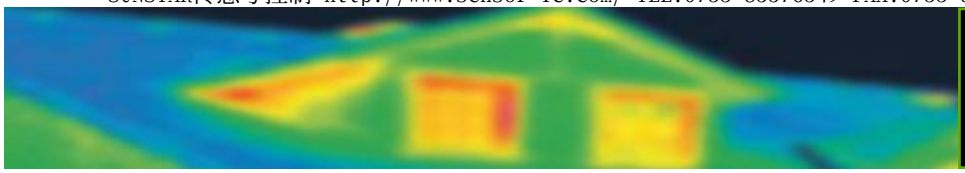
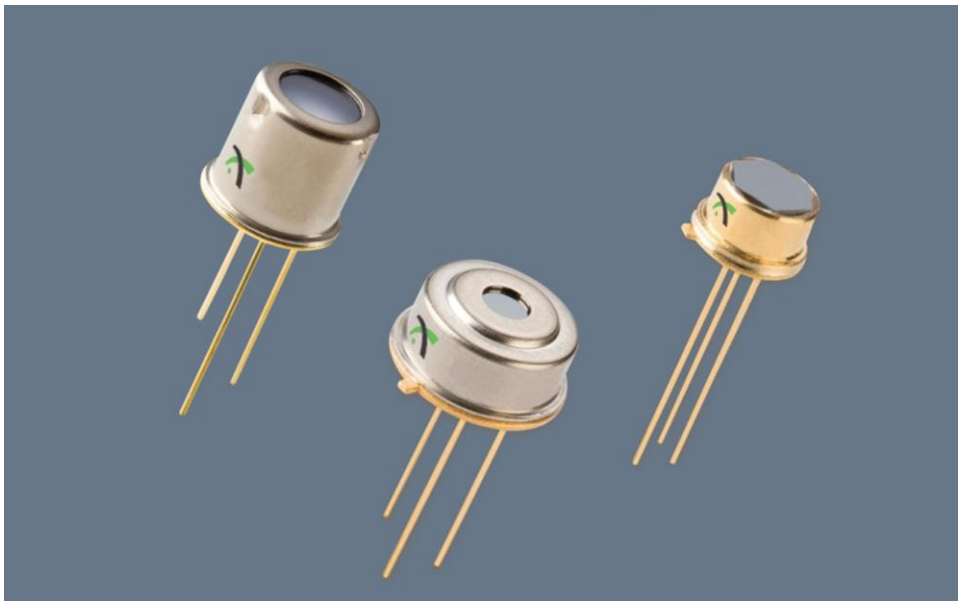


DATASHEET
IR Sensing Solutions

DigiPile™ Family
Digital Thermopiles



Key Features

- More reliable digital design functionality than with analog – all "Digi" models include Thermopile infrared Detector and proprietary digitizing circuit (ADC)
- Reduced PCB space requirements – by up to 20%
- Integrated design - no need for costly additional components like low noise amplifier and associated filters
- High signal to noise ratio based on our new thermopile chip with increased signal strength
- Improved EMI resistance
- Low operating voltage, down to 2.4V
- Low current consumption
- Range of housings and sensing areas to be offered
- Option of model with integrated lens, where a focusing system is particularly useful
- RoHS-compliant

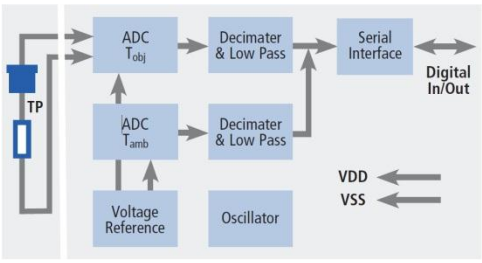
Applications

- Thermometry
- Pyrometry
- Non-contact, high-precision temperature sensing

The DigiPile™ is a Thermopile Detector with digital output. It combines a time-proven MEMS-based sensing element with a fully integrated low noise amplifier, A/D converter and integrated ambient temperature sensor. An internal clock and control unit enable the DigiPile to open a dialogue with any outside microprocessor without the need for costly additional components.

Along with the DigiPile's more reliable digital design functionality, the move from analog to digital provides OEM designers with a number of distinct advantages including reduced PCB space requirements, improved EMI resistance, and need for fewer additional components like low offset/low noise amplifier and associated filters.

The DigiPile is specifically designed for a range of OEM applications including thermometry, pyrometry, and non-contact temperature sensing. The DigiPile will be offered in a range of housings and sensing areas with the first models from Excelitas covering the popular TO-46 and TO-5 metal housings. We are also offering a DigiPile model with a built-in lens, ideally suited to applications like forehead thermometry where a focusing system is desirable.



EXCELITAS TECHNOLOGIES

www.excelitas.com

DigiPile™ Family

Digital Thermopiles

DigiPile Models

Parameter	Symbol	TPiS 1T 1252	TPS 1T 1254	TPS 1T 1256 L5.5	Unit	Remarks / Conditions
Operating Conditions						
Operating Voltage	**VDD**	**2.4…3.6**	**2.4…3.6**	**2.4…3.6**	**V**	
Supply Current	I_{DD}	11…15	11…15	11…15	µA	V_{DD} = 3.3 V
Operating Temperature	T_o	-20…70	-20…70	-20…70	°C	[1]
Storage Temperature	T_s	-40…100	-40…100	-40…100	°C	
Thermopile Characteristics						
Sensitive Area	A	0.51 x 0.51	0.51 x 0.51	0.51 x 0.51	mm^2	
Sensitivity	S_{40}	290 [2]	150 [2]	67 [3]	counts/K	T_{obj} = 313K = 40°C, T_{amb} = 298K = 25°C
Sensitivity	S_{100}	400[2]	200[2]	85[3]		T_{obj} = 373K = 100°C, T_{amb} = 298K = 25°C
Noise		8	8	8	counts	T_{obj} = 313K (=40°C), T_{amb} = 298K (=25°C)
Time Constant	τ	45	45	45	ms	
Ambient Temperature sensor Characteristics						
Sensitivity of T_{amb}		90	90	90	counts/K	Linear for T_{amb} from 0°C to 90°C
Count @ T_{amb} = 25°C		7800	7800	7800	counts	
Optical Characteristics						
Field of View		84	56	5	Degree	At 50% intensity points
Optical Axis		0 +/- 10	0 +/- 10	0 +/- 2	Degree	
Average Filter Transmittance	T_A	>75	>75	50	%	Wavelength Range from 7.5 µm to 13.5 µm
Cut on Wavelength	λ (5 %)	5.5	5.5	-	µm	At 25°C
Electrical Characteristics						
ADC Resolution T_{obj}			17		Bits	Max Count = 2^{17}
ADC Resolution T_{amb}			14		Bits	Max Count = 2^{14}
ADC Sensitivity of T_{obj}		0.7…0.9	0.7…0.9	0.7…0.9	µV/count	
ADC Offset T_{obj}		64500	64500	64500	counts	
Input Low Voltage	V_{IL}	0.2 V_{DD}	0.2 V_{DD}	0.2 V_{DD}	V	
Input High Voltage	V_{IH}	0.8 V_{DD}	0.8 V_{DD}	0.8 V_{DD}	V	
Pull Down Current		200	200	200	µA	Direct link pin to V_{DD}
Pull Up Current		130	130	130	µA	Direct link pin to V_{SS}
LPF Cut-Off Frequency		8	8	8	Hz	

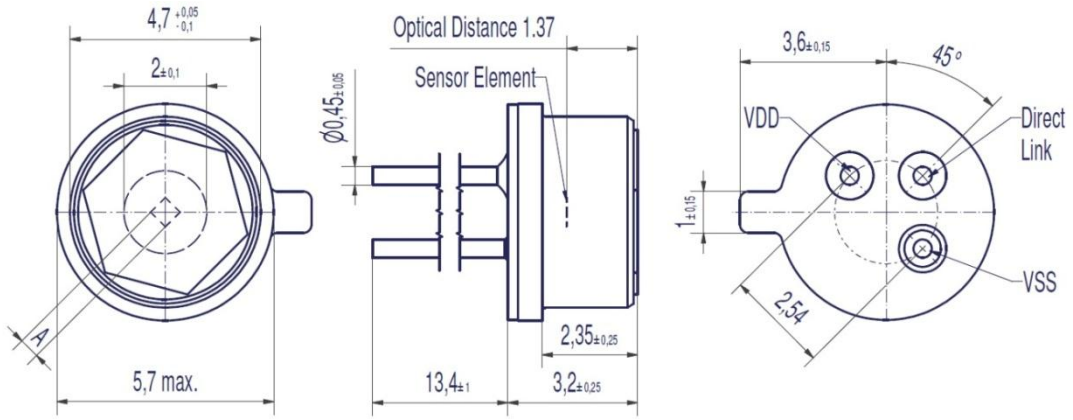
[1] The electrical parameters may vary from specified values accordance with their temperature dependence.

[2] With standard filter (LWP, cut-on 5.5 µm)

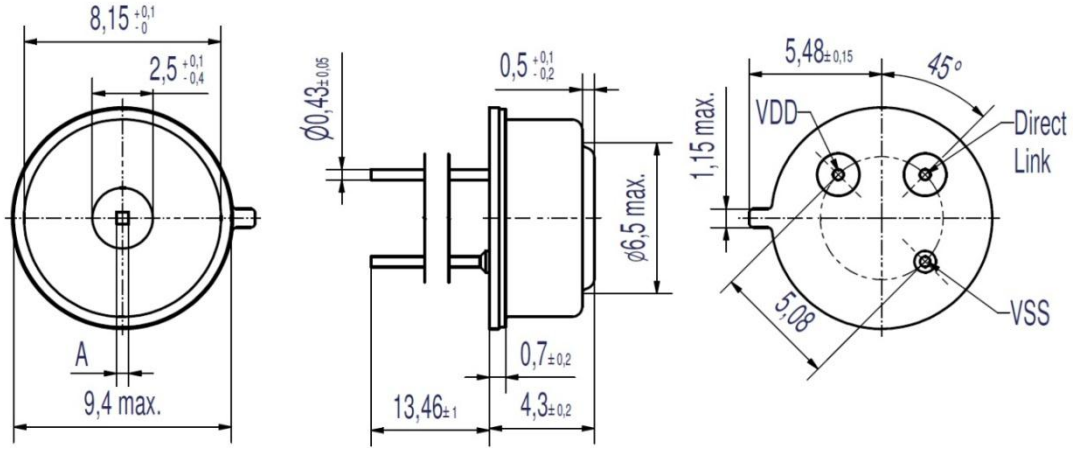
[3] Uncoated lens

Physical Configuration

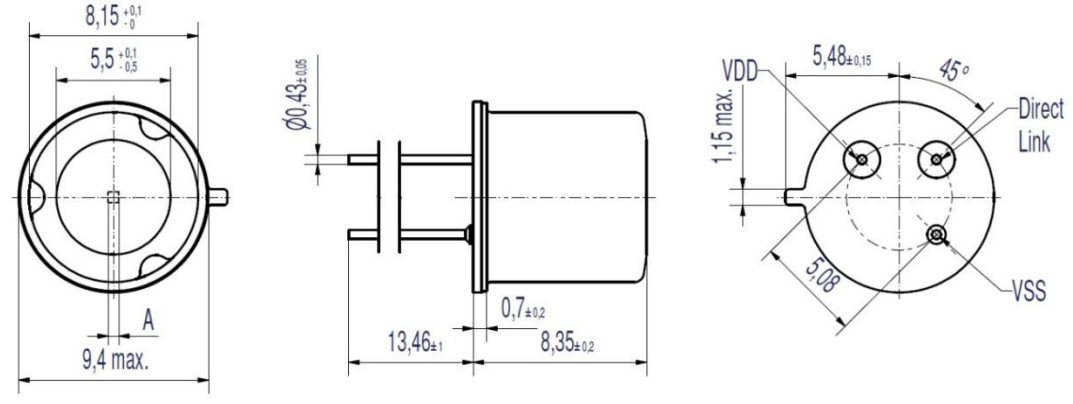
TPiS 1T 1252



TPS 1T 1254



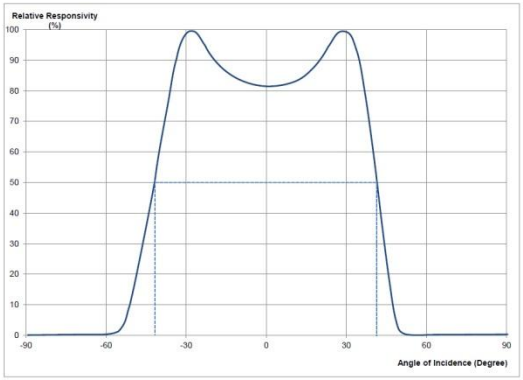
TPS 1T 1256



DigiPile™ Family

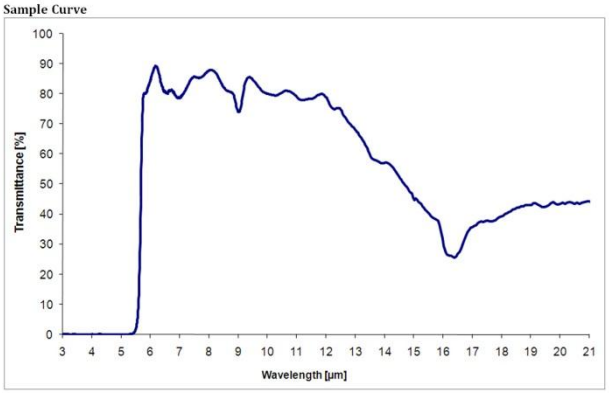
Digital Thermopiles

TPiS 1T 1252

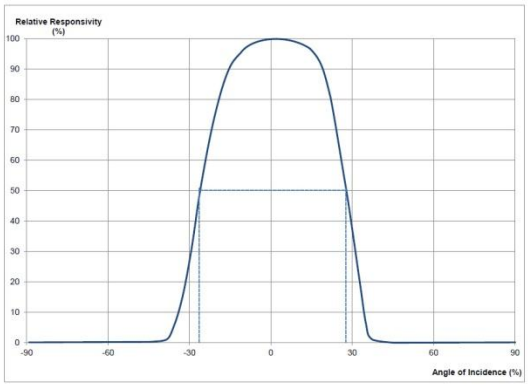


Filter Identifier	
Cut-on wavelength (CWL)	5.5 µm
Cut-on tolerance range	± 0.3 µm
Average Transmittance from 7.5µm to 13.5µm	> 70 %
Average Transmittance from visual to 5µm	< 0.5 %
Substrate material	Silicon

Sample Curve

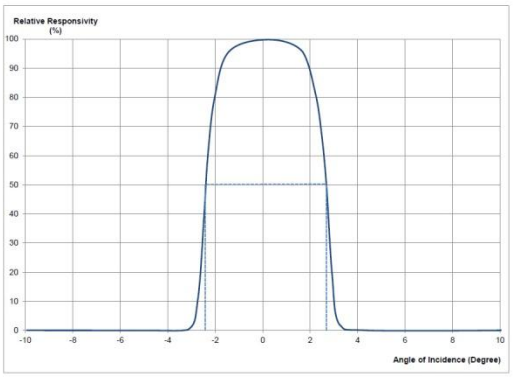


TPS 1T 1254

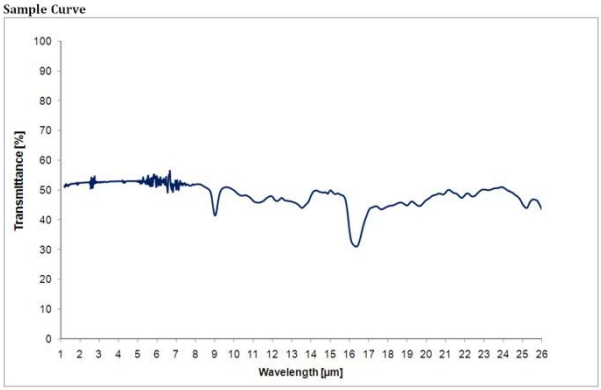


Filter Identifier	G12
Substrate material	Silicon, uncoated

TPS 1T 1256



Sample Curve



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