

IES LM-80 Test Report

Report Issue Date : June 05, 2017

Report Number : I-160223-20-I-02

Testing Start Date : March 29, 2016

Testing Completion Date : March 27, 2017

Revision Number : 02

Test Duration : 9 000 h

Manufacturer Information :

Applicant : Seoul Semiconductor Co., LTD

Address : 97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429

Description of Test Samples :

Classification : LED Package

PKG Name : MJT COB

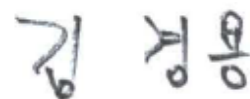
Part Number : SAWx1566-xx

Drive Current : 890 mA

Test Procedure :

IES LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources

Tested by



KyungYong KIM, Research Engineer

Approved by

YoungJoon WON, Laboratory Manager



Seoul Semiconductor Testing Laboratory(TL-688) is accredited to ISO/IEC 17025:2005 for the above test procedure by IAS, USA which is a signatory to ILAC-MRA.

Seoul Semiconductor Testing Laboratory

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Applicable Series Model Numbers

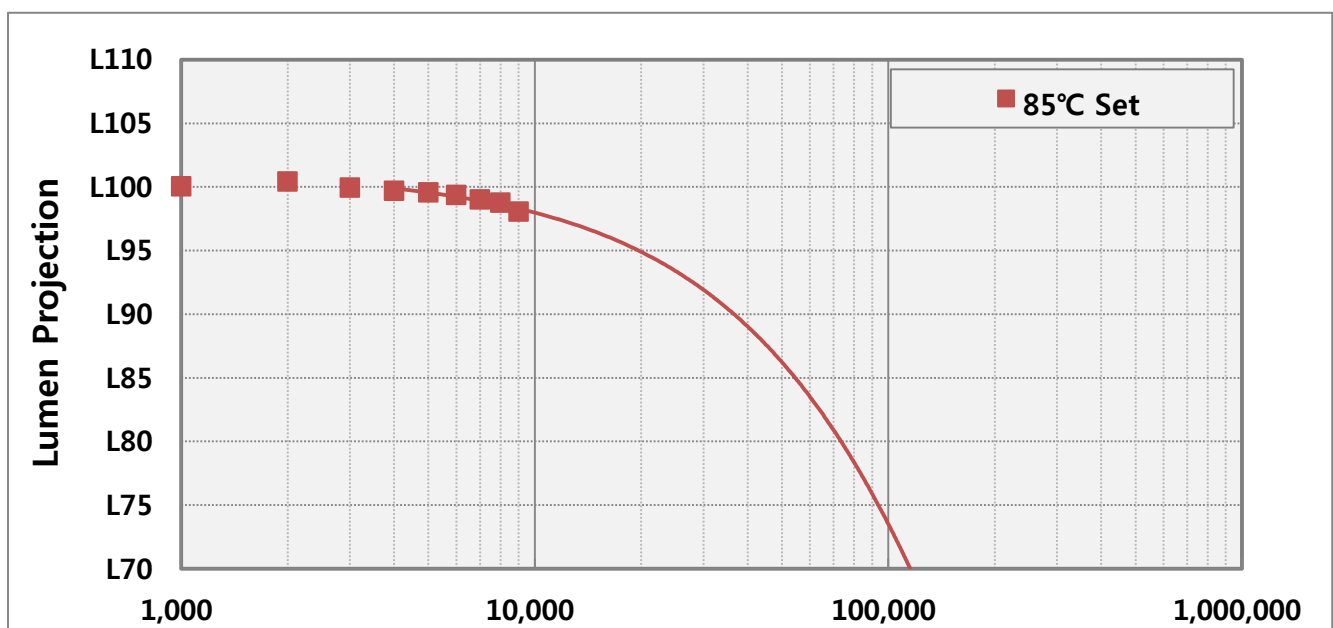
This LM-80 report is applicable to the following

Model	Current	Typical Vf	Power	Current per Die	Power Density	Current Density	CCT
SAWx1566-xx Tested	890 mA	35 V	31 W	148 mA	0.09 W/mm ²	176 mA/mm ²	≥2200 K
SDWx1F1D-xx	145 mA	35 V	5 W	145 mA	0.03 W/mm ²	172 mA/mm ²	≥2200 K
SAWx0661A-xx	145 mA	35 V	5 W	145 mA	0.03 W/mm ²	172 mA/mm ²	≥2200 K
SAWx1062A-xx	295 mA	35 V	10 W	148 mA	0.06 W/mm ²	175 mA/mm ²	≥2200 K
SAWx1063A-xx	445 mA	35 V	16 W	148 mA	0.09 W/mm ²	176 mA/mm ²	≥2200 K
SAWx1564A-xx	590 mA	35 V	21 W	148 mA	0.06 W/mm ²	175 mA/mm ²	≥2200 K
SAWx1565A-xx	740 mA	35 V	26 W	148 mA	0.07 W/mm ²	175 mA/mm ²	≥2200 K
SAWx2296A-xx	890 mA	52 V	46 W	148 mA	0.06 W/mm ²	176 mA/mm ²	≥2200 K
SAWx2298A-xx	1185 mA	52 V	62 W	148 mA	0.08 W/mm ²	175 mA/mm ²	≥2200 K
SAWx22AAA-xx	1180 mA	57 V	67 W	118 mA	0.09 W/mm ²	140 mA/mm ²	≥2200 K
SAWx33EAA-xx	1480 mA	81 V	120 W	148 mA	0.08 W/mm ²	175 mA/mm ²	≥2200 K
SAWx33GCA-xx	1360 mA	91 V	124 W	113 mA	0.09 W/mm ²	135 mA/mm ²	≥2200 K
SDWxAF1E-xx	1560 mA	138 V	215 W	130 mA	0.09 W/mm ²	154 mA/mm ²	≥2200 K

1. Test Summary

Items	Nominal Case Temperature		
		85 °C	
Number of LED tested		12	
Drive Current		890 mA	
Measurment Current		890 mA	
Test Duration		9 000 h	
Actual Case Temperature		≥83.1 °C	
Actual Ambient Temperature		≥81.7 °C	
Air Flow Velocity		≤0.47 m/s	
Averaged Initial Luminous Flux		4308.8 lm	
Averaged Initial CCT		2624 K	
Averaged Forward Voltage		34.86 V	
Averaged Lumen Maintenance		98.0 %	
Averaged Chromacity Shift		0.002 1	
α		-2.205E-07	
B		0.989	
TM-21 Projection L ₇₀		>49500	
TM-21 Projection L ₈₀		>49500	
TM-21 Projection L ₉₀		>49500	

※ The results shown in this certificate refer only to the sample(s) tested unless otherwise stated.
This test report cannot be reproduced, except in full.



2. IES LM-80-08 Test Report Requirement :

Number of LED Light Sources Tested

See the Test Summary

Description of LED Light Sources

See the Description of Test samples at the cover of certificate

Description of auxiliary equipment

Active cooling Test System

Temperature controlling chamber for LED package/array/module consists of the water cooling heat-sink plates to control the case temperature of each device and of the power supply required by LM-80 test conditions.

Measurement System

Photometric measurement tester for LED package/array/module consists of the integrating sphere with temperature controlling system(TEC) and of programmable current source meter.

Operating Cycle

Constant Direct Current (DC)

Ambient Conditions Including Airflow, Temperature and Relative Humidity

Airflow : < 1 m/s

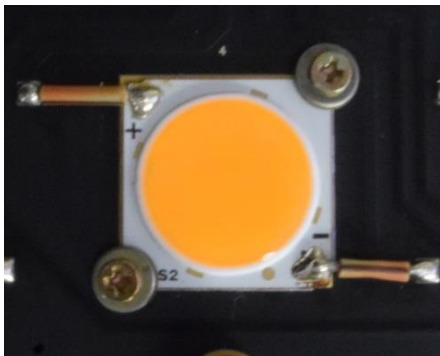
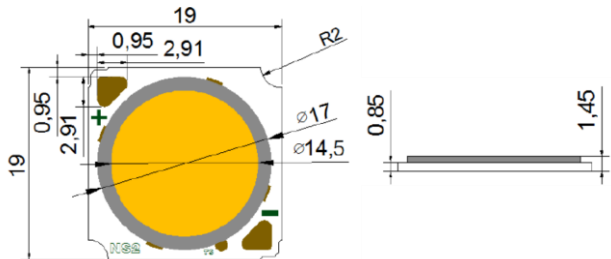
Ambient temperature : $\geq -5^{\circ}\text{C}$ of Nominal T_A

(See the Test Summary for actual T_A)

Relative Humidity : $\leq 65\%$ RH

Case Temperature (Test Point Temperature)

See the figure below, for the case temperature (T_S) measurement point and dimension

Case Temperature Measurement Point	Package Dimension
	

Drive Current of the LED Light Source During Lifetime Test

See the Test Summary

Initial Luminous Flux and Forward Voltage at Photometric Measurement Current

See the Test Summary

Lumen Maintenance Data for Each Individual LED Light Source Along with Median Value, Standard Deviation, Minimum and Maximum Lumen Maintenance Value for All of the LED Light Sources

See the table of each data set

Observation of LED light Sources Failures

No failure observed

LED Light Source Monitoring Interval

See the table of each data set

Photometric Measurement Uncertainty

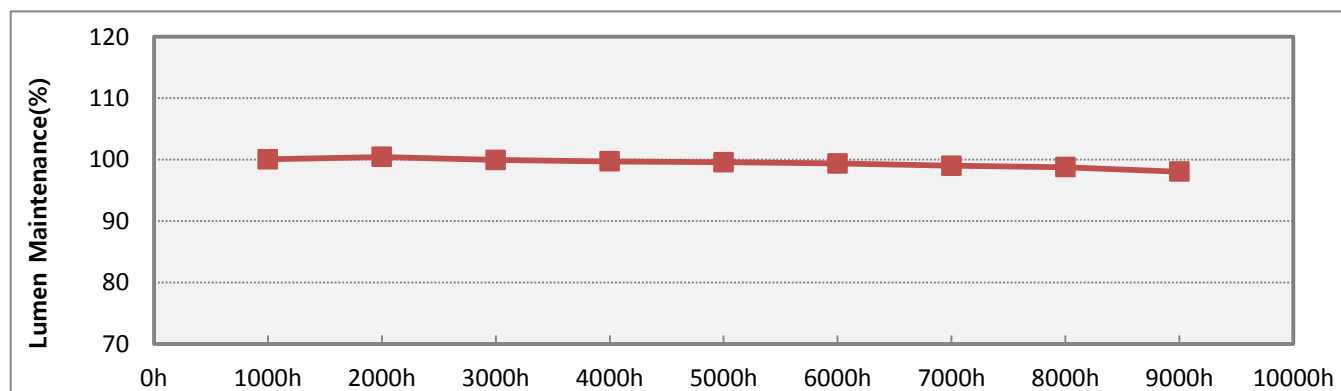
Seoul Semiconducrt maintain a tolerance of $\pm 3.04\%$ at 95% confidence level ($k = 2$)

Chromaticity Shift Over the Measurement Time

See the table of each data set

3. 85°C Data Set

No.	Initial Characteristics			Lumen Maintenance								
	Vf (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	34.89	4288.91	2630	99.9	100.3	99.9	99.6	99.4	99.1	98.6	98.2	97.5
02	34.80	4283.83	2644	100.7	100.7	100.3	100.2	100.3	100.3	100.1	100.0	99.3
03	34.80	4314.63	2648	100.2	100.6	100.4	99.9	99.8	99.9	99.6	99.3	98.5
04	34.87	4338.77	2650	100.3	100.5	100.4	100.1	100.1	99.8	99.6	99.3	98.5
05	34.86	4286.23	2633	100.0	100.3	99.8	99.5	99.3	98.8	98.1	97.5	96.7
06	34.91	4331.64	2586	100.1	100.6	100.0	99.9	99.9	99.9	99.7	99.6	99.3
07	34.84	4295.74	2615	100.4	100.9	100.4	100.1	100.1	100.0	99.6	99.5	98.7
08	34.90	4288.25	2588	100.1	100.4	100.0	99.9	99.9	99.7	99.5	99.5	99.0
09	34.86	4307.73	2623	99.8	99.9	99.7	99.5	99.5	99.3	99.2	99.0	98.6
10	34.84	4337.48	2643	99.1	99.7	98.8	98.1	97.3	96.4	95.7	95.0	94.0
11	34.91	4346.53	2630	100.0	100.5	99.8	99.6	99.7	99.4	98.9	98.9	98.0
12	34.88	4285.88	2600	100.1	100.6	99.9	99.9	99.7	99.8	99.6	99.4	98.6
Ave.	34.86	4308.80	2624	100.1	100.4	99.9	99.7	99.6	99.4	99.0	98.8	98.0
Med.	34.87	4301.74	2630	100.1	100.5	99.9	99.9	99.8	99.7	99.6	99.3	98.6
Min.	34.80	4283.83	2586	99.1	99.7	98.8	98.1	97.3	96.4	95.7	95.0	94.0
Max.	34.91	4346.53	2650	100.7	100.9	100.4	100.2	100.3	100.3	100.1	100.0	99.3
σ	0.04	24.02	23	0.4	0.3	0.5	0.6	0.8	1.0	1.2	1.4	1.5



3. 85°C Data Set

No.	Initial Characteristics		Chromaticity Shift du'v'								
	CIE1976 u'	CIE1976 v'	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	0.2651	0.5321	0.0011	0.0007	0.0009	0.0011	0.0013	0.0012	0.0016	0.0020	0.0025
02	0.2645	0.5316	0.0009	0.0006	0.0007	0.0009	0.0010	0.0008	0.0010	0.0013	0.0017
03	0.2643	0.5316	0.0010	0.0007	0.0008	0.0010	0.0011	0.0009	0.0012	0.0016	0.0020
04	0.2642	0.5314	0.0009	0.0006	0.0008	0.0010	0.0011	0.0009	0.0011	0.0015	0.0019
05	0.2650	0.5321	0.0010	0.0006	0.0009	0.0012	0.0013	0.0013	0.0017	0.0022	0.0027
06	0.2673	0.5323	0.0010	0.0006	0.0009	0.0010	0.0011	0.0009	0.0010	0.0013	0.0016
07	0.2658	0.5328	0.0009	0.0006	0.0007	0.0009	0.0010	0.0009	0.0011	0.0014	0.0019
08	0.2674	0.5316	0.0011	0.0007	0.0009	0.0011	0.0012	0.0010	0.0012	0.0015	0.0018
09	0.2656	0.5312	0.0011	0.0008	0.0009	0.0011	0.0011	0.0010	0.0012	0.0015	0.0018
10	0.2646	0.5309	0.0013	0.0010	0.0012	0.0016	0.0020	0.0020	0.0024	0.0030	0.0035
11	0.2653	0.5312	0.0010	0.0007	0.0009	0.0011	0.0011	0.0010	0.0012	0.0015	0.0020
12	0.2668	0.5314	0.0011	0.0007	0.0009	0.0011	0.0012	0.0010	0.0012	0.0015	0.0019
Ave.	0.2655	0.5317	0.0010	0.0007	0.0009	0.0011	0.0012	0.0011	0.0013	0.0017	0.0021
Med.	0.2652	0.5316	0.0010	0.0007	0.0009	0.0011	0.0011	0.0010	0.0012	0.0015	0.0019
Min.	0.2642	0.5309	0.0009	0.0006	0.0007	0.0009	0.0010	0.0008	0.0010	0.0013	0.0016
Max.	0.2674	0.5328	0.0013	0.0010	0.0012	0.0016	0.0020	0.0020	0.0024	0.0030	0.0035
σ	0.0011	0.0005	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0005	0.0005

