

BRIGHT LED ELECTRONICS CORP.

Mean Time To Failure Report

Report NO: T1803011.

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Product Part NO: BIR-HM133J-TRE

Experiment condition:

Temperature: Room Temperature Environment

Humidity: 70% below

Experiment time: 1000 hours

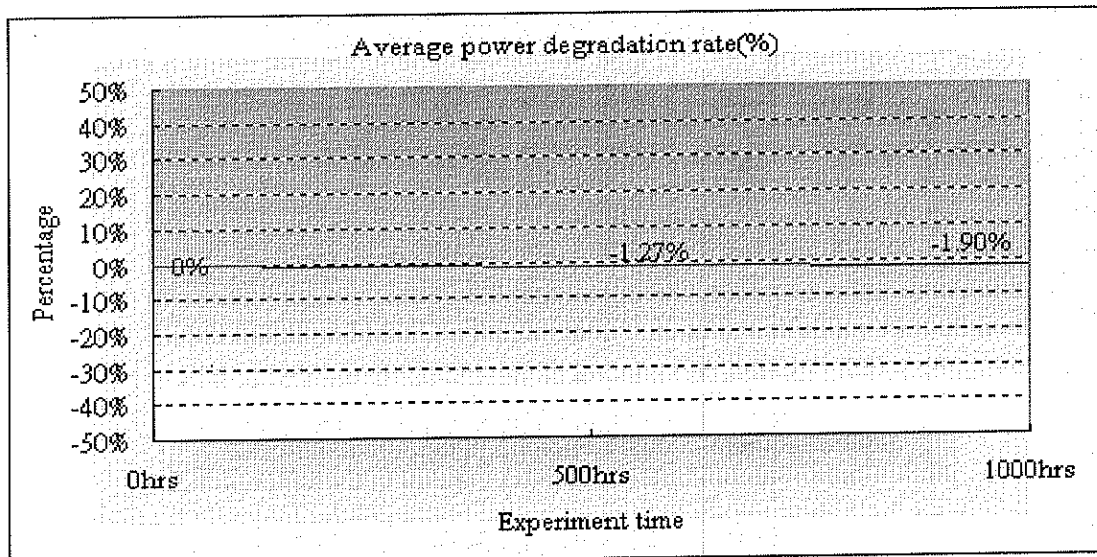
Forward current: 20mA

Samples Quantity: 30pcs

The average intensity (Po) degradation state in 1000 hours:

Item/Time	0hrs	500hrs	1000hrs
Average power data	1.58	1.56	1.55
Average power degradation rate(%)	0%	-1.27%	-1.90%

Average Power (PO) Degradation Curve



Remark:

1. Definition of failure: Forward Voltage and intensity out of specification after test;
2. According to our test, All parts are regard as acceptable after 1000 hours of test;
3. Definition of MTTF (when no failure be found then):

$$MTTF = \frac{N \cdot T}{X^2/2(r; P_A)}$$

Note: N means experiment samples quantity,

T means experiment time,

$X^2/2(r; P_A)$ means failure distribution coefficient.

Approved:

Checked:

Issued: 盤綯鹿

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General Exponential Model(For Time- Terminated Tests)

Failure Distribution Table

$X^2/2(r;P_A)$

Confidence	Number of Failure										
Level	0	1	2	3	4	5	6	7	8	9	10
95.0%	2.996	4.744	6.296	7.754	9.154	10.513	11.842	13.148	14.435	15.705	16.962
90.0%	2.303	3.890	5.322	6.681	7.994	9.275	10.532	11.771	12.995	14.206	15.407
85.0%	1.897	3.372	4.723	6.014	7.267	8.495	9.703	10.897	12.078	13.249	14.411
80.0%	1.609	2.994	4.279	5.515	6.721	7.906	9.075	10.233	11.380	12.519	13.650
75.0%	1.386	2.693	3.920	5.109	6.274	7.423	8.558	9.684	10.802	11.914	13.020
70.0%	1.203	2.440	3.616	4.762	5.890	7.006	8.111	9.209	10.301	11.387	12.470
65.0%	1.050	2.212	3.347	4.455	5.549	6.733	7.710	8.782	9.850	10.913	11.974
60.0%	0.916	2.022	3.105	4.175	5.237	6.292	7.343	8.390	9.434	10.476	11.515
55.0%	0.780	1.844	2.883	3.914	4.9446	5.973	6.998	8.021	9.043	10.064	11.083
50.0%	0.693	1.678	2.674	3.672	4.671	5.670	6.670	7.669	8.669	9.669	10.669
40.0%	0.511	1.376	2.285	3.211	4.148	5.091	6.099	6.991	7.947	8.904	9.864
30.0%	0.357	1.097	1.913	2.764	3.634	4.517	5.411	6.312	7.220	8.132	9.050

MTTF 100, 000hours with a confidence level 50%,then:

$$MTTF = \frac{N \cdot T}{X^2/2(r; P_A)} = 30 \cdot 1000 / 0.693 = 43290 \text{ hrs}$$

$$\lambda = 1/MTTF = 2.31\% \text{ Per 1000 hours}$$

Remark:

About the value of λ , industry requirement rate Percentage 1000 hours must be smaller than 5%.