

Product Specification

Number: L-KLS6-MF11-104K4500JA

Name: NTC Resistors Leaded

Specification: _____

Customer: B15

Date: 2020-05-28

Customer Signature:



NINGBO KLS ELECTRONIC CO; LTD

Tel : 0086-574-86828566

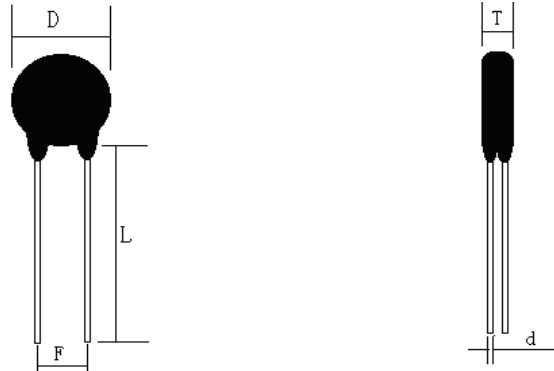
Fax : 0086-574-86824882

ADD : NO. 8-1, RONGXIA RD. XIAPU SHANQIAN
INDUSTRIAL ZONE BEILUN NINGBO ZHEJIANG.

Compile	Check	Review	Approval
Jenny	Jack.C		

1、一般参数 (Common Parameters) :

(1) 尺寸 (mm) (Size)



DMax	LMin	F	TMax	d
6.0	25.0	2.5 ± 1.0	5.0	0.45 ± 0.06

(2) 材料 (Materials)

- ①封装材料 (Wrapper) : 聚硅树脂 (Polysilicon resin)
- ②引线 (Down-lead) : 镀锡电子线 (Tinned Electron Wire)
- ③颜色 (Coating color) : 黑色 (Black)

2、主要技术参数 (Parameters of Technology) :

- ①25℃时零功率电阻值 (Ω) (Zero Power Resistance at 25℃) : 100000 ± 10%
- ②B 值 25/50℃ (K) (B Value) : 4500 ± 5%
- ③热时间常数(S) (Thermal Time Constant) : ≤ 30
- ④热耗散系数 (mW/℃) (Thermal Dissipation Constant) : ≥ 6
- ⑤工作温度 (℃) (Operating Temperature) : -40 - +125
- ⑥绝缘电阻 (MΩ) (Insulating Resistance) : ≥ 100



3. 电气性能及要求 (electrical properties and requirements)

项目	测试方法	性能要求
零功率电阻值 Zero Power Resistance	<p>在 25℃下, 当由于电阻体内部发热引起的电阻值变化相对于总测量误差可以忽略不计时所测得的电阻值。</p> <p>At 25℃, the measured resistance value can be neglected compared to the general tolerance when the change of the resistance is made through its self-heat of the resistor.</p>	见电特性参数 See Electrical Parameters
B 值 B-value	<p>B 值可以用 25℃和 50℃时的零功率电阻值计算出来。其计算公式是:</p> $B = \frac{T1 * T2}{T2 - T1} * \ln \left(\frac{R1}{R2} \right)$ <p>The B value can be calculated using the zero power resistance value at 25℃ and 50℃. The equation is as above.</p>	见电特性参数 See Electrical Parameters
热耗散系数 Thermal Dissipation Constant	<p>在规定的温度下, 热敏电阻中耗散的功率变化与热敏电阻相应温度变化之比。其单位: mw/℃</p> <p>The ratio of the change of the dissipation power to the corresponding change of the temperature at specified temperature. The unit is: mw/℃</p>	见电特性参数 See Electrical Parameters
热时间常数 Thermal Time Constant	<p>在零功率条件下, 当温度发生变化时, 热敏电阻的温度变化为其初始的和最终的温度差的 63.2%所需的时间。</p> <p>Under zero power condition, thermal time constant is the time required by a thermistor that its body temperature reach 63.2% of the difference between its initial and final temperature.</p>	见电特性参数 See Electrical Parameters
工作温度 Operating Temperature	<p>热敏电阻器长期连续工作所允许的温度范围。</p> <p>Allowable temperature range while the thermistor work continuously for long time</p>	-40--+125℃



<p>稳态湿热</p> <p>Damp Heat</p>	<p>温度 $40\pm 2^{\circ}\text{C}$，相对湿度 $93\pm 3\%$，存放 1000 ± 2 小时后，在正常状态下 1 小时。</p> <p>The sample should be subjected to $40\pm 2^{\circ}\text{C}$, relative humidity $93\pm 3\%$ for 1000 ± 2 hours, then stored at room temperature and humidity for 1 hour.</p>	<p>无可见损伤、标志清晰、无击穿或飞弧，绝缘电阻大于 $100\text{M}\Omega$。电阻值的最大变化率在 $\pm 15\%$ 以内。</p> <p>No visible damage, the mark is clear, no breakdown or arcing. Insulating resistance is $>100\text{M}\Omega$. The change ratio of the resistance is within $\pm 15\%$.</p>
<p>耐电压</p> <p>Withstand Voltage</p>	<p>施加 700ACV 电压，时间 60S，电压加在电阻器引线及绝缘层之间</p> <p>Applied AC voltage of 700v between the lead of the resistor and the insulating coating for 60S</p>	<p>无击穿或飞弧</p> <p>No breakdown or arcing</p>
<p>耐焊接热</p> <p>Resistance to Soldering Heat</p>	<p>将热敏电阻器引线在 $260\pm 10^{\circ}\text{C}$ 的焊锡液里，液面距电阻体 6mm 时间 10S。在室温下恢复到原来的状态。</p> <p>Immerse the lead of the resistor into tin liquor of $260\pm 10^{\circ}\text{C}$ for 10S, the distance from the liquor surface to the resistor is 6mm. Then resume to the original state.</p>	<p>无可见损伤、电阻值的最大变化率在 $\pm 15\%$ 以内</p> <p>No visible damage. The max change ratio of the resistance is within $\pm 15\%$</p>
<p>可焊性</p> <p>Solderability</p>	<p>引线浸在 $260\pm 10^{\circ}\text{C}$ 的锡液里，时间 3 秒。</p> <p>浸锡温度：$260\pm 5^{\circ}\text{C}$</p> <p>手锡温度：$260\pm 5^{\circ}\text{C}$ (5s)</p> <p>Immerse the lead into tin liquor of $260\pm 10^{\circ}\text{C}$ for 3 sec. The temperature of immerse welding: $260\pm 5^{\circ}\text{C}$, The temperature of hand welding: $260\pm 5^{\circ}\text{C}$ (5s)</p>	<p>焊锡涂布面积在 90% 以上</p> <p>The covered surface area should be above 90%</p>
<p>引出端变曲强度</p> <p>Bending Strength of Terminals</p>	<p>固定电阻体，在一根引出端悬挂 0.5kg 重力变曲 90 度；然后再回复，再把方向弯曲 90 度</p> <p>Fix the resistor, hanging a force of 0.5kg to one terminal to bend it by 90 degree, then resume to the original state, bend it by 90 degree again.</p>	<p>无可见损伤</p> <p>NO visible damage</p>



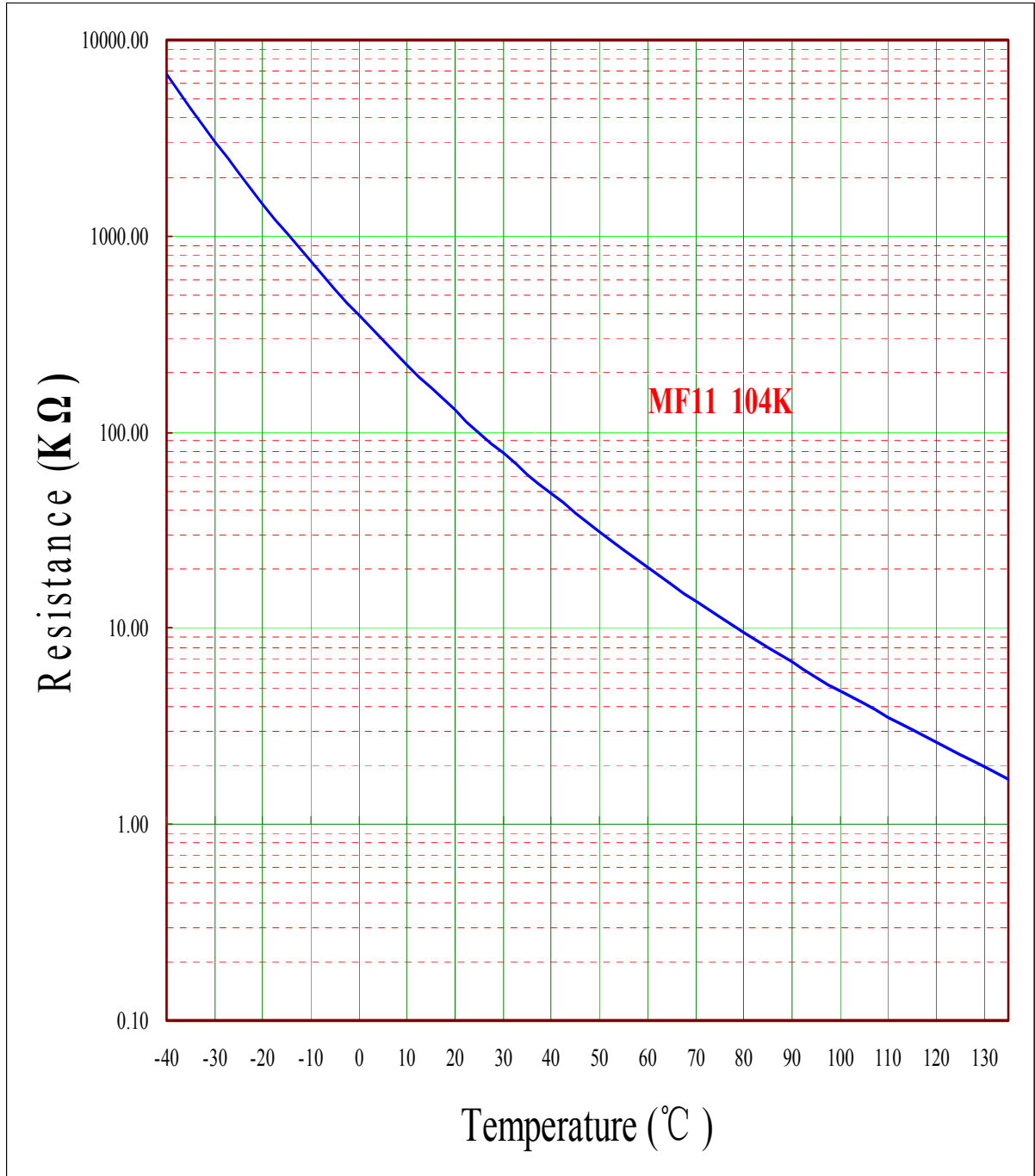
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编 号

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<p>振 动 Vibration</p>	<p>频率: 10-50HZ; 振幅: 1.55mm 方向和时间: X、Y 及 Z 轴各 2 个小时 Frequency: 10-50HZ, Wave Amplitude:1.55mm. Direction and Time: 2 hours respectively f o r X , Y a n d Z a x i s .</p>	<p>无机械损伤 No mechanical damage</p>
<p>绝缘电阻 Insulation resistance</p>	<p>施加 500DCV 电压, 时间 60s, 电压加在电 阻器引线及绝缘层之间 Applied DC voltage of 500v between the lead of the resistor and the insulating coating for 60s</p>	<p>绝缘电阻 $\geq 100M\Omega$ 无击穿或飞弧 Insulation resistance $\geq 100M\Omega$ No breakdown or arcing</p>
<p>温度快速变化 Temperature Rapid Change</p>	<p>-40°C/30 \longrightarrow 25°C/5 \longrightarrow +160°C/30 \longrightarrow 25°C/5</p>	<p>电阻变化率 $\pm 20\%$ The change ratio of the resistance is \pm 20%</p>
<p>储存条件 Storage conditions</p>	<p>-10°C ~ 40°C RH \leq 75%</p>	





R: 100000 ± 10%
B: 4500 °K ± 5%

温度 (°C)	阻值 (Ω)			温度 系数 (%/°C)	阻值精度偏差 (%)		测温精度偏差 (°C)	
	下限值	中心值	上限值		最小	最大	最小	最大
-40.0	4919610.8064	6747540.7030	9162109.4142	-8.30	-27.09	35.78	-4.31	3.27
-39.0	4548349.9315	6212624.6647	8401011.0804	-8.22	-26.79	35.22	-4.28	3.26
-38.0	4207931.3415	5724159.4356	7708857.0605	-8.15	-26.49	34.67	-4.25	3.25
-37.0	3895572.7558	5277781.1710	7078913.9562	-8.08	-26.19	34.13	-4.22	3.24
-36.0	3608761.7203	4869565.4606	6505151.3280	-8.02	-25.89	33.59	-4.19	3.23
-35.0	3345227.6930	4495980.2378	5982163.7725	-7.95	-25.60	33.06	-4.16	3.22
-34.0	3102917.1906	4153844.0284	5505102.1218	-7.88	-25.30	32.53	-4.13	3.21
-33.0	2879971.6431	3840288.9001	5069612.6412	-7.82	-25.01	32.01	-4.10	3.20
-32.0	2674707.6443	3552727.5576	4671783.2486	-7.75	-24.71	31.50	-4.06	3.19
-31.0	2485599.3251	3288824.0918	4308095.9025	-7.69	-24.42	30.99	-4.03	3.18
-30.0	2311262.6091	3046467.9586	3975384.4139	-7.62	-24.13	30.49	-4.00	3.17
-29.0	2150441.1376	2823750.8095	3670797.0330	-7.56	-23.84	30.00	-3.97	3.15
-28.0	2001993.6777	2618945.8450	3391763.2415	-7.50	-23.56	29.51	-3.94	3.14
-27.0	1864882.8482	2430489.4026	3135964.2534	-7.44	-23.27	29.03	-3.90	3.13
-26.0	1738165.0181	2256964.5222	2901306.7881	-7.38	-22.99	28.55	-3.87	3.12
-25.0	1620981.2480	2097086.2669	2685899.7338	-7.32	-22.70	28.08	-3.84	3.10
-24.0	1512549.1620	1949688.6008	2488033.3665	-7.26	-22.42	27.61	-3.80	3.09
-23.0	1412155.6476	1813712.6493	2306160.8287	-7.20	-22.14	27.15	-3.77	3.07
-22.0	1319150.2956	1688196.1886	2138881.6096	-7.14	-21.86	26.70	-3.74	3.06
-21.0	1232939.5002	1572264.2287	1984926.8002	-7.09	-21.58	26.25	-3.70	3.05
-20.0	1152981.1494	1465120.5697	1843145.9197	-7.03	-21.30	25.80	-3.67	3.03
-19.0	1078779.8428	1366040.2250	1712495.1394	-6.97	-21.03	25.36	-3.64	3.02
-18.0	1009882.5819	1274362.6179	1592026.7465	-6.92	-20.75	24.93	-3.60	3.00
-17.0	945874.8828	1189485.4684	1480879.7107	-6.87	-20.48	24.50	-3.57	2.98
-16.0	886377.2690	1110859.2951	1378271.2311	-6.81	-20.21	24.07	-3.53	2.97
-15.0	831042.1026	1037982.4682	1283489.1577	-6.76	-19.94	23.65	-3.50	2.95
-14.0	779550.7223	970396.7550	1195885.1899	-6.71	-19.67	23.24	-3.46	2.93
-13.0	731610.8536	907683.3052	1114868.7703	-6.66	-19.40	22.83	-3.43	2.91



-12.0	686954.2669	849459.0310	1039901.5965	-6.60	-19.13	22.42	-3.39	2.90
-11.0	645334.6558	795373.3409	970492.6866	-6.55	-18.86	22.02	-3.36	2.88
-10.0	606525.7153	745105.1903	906193.9393	-6.50	-18.60	21.62	-3.32	2.86
-9.0	570319.3992	698360.4169	846596.1351	-6.45	-18.33	21.23	-3.29	2.84
-8.0	536524.3396	654869.3309	791325.3337	-6.41	-18.07	20.84	-3.25	2.82
-7.0	504964.4117	614384.5357	740039.6256	-6.36	-17.81	20.45	-3.22	2.80
-6.0	475477.4302	576678.9547	692426.2008	-6.31	-17.55	20.07	-3.18	2.78
-5.0	447913.9654	541544.0432	648198.7026	-6.26	-17.29	19.69	-3.14	2.76
-4.0	422136.2650	508788.1690	607094.8369	-6.22	-17.03	19.32	-3.11	2.74
-3.0	398017.2745	478235.1423	568874.2106	-6.17	-16.77	18.95	-3.07	2.72
-2.0	375439.7445	449722.8824	533316.3767	-6.12	-16.52	18.59	-3.04	2.70
-1.0	354295.4173	423102.2062	500219.0644	-6.08	-16.26	18.23	-3.00	2.68
0.0	334484.2860	398235.7286	469396.5760	-6.03	-16.01	17.87	-2.96	2.65
1.0	315913.9186	374996.8613	440678.3346	-5.99	-15.76	17.52	-2.92	2.63
2.0	298498.8408	353268.9032	413907.5664	-5.95	-15.50	17.17	-2.89	2.61
3.0	282159.9729	332944.2117	388940.1054	-5.90	-15.25	16.82	-2.85	2.58
4.0	266824.1152	313923.4484	365643.3080	-5.86	-15.00	16.48	-2.81	2.56
5.0	252423.4777	296114.8918	343895.0673	-5.82	-14.75	16.14	-2.77	2.54
6.0	238895.2496	279433.8099	323582.9164	-5.78	-14.51	15.80	-2.73	2.51
7.0	226181.2060	263801.8890	304603.2138	-5.74	-14.26	15.47	-2.70	2.49
8.0	214227.3472	249146.7110	286860.4012	-5.70	-14.02	15.14	-2.66	2.46
9.0	202983.5687	235401.2773	270266.3279	-5.65	-13.77	14.81	-2.62	2.44
10.0	192403.3586	222503.5727	254739.6357	-5.61	-13.53	14.49	-2.58	2.41
11.0	182443.5201	210396.1676	240205.1980	-5.58	-13.29	14.17	-2.54	2.38
12.0	173063.9169	199025.8530	226593.6076	-5.54	-13.04	13.85	-2.50	2.36
13.0	164227.2396	188343.3077	213840.7102	-5.50	-12.80	13.54	-2.46	2.33
14.0	155898.7911	178302.7926	201887.1781	-5.46	-12.57	13.23	-2.42	2.30
15.0	148046.2893	168861.8710	190678.1203	-5.42	-12.33	12.92	-2.38	2.27
16.0	140639.6862	159981.1522	180162.7269	-5.38	-12.09	12.61	-2.34	2.25
17.0	133651.0008	151624.0565	170293.9433	-5.35	-11.85	12.31	-2.30	2.22
18.0	127054.1659	143756.5989	161028.1725	-5.31	-11.62	12.01	-2.26	2.19
19.0	120824.8868	136347.1917	152325.0020	-5.27	-11.38	11.72	-2.22	2.16
20.0	114940.5115	129366.4620	144146.9545	-5.24	-11.15	11.43	-2.18	2.13
21.0	109379.9104	122787.0847	136459.2588	-5.20	-10.92	11.13	-2.14	2.10
22.0	104123.3663	116583.6289	129229.6395	-5.17	-10.69	10.85	-2.10	2.07
23.0	99152.4721	110732.4161	122428.1255	-5.13	-10.46	10.56	-2.06	2.04
24.0	94450.0371	105211.3908	116026.8722	-5.10	-10.23	10.28	-2.02	2.01
25.0	90000.0000	100000.0000	110000.0000	-5.06	-10.00	10.00	-1.98	1.98
26.0	85355.5460	95079.0834	104851.2040	-5.03	-10.23	10.28	-2.04	2.03



27.0	80979.4003	90430.7713	99975.3903	-5.00	-10.45	10.55	-2.11	2.09
28.0	76854.5182	86038.3912	95356.5110	-4.96	-10.67	10.83	-2.18	2.15
29.0	72965.0312	81886.3813	90979.5492	-4.93	-10.89	11.10	-2.25	2.21
30.0	69296.1590	77960.2105	86830.4473	-4.90	-11.11	11.38	-2.32	2.27
31.0	65834.1295	74246.3051	82896.0407	-4.86	-11.33	11.65	-2.39	2.33
32.0	62566.1048	70731.9803	79163.9966	-4.83	-11.54	11.92	-2.47	2.39
33.0	59480.1130	67405.3780	75622.7569	-4.80	-11.76	12.19	-2.54	2.45
34.0	56564.9854	64255.4081	72261.4858	-4.77	-11.97	12.46	-2.61	2.51
35.0	53810.2983	61271.6951	69070.0207	-4.74	-12.18	12.73	-2.69	2.57
36.0	51206.3196	58444.5286	66038.8273	-4.71	-12.38	12.99	-2.76	2.63
37.0	48743.9593	55764.8167	63158.9571	-4.68	-12.59	13.26	-2.83	2.69
38.0	46414.7240	53224.0440	60422.0090	-4.65	-12.79	13.52	-2.91	2.75
39.0	44210.6746	50814.2318	57820.0924	-4.62	-13.00	13.79	-2.99	2.81
40.0	42124.3874	48527.9017	55345.7940	-4.59	-13.20	14.05	-3.06	2.88
41.0	40148.9180	46358.0417	52992.1467	-4.56	-13.39	14.31	-3.14	2.94
42.0	38277.7678	44298.0747	50752.5998	-4.53	-13.59	14.57	-3.22	3.00
43.0	36504.8535	42341.8296	48620.9929	-4.50	-13.79	14.83	-3.29	3.06
44.0	34824.4782	40483.5136	46591.5301	-4.47	-13.98	15.09	-3.37	3.12
45.0	33231.3049	38717.6879	44658.7568	-4.45	-14.17	15.34	-3.45	3.19
46.0	31720.3321	37039.2438	42817.5379	-4.42	-14.36	15.60	-3.53	3.25
47.0	30286.8712	35443.3811	41063.0376	-4.39	-14.55	15.86	-3.61	3.31
48.0	28926.5250	33925.5881	39390.7002	-4.36	-14.74	16.11	-3.69	3.38
49.0	27635.1684	32481.6228	37796.2331	-4.34	-14.92	16.36	-3.77	3.44
50.0	26408.9301	31107.4954	36275.5895	-4.31	-15.10	16.61	-3.86	3.51
51.0	25244.1760	29799.4519	34824.9537	-4.28	-15.29	16.86	-3.94	3.57
52.0	24137.4932	28553.9595	33440.7267	-4.26	-15.47	17.11	-4.02	3.63
53.0	23085.6756	27367.6919	32119.5127	-4.23	-15.65	17.36	-4.10	3.70
54.0	22085.7104	26237.5167	30858.1067	-4.20	-15.82	17.61	-4.19	3.76
55.0	21134.7654	25160.4829	29653.4828	-4.18	-16.00	17.86	-4.27	3.83
56.0	20230.1773	24133.8097	28502.7836	-4.15	-16.17	18.10	-4.36	3.89
57.0	19369.4409	23154.8757	27403.3095	-4.13	-16.35	18.35	-4.44	3.96
58.0	18550.1992	22221.2090	26352.5099	-4.10	-16.52	18.59	-4.53	4.03
59.0	17770.2332	21330.4780	25347.9735	-4.08	-16.69	18.83	-4.62	4.09
60.0	17027.4540	20480.4831	24387.4207	-4.05	-16.86	19.08	-4.71	4.16
61.0	16319.8939	19669.1478	23468.6956	-4.03	-17.03	19.32	-4.79	4.23
62.0	15645.6992	18894.5121	22589.7583	-4.01	-17.19	19.56	-4.88	4.29
63.0	15003.1229	18154.7249	21748.6786	-3.98	-17.36	19.80	-4.97	4.36
64.0	14390.5181	17448.0377	20943.6295	-3.96	-17.52	20.03	-5.06	4.43
65.0	13806.3316	16772.7979	20172.8809	-3.94	-17.69	20.27	-5.15	4.49



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66.0	13249.0986	16127.4441	19434.7945	-3.91	-17.85	20.51	-5.24	4.56
67.0	12717.4366	15510.4994	18727.8179	-3.89	-18.01	20.74	-5.33	4.63
68.0	12210.0410	14920.5676	18050.4803	-3.87	-18.17	20.98	-5.43	4.70
69.0	11725.6799	14356.3275	17401.3874	-3.84	-18.32	21.21	-5.52	4.77
70.0	11263.1902	13816.5292	16779.2172	-3.82	-18.48	21.44	-5.61	4.84
71.0	10821.4727	13299.9894	16182.7161	-3.80	-18.64	21.67	-5.71	4.91
72.0	10399.4892	12805.5879	15610.6948	-3.78	-18.79	21.91	-5.80	4.97
73.0	9996.2580	12332.2638	15062.0246	-3.76	-18.94	22.14	-5.89	5.04
74.0	9610.8511	11879.0121	14535.6345	-3.73	-19.09	22.36	-5.99	5.11
75.0	9242.3909	11444.8805	14030.5076	-3.71	-19.24	22.59	-6.09	5.18
76.0	8890.0471	11028.9664	13545.6783	-3.69	-19.39	22.82	-6.18	5.25
77.0	8553.0341	10630.4141	13080.2293	-3.67	-19.54	23.05	-6.28	5.32
78.0	8230.6081	10248.4122	12633.2892	-3.65	-19.69	23.27	-6.38	5.40
79.0	7922.0652	9882.1909	12204.0299	-3.63	-19.83	23.50	-6.48	5.47
80.0	7626.7385	9531.0200	11791.6640	-3.61	-19.98	23.72	-6.57	5.54
81.0	7343.9966	9194.2063	11395.4431	-3.59	-20.12	23.94	-6.67	5.61
82.0	7073.2409	8871.0920	11014.6554	-3.57	-20.27	24.16	-6.77	5.68
83.0	6813.9042	8561.0524	10648.6237	-3.55	-20.41	24.38	-6.87	5.75
84.0	6565.4487	8263.4941	10296.7038	-3.53	-20.55	24.60	-6.97	5.83
85.0	6327.3647	7977.8535	9958.2824	-3.51	-20.69	24.82	-7.08	5.90
86.0	6099.1684	7703.5950	9632.7759	-3.49	-20.83	25.04	-7.18	5.97
87.0	5880.4010	7440.2096	9319.6284	-3.47	-20.96	25.26	-7.28	6.04
88.0	5670.6269	7187.2134	9018.3108	-3.45	-21.10	25.48	-7.38	6.12
89.0	5469.4330	6944.1461	8728.3187	-3.43	-21.24	25.69	-7.49	6.19
90.0	5276.4266	6710.5702	8449.1717	-3.41	-21.37	25.91	-7.59	6.26
91.0	5091.2352	6486.0691	8180.4120	-3.39	-21.51	26.12	-7.70	6.34
92.0	4913.5046	6270.2466	7921.6031	-3.37	-21.64	26.34	-7.80	6.41
93.0	4742.8985	6062.7257	7672.3289	-3.36	-21.77	26.55	-7.91	6.49
94.0	4579.0971	5863.1473	7432.1925	-3.34	-21.90	26.76	-8.02	6.56
95.0	4421.7966	5671.1694	7200.8154	-3.32	-22.03	26.97	-8.12	6.64
96.0	4270.7080	5486.4665	6977.8363	-3.30	-22.16	27.18	-8.23	6.71
97.0	4125.5564	5308.7283	6762.9108	-3.28	-22.29	27.39	-8.34	6.79
98.0	3986.0805	5137.6592	6555.7097	-3.27	-22.41	27.60	-8.45	6.86
99.0	3852.0314	4972.9775	6355.9190	-3.25	-22.54	27.81	-8.56	6.94
100.0	3723.1725	4814.4145	6163.2387	-3.23	-22.67	28.02	-8.67	7.01
101.0	3599.2784	4661.7142	5977.3826	-3.21	-22.79	28.22	-8.78	7.09
102.0	3480.1345	4514.6324	5798.0768	-3.20	-22.91	28.43	-8.89	7.17
103.0	3365.5364	4372.9361	5625.0600	-3.18	-23.04	28.63	-9.00	7.24
104.0	3255.2895	4236.4029	5458.0822	-3.16	-23.16	28.84	-9.12	7.32



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105.0	3149.2084	4104.8206	5296.9047	-3.15	-23.28	29.04	-9.23	7.40
106.0	3047.1163	3977.9869	5141.2991	-3.13	-23.40	29.24	-9.34	7.48
107.0	2948.8447	3855.7084	4991.0470	-3.11	-23.52	29.45	-9.46	7.55
108.0	2854.2330	3737.8004	4845.9395	-3.10	-23.64	29.65	-9.57	7.63
109.0	2763.1280	3624.0866	4705.7768	-3.08	-23.76	29.85	-9.69	7.71
110.0	2675.3837	3514.3985	4570.3677	-3.07	-23.87	30.05	-9.80	7.79
111.0	2590.8606	3408.5753	4439.5294	-3.05	-23.99	30.25	-9.92	7.87
112.0	2509.4258	3306.4630	4313.0865	-3.03	-24.11	30.44	-10.04	7.95
113.0	2430.9524	3207.9147	4190.8716	-3.02	-24.22	30.64	-10.15	8.03
114.0	2355.3192	3112.7896	4072.7239	-3.00	-24.33	30.84	-10.27	8.10
115.0	2282.4105	3020.9535	3958.4897	-2.99	-24.45	31.03	-10.39	8.18
116.0	2212.1158	2932.2776	3848.0218	-2.97	-24.56	31.23	-10.51	8.26
117.0	2144.3296	2846.6391	3741.1789	-2.96	-24.67	31.42	-10.63	8.34
118.0	2078.9511	2763.9201	3637.8258	-2.94	-24.78	31.62	-10.75	8.43
119.0	2015.8840	2684.0081	3537.8330	-2.93	-24.89	31.81	-10.87	8.51
120.0	1955.0361	2606.7953	3441.0760	-2.91	-25.00	32.00	-10.99	8.59
121.0	1896.3195	2532.1783	3347.4358	-2.90	-25.11	32.20	-11.11	8.67
122.0	1839.6500	2460.0584	3256.7981	-2.88	-25.22	32.39	-11.24	8.75
123.0	1784.9471	2390.3409	3169.0533	-2.87	-25.33	32.58	-11.36	8.83
124.0	1732.1339	2322.9352	3084.0962	-2.85	-25.43	32.77	-11.48	8.91
125.0	1681.1366	2257.7543	3001.8260	-2.84	-25.54	32.96	-11.61	9.00
126.0	1631.8849	2194.7149	2922.1459	-2.82	-25.64	33.14	-11.73	9.08
127.0	1584.3114	2133.7374	2844.9629	-2.81	-25.75	33.33	-11.86	9.16
128.0	1538.3513	2074.7453	2770.1879	-2.80	-25.85	33.52	-11.99	9.24
129.0	1493.9430	2017.6651	2697.7351	-2.78	-25.96	33.71	-12.11	9.33
130.0	1451.0273	1962.4266	2627.5224	-2.77	-26.06	33.89	-12.24	9.41
131.0	1409.5475	1908.9623	2559.4707	-2.76	-26.16	34.08	-12.37	9.49
132.0	1369.4493	1857.2075	2493.5041	-2.74	-26.26	34.26	-12.50	9.58
133.0	1330.6806	1807.1001	2429.5497	-2.73	-26.36	34.44	-12.62	9.66
134.0	1293.1917	1758.5807	2367.5375	-2.71	-26.46	34.63	-12.75	9.75
135.0	1256.9348	1711.5919	2307.4001	-2.70	-26.56	34.81	-12.88	9.83
136.0	1221.8640	1666.0790	2249.0727	-2.69	-26.66	34.99	-13.02	9.92
137.0	1187.9355	1621.9892	2192.4932	-2.68	-26.76	35.17	-13.15	10.00
138.0	1155.1072	1579.2719	2137.6016	-2.66	-26.86	35.35	-13.28	10.09
139.0	1123.3386	1537.8786	2084.3404	-2.65	-26.96	35.53	-13.41	10.17
140.0	1092.5910	1497.7626	2032.6542	-2.64	-27.05	35.71	-13.54	10.26
141.0	1062.8273	1458.8789	1982.4898	-2.62	-27.15	35.89	-13.68	10.35
142.0	1034.0119	1421.1846	1933.7960	-2.61	-27.24	36.07	-13.81	10.43
143.0	1006.1104	1384.6382	1886.5233	-2.60	-27.34	36.25	-13.95	10.52



144.0	979.0900	1349.1999	1840.6244	-2.59	-27.43	36.42	-14.08	10.61
145.0	952.9192	1314.8314	1796.0535	-2.57	-27.53	36.60	-14.22	10.69
146.0	927.5677	1281.4960	1752.7666	-2.56	-27.62	36.78	-14.35	10.78
147.0	903.0064	1249.1583	1710.7213	-2.55	-27.71	36.95	-14.49	10.87
148.0	879.2074	1217.7841	1669.8770	-2.54	-27.80	37.12	-14.63	10.96
149.0	856.1438	1187.3409	1630.1942	-2.53	-27.89	37.30	-14.77	11.04
150.0	833.7898	1157.7970	1591.6351	-2.51	-27.98	37.47	-14.91	11.13
151.0	812.1206	1129.1223	1554.1632	-2.50	-28.08	37.64	-15.05	11.22
152.0	791.1125	1101.2874	1517.7434	-2.49	-28.16	37.82	-15.19	11.31
153.0	770.7424	1074.2645	1482.3417	-2.48	-28.25	37.99	-15.33	11.40
154.0	750.9885	1048.0263	1447.9256	-2.47	-28.34	38.16	-15.47	11.49
155.0	731.8295	1022.5469	1414.4635	-2.46	-28.43	38.33	-15.61	11.58
156.0	713.2450	997.8012	1381.9252	-2.44	-28.52	38.50	-15.75	11.67
157.0	695.2155	973.7652	1350.2812	-2.43	-28.61	38.67	-15.89	11.76
158.0	677.7222	950.4155	1319.5034	-2.42	-28.69	38.83	-16.04	11.85
159.0	660.7468	927.7297	1289.5646	-2.41	-28.78	39.00	-16.18	11.94
160.0	644.2720	905.6864	1260.4384	-2.40	-28.86	39.17	-16.33	12.03
161.0	628.2809	884.2645	1232.0995	-2.39	-28.95	39.34	-16.47	12.12
162.0	612.7574	863.4443	1204.5235	-2.38	-29.03	39.50	-16.62	12.21
163.0	597.6859	843.2062	1177.6868	-2.37	-29.12	39.67	-16.76	12.30
164.0	583.0514	823.5317	1151.5664	-2.36	-29.20	39.83	-16.91	12.40
165.0	568.8396	804.4029	1126.1406	-2.34	-29.28	40.00	-17.06	12.49
166.0	555.0364	785.8023	1101.3879	-2.33	-29.37	40.16	-17.21	12.58
167.0	541.6285	767.7133	1077.2880	-2.32	-29.45	40.32	-17.35	12.67
168.0	528.6031	750.1198	1053.8209	-2.31	-29.53	40.49	-17.50	12.77
169.0	515.9476	733.0063	1030.9675	-2.30	-29.61	40.65	-17.65	12.86
170.0	503.6501	716.3577	1008.7095	-2.29	-29.69	40.81	-17.80	12.95
171.0	491.6990	700.1595	987.0288	-2.28	-29.77	40.97	-17.95	13.05
172.0	480.0832	684.3978	965.9082	-2.27	-29.85	41.13	-18.11	13.14
173.0	468.7920	669.0591	945.3311	-2.26	-29.93	41.29	-18.26	13.24
174.0	457.8151	654.1304	925.2814	-2.25	-30.01	41.45	-18.41	13.33
175.0	447.1423	639.5991	905.7434	-2.24	-30.09	41.61	-18.56	13.42
176.0	436.7642	625.4531	886.7020	-2.23	-30.17	41.77	-18.72	13.52
177.0	426.6714	611.6806	868.1428	-2.22	-30.25	41.93	-18.87	13.61
178.0	416.8549	598.2704	850.0517	-2.21	-30.32	42.08	-19.03	13.71
179.0	407.3061	585.2115	832.4149	-2.20	-30.40	42.24	-19.18	13.81
180.0	398.0168	572.4932	815.2194	-2.19	-30.48	42.40	-19.34	13.90



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181.0	388.9787	560.1055	798.4524	-2.18	-30.55	42.55	-19.50	14.00
182.0	380.1842	548.0384	782.1015	-2.17	-30.63	42.71	-19.65	14.09
183.0	371.6257	536.2824	766.1549	-2.16	-30.70	42.86	-19.81	14.19
184.0	363.2960	524.8283	750.6009	-2.15	-30.78	43.02	-19.97	14.29
185.0	355.1881	513.6672	735.4285	-2.14	-30.85	43.17	-20.13	14.38
186.0	347.2953	502.7904	720.6267	-2.14	-30.93	43.33	-20.29	14.48
187.0	339.6109	492.1897	706.1851	-2.13	-31.00	43.48	-20.45	14.58
188.0	332.1288	481.8569	692.0936	-2.12	-31.07	43.63	-20.61	14.68
189.0	324.8427	471.7842	678.3424	-2.11	-31.15	43.78	-20.77	14.78
190.0	317.7469	461.9642	664.9219	-2.10	-31.22	43.93	-20.93	14.87
191.0	310.8356	452.3896	651.8229	-2.09	-31.29	44.08	-21.09	14.97
192.0	304.1033	443.0532	639.0366	-2.08	-31.36	44.23	-21.26	15.07
193.0	297.5448	433.9482	626.5543	-2.07	-31.43	44.38	-21.42	15.17
194.0	291.1548	425.0681	614.3675	-2.06	-31.50	44.53	-21.59	15.27
195.0	284.9284	416.4064	602.4683	-2.05	-31.57	44.68	-21.75	15.37
196.0	278.8609	407.9570	590.8487	-2.05	-31.64	44.83	-21.92	15.47
197.0	272.9475	399.7138	579.5012	-2.04	-31.71	44.98	-22.08	15.57
198.0	267.1837	391.6710	568.4183	-2.03	-31.78	45.13	-22.25	15.67
199.0	261.5653	383.8231	557.5928	-2.02	-31.85	45.27	-22.42	15.77
200.0	256.0880	376.1645	547.0180	-2.01	-31.92	45.42	-22.58	15.87