

## 1 Description

For users aiming to combine calorimetric measurements with optical measurements, two new calorimeter chips are available that are compatible with the Flash DSC1 of Mettler-Toledo. These chips feature a transparent area in the 500  $\mu\text{m}$  diameter aluminum sample area.

The XEN-39476-50 is identical to the standard calorimeter chip for the Flash DSC1, the XEN-39400, except that it has a hole in the aluminum sample area of 50  $\mu\text{m}$  diameter.

The XEN-39476-100 features a 100  $\mu\text{m}$  diameter hole in the sample area.

See Figs. 1 & 2 for some photographs of the chips.

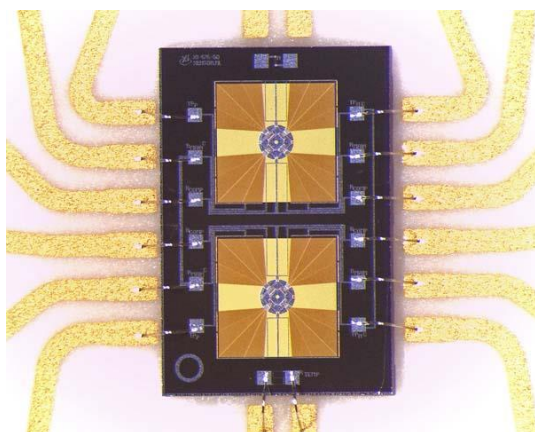


Figure 1a: XEN-39476-50 with a 50  $\mu\text{m}$  transparent hole in the center of the sample area: front side

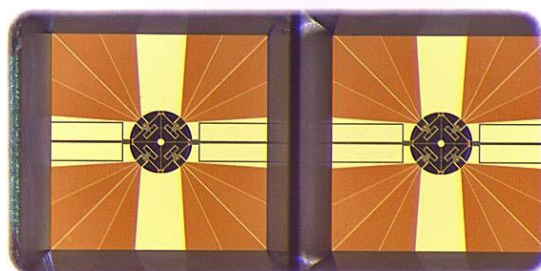


Figure 1b: XEN-39476-50 with a 50  $\mu\text{m}$  transparent hole in the center of the sample area: sample-deposition side

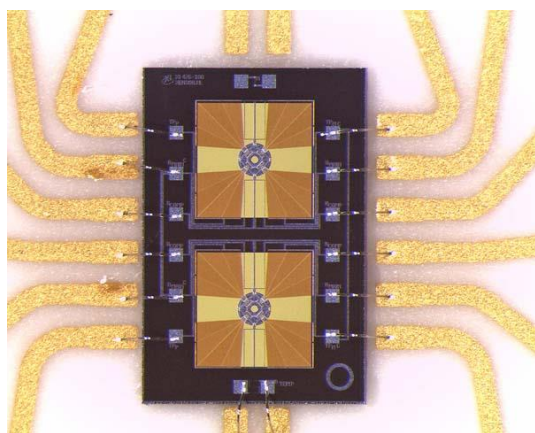


Figure 2a: XEN-39476-100 with a 100  $\mu\text{m}$  transparent hole in the center of the sample area: front side

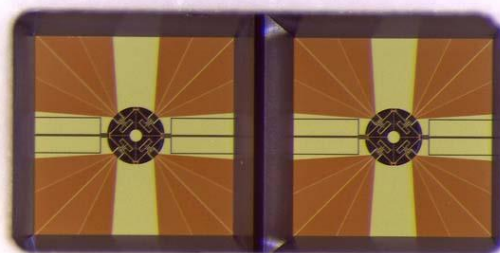


Figure 2b: XEN-39476-100 with a 100  $\mu\text{m}$  transparent hole in the center of the sample area: sample-deposition side

## 2 Application

Due to the absence of aluminum in the sample area, there is increased thermal resistance between the sample heaters and the sample (if placed on the transparent center). This will cause a temperature difference between the temperature measurement, carried out at the edge of the aluminum sample area and the sample in the center. This difference is temperature scan rate dependent, and is estimated to be typically of the order of 5 K at 1000 K/s scan rate. It is a temperature lag, so when heating, the center and sample lag behind being colder, and when cooling the center and sample lag behind being warmer.

For the 100  $\mu\text{m}$  transparent hole, the thermal lag will be larger than for the 50  $\mu\text{m}$  hole. Because of this lag, these sensors are susceptible to some oscillations at higher scan rates.

This sensor is currently not supported by Mettler-Toledo

In order to get the full advantage of the transparent hole when using the Flash DSC1, the measurement cell will need to be adapted. For instance, the user can drill a small hole in the measurement axis to allow illumination from behind, and install a camera, directly or via a microscope, to record the optical behavior of the sample. These procedures are not offered by Mettler-Toledo or Xensor Integration, and are at the responsibility and risk of the user.

Conditions: Use of sensors for industrial applications is subjected to patent rights. Xensor Integration assumes no liability arising from violation of these rights

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