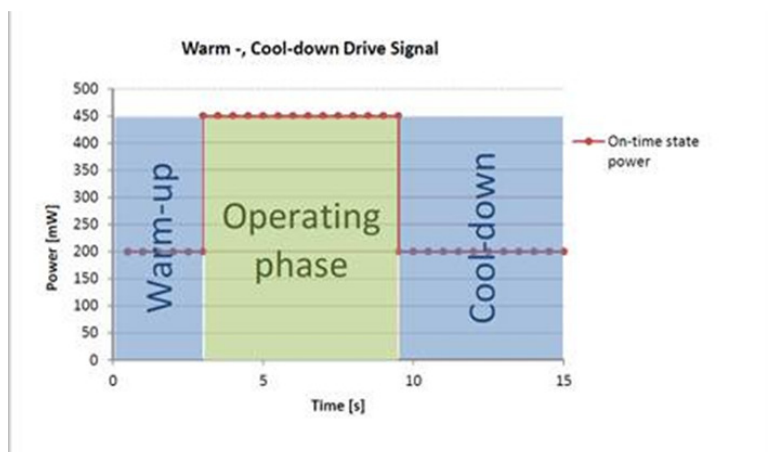


Figure 4 Soft switch Mode

Q. What is the approximate efficiency of converting electrical power into light?

- A. Please see below graph. This is in consideration that all lights are absorbed & detected without any other influencing factor. ≈4% with Cap & reflector and ≈5% with Chip-on TO header. (Primary values need to be verified with new measurements)

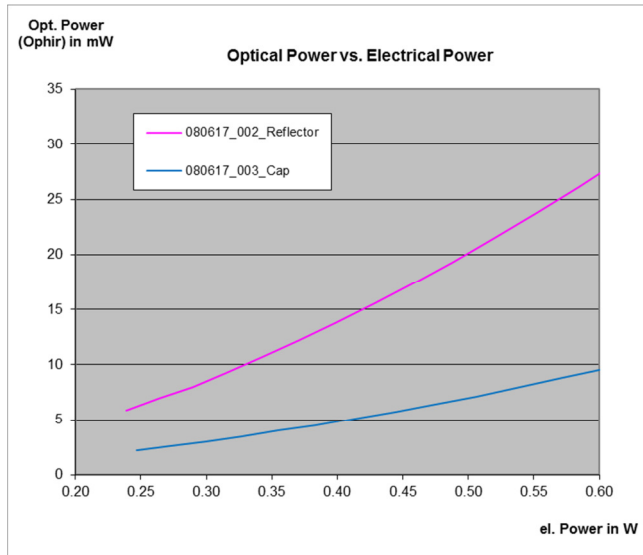


Figure 5 Optical Power vs Electrical Power

Q. Do you have any data on angular distribution differences between source to source on the reflector sources?

- A. First, we define the two major influences to the pointing vector that could give variation on angular distribution.

- tilt of the reflector (vs. header)
- deviation (chip vs reflector)

With these two impacts, variation of $1.5^\circ \pm 2\sigma$ for the standard IRS production.

Q. Do you have any data available that demonstrates the “tear out” strength of the joint?

- A. Yes, aside from the Shock & Vibration test we did for the complete IRS, there is also Pull Test which was subjected to prove the Glue bond between reflectors and TO-39 headers. The reflectors must pass the pull test with a load of 2Kg equivalent to 20N after 20 cycles according to IEC 60068-2-14. [Please contact our Sales Manager or customer support to request for this complete document.](#)

Q. (From US customers) Is your IRS a compliant of Conflict Minerals Regulation?

- A. Yes, our material is compliant. This is available as per customer’s request. It’s all about the legislation “The United States Dodd Frank Act, Section 1502”. It requires manufacturing companies to identify and disclose to the U.S. Securities and Exchange Commission (SEC) the source of 3TG minerals (tin, tantalum, tungsten and gold) used in their products when those minerals originate from or around the war-torn region of the Democratic Republic of the Congo (DRC).

FOR OTHER QUESTIONS & TECHNICAL INQUIRIES NOT DISCUSSED ON THIS FAQ, PLEASE WRITE US ON customersupport@axetris.com.