

- **CaliPile** Intelligent, Multi-Function Thermopile Sensors
- **DigiPyro** Next-Generation, Low-Power Pyroelectric Sensors



EXCELITAS
TECHNOLOGIES®



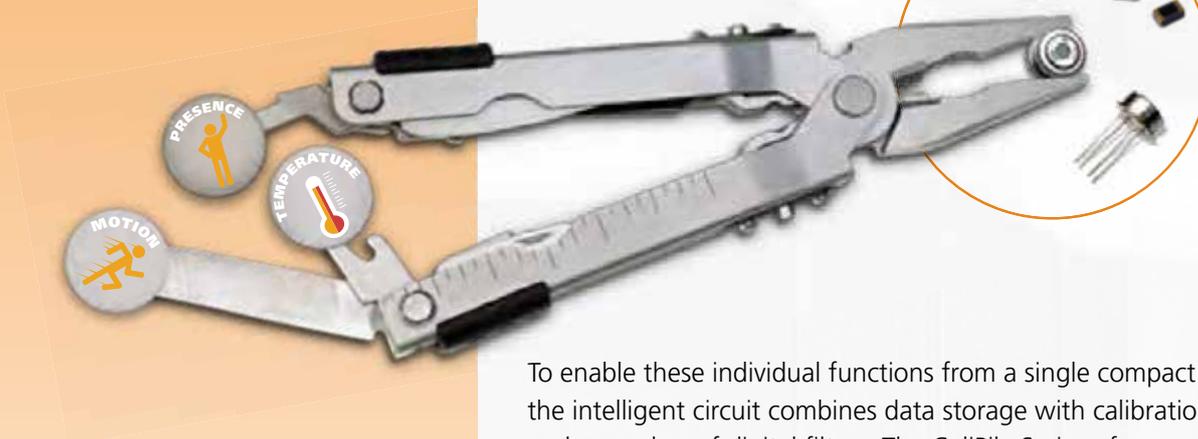
CaliPile

**The Only
IR Sensing Tool
You'll Ever Need!**

Excelitas CaliPile is the Ultimate All-in-One IR Sensing Solution!

Excelitas proudly introduces its latest technological innovation... The ultimate, all-in-one IR-Sensor for multiple applications... **CaliPile**. This sensor includes a highly sensitive Thermopile detector and onboard intelligent electronics that allow the sensor to be set into three distinct function modes:

- Temperature Measurement
- Presence Detection
- Motion Sensing



To enable these individual functions from a single compact sensor, the intelligent circuit combines data storage with calibration data and a number of digital filters. The CaliPile Series of sensors offers a variety of form factors to meet a wide range of integration requirements: an ultra-compact SMD housing is complemented with traditional TO metal case versions with either aperture window or IR focusing lens.

For all **temperature measurement** applications, the Sensor will be supplied in calibrated form for temperature range up to 120°C or 200°C. The interrupt function will also allow the sensor to function as a temperature alarm in industrial instrumentation.

For **motion and presence detection**, the default setting is 120°C maximum target temperature range. Internal filters then enable the user to select the best possible target temperature performance for his individual application.

CaliPile is supported with a PC-compatible demonstration software and interface kit, which enables the user to swiftly plug-and-play the sensor to establish the optimum on-filter settings that achieve the desired performance.



CaliPile TPiS 1S 1385

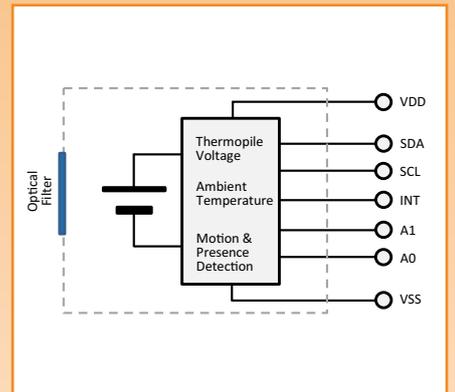
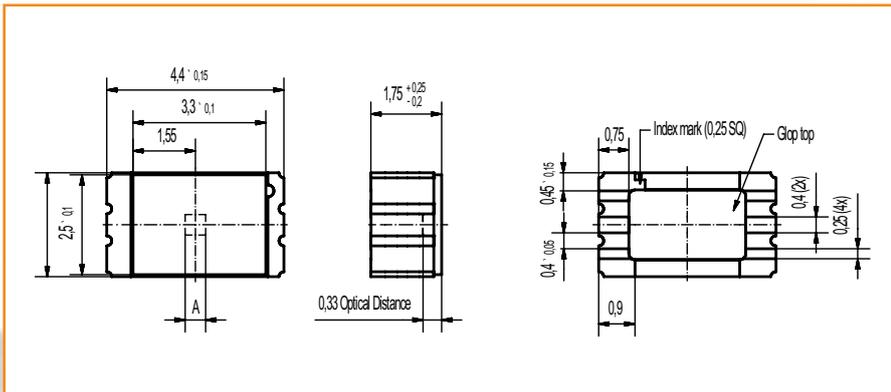
The TPiS 1S 1385 Sensor represents the SMD version of the new CaliPile Infrared Sensor Series. With a tiny SMD housing this model provides I2C bus communication, signal output and an additional interrupt can serve as a Yes/No output for the motion, presence and temperature applications. For human presence detection, effective range is up to three meters with no additional lens requirement,

facilitating an extremely compact size and making CaliPile the smallest and smartest Excelitas IR design to date.



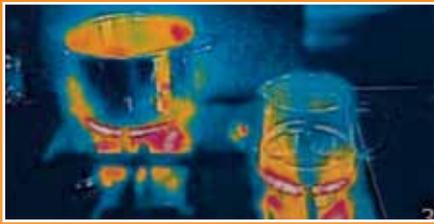
Individual settings of the internal filters will cater for the most suitable applications.

- **Application Motion:** The interrupt will signal upon a motion detected.
- **Application Presence:** The interrupt will signal presence based on the settings of signal and background filtering.



TPiS 1S 1385

Main Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Sensitivity			400		counts/K	$T_{obj} = 40^{\circ}\text{C}$
Sensitive Area			0,31		mm ²	
Noise			8		counts	$T_{obj} = 40^{\circ}\text{C}$
Operation Data						
Operating Voltage	V_{DD}	2,6	3,3	3,6	V	
Supply Current	I_{DD}			15	μA	$V_{DD} = 3\text{V}$, No Load
Operating Temperature	T_o	-20	20	+85	°C	parameters may vary
Time Constant			30		ms	μV/Count
Resolution			17		bit	
Field of View			120		°	at 50% intensity



CaliPile

- **Temperature Alert:** Use the max. temperature setting to set the trigger level. The interrupt will alert when level is exceeded.
- **Non Contact Measurement:** Use the output signals in conjunction with the stored calibration data to calculate object temperature on the host μC .

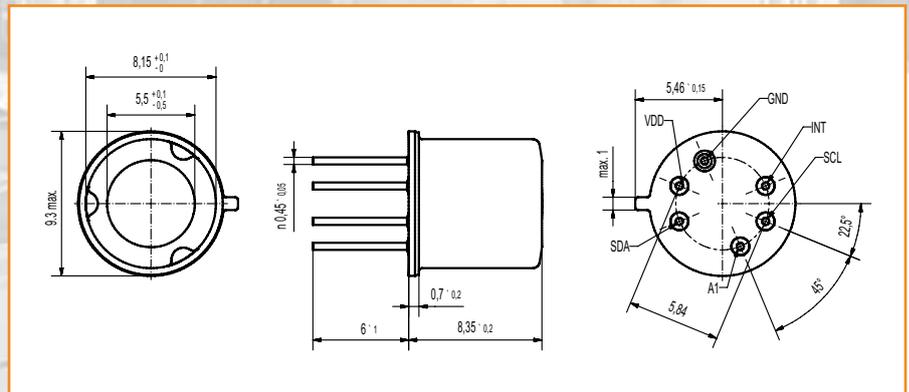
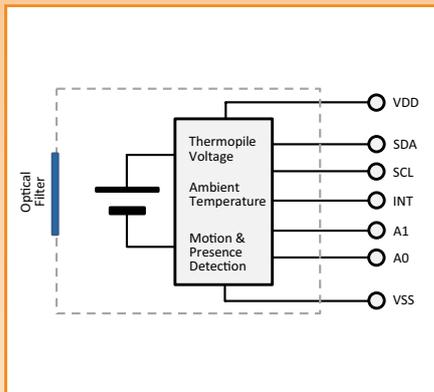
CaliPile TPiS 1T 1086 L5.5

Within the new CaliPile IR-Sensor family, this model represents the version in TO housing. It includes a highly sensitive Thermopile detector, onboard processing electronics and a focusing lens for a narrow field-of-view.

for a temperature range up to 120°C or up to 200°C. The interrupt function enables use as a temperature alarm in industrial instrumentation.



The Sensor is provided with data storage of calibration data and a number of digital filters. For all temperature measurement applications the Sensor is calibrated



TPiS 1T 1086 L5.5

Main Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Sensitivity			40		counts/K	$T_{obj} = 40^{\circ}\text{C}$
Sensitive Area			0,16		mm^2	
Noise			8		counts	$T_{obj} = 40^{\circ}\text{C}$
Operation Data						
Operating Voltage	V_{DD}	2,6	3,3	3,6	V	
Supply Current	I_{DD}			15	μA	$V_{DD} = 3\text{V}$, No Load
Operating Temperature	T_o	-20	25	+95	$^{\circ}\text{C}$	parameters may vary
Time Constant			15		ms	$\mu\text{V}/\text{Count}$
Resolution			17		bit	
Field of View			5		$^{\circ}$	at 50% intensity



CaliPile TPiS 1T 1084

This member of the CaliPile Series features a robust TO housing with an aperture by the metal housing. It includes a highly sensitive detector on Thermopile base and the processing electronics.

The Sensor will be provided with data storage of calibration data and a number of digital filters. For all temperature measurement applications, the sensor is



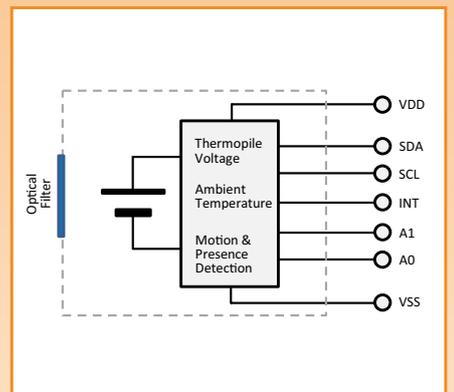
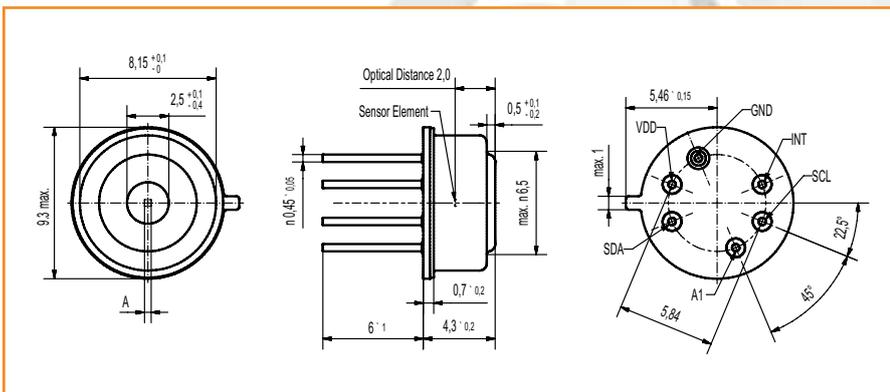
calibrated for temperature range up to 120°C or up to 200°C. The interrupt function also allows use of the sensor as a temperature alarm in industrial instrumentation.

• Thermometry Applications:

Use the output signals in conjunction with the stored calibration data to calculate object temperature on the host μC .

• Temperature Alert:

Use the max. temperature setting to set the trigger level. The interrupt will alert when level is exceeded.



TPiS 1T 1084

Main Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Sensitivity			80		counts/K	$T_{obj} = 40^{\circ}\text{C}$
Sensitive Area			0,16		mm^2	
Noise			8		counts	$T_{obj} = 40^{\circ}\text{C}$
Operation Data						
Operating Voltage	V_{DD}	2,6	3,3	3,6	V	
Supply Current	I_{DD}			15	μA	$V_{DD} = 3\text{V}$, No Load
Operating Temperature	T_o	-20	25	+85	$^{\circ}\text{C}$	parameters may vary
Time Constant			15		ms	$\mu\text{V}/\text{Count}$
Resolution			17		bit	
Field of View			67		$^{\circ}$	at 50% intensity

DigiPyro

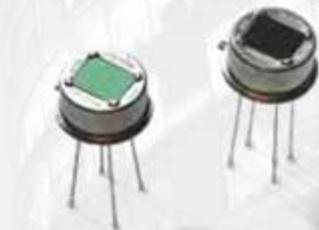


- **The new generation DigiPyro** addresses the growing market requirements for added performance and functionality.
- **Continuous motion sensing,** signal processing and event/motion detection Low-Power DigiPyro. Only upon detection of motion, per programmed settings the Low-Power DigiPyro signals the micro controller to wake up.

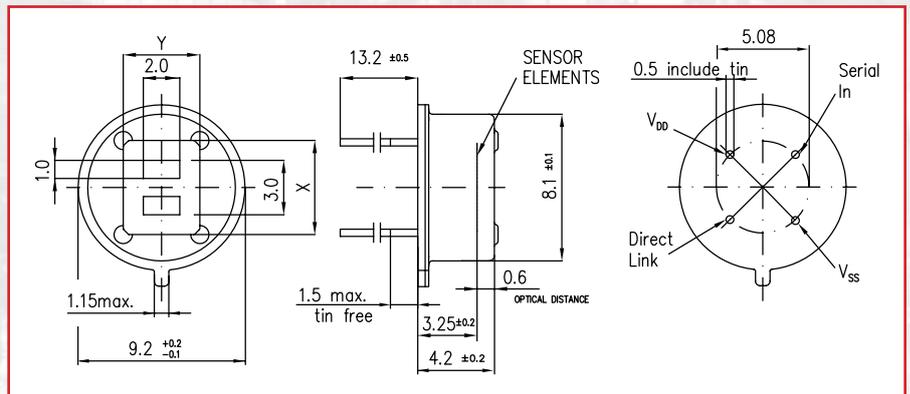
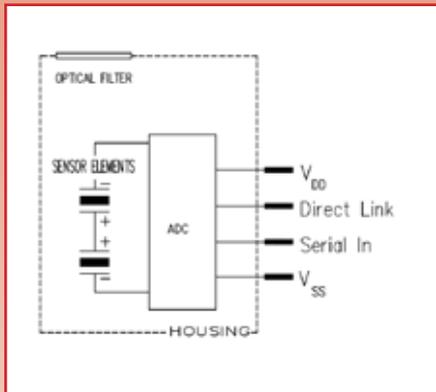
PYD 1588, PYD 1598 – DigiPyro®

The new Low-Power DigiPyro “Gen2” 1500 Series is the upgrade from our PYD 1600 Series. With significant reduction of supply voltage requirements, the PYD 1500 Series operates at 1,8V – 3,6V. Further, PYD 1588 and PYD1598 offer a selectable band-pass function, and a selection of pulse count options.

The wake-up / sleep mode promotes power savings and extends service life, making it ideal for prolonged battery-



operated motion detection. Detection is handled onboard by the Low-Power DigiPyro. With this enhanced expansion of the DigiPyro Series, we now offer a complete family of products in addition to the established PYD1688, PYD1698, PYQ1648.



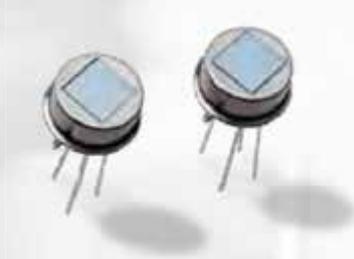
PYD 1588, PYD1598

Main Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Responsivity		3,3	4		kV/W	f = 1 Hz
Match			5	10	%	
Noise			20	78	μV_{pp}	
Operation Data						
Operating Voltage	V_{DD}	1,8	3,0	3,6	V	
Supply Current	I_{DD}		3,0	3,5	μA	$V_{DD} = 1,8V, No Load$
ADC Data						
ADC Resolution			14		Bits	Max. Count = $2^{14} - 1$
PIR ADC Sensitivity			6,5		$\mu V/Count$	
Output Range		511		$2^{14} - 511$	Counts	
LPF Cutoff Frequency	f_l		7		Hz	
HPF Cutoff Frequency	f		0,4 / 0,2		Hz	Selectable
Window Size PYD1588			x=4,6 / Y=3,4		mm	
Window Size PYD1598			x=5,2 / Y=4,2		mm	



PYQ 1548 DigiPyro®

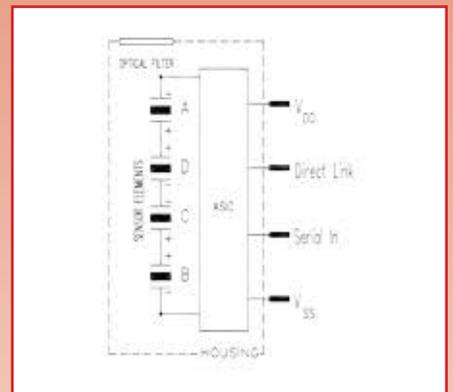
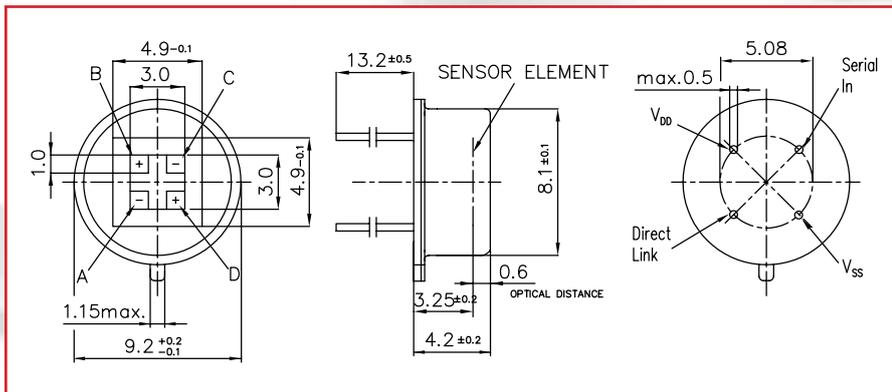
The PYQ1548 represents the 4-Element version of the Low-Power DigiPyro "Gen2". Similar to PYQ1648 this Sensor offers the Quad type Element configuration with single output.



PYQ 1548 offers the same significant reduction of supply voltage requirements, operating at 1,8 V – 3,6V as PYD 15 types. All functionality is identical to the PYD 15 Series: selectable band-pass function, selection of pulse count and

wake-up / sleep mode promotes power savings and extends service life, making it ideal for prolonged battery-operated motion detection. The Quad Element configuration makes this device best suited for ceiling mount sensor applications.

- **The new generation DigiPyro** addresses the growing market requirements for added performance and functionality.
- **Continuous motion sensing,** signal processing and event/ motion detection Low-Power DigiPyro. Only upon detection of motion, per programmed settings, the Low-Power DigiPyro signalizes the micro controller to wake up.



PYQ 1548							
Main Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks	
Responsivity		5,4	6,4		kV/W	f = 1 Hz	
Match			5	10	%		
Noise			40	160	μV _{pp}		
Operation Data							
Operating Voltage	V _{DD}	1,8	3,0	3,6	V		
Supply Current	I _{DD}		3,0	3,5	μA	V _{DD} = 1,8V, No Load	
ADC Data							
ADC Resolution			14		Bits	Max. Count = 2 ¹⁴ - 1	
PIR ADC Sensitivity			6,5		μV/Count		
Output Range		511		2 ¹⁴ - 511	Counts		
LPF Cutoff Frequency	f _i		7		Hz		
HPF Cutoff Frequency	f		0,4 / 0,2		Hz	Selectable	

About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the detection, lighting, optical, imaging, photonic and advanced electronic systems needs of OEM customers. From safety and security applications to industrial, consumer, medical, analytical instrumentation, clinical diagnostics, and aerospace and defense applications, Excelitas Technologies is committed to enabling our customers' success in their end-markets. Excelitas Technologies has approximately 5,500 employees in North America, Europe and Asia, serving customers around the world.

Excelitas infrared sensing technologies are playing a vital role in creating a healthier, cleaner and safer tomorrow. Excelitas has gained worldwide recognition for the design and production of high-performance pyroelectric detectors, thermopile detectors and sensor modules which – every day – safeguard our homes, conserve energy, and empower smart technology. From motion and presence detection to gas detection, thermometry and indoor climate control applications, Excelitas' IR sensing products are the smartest choice for your smart technologies.

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