

**A2TPMI 334 OAA060**

Product Picture:



Description: **Sensor module for low temperature radiation measurement**

Referenced Document(s): **Datasheet A2TPMI, Rev. 4**

Product Name:

**A2TPMI 334 OAA060**

Part Number:

**6259**

Sensing range

**-20 ... 60° C**

Accuracy:

**1.5°C at calibration point,  
other ranges: see appropriate section**

## Absolute Maximum Ratings

Parameter	Min	MAX
Supply Voltage $V_{DD}$	-0.3 V	+6.5 V
Storage Temperature Range <sup>Note 1)</sup>	-40 °C	100°C
Operating Temperature Range	-40°C	100°C
Voltage at all inputs and outputs <sup>Note 2)</sup>	-0.3 V	$V_{DD} + 0.3$ V
Current at input pins <sup>Note 2)</sup>		+/- 5mA
Lead temperature (Soldering, 10sec)		+300°C
ESD Tolerance <sup>Note 3)</sup>		2.5 kV

**Note 1:** Extension to 120°C for limited periods of several minutes possible

**Note 2:** Limiting input pin current is only necessary for input voltages that exceed absolute maximum input voltage ratings

**Note 3:** Human body model, 1.5kΩ in series with 100pF. All pins rated per method 3015.7 of MIL-STD-883.

Static-sensitive device. Unused devices must be stored in conductive material. Protect devices from static discharge and static fields. Stresses above those listed under "Absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Precautions should be taken to avoid reverse polarity of power supply. Reversed polarity of power supply results in a destroyed unit.

Do not expose the sensors to aggressive detergents such as freon, trichlorethylen, etc. Optical windows (e.g. filter, lens) may be cleaned with alcohol and cotton swab.

## **Electrical Characteristics**

Unless otherwise indicated, all limits specified for  $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{DD} = +5\text{ V}$

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
<b>Power Supply</b>						
$V_{DD}$	Supply Voltage	4.5	5	5.5	V	
$I_{DD}$	Supply Current		1.5	2	mA	$R_L > 1\text{ M}\Omega$
<b>Outputs <math>V_{Tobj} / V_{TambESD}</math></b>						
$V_O$	Output Voltage Swing	0.25		$V_{DD} - 0.25\text{V}$	V	$I_{out}: -100\mu\text{A} \dots +100\mu\text{A}$
$R_O$	Output Resistance			10 100	$\Omega$	$I_{out}: -100\mu\text{A} \dots +100\mu\text{A}$ otherwise
$R_L$	Resistive Output Load	50			$\text{k}\Omega$	
$C_L$	Capacitive Output Load		100	500	pF	
$I_{SC}$	Output short circuit current		6		mA	Sourcing
			13		mA	Sinking
$V_{OL}$	Low level output voltage			0.5	V	output current $\leq 2\text{mA}$
$V_{OH}$	High level output voltage	$V_{DD} - 0.6\text{V}$			V	output current $\geq -2\text{mA}$
<b>Reference Voltage</b>						
$V_{Ref}$	Reference voltage	1.223	1.225	1.227	V	$R_L > 1\text{ M}\Omega$ , $T_A = 25^{\circ}\text{C}$
$TC_{VRef}$	Temperature coefficient of reference voltage		$\pm 30$	$\pm 100$	ppm $\text{K}^{-1}$	

## **AC Characteristics**

Unless otherwise indicated, all limits specified for  $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{DD} = +5\text{V}$

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$I_{N}$	V1 Input referred voltage noise			120	nV/ $\sqrt{\text{Hz}}$	rms value
$t_{Stt}$	Response Time after Power On			1	s	
$t_{lat}$	Latency time for $V_{Tobj}$			75	ms	
$t_{resp}$	Response Time		90	150	ms	

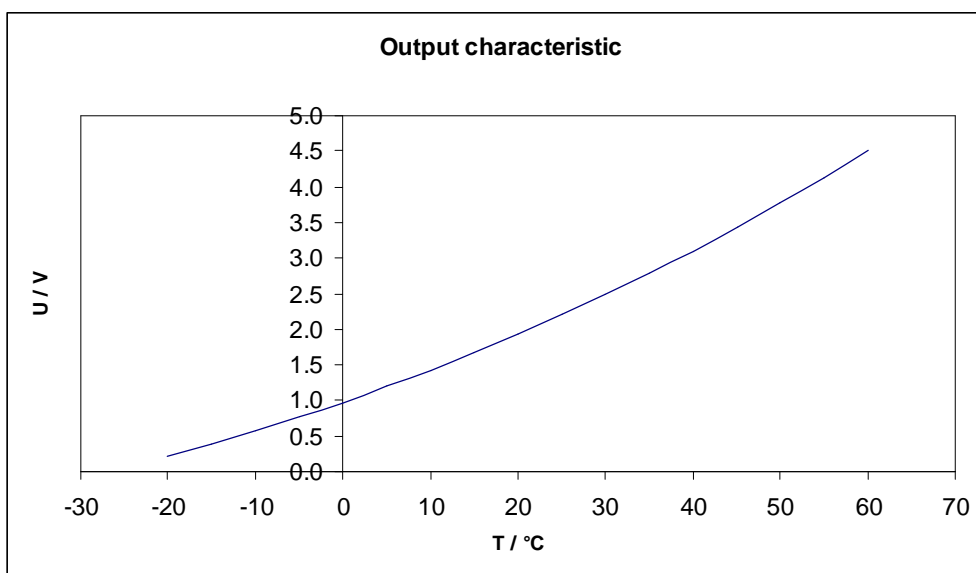
## **Thermopile Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
<b>3-type chip (TPS 33x)</b>						
S	Sensitive (absorber) area		0.7x0.7		$\text{mm}^2$	
N	Noise voltage		38		nV/ $\sqrt{\text{Hz}}$	
$\tau$	Time constant		25		ms	

## **V<sub>Tobj</sub>** Characteristics

Unless otherwise specified, all limits specified for V<sub>DD</sub> = +5 V, V<sub>Ref</sub> = +1.225V, T<sub>amb</sub> = 25°C

Object temperature / °C	Min	Typ	Max	Unit	Gradient / V/K
-40...-20	<0.119	<0.216	<0.312	V	<0.0333
-20	0.133	0.216	0.299	V	0.0333
-15	0.299	0.388	0.476	V	0.0355
-10	0.476	0.571	0.665	V	0.0378
-5	0.706	0.766	0.826	V	0.0402
0	0.909	0.973	1.037	V	0.0426
5	1.125	1.192	1.260	V	0.0452
10	1.353	1.425	1.496	V	0.0477
15	1.594	1.670	1.745	V	0.0503
20	1.849	1.928	2.008	V	0.0530
25	2.116	2.200	2.284	V	0.0557
30	2.398	2.486	2.573	V	0.0585
35	2.693	2.785	2.877	V	0.0613
40	3.003	3.099	3.196	V	0.0642
45	3.327	3.428	3.528	V	0.0671
50	3.665	3.770	3.876	V	0.0701
55	4.019	4.128	4.238	V	0.0731
60	4.387	4.501	4.615	V	0.0761



**Figure 1:** Output Characteristic

**Polynom to calculate Tobj from V<sub>Tobj</sub>:**

$$\text{Tobj } [^{\circ}\text{C}] = - 0.002603 x^6 + 0.04802 x^5 - 0.38431 x^4 + 1.8498 x^3 - 6.835 x^2 + 32.71 x - 26.75$$

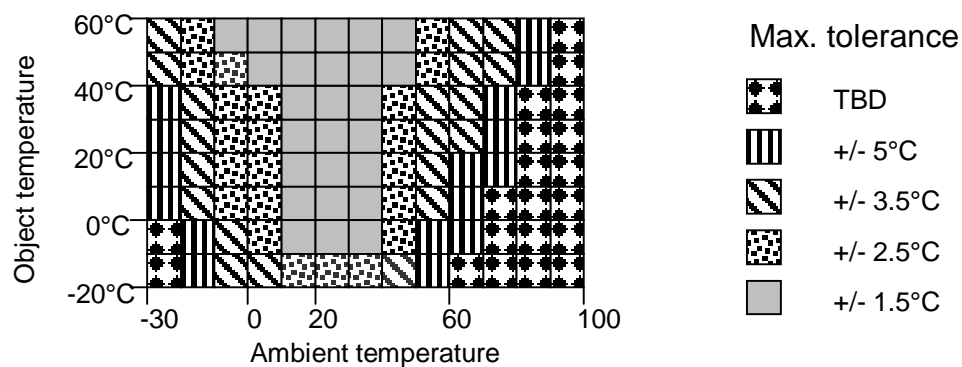
x = V<sub>Tobj</sub> in Volt

## V<sub>TAMB</sub> Characteristics

Unless otherwise specified, all limits specified for V<sub>DD</sub> = +5 V, V<sub>Ref</sub> = +1.225V

Ambient temperature / °C	Min	Typ	Max	Unit	Gradient / V/K
-40	0.300	0.310	0.319	V	0.005
-30	0.355	0.370	0.385	V	0.008
-20	0.439	0.460	0.481	V	0.0104
-10	0.552	0.579	0.606	V	0.0134
0	0.695	0.727	0.760	V	0.0163
15	0.963	1.004	1.045	V	0.0206
20	1.075	1.111	1.146	V	0.0221
25	1.201	1.225	1.249	V	0.0236
30	1.321	1.346	1.371	V	0.0250
35	1.449	1.475	1.502	V	0.0265
40	1.583	1.611	1.639	V	0.0279
50	1.874	1.905	1.936	V	0.0308
60	2.174	2.228	2.282	V	0.0338
80	2.883	2.962	3.041	V	0.0396
90	3.287	3.372	3.457	V	0.0425
100	3.721	3.812	3.903	V	0.0454

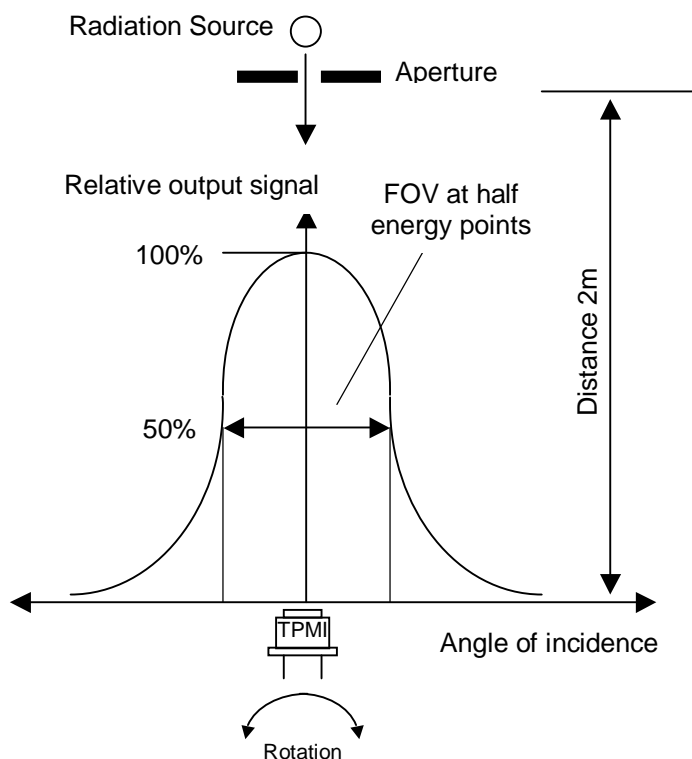
## AMBIENT TEMPERATURE COMPENSATION OF OBJECT TEMPERATURE



**Figure 2:** Ambient Compensation behaviour of Object temperature

## Optical Characteristics

### FIELD OF VIEW



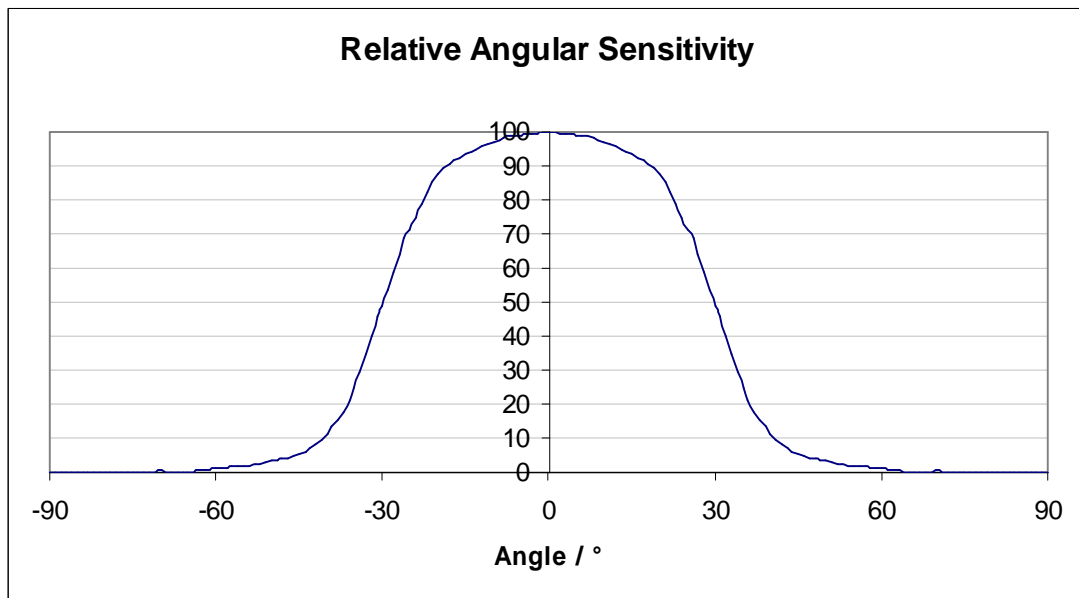
The A2TPMI is available with different standard optical cap assemblies with and without an infrared lens or mirror.

The optics defines the view angle or field of view (FOV) of the sensor.

The FOV is defined as the incidence angle difference, where the sensor shows 50% relative output signal according to the setup shown.

**Figure 3:** FOV Definition

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
<b>Standard Cap Type (C4)</b>						
FOV	Field of view		60	70	°	50% rel. output signal
OA	Optical axis		0	± 10	°	in reference to symmetrical axis of cap

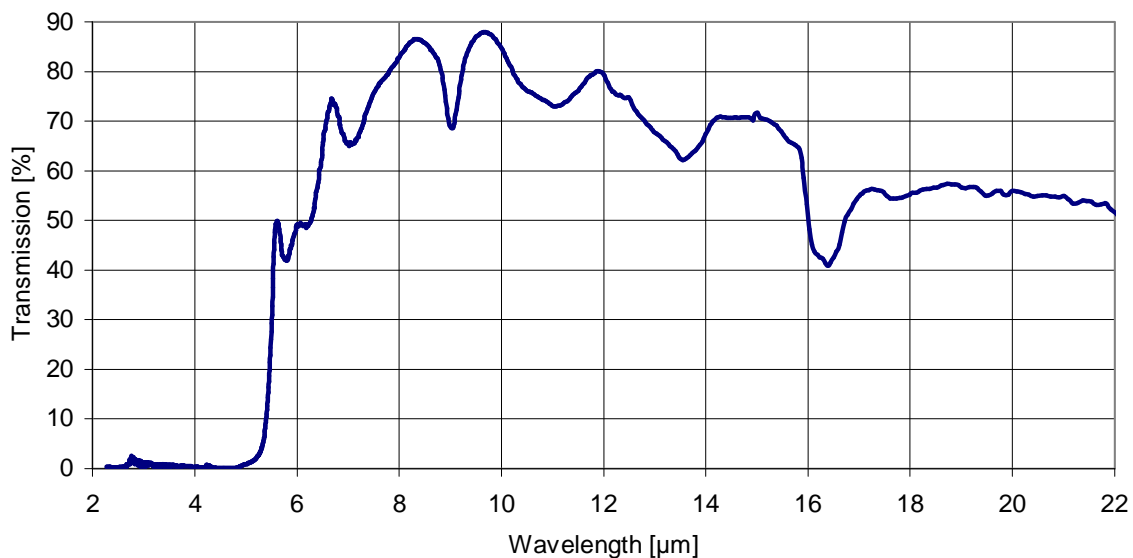


**Figure 4:** Typical angular sensitivity of A2TPMI 334 type sensors

### IR-FILTER CHARACTERISTICS

The following picture shows typical transmission curves for a standard Filter in a wavelength range from 2μm to 22μm.

The average transmission for a standard filter is at least 70% in a range from 7.5μm to 13.5μm.



**Figure 5:** IR-Filter Characteristic

## **Configuration**

Feature	Adjustment	
Ambient Temperature Compensation	Enabled	✓
	Disabled	
$V_{Tamb}$ / $V_{Ref}$ Output Signal	Reference Voltage $V_{Ref}$	
	$V_{Tamb}$ Signal	✓
$V_{Tobj}$ Output Configuration	Analog Mode	✓
	Comparator Mode	
$V_{Tamb}$ Output Configuration	Analog Mode	✓
	Comparator Mode	

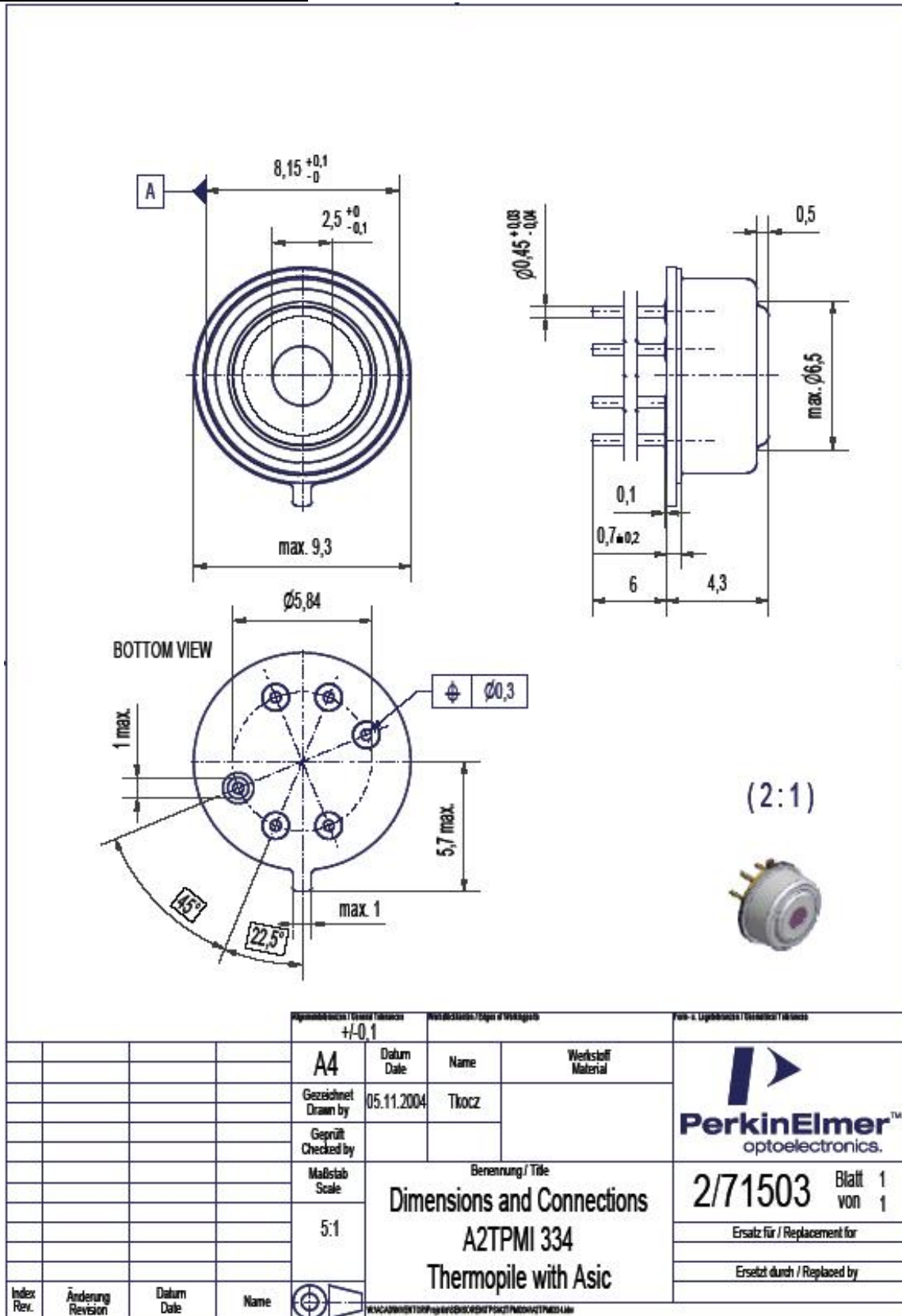
## **Test Conditions**

Object Size	Full field of view coverage
Object Emissivity	> 99%
Object Temperature	40°C ± 0.3°C
Ambient Temperature	25°C ± 1°C
Supply Voltage	5V

TEST PARAMETER:							
Tobj °C	Tamb °C	$V_{Tobj}$			$V_{Tamb}$		
		Minimum V	Typical V	Maximum V	Minimum V	Typical V	Maximum V
40	25	3.003	3.099	3.196	1.201	1.225	1.249

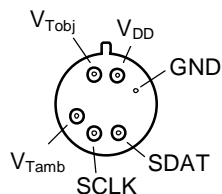


## Mechanical Information



## Connection Information

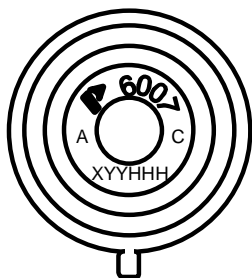
### Non PCB Version



**Bottom view**

## Labeling

6007	Last four digits of the TPMI sensor part number 6007
XYX	Manufacturing date: X = Last digit of the calendar year, YY = Week of the calendar year
HHH	Serial number of the production lot
AC	“AC” Represents the module part number 6259 and will be applied after object calibration in mass production



## Quality System

PerkinElmer is an ISO 9001 / IQS 9000 certified manufacturer with established SPC and TQM. All materials are checked according to specifications and final goods meet the specified tests.

The here specified components are of lead-free type, compliant to RoHS regulations.