

PICO-IMX6

Reliability Prediction Report (MTBF)

Summary	Failure Rate: 6011.871385 ppm MTBF: 166,338 Hours
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Issue date	Approval	Test Engineer
07/08/2015	KJ Wang	Louie Lee

Reliability Prediction (MTBF)

I . Model Name: PICO-IMX6

II . Prediction Date: July. 8th, 2015

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

IV . Predicted by: Louie Lee

V . Equipment: Windchill Quality Solutions 10.1

VI. Simulation Environment:

- Temperature: 30 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 Failure rate multiplier is 1000000000.
- MTBF : MTBF is always specified in hours.

VIII. Prediction Result:

PICO-IMX6 (9697IMX006-D):

- Failure Rate: 6011.871385 ppm

- MTBF: 166,338 Hours

**AAEON Reliability Prediction
Summary**

File Name: PICO-IMX6.rfp
Duty Cycle: 100
Calculation Model: Telcordia Issue 2
Method: Method I Case 3

Failure Rate: 6011.871385
MTBF (hrs): 166,338
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
PICO-IMX6	9697IMX006-D		1	6011.871385	166,338

File Name: PICO-IMX6.rfp
Assembly: 9697IMX006-D
Ref Des:
Description:

Failure Rate: 6011.871385
MTBF (hrs): 166,338
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1050501054	Resistor	R112,R209,R327, R328		2.547039	4	82309758.689546
1050501234	Resistor	R111		2.547039	1	282340674.079668
1050502734	Resistor	R173,R207		2.547039	2	154078778.388085
1050504734	Resistor	R1486,R175, R176, R752		2.547039	4	82309758.689546
1050506234	Resistor	R290		2.547039	1	282340674.079668
1050507530	Resistor	R208		2.547039	1	282340674.079668
1050510034	Resistor	R1433,R1438 ,R1440, R1477,R271, R753		2.547039	6	56573956.677649
1050515034	Resistor	R760		2.547039	1	282340674.079668
1050516014	Resistor	R39		2.547039	1	282340674.079668
1050520004	Resistor	R1,R2,R47		2.547039	3	107020754.986850
1050523714	Resistor	R1455		2.547039	1	282340674.079668
1050524004	Resistor	R73,R74,R75 ,R76,R9		2.547039	5	67008142.102588
1050531624	Resistor	R766		2.547039	1	282340674.079668
1050547564	Resistor	R79		2.547039	1	282340674.079668
1050551004	Resistor	R310		2.547039	1	282340674.079668
1050560414	Resistor	R51,R52		2.547039	2	154078778.388085
1050560464	Resistor	R183,R184		2.547039	2	154078778.388085
105270000A	Resistor	R913		2.547039	1	282340674.079668
1059700001	Resistor	R1490		2.547039	1	282340674.079668
105A501039	Resistor	R736		2.547039	1	282340674.079668
105A501333	Resistor	R291		2.547039	1	282340674.079668
105A502003	Resistor	R555,R556		2.547039	2	154078778.388085
105A502039	Resistor	R281,R293		2.547039	2	154078778.388085
105A502200	Resistor	R383,R387		2.547039	2	154078778.388085
105A502223	Resistor	R565,R566		2.547039	2	154078778.388085
105A502253	Resistor	R744		2.547039	1	282340674.079668
105A502839	Resistor	R767		2.547039	1	282340674.079668
105A503033	Resistor	R278		2.547039	1	282340674.079668
105A503039	Resistor	R737		2.547039	1	282340674.079668
105A506834	Resistor	R407,R408		2.547039	2	154078778.388085
105A509133	Resistor	R289		2.547039	1	282340674.079668
105A512039	Resistor	R761		2.547039	1	282340674.079668
105A515009	Resistor	R24		2.547039	1	282340674.079668
105A549969	Resistor	R194,R195		2.547039	2	154078778.388085
105A700003	Resistor	R1155,R1156 ,R1491, R305,R308,R314, R315,R316,R317, R318,R319,R321, R915		2.547039	13	27342571.921361

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Ref Des:
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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A700009	Resistor	C893,R1163, R133, R134,R138,R 142, R143,R1453, R146, R147,R148,R 1485, R164,R167,R 170, R179,R180,R 182, R189,R190,R 203, R204,R221,R 223, R224,R225,R 227, R243,R247,R 249,R25, R251,R252,R 255,R27, R273,R284,R 29,R297, R30,R307,R3 1,R32, R365,R366,R 384, R385,R386,R 396		2.547039	51	7312342.249386
105A70000A	Resistor	R115,R116,R 120, R299		2.547039	4	82309758.689546
105A700103	Resistor	R276,R287		2.547039	2	154078778.388085
105A700139	Resistor	R1164,R154, R155, R162,R181,R 185, R226,R292,R 303, R311,R378,R 92		2.547039	12	29507083.749401
105A701009	Resistor	R1436		2.547039	1	282340674.079668

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105A701039	Resistor	R101,R109,R129, R131,R140,R1441, R1442,R1445,R145, R1458,R1461,R1462, R1464,R1467,R1468, R1473,R1475,R1482, R1483,R151,R152, R160,R161,R168, R169,R171,R205, R206,R210,R211, R212,R213,R214, R231,R254,R374, R377,R379,R731, R733		2.547039	40	9263254.152485
105A701059	Resistor	R1160		2.547039	1	282340674.079668
105A701069	Resistor	R1149		2.547039	1	282340674.079668
105A701529	Resistor	R1443		2.547039	1	282340674.079668
105A701539	Resistor	R174		2.547039	1	282340674.079668
105A702209	Resistor	R1446,R1447,R1448, R1449,R1450,R1451, R1454,R1456		2.547039	8	43225424.698300
105A702229	Resistor	R1151,R1152		2.547039	2	154078778.388085
105A702239	Resistor	R1165,R1166		2.547039	2	154078778.388085
105A704729	Resistor	R106,R157,R158, R177,R178,R405, R406,R77,R78,R82, R83		2.547039	11	32049696.385471
105A710009	Resistor	R1479		2.547039	1	282340674.079668
105A710039	Resistor	R1161,R1444,R748		2.547039	3	107020754.986850
105A715009	Resistor	R1469,R1471		2.547039	2	154078778.388085
105A733009	Resistor	R1459,R222,R232		2.547039	3	107020754.986850

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105B500009	Resistor	R14,R17,R35 ,R37, R43,R46,R48 ,R5,R6, R7,R8		2.547039	11	32049696.385471
105B501039	Resistor	R12,R3,R4		2.547039	3	107020754.986850
1121501690	Capacitor	C147,C163,C 164, C165,C166,C 169, C172,C174,C 176, C207,C215,C 216, C218,C219,C 221, C231,C232,C 233, C234,C236,C 237, C238,C247,C 249, C252,C261,C 262, C263,C264,C 265, C266,C268,C 269, C270,C271,C 272, C284,C289,C 301, C302,C303,C 331, C340,C350,C 351, C363,C368,C 369,		1.128806	75	11480604.167884
1124410190	Capacitor	C208,C280,C 281, C282,C283,C 871		1.128806	6	133979725.056342
1124418090	Capacitor	C179,C180,C 855, C857		1.128806	4	196873384.410843
1124427090	Capacitor	C876,C877		1.128806	2	375289731.076049
1124433090	Capacitor	C892		1.128806	1	704977644.692287
1124433190	Capacitor	C335,C343		1.128806	2	375289731.076049
1124447180	Capacitor	C230		1.128806	1	704977644.692287
1124522290	Capacitor	C330,C339		1.128806	2	375289731.076049
1124547190	Capacitor	C874,C878,C 879		1.128806	3	257514172.353070

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1129522790	Capacitor	C148,C149,C346, C409,C410,C448		1.128806	6	133979725.056342
1129610051	Capacitor	C171,C173,C29		1.128806	3	257514172.353070
1129622690	Capacitor	C413,C442,C444, C445,C865		1.128806	5	159367490.199266
1129710391	Capacitor	C859		1.128806	1	704977644.692287
1129722091	Capacitor	C241,C244,C245, C248		1.128806	4	196873384.410843
1149547050	Capacitor	C175		1.128806	1	704977644.692287
1181610090	Capacitor	C861		4.744484	1	159663026.715137
1189610192	Capacitor	C371,C374,C825		4.744484	3	59399119.141203
1189615154	Capacitor	C28,C342		4.744484	2	86049450.747498
118A6221B0	Capacitor	C353		4.744484	1	159663026.715137
11A4416080	Capacitor	C7,C8		1.128806	2	375289731.076049
11C1501080	Capacitor	C555,C557,C561		1.128806	3	257514172.353070
11C1510390	Capacitor	C429,C430,C431, C432		1.128806	4	196873384.410843
11C2510480	Capacitor	C327,C328,C334, C336		1.128806	4	196873384.410843
11C4547190	Capacitor	C239		1.128806	1	704977644.692287
11C4547730	Capacitor	C860		1.128806	1	704977644.692287
11C9510490	Capacitor	C858		1.128806	1	704977644.692287
11E1522680	Capacitor	C550,C553,C554, C558		1.128806	4	196873384.410843
11E2501030	Capacitor	C337		1.128806	1	704977644.692287
11E2501690	Capacitor	C295		1.128806	1	704977644.692287
11E2510010	Capacitor	C251		1.128806	1	704977644.692287
11E2647650	Capacitor	C329,C332,C333, C338		1.128806	4	196873384.410843
11E9501090	Capacitor	C868,C875,C882		1.128806	3	257514172.353070
11E9501091	Capacitor	C177,C178,C199, C201,C209,C211, C347,C348,C349, C366,C367,C412, C447,C449,C450, C467,C888,C889		1.128806	18	46478509.590073

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11E9510490	Capacitor	C1,C121,C122,C123,C124,C125,C126,C127,C128,C129,C130,C135,C136,C137,C138,C139,C140,C141,C142,C143,C144,C16,C18,C4,C5,C6		1.128806	26	32480878.530766
11E9547680	Capacitor	C192,C196,C203,C214,C225,C228,C543		1.128806	7	115633865.771428
11E9547682	Capacitor	C545,C547,C548,C556		1.128806	4	196873384.410843
11E9547790	Capacitor	C597,C598,C599,C600		1.128806	4	196873384.410843
11E9610080	Capacitor	C12,C213,C217,C250,C345,C370,C866,C869,C89,C93		1.128806	10	82101057.548118
11E9622080	Capacitor	C101,C102,C105,C106,C107,C119,C146,C355,C356,C357,C358,C359,C360,C361,C362,C41,C42,C54,C56,C65,C71,C73,C75		1.128806	23	36609385.175833
11E9647690	Capacitor	C120,C145,C150,C212,C443		1.128806	5	159367490.199266
11EA510390	Capacitor	C95		1.128806	1	704977644.692287

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11EA922491	Capacitor	C100,C103,C104, C115,C116,C117, C118,C13,C131,C132, C133,C134,C14,C15, C19,C22,C24,C25, C26,C27,C45,C48, C49,C51,C52,C53, C55,C57,C58,C59, C60,C61,C62,C63, C64,C66,C67,C68, C69,C70,C72,C74, C76,C77,C78,C79, C80,C81,C82,C83, C84,C85,C86,C87, C88,C90,C91,C9		1.128806	63	13632557.733278
11EB522640	Capacitor	C235,C246		1.128806	2	375289731.076049
11EB610050	Capacitor	C114,C341,C344, C373,C463,C464		1.128806	6	133979725.056342
121110106M	Inductor	L21,L22,L23,L25		4.944252	4	43912872.424775
1211122070	Inductor	L30		4.944252	1	154760964.143460
1211122078	Inductor	L29	31.1	8.438640	1	90675417.100605
121114707M	Inductor	L31		4.944252	1	154760964.143460
1212306030	Inductor	FB34,FB38,FB53		4.944252	3	57363284.375370
1212306035	Inductor	FB51,FB54		4.944252	2	83201062.149749
1212308054	Inductor	FB37,FB39		4.944252	2	83201062.149749
12123C0003	Inductor	FB15		4.944252	1	154760964.143460
12123C0006	Inductor	FB35,FB36,FB40, FB41,FB42,FB6,FB7		4.944252	7	25970990.056682
12123C0014	Inductor	FB45,FB46,FB47, FB55		4.944252	4	43912872.424775

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1214109000	Inductor	L1,L2,L3,L8,L9		4.944252	5	35631881.582999
12310024A0	Miscellaneous	Y1,Y4		19.200000	2	8854051.752197
12310025A3	Miscellaneous	Y14		19.200000	1	23844262.770939
1231332726	Miscellaneous	Y13		19.200000	1	23844262.770939
1301005444	Semiconductor	D1,D11,D2,D7,D9		7.793411	5	21965031.404253
1301005446	Semiconductor	D50	28	15.891876	1	45512906.737788
1301013040	Semiconductor	D44		7.793411	1	92807310.010983
1301793040	Semiconductor	D51		7.793411	1	92807310.010983
1304000044	Optical Device	LED3		79.003355	1	6497172.749112
1304300140	Optical Device	LED4		79.003355	1	6497172.749112
1305080040	Semiconductor	U29,U30		22.463360	2	17315095.066101
1305240040	Semiconductor	D16,D17,D36,D37,D38,D39,D40,D41,D42,D43,D45,D46,D8,U63,U66,U67,U78		22.463360	17	2391128.567891
1310390413	Semiconductor	Q18		22.463360	1	31642600.748419
1315230511	Semiconductor	Q13,Q59,Q60		22.463360	3	12043329.789539
1315443512	Semiconductor	Q25,Q26,Q28		22.463360	3	12043329.789539
13156K1N10	Semiconductor	Q11		22.463360	1	31642600.748419
1315700216	Semiconductor	Q22,Q36,Q37,Q61,Q7,Q8		22.463360	6	6378891.324740
1315700217	Semiconductor	Q1,Q2,Q3,Q4,Q5		22.463360	5	7551839.591592
1315720010	Semiconductor	Q24,Q27		22.463360	2	17315095.066101
1315971500	Semiconductor	U100		22.463360	1	31642600.748419
143CM20200	Integrated Circuit	U23		43.803003	1	11739202.588727
143MMPF011	Integrated Circuit	U68	36.3	434.211020	1	1184245.229051
143WM89620	Integrated Circuit	U61		43.803003	1	11739202.588727
1440010500	Integrated Circuit	U26		43.803003	1	11739202.588727
14401004A0	Integrated Circuit	U102		11.063278	1	58231413.220643
1440IMX6Q1	Integrated Circuit	U1	39.3	101.103655	1	5085991.500146
144LF723A0	Integrated Circuit	U18		26.018600	1	25551442.237972
14682G1641	Integrated Circuit	U2	24.5	30.147586	1	21369216.138451
14682G1641	Integrated Circuit	U3,U4,U5		11.063278	3	22909630.505226
1490080100	Integrated Circuit	U70		43.803003	1	11739202.588727
1490V1T340	Integrated Circuit	U46,U7,U73,U75		43.803003	4	3879156.910661
149AR80330	Integrated Circuit	U8		43.803003	1	11739202.588727
14S2202600	Integrated Circuit	U12		43.803003	1	11739202.588727

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14S3010700	Integrated Circuit	U74,U76	35	43.803003	2	6834791.244197
14S3104500	Integrated Circuit	U56,U58		43.803003	2	6834791.244197
14S3112300	Integrated Circuit	U38		43.803003	1	11739202.588727
14S3524700	Integrated Circuit	U27		43.803003	1	11739202.588727
14S4251701	Integrated Circuit	U50		403.384008	1	1274746.444051
14S4322200	Integrated Circuit	U71,U77		43.803003	2	6834791.244197
14S5A00821	Integrated Circuit	U101,U13		26.018600	2	14194252.866846
14S6203205	Integrated Circuit	U103		11.063278	1	58231413.220643
1540510380	Resistor	RP11,RP13,R P15, RP17,RP19,R P20,RP3, RP5,RP7,RP9		9.971436	10	7746494.690806
1540747285	Resistor	RP10,RP12,R P14, RP16,RP18,R P4,RP6, RP8		9.971436	8	9424088.116087
1600160800	Connection	SW1		16.184835	1	35685591.360212
165251420B	Connection	RJ45_1		16.184835	1	35685591.360212
1653002101	Connection	CN42,JP44		16.184835	2	20390152.380746
1653002201	Connection	CN41,JP30		16.184835	2	20390152.380746
165300310G	Connection	JP34,JP35,JP 36	16.184835	3	14515880.849373	
165300410B	Connection	I2C1	16.184835	1	35685591.360212	
1653005264	Connection	CN37	16.184835	1	35685591.360212	
1653300107	Connection	JP34(2-3), JP36(2-3)	16.184835	2	20390152.380746	
165330010E	Connection	JP30(1-2), JP35(2-3), JP44(1-2)	16.184835	3	14515880.849373	
1654020004	Connection	CN40	16.184835	1	35685591.360212	
1654226303	Connection	Mini_Card1	16.184835	1	35685591.360212	
1654401930	Connection	HDMI1	16.184835	1	35685591.360212	
1654409103	Connection	COM1	16.184835	1	35685591.360212	
1654800530	Connection	CN9	16.184835	1	35685591.360212	
1654808309	Connection	USB1	16.184835	1	35685591.360212	
1654901035	Connection	MSD1	16.184835	1	35685591.360212	
1654903901	Connection	SIM1	16.184835	1	35685591.360212	
165490700D	Connection	SATA1	16.184835	1	35685591.360212	
1655004020	Connection	DCIN1	16.184835	1	35685591.360212	
1655302025	Connection	CN20	16.184835	1	35685591.360212	
1655305025	Connection	CN31	16.184835	1	35685591.360212	
1655802020	Connection	CN43	16.184835	1	35685591.360212	
1655809120	Connection	CN33	16.184835	1	35685591.360212	
1655904127	Connection	CAN_BUS1	16.184835	1	35685591.360212	
1655905036	Connection	USB3,USB4	16.184835	2	20390152.380746	
1655905037	Connection	CN19	16.184835	1	35685591.360212	
1655907131	Connection	CN3	16.184835	1	35685591.360212	

**Reliability Prediction
Summary**

File Name: PICO-IMX6.rfp
Assembly: 9697IMX006-D
Ref Des:
Description:

Failure Rate: 6011.871385
MTBF (hrs): 166,338
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1655910131	Connection	HPO1		16.184835	1	35685591.360212
175011301C	Miscellaneous	U105(CN43)		306.000000	1	1681683.006787
1752002400	Miscellaneous	FS7		2.400000	1	254626042.602335
1752002500	Miscellaneous	FS8,FS9		2.400000	2	143944727.196625
1752002700	Miscellaneous	FS4,FS5		2.400000	2	143944727.196625