THERMOMETRICS
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ZTP-135SR

Thermometrics Thermopile IR Sensor

This thermopile sensor is used for non-contact surface temperature measuring. The ZTP-135SR model consists of thermo-elements, flat IR filter, a thermistor for temperature compensation in a hermetically-sealed TO-46(18) package. There is also a variety of filters available to help maximize performance in specific applications.

Applications

- Ear thermometers
- Non-contact thermometers
- Appliances
- Electronics

Features

- Small-size sensor (TO-46 package)
- Included ambient temperature (thermistor) sensor for compensation
- High sensitivity
- Fast response time
- Low cost

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Thermopile Chip

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Chip Size		1.8 x 1.8		mm^2	
Diaphragm Size		1.4 x 1.4		mm^2	
Active Area		0.7 x 0.7		mm^2	
Internal Resistance	42	60	81	kΩ	25 °C
Resistance T.C.			0.12	%/ °C	
Responsivity	43	62	81	V/W	500K, 1Hz
Responsivity T.C.		-0.10		%/ °C	
Noise Voltage		32		nV rms	R.M.S., 25 °C
NEP		0.51		$nW/Hz^{1/2}$	500K, 1Hz
Detectivity		1.35 E08		$cmHz^{1/2}/W$	500K, 1Hz
Time Constant		25		ms	

Thermistor

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Resistance	97	100	103	kΩ	Tol.:3%, @25 °C
Beta - Value	3920	3960	4000	K	Tol.:1%, Defined at @25 °C/50 °C

Absolute Maximum Ratings

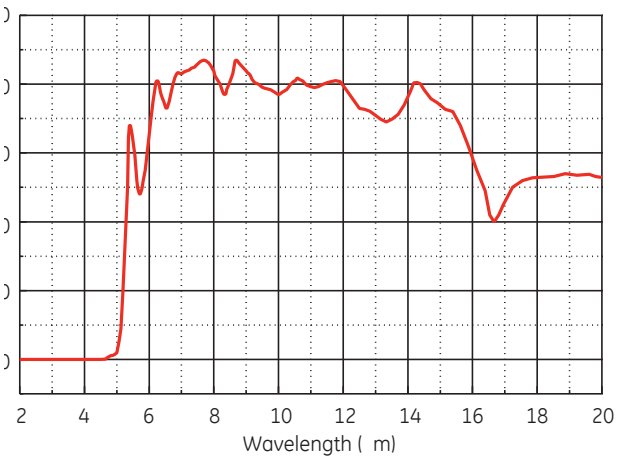
Operating Temperature

-20°C ~ 100°C

Storage Temperature

-40°C ~ 120°C

Filter Transmission Data

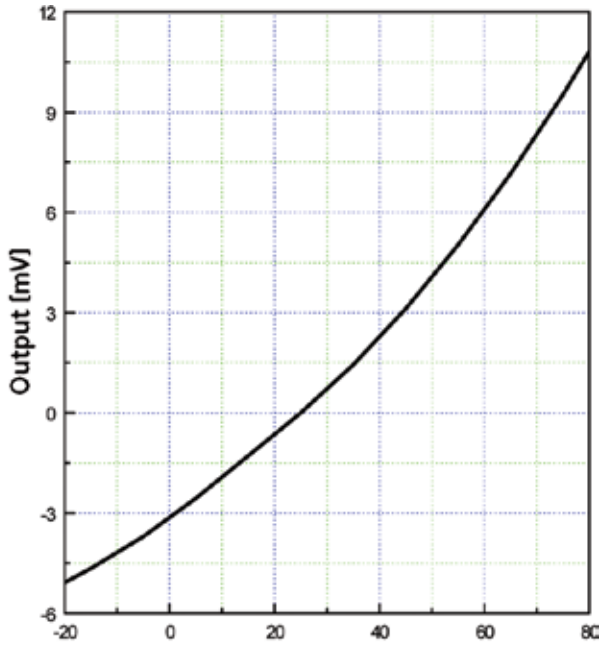


Thermistor Resistance (R-T Table)

Tamb (°C)	Rmin (kΩ	Rcent (kΩ)	Rmax (kΩ)
-20	909.1	947.9	987.3
-15	687.7	715.9	744.7
-10	524.5	545.4	566.5
-5	403.3	418.8	434.5
0	312.6	324.1	335.8
5	244.0	252.7	261.5
10	191.8	198.5	205.1
15	151.9	156.9	162.0
20	121.0	124.9	128.8
25	97.00	100.0	103.0
30	78.05	80.55	83.06
35	63.16	65.25	67.36
40	51.39	53.15	54.91
45	42.03	43.51	45.00
50	34.54	35.79	37.05
55	28.52	29.58	30.65
65	19.70	20.47	21.25
70	16.48	17.14	17.81
75	13.83	14.40	14.98
80	11.66	12.15	12.65
85	9.867	10.29	10.72
90	8.380	8.745	9.118
95	7.143	7.460	7.785
100	6.111	6.388	6.670

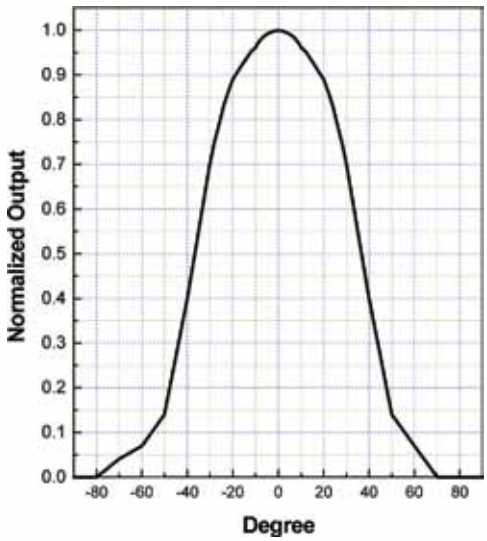
Typical Characteristic Data

Sensitivity

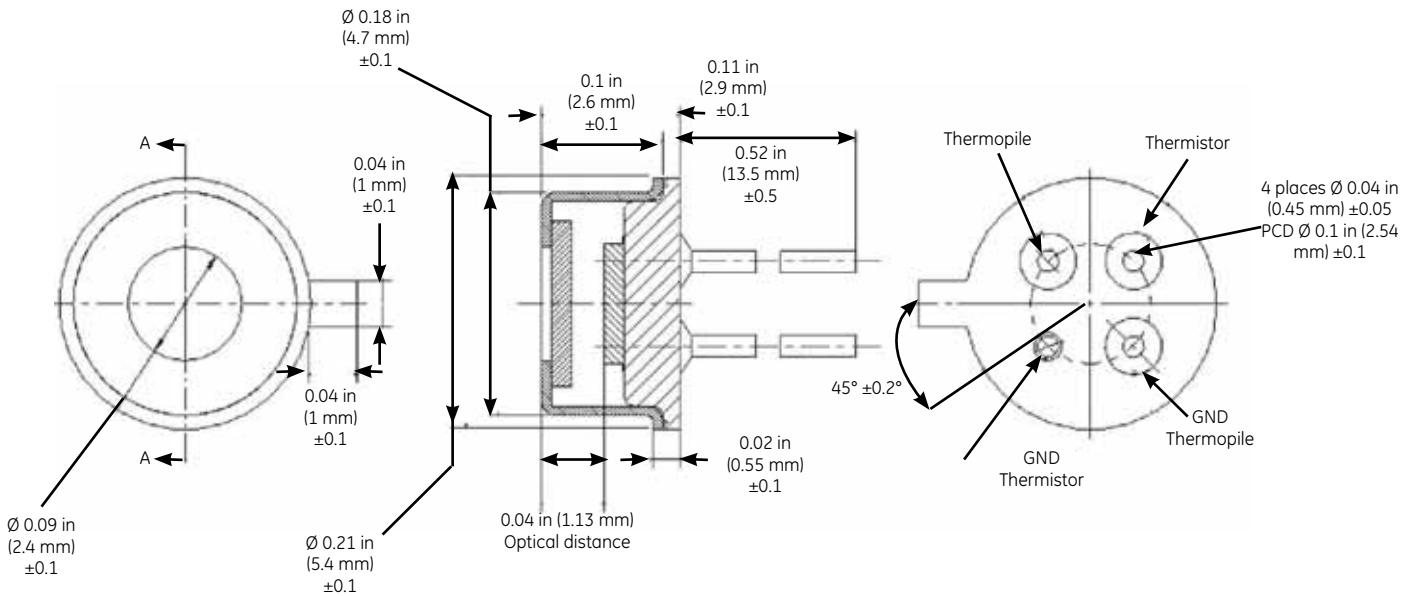


Field of View

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Field of View	80	85	90	Degree	50% of Maximum Output



Outline of Sensor Package and Pin Arrangement



ZTP-135SR dimensions

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ZTP-015
Thermometrics IR Sensor

This thermopile sensor is used for non-contact surface temperature measuring. The ZTP-015 model consists of thermo-elements, flat IR filter, a thermistor for temperature compensation and a hermetically-sealed TO-41 (small-size) package.

Applications

- Infant ear thermometers
- Non-contact thermometers

Features

- Ultra small-size sensor (TO-41 package)
- Included ambient temperature (thermistor) sensor for compensation
- High sensitivity
- Fast response time

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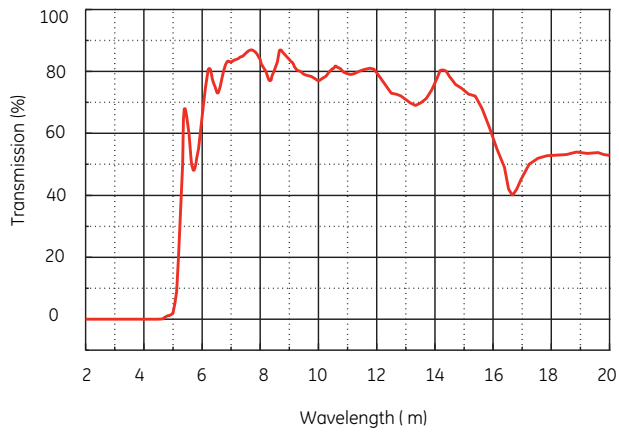
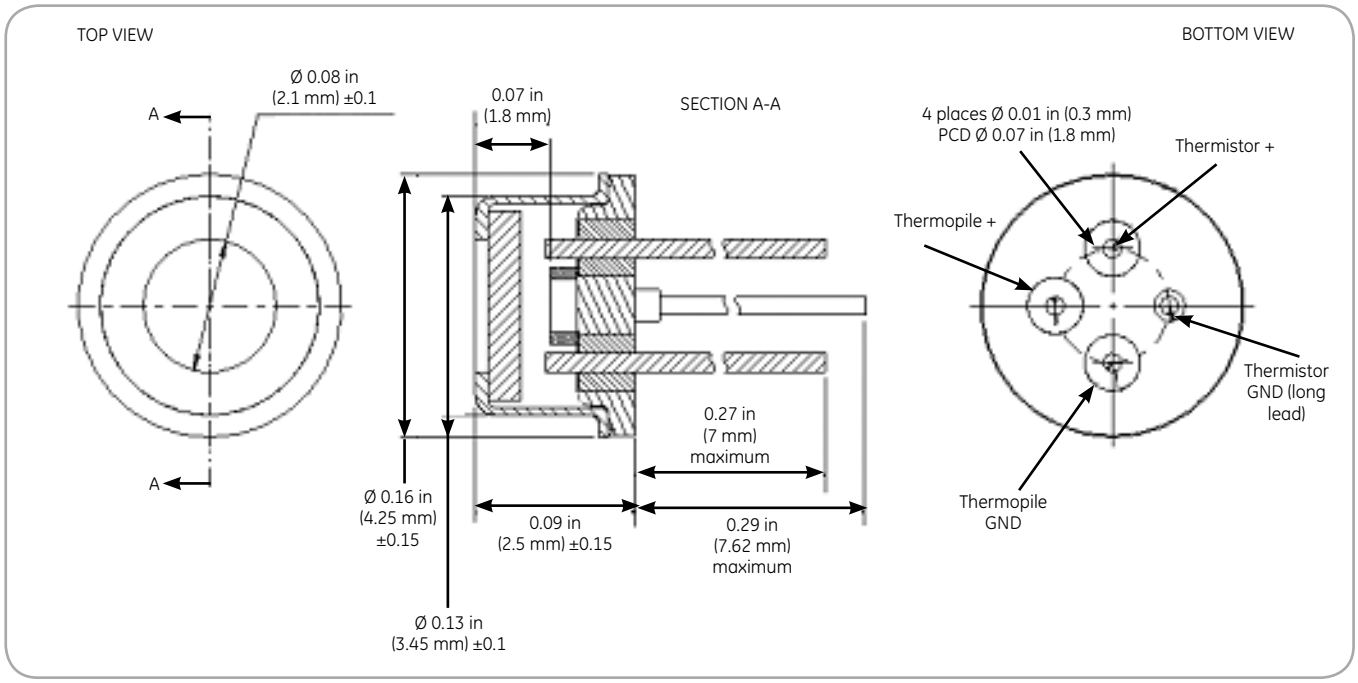
ZTP-015 Specifications

Parameter	Unit	Value	Condition
Chip Size	mm^2	1.2 x 1.2	-
Diaphragm Size	mm^2	0.8 x 0.8	-
Number of Couples	-	60	-
Active Area	mm^2	0.4 x 0.4	-
Internal Resistance	kΩ	60 ±30%	-
Resistance T.C.	% °F (°C)	< 0.10	-
Responsitivity	V/W	33 ±30%	500K, 1 Hz
Responsitivity T.C.	% °F (°C)	-0.1	Typical
Noise Voltage	nV rms	38	R.M.S, Typical
NEP	nW/ √Hz	0.4	500K, 1 Hz, Typical
Detectivity	cn √Hz/W	1.00E + 08	500K, 1 Hz, Typical
Time Constant	ms	20	500K, 1 Hz, Typical
Operating Temperature	°F (°C)	-4°F to 212°F (-20°C to 100°C)	-
Storage Temperature	°F (°C)	-4°F to 248°F (-40°C to 120°C)	-
Thermistor Resistance	kΩ	100 ±3%	@ 77°F (25°C)
Beta	K	3960 ±1%	-
Package Type	-	TO-41	-





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ZTP-101T

Thermopile Infrared (IR) Sensor

Thermometrics Thermopile Sensors are used for non-contact surface temperature measurement. The ZTP -101T model consists of thermo-elements, flat Infrared (IR) filter, a thermistor for temperature compensation and a hermetically-sealed small-size package. There is also a variety of filters available to maximize performance in specific applications.

Applications

- Patient monitoring
- Ear and tympanic thermometers
- Occupancy detection
- HVAC
- Appliances

Features

- Non-contact measurement
- Wider surface area measurement
- Small-size sensor package
- Included ambient temperature (thermistor) sensor for compensation
- High sensitivity
- Fast response time
- Low cost

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Specifications

Thermopile Chip

Parameter	Min	Limits Typ	Max	Units	Condition
Chip Size		3.0 X 3.0		mm^2	
Diaphragm Size		1.5 x 1.5		mm^2	
Active Area		0.51 x 0.51		mm^2	
Internal Resistance	140	200	260	kΩ	25°C
Resistance T.C			0.10	%/°C	
Responsivity	77	110	143	V/W	500K, 1 Hz
Responsivity T.C		-0.11		%/°C	
Noise Voltage		62		nV rms	R.M.S., 25°C
NEP		0.60		$nW/Hz^{1/2}$	500K, 1 Hz
Detectivity		9.00 E07		$cmHz^{1/2}/W$	500K, 1 Hz
Time Constant		22		ms	

Thermistor for Temperature Compensation

Parameter	Limits Min	Typ	Max	Units	Condition
Resistance	29.1	30	30.9	kΩ	Tol. :3%, @25°C
Beta - Value	3773	3811	3849	K	Tol. :1%, Defined at 0°C/50°C

Absolute Maximum Ratings

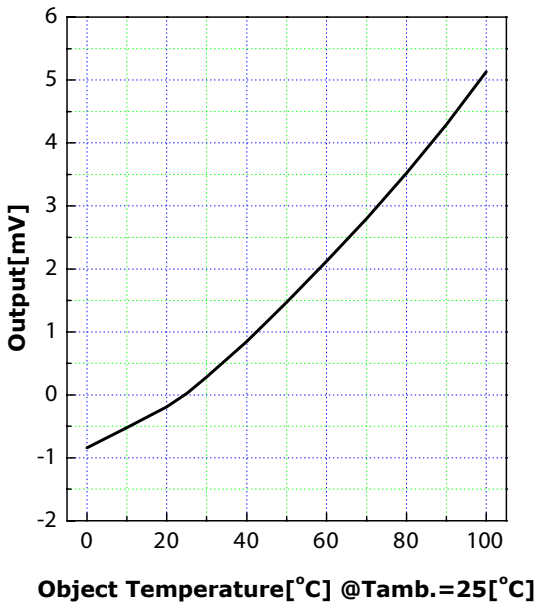
Operating Temperature
-20°C ~ 100°C

Storage Temperature
-40°C ~ 120°C

Thermistor Resistance (R-T Table)

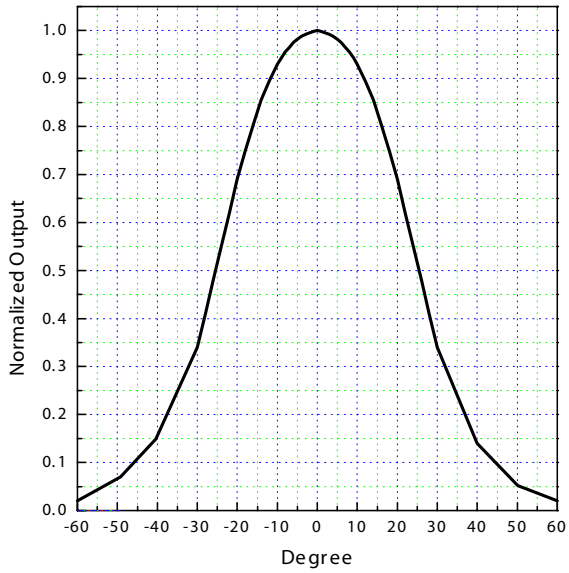
T ambient (°C)	Rmin (kΩ)	Rcent (kΩ)	Rmax (kΩ)
-20.0	255.42	269.16	283.38
-15.0	194.73	204.64	214.87
-10.0	149.73	156.94	164.34
-5.0	116.06	121.33	126.73
0.0	90.644	94.526	98.486
5.0	71.299	74.173	77.093
10.0	56.463	58.600	60.763
15.0	45.000	46.596	48.206
20.0	36.083	37.280	38.481
25.0	29.100	30.000	30.900
30.0	23.498	24.276	25.058
35.0	19.077	19.749	20.427
40.0	15.567	16.148	16.736
45.0	12.765	13.268	13.778
50.0	10.517	10.952	11.395
55.0	8.704	9.081	9.466
60.0	7.234	7.562	7.897
65.0	6.038	6.323	6.614
70.0	5.060	5.308	5.562
75.0	4.257	4.473	4.695
80.0	3.594	3.783	3.978
85.0	3.046	3.211	3.382
90.0	2.590	2.735	2.885
95.0	2.210	2.337	2.469
100.0	1.891	2.003	2.120

Sensitivity

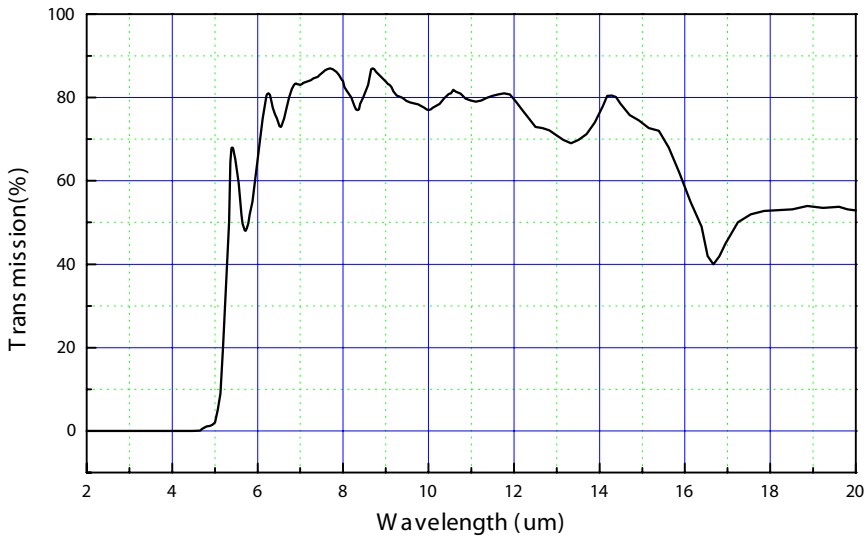


Field of View

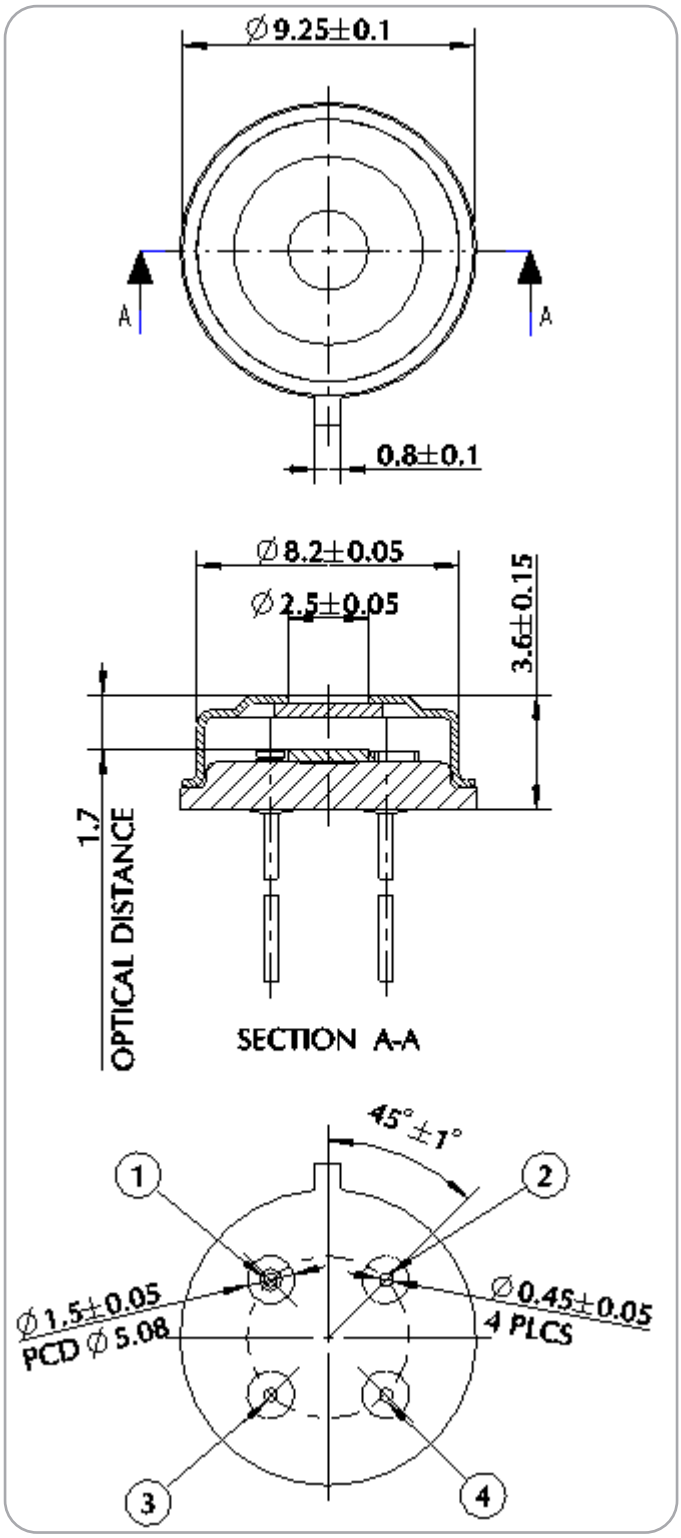
Parameter	Limits			Units	Condition
	Min	Typ	Max		
Field of View	45	50	55	Degree	50% of Maximum Output



Transmission Data of Filter



Outline of Sensor Packaging and Pin Arrangement (unit = mm)



Unit: mm

Pin arrangement:
1. GND Thermistor
2 . Thermopile
3. GND Thermopile
4 . Thermistor

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ZTP-115

Thermopile Infrared (IR) Sensor

Thermometrics Thermopile Infrared (IR) Sensors are used for non-contact surface temperature measurement. The ZTP-115 Model consists of thermo-elements, flat IR filter, and a thermistor for temperature compensation in a hermetically-sealed small-size package. Various filters are also available to maximize performance in specific applications.

Applications

- Patient monitoring
- Ear & Tympanic thermometers
- Occupancy detection
- HVAC
- Appliance

Features

- Non-contact measurement
- Wider surface area measurement
- Small-size sensor package
- Included ambient temperature (thermistor) sensor for compensation
- High sensitivity
- Fast response time
- Low cost
- RoHS compliant

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Specifications

Thermopile Chip

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Chip Size		1.8 x 1.8		mm^2	
Diaphragm Size		1.0 x 1.0		mm^2	
Active Area		0.5 x 0.5		mm^2	
Internal Resistance	35	50	65	kΩ	25°C
Resistance T.C			0.15	%/°C	
Responsivity	42	60	78	V/W	500K, 1 Hz
Responsivity T.C		-0.10		%/°C	
Noise Voltage		30		nV rms	R.M.S., 25°C
NEP		0.50		$nW/Hz^{1/2}$	500K, 1 Hz
Detectivity		1.00 E08		$cmHz^{1/2}/W$	500K, 1 Hz
Time Constant		20		ms	

Thermistor for Temperature Compensation

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Resistance	9.7	10	10.3	kΩ	Tol. :3%, @25°C
Beta - Value	3930	3970	4010	K	Tol. :1%, Defined at 25°C/85°C

Absolute Maximum Ratings

Operating Temperature
-20°C ~ 100°C

Storage Temperature
-40°C ~ 120°C

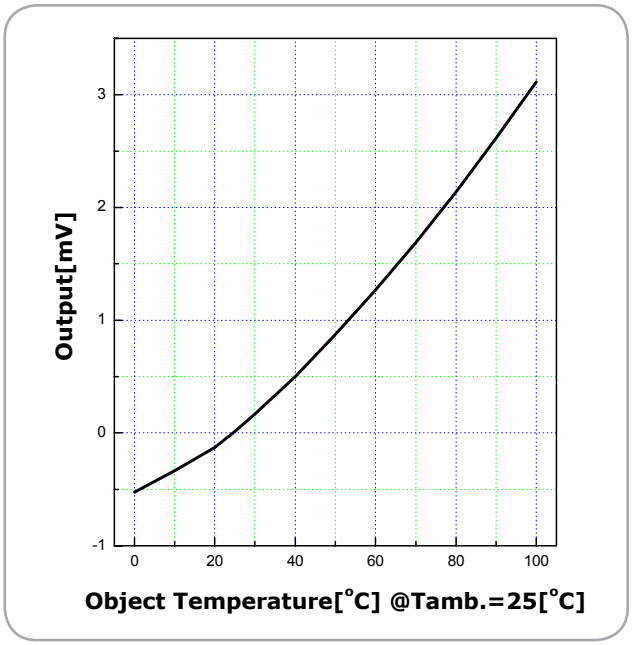
Ordering Information

Lead Length (mm)	Part No.
3.0	ZTP-115
6.7	ZTP-115L1
13.2	ZTP-115L

Thermistor Resistance (R-T Table)

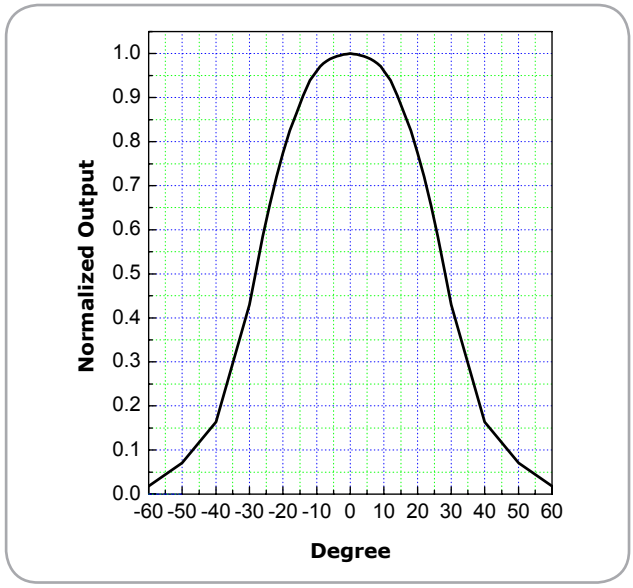
T ambient (° C)	Rmin (kΩ)	Rcent (kΩ)	Rmax (kΩ)
-40	267	284.7	303.2
-35	197.2	209.6	222.5
-30	147.1	155.9	165
-25	110.8	117.1	123.6
-20	84.16	88.68	93.35
-15	64.46	67.73	71.11
-10	49.74	52.13	54.59
-5	38.65	40.41	42.21
0	30.24	31.54	32.86
5	23.81	24.77	25.75
10	18.86	19.58	20.3
15	15.03	15.56	16.1
20	12.04	12.44	12.84
25	9.7	10	10.3
30	7.823	8.082	8.342
35	6.342	6.566	6.791
40	5.168	5.361	5.557
45	4.233	4.4	4.569
50	3.484	3.629	3.776
55	2.882	3.007	3.135
60	2.396	2.504	2.615
65	2.0009	2.095	2.192
70	1.679	1.7612	1.8458
75	1.4153	1.4871	1.5612
80	1.1984	1.261	1.3264
85	1.0193	1.0745	1.1317
90	0.8707	0.9193	0.9697
95	0.7469	0.7898	0.8344
100	0.6433	0.6812	0.7208
105	0.5562	0.5899	0.625

Sensitivity

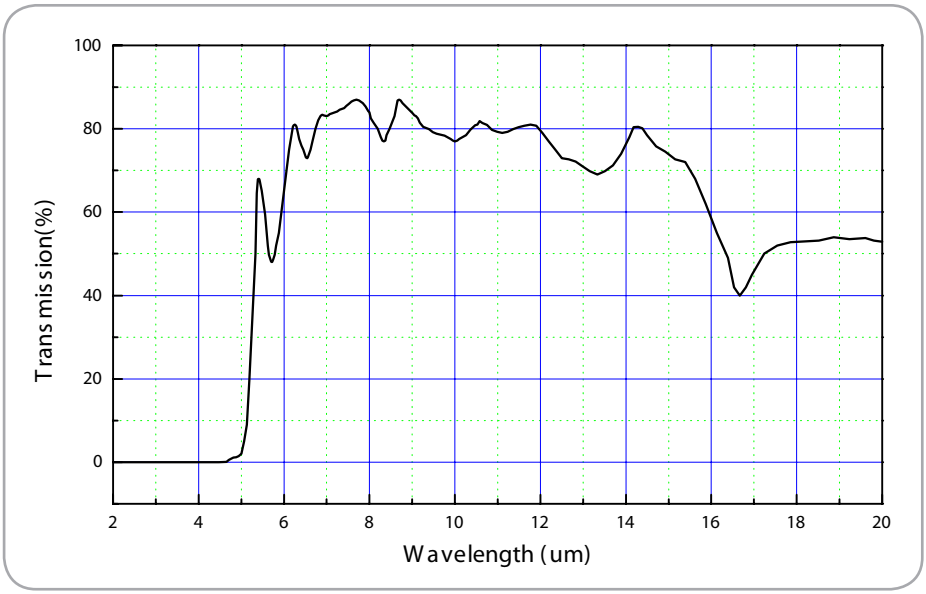


Field of View

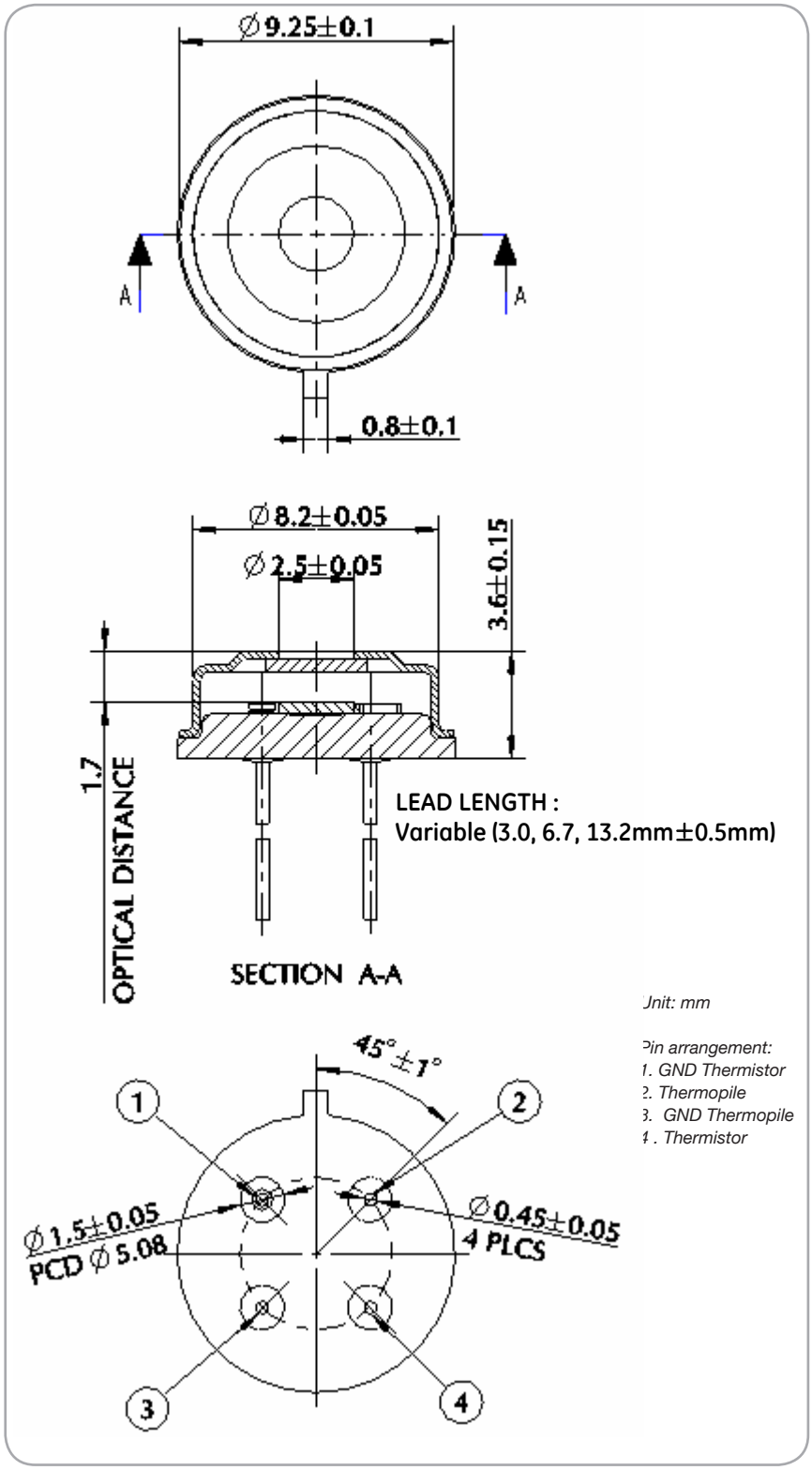
Parameter	Limits			Units	Condition
	Min	Typ	Max		
Field of View	50	55	60	Degree	50% of Maximum Output



Filter Transmission Data



Outline of Sensor Packaging and Pin Arrangement (unit: mm)



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ZTP-135
Thermopile IR Sensor

This thermopile sensor is used for non-contact surface temperature measuring. The ZTP-135 model consists of thermo-elements, flat IR filter, a thermistor for temperature compensation and a hermetically-sealed small-size package. There is also a variety of filters available to maximize performance in specific applications

Applications

- Patient monitoring
- Ear & Tympanic thermometers
- Occupancy detection
- HVAC
- Appliance

Features

- Non-contact measurement
- Wider surface area measurement
- Small-size sensor package
- Included ambient temperature - (thermistor) sensor for compensation
- High sensitivity
- Fast response time
- Low cost

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Specifications

Thermopile Chip

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Chip Size		1.8 x 1.8		mm^2	
Diaphragm Size		1.4 x 1.4		mm^2	
Active Area		0.7 x 0.7		mm^2	
Internal Resistance	42	60	78	kΩ	25°C
Resistance T.C			0.12	%/°C	
Responsivity	42	60	78	V/W	500K, 1 Hz
Responsivity T.C		-0.10		%/°C	
Noise Voltage		32		nV rms	R.M.S., 25°C
NEP		0.53		$nW/Hz^{1/2}$	500K, 1 Hz
Detectivity		1.30 E08		$cmHz^{1/2}/W$	500K, 1 Hz
Time Constant		25		ms	

Thermistor for Temperature Compensation

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Resistance	9.7	10	10.3	kΩ	Tol. :3%, @25°C
Beta - Value	3930	3970	4001	K	Tol. :1%, Defined at 25°C/85°C

Absolute Maximum Ratings

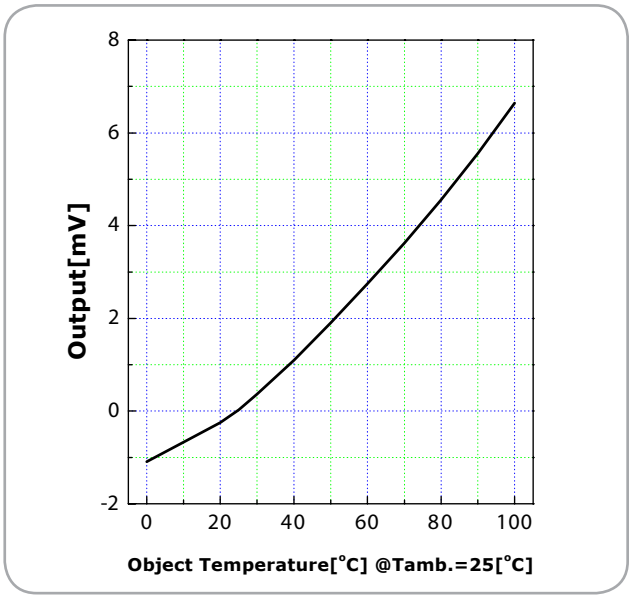
Operating Temperature
-20°C ~ 100°C

Storage Temperature
-40°C ~ 120°C

Thermistor Resistance (R-T Table)

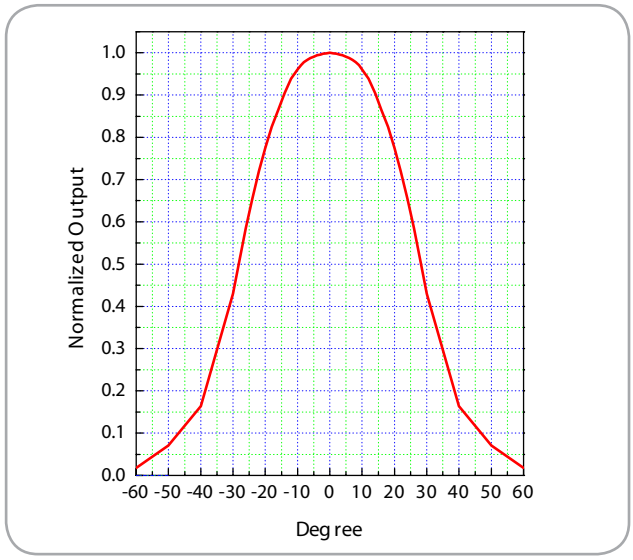
T ambient (° C)	Rmin (kΩ)	Rcent (kΩ)	Rmax (kΩ)
-40	267	284.7	303.2
-35	197.2	209.6	222.5
-30	147.1	155.9	165
-25	110.8	117.1	123.6
-20	84.16	88.68	93.35
-15	64.46	67.73	71.11
-10	49.74	52.13	54.59
-5	38.65	40.41	42.21
0	30.24	31.543	32.86
5	23.81	24.772	25.75
10	18.86	19.58	20.3
15	15.03	15.56	16.1
20	12.04	12.44	12.84
25	9.7	10	10.3
30	7.823	8.082	8.342
35	6.342	6.566	6.791
40	5.168	5.361	5.557
45	4.233	4.4	4.569
50	3.484	3.629	3.776
55	2.882	3.007	3.135
60	2.396	2.504	2.615
65	2.0009	2.095	2.192
70	1.679	1.7612	1.8458
75	1.4153	1.4871	1.5612
80	1.1984	1.261	1.3264
85	1.0193	1.0745	1.1317
90	0.8707	0.9193	0.9697
95	0.7469	0.7898	0.8344
100	0.6433	0.6812	0.7208
105	0.5562	0.5899	0.625

Sensitivity

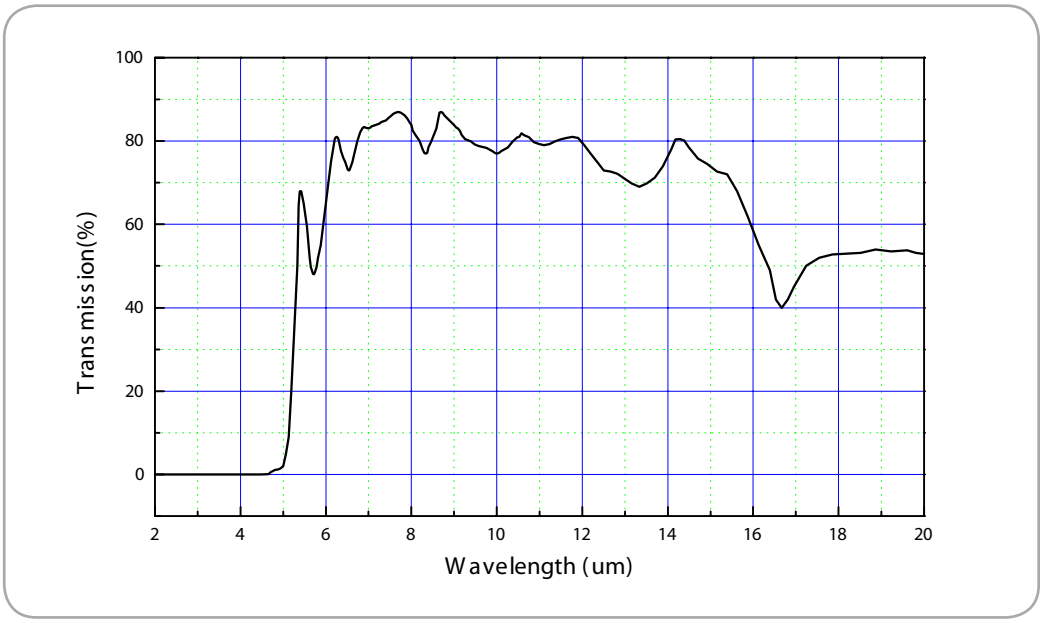


Field of View

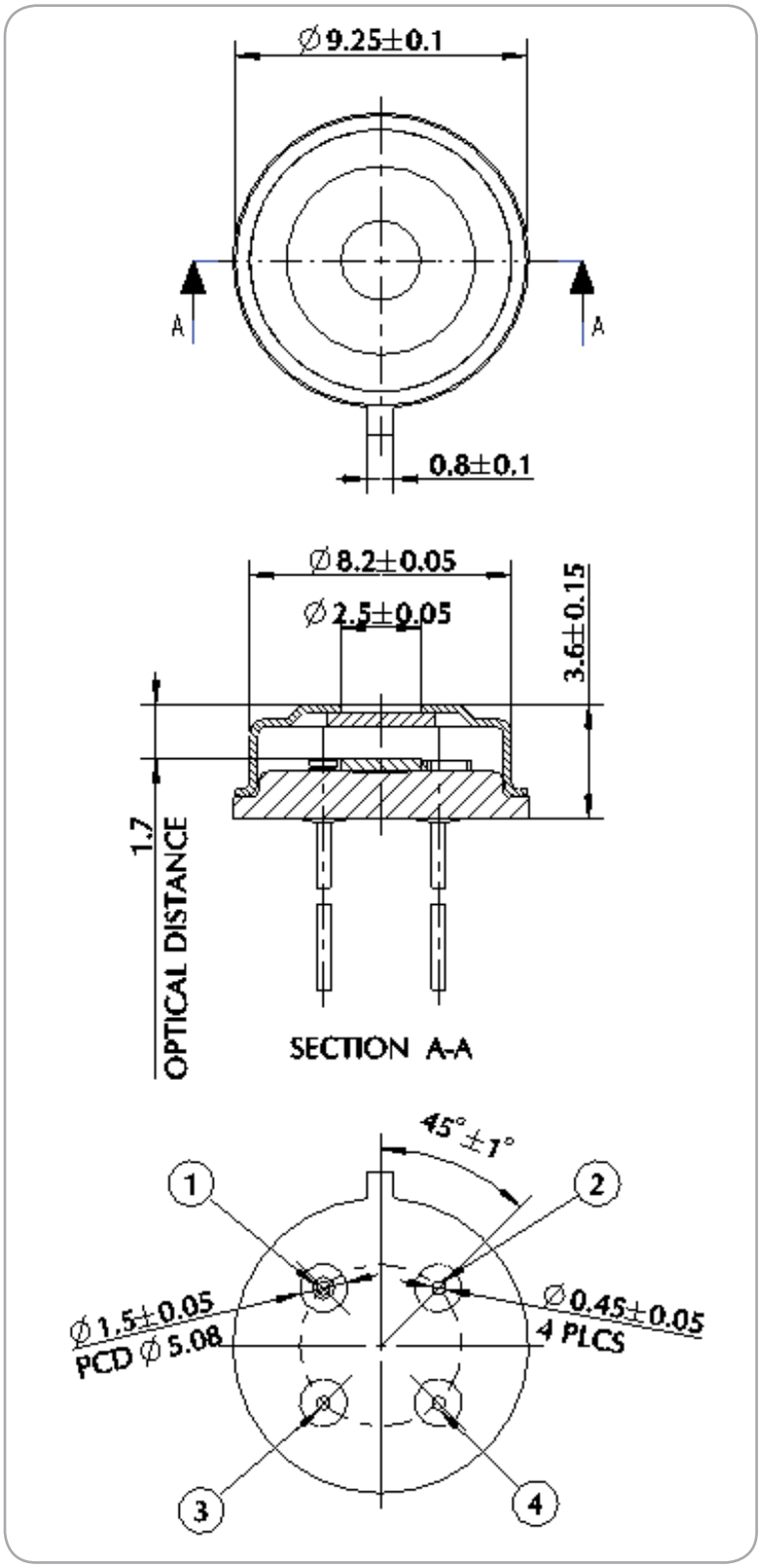
Parameter	Limits			Units	Condition
	Min	Typ	Max		
Field of View	51	56	61	Degree	50% of Maximum Output



Filter Transmission Data



Outline of Sensor Packaging and Pin Arrangement (unit: mm)



Unit: mm

Pin arrangement:
1. GND Thermistor
2. Thermopile
3. GND Thermopile
4 . Thermistor

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AAS-920-151A-03/2014

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ZTP-148SR

Thermopile IR Sensor

Thermometrics Thermopile IR Sensors are used for non-contact surface, or infrared, temperature measurement. The ZTP-148SR Model consists of thermo-elements, flat infrared filter and thermistor for temperature compensation, all in one hermetically-sealed TO-46 (18) sensor package. There are a variety of filters available to maximize performance in specific applications.

Applications

- Ear thermometers
- Forehead thermometers
- Surface temperature measurement of the human body

Features

- Compact design
- High sensitivity
- Fast response time
- Low cost
- Included ambient temperature (thermistor) sensor

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ZTP-148SR Specifications

Thermopile Chip

Parameter	Limits			Unit	Condition
	Min	Typ	Max		
Chip Size		1.8 X 1.8		mm^2	
Active Area		0.7x0.7		mm^2	Absorber area
Internal Resistance	60	85	111	kΩ	@25°C
Resistance T.C.			0.12	%/°C	
Responsivity	43	61	79	V/W	500K, 1Hz,
Responsivity T.C.		-0.07		%/°C	
Noise Voltage		37		nV rms	R.M.S, 25°C
NEP		0.61		$nW/Hz^{1/2}$	
Detectivity		1.14		$cmHz^{1/2}/W$	
Time Constant		32		ms	

NTC Thermistor for Temperature Compensation

Parameter	Limits			Unit	Condition
	Min	Typ	Max		
Resistance	97	100	103	kΩ	Tol.:3%, @ 25°C
Beta – Value	3920	3960	4000	K	Tol.:1%, Defined at 25°C/50°C

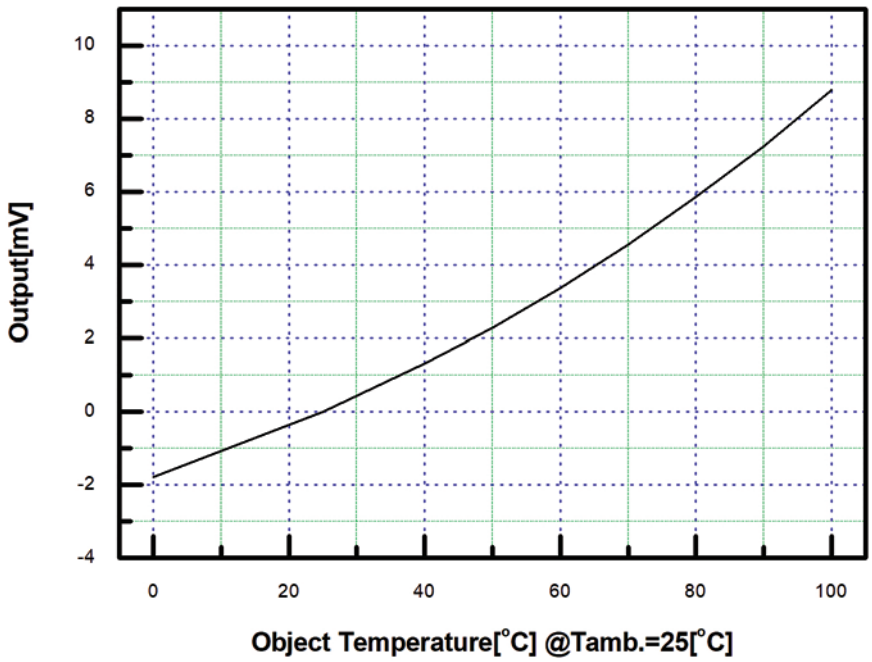
Absolute Maximum Ratings

- Operating temperature : -20°C ~ 100°C
- Storage temperature : -40°C ~ 120°C

ZTP-148SR Specifications

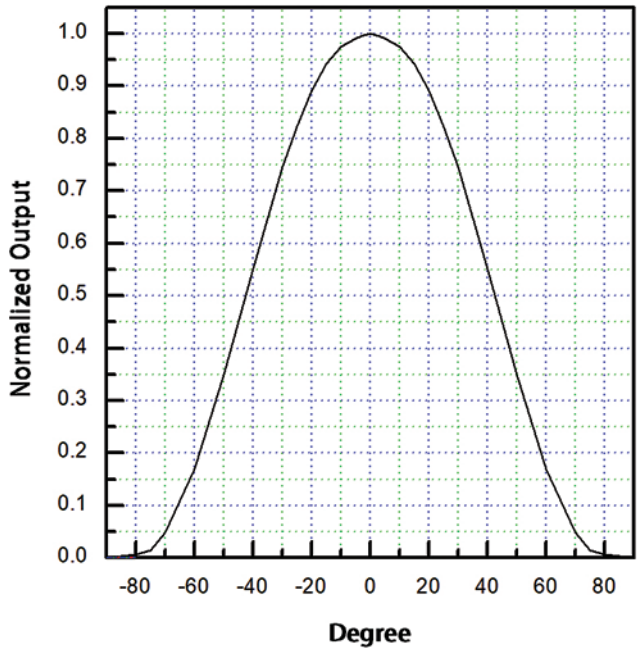
Typical Characteristic Data

Sensitivity



Field of View

Parameter	Limits			Units	Condition
	Min	Typ	Max		
Field of View	80	85	90	Degree	50% of Maximum Output

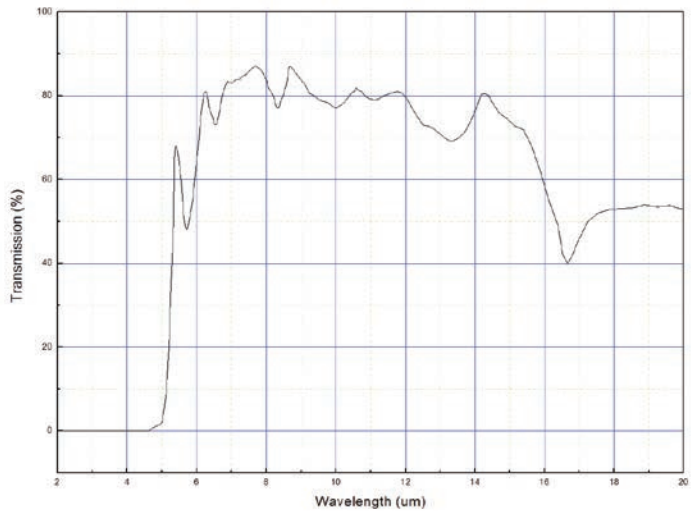


ZTP-148SR Specifications

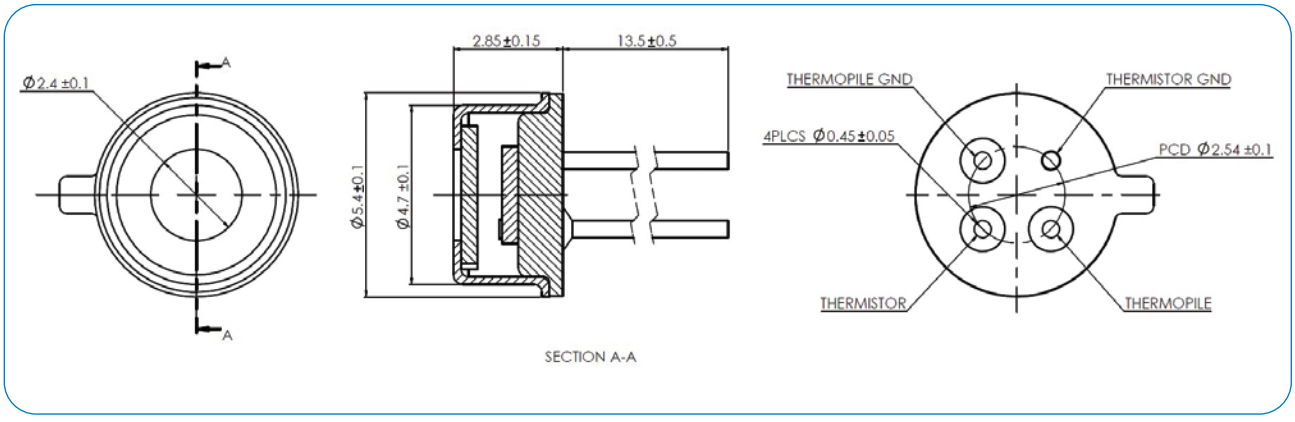
Thermistor Resistance

Tambient (kΩ)	Rmin (kΩ)	Rcent (kΩ)	Rmax (kΩ)
-20	893.8	942.3	992.6
-15	677.7	712.5	748.4
-10	518.2	543.3	569.2
-5	399.4	417.6	436.4
0	310.1	323.5	337.1
5	242.6	252.4	262.4
10	191.1	198.3	205.7
15	151.5	156.9	162.3
20	120.9	124.9	128.9
25	97.00	100.0	103.0
30	77.97	80.55	83.15
35	63.03	65.25	67.50
40	51.22	53.14	55.09
45	41.85	43.50	45.18
50	34.36	35.79	37.24
55	28.35	29.58	30.84
60	23.49	24.56	25.66
65	19.56	20.49	21.44
70	16.35	17.16	17.99
75	13.73	14.43	15.15
80	11.57	12.18	12.81
85	9.79	10.32	10.88
90	8.313	8.781	9.267
95	7.085	7.495	7.923
100	6.058	6.420	6.796

Transmission Data of Filter



Outline of Sensor Package & PIN Arrangement (unit : mm)



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