



TEST REPORT

According to ANSI/IES LM-80-15

For

Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

Model: HL-AS-2835DVW-2C-S1-08L-PCT-HR5

Report Type: 6000 Hours Test Report	Product Type: LED Package
Reviewed By: Pote Wang	<i>Pote Wang</i>
Report Number: RSZ200925503-10-6000	
Test Date: 2020-09-30 to 2021-06-30	
Report Date: 2021-07-20	
Approved by: Blake Zhang / EE Engineer	
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

TABLE OF CONTENTS

1 - General Information	3
1.1 Description of LED Light Sources	3
1.2 Standards and Reference Documentations	5
1.3 Testing Equipment	5
1.4 Drive Level	5
1.5 Ambient Conditions for Maintenance Test	5
1.6 Photometric Measurement Method and Uncertainty.....	6
1.7 Statement of Traceability	6
1.8 Sample Set.....	6
2 - Summary of Test Result	7
3 - Test Data	8
3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)	8
3.2 Data Set 1, 55°C, 60mA (Forward Voltage).....	9
3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)	10
3.4 Data Set 2, 105°C, 60mA (Lumen Maintenance)	11
3.5 Data Set 2, 105°C, 60mA (Forward Voltage).....	12
3.6 Data Set 2, 105°C, 60mA (Chromaticity Shift).....	13
4 - DUT Photo	14
4.1 Mechanical Dimensions	14
4.2 DUT Photo.....	14
Directions	15

1 - General Information

1.1 Description of LED Light Sources

Sample Size:

50 PCS test samples were in good condition and received on 2020-09-25. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-AS-2835DVW-2C-S1-08L-PCT-HR5
Part Type:	LED Package
#Drive Level:	DC 60mA
#Nominal CCT:	2700K
#Power:	1.2W
#Average Current Density per LED die:	270.334mA/mm ²
#Average Power Density per LED die:	2.703W/mm ²
#CRI:	90
#Die Spacing:	0.15mm

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

Family products covered by this report:

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model name	CRI (typ.)	CCT (K)	Series	Parallel	Power density per PCB (W/mm ²)	Current density per LED die (mA/mm ²)	Current per die (mA)	Distance between of dies(mm)	Current (mA)
HL-AS-2835DVW-2C-S1-08L-PCT-HR5	90	2700	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.1225	270.334	60	0.15	60
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.1225	270.334	60	0.15	60
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.0612	135.167	30	0.15	30
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.0612	135.167	30	0.15	30
HL-**-2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.0612	135.167	30	0.15	30
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.0612	135.167	30	0.15	30
HL-**-2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0612	270.334	60	/	60
HL-**-PU2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0612	270.334	60	/	60
HL-**-2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0612	270.334	60	/	60
HL-**-PU2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0612	270.334	60	/	60
HL-**-2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0306	135.167	30	/	30

Model name	CRI (typ.)	CCT (K)	Series	Parallel	Power density per PCB (W/mm ²)	Current density per LED die (mA/mm ²)	Current per die (mA)	Distance between of dies(mm)	Current (mA)
HL-**-PU2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0306	135.167	30	/	30
HL-**-2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0306	135.167	30	/	30
HL-**-PU2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0306	135.167	30	/	30
HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.1225	270.334	60	0.15	120
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.1225	270.334	60	0.15	120
HL-**-2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.1225	270.334	60	0.15	120
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.1225	270.334	60	0.15	120
HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.1021	225.278	50	0.15	100
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.1021	225.278	50	0.15	100
HL-**-2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.1021	225.278	50	0.15	100
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.1021	225.278	50	0.15	100
HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0612	135.167	30	0.15	60
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0612	135.167	30	0.15	60
HL-**-2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0612	135.167	30	0.15	60
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0612	135.167	30	0.15	60
HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0306	67.583	15	0.15	30
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0306	67.583	15	0.15	30
HL-**-2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0306	67.583	15	0.15	30
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0306	67.583	15	0.15	30
HL-**-2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0612	255.495	30	0.15	60
HL-**-PU2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0612	255.495	30	0.15	60
HL-**-2835HV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0612	255.495	30	0.15	60
HL-**-PU2835HV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0612	255.495	30	0.15	60
HL-**-2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0306	127.748	15	0.15	30
HL-**-PU2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500	1	2	0.0306	127.748	15	0.15	30
HL-**-2835HV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0306	127.748	15	0.15	30
HL-**-PU2835HV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	2	0.0306	127.748	15	0.15	30
HL-**-2835HV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.0612	255.495	30	0.15	30
HL-**-PU2835HV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500	2	1	0.0612	255.495	30	0.15	30
HL-**-2835HV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.0612	255.495	30	0.15	30
HL-**-PU2835HV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500	2	1	0.0612	255.495	30	0.15	30
HL-**-2835HV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0306	255.495	30	/	30

Model name	CRI (typ.)	CCT (K)	Series	Parallel	Power density per PCB (W/mm ²)	Current density per LED die (mA/mm ²)	Current per die (mA)	Distance between of dies(mm)	Current (mA)
HL-**-PU2835HV***W-S1-08*-PCT-HR5-***	90	2200-6500	1	1	0.0306	255.495	30	/	30
HL-**-2835HV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0306	255.495	30	/	30
HL-**-PU2835HV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500	1	1	0.0306	255.495	30	/	30

Note:

The model name begins with "HL", such as "HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***", "*" is described in detail as follows:

1. The first "*" is a letter A or AS which stands for the Market demand.
2. The second "****" is a number from 1 to 999 which stands for the brightness level.
3. The third "*" is a letter L or None which stands for the bonding wire style.
4. The fourth "****" is the letter, which stands for the customer code.

1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR[®] Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2020-10-22	2021-10-21
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2020-10-22	2021-10-21
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2020-10-21	2021-10-20
Standard Light Source	EVERFINE	D062	1011093	2020-10-20	2021-10-19
Multilayer aging machine	BACL	B2-270	20023	2021-02-24	2022-02-23
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090003	2020-07-01	2021-06-30

1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ during photometric and electrical measurement test.

1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within $\pm 3\%$ of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to 25°C \pm 2°C, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 2 π measurement was used and sample was driven by DC power supply. The forward current was regulated to within $\pm 0.5\%$ of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is $U=1.59\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=21\text{K}$ ($K=2$), at the 95% confidence level.

The uncertainty of the temperature is $U=0.8671^{\circ}\text{C}$ ($K=2$), at the 95% confidence level.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

1.8 Sample Set

Data Set 1: 55°C , 60mA

Part Number: HL-AS-2835DVW-2C-S1-08L-PCT-HR5
Number of Units: 25
Case Temperature: $>53^{\circ}\text{C}$
Ambient Temperature: $>50^{\circ}\text{C}$
Life Test Drive Current: 60mA
Measurement Current: 60mA

Data Set 2: 105°C , 60mA

Part Number: HL-AS-2835DVW-2C-S1-08L-PCT-HR5
Number of Units: 25
Case Temperature: $>103^{\circ}\text{C}$
Ambient Temperature: $>100^{\circ}\text{C}$
Life Test Drive Current: 60mA
Measurement Current: 60mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L ₇₀ Lifetime
1	25	0	1000hrs	6000hrs	2.368E-06	1.003	>36000 hours
2	25	0	1000hrs	6000hrs	2.989E-06	1.003	>36000 hours

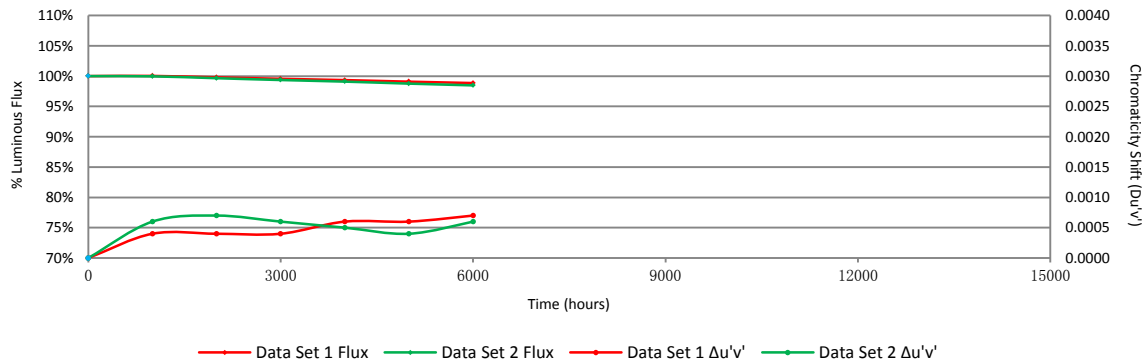
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	100.03%	99.79%	99.55%	99.34%	99.08%	98.85%
2	99.96%	99.65%	99.35%	99.09%	98.76%	98.47%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007
2	0.0006	0.0007	0.0006	0.0005	0.0004	0.0006

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	121.20	100.25	100.08	99.92	99.50	99.34	99.26
2	121.00	100.08	99.75	99.59	99.26	99.01	98.60
3	122.00	100.49	100.33	100.16	99.84	99.34	98.85
4	122.10	100.08	99.92	99.67	99.59	99.51	99.43
5	119.60	100.42	100.33	100.25	99.92	99.75	99.50
6	121.50	100.08	99.92	99.75	99.75	99.42	99.18
7	122.80	100.16	99.92	99.59	99.35	98.78	98.21
8	121.70	99.84	99.67	99.42	99.34	98.85	98.77
9	121.50	99.84	99.59	99.34	99.09	98.52	98.27
10	120.40	99.92	99.58	99.50	99.42	99.09	98.75
11	122.00	100.08	99.43	99.26	99.18	99.10	98.77
12	122.60	99.92	99.67	99.43	99.35	99.10	98.94
13	120.70	99.92	99.75	99.42	99.34	99.17	98.92
14	120.80	99.92	99.67	99.42	99.25	99.09	99.01
15	121.90	99.84	99.75	99.43	99.18	98.93	98.69
16	121.50	99.92	99.67	99.34	99.09	99.01	98.68
17	122.50	100.08	99.84	99.43	99.18	99.02	98.86
18	122.10	100.33	99.92	99.67	99.34	99.18	99.10
19	120.80	100.17	99.67	99.59	99.34	99.09	99.01
20	120.90	99.92	99.83	99.59	99.34	99.26	99.17
21	123.70	100.16	99.76	99.43	99.11	98.79	98.14
22	121.70	99.92	99.67	99.51	99.10	98.77	98.52
23	123.00	99.76	99.51	99.27	99.19	99.02	98.94
24	121.60	99.84	99.75	99.42	99.26	99.18	99.10
25	121.80	99.75	99.67	99.43	99.10	98.77	98.60
Avg.	121.66	100.03	99.79	99.55	99.34	99.08	98.85
Med.	121.70	99.92	99.75	99.43	99.34	99.09	98.86
st dev	0.89	0.20	0.22	0.25	0.23	0.27	0.35
Min.	119.60	99.75	99.43	99.26	99.09	98.52	98.14
Max.	123.70	100.49	100.33	100.25	99.92	99.75	99.50

3.2 Data Set 1, 55°C, 60mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	18.45	18.48	18.50	18.49	18.51	18.51	18.52
2	18.59	18.56	18.58	18.58	18.60	18.55	18.60
3	18.36	18.34	18.35	18.35	18.36	18.33	18.36
4	18.65	18.64	18.66	18.65	18.67	18.65	18.67
5	18.40	18.41	18.43	18.42	18.45	18.41	18.44
6	18.43	18.43	18.46	18.46	18.48	18.44	18.46
7	18.54	18.53	18.54	18.55	18.56	18.53	18.55
8	18.52	18.50	18.53	18.52	18.54	18.51	18.52
9	18.46	18.46	18.46	18.47	18.49	18.45	18.47
10	18.49	18.49	18.51	18.50	18.53	18.48	18.49
11	18.53	18.52	18.55	18.53	18.55	18.53	18.32
12	18.32	18.32	18.33	18.33	18.35	18.31	18.54
13	18.60	18.60	18.61	18.60	18.63	18.60	18.61
14	18.57	18.56	18.57	18.56	18.59	18.56	18.56
15	18.44	18.44	18.45	18.45	18.47	18.44	18.45
16	18.31	18.31	18.32	18.32	18.34	18.30	18.31
17	18.58	18.59	18.59	18.58	18.61	18.59	18.58
18	18.43	18.44	18.44	18.44	18.46	18.44	18.45
19	18.59	18.61	18.61	18.61	18.62	18.60	18.61
20	18.34	18.34	18.34	18.34	18.37	18.34	18.35
21	18.43	18.41	18.40	18.40	18.41	18.39	18.39
22	18.43	18.40	18.41	18.41	18.44	18.40	18.40
23	18.58	18.55	18.55	18.55	18.58	18.57	18.54
24	18.56	18.53	18.53	18.54	18.55	18.55	18.53
25	18.64	18.61	18.61	18.63	18.64	18.63	18.62
Avg.	18.49	18.48	18.49	18.49	18.51	18.48	18.49
Med.	18.49	18.49	18.51	18.50	18.53	18.51	18.52
st dev	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Min.	18.31	18.31	18.32	18.32	18.34	18.30	18.31
Max.	18.65	18.64	18.66	18.65	18.67	18.65	18.67

3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2571	0.5346	2782	0.0002	0.0002	0.0001	0.0007	0.0009	0.0009
2	0.2571	0.5348	2781	0.0001	0.0003	0.0003	0.0011	0.0012	0.0010
3	0.2574	0.5328	2784	0.0004	0.0005	0.0006	0.0006	0.0005	0.0005
4	0.2584	0.5365	2747	0.0004	0.0004	0.0004	0.0006	0.0004	0.0007
5	0.2583	0.5356	2752	0.0003	0.0000	0.0002	0.0009	0.0006	0.0009
6	0.2561	0.5355	2799	0.0002	0.0001	0.0001	0.0011	0.0010	0.0012
7	0.2572	0.5352	2778	0.0005	0.0004	0.0005	0.0005	0.0002	0.0004
8	0.2573	0.5352	2775	0.0004	0.0003	0.0002	0.0007	0.0009	0.0010
9	0.2586	0.5343	2752	0.0004	0.0003	0.0002	0.0008	0.0006	0.0012
10	0.2574	0.5354	2772	0.0004	0.0006	0.0004	0.0004	0.0005	0.0007
11	0.2594	0.5357	2730	0.0005	0.0006	0.0004	0.0006	0.0004	0.0006
12	0.2571	0.5358	2776	0.0004	0.0005	0.0004	0.0004	0.0005	0.0012
13	0.2579	0.5355	2761	0.0006	0.0006	0.0005	0.0004	0.0005	0.0006
14	0.2581	0.5355	2759	0.0006	0.0007	0.0006	0.0003	0.0002	0.0001
15	0.2585	0.5350	2752	0.0004	0.0004	0.0004	0.0005	0.0008	0.0008
16	0.2569	0.5351	2785	0.0004	0.0004	0.0004	0.0006	0.0009	0.0007
17	0.2564	0.5350	2795	0.0006	0.0006	0.0006	0.0004	0.0004	0.0007
18	0.2596	0.5362	2724	0.0002	0.0001	0.0001	0.0009	0.0006	0.0009
19	0.2591	0.5359	2736	0.0005	0.0005	0.0004	0.0003	0.0004	0.0004
20	0.2566	0.5341	2795	0.0004	0.0005	0.0004	0.0005	0.0002	0.0005
21	0.2587	0.5354	2745	0.0004	0.0004	0.0004	0.0007	0.0008	0.0010
22	0.2592	0.5351	2736	0.0008	0.0006	0.0007	0.0003	0.0002	0.0005
23	0.2578	0.5351	2765	0.0006	0.0005	0.0006	0.0003	0.0004	0.0004
24	0.2568	0.5333	2795	0.0005	0.0006	0.0006	0.0006	0.0003	0.0004
25	0.2565	0.5355	2791	0.0007	0.0006	0.0005	0.0003	0.0003	0.0005
Avg.	0.2577	0.5351	2767	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007
Med.	0.2574	0.5352	2772	0.0004	0.0005	0.0004	0.0006	0.0005	0.0007
st dev	0.0010	0.0008	22	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2561	0.5328	2724	0.0001	0.0000	0.0001	0.0003	0.0002	0.0001
Max.	0.2596	0.5365	2799	0.0008	0.0007	0.0007	0.0011	0.0012	0.0012

3.4 Data Set 2, 105°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	120.30	100.25	100.17	99.83	99.75	99.33	99.17
27	121.90	99.75	99.67	99.51	99.34	99.18	99.02
28	122.30	99.84	99.75	99.43	99.26	98.77	98.69
29	121.20	99.67	99.26	99.17	98.76	98.51	98.27
30	120.00	99.75	99.33	99.17	99.00	98.83	98.58
31	123.20	99.84	99.68	99.43	99.11	98.78	98.70
32	122.10	99.92	99.75	99.59	99.26	98.94	98.85
33	122.20	99.92	99.67	99.43	99.18	98.85	98.61
34	120.90	99.92	99.34	99.17	99.09	99.01	98.68
35	123.30	100.08	99.51	99.11	98.95	98.86	98.46
36	122.10	100.16	99.51	99.18	98.94	98.61	98.44
37	122.80	100.08	99.67	99.19	99.02	98.94	98.70
38	120.60	99.92	99.59	99.09	98.92	98.76	98.59
39	121.90	99.84	99.51	99.10	98.69	98.44	97.95
40	120.30	99.50	99.09	98.92	98.67	98.42	98.17
41	120.40	99.92	99.83	99.25	98.92	98.75	98.34
42	121.50	100.08	99.84	99.34	99.01	98.60	98.35
43	121.00	100.08	99.67	99.50	99.09	98.76	98.35
44	120.70	100.25	99.92	99.50	99.01	98.84	98.51
45	121.50	99.92	99.51	99.26	99.01	98.35	97.86
46	122.30	100.08	99.67	99.35	99.02	98.69	98.20
47	121.20	99.92	99.59	99.34	98.93	98.27	97.85
48	120.70	100.25	99.92	99.75	99.59	98.92	98.76
49	121.30	100.25	100.08	99.59	99.42	98.85	98.35
50	120.60	99.92	99.83	99.59	99.42	98.76	98.26
Avg.	121.45	99.96	99.65	99.35	99.09	98.76	98.47
Med.	121.30	99.92	99.67	99.34	99.02	98.77	98.46
st dev	0.93	0.19	0.25	0.22	0.26	0.24	0.33
Min.	120.00	99.50	99.09	98.92	98.67	98.27	97.85
Max.	123.30	100.25	100.17	99.83	99.75	99.33	99.17

3.5 Data Set 2, 105°C, 60mA (Forward Voltage)

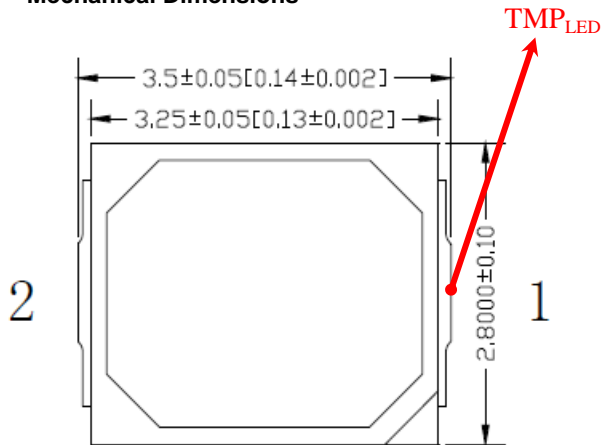
No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	18.35	18.35	18.36	18.35	18.39	18.37	18.36
27	18.39	18.37	18.38	18.39	18.41	18.39	18.39
28	18.34	18.31	18.33	18.31	18.34	18.32	18.32
29	18.42	18.39	18.42	18.41	18.44	18.41	18.42
30	18.31	18.30	18.32	18.32	18.34	18.31	18.31
31	18.57	18.52	18.54	18.54	18.56	18.54	18.54
32	18.40	18.38	18.41	18.40	18.42	18.39	18.39
33	18.43	18.41	18.41	18.42	18.44	18.42	18.41
34	18.42	18.41	18.42	18.42	18.44	18.41	18.42
35	18.40	18.40	18.40	18.40	18.42	18.39	18.40
36	18.41	18.41	18.42	18.43	18.45	18.41	18.42
37	18.39	18.38	18.40	18.39	18.42	18.39	18.39
38	18.52	18.51	18.52	18.52	18.55	18.52	18.53
39	18.40	18.40	18.40	18.42	18.43	18.40	18.40
40	18.32	18.33	18.33	18.33	18.35	18.33	18.33
41	18.50	18.51	18.51	18.51	18.53	18.49	18.51
42	18.47	18.48	18.49	18.48	18.50	18.48	18.49
43	18.55	18.56	18.56	18.56	18.58	18.55	18.55
44	18.44	18.44	18.44	18.45	18.48	18.44	18.44
45	18.37	18.38	18.39	18.37	18.41	18.38	18.38
46	18.50	18.50	18.51	18.49	18.53	18.50	18.50
47	18.49	18.51	18.50	18.50	18.53	18.49	18.50
48	18.37	18.37	18.37	18.38	18.40	18.37	18.37
49	18.59	18.60	18.60	18.59	18.62	18.59	18.59
50	18.49	18.49	18.49	18.48	18.51	18.48	18.48
Avg.	18.43	18.43	18.44	18.43	18.46	18.43	18.43
Med.	18.42	18.41	18.42	18.42	18.44	18.41	18.42
st dev	0.08	0.08	0.08	0.08	0.08	0.07	0.08
Min.	18.31	18.30	18.32	18.31	18.34	18.31	18.31
Max.	18.59	18.60	18.60	18.59	18.62	18.59	18.59

3.6 Data Set 2, 105°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2608	0.5358	2702	0.0003	0.0001	0.0001	0.0007	0.0007	0.0009
27	0.2573	0.5354	2774	0.0007	0.0008	0.0008	0.0002	0.0003	0.0004
28	0.2565	0.5339	2798	0.0007	0.0006	0.0006	0.0010	0.0008	0.0009
29	0.2603	0.5359	2712	0.0004	0.0003	0.0002	0.0010	0.0008	0.0011
30	0.2576	0.5354	2768	0.0008	0.0011	0.0010	0.0003	0.0002	0.0001
31	0.2590	0.5357	2738	0.0008	0.0008	0.0007	0.0009	0.0005	0.0006
32	0.2569	0.5353	2783	0.0009	0.0011	0.0009	0.0003	0.0003	0.0000
33	0.2580	0.5354	2759	0.0006	0.0005	0.0004	0.0009	0.0005	0.0006
34	0.2572	0.5342	2783	0.0004	0.0006	0.0004	0.0007	0.0002	0.0005
35	0.2566	0.5343	2795	0.0006	0.0007	0.0006	0.0004	0.0003	0.0007
36	0.2609	0.5358	2700	0.0005	0.0008	0.0007	0.0003	0.0001	0.0004
37	0.2573	0.5351	2777	0.0005	0.0008	0.0006	0.0002	0.0002	0.0003
38	0.2581	0.5363	2754	0.0006	0.0008	0.0008	0.0001	0.0003	0.0001
39	0.2598	0.5362	2720	0.0002	0.0002	0.0001	0.0010	0.0010	0.0013
40	0.2571	0.5361	2777	0.0007	0.0009	0.0007	0.0002	0.0003	0.0004
41	0.2579	0.5351	2764	0.0005	0.0007	0.0006	0.0003	0.0006	0.0006
42	0.2567	0.5356	2785	0.0005	0.0006	0.0005	0.0004	0.0003	0.0007
43	0.2581	0.5352	2760	0.0004	0.0006	0.0005	0.0003	0.0003	0.0005
44	0.2577	0.5340	2772	0.0006	0.0007	0.0007	0.0003	0.0004	0.0008
45	0.2556	0.5349	2813	0.0005	0.0006	0.0005	0.0004	0.0001	0.0005
46	0.2574	0.5354	2773	0.0005	0.0007	0.0006	0.0004	0.0001	0.0006
47	0.2567	0.5332	2796	0.0005	0.0006	0.0005	0.0007	0.0004	0.0007
48	0.2593	0.5352	2733	0.0006	0.0007	0.0007	0.0003	0.0000	0.0005
49	0.2578	0.5353	2765	0.0006	0.0008	0.0006	0.0002	0.0001	0.0002
50	0.2596	0.5343	2732	0.0005	0.0006	0.0005	0.0006	0.0004	0.0007
Avg.	0.2580	0.5352	2761	0.0006	0.0007	0.0006	0.0005	0.0004	0.0006
Med.	0.2577	0.5353	2768	0.0005	0.0007	0.0006	0.0004	0.0003	0.0006
st dev	0.0014	0.0008	31	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003
Min.	0.2556	0.5332	2700	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000
Max.	0.2609	0.5363	2813	0.0009	0.0011	0.0010	0.0010	0.0010	0.0013

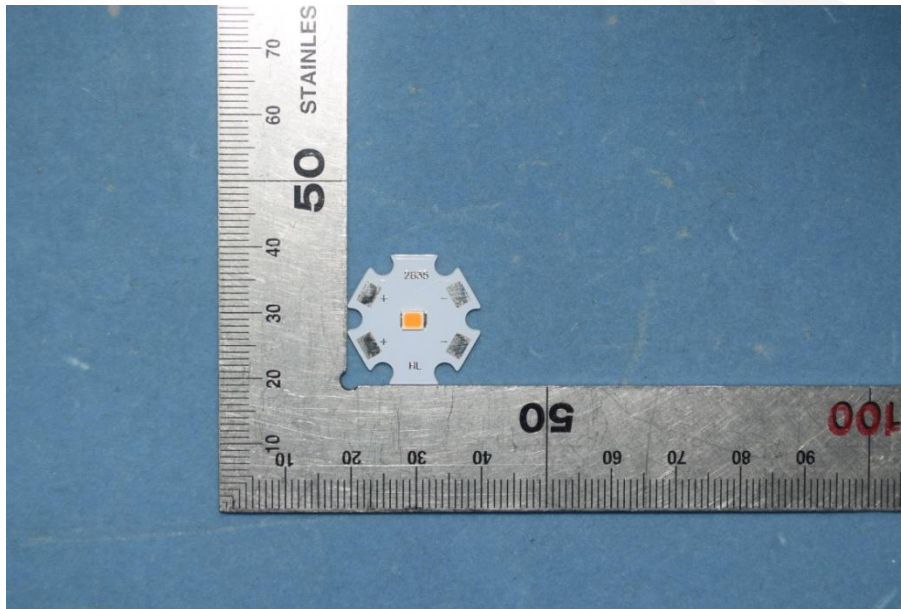
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
6. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

*****END OF REPORT*****