

NTC Thermistors, Flex Foil Sensors



QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Resistance value at 25 °C	10K, 47K	Ω
Tolerance on R_{25} -value	± 3	%
$B_{25/85}$ -value	3960	K
Tolerance on $B_{25/85}$ -value	± 1	%
Operating temperature range at zero power	- 40 to 125	$^{\circ}\text{C}$
Climatic category (IEC 60539)	40/125/56	
Thermal time constant on heating ⁽¹⁾	2	s
Minimum dielectric withstanding voltage	500	V_{AC}
Minimum insulation resistance	10	$M\Omega$
Maximum dissipation at 25 °C	60	mW
Weight (without connector)	0.13	g
Weight (with connector)	0.53	g

Note

⁽¹⁾ Measured from 25 °C air to 125 °C heated plate, pressed on the surface

DESIGNERS OPTIONS

- The sensor can be delivered with a FFC/FPC connector
- The connector termination can be tin or gold plated
- Other dimensions and various shapes of the flex circuit are available on request
- A 3D solid model is available on request

Note

- FFC/FPC = Flexible Film Circuit/Flexible Printed Circuit

FEATURES

- Rapid response time
- Suitable for narrow space applications
- High flexibility of the foil
- Insulated and humidity resistant
- A strain relief hole is included in the flex design to avoid traction to the sensor head
- e3 - Sn
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Consumer appliances and white goods
- Power supply (aluminum fins)
- Battery, displays
- Industrial applications
- Boilers

DESCRIPTION

- Miniature NTC temperature sensor on flex foil, insulated used for temperature sensing and control
- Surface temperature sensor with low thermal mass and rapid response time on surface

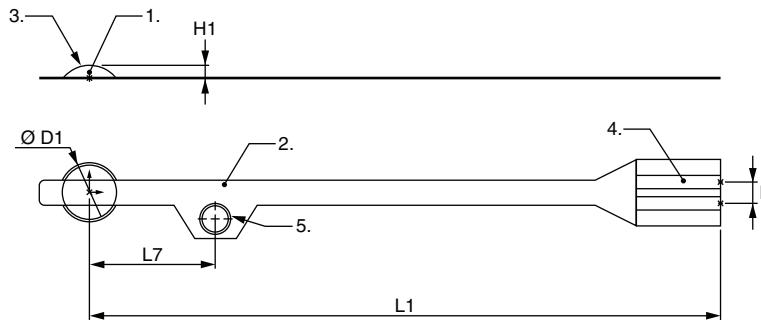
MOUNTING

- The sensor head can be pressed on the surface with means of insulating material (silicone foam) or spring
- The sensor head can also be glued with a double-face temperature resistant adhesive
- The sensor end can be connected to PCB counter-connector or wire-to-wire connector or soldered to conductors, or crimped with FFC connectors
- The strain relief hole can allow a screw mounting, or be included within a melted plastic pin
- Remark: The response time and thermal gradient are dependant of the application and of the way of mounting the sensor in place

ELECTRICAL DATA AND ORDERING INFORMATION							
VISHAY SAP ORDERING NUMBER	R_{25} -VALUE (Ω)	R_{25} TOL. (\pm %)	$B_{25/85}$ -VALUE (K)	$B_{25/85}$ TOL. (\pm %)	DESCRIPTION	WEIGHT (g)	R/T TABLE
NTCAFLEX01103HH	10 000	3	3960	1	NTC Flex01 10K 3 % 3960 K 75 mm	0.13	Table 1
NTCAFLEX01103HHC	10 000	3	3960	1	NTC Flex01 10K 3 % 3960 K 75 mm connector	0.53	Table 1
NTCAFLEX01473HH	47 000	3	3960	1	NTC Flex01 47K 3 % 3960 K 75 mm	0.13	Table 2
NTCAFLEX01473HHC	47 000	3	3960	1	NTC Flex01 47K 3 % 3960 K 75 mm connector	0.53	Table 2

SAP CODIFICATION																
Part Number: NTCAFLEX01473HH																
	N	T	C	A	F	L	E	X	0	1	4	7	3	H	H	
MODEL	ASSEMBLY	FLEX SENSOR	MECHANICAL EXECUTION	RESISTANCE VALUE	TOLERANCE ON R_{25}	B-VALUE RANGE		CONNECTOR OPTION								
NTC	A	FLEX	01	103 = $10 \times 10^3 \Omega$ 473 = $47 \times 10^3 \Omega$	H = $\pm 3\%$	L (low) = $3000 \leq B_{25/85} < 3500$ M (medium) = $3500 \leq B_{25/85} < 3750$ H (high) = $3750 \leq B_{25/85} < 4000$ X (very high) = $4000 \leq B_{25/85} < 4250$		Blank = No connector C = With connector tin plated								

MECHANICAL DATA



DIMENSIONS in millimeters				
L1	L7	Ø D1	H1	P
75 ± 1	15 ± 1	7 ± 0.5	1.40 ± 0.2	2.54

1. NTC SMD soldered on flex foil circuit
2. Flex foil circuit
3. High quality modified epoxy glob top
4. Conductive tracks
5. Hole for strain relief

REFERENCE PITCH

Connector 2 positions, 2.54 mm (0.1").

The connector mates with industry standard headers or wire-to-wire connectors.



R/T TABLE 1				
R₂₅-VALUE (kΩ)	R₂₅ TOL. (%)	B_{25/85}-VALUE (K)	B_{25/85} TOL. (%)	SAP MATERIAL NO.
10	3	3960	1	NTCAFLEX01103HH
10	3	3960	1	NTCAFLEX01103HHC

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES							
TEMP. (°C)	R_T/R₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	ΔT (K)	R_{min.} (Ω)	R_{max.} (Ω)
-40	34.71163947	347 116	10.80	- 6.66	1.62	309 617	384 616
-35	25.00890569	250 089	10.04	- 6.45	1.56	224 982	275 196
-30	18.20232445	182 023	9.31	- 6.25	1.49	165 078	198 968
-25	13.38037423	133 804	8.61	- 6.06	1.42	122 282	145 326
-20	9.93127849	99 313	7.94	- 5.87	1.35	91 425	107 201
-15	7.44075008	74 408	7.30	- 5.68	1.28	68 974	79 841
-10	5.62571387	56 257	6.69	- 5.50	1.22	52 495	60 019
-5	4.29101709	42 910	6.10	- 5.33	1.14	40 294	45 526
0	3.30092818	33 009	5.53	- 5.16	1.07	31 184	34 835
5	2.56021927	25 602	4.99	- 5.00	1.00	24 326	26 879
10	2.00150645	20 015	4.46	- 4.85	0.92	19 122	20 908
15	1.57670794	15 767	3.96	- 4.70	0.84	15 143	16 391
20	1.25123357	12 512	3.47	- 4.55	0.76	120 78	12 946
25	1.00000000	10 000	3.00	- 4.41	0.68	9700	10 300
30	0.80467618	8047	3.23	- 4.28	0.75	7787	8306
35	0.65176424	6518	3.45	- 4.15	0.83	6293	6742
40	0.53125205	5313	3.66	- 4.03	0.91	5118	5507
45	0.43566003	4357	3.86	- 3.91	0.99	4188	4525
50	0.35936184	3594	4.06	- 3.79	1.07	3448	3740
55	0.29809679	2981	4.26	- 3.68	1.16	2854	3108
60	0.24861736	2486	4.44	- 3.58	1.24	2376	2597
65	0.20843270	2084	4.63	- 3.48	1.33	1988	2181
70	0.17562061	1756	4.80	- 3.38	1.42	1672	1841
75	0.14868900	1487	4.97	- 3.28	1.52	1413	1561
80	0.12647302	1265	5.14	- 3.19	1.61	1200	1330
85	0.10805820	1081	5.30	- 3.10	1.71	1023	1138
90	0.09272284	927.2	5.62	- 3.02	1.86	875.1	979.3
95	0.07989439	798.9	5.93	- 2.94	2.02	751.6	846.3
100	0.06911632	691.2	6.23	- 2.86	2.18	648.1	734.2
105	0.06002288	600.2	6.53	- 2.78	2.35	561.0	639.4
110	0.05231963	523.2	6.82	- 2.71	2.51	487.5	558.9
115	0.04576848	457.7	7.10	- 2.64	2.69	425.2	490.2
120	0.04017603	401.8	7.37	- 2.57	2.86	372.1	431.4
125	0.03538453	353.8	7.64	- 2.51	3.05	326.8	380.9



R/T TABLE 2				
R₂₅-VALUE (kΩ)	R₂₅ TOL. (%)	B_{25/85}-VALUE (K)	B_{25/85} TOL. (%)	SAP MATERIAL NO.
47	3	3960	1	NTCAFLEX01473HH
47	3	3960	1	NTCAFLEX01473HHC

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES

TEMP. (°C)	R_T/R₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	ΔT (K)	R_{min.} (Ω)	R_{max.} (Ω)
-40	34.97	1 643 693	10.80	- 6.85	1.58	1 466 123	1 821 262
-35	25.00	1 174 859	10.04	- 6.59	1.52	1 056 912	1 292 806
-30	18.09	850 461	9.31	- 6.34	1.47	771 290	929 633
-25	13.26	623 018	8.61	- 6.11	1.41	569 370	676 666
-20	9.82	461 557	7.94	- 5.89	1.35	424 898	498 216
-15	7.35	345 583	7.30	- 5.69	1.28	320 350	370 816
-10	5.56	261 354	6.69	- 5.49	1.22	243 877	278 831
-5	4.25	199 536	6.10	- 5.31	1.15	187 370	211 702
0	3.27	153 714	5.53	- 5.13	1.08	145 213	162 215
5	2.54	119 427	4.99	- 4.97	1.00	113 473	125 381
10	1.99	93 541	4.46	- 4.81	0.93	89 369	97 714
15	1.57	73 832	3.96	- 4.66	0.85	70 911	76 752
20	1.25	58 703	3.47	- 4.52	0.77	56 666	60 739
25	1.00	47 000	3.00	- 4.38	0.69	45 590	48 410
30	0.81	37 881	3.23	- 4.25	0.76	36 659	39 103
35	0.65	30 726	3.45	- 4.13	0.84	29 667	31 784
40	0.53	25 073	3.66	- 4.01	0.91	24 156	25 990
45	0.44	20 579	3.86	- 3.89	0.99	19 784	21 374
50	0.36	16 984	4.06	- 3.79	1.07	16 294	17 674
55	0.30	14 092	4.26	- 3.68	1.16	13 492	14 692
60	0.25	11 751	4.44	- 3.58	1.24	11 229	12 274
65	0.21	9848	4.63	- 3.49	1.33	9392	10 303
70	0.18	8291	4.80	- 3.40	1.41	7893	8689
75	0.15	7011	4.97	- 3.31	1.50	6663	7360
80	0.13	5955	5.14	- 3.22	1.59	5649	6261
85	0.11	5079	5.30	- 3.14	1.69	4809	5348
90	0.09	4349	5.62	- 3.07	1.83	4104	4593
95	0.08	3738	5.93	- 2.99	1.98	3516	3960
100	0.07	3225	6.23	- 2.92	2.14	3024	3426
105	0.06	2792	6.53	- 2.85	2.29	2610	2974
110	0.05	2425	6.82	- 2.78	2.45	2260	2591
115	0.04	2114	7.10	- 2.72	2.61	1964	2264
120	0.04	1848	7.37	- 2.65	2.78	1712	1985
125	0.03	1621	7.64	- 2.59	2.95	1497	1745



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.