

# **AEC-6820-A2**

## **Reliability Prediction Report**

### **(MTBF)**

Report NO : 05P070003

**01-20-2005**

Issue Date

**Wenyuan Yang**

Manager

**Jessica Chou**

Test Engineer

## Reliability Prediction (MTBF)

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### I . Model Name:

- AEC-6820-A2 (Embedded control PC.Transmeta TM5800 1GHz CPU.Fanless.2PCM.DC 9-30V)

### II . Prediction Date: Jan. 20, 2005

### III . Prediction Site: AAEON Q.E. Dept.

### IV . Predicted by : Jessica Chou

### V . Equipment: Relx Ver.7.3 Visual Reliability Software

### VI. Simulation Environment:

- Temperature: 25 degrees C
- Standard: Telcordia (Bellcore) Standard

### VII. Term and Definition:

- Unit : An assembly of device.
- Duty Cycle : Used to specify the percentage of time that the element is in an on state, and it is equal to the percentage of total time the item is in the active environment.
- Quantity : The quantity of the selected item.
- Failure Rate : Used to specify that the failure rate is to be calculated based the selected Calculation models. The multiplier is 1,000,000.
- MTBF : MTBF is always specified in hours.

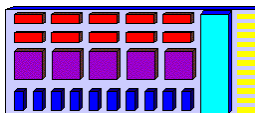
### VIII. Prediction Result:

- Failure Rate: 13.323297 ppm
- MTBF: 75,056 Hours

### IX. Remark

### Standard Reliability Prediction Report

**Part Number** System  
**Reference Des**  
**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 25.00

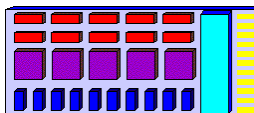


**Description** Top-level assembly  
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 13.323297  
**MTBF** 75,056

Assembly Name	Part Number	Ref Des	Qty	Failure Rate	MTBF
AEC-6820-A2	System		1.00	13.323297	75,056
969763300U			1.00	8.762892	114,118
9697Y20702			1.00	3.926494	254,680
9697Y20403			1.00	0.118863	8,413,040
9697E10202			1.00	0.577014	1,733,060
9697E10203			1.00	0.414782	2,410,904

### Standard Reliability Prediction Report

**Part Number** System  
**Reference Des**  
**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 25.00



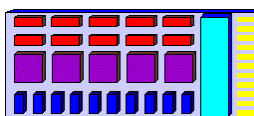
**Description** Top-level assembly  
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 13.323297  
**MTBF** 75,056

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1602606A00	Switching Device	switch	0.056897	1.00	0.056897

### Standard Reliability Prediction Report

**Part Number**  
**Reference Des**

**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 23.00



**Description**

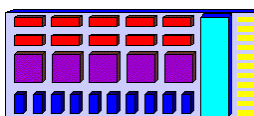
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 8.762892  
**MTBF** 114,118

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1653005100	Connection	CN4	0.002561	1.00	0.002561
1654409103	Connection	CN9	0.004609	1.00	0.004609
1652512203	Connection	CN10	0.006146	1.00	0.006146
1653005201	Connection	CN12,CN15	0.005121	2.00	0.010243
1655306020	Connection	CN13	0.003073	1.00	0.003073
1653003201	Connection	JP1,JP2*2	0.003073	3.00	0.009219
1750119014	Miscellaneous	BAT1	0.900000	1.00	0.900000
1654606303	Connection	CN1	0.003073	1.00	0.003073
1653017202	Connection	CN3	0.017413	1.00	0.017413
1654515302	Connection	CN11	0.007682	1.00	0.007682
1653007201	Connection	CN14	0.007170	1.00	0.007170
1653003101	Connection	J3-5	0.001536	3.00	0.004609
1653013203	Connection	CN2	0.013316	1.00	0.013316
105A501823	Resistor	R317	0.002180	1.00	0.002180
1315700212	Semiconductor	Q6,Q9	0.075128	2.00	0.150255
1314108412	Integrated Circuit	Q10	0.026602	1.00	0.026602
1311119710	Semiconductor	Q12	0.022538	1.00	0.022538
1540722084	Resistor	RN1-8,RN10,RN1-2,RN14-18,RN20	0.005697	16.00	0.091146
1540710380	Resistor	RN22-23	0.005697	2.00	0.011393
1540747282	Resistor	RN24-25,RN49-51	0.005697	5.00	0.028483
1540733082	Resistor	RN29-34,RN38-48	0.005697	17.00	0.096843
15407331A0	Resistor	RP1,RP7	0.005697	2.00	0.011393
106B501031	Resistor	RT1	0.010243	1.00	0.010243
105A700003	Resistor	L47,R110,R115,R-134-135,R138,R1-50-151,R189,R19-7-198,R206,R208-,R215,R221,R225-,R228,R230-231,-R260-261,R272-2-73,R281,R288,R2-90,R294,R298,R3-15,R5,R60,R65,R-67-68,R81	0.002180	16.00	0.034880
105A701003	Resistor	C112,L11,L12,L15-,L18-L20,L2,L26,L-35,L4,L42,R111,R-112,R114,R282,R-283	0.002180	20.00	0.043600
105A704723	Resistor	R11-26,R118,R12-4,R126,L43	0.002180	47.00	0.102459
105A733003	Resistor	R100-101,R104,R-107,R165-170,R1-77,R179-181,R21-0-213,R241-244,-R278,R286-287,R-3,R30,R301,R303-306,R320-321,R-34,R49,R58-59,R-63-64,R79-80,R85-,R87,R99,R138,R-299	0.002180	4.00	0.008720

**Standard Reliability Prediction Report**

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**Reference Des**

**Date** 一月 20, 2005  
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**Temperature** 23.00



**Description**

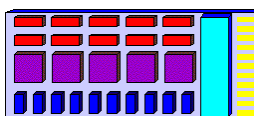
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 8.762892  
**MTBF** 114,118

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
105A502833	Resistor	R66	0.002180	1.00	0.002180
105A702203	Resistor	R183,R233,R250- ,R307-309,R317,- R72,R83,R322	0.002180	10.00	0.021800
105A553623	Resistor	R74	0.002180	1.00	0.002180
105A547003	Resistor	R157-160,R162-1- 63,R318-319,R88	0.002180	10.00	0.021800
105A756033	Resistor	R105-106,R92-93	0.002180	4.00	0.008720
105A705623	Resistor	R10,R97-98	0.002180	3.00	0.006540
105A505103	Resistor	R142-145	0.002180	4.00	0.008720
105A704733	Resistor	R184-185,R217-2- 18,R232,R236,R2- 45,R251	0.002180	8.00	0.017440
105A575003	Resistor	R203	0.002180	1.00	0.002180
105A512103	Resistor	R270	0.002180	1.00	0.002180
105A702723	Resistor	R274-276	0.002180	3.00	0.006540
14S4268601	Integrated Circuit	U3	0.039760	1.00	0.039760
14S4070610	Integrated Circuit	U5	0.051235	1.00	0.051235
14S3128420	Integrated Circuit	U8	0.051235	1.00	0.051235
14S5824401	Integrated Circuit	U10	0.034909	1.00	0.034909
14S4021300	Integrated Circuit	U12	0.073246	1.00	0.073246
14S6334610	Integrated Circuit	U20	0.026407	1.00	0.026407
14S6202002	Integrated Circuit	U21	0.113273	1.00	0.113273
1231325050	Miscellaneous	Y2	0.150000	1.00	0.150000
1231324551	Miscellaneous	Y3	0.150000	1.00	0.150000
1129701080	Capacitor	CB11-12,C10,C12- -15,C17-24,C26-3- 1,C321-322,C35-- C44,C54,C56,C58- -61,C64-69,C71,C- 77,C86-93,C95-97- ,C4-C9,C327,C328	0.002687	66.00	0.177324
1129701080	Capacitor	C11	0.002801	1.00	0.002801
1122710080	Capacitor	BC30,C100,C175- ,C70,C72,C99,C1- 07,C108	0.001046	8.00	0.008371
1759100006	Miscellaneous	BUZZ1	0.150000	1.00	0.150000
1654040000	Connection	CN18	0.020486	1.00	0.020486
1174610280	Capacitor	CP1(*4)	0.001046	4.00	0.004185
1189647080	Capacitor	C3,C57	0.004742	2.00	0.009484
1129610060	Capacitor	C106,C138-139,C- 157,C165,C25,C3- 17-320,C325-326- ,C73-76,C78-79,C- 82-83,C94,TC10,- TC4-5	0.005952	24.00	0.142848
15407472A0	Resistor	RP3-6,RP8	0.014242	5.00	0.071208
1121733780	Capacitor	C116-118,C122-1- 24	0.002506	6.00	0.015035
1129747650	Capacitor	C200,C203,C207- ,C210,C213,C212	0.002687	6.00	0.016120
1651572990	Connection	SODIMM1	0.073749	1.00	0.073749
1301005443	Semiconductor	D1-3,D5	0.007513	4.00	0.030051

**Standard Reliability Prediction Report**

**Part Number**  
**Reference Des**

**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 23.00



**Description**

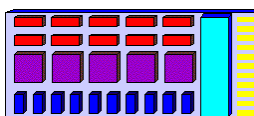
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 8.762892  
**MTBF** 114,118

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1300581740	Semiconductor	D8-9	0.022538	2.00	0.045077
1212306033	Inductor	FB10,FB13,FB15--16,FB2-4,FB6-7,L-10,L13,L14,L16,L-17,L21-25,L3,L5-9-,L45-46	0.002180	27.00	0.058859
1752311000	Miscellaneous	FS1-2	0.030000	2.00	0.060000
1174547080	Capacitor	NC2-3,NC8-9	0.001046	4.00	0.004185
1174522180	Capacitor	NC4-7,NC1	0.001046	5.00	0.005232
1315993310	Semiconductor	Q4	0.150255	1.00	0.150255
1651203291	Connection	U21	0.016389	1.00	0.016389
14S3161200	Integrated Circuit	U26	0.051235	1.00	0.051235
14S3000201	Inductor	U37	0.136062	1.00	0.136062
1231314350	Miscellaneous	X2	0.150000	1.00	0.150000
1231332721	Miscellaneous	Y1	0.150000	1.00	0.150000
1122701680	Capacitor	BCBC1-10,BC13--20,BC25,BC29,B-C34-35,BC39-42,-BC44,C101-103,-C109-110,C111,C-113-115,C125-126-,C129-130,C151--156,C158-164,C1-66-170,C178-192-,C194-199,C202,-C206,C209,C211-,C302-305,C45-53-,C55,C98	0.001577	98.00	0.154515
1124547180	Capacitor	BC22-24,BC26-28-,BC31-32	0.001046	8.00	0.008371
1654020000	Connection	CN19	0.010243	1.00	0.010243
1124510280	Capacitor	C127-128,C131-1-33,C80-81,C84-85	0.001046	9.00	0.009417
1124422080	Capacitor	C104-105,C136-1-37	0.001046	4.00	0.004185
1129610260	Capacitor	C306	0.000703	1.00	0.000703
14S3006000	Integrated Circuit	DN1	0.051235	1.00	0.051235
1304100540	Semiconductor	D4	0.004056	1.00	0.004056
1212308054	Inductor	FB12,FB17,FB5,L-1,L27-34,L37-L41	0.002180	15.00	0.032700
1315970110	Semiconductor	F1-F4	0.150255	4.00	0.601020
1310390410	Semiconductor	Q2,Q5,Q8,Q11	0.022538	4.00	0.090153
1310390410	Semiconductor	Q1	0.026451	1.00	0.026451
105A502233	Resistor	R108-109,R310	0.002180	3.00	0.006540
105A702223	Resistor	R172	0.002180	1.00	0.002180
105A507503	Resistor	R237-R240	0.002180	4.00	0.008720
105A520003	Resistor	R271	0.002180	1.00	0.002180
14S5A00700	Integrated Circuit	U2	0.033659	1.00	0.033659
14S5824500	Integrated Circuit	U6-7	0.034041	2.00	0.068081
14S5A01400	Integrated Circuit	U14,U31,U9	0.051235	3.00	0.153705
14S4048501	Integrated Circuit	U13	0.051235	1.00	0.051235
14S4048501	Integrated Circuit	U15	0.064322	1.00	0.064322
14S4813905	Integrated Circuit	U19	0.054285	1.00	0.054285

**Standard Reliability Prediction Report**

**Part Number**  
**Reference Des**

**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 23.00



**Description**

**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 8.762892  
**MTBF** 114,118

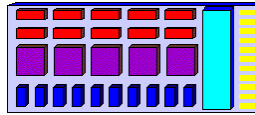
Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1540727080	Resistor	RN27,RN35	0.005697	2.00	0.011393
1540775080	Resistor	RN37	0.005697	1.00	0.005697
15407103A0	Resistor	RP2	0.007121	1.00	0.007121
105A703303	Resistor	R119-123,R129,R-161,R204,R7,R84-,R94-95	0.002180	12.00	0.026160
105A501033	Resistor	R116-117,R127,R-147-149,R153-156-,R164,R262,R27--29,R302,R31,R31-4,R32-33,R51-52,-R54,R71,R75-77	0.002180	27.00	0.058859
105A500133	Resistor	R133,R136,R205-,R235,R55,R78,R-89,R96	0.002180	8.00	0.017440
105A560423	Resistor	R69	0.002180	1.00	0.002180
105A501633	Resistor	R73	0.002180	1.00	0.002180
105A700233	Resistor	R277,R82	0.002180	1.00	0.002180
105A747033	Resistor	R102-103,R90-91	0.002180	4.00	0.008720
14S6863300	Integrated Circuit	UB1	0.173732	1.00	0.173732
14S6335601	Integrated Circuit	U24	0.030354	1.00	0.030354
14S3924802	Integrated Circuit	U17	0.034909	1.00	0.034909
1654262300	Connection	CN21	0.063506	1.00	0.063506
14S824A302	Integrated Circuit	U16	0.061091	1.00	0.061091
1653925216	Connection	CN7	0.025607	1.00	0.025607
1311390610	Semiconductor	Q3	0.022538	1.00	0.022538
105A510033	Resistor	R1,R20,R24,R6	0.002180	4.00	0.008720
105A516513	Resistor	R10,R14,R2,R4	0.002180	4.00	0.008720
105A510133	Resistor	R22,R26,R3,R9	0.002180	4.00	0.008720
105A705623	Resistor	R5	0.002180	1.00	0.002180
105A501033	Resistor	R13,R18-19,R7	0.002180	4.00	0.008720
105A702263	Resistor	R16,R8	0.002180	2.00	0.004360
105A512103	Resistor	R11,R12	0.002180	2.00	0.004360
105A564903	Resistor	R15	0.002180	1.00	0.002180
105A701003	Resistor	R17,R23,R29	0.002180	3.00	0.006540
105A514723	Resistor	R21	0.002180	1.00	0.002180
105A700003	Resistor	R25,R28	0.002180	2.00	0.004360
14S2039300	Integrated Circuit	U1	0.039698	1.00	0.039698
14S2303700	Integrated Circuit	U2	0.051235	1.00	0.051235
14S3115000	Integrated Circuit	U3	0.051235	1.00	0.051235
14S2525000	Integrated Circuit	U4	0.051235	1.00	0.051235
1129710050	Capacitor	C300,C301	0.010395	2.00	0.020790
1124582280	Capacitor	C2	0.001046	1.00	0.001046
1122701680	Capacitor	C10,C3,C6,C8-9	0.001577	5.00	0.007883
1129701080	Capacitor	C12,C7	0.002687	2.00	0.005373
1189615181	Capacitor	C11	0.004742	1.00	0.004742
1189622181	Capacitor	C14	0.076897	1.00	0.076897
1301005443	Semiconductor	D1-2	0.022538	2.00	0.045077
1314043210	Integrated Circuit	D3	0.051235	1.00	0.051235
1300003240	Semiconductor	D4	0.022538	1.00	0.022538
1653027100	Connection	J1-Bottom,J1-Top	0.013828	2.00	0.027656
1211103362	Inductor	L1	0.094890	1.00	0.094890



## Standard Reliability Prediction Report

Part Number  
Reference Des

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Environment GF, GU - Ground Fixed,  
Temperature 23.00



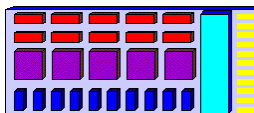
## Description

File Name AEC-6820-A2.RPJ  
Time 1:37 下午  
Failure Rate 8.762892  
MTBF 114,118

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1211102260	Inductor	L2	0.082839	1.00	0.082839
1315441011	Semiconductor	Q1	0.075128	1.00	0.075128
1315700212	Semiconductor	Q5,Q8	0.075128	2.00	0.150255
1653005201	Connection	CN6,CN8	0.005121	2.00	0.010243
1653003101	Connection	J6	0.001536	1.00	0.001536
14S6863300	Integrated Circuit	UB2	0.125937	1.00	0.125937
14S6863300	Integrated Circuit	UB3	0.125937	1.00	0.125937
14S6863300	Integrated Circuit	UB4	0.125937	1.00	0.125937
1189647080	Capacitor	C16	0.005401	1.00	0.005401
1189647080	Capacitor	C2	0.004742	1.00	0.004742
14S4021300	Integrated Circuit	U11	0.095210	1.00	0.095210
1315441011	Semiconductor	Q4	0.075128	1.00	0.075128
1315441011	Semiconductor	Q6	0.075128	1.00	0.075128
1315441011	Semiconductor	Q7	0.075128	1.00	0.075128
1315700212	Semiconductor	Q2	0.075128	1.00	0.075128
1189615181	Capacitor	C13	0.004742	1.00	0.004742
1189615181	Capacitor	C15	0.004742	1.00	0.004742
1059700001	Resistor	L44	0.002180	1.00	0.002180
1121701050	Capacitor	C1	0.002506	1.00	0.002506
1124433080	Capacitor	R128	0.001046	1.00	0.001046
121230603H	Inductor	FB17	0.002180	1.00	0.002180
14S4071201	Integrated Circuit	U30	0.041911	1.00	0.041911
14S4580001	Integrated Circuit	U1	0.060075	1.00	0.060075
14S6208103	Integrated Circuit	U36	0.050128	1.00	0.050128
14S824A303	Integrated Circuit	U22	0.056158	1.00	0.056158
1540710080	Resistor	RN11,RN13,RN19- ,RN21,RN9	0.005697	5.00	0.028483
1653002101	Connection	JP6	0.025607	1.00	0.025607
1655303020	Connection	CN22	0.038411	1.00	0.038411
16540F0201	Connection	CN16	0.076822	1.00	0.076822
1656304022	Connection	CN17	0.051215	1.00	0.051215
1653022201	Connection	CN5	0.563363	1.00	0.563363

### Standard Reliability Prediction Report

**Part Number**  
**Reference Des**  
**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 25.00

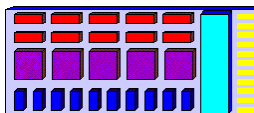


**Description** I/O Board  
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 3.926494  
**MTBF** 254,680

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1653004302	Connection	JP2/JP3	0.170691	1.00	0.170691
1654808300	Connection	USB1,SUB2	0.113794	2.00	0.227588
1601123600	Connection	SW1	0.056897	1.00	0.056897
1654409103	Connection	COM1	0.128018	1.00	0.128018
1654425306	Connection	CN2	0.355607	1.00	0.355607
1654609301	Connection	CN1	0.128018	1.00	0.128018
1653022205	Connection	CN8	0.625867	1.00	0.625867
1653003201	Connection	JP1	0.085346	1.00	0.085346
1653003220	Connection	JP4-JP6	0.085346	3.00	0.256037
1653005221	Connection	CN3-CN5,CN7	0.142243	4.00	0.568970
1653007221	Connection	CN10	0.199140	1.00	0.199140
1653013221	Connection	CN6	0.369831	1.00	0.369831
1653022222	Connection	CN9	0.625867	1.00	0.625867
1304100053	Semiconductor	LED1	0.004877	1.00	0.004877
1304100052	Semiconductor	LED2	0.004877	1.00	0.004877

### Standard Reliability Prediction Report

**Part Number**  
**Reference Des**  
**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 25.00

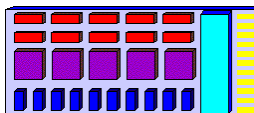


**Description**  
**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 0.118863  
**MTBF** 8,413,040

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1212308056	Inductor	L1-L9,L10-L42	0.002268	42.00	0.095244
1174547180	Capacitor	NC1,NC3-NC8	0.001060	7.00	0.007422
105A533003	Resistor	R1,R2	0.002268	2.00	0.004535
1124547180	Capacitor	C1,C10,C11,C2-C9	0.001060	11.00	0.011662

### Standard Reliability Prediction Report

**Part Number**  
**Reference Des**  
**Date**            一月 20, 2005  
**Environment**    GF, GU - Ground Fixed,  
**Temperature**    25.00



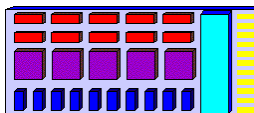
**Description**    ASS'Y Power Board  
**File Name**        AEC-6820-A2.RPJ  
**Time**                1:37 下午  
**Failure Rate**    0.577014  
**MTBF**                1,733,060

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
1181618110	Capacitor	CE1,CE3	0.002357	2.00	0.004714
1114610230	Capacitor	CE2	0.027232	1.00	0.027232
1655204021	Connection	JP1	0.056897	1.00	0.056897
1211100300	Inductor	L1	0.002268	1.00	0.002268
1652002100	Connection	POWER_IN	0.028449	1.00	0.028449
1655103010	Connection	SW1	0.042673	1.00	0.042673

### Standard Reliability Prediction Report

**Part Number**  
**Reference Des**

**Date** 一月 20, 2005  
**Environment** GF, GU - Ground Fixed,  
**Temperature** 25.00



**Description**

**File Name** AEC-6820-A2.RPJ  
**Time** 1:37 下午  
**Failure Rate** 0.414782  
**MTBF** 2,410,904

Part Number	Category	Ref Des	Failure Rate, Unit	Quantity	Failure Rate
105A512713	Resistor	R7	0.002268	1.00	0.002268
1122722780	Capacitor	C2	0.001598	1.00	0.001598
1124510180	Capacitor	C5	0.001060	1.00	0.001060
1124547180	Capacitor	C6	0.001060	1.00	0.001060
1124568280	Capacitor	C9	0.001060	1.00	0.001060
1121610060	Capacitor	C1	0.002539	1.00	0.002539
1301581941	Semiconductor	D1,D2	0.023881	2.00	0.047762
1315301110	Semiconductor	Q1	0.159207	1.00	0.159207
105A510033	Resistor	R4	0.002268	1.00	0.002268
105A501133	Resistor	R1	0.002268	1.00	0.002268
105A503333	Resistor	R2	0.002268	1.00	0.002268
105A502033	Resistor	R5	0.002268	1.00	0.002268
105A703953	Resistor	R8	0.013606	1.00	0.013606
105A506823	Resistor	R6	0.002268	1.00	0.002268
105A700103	Resistor	R9	0.002268	1.00	0.002268
1315177810	Semiconductor	U1	0.079603	1.00	0.079603
1124701680	Capacitor	C10-C14,C3,C4,C-7,C8	0.001060	9.00	0.009542
105A701053	Resistor	R3	0.002268	1.00	0.002268
1315567011	Semiconductor	Q2	0.079603	1.00	0.079603