

可靠性测试报告

Reliability Test Report

PZFR

精密箔技术贴片电阻

Precision Foil Chip Resistor



丰全球电子产业羽翼
解客户设计制造难题

Better Solution for
Sustainable High End Manufacturing

可靠性检测报告

Reliability Test Report

测试型号

Tested Parts

PZFR0603B100RL9

PZFR0805B10K0L9

PZFR1206B30K0L9

报告编号

Report Number

RESI202308161

生产日期

Date of Manufacture

2023.4

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测试项目概览

Test Overview

1、检验环境/Test Environment

环境温度/Ambient Temperature: 15°C ~ 25°C

相对湿度/Relative Humidity: 40 % RH ~ 65 % RH

气压/Atmospheric Pressure: 标准大气压/Standard Atmospheric Pressure

2、检验项目/Test Items

负载寿命测试记录/Load Life Test Record

高温存储测试记录/High Temperature Storage Test Record

3、检验依据/Test References

IEC60115-2008 电子设备用固定电阻器

MIL-STD-202 Electronic & Electrical Component Testing Standards

AEC-Q200

4、检验结论/Test Result

合格/Qualified

负载寿命测试记录

Load Life Test Record

1、样品信息/Sample

物料编号 Part Number	样品数量 Sampling Size	样品编号 Sample Code
PZFR0603B100RL9	60	A1~A60
PZFR0805B10K0L9	60	B1~B60
PZFR1206B30K0L9	60	C1~C60

2、试验标准/Test Standards

MIL-STD-202 Method 108

3、测试设备/Test Equipment

精密鼓风干燥箱/Precision Blast Drying Oven
可编程直流电源/Programmable DC Power Supply
直流低阻表/DC Low Ohmmeter

4、测试日期/Test Date

2023.5.8—2023.7.28

5、试验要求/Test Requirements

5.1. 试验温度: $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$;

5.2. 试验电流: 给样品施加额定功率的试验电流;

试验电流应进行90 min ON / 30 min OFF的不间断循环;

5.3. 试验时间: 2000 小时。

5.1. Test Temperature: $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$;

5.2. Test Current: Apply the test current of rated power to the sample;

Test current should be in a continuous cycle of 90 min ON and 30 min OFF;

5.3. Duration: 2000 h.

6、测试合格标准/Test Qualified Standards

6.1. 外观无损伤, 标识可清晰辨认;

6.2. $\Delta R/R \leq \pm 0.02\%$;

6.1. No appearance damage and the mark shall be clear;

6.2. $\Delta R/R \leq \pm 0.02\%$.

7、测试数据与结果/Test Data & Results

PZFR0603B100RL9

编号 Code	初始值 Initial Value $R_0(\Omega)$	测试后 Value After Test $R_1(\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
A1	99.98080	99.98334	25.4	Pass
A2	99.95281	99.95344	6.3	Pass
A3	99.97107	99.97444	33.7	Pass
A4	99.98413	99.98514	10.1	Pass
A5	100.00674	100.00916	24.2	Pass
A6	99.95517	99.95710	19.3	Pass
A7	99.99093	99.99255	16.2	Pass
A8	100.03257	100.03470	21.3	Pass
A9	100.01448	100.01768	32.0	Pass
A10	99.97384	99.97671	28.7	Pass
A11	99.97738	99.97793	5.5	Pass
A12	99.95407	99.95549	14.2	Pass
A13	100.03044	100.03303	25.9	Pass
A14	99.96677	99.96728	5.1	Pass
A15	100.01504	100.01853	34.9	Pass
A16	100.02328	100.02383	5.5	Pass
A17	99.97382	99.97513	13.1	Pass
A18	99.96083	99.96244	16.1	Pass
A19	99.96796	99.97101	30.5	Pass
A20	99.99776	99.99936	16.0	Pass
A21	99.95661	99.95835	17.4	Pass
A22	100.00672	100.00742	7.0	Pass
A23	100.04879	100.05021	14.2	Pass
A24	99.97296	99.97646	35.0	Pass
A25	99.96718	99.96982	26.4	Pass
A26	99.98062	99.98382	32.0	Pass
A27	99.98241	99.98418	17.7	Pass
A28	100.00721	100.00771	5.0	Pass
A29	99.95254	99.95347	9.3	Pass
A30	99.99610	99.99925	31.5	Pass

负载寿命测试记录

Load Life Test Record

PZFR0603B100RL9

编号 Code	初始值 Initial Value	测试后 Value After Test	$\Delta R/R$ (PPM)	测试结果 Test Result
	$R_0(\Omega)$	$R_t(\Omega)$		
A31	99.97718	99.97875	15.7	Pass
A32	100.02572	100.02630	5.8	Pass
A33	100.02545	100.02765	22.0	Pass
A34	100.02736	100.02843	10.7	Pass
A35	100.02361	100.02501	14.0	Pass
A36	99.98178	99.98337	15.9	Pass
A37	99.99032	99.99105	7.3	Pass
A38	100.04686	100.04774	8.8	Pass
A39	100.04647	100.04908	26.1	Pass
A40	99.95433	99.95485	5.2	Pass
A41	100.03868	100.04141	27.3	Pass
A42	100.04445	100.04695	25.0	Pass
A43	100.03801	100.04067	26.6	Pass
A44	99.95237	99.95553	31.6	Pass
A45	100.01353	100.01510	15.7	Pass
A46	99.97517	99.97583	6.6	Pass
A47	100.01428	100.01751	32.3	Pass
A48	99.96013	99.96116	10.3	Pass
A49	100.04748	100.05073	32.5	Pass
A50	100.02773	100.03107	33.4	Pass
A51	99.97981	99.98050	6.9	Pass
A52	100.04289	100.04428	13.9	Pass
A53	100.04343	100.04653	31.0	Pass
A54	100.03282	100.03454	17.2	Pass
A55	99.97976	99.98099	12.3	Pass
A56	100.00696	100.00852	15.6	Pass
A57	99.95547	99.95794	24.7	Pass
A58	99.98470	99.98535	6.5	Pass
A59	100.03726	100.03918	19.2	Pass
A60	99.98729	99.98851	12.2	Pass

负载寿命测试记录

Load Life Test Record

PZFR0805B10K0L9

编号 Code	初始值 Initial Value R ₀ (KΩ)	测试后 Value After Test R _t (KΩ)	ΔR/R (PPM)	测试结果 Test Result
B1	100.05288	100.05520	23.2	Pass
B2	99.98157	99.98279	12.2	Pass
B3	99.96395	99.96579	18.4	Pass
B4	100.03439	100.03653	21.4	Pass
B5	99.94266	99.94461	19.5	Pass
B6	99.98366	99.98712	34.6	Pass
B7	99.97304	99.97403	9.9	Pass
B8	99.95872	99.95958	8.6	Pass
B9	100.02719	100.02816	9.7	Pass
B10	99.94718	99.95058	34.0	Pass
B11	99.94543	99.94641	9.8	Pass
B12	99.98066	99.98147	8.1	Pass
B13	99.99143	99.99482	33.9	Pass
B14	99.99567	99.99684	11.7	Pass
B15	99.94388	99.94707	31.9	Pass
B16	100.01030	100.01240	21.0	Pass
B17	100.03066	100.03315	24.9	Pass
B18	99.92494	99.92623	12.9	Pass
B19	99.94711	99.94915	20.4	Pass
B20	99.99137	99.99438	30.1	Pass
B21	99.99663	99.99739	7.6	Pass
B22	99.93854	99.93950	9.6	Pass
B23	100.00090	100.00346	25.6	Pass
B24	99.98162	99.98371	20.9	Pass
B25	100.00442	100.00565	12.3	Pass
B26	100.00817	100.01113	29.6	Pass
B27	100.04756	100.04865	10.9	Pass
B28	99.99563	99.99653	9.0	Pass
B29	99.92967	99.93209	24.2	Pass
B30	99.95541	99.95823	28.2	Pass

负载寿命测试记录

Load Life Test Record

PZFR0805B10K0L9

编号 Code	初始值 Initial Value $R_0(K\Omega)$	测试后 Value After Test $R_1(K\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
B31	99.93735	99.93791	5.6	Pass
B32	100.00244	100.00577	33.3	Pass
B33	99.93185	99.93315	13.0	Pass
B34	100.02363	100.02671	30.8	Pass
B35	100.05812	100.05912	10.0	Pass
B36	100.01577	100.01821	24.4	Pass
B37	100.02571	100.02914	34.3	Pass
B38	100.02585	100.02688	10.3	Pass
B39	100.00939	100.01046	10.7	Pass
B40	99.96093	99.96409	31.6	Pass
B41	99.99425	99.99466	4.1	Pass
B42	99.94966	99.95135	16.9	Pass
B43	99.99566	99.99805	23.9	Pass
B44	100.05763	100.06051	28.8	Pass
B45	99.96641	99.96928	28.7	Pass
B46	100.03748	100.03791	4.3	Pass
B47	100.03343	100.03521	17.8	Pass
B48	100.00426	100.00744	31.8	Pass
B49	100.01002	100.01343	34.1	Pass
B50	99.94111	99.94392	28.1	Pass
B51	100.04808	100.05057	24.9	Pass
B52	99.92170	99.92361	19.1	Pass
B53	99.97135	99.97230	9.5	Pass
B54	99.97237	99.97334	9.7	Pass
B55	99.98216	99.98290	7.4	Pass
B56	99.94078	99.94220	14.2	Pass
B57	99.98133	99.98402	26.9	Pass
B58	100.02069	100.02334	26.5	Pass
B59	99.98108	99.98308	20.0	Pass
B60	100.04619	100.04774	15.5	Pass

负载寿命测试记录

Load Life Test Record

PZFR1206B30K0L9

编号 Code	初始值 Initial Value $R_0(K\Omega)$	测试后 Value After Test $R_1(K\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
C1	29.97412	29.97486	24.6	Pass
C2	29.97690	29.97709	6.2	Pass
C3	29.97348	29.97389	13.8	Pass
C4	30.00890	30.01020	43.3	Pass
C5	30.02110	30.02165	18.2	Pass
C6	29.97452	29.97476	7.9	Pass
C7	29.97921	29.97928	2.3	Pass
C8	30.02133	30.02290	52.4	Pass
C9	30.00046	30.00203	52.3	Pass
C10	30.01070	30.01085	4.9	Pass
C11	30.01978	30.02006	9.4	Pass
C12	30.02559	30.02672	37.7	Pass
C13	29.99362	29.99440	25.9	Pass
C14	29.97865	29.97950	28.3	Pass
C15	30.00246	30.00260	4.8	Pass
C16	29.97769	29.97775	2.0	Pass
C17	30.02271	30.02317	15.4	Pass
C18	29.98851	29.98907	18.8	Pass
C19	30.00536	30.00669	44.3	Pass
C20	30.01622	30.01677	18.3	Pass
C21	30.00467	30.00534	22.3	Pass
C22	30.00943	30.00985	13.9	Pass
C23	30.02413	30.02571	52.5	Pass
C24	29.97839	29.97924	28.3	Pass
C25	30.01800	30.01955	51.7	Pass
C26	29.97978	29.98065	29.1	Pass
C27	30.01279	30.01391	37.4	Pass
C28	30.02535	30.02547	3.9	Pass
C29	29.98208	29.98362	51.3	Pass
C30	29.98619	29.98728	36.4	Pass

负载寿命测试记录

Load Life Test Record PZFR1206B30K0L9

编号 Code	初始值 Initial Value R ₀ (KΩ)	测试后 Value After Test R _t (KΩ)	ΔR/R (PPM)	测试结果 Test Result
C31	29.97655	29.97767	37.5	Pass
C32	29.97843	29.97930	28.9	Pass
C33	30.02604	30.02637	11.1	Pass
C34	29.99867	30.00001	44.7	Pass
C35	29.99424	29.99549	41.8	Pass
C36	29.99144	29.99153	3.1	Pass
C37	29.98440	29.98568	42.6	Pass
C38	29.98835	29.98855	6.8	Pass
C39	29.98020	29.98029	2.9	Pass
C40	29.98140	29.98242	33.9	Pass
C41	30.01085	30.01218	44.3	Pass
C42	29.98772	29.98825	17.6	Pass
C43	30.01425	30.01483	19.3	Pass
C44	29.98717	29.98739	7.3	Pass
C45	29.99381	29.99417	12.0	Pass
C46	29.99213	29.99290	25.8	Pass
C47	29.97554	29.97642	29.5	Pass
C48	30.00848	30.01006	52.5	Pass
C49	29.98640	29.98739	33.0	Pass
C50	30.02657	30.02749	30.7	Pass
C51	29.99992	30.00097	35.0	Pass
C52	29.99635	29.99793	52.8	Pass
C53	30.02157	30.02171	4.6	Pass
C54	30.01862	30.02019	52.2	Pass
C55	29.98554	29.98659	35.0	Pass
C56	30.01251	30.01257	2.1	Pass
C57	30.02317	30.02387	23.3	Pass
C58	29.97395	29.97540	48.5	Pass
C59	30.01241	30.01392	50.3	Pass
C60	29.98564	29.98601	12.5	Pass

高温存储测试记录

High Temperature Storage Test Record

1、样品信息/Sample

物料编号 Part Number	样品数量 Sampling Size	样品编号 Sample Code
PZFR0603B100RL9	60	A1~A60
PZFR0805B10K0L9	60	B1~B60
PZFR1206B30K0L9	60	C1~C60

2、试验标准/Test Standards

MIL-STD-202 Method 108

3、测试设备/Test Equipment

高温存储试验箱/High Temperature Storage Test Chamber
直流低阻表/DC Low Ohmmeter

4、测试日期/Test Date

2023.7.31—2023.8.4

5、试验要求/Test Requirements

- 5.1. 试验温度: 150°C;
- 5.3. 试验电压: 无负载;
- 5.2. 实验时间: 100h。

- 5.1. Test Temperature: 150°C;
- 5.2. Test Voltage: No load;
- 5.3. Time Duration: 100h.

6、测试合格标准/Test Qualified Standards

- 6.外观无损伤, 标识可清晰辨认;
- 6.2. $\Delta R/R \leq \pm 0.01\%$ 。

- 6.1. No appearance damage and the mark shall be clear;
- 6.2. $\Delta R/R \leq \pm 0.01\%$.

7、测试数据与结果/Test Data & Results

PZFR0603B100RL9

编号 Code	初始值 Initial Value $R_0(\Omega)$	测试后 Value After Test $R_1(\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
A1	99.99869	99.99201	-66.8	Pass
A2	99.94088	99.94437	34.9	Pass
A3	99.95073	99.94218	-85.5	Pass
A4	100.05797	100.06450	65.3	Pass
A5	100.01214	100.01074	-14	Pass
A6	99.99302	99.98864	-43.8	Pass
A7	100.03414	100.02734	-68	Pass
A8	100.01736	100.01030	-70.6	Pass
A9	100.05127	100.05154	2.7	Pass
A10	100.04980	100.05640	66	Pass
A11	99.99628	99.99751	12.3	Pass
A12	100.03836	100.04567	73.1	Pass
A13	100.06024	100.05320	-70.4	Pass
A14	100.03165	100.03420	25.5	Pass
A15	100.03404	100.04051	64.7	Pass
A16	99.95015	99.94601	-41.4	Pass
A17	99.97171	99.96245	-92.6	Pass
A18	99.94258	99.93989	-26.9	Pass
A19	100.04661	100.04146	-51.5	Pass
A20	100.02940	100.03065	12.5	Pass
A21	100.04137	100.04752	61.5	Pass
A22	99.94735	99.94227	-50.8	Pass
A23	99.97065	99.97649	58.4	Pass
A24	100.06942	100.07134	19.2	Pass
A25	100.07638	100.08128	49	Pass
A26	99.99564	99.99523	-4.1	Pass
A27	99.93901	99.94565	66.4	Pass
A28	100.07540	100.07376	-16.4	Pass
A29	99.95237	99.95498	26.1	Pass
A30	99.99804	100.00476	67.2	Pass

高温存储测试记录

High-Temperature Storage Test Record

PZFR0603B100RL9

编号 Code	初始值 Initial Value $R_0(\Omega)$	测试后 Value After Test $R_1(\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
A31	100.02525	100.01653	-87.2	Pass
A32	99.95030	99.95389	35.9	Pass
A33	99.98602	99.98058	-54.4	Pass
A34	99.94167	99.94649	48.2	Pass
A35	99.97116	99.96176	-94	Pass
A36	100.05183	100.05387	20.4	Pass
A37	99.98854	99.98436	-41.8	Pass
A38	100.04139	100.03692	-44.7	Pass
A39	99.93307	99.93384	7.7	Pass
A40	99.93995	99.94181	18.6	Pass
A41	99.97769	99.97232	-53.7	Pass
A42	99.99877	100.00457	58	Pass
A43	100.04864	100.05208	34.4	Pass
A44	100.05420	100.04758	-66.2	Pass
A45	100.07514	100.08419	90.4	Pass
A46	100.03417	100.03471	5.4	Pass
A47	99.96203	99.96588	38.5	Pass
A48	100.02000	100.02678	67.8	Pass
A49	99.93895	99.93338	-55.7	Pass
A50	100.01723	100.02614	89.1	Pass
A51	100.06471	100.07067	59.6	Pass
A52	100.02361	100.02056	-30.5	Pass
A53	100.03742	100.03488	-25.4	Pass
A54	100.07729	100.07759	3	Pass
A55	100.01914	100.01489	-42.5	Pass
A56	100.04432	100.04842	41	Pass
A57	100.01828	100.01845	1.7	Pass
A58	99.98113	99.97912	-20.1	Pass
A59	99.94376	99.93788	-58.8	Pass
A60	99.99532	99.99689	15.7	Pass

高温存储测试记录

High-Temperature Storage Test Record

PZFR0805B10K0L9

编号 Code	初始值 Initial Value $R_0(K\Omega)$	测试后 Value After Test $R_1(K\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
B1	10.00228	10.00184	-43.9	Pass
B2	10.00233	10.00224	-9	Pass
B3	9.99803	9.99783	-20	Pass
B4	10.00560	10.00543	-17.1	Pass
B5	10.00648	10.00664	15.5	Pass
B6	10.00258	10.00292	33.5	Pass
B7	10.00433	10.00462	29.4	Pass
B8	10.00695	10.00663	-31.6	Pass
B9	10.00297	10.00276	-20.7	Pass
B10	10.00372	10.00397	25.4	Pass
B11	10.00486	10.00531	44.7	Pass
B12	10.00418	10.00446	27.9	Pass
B13	10.00573	10.00538	-34.5	Pass
B14	10.00536	10.00503	-32.8	Pass
B15	10.00003	9.99984	-18.7	Pass
B16	9.99855	9.99851	-4.4	Pass
B17	10.00047	10.00011	-35.8	Pass
B18	10.00626	10.00669	43.4	Pass
B19	9.99988	9.99967	-21.2	Pass
B20	9.99980	10.00011	31.1	Pass
B21	9.99807	9.99804	-2.7	Pass
B22	10.00274	10.00260	-14.3	Pass
B23	10.00583	10.00615	31.6	Pass
B24	10.00243	10.00195	-47.8	Pass
B25	10.00048	10.00021	-26.8	Pass
B26	10.00725	10.00718	-7	Pass
B27	10.00290	10.00300	9.8	Pass
B28	10.00477	10.00501	24	Pass
B29	9.99990	9.99986	-3.9	Pass
B30	10.00606	10.00573	-33.4	Pass

高温存储测试记录

High-Temperature Storage Test Record

PZFR0805B10K0L9

编号 Code	初始值 Initial Value R_0 (K Ω)	测试后 Value After Test R_1 (K Ω)	$\Delta R/R$ (PPM)	测试结果 Test Result
B31	10.00175	10.00211	36.3	Pass
B32	10.00698	10.00732	33.6	Pass
B33	10.00213	10.00184	-28.5	Pass
B34	9.99919	9.99885	-34	Pass
B35	10.00255	10.00265	9.5	Pass
B36	10.00213	10.00252	39.1	Pass
B37	10.00056	10.00022	-33.5	Pass
B38	9.99879	9.99904	25.2	Pass
B39	10.00336	10.00338	1.5	Pass
B40	10.00217	10.00179	-37.8	Pass
B41	10.00053	10.00075	21.7	Pass
B42	9.99870	9.99875	4.9	Pass
B43	10.00291	10.00333	42.1	Pass
B44	10.00471	10.00449	-21.6	Pass
B45	10.00380	10.00360	-19.9	Pass
B46	10.00747	10.00757	10.4	Pass
B47	9.99893	9.99857	-36.1	Pass
B48	10.00475	10.00517	42	Pass
B49	9.99822	9.99781	-41	Pass
B50	10.00152	10.00159	7.2	Pass
B51	10.00254	10.00264	10.2	Pass
B52	10.00203	10.00188	-15.3	Pass
B53	10.00121	10.00108	-13.2	Pass
B54	10.00308	10.00287	-21.4	Pass
B55	10.00105	10.00102	-3.1	Pass
B56	10.00255	10.00296	41.1	Pass
B57	10.00347	10.00322	-24.5	Pass
B58	10.00709	10.00695	-14.4	Pass
B59	9.99829	9.99853	24.5	Pass
B60	9.99877	9.99885	8	Pass

高温存储测试记录

High-Temperature Storage Test Record

PZFR1206B30K0L9

编号 Code	初始值 Initial Value $R_0(K\Omega)$	测试后 Value After Test $R_1(K\Omega)$	$\Delta R/R$ (PPM)	测试结果 Test Result
C1	29.97506	29.97582	25.4	Pass
C2	29.98415	29.98421	2.1	Pass
C3	30.00046	30.00181	45.1	Pass
C4	30.01948	30.01974	8.6	Pass
C5	29.97898	29.98032	44.8	Pass
C6	30.01970	30.02096	42	Pass
C7	30.01559	30.01549	-3.2	Pass
C8	30.02175	30.02212	12.3	Pass
C9	30.00244	30.00143	-33.8	Pass
C10	30.01545	30.01482	-21	Pass
C11	30.01228	30.01151	-25.6	Pass
C12	29.98636	29.98781	48.4	Pass
C13	29.97400	29.97351	-16.3	Pass
C14	29.99155	29.99056	-33	Pass
C15	29.97419	29.97479	19.9	Pass
C16	29.99130	29.99255	41.8	Pass
C17	29.97606	29.97634	9.4	Pass
C18	30.01993	30.01868	-41.5	Pass
C19	30.00889	30.00878	-3.5	Pass
C20	29.98737	29.98773	12	Pass
C21	29.99950	29.99958	2.8	Pass
C22	30.00928	30.00886	-13.9	Pass
C23	29.98703	29.98685	-6.1	Pass
C24	30.00584	30.00508	-25.3	Pass
C25	30.01145	30.01059	-28.5	Pass
C26	29.97772	29.97901	42.9	Pass
C27	29.97441	29.97467	8.6	Pass
C28	29.98390	29.98336	-18	Pass
C29	29.98553	29.98478	-24.9	Pass
C30	29.99423	29.99485	20.6	Pass

高温存储测试记录

High-Temperature Storage Test Record PZFR1206B30K0L9

编号 Code	初始值 Initial Value R ₀ (KΩ)	测试后 Value After Test R _t (KΩ)	ΔR/R (PPM)	测试结果 Test Result
C31	30.01975	30.01859	-38.7	Pass
C32	30.01317	30.01372	18.4	Pass
C33	30.00532	30.00392	-46.6	Pass
C34	30.01392	30.01501	36.4	Pass
C35	30.02019	30.02077	19.2	Pass
C36	29.98086	30.02077	-20.3	Pass
C37	29.97781	29.97756	-8.2	Pass
C38	30.01046	30.01072	8.5	Pass
C39	29.99439	29.99435	-1.4	Pass
C40	30.00553	30.00545	-2.5	Pass
C41	29.98375	29.98391	5.4	Pass
C42	29.97448	29.97324	-41.3	Pass
C43	30.02463	30.02512	16.2	Pass
C44	29.99459	29.99445	-4.8	Pass
C45	30.01281	30.01428	48.9	Pass
C46	29.97763	29.97778	5	Pass
C47	30.00897	30.01036	46.2	Pass
C48	29.98724	29.98851	42.5	Pass
C49	29.99564	29.99465	-33	Pass
C50	29.97862	29.97897	11.7	Pass
C51	29.98998	29.98892	-35.2	Pass
C52	30.01077	30.01071	-2.1	Pass
C53	30.01434	30.01520	28.6	Pass
C54	29.98180	29.98245	21.8	Pass
C55	29.99174	29.99257	27.7	Pass
C56	30.00627	30.00759	44	Pass
C57	30.01066	30.01023	-14.4	Pass
C58	29.97904	29.98004	33.3	Pass
C59	30.01618	30.01622	1.2	Pass
C60	30.00994	30.00846	-49.3	Pass



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