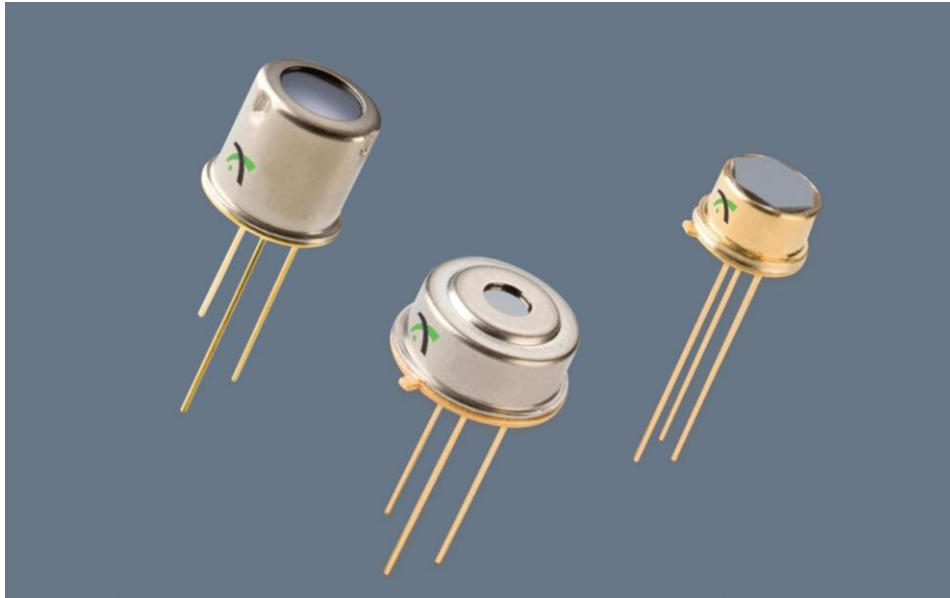


DigiPile™ Family

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

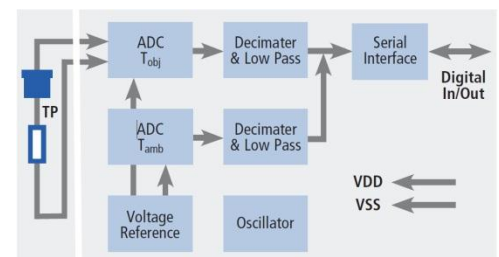
Applications

- 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.



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	V _{DD}	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	

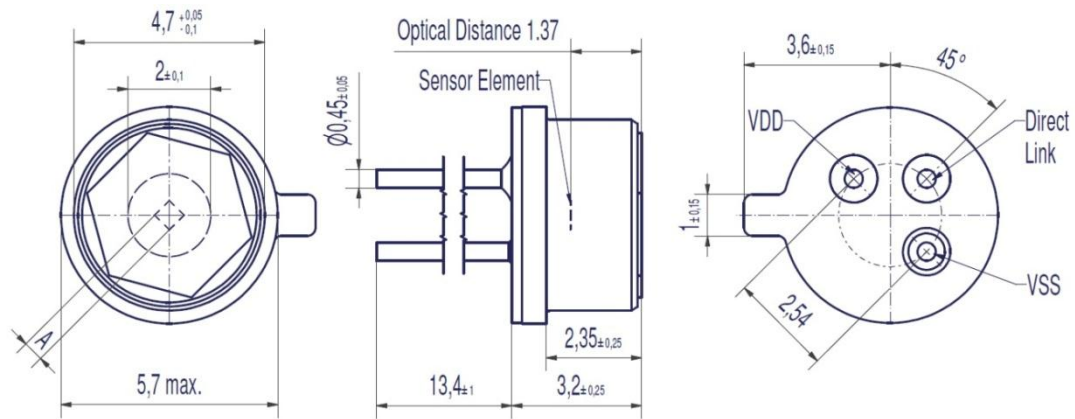
¹The electrical parameters may vary from specified values accordance with their temperature dependence.

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

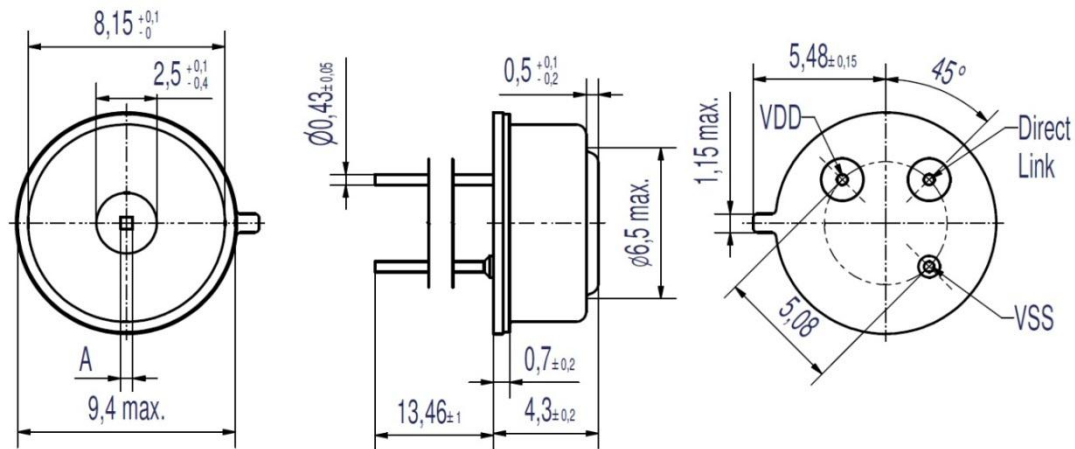
³ Uncoated lens

Physical Configuration

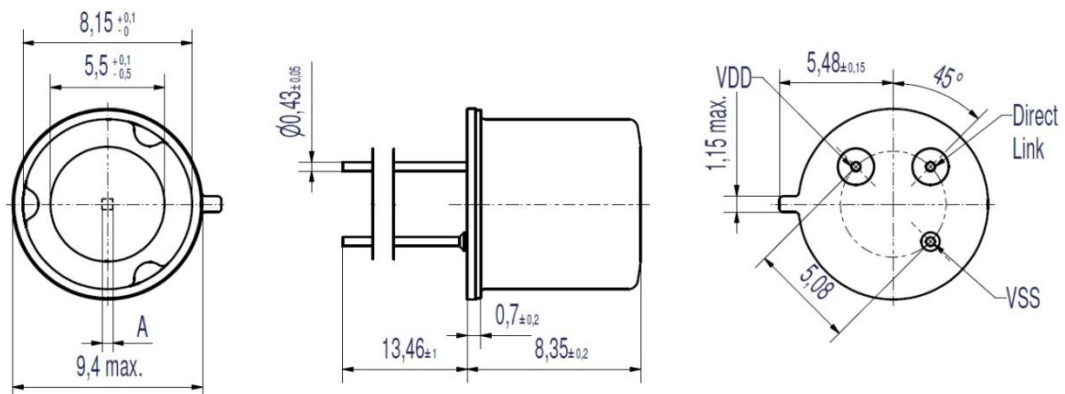
TPIS 1T 1252



TPS 1T 1254



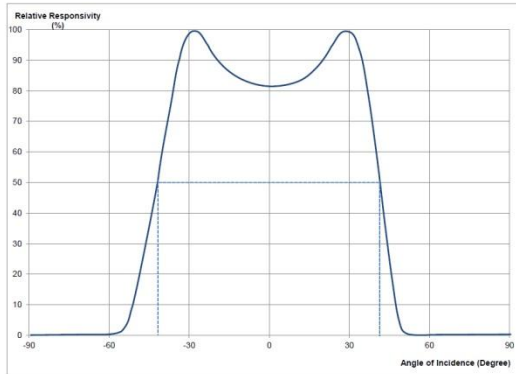
TPS 1T 1256



DigiPile™ Family

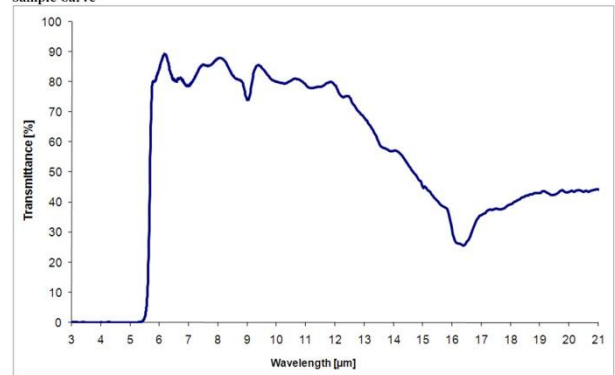
Digital Thermopiles

TPiS 1T 1252

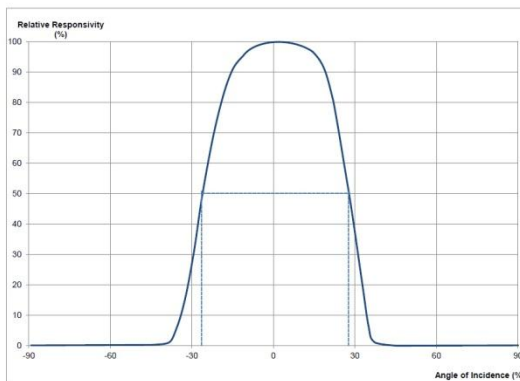


Filter Identifier	
Cut-on wavelength (CWL)	5.5 μm
Cut-on tolerance range	$\pm 0.3 \mu\text{m}$
Average Transmittance from 7.5 μm to 13.5 μm	> 70 %
Average Transmittance from visual to 5 μm	< 0.5 %
Substrate material	Silicon

Sample Curve

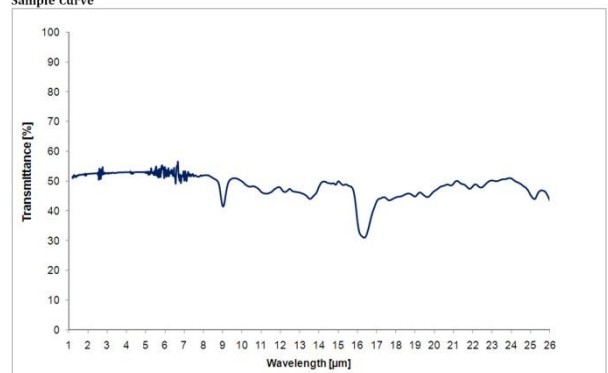


TPS 1T 1254

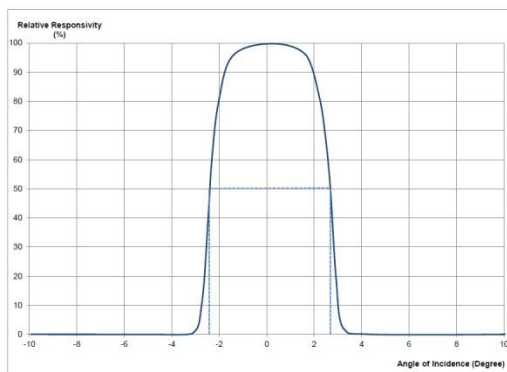


Filter Identifier	G12
Substrate material	Silicon, uncoated

Sample Curve



TPS 1T 1256



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