



MTBF PREDICTION REPORT

PA Department

DFI



MTBF PREDICTION REPORT

Model: ALF51-BN-23E40

Revision: AA0

Completed Date	2019/03/15
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1. Purpose:

This MTBF prediction report presents the product reliability by the Relex reliability analysis tools, which is developed by Relex Software Corporation. When performing a reliability prediction analysis, there are several calculated values that provide measures of reliability. These values include failure rate, MTBF, reliability and availability. This report should provide the reliable and worth result for MTBF and failure rate reference.

2. Prediction Models:

For motherboard product, this report is based on Telcordia (formerly Bellcore). The Telcordia reliability prediction model was originally developed by AT&T Bell Labs. Bell Labs modified the equations from MIL-HDBK-217 to better represent what their equipment was experiencing in the field.

3. Definition:

- Failure Rate: Failure rate is defined as the rate of occurrence of failure. It is basically the anticipated number of times that an item fails in a specified period of time.
- MTBF: MTBF stands for Mean Time between Failures. MTBF is the inverse of the failure rate for constant failure rate systems. MTBF can be described as the number of hours to pass before for a component, assembly, or system.
- Description: A description of the item on the Relex file.
- Environment: It is based on those outlined in the Telcordia (Bellcore) standards.
- Temperature: Present the operation temperature (in degrees Celsius) to meet the requirement.

4. MTBF Result and Relax Software Report:

Temperature (Celsius)	MTBF (hours)
25	868962
45	638889
60	465382

File Name: ALF51-BN-23E40.rfp
System: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 868962
Failure Rate: 1,150.80
Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Assembly Name	Part Number	Quantity	Failure Rate (Fit)	MTBF (Hrs)
ALF51-BN-23E40	774-ALF511-000G	1	1150.80	868,962

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 868962
Failure Rate: 1,150.7984
Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
113-500008-210G	IC TTL,Single 2-Input Positive-AND Gate,SN74LVC1G08DCKR/SC70-5(TI)RoHS	1.9772	5	12.0774
113-833306-400G	IC TTL,Dual FET Bus Switch,SN74CB3Q3306ADCUR/VSSOP8(US8-DCU)(TI)RoHS	1.9772	2	5.3538
113-906408-400G	IC LOW-VOLTAGE 8-BIT I2C AND SMBus I/O EXPANDER,UQFN16, TCA6408ARSVR(TI)RoHS	1.9772	1	2.9741
121-000104-420G	IC 4-BIT BIDIRECTIONAL VOLTAGE-LEVEL TRANSLATOR,NTS0104GU12/XQFN12(NXP) RoHS	1.9772	6	14.2597
121-009406-200G	IC DUAL BIDIRECTIONAL I ² C-bus and SMBus TRANSLATOR,TCA9406DCUR/micro SO8(TI)RoHS	1.9772	2	5.3538
121-081439-400G	IC RS232/RS422/RS485 Multiprotocol Transceivers,F81439N/TQFN40(FINTEK)RoHS	1.9772	1	2.9741
121-229130-400G	IC Power Switch,TPS22913CYZV/DSBGA-4(TI)RoHS	1.9474	2	6.5047
123-100341-200G	IC OP Amplifier,LMV341IDCK/SC70-6(TI)RoHS	1.9772	1	2.9741
131-568192-100G	LPDDR4-3200 SDRAM 8Gb (256M*32),MT53B256M32D1NP-062WT:C/WFBGA-200(MICRON)RoHS	4.4178	2	12.2615
135-301004-201G	EEPROM 8K(1024*8)M24C08-WMN6TP/SO-8(ST) RoHS	4.4178	1	6.8575
135-301282-210G	SPI SERIAL FLASH 128Mbit,W25Q128FWSIQ/SOIC-8 (WINBOND)RoHS	4.4178	1	6.8575
136-115090-400G	Flash 8-Bit Microcontroller PIC16F1509-I/ML/QFN-20 (MICROCHIP)RoHS	4.4178	1	6.8575
141-006850-401G	IC Synchronous Buck Converter,4.5-26Vin,12A,NB685AGQ/QFN16(MPS)RoHS	1.9772	1	2.9741
141-021880-400G	IC Synchronous Step-down Converter,MP2188GQA/QFN-16(MPS)RoHS	1.9772	1	2.9741
141-029390-403G	IC Controller,Multi-Rail PWM for Intel IMVP8,MP2939GQK-Z/QFN-48,D/C after 1650(MPS) RoHS	1.9772	1	2.9741
141-562150-400G	IC Synchronous Step-down Converter,TPS56C215RNN/VQFN-18(TI)RoHS	1.9772	2	5.3538
147-002110-200G	IC CHIP,Giga LAN CTRL,WGI211AT SLJXZ/QFN-64 (INTEL)RoHS	1.9772	2	5.3538
147-818030-200G	IC CHIP,-40~85°C,F81803U-I/TQFP-64(FINTEK) RoHS	1.9772	1	2.9741
148-100032-402G	eMMC 5.1,32G,-25°C~+85°C,SMD,EMMC32G-M525-A53/FBGA-153(KINGSTON)RoHS	4.4178	1	6.8575
171-205200-210S	DIODE SCHOTTKY BARRIER 30V,200mA,IR=1uA@VR=10V,SCS520S-T2G-WG/SOD-523(WILLAS)	0.2189	6	1.8094
171-214148-503S	DIODE Switching,SMD,1N4148W-TG-WS/SOD-123 (WILLAS)	0.2189	1	0.4229
171-230502-200G	DIODE ESD Protection,VRWM=5.0V,IRM=100nA,VESD=10KV,SM T,SOT883,PESD5V0U2BM(NXP)RoHS	0.2189	1	0.4229
171-364212-200G	DIODE TVS VRWM:-12V~12V,AZ4212-01G.R7G/SOD -123(AMAZING)RoHS	0.2189	1	0.4229

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Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
171-404010-200S	DIODE 4-CHANNEL ESD PROTECTION,TPD4S010DQAR/SON-DQA10(TI)	1.9772	5	12.0774
171-450150-200G	DIODE Zener,15V,UDZS 15B/SOD323(ROHM)RoHS	0.2189	1	0.4229
172-223904-400G	TRANSISTOR Dual NPN,MBT3904DW1T1G/SOT-363 (ON)RoHS	1.1741	2	3.6275
172-223906-207S	TRANSISTOR PNP,PMBS3906/SOT23(NXP)	1.1741	1	2.0814
172-300612-200G	MOSFET Dual N-Ch,VDS:30V,VGS:±20V,ID:100mA,@4V,RDS:8Ω,EM 6K1GT2R/SOT-563(ROHM)RoHS	7.2970	7	60.0237
172-304435-200G	MOSFET P-Ch,VDS:-30V,ID:-11A,VGS:±25V,@-4.5V,RDS:36mΩ,AP4435GYT-HF/PMPAK3x3(APEC) HF	7.2970	2	19.4351
172-304438-200G	MOSFET N-Ch,VDS:30V,ID:13.7A,VGS:±20V,@-4.5V,RDS:18mΩ,AP4438GYT-HF/PMPAK3x3(APEC) HF	7.2970	1	10.7463
172-886901-200G	DrMOS Power Stage MP86901-AGQT-Z/TQFN13 (MPS)RoHS	7.2970	1	10.7463
172-886901-210G	DrMOS Power Stage MP86901-CGLT-Z/TQFN21 (MPS)RoHS	7.2970	1	10.7463
174-210110-330G	LED Brilliant Green SMD0603,H=0.4mm,19-217/GHC -YR1S2/3T(EVERLIGHT)RoHS	0.0677	1	0.1329
213-151505-200C	MLCC 15pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	2	0.1987
213-151805-200C	MLCC 18pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	2	0.1987
213-152215-200C	MLCC 221P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	5	0.4816
213-152705-200C	MLCC 27pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	4	0.3877
213-152715-200C	MLCC 271P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	1	0.1028
213-153319-200C	MLCC 331P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.0911	10	0.9479
213-155605-200C	MLCC 56pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	1	0.1028
213-156805-200C	MLCC 68pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	2	0.1987
213-158205-200C	MLCC 82pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	1	0.1028
213-251028-200C	MLCC 102P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.0911	2	0.1987
213-251029-110C	MLCC 102P/25V,X7R,K(10%)SMD,0201(None JP) RoHS	0.0911	2	0.1987
213-251038-250C	MLCC 103P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.0911	3	0.2935
213-251048-230J	MLCC 104P/50V,X7R,K(10%),SMD,0402,(JP)RoHS	0.0911	1	0.1028
213-251049-130J	MLCC 104P/10V,X5R,K(10%),SMD,0201,(JP)RoHS	0.0911	85	7.8506
213-251049-200J	MLCC 104P/16V,X7R,K(10%),SMD,0402,(JP)RoHS	0.0911	30	2.7968

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Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
213-251059-109G	MLCC 105P/6.3V,X5R,K (10%),SMD,0201,CC0201KRX5R5BB105(YAGEO) RoHS	0.0911	15	1.4116
213-251059-220J	MLCC 105P/10V,X5R,K(10%),SMD,0402,(JP)RoHS	0.0911	14	1.3190
213-251059-230J	MLCC 105P/16V,X5R,K(10%),SMD,0402,(JP)RoHS	0.0911	38	3.5335
213-251068-200J	MLCC 106P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.0911	19	1.7817
213-251068-300J	MLCC 106P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.0911	6	0.5752
213-251069-320J	MLCC 106P/10V,X5R,K(10%),SMD,0603,(JP)RoHS	0.0911	8	0.7618
213-251069-540J	MLCC 106P/16V,X5R,K(10%),SMD,0805,(JP)RoHS	0.0911	11	1.0407
213-252249-330C	MLCC 224P/25V,X7R,K(10%),SMD,0603,(None JP) RoHS	0.0911	1	0.1028
213-252259-200J	MLCC 225P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.0911	9	0.8549
213-252268-310J	MLCC 226P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.0911	50	4.6372
213-252269-510J	MLCC 226P/6.3V,X5R,M(20%),SMD,0805,(JP)RoHS	0.0911	4	0.3877
213-253939-240J	MLCC 393P/25V,X7R,K(10%),SMD,0402,(JP)RoHS	0.0911	2	0.1987
213-254715-200C	MLCC 471P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.0911	7	0.6685
213-254739-210C	MLCC 473P/16V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.0911	2	0.1987
213-254758-210J	MLCC 475P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.0911	5	0.4816
213-254759-320C	MLCC 475P/10V,X5R,K(10%),SMD,0603,(None JP) RoHS	0.0911	2	0.1987
213-254759-510J	MLCC 475P/25V,X5R,K(10%),SMD,0805,(JP)RoHS	0.0911	2	0.1987
217-301078-325G	POLYMER(TAN) CAP 100uF/6.3V,40mΩ,1.8A,SMD,B3528,105°C/2000H,M (20%),T520B107M006ATE040(KEMET)RoHS	0.7181	2	1.7589
217-302278-326G	POLYMER(TAN)CAP 220uF/6.3V,45mΩ,1700mA,105°C/2000H,M (20%),B3528(1.9),T520B227M006ATE045(KEMET) RoHS	0.7181	3	2.5481
223-010220-810G	CHOKE 1uH,M (20%),RDC ≤ 59mΩ,Irms ≤ 2.7A,Isat ≤ 2.7A,SMD, (2.5*2.0*1.2),CSCA2520D-1R0M-LRH(PDC)RoHS	0.0831	2	0.1942
223-015122-600G	CHOKE 0.15uH,M (20%),RDC ≤ 0.66mΩ,Idc ≤ 36A,Isat=45A,SMD, (7.6*6.6*3.8),PCME064T-R15MS0R667(CYNTEC) RoHS	0.0831	1	0.1030
223-015222-620G	CHOKE 1.5uH,M (20%),RDC ≤ 14mΩ,Idc=9A,Isat=18A,SMD, (7.3x6.6x3),PCMC063T-1R5MN(CYNTEC)RoHS	0.0831	1	0.1030
223-036121-700G	CHOKE 0.36uH,M (20%),DCR ≤ 12mΩ,Irms:9A,Isat:11A,SMD (4.5*4*1.8),GSTD4020PJ-R36M(GOTREND)RoHS	0.0831	1	0.1030
223-047121-900G	CHOKE 0.47uH,M (20%),Rdc < 8.5mΩ,Idc=13A,Isat=12A,SMD, (4.85x4.7x2.8),PCMB053T-R47MS(CYNTEC)RoHS	0.0831	1	0.1030
223-068121-900G	CHOKE 0.68uH,M (20%),RDC ≤ 9.2mΩ,Idc=10A,Isat=15A,SMD (4.85x4.7x2.8),CMMB053T-R68MS(CYNTEC)RoHS	0.0831	1	0.1030

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Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
223-410040-501S	COMMON CHOKE $Z \geq 90\Omega$,M (20%), $RDC \leq 0.35\Omega$, $I_{dc} \leq 330mA$,SMD, (2.05*1.25*1.2),CMM21T-900M-N(CHILISIN)	0.0831	1	0.1030
223-490090-500S	COMMON CHOKE 90Ω,60-100Ω,300mA (Max), $RDC \leq 300m\Omega$,HDMI/USB3.0 6GHZ,SMD0805 (2*1.2*1.2mm),GLECM2012B-900QT(GOTREND)	0.0831	4	0.3713
223-523000-410G	CM FILTER $C_d=0.25pF$, $R_s=3\Omega$,SMD (1.57*1.17*0.57),PCMF2USB3S/WLCSP10(NXP) RoHS	0.0831	2	0.1942
231-107168-200G	REGULATOR 0.8A,GS7168TD-R/TDFN8(GSTEK)HF	1.9474	1	3.7871
231-171330-200G	REGULATOR GS7133TD-R,3A,TDFN10(GSTEK)RoHS	1.9474	3	9.0302
241-219206-330G	X'TAL 19.2MHz,12pF,±30ppm,ESR:50Ω (Max),TOPR=-40°C~+105°C,SMD3225 (4PAD),7M19200021(TXC)RoHS	1.4698	1	2.4229
241-225006-340G	X'TAL 25MHz,18pF,±10ppm,TOPR=-40°C ~+85°C,SMD3225(4PAD),7M25090002(TXC)RoHS	1.4698	2	4.2797
241-432773-314G	X'TAL 32.768kHz,12.5pf,±20ppm,ESR:70KΩ (Max),TOPR=-40°C~+85°C,SMD3215 (2PAD),Q13FC1350000400(EPSON)RoHS	1.4698	1	2.4229
242-248006-200G	OSC 48Mhz,3.3V,15pf,25ppm,TOPR=-40°C ~+85°C,SMD2520(4PAD),FCO-236A 48.000MAC (FUJICOM)RoHS	1.1257	1	1.8325
251-160808-083S	BEAD CORE 160808 80Ω,300mA,25%,SMT0603,SBK160808T-800Y-N (CHILISIN)	0.4535	2	1.5088
251-160808-124S	BEAD CORE 160808 120Ω,2.5A,25%,SMT0603,PBY160808T-121Y-N (CHILISIN)	0.4535	1	0.8779
253-100115-501S	POLYSWITCH 1.1A,6V,SMT0805,0805L100 (LITTELFUSE)	0.4000	3	1.6363
253-100155-604S	POLYSWITCH 1.5A/8V,SMD1206 TYPE PTC,1206L150THWR(LITTELFUSE)	0.4000	1	0.6546
253-105000-610G	FUSE 5A/32V SMD3216(1206),0466005.NRHF (LITTELFUSE)RoHS	0.4000	1	0.6546
261-361515-200C	RES NET 150Ω 8P4R J(5%),0402*4,(None JP)RoHS	0.0605	2	0.1490
261-364725-200C	RES NET 4.7KΩ 8P4R J(5%),0402*4,(None JP)RoHS	0.0605	1	0.0805
263-180005-100C	RES 0Ω,J(5%),SMD,0201,(None JP)RoHS	0.0605	45	2.8512
263-180005-200C	RES 0Ω,J(5%),SMD,0402,(None JP)RoHS	0.0605	26	1.6711
263-180005-300C	RES 0Ω,J(5%),SMD,0603,(None JP)RoHS	0.0605	1	0.0805
263-180100-110C	RES 10Ω,F(1%),SMD,0201,(None JP)RoHS	0.0605	11	0.7295
263-180100-210C	RES 10Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	7	0.4746
263-180200-210C	RES 20Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-180220-110C	RES 22Ω,F(1%),SMD,0201,(None JP)RoHS	0.0605	8	0.5386
263-180220-210C	RES 22Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-180519-210C	RES 5.1Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-180680-210C	RES 68Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181000-110C	RES 100Ω,F(1%),SMD,0201,(None JP)RoHS	0.0605	2	0.1490
263-181000-210C	RES 100Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	7	0.4746

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263-181001-110C	RES 1KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	16	1.0451
263-181001-210C	RES 1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	7	0.4746
263-181001-310C	RES 1KΩ,F(1%),SMD,0603,(None JP)RoHS	0.0605	2	0.1490
263-181002-110C	RES 10KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	49	3.0988
263-181002-210C	RES 10KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	11	0.7295
263-181003-110C	RES 100KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	8	0.5386
263-181003-210C	RES 100KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181004-210C	RES 1MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181005-210C	RES 10MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181022-210C	RES 10.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181050-210C	RES 105Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181053-210C	RES 105KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181130-210C	RES 113Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181182-210C	RES 11.8KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181202-210C	RES 12KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181273-210C	RES 127KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181302-210C	RES 13KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181400-210C	RES 140Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181500-210C	RES 150Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	5	0.3464
263-181502-210C	RES 15KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	3	0.2157
263-181503-210C	RES 150KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181542-210C	RES 15.4KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181651-210C	RES 1.65KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181652-210C	RES 16.5KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181690-210C	RES 169Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181691-210C	RES 1.69KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-181803-210C	RES 180KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-181962-210C	RES 19.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-182000-110C	RES 200Ω,F(1%),SMD,0201,(None JP)RoHS	0.0605	3	0.2157
263-182001-210C	RES 2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-182002-110C	RES 20KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	4	0.2814
263-182002-210C	RES 20KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	3	0.2157
263-182003-210C	RES 200KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-182004-210C	RES 2MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-182200-210C	RES 220Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-182201-110C	RES 2.2KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	1	0.0805
263-182208-310C	RES 2.2Ω,F(1%),SMD,0603,(None JP)RoHS	0.0605	1	0.0805
263-182400-110C	RES 240Ω,F(1%),SMD,0201,(None JP)RoHS	0.0605	4	0.2814
263-182491-210C	RES 2.49KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-182553-210C	RES 255KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-182872-210C	RES 28.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-183001-210C	RES 3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-183092-210C	RES 30.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-183161-210C	RES 3.16KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-183162-210C	RES 31.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-183300-210C	RES 330Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	4	0.2814

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 868962
Failure Rate: 1,150.7984
Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
263-183301-110C	RES 3.3KΩ,F(1%),SMD,0201(None JP)RoHS	0.0605	12	0.7928
263-183301-210C	RES 3.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	5	0.3464
263-183302-110C	RES 33KΩ,F(1%),SMD,0201(None JP)RoHS	0.0605	4	0.2814
263-183303-210C	RES 330KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-183305-100C	RES 33Ω,J(5%),SMD,0201(None JP)RoHS	0.0605	18	1.1707
263-183901-210C	RES 3.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184020-210C	RES 402Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	3	0.2157
263-184122-210C	RES 41.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184532-210C	RES 45.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184701-110C	RES 4.7KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	41	2.6034
263-184701-210C	RES 4.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	3	0.2157
263-184702-110C	RES 47KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	8	0.5386
263-184750-210C	RES 475Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184872-210C	RES 48.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184990-210C	RES 499Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-184991-210C	RES 4.99KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-184992-210C	RES 49.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-185102-210C	RES 51KΩ,F(1%),SMD,0402(None JP)RoHS	0.0605	2	0.1490
263-185103-210C	RES 510KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185110-210C	RES 511Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185112-210C	RES 51.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185230-210C	RES 523Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185600-210C	RES 560Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185602-210C	RES 56KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-185621-210C	RES 5.62KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-186040-210C	RES 604Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-186049-210C	RES 60.4Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-186801-110C	RES 6.8KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0605	1	0.0805
263-187502-210C	RES 75KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-187870-210C	RES 787Ω,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-188062-210C	RES 80.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-188201-210C	RES 8.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-188459-210C	RES 84.5Ω,F(1%),SMD,0402 (None JP)RoHS	0.0605	1	0.0805
263-189312-210C	RES 93.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	1	0.0805
263-189531-210C	RES 9.53KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
263-189762-210C	RES 97.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0605	2	0.1490
273-100402-301S	THERM RES 10KΩ,J(5%),SMD,0603, (B25/85=3435,3%),TSM1A103J34D3RZ(TKS)	0.9957	2	3.3397
314-ALF511-119G	PCB ALF51 R.A(a01) (12L HDI 140x104x1.6mm / 2) OSP(CIRCUITECH)RoHS	2.4655	1	4.6984
342-112003-211G	MINI DISPLAYPORT,20pin,F,0.6mm,R/A,30u",WMDR -20FEL1PH5(WIN WIN)RoHS	2.0862	1	3.6121
342-310022-110G	Screw CONN. Terminal Block,Green,2Pos,300V,16A,PIT:5.0mm,MB612- 50002(DECA) RoHS	2.0862	1	3.6121

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Assembly: 774-ALF511-000G
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Calculation Model: Telcordia Issue 4



MTBF (hrs): 868962
Failure Rate: 1,150.7984
Temperature: 25
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
343-501402-200G	Giga LAN CONN RJ45,SMT,GF,W/Transformer,W/LED,MRJG-11S88RS (MATRIX),RoHS	2.0862	2	6.3217
343-503600-100S	USB 3.0*2 ,A Type,30u,UEA1112C-8FS6-4F (FOXCONN)	2.0862	1	3.6121
346-120310-201G	PIN PLUG 2*3, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180806P(V-STAR)RoHS	14.6036	1	25.2847
346-120511-201G	PIN PLUG 2*5, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180810P(V-STAR)RoHS	14.6036	1	25.2847
346-221910-201G	PIN PLUG 2*19P/1.27mm, M, 90D, BLACK, SMT, H13473-219D-R131A(V-STAR)RoHS	14.6036	1	25.2847
346-510223-102G	WAFER 1*2,2.0mm,M,H=6.1mm,180D,DIP,WHITE,721-81- 02TW00(PINREX)RoHS	14.6036	1	25.2847
348-220800-200S	SOCKET SPI 8Pin,GF,H=5.65mm,180D,SMT,ACA-SPI -004-K01(LOTES)	1.1379	1	1.8544
348-660522-200S	MINI PCI-EXPRESS 1*52,0.8mm,10u",F,H=9.9mm,90D,SMT,IVORY,GEN RAL TYPE,AS0B226-S99Q-7H(FOXCONN)HF	1.1379	1	1.8544
622-010140-000G	BATTERY CR2032 3V 220mAh W/CABLE (L=150mm&TAPE),BIN-CR2032-I-CT-SL-PV-01(RE- ENERGY)RoHS Belong to UN3090	25.0000	1	34.9638
292-301000-500S	BUZZER 3V,100mA,12Ω,4Khz,85db,SMD (5*4.2mm),SMT-G5030A(KEPO)	600.0000	1	600.0000
143-10160H-401G	CPU Intel Atom x5-E3940 1.6GHz C/2M,D0,LH8066803102401 SR33M/FCBGA-1296 (INTEL)RoHS	159.0000	1	159.0000

File Name: ALF51-BN-23E40.rfp
System: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.22
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Assembly Name	Part Number	Quantity	Failure Rate (Fit)	MTBF (Hrs)
ALF51-BN-23E40	774-ALF511-000G	1	1565.22	638,889

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Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
113-500008-210G	IC TTL,Single 2-Input Positive-AND Gate,SN74LVC1G08DCKR/SC70-5(TI)RoHS	4.6582	5	28.4535
113-833306-400G	IC TTL,Dual FET Bus Switch,SN74CB3Q3306ADCUR/VSSOP8(US8-DCU)(TI)RoHS	4.6582	2	12.6132
113-906408-400G	IC LOW-VOLTAGE 8-BIT I2C AND SMBus I/O EXPANDER,UQFN16, TCA6408ARSVR(TI)RoHS	4.6582	1	7.0069
121-000104-420G	IC 4-BIT BIDIRECTIONAL VOLTAGE-LEVEL TRANSLATOR,NTS0104GU12/XQFN12(NXP) RoHS	4.6582	6	33.5948
121-009406-200G	IC DUAL BIDIRECTIONAL I ² C-bus and SMBus TRANSLATOR,TCA9406DCUR/micro SO8(TI)RoHS	4.6582	2	12.6132
121-081439-400G	IC RS232/RS422/RS485 Multiprotocol Transceivers,F81439N/TQFN40(FINTEK)RoHS	4.6582	1	7.0069
121-229130-400G	IC Power Switch,TPS22913CYZV/DSBGA-4(TI)RoHS	7.6721	2	25.6262
123-100341-200G	IC OP Amplifier,LMV341IDCK/SC70-6(TI)RoHS	4.6582	1	7.0069
131-568192-100G	LPDDR4-3200 SDRAM 8Gb (256M*32),MT53B256M32D1NP-062WT:C/WFBGA-200(MICRON)RoHS	10.4080	2	28.8873
135-301004-201G	EEPROM 8K(1024*8)M24C08-WMN6TP/SO-8(ST) RoHS	10.4080	1	16.1558
135-301282-210G	SPI SERIAL FLASH 128Mbit,W25Q128FWSIQ/SOIC-8 (WINBOND)RoHS	10.4080	1	16.1558
136-115090-400G	Flash 8-Bit Microcontroller PIC16F1509-I/ML/QFN-20 (MICROCHIP)RoHS	10.4080	1	16.1558
141-006850-401G	IC Synchronous Buck Converter,4.5-26Vin,12A,NB685AGQ/QFN16(MPS)RoHS	4.6582	1	7.0069
141-021880-400G	IC Synchronous Step-down Converter,MP2188GQA/QFN-16(MPS)RoHS	4.6582	1	7.0069
141-029390-403G	IC Controller,Multi-Rail PWM for Intel IMVP8,MP2939GQK-Z/QFN-48,D/C after 1650(MPS) RoHS	4.6582	1	7.0069
141-562150-400G	IC Synchronous Step-down Converter,TPS56C215RNN/VQFN-18(TI)RoHS	4.6582	2	12.6132
147-002110-200G	IC CHIP,Giga LAN CTRL,WGI211AT SLJXZ/QFN-64 (INTEL)RoHS	4.6582	2	12.6132
147-818030-200G	IC CHIP,-40~85°C,F81803U-I/TQFP-64(FINTEK) RoHS	4.6582	1	7.0069
148-100032-402G	eMMC 5.1,32G,-25°C~+85°C,SMD,EMMC32G-M525-A53/FBGA-153(KINGSTON)RoHS	10.4080	1	16.1558
171-205200-210S	DIODE SCHOTTKY BARRIER 30V,200mA,IR=1uA@VR=10V,SCS520S-T2G-WG/SOD-523(WILLAS)	0.3751	6	3.1007
171-214148-503S	DIODE Switching,SMD,1N4148W-TG-WS/SOD-123 (WILLAS)	0.3751	1	0.7247
171-230502-200G	DIODE ESD Protection,VRWM=5.0V,IRM=100nA,VESD=10KV,SM T,SOT883,PESD5V0U2BM(NXP)RoHS	0.3751	1	0.7247
171-364212-200G	DIODE TVS VRWM:-12V~12V,AZ4212-01G.R7G/SOD-123(AMAZING)RoHS	0.3751	1	0.7247

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Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
171-404010-200S	DIODE 4-CHANNEL ESD PROTECTION,TPD4S010DQAR/SON-DQA10(TI)	4.6582	5	28.4535
171-450150-200G	DIODE Zener,15V,UDZS 15B/SOD323(ROHM)RoHS	0.3751	1	0.7247
172-223904-400G	TRANSISTOR Dual NPN,MBT3904DW1T1G/SOT-363 (ON)RoHS	2.0121	2	6.2164
172-223906-207S	TRANSISTOR PNP,PMBS3906/SOT23(NXP)	2.0121	1	3.5668
172-300612-200G	MOSFET Dual N-Ch,VDS:30V,VGS:±20V,ID:100mA,@4V,RDS:8Ω,EM 6K1GT2R/SOT-563(ROHM)RoHS	12.5047	7	102.8615
172-304435-200G	MOSFET P-Ch,VDS:-30V,ID:-11A,VGS:±25V,@-4.5V,RDS:36mΩ,AP4435GYT-HF/PMPAK3x3(APEC) HF	12.5047	2	33.3055
172-304438-200G	MOSFET N-Ch,VDS:30V,ID:13.7A,VGS:±20V,@-4.5V,RDS:18mΩ,AP4438GYT-HF/PMPAK3x3(APEC) HF	12.5047	1	18.4158
172-886901-200G	DrMOS Power Stage MP86901-AGQT-Z/TQFN13 (MPS)RoHS	12.5047	1	18.4158
172-886901-210G	DrMOS Power Stage MP86901-CGLT-Z/TQFN21 (MPS)RoHS	12.5047	1	18.4158
174-210110-330G	LED Brilliant Green SMD0603,H=0.4mm,19-217/GHC -YR1S2/3T(EVERLIGHT)RoHS	0.3759	1	0.7374
213-151505-200C	MLCC 15pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	2	0.2246
213-151805-200C	MLCC 18pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	2	0.2246
213-152215-200C	MLCC 221P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	5	0.5443
213-152705-200C	MLCC 27pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	4	0.4382
213-152715-200C	MLCC 271P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	1	0.1162
213-153319-200C	MLCC 331P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1030	10	1.0713
213-155605-200C	MLCC 56pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	1	0.1162
213-156805-200C	MLCC 68pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	2	0.2246
213-158205-200C	MLCC 82pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	1	0.1162
213-251028-200C	MLCC 102P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1030	2	0.2246
213-251029-110C	MLCC 102P/25V,X7R,K(10%)SMD,0201(None JP) RoHS	0.1030	2	0.2246
213-251038-250C	MLCC 103P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1030	3	0.3317
213-251048-230J	MLCC 104P/50V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1030	1	0.1162
213-251049-130J	MLCC 104P/10V,X5R,K(10%),SMD,0201,(JP)RoHS	0.1030	85	8.8730
213-251049-200J	MLCC 104P/16V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1030	30	3.1610

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Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
213-251059-109G	MLCC 105P/6.3V,X5R,K (10%),SMD,0201,CC0201KRX5R5BB105(YAGEO) RoHS	0.1030	15	1.5955
213-251059-220J	MLCC 105P/10V,X5R,K(10%),SMD,0402,(JP)RoHS	0.1030	14	1.4908
213-251059-230J	MLCC 105P/16V,X5R,K(10%),SMD,0402,(JP)RoHS	0.1030	38	3.9937
213-251068-200J	MLCC 106P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1030	19	2.0137
213-251068-300J	MLCC 106P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.1030	6	0.6501
213-251069-320J	MLCC 106P/10V,X5R,K(10%),SMD,0603,(JP)RoHS	0.1030	8	0.8610
213-251069-540J	MLCC 106P/16V,X5R,K(10%),SMD,0805,(JP)RoHS	0.1030	11	1.1763
213-252249-330C	MLCC 224P/25V,X7R,K(10%),SMD,0603,(None JP) RoHS	0.1030	1	0.1162
213-252259-200J	MLCC 225P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1030	9	0.9662
213-252268-310J	MLCC 226P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.1030	50	5.2411
213-252269-510J	MLCC 226P/6.3V,X5R,M(20%),SMD,0805,(JP)RoHS	0.1030	4	0.4382
213-253939-240J	MLCC 393P/25V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1030	2	0.2246
213-254715-200C	MLCC 471P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1030	7	0.7556
213-254739-210C	MLCC 473P/16V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1030	2	0.2246
213-254758-210J	MLCC 475P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1030	5	0.5443
213-254759-320C	MLCC 475P/10V,X5R,K(10%),SMD,0603,(None JP) RoHS	0.1030	2	0.2246
213-254759-510J	MLCC 475P/25V,X5R,K(10%),SMD,0805,(JP)RoHS	0.1030	2	0.2246
217-301078-325G	POLYMER(TAN) CAP 100uF/6.3V,40mΩ,1.8A,SMD,B3528,105°C/2000H,M (20%),T520B107M006ATE040(KEMET)RoHS	1.0368	2	2.5395
217-302278-326G	POLYMER(TAN)CAP 220uF/6.3V,45mΩ,1700mA,105°C/2000H,M (20%),B3528(1.9),T520B227M006ATE045(KEMET) RoHS	1.0368	3	3.6789
223-010220-810G	CHOKE 1uH,M (20%),RDC ≤ 59mΩ,Irms ≤ 2.7A,Isat ≤ 2.7A,SMD, (2.5*2.0*1.2),CSCA2520D-1R0M-LRH(PDC)RoHS	0.1200	2	0.2804
223-015122-600G	CHOKE 0.15uH,M (20%),RDC ≤ 0.66mΩ,Idc ≤ 36A,Isat=45A,SMD, (7.6*6.6*3.8),PCME064T-R15MS0R667(CYNTEC) RoHS	0.1200	1	0.1487
223-015222-620G	CHOKE 1.5uH,M (20%),RDC ≤ 14mΩ,Idc=9A,Isat=18A,SMD, (7.3x6.6x3),PCMC063T-1R5MN(CYNTEC)RoHS	0.1200	1	0.1487
223-036121-700G	CHOKE 0.36uH,M (20%),DCR ≤ 12mΩ,Irms:9A,Isat:11A,SMD (4.5*4*1.8),GSTD4020PJ-R36M(GOTREND)RoHS	0.1200	1	0.1487
223-047121-900G	CHOKE 0.47uH,M (20%),Rdc < 8.5mΩ,Idc=13A,Isat=12A,SMD, (4.85x4.7x2.8),PCMB053T-R47MS(CYNTEC)RoHS	0.1200	1	0.1487
223-068121-900G	CHOKE 0.68uH,M (20%),RDC ≤ 9.2mΩ,Idc=10A,Isat=15A,SMD (4.85x4.7x2.8),CMMB053T-R68MS(CYNTEC)RoHS	0.1200	1	0.1487



File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4

MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
223-410040-501S	COMMON CHOKE $Z \geq 90\Omega$,M (20%), $RDC \leq 0.35\Omega$, $I_{dc} \leq 330mA$,SMD, (2.05*1.25*1.2),CMM21T-900M-N(CHILISIN)	0.1200	1	0.1487
223-490090-500S	COMMON CHOKE 90 Ω ,60-100 Ω ,300mA (Max), $RDC \leq 300m\Omega$,HDMI/USB3.0 6GHZ,SMD0805 (2*1.2*1.2mm),GLECM2012B-900QT(GOTREND)	0.1200	4	0.5361
223-523000-410G	CM FILTER $C_d=0.25pF$, $R_s=3\Omega$,SMD (1.57*1.17*0.57),PCMF2USB3S/WLCSP10(NXP) RoHS	0.1200	2	0.2804
231-107168-200G	REGULATOR 0.8A,GS7168TD-R/TDFN8(GSTEK)HF	7.6721	1	14.9200
231-171330-200G	REGULATOR GS7133TD-R,3A,TDFN10(GSTEK)RoHS	7.6721	3	35.5760
241-219206-330G	X'TAL 19.2MHz,12pF, $\pm 30ppm$,ESR:50 Ω (Max),TOPR=-40 $^{\circ}C \sim +105^{\circ}C$,SMD3225 (4PAD),7M19200021(TXC)RoHS	3.9138	1	6.4515
241-225006-340G	X'TAL 25MHz,18pF, $\pm 10ppm$,TOPR=-40 $^{\circ}C \sim +85^{\circ}C$,SMD3225(4PAD),7M25090002(TXC)RoHS	3.9138	2	11.3958
241-432773-314G	X'TAL 32.768kHz,12.5pf, $\pm 20ppm$,ESR:70K Ω (Max),TOPR=-40 $^{\circ}C \sim +85^{\circ}C$,SMD3215 (2PAD),Q13FC1350000400(EPSON)RoHS	3.9138	1	6.4515
242-248006-200G	OSC 48Mhz,3.3V,15pf,25ppm,TOPR=-40 $^{\circ}C \sim +85^{\circ}C$,SMD2520(4PAD),FCO-236A 48.000MAC (FUJICOM)RoHS	4.4349	1	7.2196
251-160808-083S	BEAD CORE 160808 80 Ω ,300mA,25%,SMT0603,SBK160808T-800Y-N (CHILISIN)	0.6548	2	2.1784
251-160808-124S	BEAD CORE 160808 120 Ω ,2.5A,25%,SMT0603,PBY160808T-121Y-N (CHILISIN)	0.6548	1	1.2675
253-100115-501S	POLYSWITCH 1.1A,6V,SMT0805,0805L100 (LITTELFUSE)	0.4000	3	1.6363
253-100155-604S	POLYSWITCH 1.5A/8V,SMD1206 TYPE PTC,1206L150THWR(LITTELFUSE)	0.4000	1	0.6546
253-105000-610G	FUSE 5A/32V SMD3216(1206),0466005.NRHF (LITTELFUSE)RoHS	0.4000	1	0.6546
261-361515-200C	RES NET 150 Ω 8P4R J(5%),0402*4,(None JP)RoHS	0.0873	2	0.2152
261-364725-200C	RES NET 4.7K Ω 8P4R J(5%),0402*4,(None JP)RoHS	0.0873	1	0.1162
263-180005-100C	RES 0 Ω ,J(5%),SMD,0201,(None JP)RoHS	0.0873	45	4.1165
263-180005-200C	RES 0 Ω ,J(5%),SMD,0402,(None JP)RoHS	0.0873	26	2.4126
263-180005-300C	RES 0 Ω ,J(5%),SMD,0603,(None JP)RoHS	0.0873	1	0.1162
263-180100-110C	RES 10 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.0873	11	1.0532
263-180100-210C	RES 10 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	7	0.6852
263-180200-210C	RES 20 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-180220-110C	RES 22 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.0873	8	0.7776
263-180220-210C	RES 22 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-180519-210C	RES 5.1 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-180680-210C	RES 68 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181000-110C	RES 100 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.0873	2	0.2152
263-181000-210C	RES 100 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.0873	7	0.6852

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
263-181001-110C	RES 1KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	16	1.5088
263-181001-210C	RES 1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	7	0.6852
263-181001-310C	RES 1KΩ,F(1%),SMD,0603,(None JP)RoHS	0.0873	2	0.2152
263-181002-110C	RES 10KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	49	4.4739
263-181002-210C	RES 10KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	11	1.0532
263-181003-110C	RES 100KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	8	0.7776
263-181003-210C	RES 100KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181004-210C	RES 1MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181005-210C	RES 10MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181022-210C	RES 10.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181050-210C	RES 105Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181053-210C	RES 105KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181130-210C	RES 113Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181182-210C	RES 11.8KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181202-210C	RES 12KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181273-210C	RES 127KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181302-210C	RES 13KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181400-210C	RES 140Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181500-210C	RES 150Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	5	0.5001
263-181502-210C	RES 15KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	3	0.3114
263-181503-210C	RES 150KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181542-210C	RES 15.4KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181651-210C	RES 1.65KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181652-210C	RES 16.5KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181690-210C	RES 169Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181691-210C	RES 1.69KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-181803-210C	RES 180KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-181962-210C	RES 19.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-182000-110C	RES 200Ω,F(1%),SMD,0201,(None JP)RoHS	0.0873	3	0.3114
263-182001-210C	RES 2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-182002-110C	RES 20KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	4	0.4062
263-182002-210C	RES 20KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	3	0.3114
263-182003-210C	RES 200KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-182004-210C	RES 2MΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-182200-210C	RES 220Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-182201-110C	RES 2.2KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	1	0.1162
263-182208-310C	RES 2.2Ω,F(1%),SMD,0603,(None JP)RoHS	0.0873	1	0.1162
263-182400-110C	RES 240Ω,F(1%),SMD,0201,(None JP)RoHS	0.0873	4	0.4062
263-182491-210C	RES 2.49KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-182553-210C	RES 255KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-182872-210C	RES 28.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-183001-210C	RES 3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-183092-210C	RES 30.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-183161-210C	RES 3.16KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-183162-210C	RES 31.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-183300-210C	RES 330Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	4	0.4062

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
263-183301-110C	RES 3.3KΩ,F(1%),SMD,0201(None JP)RoHS	0.0873	12	1.1446
263-183301-210C	RES 3.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	5	0.5001
263-183302-110C	RES 33KΩ,F(1%),SMD,0201(None JP)RoHS	0.0873	4	0.4062
263-183303-210C	RES 330KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-183305-100C	RES 33Ω,J(5%),SMD,0201(None JP)RoHS	0.0873	18	1.6902
263-183901-210C	RES 3.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184020-210C	RES 402Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	3	0.3114
263-184122-210C	RES 41.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184532-210C	RES 45.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184701-110C	RES 4.7KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	41	3.7587
263-184701-210C	RES 4.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	3	0.3114
263-184702-110C	RES 47KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	8	0.7776
263-184750-210C	RES 475Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184872-210C	RES 48.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184990-210C	RES 499Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-184991-210C	RES 4.99KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-184992-210C	RES 49.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-185102-210C	RES 51KΩ,F(1%),SMD,0402(None JP)RoHS	0.0873	2	0.2152
263-185103-210C	RES 510KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185110-210C	RES 511Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185112-210C	RES 51.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185230-210C	RES 523Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185600-210C	RES 560Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185602-210C	RES 56KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-185621-210C	RES 5.62KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-186040-210C	RES 604Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-186049-210C	RES 60.4Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-186801-110C	RES 6.8KΩ,F(1%),SMD,0201,(None JP)RoHS	0.0873	1	0.1162
263-187502-210C	RES 75KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-187870-210C	RES 787Ω,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-188062-210C	RES 80.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-188201-210C	RES 8.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-188459-210C	RES 84.5Ω,F(1%),SMD,0402 (None JP)RoHS	0.0873	1	0.1162
263-189312-210C	RES 93.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	1	0.1162
263-189531-210C	RES 9.53KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
263-189762-210C	RES 97.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.0873	2	0.2152
273-100402-301S	THERM RES 10KΩ,J(5%),SMD,0603, (B25/85=3435,3%),TSM1A103J34D3RZ(TKS)	2.6513	2	8.8927
314-ALF511-119G	PCB ALF51 R.A(a01) (12L HDI 140x104x1.6mm / 2) OSP(CIRCUITECH)RoHS	6.5651	1	12.5107
342-112003-211G	MINI DISPLAYPORT,20pin,F,0.6mm,R/A,30u",WMDR -20FEL1PH5(WIN WIN)RoHS	5.5551	1	9.6181
342-310022-110G	Screw CONN. Terminal Block,Green,2Pos,300V,16A,PIT:5.0mm,MB612- 50002(DECA) RoHS	5.5551	1	9.6181

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 638889
Failure Rate: 1,565.2179
Temperature: 45
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
343-501402-200G	Giga LAN CONN RJ45,SMT,GF,W/Transformer,W/LED,MRJG-11S88RS (MATRIX),RoHS	5.5551	2	16.8329
343-503600-100S	USB 3.0*2 ,A Type,30u,UEA1112C-8FS6-4F (FOXCONN)	5.5551	1	9.6181
346-120310-201G	PIN PLUG 2*3, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180806P(V-STAR)RoHS	38.8854	1	67.3264
346-120511-201G	PIN PLUG 2*5, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180810P(V-STAR)RoHS	38.8854	1	67.3264
346-221910-201G	PIN PLUG 2*19P/1.27mm, M, 90D, BLACK, SMT, H13473-219D-R131A(V-STAR)RoHS	38.8854	1	67.3264
346-510223-102G	WAFER 1*2,2.0mm,M,H=6.1mm,180D,DIP,WHITE,721-81- 02TW00(PINREX)RoHS	38.8854	1	67.3264
348-220800-200S	SOCKET SPI 8Pin,GF,H=5.65mm,180D,SMT,ACA-SPI -004-K01(LOTES)	3.0300	1	4.9378
348-660522-200S	MINI PCI-EXPRESS 1*52,0.8mm,10u",F,H=9.9mm,90D,SMT,IVORY,GEN RAL TYPE,AS0B226-S99Q-7H(FOXCONN)HF	3.0300	1	4.9378
622-010140-000G	BATTERY CR2032 3V 220mAh W/CABLE (L=150mm&TAPE),BIN-CR2032-I-CT-SL-PV-01(RE- ENERGY)RoHS Belong to UN3090	25.0000	1	34.9638
292-301000-500S	BUZZER 3V,100mA,12Ω,4Khz,85db,SMD (5*4.2mm),SMT-G5030A(KEPO)	600.0000	1	600.0000
143-10160H-401G	CPU Intel Atom x5-E3940 1.6GHz C/2M,D0,LH8066803102401 SR33M/FCBGA-1296 (INTEL)RoHS	159.0000	1	159.0000

**Reliability Prediction
Summary**

File Name: ALF51-BN-23E40.rfp
System: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 465382
Failure Rate: 2,148.77
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Assembly Name	Part Number	Quantity	Failure Rate (Fit)	MTBF (Hrs)
ALF51-BN-23E40	774-ALF511-000G	1	2148.77	465,382



File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4

MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
113-500008-210G	IC TTL,Single 2-Input Positive-AND Gate,SN74LVC1G08DCKR/SC70-5(TI)RoHS	8.2795	5	50.5731
113-833306-400G	IC TTL,Dual FET Bus Switch,SN74CB3Q3306ADCUR/VSSOP8(US8-DCU)(TI)RoHS	8.2795	2	22.4187
113-906408-400G	IC LOW-VOLTAGE 8-BIT I2C AND SMBus I/O EXPANDER,UQFN16, TCA6408ARSVR(TI)RoHS	8.2795	1	12.4540
121-000104-420G	IC 4-BIT BIDIRECTIONAL VOLTAGE-LEVEL TRANSLATOR,NTS0104GU12/XQFN12(NXP) RoHS	8.2795	6	59.7113
121-009406-200G	IC DUAL BIDIRECTIONAL I ² C-bus and SMBus TRANSLATOR,TCA9406DCUR/micro SO8(TI)RoHS	8.2795	2	22.4187
121-081439-400G	IC RS232/RS422/RS485 Multiprotocol Transceivers,F81439N/TQFN40(FINTEK)RoHS	8.2795	1	12.4540
121-229130-400G	IC Power Switch,TPS22913CYZV/DSBGA-4(TI)RoHS	19.2561	2	64.3188
123-100341-200G	IC OP Amplifier,LMV341IDCK/SC70-6(TI)RoHS	8.2795	1	12.4540
131-568192-100G	LPDDR4-3200 SDRAM 8Gb (256M*32),MT53B256M32D1NP-062WT:C/WFBGA-200(MICRON)RoHS	18.4992	2	51.3441
135-301004-201G	EEPROM 8K(1024*8)M24C08-WMN6TP/SO-8(ST) RoHS	18.4992	1	28.7152
135-301282-210G	SPI SERIAL FLASH 128Mbit,W25Q128FWSIQ/SOIC-8 (WINBOND)RoHS	18.4992	1	28.7152
136-115090-400G	Flash 8-Bit Microcontroller PIC16F1509-I/ML/QFN-20 (MICROCHIP)RoHS	18.4992	1	28.7152
141-006850-401G	IC Synchronous Buck Converter,4.5-26Vin,12A,NB685AGQ/QFN16(MPS)RoHS	8.2795	1	12.4540
141-021880-400G	IC Synchronous Step-down Converter,MP2188GQA/QFN-16(MPS)RoHS	8.2795	1	12.4540
141-029390-403G	IC Controller,Multi-Rail PWM for Intel IMVP8,MP2939GQK-Z/QFN-48,D/C after 1650(MPS) RoHS	8.2795	1	12.4540
141-562150-400G	IC Synchronous Step-down Converter,TPS56C215RNN/VQFN-18(TI)RoHS	8.2795	2	22.4187
147-002110-200G	IC CHIP,Giga LAN CTRL,WGI211AT SLJXZ/QFN-64 (INTEL)RoHS	8.2795	2	22.4187
147-818030-200G	IC CHIP,-40~85°C,F81803U-I/TQFP-64(FINTEK) RoHS	8.2795	1	12.4540
148-100032-402G	eMMC 5.1,32G,-25°C~+85°C,SMD,EMMC32G-M525-A53/FBGA-153(KINGSTON)RoHS	18.4992	1	28.7152
171-205200-210S	DIODE SCHOTTKY BARRIER 30V,200mA,IR=1uA@VR=10V,SCS520S-T2G-WG/SOD-523(WILLAS)	0.5385	6	4.4511
171-214148-503S	DIODE Switching,SMD,1N4148W-TG-WS/SOD-123 (WILLAS)	0.5385	1	1.0403
171-230502-200G	DIODE ESD Protection,VRWM=5.0V,IRM=100nA,VESD=10KV,SM T,SOT883,PESD5V0U2BM(NXP)RoHS	0.5385	1	1.0403
171-364212-200G	DIODE TVS VRWM:-12V~12V,AZ4212-01G.R7G/SOD-123(AMAZING)RoHS	0.5385	1	1.0403

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MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
171-404010-200S	DIODE 4-CHANNEL ESD PROTECTION,TPD4S010DQAR/SON-DQA10(TI)	8.2795	5	50.5731
171-450150-200G	DIODE Zener,15V,UDZS 15B/SOD323(ROHM)RoHS	0.5385	1	1.0403
172-223904-400G	TRANSISTOR Dual NPN,MBT3904DW1T1G/SOT-363 (ON)RoHS	2.8884	2	8.9237
172-223906-207S	TRANSISTOR PNP,PMBS3906/SOT23(NXP)	2.8884	1	5.1202
172-300612-200G	MOSFET Dual N-Ch,VDS:30V,VGS:±20V,ID:100mA,@4V,RDS:8Ω,EM 6K1GT2R/SOT-563(ROHM)RoHS	17.9506	7	147.6590
172-304435-200G	MOSFET P-Ch,VDS:-30V,ID:-11A,VGS:±25V,@-4.5V,RDS:36mΩ,AP4435GYT-HF/PMPAK3x3(APEC) HF	17.9506	2	47.8105
172-304438-200G	MOSFET N-Ch,VDS:30V,ID:13.7A,VGS:±20V,@-4.5V,RDS:18mΩ,AP4438GYT-HF/PMPAK3x3(APEC) HF	17.9506	1	26.4362
172-886901-200G	DrMOS Power Stage MP86901-AGQT-Z/TQFN13 (MPS)RoHS	17.9506	1	26.4362
172-886901-210G	DrMOS Power Stage MP86901-CGLT-Z/TQFN21 (MPS)RoHS	17.9506	1	26.4362
174-210110-330G	LED Brilliant Green SMD0603,H=0.4mm,19-217/GHC -YR1S2/3T(EVERLIGHT)RoHS	1.1876	1	2.3295
213-151505-200C	MLCC 15pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	2	0.2438
213-151805-200C	MLCC 18pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	2	0.2438
213-152215-200C	MLCC 221P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	5	0.5909
213-152705-200C	MLCC 27pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	4	0.4757
213-152715-200C	MLCC 271P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	1	0.1261
213-153319-200C	MLCC 331P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1118	10	1.1630
213-155605-200C	MLCC 56pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	1	0.1261
213-156805-200C	MLCC 68pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	2	0.2438
213-158205-200C	MLCC 82pF/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	1	0.1261
213-251028-200C	MLCC 102P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1118	2	0.2438
213-251029-110C	MLCC 102P/25V,X7R,K(10%)SMD,0201(None JP) RoHS	0.1118	2	0.2438
213-251038-250C	MLCC 103P/50V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1118	3	0.3601
213-251048-230J	MLCC 104P/50V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1118	1	0.1261
213-251049-130J	MLCC 104P/10V,X5R,K(10%),SMD,0201,(JP)RoHS	0.1118	85	9.6328
213-251049-200J	MLCC 104P/16V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1118	30	3.4317

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MTBF (hrs): 465382
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Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
213-251059-109G	MLCC 105P/6.3V,X5R,K (10%),SMD,0201,CC0201KRX5R5BB105(YAGEO) RoHS	0.1118	15	1.7321
213-251059-220J	MLCC 105P/10V,X5R,K(10%),SMD,0402,(JP)RoHS	0.1118	14	1.6184
213-251059-230J	MLCC 105P/16V,X5R,K(10%),SMD,0402,(JP)RoHS	0.1118	38	4.3357
213-251068-200J	MLCC 106P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1118	19	2.1861
213-251068-300J	MLCC 106P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.1118	6	0.7057
213-251069-320J	MLCC 106P/10V,X5R,K(10%),SMD,0603,(JP)RoHS	0.1118	8	0.9347
213-251069-540J	MLCC 106P/16V,X5R,K(10%),SMD,0805,(JP)RoHS	0.1118	11	1.2770
213-252249-330C	MLCC 224P/25V,X7R,K(10%),SMD,0603,(None JP) RoHS	0.1118	1	0.1261
213-252259-200J	MLCC 225P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1118	9	1.0489
213-252268-310J	MLCC 226P/6.3V,X5R,M(20%),SMD,0603,(JP)RoHS	0.1118	50	5.6900
213-252269-510J	MLCC 226P/6.3V,X5R,M(20%),SMD,0805,(JP)RoHS	0.1118	4	0.4757
213-253939-240J	MLCC 393P/25V,X7R,K(10%),SMD,0402,(JP)RoHS	0.1118	2	0.2438
213-254715-200C	MLCC 471P/50V,NPO,J(5%),SMD,0402,(None JP) RoHS	0.1118	7	0.8203
213-254739-210C	MLCC 473P/16V,X7R,K(10%),SMD,0402,(None JP) RoHS	0.1118	2	0.2438
213-254758-210J	MLCC 475P/6.3V,X5R,M(20%),SMD,0402,(JP)RoHS	0.1118	5	0.5909
213-254759-320C	MLCC 475P/10V,X5R,K(10%),SMD,0603,(None JP) RoHS	0.1118	2	0.2438
213-254759-510J	MLCC 475P/25V,X5R,K(10%),SMD,0805,(JP)RoHS	0.1118	2	0.2438
217-301078-325G	POLYMER(TAN) CAP 100uF/6.3V,40mΩ,1.8A,SMD,B3528,105°C/2000H,M (20%),T520B107M006ATE040(KEMET)RoHS	1.3266	2	3.2494
217-302278-326G	POLYMER(TAN)CAP 220uF/6.3V,45mΩ,1700mA,105°C/2000H,M (20%),B3528(1.9),T520B227M006ATE045(KEMET) RoHS	1.3266	3	4.7073
223-010220-810G	CHOKE 1uH,M (20%),RDC ≤ 59mΩ,Irms ≤ 2.7A,Isat ≤ 2.7A,SMD, (2.5*2.0*1.2),CSCA2520D-1R0M-LRH(PDC)RoHS	0.1536	2	0.3588
223-015122-600G	CHOKE 0.15uH,M (20%),RDC ≤ 0.66mΩ,Idc ≤ 36A,Isat=45A,SMD, (7.6*6.6*3.8),PCME064T-R15MS0R667(CYNTEC) RoHS	0.1536	1	0.1903
223-015222-620G	CHOKE 1.5uH,M (20%),RDC ≤ 14mΩ,Idc=9A,Isat=18A,SMD, (7.3x6.6x3),PCMC063T-1R5MN(CYNTEC)RoHS	0.1536	1	0.1903
223-036121-700G	CHOKE 0.36uH,M (20%),DCR ≤ 12mΩ,Irms:9A,Isat:11A,SMD (4.5*4*1.8),GSTD4020PJ-R36M(GOTREND)RoHS	0.1536	1	0.1903
223-047121-900G	CHOKE 0.47uH,M (20%),Rdc < 8.5mΩ,Idc=13A,Isat=12A,SMD, (4.85x4.7x2.8),PCMB053T-R47MS(CYNTEC)RoHS	0.1536	1	0.1903
223-068121-900G	CHOKE 0.68uH,M (20%),RDC ≤ 9.2mΩ,Idc=10A,Isat=15A,SMD (4.85x4.7x2.8),CMMB053T-R68MS(CYNTEC)RoHS	0.1536	1	0.1903



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Calculation Model: Telcordia Issue 4

MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
223-410040-501S	COMMON CHOKE $Z \geq 90\Omega$,M (20%), $RDC \leq 0.35\Omega$, $I_{dc} \leq 330mA$,SMD, (2.05*1.25*1.2),CMM21T-900M-N(CHILISIN)	0.1536	1	0.1903
223-490090-500S	COMMON CHOKE 90 Ω ,60-100 Ω ,300mA (Max), $RDC \leq 300m\Omega$,HDMI/USB3.0 6GHZ,SMD0805 (2*1.2*1.2mm),GLECM2012B-900QT(GOTREND)	0.1536	4	0.6860
223-523000-410G	CM FILTER $C_d=0.25pF$, $R_s=3\Omega$,SMD (1.57*1.17*0.57),PCMF2USB3S/WLCSP10(NXP) RoHS	0.1536	2	0.3588
231-107168-200G	REGULATOR 0.8A,GS7168TD-R/TDFN8(GSTEK)HF	19.2561	1	37.4477
231-171330-200G	REGULATOR GS7133TD-R,3A,TDFN10(GSTEK)RoHS	19.2561	3	89.2920
241-219206-330G	X'TAL 19.2MHz,12pF, $\pm 30ppm$,ESR:50 Ω (Max),TOPR=-40 $^{\circ}C \sim +105^{\circ}C$,SMD3225 (4PAD),7M19200021(TXC)RoHS	7.5521	1	12.4488
241-225006-340G	X'TAL 25MHz,18pF, $\pm 10ppm$,TOPR=-40 $^{\circ}C$ $\sim +85^{\circ}C$,SMD3225(4PAD),7M25090002(TXC)RoHS	7.5521	2	21.9893
241-432773-314G	X'TAL 32.768kHz,12.5pf, $\pm 20ppm$,ESR:70K Ω (Max),TOPR=-40 $^{\circ}C \sim +85^{\circ}C$,SMD3215 (2PAD),Q13FC1350000400(EPSON)RoHS	7.5521	1	12.4488
242-248006-200G	OSC 48Mhz,3.3V,15pf,25ppm,TOPR=-40 $^{\circ}C$ $\sim +85^{\circ}C$,SMD2520(4PAD),FCO-236A 48.000MAC (FUJICOM)RoHS	11.1310	1	18.1204
251-160808-083S	BEAD CORE 160808 80 Ω ,300mA,25%,SMT0603,SBK160808T-800Y-N (CHILISIN)	0.8378	2	2.7874
251-160808-124S	BEAD CORE 160808 120 Ω ,2.5A,25%,SMT0603,PBY160808T-121Y-N (CHILISIN)	0.8378	1	1.6218
253-100115-501S	POLYSWITCH 1.1A,6V,SMT0805,0805L100 (LITTELFUSE)	0.4000	3	1.6363
253-100155-604S	POLYSWITCH 1.5A/8V,SMD1206 TYPE PTC,1206L150THWR(LITTELFUSE)	0.4000	1	0.6546
253-105000-610G	FUSE 5A/32V SMD3216(1206),0466005.NRHF (LITTELFUSE)RoHS	0.4000	1	0.6546
261-361515-200C	RES NET 150 Ω 8P4R J(5%),0402*4,(None JP)RoHS	0.1117	2	0.2753
261-364725-200C	RES NET 4.7K Ω 8P4R J(5%),0402*4,(None JP)RoHS	0.1117	1	0.1487
263-180005-100C	RES 0 Ω ,J(5%),SMD,0201,(None JP)RoHS	0.1117	45	5.2672
263-180005-200C	RES 0 Ω ,J(5%),SMD,0402,(None JP)RoHS	0.1117	26	3.0870
263-180005-300C	RES 0 Ω ,J(5%),SMD,0603,(None JP)RoHS	0.1117	1	0.1487
263-180100-110C	RES 10 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.1117	11	1.3476
263-180100-210C	RES 10 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	7	0.8767
263-180200-210C	RES 20 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-180220-110C	RES 22 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.1117	8	0.9949
263-180220-210C	RES 22 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-180519-210C	RES 5.1 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-180680-210C	RES 68 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181000-110C	RES 100 Ω ,F(1%),SMD,0201,(None JP)RoHS	0.1117	2	0.2753
263-181000-210C	RES 100 Ω ,F(1%),SMD,0402,(None JP)RoHS	0.1117	7	0.8767

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MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
263-181001-110C	RES 1KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	16	1.9306
263-181001-210C	RES 1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	7	0.8767
263-181001-310C	RES 1KΩ,F(1%),SMD,0603,(None JP)RoHS	0.1117	2	0.2753
263-181002-110C	RES 10KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	49	5.7245
263-181002-210C	RES 10KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	11	1.3476
263-181003-110C	RES 100KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	8	0.9949
263-181003-210C	RES 100KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181004-210C	RES 1MΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181005-210C	RES 10MΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181022-210C	RES 10.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181050-210C	RES 105Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181053-210C	RES 105KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181130-210C	RES 113Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181182-210C	RES 11.8KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181202-210C	RES 12KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181273-210C	RES 127KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181302-210C	RES 13KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181400-210C	RES 140Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181500-210C	RES 150Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	5	0.6399
263-181502-210C	RES 15KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	3	0.3984
263-181503-210C	RES 150KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181542-210C	RES 15.4KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181651-210C	RES 1.65KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181652-210C	RES 16.5KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181690-210C	RES 169Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181691-210C	RES 1.69KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-181803-210C	RES 180KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-181962-210C	RES 19.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-182000-110C	RES 200Ω,F(1%),SMD,0201,(None JP)RoHS	0.1117	3	0.3984
263-182001-210C	RES 2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-182002-110C	RES 20KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	4	0.5198
263-182002-210C	RES 20KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	3	0.3984
263-182003-210C	RES 200KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-182004-210C	RES 2MΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-182200-210C	RES 220Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-182201-110C	RES 2.2KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	1	0.1487
263-182208-310C	RES 2.2Ω,F(1%),SMD,0603,(None JP)RoHS	0.1117	1	0.1487
263-182400-110C	RES 240Ω,F(1%),SMD,0201,(None JP)RoHS	0.1117	4	0.5198
263-182491-210C	RES 2.49KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-182553-210C	RES 255KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-182872-210C	RES 28.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-183001-210C	RES 3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-183092-210C	RES 30.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-183161-210C	RES 3.16KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-183162-210C	RES 31.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-183300-210C	RES 330Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	4	0.5198

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MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
263-183301-110C	RES 3.3KΩ,F(1%),SMD,0201(None JP)RoHS	0.1117	12	1.4645
263-183301-210C	RES 3.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	5	0.6399
263-183302-110C	RES 33KΩ,F(1%),SMD,0201(None JP)RoHS	0.1117	4	0.5198
263-183303-210C	RES 330KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-183305-100C	RES 33Ω,J(5%),SMD,0201(None JP)RoHS	0.1117	18	2.1627
263-183901-210C	RES 3.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184020-210C	RES 402Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	3	0.3984
263-184122-210C	RES 41.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184532-210C	RES 45.3KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184701-110C	RES 4.7KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	41	4.8094
263-184701-210C	RES 4.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	3	0.3984
263-184702-110C	RES 47KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	8	0.9949
263-184750-210C	RES 475Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184872-210C	RES 48.7KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184990-210C	RES 499Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-184991-210C	RES 4.99KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-184992-210C	RES 49.9KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-185102-210C	RES 51KΩ,F(1%),SMD,0402(None JP)RoHS	0.1117	2	0.2753
263-185103-210C	RES 510KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185110-210C	RES 511Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185112-210C	RES 51.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185230-210C	RES 523Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185600-210C	RES 560Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185602-210C	RES 56KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-185621-210C	RES 5.62KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-186040-210C	RES 604Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-186049-210C	RES 60.4Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-186801-110C	RES 6.8KΩ,F(1%),SMD,0201,(None JP)RoHS	0.1117	1	0.1487
263-187502-210C	RES 75KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-187870-210C	RES 787Ω,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-188062-210C	RES 80.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-188201-210C	RES 8.2KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-188459-210C	RES 84.5Ω,F(1%),SMD,0402 (None JP)RoHS	0.1117	1	0.1487
263-189312-210C	RES 93.1KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	1	0.1487
263-189531-210C	RES 9.53KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
263-189762-210C	RES 97.6KΩ,F(1%),SMD,0402,(None JP)RoHS	0.1117	2	0.2753
273-100402-301S	THERM RES 10KΩ,J(5%),SMD,0603, (B25/85=3435,3%),TSM1A103J34D3RZ(TKS)	5.1159	2	17.1593
314-ALF511-119G	PCB ALF51 R.A(a01) (12L HDI 140x104x1.6mm / 2) OSP(CIRCUITECH)RoHS	12.6680	1	24.1406
342-112003-211G	MINI DISPLAYPORT,20pin,F,0.6mm,R/A,30u",WMDR -20FEL1PH5(WIN WIN)RoHS	10.7191	1	18.5590
342-310022-110G	Screw CONN. Terminal Block,Green,2Pos,300V,16A,PIT:5.0mm,MB612- 50002(DECA) RoHS	10.7191	1	18.5590

File Name: ALF51-BN-23E40.rfp
Assembly: 774-ALF511-000G
Ref Des:
Calculation Model: Telcordia Issue 4



MTBF (hrs): 465382
Failure Rate: 2,148.7746
Temperature: 60
Environment: GB, GC - Ground Benign, Controlled

Part Number	Description	Unit Failure Rate	Quantity	Total Failure Rate
343-501402-200G	Giga LAN CONN RJ45,SMT,GF,W/Transformer,W/LED,MRJG-11S88RS (MATRIX),RoHS	10.7191	2	32.4809
343-503600-100S	USB 3.0*2 ,A Type,30u,UEA1112C-8FS6-4F (FOXCONN)	10.7191	1	18.5590
346-120310-201G	PIN PLUG 2*3, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180806P(V-STAR)RoHS	75.0334	1	129.9132
346-120511-201G	PIN PLUG 2*5, 1.27mm, H=5mm, 180D, SMD, SHY- JCL180810P(V-STAR)RoHS	75.0334	1	129.9132
346-221910-201G	PIN PLUG 2*19P/1.27mm, M, 90D, BLACK, SMT, H13473-219D-R131A(V-STAR)RoHS	75.0334	1	129.9132
346-510223-102G	WAFER 1*2,2.0mm,M,H=6.1mm,180D,DIP,WHITE,721-81- 02TW00(PINREX)RoHS	75.0334	1	129.9132
348-220800-200S	SOCKET SPI 8Pin,GF,H=5.65mm,180D,SMT,ACA-SPI -004-K01(LOTES)	5.8468	1	9.5280
348-660522-200S	MINI PCI-EXPRESS 1*52,0.8mm,10u",F,H=9.9mm,90D,SMT,IVORY,GEN RAL TYPE,AS0B226-S99Q-7H(FOXCONN)HF	5.8468	1	9.5280
622-010140-000G	BATTERY CR2032 3V 220mAh W/CABLE (L=150mm&TAPE),BIN-CR2032-I-CT-SL-PV-01(RE- ENERGY)RoHS Belong to UN3090	25.0000	1	34.9638
292-301000-500S	BUZZER 3V,100mA,12Ω,4Khz,85db,SMD (5*4.2mm),SMT-G5030A(KEPO)	600.0000	1	600.0000
143-10160H-401G	CPU Intel Atom x5-E3940 1.6GHz C/2M,D0,LH8066803102401 SR33M/FCBGA-1296 (INTEL)RoHS	159.0000	1	159.0000