

# Datasheet Thermopile Module Type HCM G15 Fx Tx (PWM)



## Features and Benefits

- Non-contact surface temperature detection with digital temperature output
- Thermopile Sensor and ASIC in ceramic SMD package 8 leads
- Digital temperature or sensor voltage output (SMBus compatible or PWM)
- Temperature resolution < 0.1°C at T200 and SMBus compatible operation
- High accuracy over wide sensor temperature and object temperature ranges
- 3V or 5V supply voltage freely selectable
- Complies with ROHS regulations

## Ordering Information

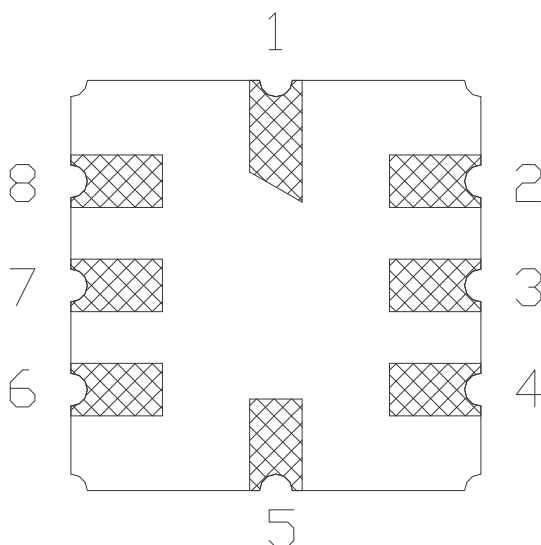
HCM -> Heimann thermopile sensor and ASIC in SMD package  
 G15 -> „G“ ceramic SMD package size 5x5(mm) ;  
 -> „1“ sensor chip TP1  
 -> Supply voltage 3V or 5V freely selectable  
 Fx -> Infrared filter according to below table  
 Tx -> Object temperature range, max. temperature on digital output 382°C  
 (PWM) -> optional: „PWM“ output - SDA/PWM-pin adusted to pulse width modulation



Sample: HCM G15 F5.5 T200 PWM

Filter Selection		
Filter Type	Application	Specification
F5.5	temperature detection	Long Wave Pass Cut On 5.5µm
F8-14	temperature detection	Bandpass HPP 8µm to 14µm

## Pin Configuration



Pin No.	Sym bol	Description
1/5	VSS/ GND	Negative supply voltage / Ground (0V)
3	SCL	Serial Clock
4	SDA/ PWM	Serial Data or PWM
6	VDD 5V	Positive Supply Voltage 5V Supply (pin 7 and pin 8 not connected)
6/7/ 8	VDD 3V	Positive Supply Voltage 3V Supply (3V connected to shorted pins 6,7,8)

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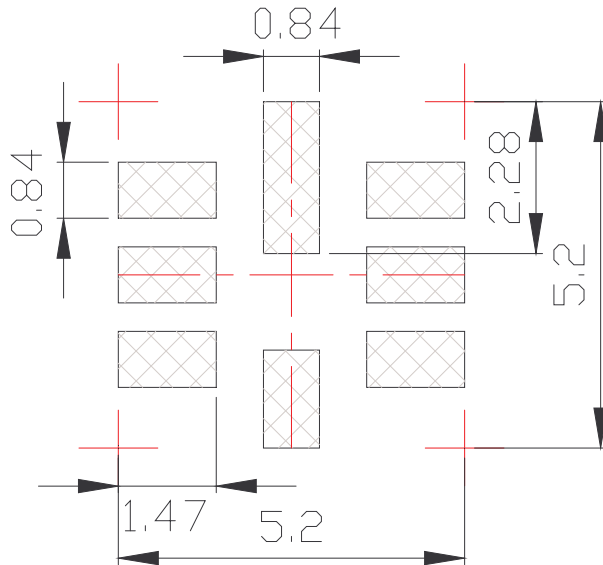
### Maximum Ratings

Parameter	Max. value	Unit	Condition
Supply voltage VDD	7	V	5V connection
Supply voltage 2 VDD	5	V	3V connection
Reverse voltage	0.4	V	Ground
ESD sensitivity	2	kV	Human body
Storage temperature range	-40.. 125	°C	
Maximum soldering profile	260°C for 30s		Reflow soldering

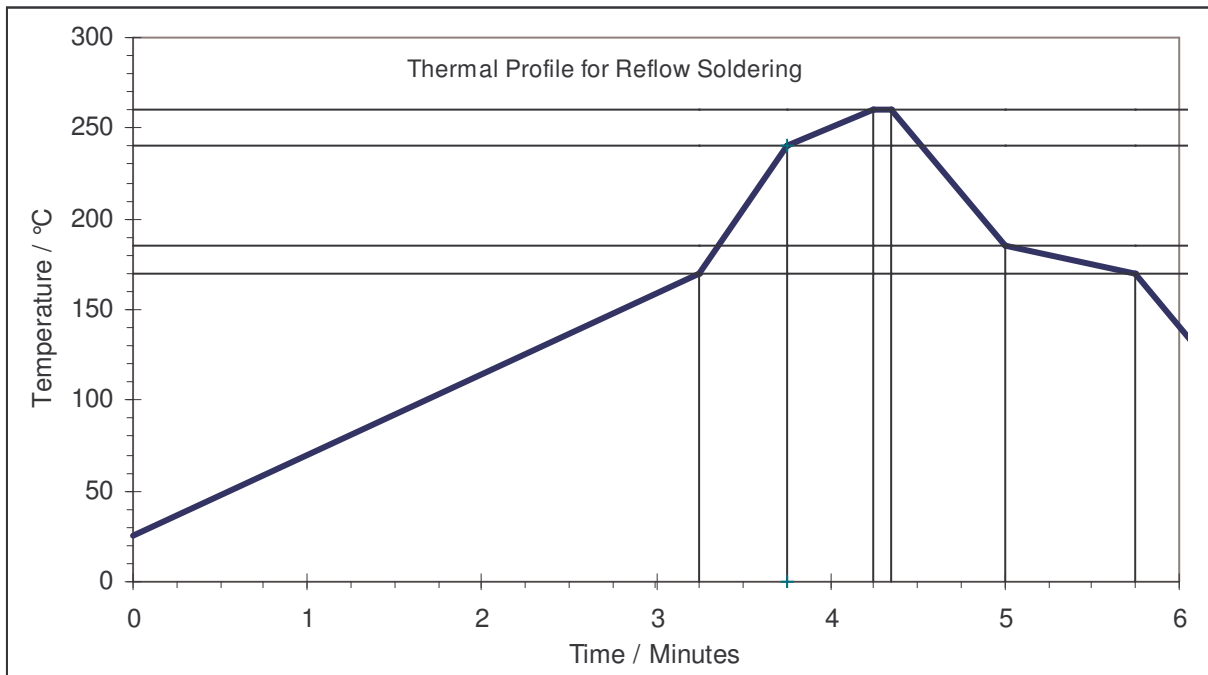
### Characteristics and Operating Conditions

Parameter	Typical Value	Unit	Condition
Supply voltage 1 VDD	(4.5) .. 5 .. (5.5)	V	5V connection
Supply voltage VDD	(2.4) .. 3 .. (3.6)	V	3V connection
Supply voltage VSS	0	V	Ground
Supply current	1	mA	Without load
Start up time after POR	0.15	sec	
Sensor absorbing area	0.61 x 0.61	mm <sup>2</sup>	Type TP1
Object temperature range	-30 .. +380	°C	Type "Tyyy"
Ambient temperature range	-40 .. +125	°C	
Temperature Resolution	0.1	°C	
Response time	5	ms	Sensor chip
Refresh rate	60	ms	ASIC
IR transmission	min. 70%	%	Wavelength range 7.5 to 13.5µm Cut on wavelength 5.5µm
Field of View	150	°	
Operating temperature	-30.. 120	°C	
Slave address	5Ah	hex	Factory default
Interface SM-Bus (default)	2-wire SMBus compatible, factory default without interface indication, output configured as open drain NMOS		
Interface PWM (type .. PWM)	1-wire PWM output on SDA, 10 bit resolution default settings: push-pull, single PWM, output of object temperature sensor 1, coefficients for voltage to temp. calculation Tomin: -40°C & Tomax: defined by Tyyy		

**PCB Footprint**



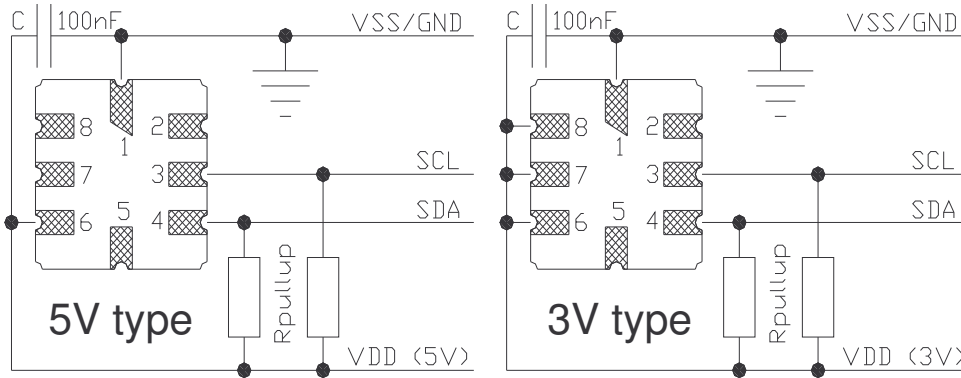
**Reflow Furnace Profile**



Suitable for lead free soldering.

The shown thermal profile should not be exceeded or component damage may result.

**Applications Circuitry SM-Bus Operation**

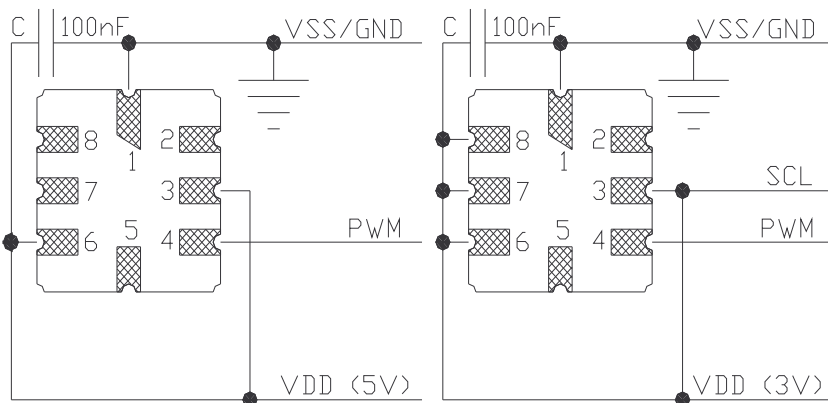


Pull-up resistor recommendation:

low power applications 20kOhm (SM-Bus DC specification  $I_{pullup}$  100 $\mu$ A .. 350 $\mu$ A)

high power applications 1.5kOhm (SM-Bus DC specification  $I_{pullup}$  min. 4mA)

**Applications Circuitry PWM Operation**



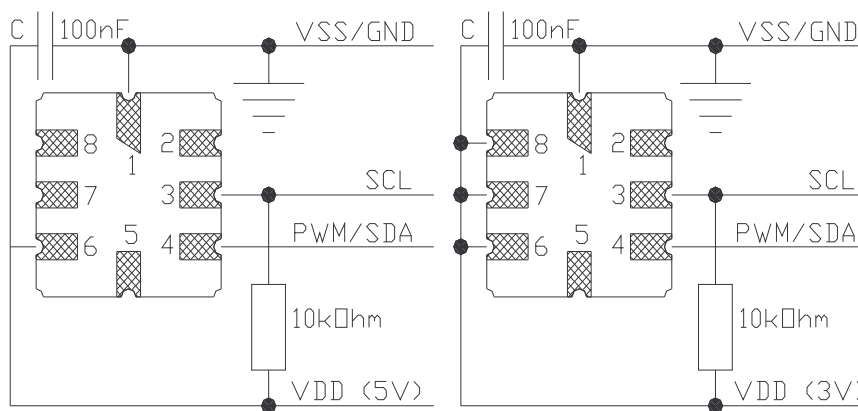
PWM mode is free running after power on.

Pin 3 (SCL) must be forced high for PWM mode

PWM output is configured as push pull

Default PWM output of object temperature 1

**Applications Circuitry PWM Operation with SM-Bus Option**



PWM mode is free running after power on.

SM-Bus operation available by added pull-up resistor

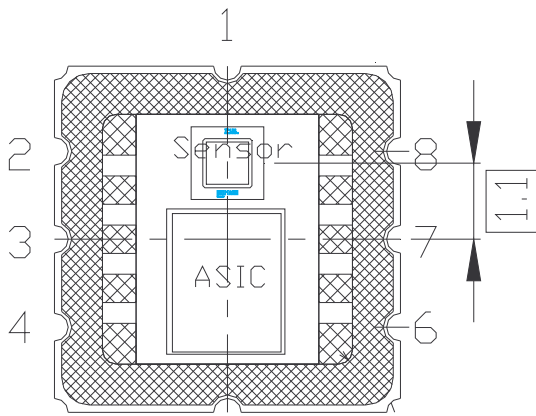
PWM output is configured as push pull

Default PWM output of object temperature 1

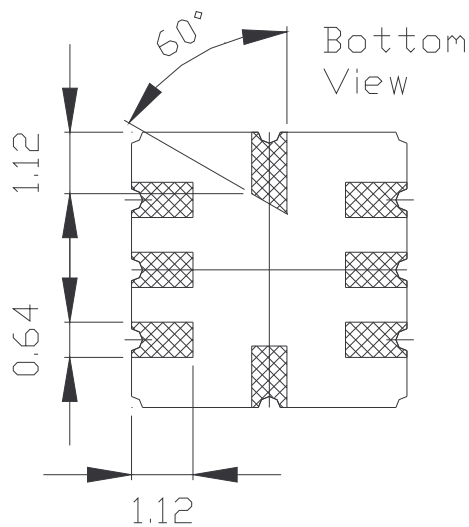
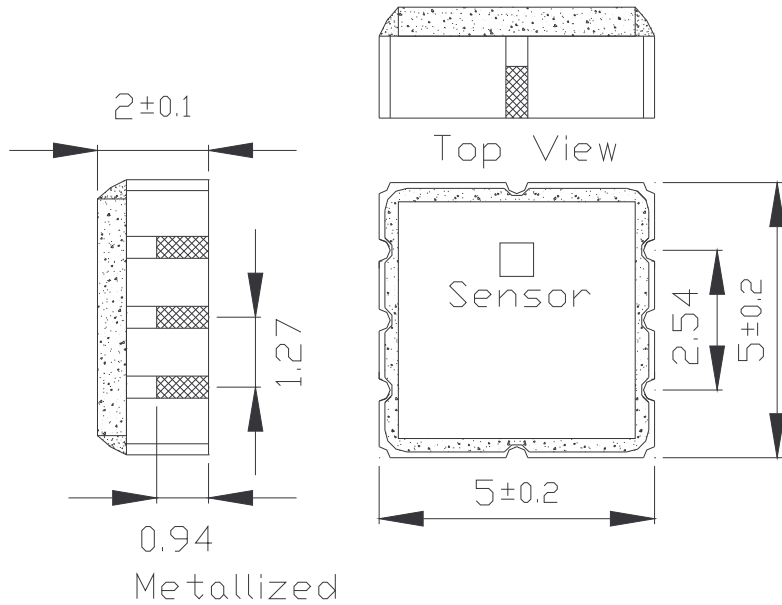
Datasheet Thermopile Module  
 Type HCM G15 Fx Tx (PWM)



Dimensions



Materials	
Solder pad termination	Au plating min. 0.75µm over nickel
Filter	Silicon coated
Body	Al2O3 ceramic
PB free , ROHS compliant	



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**Temperature Performance**

		Sensor (Ambient) Temperature [°C]				
		-40 .. 0	0 .. 50	50 .. 100	100 .. 125	
Object Temperature [°C]	-30 .. 0	±3°C	±2°C	±3°C	±4°C	Temperature Accuracy [°C]
	0 .. 60	±2°C	±1°C	±1.5°C	±2.5°C	
	60 .. 120	±3°C	±2°C	±2°C	±3°C	
	120 .. 180	±4°C	±2°C	±2.5°C	±3.5°C	
	180 .. 240	±5°C	±3°C	±3°C	±4°C	
	240 .. 300	±5°C	±4°C	±4°C	±5°C	

**Notes to the temperature performance:**

- The specified temperature performance presents preliminary findings based on sample investigations using special test equipment.
- The temperature accuracies are achievable by following conditions
  - thermal equilibrium of the sensor
  - no temperature differences in the sensor package
  - the object fills the sensor field of view completely
  - homogenously distributed temperature on the object surface
  - high and uniform emissivity of the object surface in the interesting infrared range

**Liability**

Changes or modifications at the product which haven't influence to the performance and/or quality of the device haven't to be announced to the customers in advance. Customers are requested to consult with Heimann Sensor representatives before the use of Heimann Sensor products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage. The company or their representatives will not be responsible for damage arising from such use without prior approval.