

# EDISON OPTO Laboratory Test Report

## IES LM-80-08

### MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCE

Report Number	Q131201
Test Sample	2T05X5WW23000003
Rating	DC 20mA 0.5W
Normal CCT	2,700 K
Test Date	October 9,2013 to July 3,2014
Test Address	9F, NO.800, Chung-Cheng Rd., Chung-Ho Dist., New Taipei City 235, Taiwan
Test Standard	IES LM-80-08 Approved Method : Measuring Lumen Maintenance of Led Lighting Sources
Temp. Measure point	See page 3
Description of test equipment	See page 3
Test Engineer	Amos Huang <i>Amos Huang</i>
Review By	Kenny Yen <i>Kenny yen</i>

Notes:

1. The test center executes the test operations with prudent manners. All the test results are detail stated in the report. All test service meet under the regulations of ISO/IEC 17025.
2. The report is only responsible to the assigned test. It shall not be any of the bases of Compliance judgments.
3. There are 11 pages in the test report (include the cover page). It is invalid when being used separately.
4. The test report is forbidden to reproduce in separate pages. The complete report copy is unrestricted.
5. The recorded contents in this report shall not be used as advertising, publications or merchandising purposes without written permissions by the test center.
6. Lumen maintenance(lm) uncertainty=6.2%; Chromaticity(x,y) uncertainty=0.0002.

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According to section 3 item 7 and section 4 item 5 of ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products, the test report also applies to the following products:

Part Number	Normal CCT	Watt	W/mm <sup>2</sup>
2T05X5WW23000003	2700K	0.5W	0.029
2T05X5NW23000005	4000K	0.5W	0.029
2T05X5CW23000003	6000K	0.5W	0.029

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## 1. Test Summary

Case temperature (Ts)	83°C ≤ Ts	103°C ≤ Ts
Ambient conditions (T <sub>A</sub> )	80°C ≤ T <sub>A</sub> R.H. < 65 % Minimized airflow	100°C ≤ T <sub>A</sub> R.H. < 65 % Minimized airflow
Sample Size	24	24
Drive current of the LED	20mA	20mA
Initial flux (lm) / V <sub>f</sub> (V)	53.32 / 24.41	53.51 / 24.28
Lumen maintenance at 6000 hrs	97.74% Page 5	96.77% Page 8
LED failure	0	0
Monitoring interval (hrs)	0, 1000, 2000, 3000, 4000, 5000, 6000	
Chromaticity shift	Page 6	Page 9

## 2. Case and ambient temperature

The case temperature T<sub>s</sub> is the temperature on the substrate; the ambient temperature T<sub>A</sub> is the temperature of the air at a distance of 50 mm above substrate.

Ts Measurement Point



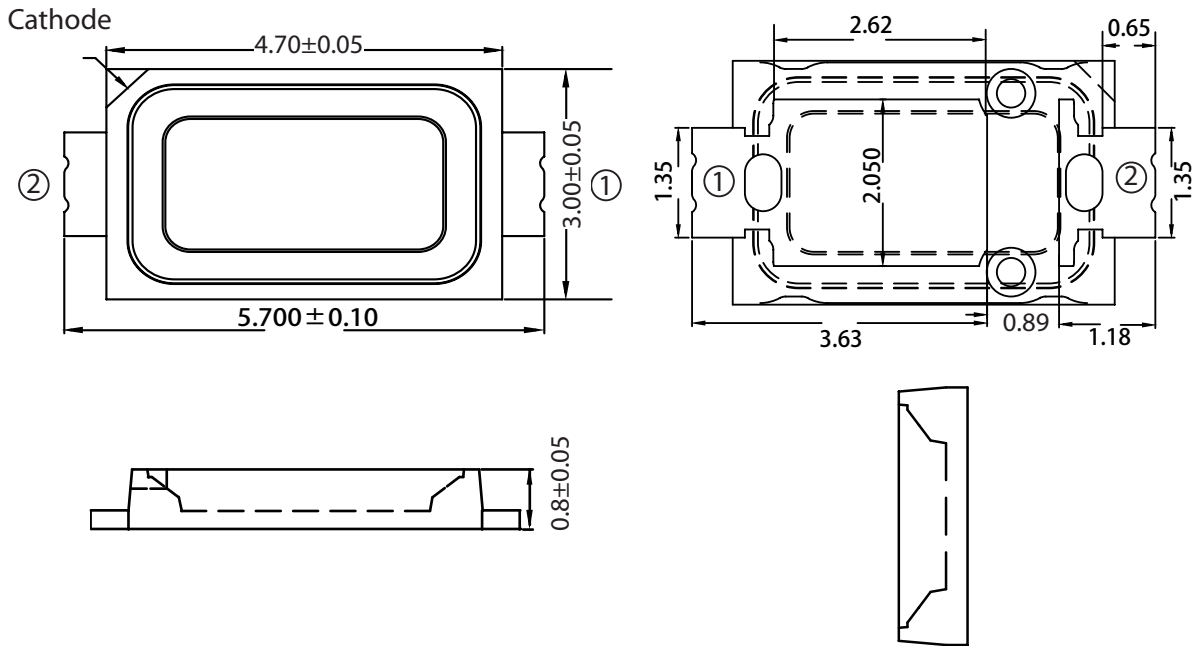
## 3. Description of test equipment

Equipment	Model No. / Serial No.	Cal. Laboratory/ Standard	Report No.	Effective Date
Integrating sphere	ISP250 45392012	Standard Light Source L7386A	O130434A	03.12.2014
DC power source	KEITHLEY 2425 1347276	SGS Taiwan Ltd.	ECAC1606814	16.06.2015
Temperature controlled test	VEKTREX/ SpikeSafe 200 1080030009	SGS Taiwan Ltd.	ECAC0780614A	27.03.2015
	VEKTREX/ ITCS 428		ECAC0780214A	
	VEKTREX/ ITCS 429		ECAC0780314A	
	VEKTREX/ ITCS 430		ECAC0780414A	
	VEKTREX/ ITCS 454		ECAC0780514A	

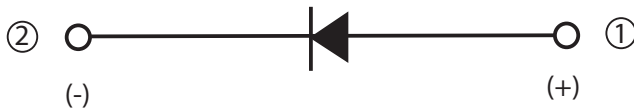
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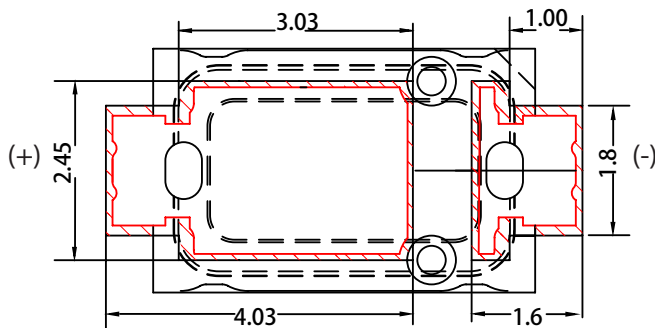
## Package Dimensions and Polarity



## Circuit



## Solder Pad



## Notes:

1. All dimensions are measured in mm.
2. Tolerance :  $\pm 0.20$  mm

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## 4. Test Results

### 4.1 Lumen and Color Maintenance data (85 °C)

#### ■ Lumen Maintenance data (85 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	54.47	1	1.006	0.996	0.989	0.991	0.979	0.973
2	53.32	1	1.003	0.993	0.987	0.981	0.975	0.970
3	52.72	1	1.000	0.989	0.982	0.978	0.974	0.968
4	52.42	1	1.000	0.991	0.984	0.982	0.976	0.973
5	53.13	1	1.005	0.997	0.992	0.986	0.982	0.978
6	53.75	1	1.002	0.994	0.988	0.984	0.978	0.975
7	51.94	1	1.005	0.999	0.991	0.994	0.981	0.961
8	53.93	1	1.005	0.994	0.988	0.986	0.979	0.972
9	53.56	1	1.001	0.992	0.985	0.987	0.980	0.975
10	53.83	1	1.000	0.990	0.984	0.980	0.973	0.970
11	53.02	1	1.004	0.996	0.991	0.989	0.982	0.980
12	53.05	1	1.000	0.991	0.985	0.981	0.976	0.974
13	53.02	1	1.000	0.991	0.986	0.987	0.973	0.973
14	53.43	1	1.002	0.994	0.989	0.989	0.982	0.977
15	53.33	1	1.001	0.990	0.987	0.983	0.979	0.973
16	53.36	1	1.003	0.995	0.990	0.991	0.982	0.978
17	54.00	1	1.005	0.998	0.995	0.997	0.992	0.989
18	53.56	1	1.009	1.001	0.997	1.016	1.010	1.007
19	53.22	1	1.001	0.991	0.984	0.983	0.972	0.966
20	52.16	1	1.002	0.994	0.988	0.992	0.985	0.981
21	52.67	1	1.004	0.995	0.990	0.995	0.989	0.984
22	54.12	1	1.003	0.996	0.992	0.993	0.983	0.980
23	53.96	1	1.002	0.995	0.990	0.991	0.985	0.982
24	53.82	1	1.016	1.008	1.004	1.006	1.000	0.997
AVG	53.32	1	1.003	0.995	0.989	0.989	0.982	0.977
MIN	51.94	1	1.000	0.989	0.982	0.978	0.972	0.961
MAX	54.47	1	1.016	1.008	1.004	1.016	1.010	1.007

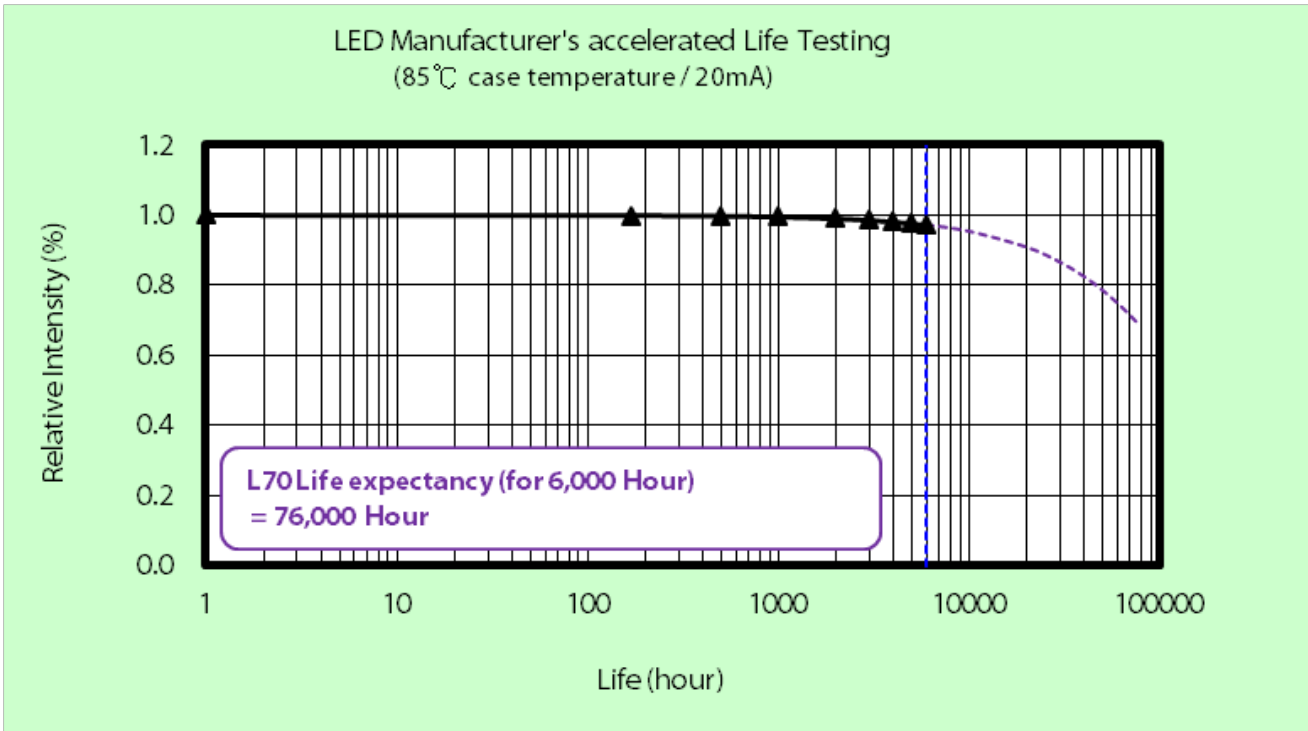
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■ Color Maintenance data (85 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	2683.71	0	0.0003	0.0003	0.0004	0.0003	0.0004	0.0004
2	2731.95	0	0.0004	0.0004	0.0005	0.0005	0.0006	0.0005
3	2791.90	0	0.0005	0.0005	0.0006	0.0006	0.0008	0.0007
4	2716.53	0	0.0004	0.0005	0.0005	0.0006	0.0007	0.0006
5	2714.07	0	0.0004	0.0005	0.0005	0.0006	0.0007	0.0006
6	2751.17	0	0.0004	0.0004	0.0005	0.0006	0.0006	0.0005
7	2705.93	0	0.0004	0.0013	0.0016	0.0013	0.0016	0.0016
8	2713.20	0	0.0005	0.0005	0.0006	0.0005	0.0006	0.0006
9	2803.47	0	0.0006	0.0006	0.0007	0.0007	0.0009	0.0009
10	2809.52	0	0.0005	0.0005	0.0007	0.0006	0.0007	0.0007
11	2731.11	0	0.0005	0.0005	0.0006	0.0006	0.0007	0.0006
12	2793.52	0	0.0005	0.0006	0.0007	0.0008	0.0009	0.0008
13	2796.82	0	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005
14	2718.92	0	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004
15	2735.92	0	0.0004	0.0005	0.0005	0.0005	0.0007	0.0005
16	2678.24	0	0.0004	0.0004	0.0005	0.0008	0.0009	0.0007
17	2651.47	0	0.0003	0.0003	0.0005	0.0015	0.0015	0.0013
18	2642.05	0	0.0004	0.0003	0.0004	0.0013	0.0013	0.0011
19	2733.77	0	0.0004	0.0005	0.0006	0.0005	0.0006	0.0005
20	2648.91	0	0.0003	0.0004	0.0005	0.0005	0.0006	0.0005
21	2689.05	0	0.0005	0.0006	0.0007	0.0011	0.0012	0.0010
22	2675.18	0	0.0002	0.0003	0.0004	0.0004	0.0005	0.0005
23	2732.59	0	0.0002	0.0004	0.0004	0.0005	0.0005	0.0005
24	2794.65	0	0.0004	0.0006	0.0007	0.0006	0.0005	0.0007
AVG	2726.82	0	0.0004	0.0005	0.0006	0.0007	0.0008	0.0007
MIN	2642.05	0	0.0002	0.0003	0.0004	0.0003	0.0004	0.0004
MAX	2809.52	0	0.0006	0.0013	0.0016	0.0015	0.0016	0.0016

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Test Condition 1 - 85°C Case Temp	
Sample size	24
Number of failures	0
DUT drive current used in the test (mA)	20
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	85
$\alpha$	4.797E-06
B	1.006
Calculated L70(6k) (hours)	76,000
Reported L70(6k) (hours)	>36000

## EDISON OPTO Laboratory Test Report

### 4.2 Lumen and Color Maintenance data (105 °C)

#### ■ Lumen Maintenance data (105 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	52.25	1	0.995	0.984	0.976	0.976	0.967	0.964
2	53.13	1	0.995	0.984	0.978	0.972	0.968	0.964
3	54.12	1	0.993	0.983	0.977	0.976	0.972	0.968
4	53.65	1	0.997	0.988	0.984	0.981	0.976	0.973
5	53.68	1	0.998	0.989	0.986	0.993	0.988	0.985
6	54.77	1	0.995	0.987	0.981	0.978	0.972	0.968
7	53.91	1	0.995	0.986	0.982	0.984	0.970	0.967
8	53.06	1	0.990	0.979	0.973	0.968	0.965	0.960
9	52.49	1	0.996	0.984	0.979	0.989	0.983	0.979
10	53.52	1	0.995	0.984	0.979	0.984	0.980	0.975
11	54.3	1	1.001	0.993	0.987	0.987	0.983	0.979
12	54.26	1	0.998	0.990	0.983	0.981	0.978	0.973
13	52.98	1	0.991	0.979	0.970	0.970	0.963	0.958
14	54.03	1	0.995	0.986	0.980	0.975	0.970	0.966
15	52.06	1	0.997	0.989	0.984	0.976	0.970	0.966
16	52.75	1	0.998	0.988	0.983	0.975	0.971	0.967
17	54.24	1	0.995	0.989	0.982	0.981	0.978	0.975
18	53.03	1	0.996	0.987	0.983	0.982	0.979	0.975
19	52.08	1	0.992	0.979	0.963	0.968	0.950	0.948
20	51.98	1	0.987	0.975	0.968	0.965	0.959	0.955
21	53.97	1	0.992	0.983	0.977	0.974	0.970	0.966
22	54.67	1	0.996	0.987	0.980	0.979	0.972	0.969
23	54.56	1	0.991	0.981	0.974	0.971	0.969	0.960
24	54.68	1	0.992	0.982	0.978	0.969	0.966	0.964
AVG	53.51	1	0.995	0.985	0.979	0.977	0.972	0.968
MIN	51.98	1	0.987	0.975	0.963	0.965	0.950	0.948
MAX	54.77	1	1.001	0.993	0.987	0.993	0.988	0.985



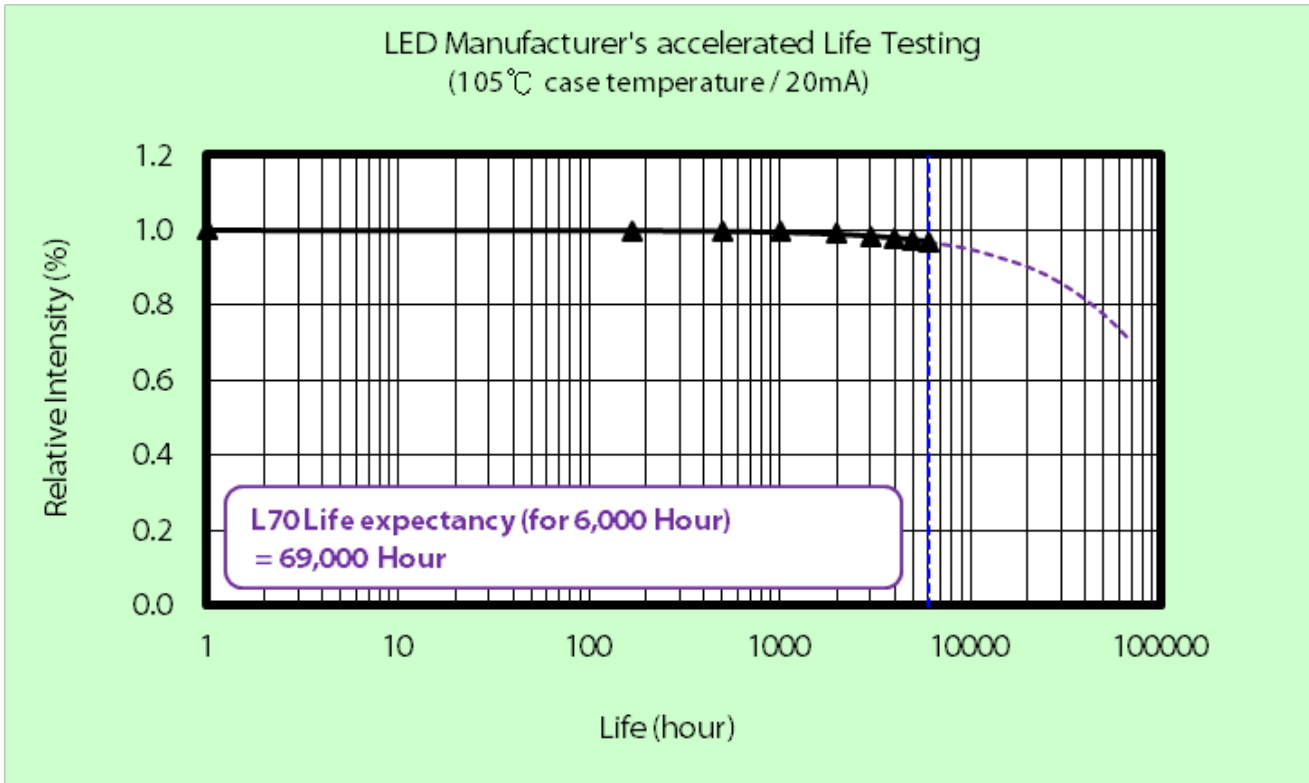
# EDISON OPTO Laboratory Test Report

## ■ Color Maintenance data (105 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	2670.21	0	0.0010	0.0010	0.0011	0.0009	0.0011	0.0011
2	2689.25	0	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008
3	2706.46	0	0.0006	0.0006	0.0007	0.0008	0.0009	0.0009
4	2688.96	0	0.0006	0.0006	0.0007	0.0008	0.0010	0.0009
5	2754.26	0	0.0005	0.0006	0.0007	0.0006	0.0007	0.0008
6	2728.83	0	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008
7	2761.04	0	0.0006	0.0007	0.0009	0.0008	0.0011	0.0010
8	2795.86	0	0.0008	0.0008	0.0010	0.0009	0.0011	0.0010
9	2710.33	0	0.0007	0.0008	0.0009	0.0010	0.0011	0.0010
10	2757.44	0	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
11	2713.30	0	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009
12	2703.82	0	0.0004	0.0006	0.0007	0.0007	0.0008	0.0009
13	2692.39	0	0.0008	0.0010	0.0011	0.0010	0.0012	0.0011
14	2711.92	0	0.0005	0.0007	0.0008	0.0008	0.0009	0.0009
15	2686.26	0	0.0007	0.0007	0.0009	0.0008	0.0010	0.0009
16	2694.62	0	0.0005	0.0006	0.0008	0.0007	0.0009	0.0009
17	2683.91	0	0.0006	0.0006	0.0007	0.0008	0.0009	0.0009
18	2712.39	0	0.0005	0.0005	0.0007	0.0011	0.0013	0.0011
19	2738.79	0	0.0008	0.0009	0.0011	0.0011	0.0015	0.0014
20	2693.95	0	0.0008	0.0009	0.0009	0.0010	0.0011	0.0011
21	2773.97	0	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009
22	2704.03	0	0.0006	0.0006	0.0007	0.0007	0.0008	0.0009
23	2733.05	0	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008
24	2769.74	0	0.0005	0.0005	0.0007	0.0008	0.0009	0.0009
AVG	2719.78	0	0.0006	0.0007	0.0008	0.0008	0.0010	0.0009
MIN	2670.21	0	0.0003	0.0005	0.0006	0.0006	0.0007	0.0008
MAX	2795.86	0	0.0010	0.0010	0.0011	0.0011	0.0015	0.0014

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Test Condition 2 - 105°C Case Temp	
Sample size	24
Number of failures	0
DUT drive current used in the test (mA)	20
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	105
$\alpha$	5.111E-06
B	0.997
Calculated L70(6k) (hours)	69,000
Reported L70(6k) (hours)	>36000

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### 5. EPA Recognized Certification Laboratory Information

#### EPA Recognized Certification Bodies (CBs) and Laboratories List Results

Notes:

1. Only accredited laboratories are listed on this page. Laboratories that are EPA-recognized through enrolling in a Certification Body's WMTL or SMTL program are not listed here.
2. EPA encourages manufacturers to contact laboratories directly to ensure they have the capability and availability to test the particular products for which certification is sought, as some product types may require special testing equipment or capabilities. Manufacturers must also confirm with an EPA-recognized certification body (CB) that the laboratory is acceptable under the CB's program for that product type.
3. Windows, Doors, and Skylights partners are advised to contact the National Fenestration Rating Council([www.nfrc.org](http://www.nfrc.org) [EXIT ↗](#)) for a complete list of EPA-recognized laboratories for these products.
4. [Lighting \(CFLs, ILLs, Luminaires, and Decorative Light Strings\) Labs](#) and [CBs](#) are listed separately.
5. Please note, EPA recognizes the Association of Home Appliance Manufacturers (AHAM) only for administering verification testing.

Organization ID	Organization Name	Type of Recognized Body	If Lab is it 1st Party?	Programs	Organization Address	City	State	Country
1114690	Edison Opto Corporation - OPTO Testing Laboratory	Accredited Laboratory	Y	Luminaires	4F, NO.800, Chung-Cheng Rd., Chung-Ho Dist.,	New Taipei City	-	TW

### About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at [www.edison-opto.com](http://www.edison-opto.com)

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[www.edison-opto.com](http://www.edison-opto.com)

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For technical assistance please contact:  
[LED.Detective@edison-opto.com.tw](mailto:LED.Detective@edison-opto.com.tw)

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