NTC Thermistors, Low Thermal Gradient Lug Sensors

ADDITIONAL RESOURCES

3D Models | Design Tools | SPICE Models

- NTC curve computation: www.vishay.com/thermistors/ntc-curve-list/

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Resistance value at 25 °C (1)	4.7K to 100K	Ω
Tolerance on R_{25}-value (1)	± 1; ± 2; ± 3	%
$B_{25/85}$ value (1)	3435 to 4190	K
Tolerance on $B_{25/85}$-value	± 0.5; ± 1.0; ± 1.5	%
Operating temperature range at zero power	-55 to +125	°C
Thermal time constant τ	≈ 5	s
Dissipation factor	10	mW/K
Thermal gradient (2)	< 0.05	K/K
Min. dielectric withstanding voltage between terminals and lug	1500	V_{AC}
Climatic category (LCT / UCT / days)	55 / 125 / 56	
Weight	≈ 1.0	g

Notes

(1) Other R_{25}-values, $B_{25/85}$-values, and tolerances are available upon request

(2) The thermal gradient is the difference per °C between the true temperature of the surface to be sensed and the temperature measured by the sensor

FEATURES

- Low thermal gradient due to the use of nickel conductor and low profile closed ring tongue
- AEC-Q200 qualified (grade 1)
- cULus recognized, file E148885 (UL category XGPU2/XGPU8)
- Mounting: assembly screw mounting
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS COMPLIANT

APPLICATIONS

Thermistors used for accurate surface temperature sensing and control in:

- Computer equipment
- Power electronics, heat-sink temperature control
- Consumer appliances
- Industrial equipment
- Automotive equipment

DESCRIPTION

Vishay thermistor chip NTC with epoxy coating and middle buffer layer mounted in a tin plated copper ring lug with PEEK insulated leads AWG#30 (Ø 0.25 mm), mono-stranded silver-plated nickel.

MOUNTING

- The device is suitable for screwing e.g. on a metal surface through means of an M3 or M3.5 screw
- The connections are suitable for soldering on a PCB or for connector insertion
- The sensor is not suitable for being in permanent contact with water or liquids
- Other applicable screw hole sizes are available, for example M4 or American Stud #8
- AWG#28 or AWG#26 wires available on request
- Consult Vishay for other cable length, cable section, screw sizes, insulation, connector crimping or other features

ELECTRICAL DATA AND ORDERING INFORMATION

R_{25} (Ω)	R_{25}-TOL. (± %)	$B_{25/85}$ (K)	$B_{25/85}$-TOL. (± %)	L_1 (mm)	UL RECOGNIZED (Y / N)	SAP MATERIAL AND ORDERING NUMBER	
						RoHS COMPLIANT WITH EXEMPTION (1)	RoHS COMPLIANT
4700	2	3984	0.5	45 ± 3	N	NTCALUG02A472G	NTCALUG02A472GA
4700	1	3984	0.5	45 ± 3	N	NTCALUG02A472F	NTCALUG02A472FA
5000	2	3984	0.5	45 ± 3	Y	**NTCALUG02A502G**	**NTCALUG02A502GA**
10 000	2	3984	0.5	45 ± 3	Y	**NTCALUG02A103G (2)**	**NTCALUG02A103GA**
10 000	1	3984	0.5	45 ± 3	Y	NTCALUG02A103F	NTCALUG02A103FA
10 000	1	3984	0.5	80 +5 / -3	Y	NTCALUG02A103F800	NTCALUG02A103F800A
10 000	1	3984	0.5	160 +5 / -3	Y	NTCALUG02A103F161	NTCALUG02A103F161A
10 000	1	3435	1.0	45 ± 3	Y	NTCALUG02A103FL	NTCALUG02A103FLA
10 000	1	3435	1.0	80 +5 / -3	Y	NTCALUG02A103F800L	NTCALUG02A103F804A
10 000	1	3435	1.0	160 +5 / -3	Y	NTCALUG02A103F161L	NTCALUG02A103F165A
100 000	3	4190	1.5	45 ± 3	N	NTCALUG02A104H	NTCALUG02A104HA

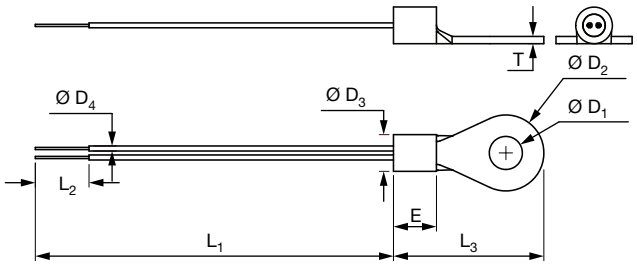
Notes

(1) RoHS exemption 7(c)-I: electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezo-electronic devices, or in a glass or ceramic matrix compound

(2) Is also known under material number NTCALUGE4C90294

For technical questions, contact: nlr@vishay.com

DIMENSIONS in millimeters



L_1	L_2	L_3	Ø D_1	Ø D_2	Ø D_3	Ø D_4	E	T
Refer to the ordering table	6 ± 1	16.8 ± 0.3	3.7 + 0.2 / - 0	8.5 ± 0.2	4.1 + 0.4 / - 0.1	0.56 ± 0.1	4.8 ± 0.2	0.8

NTCALUG02A472G*	NTC LUG02A 4.7K 2 % 3984 K 0.5 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.43	157 109	3.90	-6.63	0.59	150 982	163 236
-35	24.13	113 422	3.72	-6.41	0.58	109 206	117 638
-30	17.61	82 782	3.54	-6.19	0.57	79 851	85714
-25	12.99	61 053	3.37	-5.99	0.56	58 994	63 112
-20	9.68	45 478	3.21	-5.79	0.55	44 017	46 938
-15	7.276	34 199	3.06	-5.61	0.54	33 154	35 244
-10	5.522	25 953	2.91	-5.43	0.54	25 198	26 707
-5	4.227	19 866	2.76	-5.26	0.53	19 317	20 415
0	3.262	15 333	2.62	-5.10	0.51	14 931	15 736
5	2.538	11 929	2.49	-4.94	0.50	11 632	12 226
10	1.990	9352	2.36	-4.80	0.49	9131	9572
15	1.571	7384	2.24	-4.65	0.48	7219	7549
20	1.249	5872	2.12	-4.52	0.47	5747	5996
25	1.000	4700	2.00	-4.39	0.46	4606	4794
30	0.8056	3786	2.11	-4.26	0.50	3706	3866
35	0.6530	3069	2.22	-4.14	0.54	3001	3137
40	0.5324	2502	2.33	-4.03	0.58	2444	2560
45	0.4365	2052	2.43	-3.92	0.62	2002	2102
50	0.3599	1691	2.53	-3.81	0.66	1649	1734
55	0.2982	1402	2.62	-3.71	0.71	1365	1438
60	0.2484	1167	2.72	-3.61	0.75	1136	1199
65	0.2079	977.0	2.81	-3.51	0.80	949.6	1004
70	0.1748	821.4	2.89	-3.42	0.85	797.6	845.2
75	0.1476	693.7	2.98	-3.34	0.89	673.0	714.3
80	0.1252	588.3	3.06	-3.25	0.94	570.3	606.4
85	0.1066	501.1	3.14	-3.17	0.99	485.3	516.8
90	0.09116	428.4	3.22	-3.09	1.04	414.7	442.2
95	0.07825	367.8	3.30	-3.02	1.09	355.6	379.9
100	0.06741	316.8	3.37	-2.94	1.14	306.2	327.5
105	0.05828	273.9	3.44	-2.87	1.20	264.5	283.4
110	0.05057	237.7	3.51	-2.81	1.25	229.3	246.0
115	0.04402	206.9	3.58	-2.74	1.31	199.5	214.3
120	0.03844	180.7	3.65	-2.68	1.36	174.1	187.3
125	0.03367	158.3	3.71	-2.62	1.42	152.4	164.1

NTCALUG02A472F*	NTC LUG02A 4.7K 1 % 3984 K 0.5 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.43	157 109	2.88	-6.63	0.43	152 582	161 636
-35	24.13	113 422	2.70	-6.41	0.42	110 359	116 484
-30	17.61	82 782	2.53	-6.19	0.41	80 691	84 874
-25	12.99	61 053	2.36	-5.99	0.39	59 612	62 494
-20	9.68	45 478	2.20	-5.79	0.38	44 477	46 478
-15	7.276	34 199	2.05	-5.61	0.36	33 500	34 899
-10	5.522	25 953	1.90	-5.43	0.35	25 460	26 445
-5	4.227	19 866	1.75	-5.26	0.33	19 517	20 215
0	3.262	15 333	1.62	-5.10	0.32	15 085	15 581
5	2.538	11 929	1.49	-4.94	0.30	11 752	12 106
10	1.990	9352	1.36	-4.80	0.28	9225	9478
15	1.571	7384	1.23	-4.65	0.27	7293	7475
20	1.249	5872	1.12	-4.52	0.25	5806	5937
25	1.000	4700	1.00	-4.39	0.23	4653	4747
30	0.8056	3786	1.11	-4.26	0.26	3744	3828
35	0.6530	3069	1.22	-4.14	0.29	3032	3106
40	0.5324	2502	1.32	-4.03	0.33	2469	2535
45	0.4365	2052	1.42	-3.92	0.36	2022	2081
50	0.3599	1691	1.52	-3.81	0.40	1666	1717
55	0.2982	1402	1.62	-3.71	0.44	1379	1424
60	0.2484	1167	1.71	-3.61	0.47	1147	1187
65	0.2079	977.0	1.80	-3.51	0.51	959.4	994.5
70	0.1748	821.4	1.88	-3.42	0.55	805.9	836.9
75	0.1476	693.7	1.97	-3.34	0.59	680.0	707.3
80	0.1252	588.3	2.05	-3.25	0.63	576.3	600.4
85	0.1066	501.1	2.13	-3.17	0.67	490.4	511.7
90	0.09116	428.4	2.21	-3.09	0.71	419.0	437.9
95	0.07825	367.8	2.28	-3.02	0.76	359.4	376.2
100	0.06741	316.8	2.36	-2.94	0.80	309.4	324.3
105	0.05828	273.9	2.43	-2.87	0.84	267.3	280.6
110	0.05057	237.7	2.50	-2.81	0.89	231.7	243.6
115	0.04402	206.9	2.56	-2.74	0.94	201.6	212.2
120	0.03844	180.7	2.63	-2.68	0.98	175.9	185.4
125	0.03367	158.3	2.69	-2.62	1.03	154.0	162.5

NTCALUG02A502G*	NTC LUG02A 5K 2 % 3984 K 0.5 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.43	167 137	3.90	-6.63	0.59	160 619	173 655
-35	24.13	120 661	3.72	-6.41	0.58	116 177	125 146
-30	17.61	88 066	3.54	-6.19	0.57	84 947	91 185
-25	12.99	64 950	3.37	-5.99	0.56	62 759	67 141
-20	9.68	48 381	3.21	-5.79	0.55	46 827	49 934
-15	7.276	36 382	3.06	-5.61	0.54	35 270	37 494
-10	5.522	27 609	2.91	-5.43	0.54	26 807	28 411
-5	4.227	21 134	2.76	-5.26	0.53	20 550	21 718
0	3.262	16 312	2.62	-5.10	0.51	15 884	16 740
5	2.538	12 691	2.49	-4.94	0.50	12 375	13 007
10	1.990	9948	2.36	-4.80	0.49	9714	10 183
15	1.571	7856	2.24	-4.65	0.48	7680	8031
20	1.249	6246	2.12	-4.52	0.47	6114	6379
25	1.000	5000	2.00	-4.39	0.46	4900	5100
30	0.8056	4028	2.11	-4.26	0.50	3943	4113
35	0.6530	3265	2.22	-4.14	0.54	3192	3337
40	0.5324	2662	2.33	-4.03	0.58	2600	2724
45	0.4365	2183	2.43	-3.92	0.62	2130	2236
50	0.3599	1799	2.53	-3.81	0.66	1754	1845
55	0.2982	1491	2.62	-3.71	0.71	1452	1530
60	0.2484	1242	2.72	-3.61	0.75	1208	1276
65	0.2079	1039	2.81	-3.51	0.80	1010	1068
70	0.1748	873.8	2.89	-3.42	0.85	848.5	899.1
75	0.1476	738.0	2.98	-3.34	0.89	716.0	759.9
80	0.1252	625.9	3.06	-3.25	0.94	606.7	645.1
85	0.1066	533.1	3.14	-3.17	0.99	516.3	549.8
90	0.09116	455.8	3.22	-3.09	1.04	441.1	470.5
95	0.07825	391.2	3.30	-3.02	1.09	378.3	404.1
100	0.06741	337.1	3.37	-2.94	1.14	325.7	348.4
105	0.05828	291.4	3.44	-2.87	1.20	281.4	301.5
110	0.05057	252.8	3.51	-2.81	1.25	244.0	261.7
115	0.04402	220.1	3.58	-2.74	1.31	212.2	228.0
120	0.03844	192.2	3.65	-2.68	1.36	185.2	199.2
125	0.03367	168.4	3.71	-2.62	1.42	162.1	174.6

NTCALUG02A103G*	NTC LUG02A 10K 2 % 3984 K 0.5 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.43	334 274	3.90	-6.63	0.59	321 238	347 311
-35	24.13	241 323	3.72	-6.41	0.58	232 353	250 293
-30	17.61	176 133	3.54	-6.19	0.57	169 895	182 370
-25	12.99	129 900	3.37	-5.99	0.56	125 518	134 282
-20	9.68	96 761	3.21	-5.79	0.55	93 654	99 869
-15	7.276	72 765	3.06	-5.61	0.54	70 541	74 988
-10	5.522	55 218	2.91	-5.43	0.54	53 613	56 823
-5	4.227	42 268	2.76	-5.26	0.53	41 100	43 435
0	3.262	32 624	2.62	-5.10	0.51	31 768	33 480
5	2.538	25 381	2.49	-4.94	0.50	24 749	26 013
10	1.990	19 897	2.36	-4.80	0.49	19 427	20 367
15	1.571	15 711	2.24	-4.65	0.48	15 360	16 063
20	1.249	12 493	2.12	-4.52	0.47	12 228	12 757
25	1.000	10 000	2.00	-4.39	0.46	9800	10 200
30	0.8056	8056	2.11	-4.26	0.50	7886	8226
35	0.6530	6530	2.22	-4.14	0.54	6385	6675
40	0.5324	5324	2.33	-4.03	0.58	5200	5448
45	0.4365	4365	2.43	-3.92	0.62	4259	4471
50	0.3599	3599	2.53	-3.81	0.66	3508	3690
55	0.2982	2982	2.62	-3.71	0.71	2904	3060
60	0.2484	2484	2.72	-3.61	0.75	2416	2551
65	0.2079	2079	2.81	-3.51	0.80	2020	2137
70	0.1748	1748	2.89	-3.42	0.85	1697	1798
75	0.1476	1476	2.98	-3.34	0.89	1432	1520
80	0.1252	1252	3.06	-3.25	0.94	1213	1290
85	0.1066	1066	3.14	-3.17	0.99	1033	1100
90	0.09116	911.6	3.22	-3.09	1.04	882.2	940.9
95	0.07825	782.5	3.30	-3.02	1.09	756.7	808.2
100	0.06741	674.1	3.37	-2.94	1.14	651.4	696.8
105	0.05828	582.8	3.44	-2.87	1.20	562.8	602.9
110	0.05057	505.7	3.51	-2.81	1.25	487.9	523.4
115	0.04402	440.2	3.58	-2.74	1.31	424.4	455.9
120	0.03844	384.4	3.65	-2.68	1.36	370.4	398.4
125	0.03367	336.7	3.71	-2.62	1.42	324.2	349.2

NTCALUG02A103F*	NTC LUG02A 10K 1 % 3984 K 0.5 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.43	334 274	2.88	-6.63	0.43	324 643	343 906
-35	24.13	241 323	2.70	-6.41	0.42	234 807	247 839
-30	17.61	176 133	2.53	-6.19	0.41	171 683	180 582
-25	12.99	129 900	2.36	-5.99	0.39	126 835	132 965
-20	9.68	96 761	2.20	-5.79	0.38	94 633	98 889
-15	7.276	72 765	2.05	-5.61	0.36	71 276	74 253
-10	5.522	55 218	1.90	-5.43	0.35	54 170	56 266
-5	4.227	42 268	1.75	-5.26	0.33	41 526	43 010
0	3.262	32 624	1.62	-5.10	0.32	32 096	33 152
5	2.538	25 381	1.49	-4.94	0.30	25 004	25 758
10	1.990	19 897	1.36	-4.80	0.28	19 627	20 167
15	1.571	15 711	1.23	-4.65	0.27	15 517	15 905
20	1.249	12 493	1.12	-4.52	0.25	12 353	12 632
25	1.000	10 000	1.00	-4.39	0.23	9900	10 100
30	0.8056	8056	1.11	-4.26	0.26	7966	8145
35	0.6530	6530	1.22	-4.14	0.29	6450	6609
40	0.5324	5324	1.32	-4.03	0.33	5253	5394
45	0.4365	4365	1.42	-3.92	0.36	4303	4427
50	0.3599	3599	1.52	-3.81	0.40	3544	3653
55	0.2982	2982	1.62	-3.71	0.44	2934	3030
60	0.2484	2484	1.71	-3.61	0.47	2441	2526
65	0.2079	2079	1.80	-3.51	0.51	2041	2116
70	0.1748	1748	1.88	-3.42	0.55	1715	1781
75	0.1476	1476	1.97	-3.34	0.59	1447	1505
80	0.1252	1252	2.05	-3.25	0.63	1226	1277
85	0.1066	1066	2.13	-3.17	0.67	1043	1089
90	0.09116	911.6	2.21	-3.09	0.71	891.5	931.7
95	0.07825	782.5	2.28	-3.02	0.76	764.6	800.3
100	0.06741	674.1	2.36	-2.94	0.80	658.2	690.0
105	0.05828	582.8	2.43	-2.87	0.84	568.7	597.0
110	0.05057	505.7	2.50	-2.81	0.89	493.0	518.3
115	0.04402	440.2	2.56	-2.74	0.94	428.9	451.5
120	0.03844	384.4	2.63	-2.68	0.98	374.3	394.5
125	0.03367	336.7	2.69	-2.62	1.03	327.7	345.8

NTCALUG02A103FL*	NTC LUG02A 10K 1 % 3435 K 1 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	19.10	190 953	4.24	-5.46	0.78	182 848	199 057
-35	14.60	145 953	3.93	-5.30	0.74	140 213	151 693
-30	11.24	112 440	3.63	-5.14	0.71	108 354	116 526
-25	8.729	87 285	3.35	-4.99	0.67	84 364	90 206
-20	6.826	68 260	3.07	-4.85	0.63	66 164	70 355
-15	5.376	53 762	2.80	-4.71	0.60	52 254	55 270
-10	4.264	42 636	2.55	-4.57	0.56	41 549	43 723
-5	3.404	34 038	2.30	-4.44	0.52	33 254	34 822
0	2.735	27 348	2.07	-4.31	0.48	26 783	27 913
5	2.211	22 108	1.84	-4.19	0.44	21 702	22 515
10	1.798	17 979	1.62	-4.08	0.40	17 689	18 270
15	1.471	14 706	1.40	-3.96	0.35	14 499	14 912
20	1.209	12 094	1.20	-3.86	0.31	11 949	12 239
25	1.000	10 000	1.00	-3.75	0.27	9900	10 100
30	0.8311	8311	1.19	-3.65	0.33	8212	8410
35	0.6941	6941	1.38	-3.55	0.39	6845	7037
40	0.5825	5825	1.56	-3.46	0.45	5734	5916
45	0.4911	4911	1.73	-3.37	0.51	4826	4996
50	0.4158	4158	1.90	-3.28	0.58	4079	4237
55	0.3536	3536	2.06	-3.20	0.65	3463	3609
60	0.3020	3020	2.22	-3.12	0.71	2953	3087
65	0.2589	2589	2.38	-3.04	0.78	2527	2650
70	0.2228	2228	2.53	-2.96	0.85	2172	2284
75	0.1925	1925	2.67	-2.89	0.92	1873	1976
80	0.1668	1668	2.81	-2.82	1.00	1621	1715
85	0.1451	1451	2.95	-2.75	1.07	1409	1494
90	0.1267	1267	3.08	-2.69	1.15	1228	1306
95	0.1109	1109	3.21	-2.62	1.22	1074	1145
100	0.09743	974.3	3.34	-2.56	1.30	941.7	1007
105	0.08583	858.3	3.46	-2.50	1.38	828.6	888.0
110	0.07584	758.4	3.58	-2.45	1.46	731.2	785.6
115	0.06720	672.0	3.70	-2.39	1.55	647.1	696.8
120	0.05971	597.1	3.81	-2.34	1.63	574.3	619.8
125	0.05319	531.9	3.92	-2.29	1.72	511.0	552.7

NTCALUG02A104H*	NTC LUG02A 100K 3 % 4190 K 1.50 %

RESISTANCE TEMPERATURE CHARACTERISTICS

TEMP. (°C)	$R_{(T)}/R_{25}$	RESISTANCE (Ω)	$\Delta R/R$ (%)	α (%/K)	ΔT (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	36.66	3 666 299	9.05	-6.69	1.35	3 334 354	3 998 244
-35	26.38	2 637 588	8.47	-6.49	1.31	2 414 139	2 861 036
-30	19.17	1 916 576	7.91	-6.29	1.26	1 764 917	2 068 236
-25	14.06	1 406 111	7.38	-6.10	1.21	1 302 387	1 509 836
-20	10.41	1 041 184	6.86	-5.92	1.16	969 745	1 112 622
-15	7.778	777 846	6.37	-5.75	1.11	728 330	827 362
-10	5.861	586 097	5.89	-5.58	1.06	551 581	620 613
-5	4.453	445 257	5.43	-5.42	1.00	421 079	469 435
0	3.409	340 942	4.99	-5.26	0.95	323 936	357 948
5	2.631	263 054	4.56	-5.11	0.89	251 054	275 054
10	2.044	204 446	4.15	-4.97	0.84	195 960	212 931
15	1.600	160 014	3.75	-4.83	0.78	154 008	166 020
20	1.261	126 087	3.37	-4.70	0.72	121 837	130 336
25	1.000	100 000	3.00	-4.57	0.66	97 000	103 000
30	0.7981	79 808	3.36	-4.45	0.75	77 128	82 488
35	0.6408	64 077	3.70	-4.33	0.86	61 703	66 451
40	0.5175	51 745	4.04	-4.22	0.96	49 655	53 836
45	0.4202	42 021	4.36	-4.11	1.06	40 187	43 855
50	0.3431	34 308	4.68	-4.00	1.17	32 702	35 913
55	0.2816	28 156	4.98	-3.90	1.28	26 752	29 559
60	0.2322	23 222	5.28	-3.80	1.39	21 996	24 449
65	0.1925	19 246	5.57	-3.71	1.50	18 174	20 318
70	0.1602	16 025	5.85	-3.62	1.62	15 088	16 961
75	0.1340	13 402	6.12	-3.53	1.73	12 582	14 222
80	0.1126	11 258	6.38	-3.45	1.85	10 539	11 976
85	0.09496	9496	6.64	-3.36	1.97	8866	10 126
90	0.08042	8042	6.89	-3.28	2.10	7488	8596
95	0.06837	6837	7.13	-3.21	2.22	6350	7325
100	0.05835	5835	7.36	-3.13	2.35	5405	6265
105	0.04998	4998	7.59	-3.06	2.48	4618	5377
110	0.04296	4296	7.82	-2.99	2.61	3960	4632
115	0.03705	3705	8.03	-2.93	2.75	3407	4003
120	0.03206	3206	8.25	-2.86	2.88	2942	3470
125	0.02783	2783	8.45	-2.80	3.02	2548	3018

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