SMD 0805, Glass Protected NTC Thermistors

QUICK REFERENCE DATA	
PARAMETER	**VALUE**
Resistance value at 25 °C	2.2 kΩ to 680 kΩ
Tolerance on R_{25} - value	± 1 %; ± 2 %; ± 3 %; ± 5 %
$B_{25/85}$ value	3600K to 4125K
Tolerance on $B_{25/85}$ - value	± 1 %; ± 3 %
Maximum dissipation at 25 °C	210 mW
Thermal time constant τ	≈ 10 s
Dissipation factor D	3.5 mW/K
Operating temperature range at zero power	- 40 °C to + 150 °C
R/T values	see tables
Climatic category	40/125/56
Weight	≈ 0.008 g

FEATURES

- TCR ranging from - 6 %/K at - 40 °C to - 2 %/K at 150 °C
- Tolerance on R_{25} down to 1 %, and on $B_{25/85}$ down to 1 %
- Suitable for wave or reflow soldering
- NiSn terminations
- Fully glass coated and protected
- Old part number was 2322 615 5....
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

APPLICATIONS

- Temperature sensing, protection and compensation in automotive, industrial, telecom and consumer applications. Examples are:
  - Battery chargers
  - Power suppliers
  - Office equipment
  - LCD compensation
  - In-car entertainment

DESCRIPTION

Size 0805 chip thermistors with a negative temperature coefficient. The device has no marking.

PACKAGING

Available in 8 mm punched paper tape on reel package of 4000 units.

DESIGN-IN SUPPORT

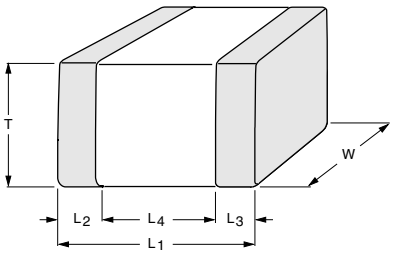
For complete Curve Computation, visit:
http://www.vishay.com/thermistors/curve-computation-list/

ELECTRICAL DATA AND ORDERING INFORMATION

R_{25} - VALUE [kΩ]	$B_{25/85}$ - VALUE [K]	TOLERANCE ON $B_{25/85}$ [%]	12NC ORDERING CODE 2381 615 5.... (1)	SAP MATERIAL NO. NTCS0805E3... (2)
2.2	3600	± 1	*222	222*MT
4.7	3500	± 1	*472	472*MT
10	3570	± 3	*103	103*MT
15	3700	± 1	*153	153*MT
22	3800	± 1	*223	223*HT
33	3920	± 1	*333	333*HT
47	3960	± 1	*473	473*HT
68	4100	± 1	*683	683*XT
100	4100	± 1	*104	104*XT
330	3930	± 1	*334	334*HT
470	4025	± 1	*474	474*XT
680	4125	± 1	*684	684*XT

Notes
(1) Replace * in 12NC by 3 for 5 %, 6 for 3 %, 4 for 2 %, 5 for 1 % tolerance on R_{25}
(2) Replace * in SAP part no by J for 5 %, H for 3 %, G for 2 %, F for 1 % tolerance on R_{25}

DIMENSIONS in millimeters



L_1	W	T	L_2 and L_3 MIN.	L_4 MIN.
2.0 ± 0.2	1.25 ± 0.15	0.8 ± 0.15	0.2	0.55

For complete Curve Computation, visit: http://www.vishay.com/thermistors/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 2.2 AND 4.7 kΩ

T_{OPER} [°C]	PART NUMBER 2381 615 5*222/NTC0805E3222*MT		PART NUMBER 2381 615 5*472/NTC0805E3472*MT		$\Delta R/R$ DUE TO B_{tol} [± %]
	R_T [Ω]	TCR [%/K]	R_T [Ω]	TCR [%/K]	
- 40	57 658	- 6.26	101 275	- 5.75	7.58
- 35	42 410	- 6.03	76 325	- 5.57	6.83
- 30	31 537	- 5.82	58 034	- 5.39	6.13
- 25	23 698	- 5.61	44 505	- 5.22	5.45
- 20	17 986	- 5.42	34 413	- 5.06	4.80
- 15	13 782	- 5.23	26 821	- 4.91	4.18
- 10	10 657	- 5.06	21 065	- 7.76	3.58
- 5	8312.0	- 4.89	16 667	- 4.61	3.01
0	6537.1	- 4.72	13 280	- 4.47	2.46
5	5182.1	- 4.57	10 654	- 4.34	1.93
10	4139.2	- 4.42	8603.2	- 4.21	1.42
15	3330.1	- 4.28	6991.1	- 4.09	0.93
20	2697.8	- 4.14	5715.6	- 3.97	0.46
25	2200.0	- 4.02	4700.0	- 3.86	0.00
30	1805.5	- 3.89	3886.6	- 3.75	0.22
35	1490.7	- 3.77	3231.2	- 3.64	0.43
40	1237.9	- 3.66	2700.3	- 3.54	0.64
45	1033.7	- 3.55	2267.9	- 3.44	0.84
50	867.85	- 3.45	1913.9	- 3.35	1.03
55	732.31	- 3.35	1622.6	- 3.26	1.22
60	620.96	- 3.25	1381.7	- 3.17	1.40
65	529.02	- 3.16	1181.7	- 3.09	1.58
70	452.73	- 3.07	1014.7	- 3.01	1.75
75	389.13	- 2.99	874.85	- 2.93	1.92
80	335.85	- 2.90	757.13	- 2.85	2.08
85	291.02	- 2.83	657.67	- 2.78	2.23
90	253.15	- 2.75	573.31	- 2.71	2.54
95	221.03	- 2.68	501.48	- 2.64	2.85
100	193.66	- 2.61	440.10	- 2.58	3.14
105	170.27	- 2.54	387.47	- 2.52	3.43
110	150.20	- 2.48	342.18	- 2.46	3.71
115	132.91	- 2.41	303.09	- 2.40	3.98
120	117.98	- 2.35	269.24	- 2.34	4.24
125	105.03	- 2.20	239.83	- 2.29	4.50
130	93.766	- 2.24	214.20	- 2.23	4.76
135	83.943	- 2.19	191.82	- 2.18	5.00
140	75.349	- 2.13	172.20	- 2.13	5.25
145	67.807	- 2.08	154.96	- 2.09	5.48
150	61.172	- 2.04	139.78	- 2.04	5.71

For complete Curve Computation, visit: http://www.vishay.com/thermistors/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 10 kΩ			
T_{OPER} [°C]	PART NUMBER 2381 615 5*103/NTC0805E3103*MT		$\Delta R/R$ DUE TO B_{tol} [± %]
	R_T [Ω]	TCR [%/K]	
- 40	232 634	- 5.92	11.22
- 35	173 538	- 5.71	10.14
- 30	130 769	- 5.51	9.10
- 25	99 489	- 5.33	8.11
- 20	76 385	- 5.15	7.15
- 15	59 157	- 4.98	6.24
- 10	46 194	- 4.82	5.35
- 5	36 356	- 4.67	4.50
0	28 829	- 4.52	3.68
5	23 025	- 4.38	2.89
10	18 515	- 4.25	2.13
15	14 986	- 4.12	1.40
20	12 205	- 4.00	0.69
25	10 000	- 3.88	0.00
30	8240.3	- 3.77	0.66
35	6827.5	- 3.66	1.31
40	5686.6	- 3.56	1.93
45	4760.3	- 3.46	2.53
50	4004.2	- 3.37	3.11
55	3383.8	- 3.28	3.68
60	2872.3	- 3.19	4.23
65	2448.5	- 3.11	4.76
70	2095.9	- 3.03	5.28
75	1801.2	- 2.95	5.78
80	1553.8	- 2.88	6.27
85	1345.3	- 2.81	6.74
90	1168.9	- 2.74	7.20
95	1019.2	- 2.67	7.65
100	891.48	- 2.61	8.09
105	782.28	- 2.54	8.51
110	688.56	- 2.48	8.93
115	607.85	- 2.43	9.33
120	538.14	- 2.37	9.73
125	477.73	- 2.32	10.11
130	425.24	- 2.26	10.48
135	379.49	- 2.21	10.85
140	339.51	- 2.17	11.20
145	304.47	- 2.12	11.55
150	273.69	- 2.07	11.89

For complete Curve Computation, visit: http://www.vishay.com/thermistors/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 15, 22 AND 33 kΩ

T_{OPER} [°C]	PART NUMBER 2381 615 5*153/ NTC0805E3153*MT		PART NUMBER 2381 615 5*223/ NTC0805E3223*HT		PART NUMBER 2381 615 5*333/ NTC0805E3333*MT		$\Delta R/R$ DUE TO B_{tol} [± %]
	R_T [Ω]	TCR [%/K]	R_T [Ω]	TCR [%/K]	R_T [Ω]	TCR [%/K]	
- 40	391 251	- 6.14	641 004	- 6.40	1 104 739	- 6.79	7.58
- 35	289 245	- 5.94	468 038	- 6.18	793 249	- 6.53	6.83
- 30	215 960	- 5.75	345 469	- 5.97	576 683	- 6.28	6.13
- 25	162 779	- 5.56	257 644	- 5.77	424 161	- 6.05	5.45
- 20	123 815	- 5.38	194 045	- 5.57	315 430	- 5.84	4.80
- 15	95 001	- 5.21	147 521	- 5.39	237 022	- 5.63	4.18
- 10	73 505	- 5.05	113 159	- 5.22	179 865	- 5.44	3.58
- 5	57 329	- 4.89	87 544	- 5.05	137 767	- 5.26	3.01
0	45 058	- 4.74	68 281	- 4.89	106 459	- 5.08	2.46
5	35 674	- 4.60	53 672	- 4.74	82 958	- 4.92	1.93
10	28 445	- 4.46	42 503	- 4.59	65 162	- 4.76	1.42
15	22 834	- 4.33	33 898	- 4.46	51 572	- 4.61	0.93
20	18 450	- 4.20	27 220	- 4.32	41 112	- 4.47	0.46
25	15 000	- 4.08	22 000	- 4.20	33 000	- 4.34	0.00
30	12 268	- 3.96	17 892	- 4.07	26 663	- 4.21	0.22
35	10 092	- 3.85	14 638	- 3.96	21 678	- 4.08	0.43
40	8347.4	- 3.74	12 045	- 3.84	17 730	- 3.97	0.64
45	6941.1	- 3.64	9965.0	- 3.74	14 585	- 3.86	0.84
50	5801.1	- 3.54	8288.3	- 3.63	12 063	- 3.75	1.03
55	4872.1	- 3.44	6928.4	- 3.54	10 030	- 3.65	1.22
60	4111.1	- 3.35	5819.8	- 3.44	8381.6	- 3.55	1.40
65	3484.7	- 3.26	4911.4	- 3.35	7037.8	- 3.45	1.58
70	2966.6	- 3.18	4163.4	- 3.26	5936.8	- 3.36	1.75
75	2536.2	- 3.09	3544.6	- 3.18	5030.3	- 3.27	1.92
80	2176.9	- 3.02	3030.2	- 3.10	4280.4	- 3.19	2.08
85	1875.8	- 2.94	2600.9	- 3.02	3657.2	- 3.11	2.23
90	1622.5	- 2.87	2241.0	- 2.94	3137.1	- 3.03	2.54
95	1408.4	- 2.79	1938.0	- 2.87	2701.2	- 2.96	2.85
100	1226.8	- 2.73	1682.0	- 2.80	2334.4	- 2.89	3.14
105	1072.3	- 2.66	1464.9	- 2.73	2024.4	- 2.82	3.43
110	940.20	- 2.60	1280.0	- 2.67	1761.6	- 2.75	3.71
115	827.00	- 2.54	1122.0	- 2.60	1538.0	- 2.69	3.98
120	729.62	- 2.48	986.60	- 2.54	1346.9	- 2.63	4.24
125	645.60	- 2.42	870.11	- 2.48	1183.23	- 2.57	4.50
130	572.86	- 2.36	769.60	- 2.43	1042.4	- 2.51	4.76
135	509.71	- 2.31	682.59	- 2.37	921.02	- 2.45	5.00
140	454.71	- 2.26	607.05	- 2.32	815.99	- 2.40	5.25
145	406.69	- 2.21	541.28	- 2.27	724.85	- 2.35	5.48
150	364.64	- 2.16	483.86	- 2.22	645.54	- 2.30	5.71

For complete Curve Computation, visit: http://www.vishay.com/thermistors/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 47, 68 AND 100 kΩ

T_{OPER} [°C]	PART NUMBER 2381 615 5*473/ NTC0805E3473*HT		PART NUMBER 2381 615 5*683/ NTC0805E3683*XT		PART NUMBER 2381 615 5*104/ NTC0805E3104*XT		$\Delta R/R$ DUE TO B_{tol} [± %]
	R_T [Ω]	TCR [%/K]	R_T [Ω]	TCR [%/K]	R_T [Ω]	TCR [%/K]	
- 40	1 536 095	- 6.60	2 596 437	- 6.92	3 833 689	- 6.96	7.58
- 35	1 110 020	- 6.37	1 848 208	- 6.68	2 724 206	- 6.71	6.83
- 30	811 212	- 6.15	1 331 164	- 6.45	1 959 612	- 6.47	6.13
- 25	599 204	- 5.94	969 559	- 6.23	1 426 014	- 6.25	5.45
- 20	447 111	- 5.74	713 753	- 6.02	1 049 150	- 6.03	4.80
- 15	336 851	- 5.56	530 805	- 5.82	779 950	- 5.83	4.18
- 10	256 116	- 5.38	398 593	- 5.64	585 575	- 5.64	3.58
- 5	196 435	- 5.21	302 091	- 5.45	443 786	- 5.45	3.01
0	151 917	- 5.05	230 981	- 5.28	339 343	- 5.28	2.46
5	118 422	- 4.89	178 104	- 5.12	261 695	- 5.11	1.93
10	93 012	- 4.74	138 441	- 4.96	203 455	- 4.96	1.42
15	73 583	- 4.60	108 442	- 4.81	159 402	- 4.81	0.93
20	58 615	- 4.47	85 571	- 4.67	125 811	- 4.66	0.46
25	47 000	- 4.34	68 000	- 4.53	100 000	- 4.52	0.00
30	37 925	- 4.22	54 403	- 4.40	80 021	- 4.39	0.22
35	30 788	- 4.10	43 806	- 4.27	64 447	- 4.27	0.43
40	25 139	- 3.99	35 493	- 4.15	52 224	- 4.15	0.64
45	20 641	- 3.88	28 928	- 4.03	42 570	- 4.03	0.84
50	17 038	- 3.78	23 712	- 3.92	34 897	- 3.92	1.03
55	14 136	- 3.68	19 543	- 3.81	28 763	- 3.81	1.22
60	11 786	- 3.58	16 192	- 3.71	23 830	- 3.71	1.40
65	9872.9	- 3.49	13 483	- 3.61	19 842	- 3.61	1.58
70	8308.1	- 3.40	11 282	- 3.52	16 601	- 3.52	1.75
75	7021.9	- 3.31	9484.2	- 3.43	13 954	- 3.43	1.92
80	5959.7	- 3.23	8008.8	- 3.34	11 781	- 3.34	2.08
85	5078.7	- 3.15	6792.1	- 3.25	9988.4	- 3.26	2.23
90	4344.9	- 3.08	5784.2	- 3.17	8503.6	- 3.18	2.54
95	3731.0	- 3.00	4945.7	- 3.09	7268.2	- 3.10	2.85
100	3215.5	- 2.93	4245.0	- 3.02	6236.0	- 3.03	3.14
105	2781.0	- 2.86	3657.2	- 2.94	5370.1	- 2.95	3.43
110	2413.2	- 2.80	3162.1	- 2.87	4640.8	- 2.88	3.71
115	2101.0	- 2.73	2743.5	- 2.81	4024.3	- 2.82	3.98
120	1834.9	- 2.67	2388.2	- 2.74	3501.2	- 2.75	4.24
125	1607.3	- 2.61	2085.7	- 2.68	3055.8	- 2.69	4.50
130	1412.2	- 2.55	1827.2	- 2.62	2675.3	- 2.63	4.76
135	1244.2	- 2.50	1605.5	- 2.56	2349.2	- 2.57	5.00
140	1099.3	- 2.44	1414.9	- 2.50	2068.7	- 2.51	5.25
145	973.81	- 2.39	1250.4	- 2.44	1826.8	- 2.46	5.48
150	864.87	- 2.34	1108.0	- 2.39	1617.5	- 2.41	5.71

For complete Curve Computation, visit: http://www.vishay.com/thermistors/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 330, 470 AND 680 kΩ

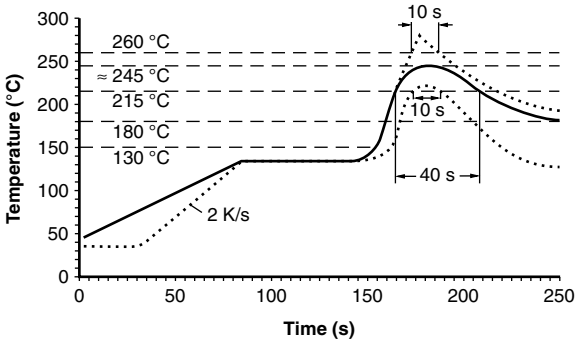
T_{OPER} [°C]	PART NUMBER 2381 615 5*334/ NTC0805E3334*HT		PART NUMBER 2381 615 5*474/ NTC0805E3474*XT		PART NUMBER 2381 615 5*684/ NTC0805E3684*XT		$\Delta R/R$ DUE TO B_{tol} [± %]
	R_T [kΩ]	TCR [%/K]	R_T [kΩ]	TCR [%/K]	R_T [kΩ]	TCR [%/K]	
- 40	10 488	- 6.53	16 325	- 6.70	23 477	- 6.58	7.58
- 35	7608.4	- 6.31	11 742	- 6.48	16 980	- 6.38	6.83
- 30	5579.1	- 6.10	8539.8	- 6.26	12 404	- 6.18	6.13
- 25	4133.1	- 5.90	6276.8	- 6.05	9147.1	- 6.00	5.45
- 20	3092.0	- 5.71	4660.3	- 5.86	6807.4	- 5.82	4.80
- 15	2334.8	- 5.53	3493.6	- 5.67	5110.7	- 5.65	4.18
- 10	1778.8	- 5.35	2643.2	- 5.49	3869.3	- 5.48	3.58
- 5	1366.9	- 5.19	2017.4	- 5.32	2953.2	- 5.33	3.01
0	1058.9	- 5.03	1552.8	- 5.15	2271.5	- 5.17	2.46
5	826.75	- 4.87	1204.7	- 5.00	1760.2	- 5.03	1.93
10	650.33	- 4.73	941.99	- 4.85	1373.89	- 4.89	1.42
15	515.22	- 4.59	741.96	- 4.70	1079.7	- 4.75	0.93
20	410.99	- 4.45	588.54	- 4.56	854.12	- 4.62	0.46
25	330.00	- 4.33	470.00	- 4.43	680.00	- 4.50	0.00
30	266.64	- 4.20	377.77	- 4.31	544.69	- 4.38	0.22
35	216.75	- 4.08	305.53	- 4.18	438.89	- 4.26	0.43
40	177.22	- 3.97	248.58	- 4.07	355.64	- 4.15	0.64
45	145.70	- 3.86	203.40	- 3.96	289.76	- 4.04	0.84
50	120.43	- 3.76	167.35	- 3.85	237.33	- 3.94	1.03
55	100.06	- 3.66	138.42	- 3.75	195.38	- 3.84	1.22
60	83.541	- 3.56	115.06	- 3.65	161.62	- 3.75	1.40
65	70.081	- 3.47	96.120	- 3.55	134.33	- 3.65	1.58
70	59.059	- 3.38	80.672	- 3.46	112.16	- 3.56	1.75
75	49.989	- 3.29	68.012	- 3.37	94.052	- 3.48	1.92
80	42.491	- 3.21	57.588	- 3.29	79.204	- 3.39	2.08
85	36.265	- 3.13	48.966	- 3.20	66.973	- 3.31	2.23
90	31.074	- 3.05	41.803	- 3.12	56.855	- 3.24	2.54
95	26.726	- 2.98	35.826	- 3.05	48.449	- 3.16	2.85
100	23.070	- 2.91	30.819	- 2.97	41.439	- 3.09	3.14
105	19.985	- 2.84	26.608	- 2.90	35.569	- 3.02	3.43
110	17.371	- 2.77	23.053	- 2.83	30.636	- 2.95	3.71
115	15.149	- 2.71	20.039	- 2.77	26.474	- 2.89	3.98
120	13.253	- 2.64	17.477	- 2.70	22.952	- 2.82	4.24
125	11.630	- 2.58	15.290	- 2.64	19.961	- 2.76	4.50
130	10.236	- 2.52	13.417	- 2.58	17.412	- 2.70	4.76
135	9.0345	- 2.47	11.808	- 2.53	15.233	- 2.65	5.00
140	7.9963	- 2.41	10.422	- 2.47	13.364	- 2.59	5.25
145	7.0964	- 2.36	9.2239	- 2.42	11.757	- 2.54	5.48
150	6.3142	- 2.31	8.1851	- 2.36	10.371	- 2.48	5.71

SOLDERING CONDITIONS

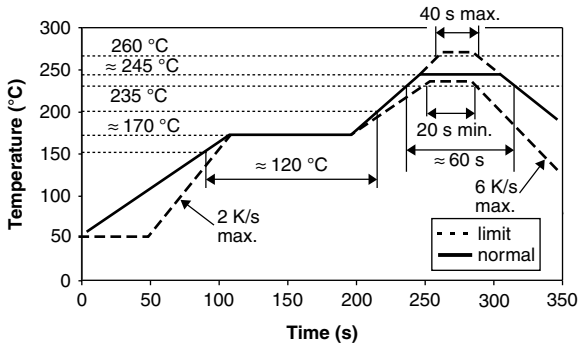
This SMD thermistor is only suitable for wave or reflow soldering, in accordance with “CECC 00802”. The maximum temperature of 260 °C during 40 seconds should not be exceeded.

Typical examples of a soldering processes that will provide reliable joints without damage, are shown below.

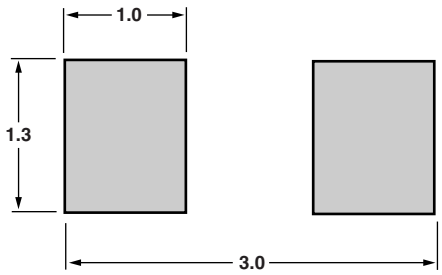
Reflow Soldering



Lead (Pb)-free Reflow Soldering Profile



Dimensions of the solder lands



TESTS AND REQUIREMENTS

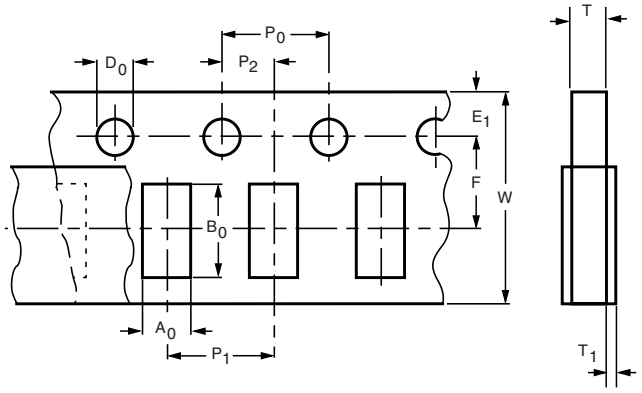
SOLDERABILITY AND RESISTANCE TO SOLDERING HEAT				
IEC 60068-2-58	**TEST METHOD**	**TEST**	**PROCEDURE**	**REQUIREMENTS**
6	T_C	Solderability	2 s at 235 °C	Min. 95 % of surface wetted
		Resistance to soldering heat	10 s at 260 °C	$\Delta R/R < 5$ %

PACKAGING

TAPE SPECIFICATIONS

All tape specifications are in accordance with “IEC 60286-3”. Basic dimensions are given below. Carrier tape material is paper.

PAPER TAPE



PAPER TAPE DIMENSIONS in millimeters		
PARAMETER	**DIMENSION**	**TOLERANCE**
A_0 (1)	1.7	± 0.2
B_0 (1)	2.35	± 0.1
W	8.0	± 0.2
E_1	1.75	± 0.1
F	3.5	± 0.05
D_0	1.55	± 0.05
P_0 (2)	4.0	± 0.1
P_1	4.0	± 0.1
P_2	2.0	± 0.05
T tape thickness	1.1	max.
T_1 cover tape	< 0.1	-

Notes

(1) Measured 0.3 mm above base pocket

(2) P_0 pitch cumulative error over any 10 pitches ± 1.0 mm

Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.