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	°C
Thermal time constant on heating (1)	2	s
Thermal gradient	< 0.02	K/K
Minimum dielectric withstanding voltage	500	V_{AC}
Minimum insulation resistance	10	MΩ
Maximum dissipation at 25 °C	60	mW
Climatic category (LCT/UCT/days)	40/125/56	
Weight (without connector)	0.06	g

Note

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

DESIGNERS OPTIONS

- 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

RoHS COMPLIANT

- Rapid response time down to 2 s
- 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
- Gold plated terminations
- AEC-Q200 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Consumer appliances and white goods
- Power supply (heat-sinks)
- Battery, displays, LED
- Industrial applications, robotics
- Boilers
- EV and HV batteries

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 wih 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 and ZiF connectors
- 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. (± %)	$B_{25/85}$-VALUE (K)	$B_{25/85}$ TOL. (± %)	DESCRIPTION	R/T TABLE
NTCAFLEX05103HH	10 000	3	3960	1	NTC Flex05 10K 3 % 3960 K 25 mm	Table 1
NTCAFLEX05473HH	47 000	3	3960	1	NTC Flex05 47K 3 % 3960 K 25 mm	Table 2

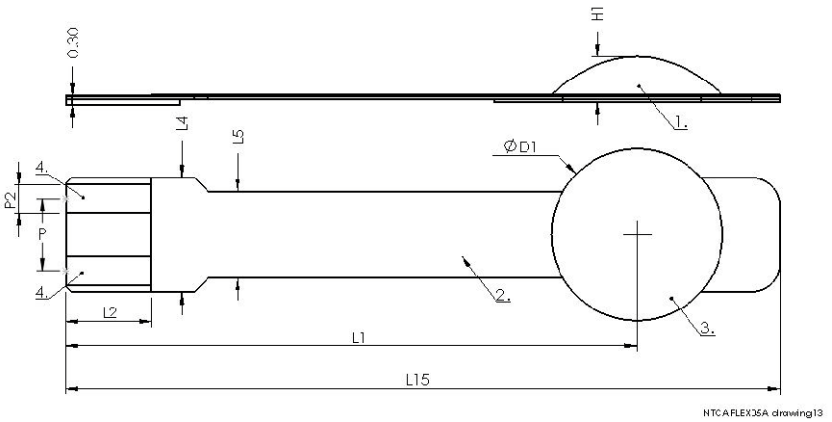
SAP CODIFICATION

Part Number: NTCAFLEX01473HH

N	T	C	A	F	L	E	X	0	5	4	7	3	H	H	

MODEL	ASSEMBLY	FLEX SENSOR	MECHANICAL EXECUTION	RESISTANCE VALUE	TOLERANCE ON R_{25}	B-VALUE RANGE	OPTION
NTC	**A**	**FLEX**	**05**	**103** = 10 x 10^3 Ω **473** = 47 x 10^3 Ω	**H** = ± 3 %	**L** (low) = 3000 ≤ $B_{25/85}$ < 3500 **M** (medium) = 3500 ≤ $B_{25/85}$ < 3750 **H** (high) = 3750 ≤ $B_{25/85}$ < 4000 **X** (very high) = 4000 ≤ $B_{25/85}$ < 4250	**Blank**

MECHANICAL DATA



DIMENSIONS in millimeters							
L1	**L15**	**L2**	**Ø D1**	**L4**	**L5**	**H1**	**P**
20 ± 1	25 ± 1	3 ± 0.5	6 ± 0.5	4 ± 1	3 ± 1	1.40 ± 0.2	2.50

1. NTC on flex foil circuit
2. Flex foil circuit
3. High quality modified epoxy glob top
4. Conductive tracks

RELIABILITY TEST (following IEC 60068 test methods)		
TEST	**PROCEDURE**	**REQUIREMENT**
Dry heat, steady state	125 °C; 1000 h	$\Delta R/R \leq 3$ %
Damp heat, steady state	56 days at 40 °C 90 % to 95 % RH	$\Delta R/R \leq 3$ %
Rapid change of temperature	- 40 °C to + 125 °C; 100 cycles	$\Delta R/R \leq 3$ %

R/T TABLE 1				
R_{25}-VALUE (kΩ)	R_{25} TOL. (%)	$B_{25/85}$-VALUE (K)	$B_{25/85}$ TOL. (%)	SAP MATERIAL NO.
10	± 3	3960	± 1	NTCAFLEX05103HH

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES							
TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
- 40	34.7116	347 116	10.8031	- 6.66	1.62	309 617	384 616
- 35	25.0089	250 089	10.0392	- 6.45	1.56	224 982	275 196
- 30	18.2023	182 023	9.3093	- 6.25	1.49	165 078	198 968
- 25	13.3804	133 804	8.6110	- 6.06	1.42	122 282	145 326
- 20	9.9313	99 313	7.9424	- 5.87	1.35	91 425	107 201
- 15	7.4408	74 408	7.3017	- 5.68	1.28	68 974	79 841
- 10	5.6257	56 257	6.6871	- 5.50	1.22	52 495	60 019
- 5	4.2910	42 910	6.0971	- 5.33	1.14	40 294	45 526
0	3.3009	33 009	5.5303	- 5.16	1.07	31 184	34 835
5	2.5602	25 602	4.9853	- 5.00	1.00	24 326	26 879
10	2.0015	20 015	4.4608	- 4.85	0.92	19 122	20 908
15	1.5767	15 767	3.9558	- 4.70	0.84	15 143	16 391
20	1.2512	12 512	3.4692	- 4.55	0.76	12 078	12 946
25	1.0000	10 000	3.0000	- 4.41	0.68	9700.0	10 300
30	0.8047	8046.8	3.2266	- 4.28	0.75	7787.1	8306.4
35	0.6518	6517.6	3.4459	- 4.15	0.83	6293.1	6742.2
40	0.5313	5312.5	3.6581	- 4.03	0.91	5118.2	5506.9
45	0.4357	4356.6	3.8637	- 3.91	0.99	4188.3	4524.9
50	0.3594	3593.6	4.0629	- 3.79	1.07	3447.6	3739.6
55	0.2981	2981.0	4.2560	- 3.68	1.16	2854.1	3107.8
60	0.2486	2486.2	4.4434	- 3.58	1.24	2375.7	2596.6
65	0.2084	2084.3	4.6252	- 3.48	1.33	1987.9	2180.7
70	0.1756	1756.2	4.8017	- 3.38	1.42	1671.9	1840.5
75	0.1487	1486.9	4.9732	- 3.28	1.52	1412.9	1560.8
80	0.1265	1264.7	5.1397	- 3.19	1.61	1199.7	1329.7
85	0.1081	1080.6	5.3017	- 3.10	1.71	1023.3	1137.9
90	0.0927	927.23	5.6204	- 3.02	1.86	875.11	979.34
95	0.0799	798.94	5.9309	- 2.94	2.02	751.56	846.33
100	0.0691	691.16	6.2335	- 2.86	2.18	648.08	734.25
105	0.0600	600.23	6.5286	- 2.78	2.35	561.04	639.42
110	0.0523	523.20	6.8163	- 2.71	2.51	487.53	558.86
115	0.0458	457.68	7.0970	- 2.64	2.69	425.20	490.17
120	0.0402	401.76	7.3709	- 2.57	2.86	372.15	431.37
125	0.0354	353.85	7.6383	- 2.51	3.05	326.82	380.87

R/T TABLE 2				
R_{25}-VALUE (kΩ)	R_{25} TOL. (%)	$B_{25/85}$-VALUE (K)	$B_{25/85}$ TOL. (%)	SAP MATERIAL NO.
47	± 3	3960	± 1	NTCAFLEX05473HH

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES							
TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
- 40	34.972	1 643 693	10.803	- 6.85	1.58	1 466 123	1 821 262
- 35	24.997	1 174 859	10.039	- 6.59	1.52	1 056 912	1 292 806
- 30	18.095	850 461	9.3093	- 6.34	1.47	771 290	929 633
- 25	13.256	623 018	8.6110	- 6.11	1.41	569 370	676 666
- 20	9.8204	461 557	7.9424	- 5.89	1.35	424 898	498 216
- 15	7.3528	345 583	7.3017	- 5.69	1.28	320 350	370 816
- 10	5.5607	261 354	6.6871	- 5.49	1.22	243 877	278 831
- 5	4.2455	199 536	6.0971	- 5.31	1.15	187 370	211 702
0	3.2705	153 714	5.5303	- 5.13	1.08	145 213	162 215
5	2.5410	119 427	4.9853	- 4.97	1.00	113 473	125 381
10	1.9902	93 541	4.4608	- 4.81	0.93	89 369	97 714
15	1.5709	73 832	3.9558	- 4.66	0.85	70 911	76 752
20	1.2490	58 703	3.4692	- 4.52	0.77	56 666	60 739
25	1.0000	47 000	3.0000	- 4.38	0.69	45 590	48 410
30	0.8060	37 881	3.2266	- 4.25	0.76	36 659	39 103
35	0.6537	30 726	3.4459	- 4.13	0.84	29 667	31 784
40	0.5335	25 073	3.6581	- 4.01	0.91	24 156	25 990
45	0.4378	20 579	3.8637	- 3.89	0.99	19 784	21 374
50	0.3614	16 984	4.0629	- 3.79	1.07	16 294	17 674
55	0.2998	14 092	4.2560	- 3.68	1.16	13 492	14 692
60	0.2500	11 751	4.4434	- 3.58	1.24	11 229	12 274
65	0.2095	9847.6	4.6252	- 3.49	1.33	9392.1	10 303
70	0.1764	8290.7	4.8017	- 3.40	1.41	7892.6	8688.8
75	0.1492	7011.4	4.9732	- 3.31	1.50	6662.7	7360.1
80	0.1267	5955.0	5.1397	- 3.22	1.59	5648.9	6261.1
85	0.1081	5078.7	5.3017	- 3.14	1.69	4809.5	5348.0
90	0.0925	4348.7	5.6204	- 3.07	1.83	4104.3	4593.1
95	0.0795	3737.8	5.9309	- 2.99	1.98	3516.1	3959.5
100	0.0686	3224.6	6.2335	- 2.92	2.14	3023.6	3425.7
105	0.0594	2791.8	6.5286	- 2.85	2.29	2609.5	2974.1
110	0.0516	2425.3	6.8163	- 2.78	2.45	2260.0	2590.7
115	0.0450	2113.9	7.0970	- 2.72	2.61	1963.9	2264.0
120	0.0393	1848.4	7.3709	- 2.65	2.78	1712.1	1984.6
125	0.0345	1621.2	7.6383	- 2.59	2.95	1497.3	1745.0

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