

THERMOPILE TYPE INFRARED SENSOR

THERMOPILE

Thermopile type Infrared sensor
utilizing own silicon micromachining
technology.

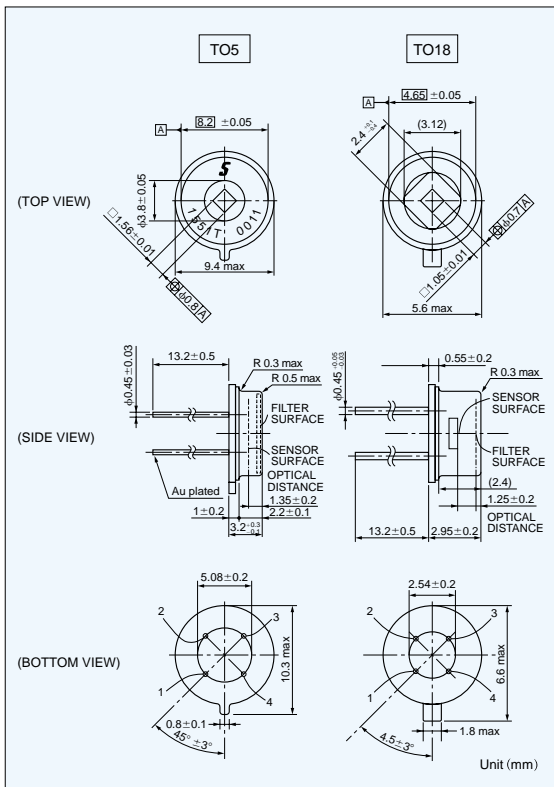
Applications: Eardrum thermometer
Microwave oven
Non contact temperature measurement



Part number

Part No.	type	Thermistor
15TP551T	TO5	Built-in
15TP551N		—
10TP581T	TO18	Built-in

Dimensions



Ratings

Parameters	Value		Unit	Conditions
	15TP551	10TP581		
Sensitive area	1.56 × 1.56	1.05 × 1.05	mm ²	Size of Absorbing Film
*1 Responsivity	16 ± 30%	15 ± 30%	V/W	
*1 Output Voltage	490 ± 30%	200 ± 30%	μV	
*2 Output Voltage	2.49 ± 30%	1.00 ± 30%	mV	
*1 Temperature Coefficient of Responsivity	0.01 ± 0.02	0.02 ± 0.02	% / °C	Reference
Thermopile Resistors	55 ± 30%	65 ± 30%	kΩ	
Temperature Coefficient of Thermopile Resistance	± 0.1	± 0.1	% / °C	
Johnson Noise Voltage	30	33	nV / √Hz	Johnson Noise r.m.s., 298K 1Hz Typical
*1 S/N Ratio	84.2	75.7	dB	Output Voltage/Johnson Noise, Typical
*1 Noise Equivalent Power	1.9	2.2	nW / Hz ^{1/2}	Typical
*1 Specific Detectivity	8.4 × 10 ⁷	4.7 × 10 ⁷	cm · Hz ^{1/2} / w	Typical
Time Constant	45	15	ms	Typical
Operating Temperature range	-20 ~ 100	-20 ~ 100	°C	
Storage Temperature range	-40 ~ 100	-40 ~ 100	°C	
Filter Range	Cut on 5	Cut on 5	μm	Standard
Field of View	± 45	± 50	deg.	Incident Angle to Achieve 50% Responsivity
Insulation Resistance	≥ 500	≥ 500	MΩ	Application of DC25V
Sealing	≤ 1 × 10 ⁻⁹	≤ 1 × 10 ⁻⁹	Pa · m ³ / s	
*3 Thermistor Resistance Value	100 ± 3%	100 ± 3%	kΩ	Rated zero-power resistance Value at 25°C
*3 Thermistor B-Value	3435 ± 0.7%	3435 ± 0.7%	K	
*3 Thermistor Rated Power	0.5	0.5	mW	at 25°C

*1 Test Condition
Blackbody Temperature : 500K
Sensor-Blackbody Distance : 100mm
Sensor Temperature : 298K
Aperture size : φ12.7mm

*2 Test Condition
Blackbody Temperature : 310K
Sensor Temperature : 298K

*3 Built-in Type

Z5D Series

Specifications

Part No.	Varistor Voltage	Maximum Allowable Voltage		Clamping Voltage (max.)	Rated Power	Maximum Energy		Maximum Peak Current (8/20 μ s)		Capacitance (max.) 1kHz
						(10/1000 μ s)	(2ms)	1 time	2 times	
						(J)	(J)	(A)	(A)	
	V _{0.1mA} (V)	AC _{rms} (V)	DC(V)	V(V)	(W)					(pF)
Z5D180	18(16-20)	11	14	40 at 1A	0.01	0.6	0.4	250	125	1600
Z5D220	22(20-24)	14	18	48	0.01	0.7	0.5	250	125	1500
Z5D270	27(24-30)	17	22	60	0.01	0.9	0.7	250	125	1450
Z5D330	33(30-36)	20	26	73	0.01	1.1	0.8	250	125	1400
Z5D390	39(35-43)	25	31	86	0.01	1.2	0.9	250	125	700
Z5D470	47(42-52)	30	38	104	0.01	1.5	1.1	250	125	650
Z5D560	56(50-62)	35	45	123	0.01	1.8	1.3	250	125	600
Z5D680	68(61-75)	40	56	150	0.01	2.2	1.6	250	125	580
*1 Z5D820	82(74-90)	50	65	145 at 5A	0.1	3.5	2.5	800	600	460
*1 Z5D101	100(90-110)	60	85	175	0.1	4.0	3.0	800	600	400
*1 Z5D121	120(108-132)	75	100	210	0.1	5.0	3.5	800	600	350
*1 Z5D151	150(135-165)	95	125	260	0.1	6.5	4.5	800	600	300
*1 Z5D201	200(185-225)	130	170	355	0.1	8.5	6.0	800	600	120
*1 Z5D221	220(198-242)	140	180	380	0.1	9.0	6.5	800	600	110
*1 Z5D241	240(216-264)	150	200	415	0.1	10.5	7.5	800	600	100 *2
*1 Z5D271	270(247-303)	175	225	475	0.1	11.0	8.0	800	600	90 *2
*1 Z5D331	330(297-363)	210	270	570	0.1	13.0	9.5	800	600	80 *2
*1 Z5D361	360(324-396)	230	300	620	0.1	16.0	11.0	800	600	80 *2
*1 Z5D391	390(351-429)	250	320	675	0.1	17.0	12.0	800	600	80 *2
*1 Z5D431	430(387-473)	275	350	754	0.1	20.0	13.0	800	600	70 *2
*1 Z5D471	470(423-517)	300	385	810	0.1	21.0	15.0	800	600	60 *2

Z7D Series

Specifications

Part No.	Varistor Voltage	Maximum Allowable Voltage		Clamping Voltage (max.)	Rated Power	Maximum Energy		Maximum Peak Current (8/20 μ s)		Capacitance (max.) 1kHz
						(10/1000 μ s)	(2ms)	1 time	2 times	
						(J)	(J)	(A)	(A)	
	V _{1mA} (V)	AC _{rms} (V)	DC(V)	V(V)	(W)					(pF)
Z7D180	18(16-20)	11	14	36 at 2.5A	0.02	1.1	0.9	500	250	3800
Z7D220	22(20-24)	14	18	43	0.02	1.3	1.1	500	250	3600
Z7D270	27(24-30)	17	22	53	0.02	1.6	1.3	500	250	3400
Z7D330	33(30-36)	20	26	65	0.02	2.0	1.6	500	250	2900
Z7D390	39(35-43)	25	31	77	0.02	2.4	1.9	500	250	1600
Z7D470	47(42-52)	30	38	93	0.02	2.8	2.3	500	250	1550
Z7D560	56(50-62)	35	45	110	0.02	3.4	2.7	500	250	1500
Z7D680	68(61-75)	40	56	135	0.02	4.1	3.3	500	250	1200
*1 Z7D820	82(74-90)	50	65	135 at 10A	0.25	7	5	1750	1250	810
*1 Z7D101	100(90-110)	60	85	165	0.25	8.5	6	1750	1250	700
*1 Z7D121	120(108-132)	75	100	200	0.25	10	7	1750	1250	590
*1 Z7D151	150(135-165)	95	125	250	0.25	13	9	1750	1250	500
*1 Z7D201	200(185-225)	130	170	340	0.25	17.5	12.5	1750	1250	200
*1 Z7D221	220(198-242)	140	180	360	0.25	19	13.5	1750	1250	190
*1 Z7D241	240(216-264)	150	200	395	0.25	21	15	1750	1250	170
*1 Z7D271	270(247-303)	175	225	455	0.25	24	17	1750	1250	150
*1 Z7D331	330(297-363)	210	270	545	0.25	28	20	1750	1250	130
*1 Z7D361	360(324-396)	230	300	595	0.25	32	23	1750	1250	130
*1 Z7D391	390(351-429)	250	320	650	0.25	35	25	1750	1250	130
*1 Z7D431	430(387-473)	275	350	710	0.25	40	27.5	1750	1250	120
*1 Z7D471	470(423-517)	300	385	775	0.25	42	30	1750	1250	100 *2
*1 Z7D511	510(459-561)	320	410	845	0.25	45	32	1750	1250	90 *2

1. Operating temperature range: -40 to 85°C
 2. Storage temperature range: -40 to 125°C
- *1 UL 1449 approved model
*2 Measured at 1MHz

Z10D Series

Specifications

Part No.	Varistor Voltage	Maximum Allowable Voltage		Clamping Voltage (max.)	Rated Power	Maximum Energy		Maximum Peak Current (8/20 μ s)		Capacitance (max.) 1kHz
						(10/1000 μ s)	(2ms)	1 time	2 times	
						(J)	(J)	(A)	(A)	
	V _{1mA} (V)	AC _{rms} (V)	DC(V)	V(V)	(W)	(J)	(J)	(A)	(A)	(pF)
Z10D180	18(16-20)	11	14	36 at 5A	0.05	2.6	2.2	1000	500	16000
Z10D220	22(20-24)	14	18	43	0.05	3.2	2.6	1000	500	11000
Z10D270	27(24-30)	17	22	53	0.05	3.9	3.2	1000	500	8000
Z10D330	33(30-36)	20	26	65	0.05	4.8	4.0	1000	500	6300
Z10D390	39(35-43)	25	31	77	0.05	5.6	4.7	1000	500	5200
Z10D470	47(42-52)	30	38	93	0.05	6.8	5.6	1000	500	4600
Z10D560	56(50-62)	35	45	110	0.05	8.1	6.7	1000	500	3750
Z10D680	68(61-75)	40	56	135	0.05	9.8	8.2	1000	500	2800
* Z10D820	82(74-90)	50	65	135 at 25A	0.4	14	10	3500	2500	2000
* Z10D101	100(90-110)	60	85	165	0.4	17	12	3500	2500	1700
* Z10D121	120(108-132)	75	100	200	0.4	20	14.5	3500	2500	1400
* Z10D151	150(135-165)	95	125	250	0.4	25	18	3500	2500	1100
* Z10D201	200(185-225)	130	170	340	0.4	35	25	3500	2500	430
* Z10D221	220(198-242)	140	180	360	0.4	39	27.5	3500	2500	410
* Z10D241	240(216-264)	150	200	395	0.4	42	30	3500	2500	380
* Z10D271	270(247-303)	175	225	455	0.4	49	35	3500	2500	350
* Z10D331	330(297-363)	210	270	545	0.4	58	42	3500	2500	300
* Z10D361	360(324-396)	230	300	595	0.4	65	45	3500	2500	300
* Z10D391	390(351-429)	250	320	650	0.4	70	50	3500	2500	300
* Z10D431	430(387-473)	275	350	710	0.4	80	55	3500	2500	270
* Z10D471	470(423-517)	300	385	775	0.4	85	60	3500	2500	230
* Z10D511	510(459-561)	320	410	845	0.4	92	67	3500	2500	210
* Z10D561	560(504-616)	350	450	930	0.4	92	67	3500	2500	200
* Z10D681	680(612-748)	420	560	1120	0.4	92	67	3500	2500	170
* Z10D751	750(675-825)	460	615	1240	0.4	100	70	3500	2500	160
* Z10D821	820(738-902)	510	670	1355	0.4	110	80	3500	2500	140
* Z10D911	910(819-1001)	550	745	1500	0.4	130	90	3500	2500	120
* Z10D102	1000(900-1100)	625	825	1650	0.4	140	100	3500	2500	110

Z15D Series

Specifications

Part No.	Varistor Voltage	Maximum Allowable Voltage		Clamping Voltage (max.)	Rated Power	Maximum Energy		Maximum Peak Current (8/20 μ s)		Capacitance (max.) 1kHz
						(10/1000 μ s)	(2ms)	1 time	2 times	
						(J)	(J)	(A)	(A)	
	V _{1mA} (V)	AC _{rms} (V)	DC(V)	V(V)	(W)	(J)	(J)	(A)	(A)	(pF)
Z15D180	18(16-20)	11	14	36 at 10A	0.1	5.2	4.3	2000	1000	25000
Z15D220	22(20-24)	14	18	43	0.1	6.3	5.3	2000	1000	20000
Z15D270	27(24-30)	17	22	53	0.1	7.8	6.5	2000	1000	16000
Z15D330	33(30-36)	20	26	65	0.1	9.5	7.9	2000	1000	12200
Z15D390	39(35-43)	25	31	77	0.1	11	9.4	2000	1000	7000
Z15D470	47(42-52)	30	38	93	0.1	14	11	2000	1000	6750
Z15D560	56(50-62)	35	45	110	0.1	16	13	2000	1000	6500
Z15D680	68(61-75)	40	56	135	0.1	20	16	2000	1000	5500
* Z15D820	82(74-90)	50	65	135 at 50A	0.6	28	20	6000	4500	3700
* Z15D101	100(90-110)	60	85	165	0.6	35	25	6000	4500	3200
* Z15D121	120(108-132)	75	100	200	0.6	42	30	6000	4500	2700
* Z15D151	150(135-165)	95	125	250	0.6	53	37.5	6000	4500	2200
* Z15D201	200(185-225)	130	170	340	0.6	70	50	6000	4500	770
* Z15D221	220(198-242)	140	180	360	0.6	78	55	6000	4500	740
* Z15D241	240(216-264)	150	200	395	0.6	84	60	6000	4500	700
* Z15D271	270(247-303)	175	225	455	0.6	99	70	6000	4500	640
* Z15D331	330(297-363)	210	270	545	0.6	115	80	6000	4500	580
* Z15D361	360(324-396)	230	300	595	0.6	130	90	6000	4500	540
* Z15D391	390(351-429)	250	320	650	0.6	140	100	6000	4500	500
* Z15D431	430(387-473)	275	350	710	0.6	155	110	6000	4500	450
* Z15D471	470(423-517)	300	385	775	0.6	175	125	6000	4500	400
* Z15D511	510(459-561)	320	410	845	0.6	190	136	6000	4500	350
* Z15D561	560(504-616)	350	450	930	0.6	190	136	6000	4500	340
* Z15D681	680(612-748)	420	560	1120	0.6	190	136	5000	4500	320
* Z15D751	750(675-825)	460	615	1240	0.6	210	150	5000	4500	310
* Z15D821	820(738-902)	510	670	1355	0.6	235	165	5000	4500	280
* Z15D911	910(819-1001)	550	745	1500	0.6	255	180	5000	4500	250
* Z15D102	1000(900-1100)	625	825	1650	0.6	280	200	5000	4500	230

1. Operating temperature range: -40 to 85°C
 2. Storage temperature range: -40 to 125°C
- * UL 1449 approved model