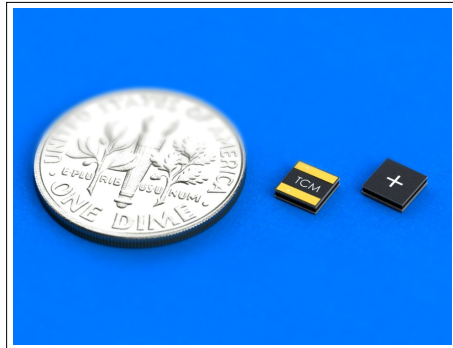


THERMOELECTRIC HEAT FLUX SENSOR ————— HRD02-040-05L04

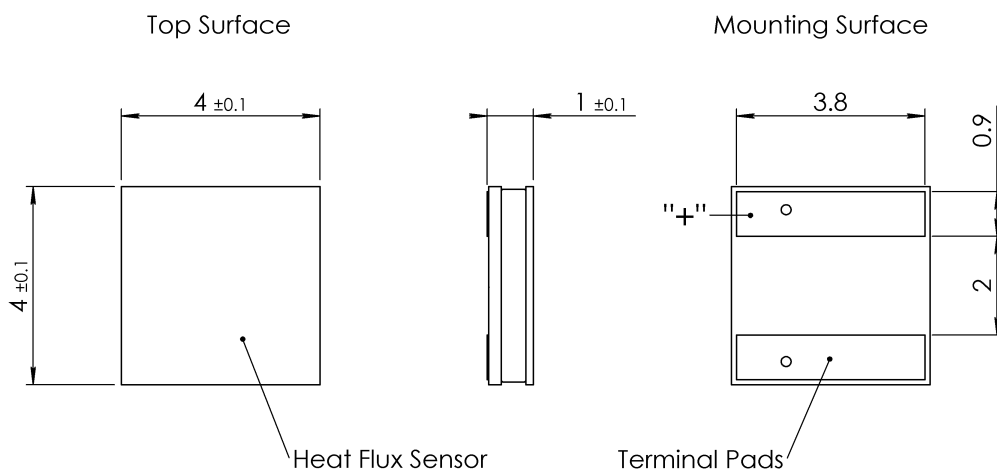


The HRD02-040-05L04 – SMD type, high sensitive and self-calibrating sensor of radiation heat fluxes in a wide range of heat flux intensities. Compatible with Datalogger DX8140.

- Ultra-High Sensitivity
- Miniature Dimensions
- Self-calibrating
- SMD solution
- Suitable for Flip-Chip mounting process

Spectral range	μm	0.2...15
Surface Emissivity ϵ		0.95
Sensitivity S_e	$\mu\text{V}/(\text{W}/\text{m}^2)$	17.3
Integral Sensitivity S_a	V/W	0.48
Detectivity	$\text{cmHz}^{1/2}/\text{W}$	1.70E+09
Time Constant τ	s	0.7
Electrical Resistance ACR	Ohm	10.0

DIMENSIONS (mm)



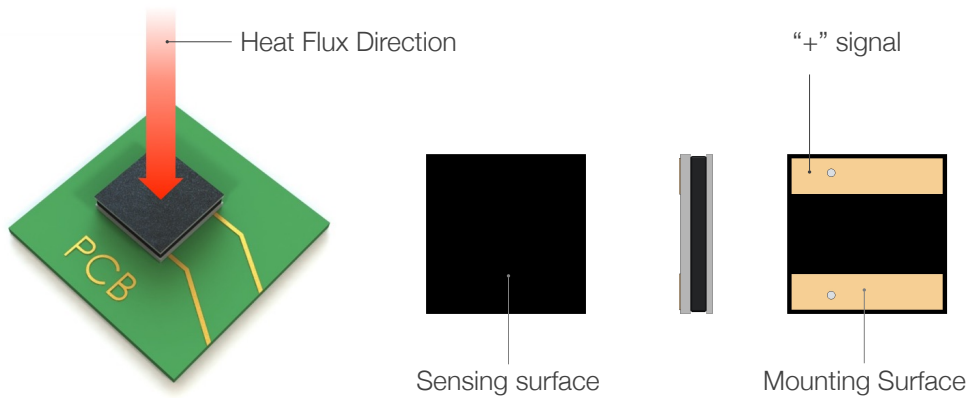
HRx Heat Flux Sensor has two flat sides. The sensing (working) side is completely black. Bottom side contains two terminal pads for SMT soldering process and a mark between them.

Sensor Type		Thermoelectric
Surface material		AlN ceramics, painted black
Protection		IP67
Surface dimensions AxB	mm ²	6x6
Thickness H	mm	1
Pellet pairs		40
Spectral range	µm	0.2... 15
Surface Emissivity ε		0.95
Sensitivity Se	µV/(W/m ²)	17.3
Integral Sensitivity Sa	V/W	0.48
Detectivity	cmHz ^{1/2} /W	1.70E+09
Time Constant τ	s	0.7
Electrical Resistance ACR ¹⁾	Ohm	10.0
Power Density max Pe	±W/m ²	9 000
Maximal Power Pa	±W	0.14
Thermal Resistance RT	K/(W/m ²)	1.30E-03
Integral Thermal Resistance RT	K/W	70.5
Temperature Dependence ²⁾ dS/dT	%/°C	0.25
Linearity with Power dS/dP	±%/(W/m ²)	0.02 %
Homogeneity dS/dA.	±%	1
Calibration Accuracy	±%	3
Calibration Temperature Range Min/Max	°C	-40 ... +85
Operating Temperature Range Min/Max	°C	-60 ... +150
Soldering Temperature ³⁾ Max °C	°C	+260
Cooling Method		Convection
Terminal Contacts		Bottom Side
RoHS		Compliant

1. Performance parameters shown in specifications are given for ambient temperature Ta=300 K (27 °C)
2. Average value. Detailed temperature dependence is available.
3. Max duration 5 minutes.

PINOUT CONFIGURATION

HRD02-040-05L04



HRx Heat Flux Sensor has two flat sides. The sensing (working) side is completely black. Bottom side contains two terminal pads for SMT soldering process and a mark between them.

SELF-CALIBRATION METHOD

Sensitivity of thermoelectric heat flux sensor S_a [V/W]

$$S_a = \frac{U}{P} = N \times \alpha \times R_t$$

U – sensor signal at heat flux P_e ;
 N – number of pellet pairs inside a sensor;
 RT – thermal resistance;
 α – Seebeck coefficient (average value P-N pair)

Figure-of Merit Z of thermoelectric sensor

$$Z = \frac{(N \times \alpha)^2 \times R_t}{ACR}$$

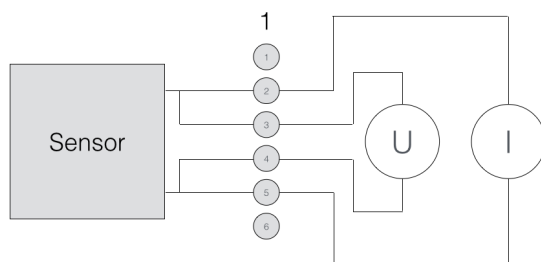
Calibration expression with use of Z, ACR and Seebeck coefficient α

$$S_a = \frac{1}{(\alpha \times N)} \times Z \times ACR$$

$$S_e = S_a \times S \quad \text{where } S - \text{surface area}$$

MEASUREMENT SCHEME

Self-calibration to be made by measurement of Figure-of-Merit and ACR Resistance of thermoelectric heat flux sensor by four-wire method which is provided by four wires of the FET cable connected to the sensor.



Use TEC Microsystems Z-Meters made by for measurement of Figure-of-Merit and ACR resistance of thermoelectric heat flux sensor.

Or Datalogger DX8140 developed for HTx, HFX series of thermoelectric heat flux sensors.

LEGAL NOTICE

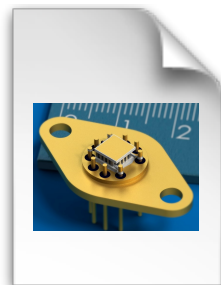
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