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-C3535F26B3EA-ZW

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ190428536-10-9000-M2
Test Date:	2020-01-09 to 2021-02-21
Report Date:	2022-08-30
Approved by:	Bill Xiong / EE Engineer
Revised Note:	The previous report RSZ190428536-10-9000-M1 is replaced by this report on 2022-08-30
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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

60 PCS test samples were in good condition and received on 2019-04-28. The samples were numbered from 1 to 30 and 31 to 60.

#Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
#Part Number:	HL-C3535F26B3EA-ZW
#Part Type:	LED Package
#Drive Level:	DC 700mA
#Wavelength:	440nm
#Power:	2.24W
#Average Current Density per LED die:	573.3mA/mm^2
#Average Power Density per LED die:	1.835W/mm^2
#CRI:	NA
#Die Spacing:	NA

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	Total Input Current (mA)	Power (W)	Wavelength (nm)	Number of dies	Driver current per die (mA)	Current Density per Die（mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
HL-C3535F26B3EA-ZW	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F**B**A-ZW	700	2.24	440	1	700	573.3	0.188	/
HL-C3535K**B**A-ZW	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F**B**A-ZW-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535K**B**A-ZW-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F**B**A-****-ZW	700	2.24	440	1	700	573.3	0.188	/
HL-C3535K**B**A-****-ZW	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F**B**A-****-ZW-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535K**B**A-****-ZW-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F**B**A-****-ZW-FC-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535K**B**A-****-ZW-FC-**	700	2.24	440	1	700	573.3	0.188	/
HL-C3535F22B3EA-ZW	700	2.24	440	1	700	535.8	0.188	/

Model Name	Total Input Current (mA)	Power (W)	Wavelength (nm)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
HL-C3535F22B3GA-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535F42B1EA	350	1.19	440	1	350	442.9	0.1	/
HL-C3535F42B1GA	350	1.19	440	1	350	442.9	0.1	/
HL-C3535F77B1GA-ZW-FC	350	1.19	440	1	350	293.4	0.1	/
HL-C3535F77B1EA-FC	350	1.19	440	1	350	293.4	0.1	/
HL-C3535K4B3EA-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K4B3EA	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K4B3GA	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K4B3GA-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K4B3GA-LVR2-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K4B3GA-LVR5-ZW-QX	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K6B3EA	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K8B1EA	350	1.19	440	1	350	307.5	0.1	/
HL-C3535F26B3GA-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535F36B3GA-ZW	700	2.24	440	1	700	535.8	0.188	/
HL-C3535K9B3GA-FC	700	2.24	440	1	700	357.1	0.188	/
HL-C3535K9B3EA-ZW-FC	700	2.24	440	1	700	357.1	0.188	/
HL-C3535K9B3GA-ZW-FC	700	2.24	440	1	700	357.1	0.188	/
HL-C3535K9B3GA-LVR-ZW-FC-QX	700	2.24	440	1	700	357.1	0.188	/

Note: The model name begins with "HL", such as “HL-C3535F**B**A-****-ZW-FC-**”, " *" is described in detail as follows:

1. The first “**” is a number from 1 to 99 which stands for the brightness level.
2. The second “*” is a number from 1 to 9 which stands for the power level.
3. The third “*” represents the molding equipment number "E" or "G".
4. The fourth “****” which stands for the Zener chip code or None, No impact on product performances, Zener chip code refers to the electrostatic capacity.
5. The fifth “**” 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
- ANSI/ASABE S640 JUL2017 Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms) (This standard was not accredited by IAS)
- ANSI/ASABE S642 SEP2018: Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2020-10-22	2021-10-21
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2020-10-21	2021-10-20
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2020-10-22	2021-10-21
Standard Light Source	EVERFINE	D062	1011093	2020-10-20	2021-10-19
Multilayer aging machine	BACL	B2-270	20013	2020-03-11	2021-03-10
Programmable D.C. power supply	Xinnuoer	ATP-5005	N/A	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 ±3% of the specified value of the manufacturer during maintenance test, and was within ±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 ±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 ± 2°C, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure spectral power distribution and photon flux. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

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: 85°C, 700mA

Part Number:	HL-C3535F26B3EA-ZW
Number of Units:	30
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	700mA
Measurement Current:	700mA

Data Set 2: 105°C, 700mA

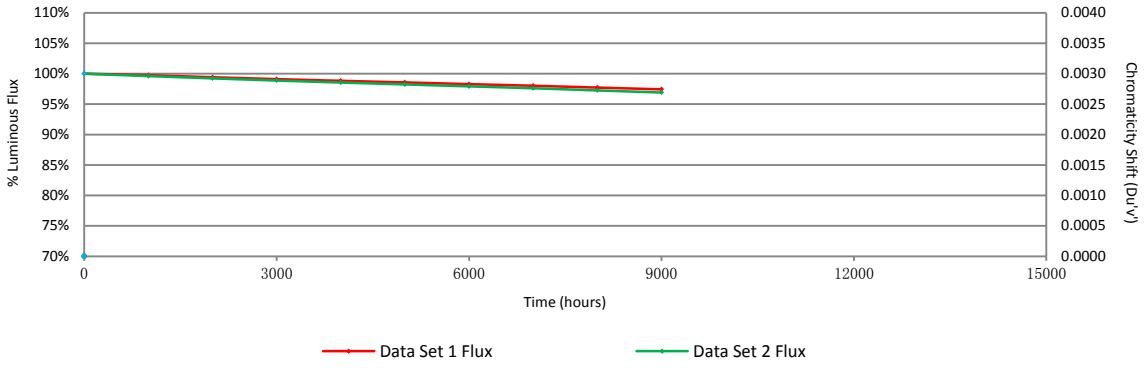
Part Number:	HL-C3535F26B3EA-ZW
Number of Units:	30
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	700mA
Measurement Current:	700mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q_{70} Lifetime	Reported TM-21 Q_{90} Lifetime
1	30	0	1000hrs	9000hrs	2.859E-06	1.000	>54000 hours	37,000 hours
2	30	0	1000hrs	9000hrs	3.356E-06	0.999	>54000 hours	31,000 hours

Average Photon Flux Maintenance, Photosynthetic 400-700nm (PFM_P) (Percentage of Initial)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	99.75%	99.42%	99.11%	98.83%	98.57%	98.29%	98.02%	97.72%	97.43%
2	99.61%	99.23%	98.88%	98.55%	98.24%	97.92%	97.61%	97.25%	96.91%



3 - Test Data

3.1 Data Set 1, 85°C, 700mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (µmol × s^{-1})	400-700nm Photon Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3.713	99.60	99.27	99.00	98.65	98.28	97.82	97.33	97.01	96.66
2	3.752	99.12	98.85	98.45	98.29	98.13	97.84	97.68	97.55	97.28
3	3.629	99.04	98.70	98.29	98.04	97.80	97.52	97.30	96.97	96.78
4	3.651	99.62	99.15	98.96	98.52	98.19	97.86	97.40	97.15	96.90
5	3.679	100.68	100.22	99.76	99.57	99.29	99.10	99.08	98.89	98.61
6	3.746	98.96	98.72	98.48	98.13	97.81	97.49	97.17	96.93	96.66
7	3.683	99.78	99.43	99.19	99.00	98.81	98.67	98.18	97.80	97.53
8	3.597	99.61	99.19	98.94	98.58	98.28	98.00	97.89	97.64	97.41
9	3.629	99.26	98.87	98.65	98.32	98.02	97.82	97.60	97.19	96.83
10	3.633	99.48	99.15	98.90	98.65	98.40	98.05	97.74	97.50	97.22
11	3.553	99.38	99.18	98.96	98.76	98.48	98.31	97.69	97.33	97.07
12	3.691	99.89	99.51	99.21	98.89	98.67	98.32	97.72	97.37	96.97
13	3.658	100.08	99.78	99.37	99.10	98.80	98.58	98.11	97.76	97.46
14	3.684	99.73	99.48	99.13	98.89	98.59	98.18	98.10	97.86	97.56
15	3.613	100.42	100.14	99.75	99.39	99.23	98.95	98.81	98.48	98.28
16	3.621	99.83	99.48	99.23	98.98	98.78	98.48	98.43	98.15	97.87
17	3.698	99.24	99.03	98.73	98.38	98.00	97.81	97.46	97.08	96.78
18	3.607	100.30	100.08	99.61	99.33	99.11	98.92	98.67	98.34	98.14
19	3.643	100.44	100.05	99.78	99.42	99.12	98.93	98.76	98.49	98.13
20	3.647	98.96	98.74	98.52	98.16	97.94	97.61	97.42	97.07	96.71
21	3.668	99.48	99.13	98.75	98.42	98.20	97.93	97.93	97.57	97.30
22	3.661	100.36	100.14	99.84	99.64	99.37	99.04	98.72	98.47	98.12
23	3.542	100.56	100.08	99.83	99.58	99.27	98.96	98.79	98.48	98.11
24	3.705	100.32	99.92	99.70	99.46	99.16	98.84	98.57	98.30	97.95
25	3.739	100.32	99.92	99.44	99.17	98.82	98.53	98.18	97.91	97.65
26	3.676	99.56	99.21	98.94	98.64	98.45	98.15	97.74	97.50	97.28
27	3.577	99.02	98.80	98.57	98.29	98.13	97.96	97.68	97.37	97.09
28	3.645	99.81	99.34	99.09	98.88	98.68	98.33	97.86	97.45	97.17
29	3.588	99.92	99.67	99.39	99.11	98.89	98.72	98.49	98.10	97.77
30	3.631	99.61	99.28	98.93	98.79	98.40	98.10	97.99	97.82	97.58
Avg.	3.652	99.75	99.42	99.11	98.83	98.57	98.29	98.02	97.72	97.43
Med.	3.649	99.67	99.31	99.05	98.83	98.53	98.25	97.91	97.61	97.36
st dev	0.053	0.51	0.48	0.46	0.47	0.47	0.49	0.53	0.54	0.54
Min.	3.542	98.96	98.70	98.29	98.04	97.80	97.49	97.17	96.93	96.66
Max.	3.752	100.68	100.22	99.84	99.64	99.37	99.10	99.08	98.89	98.61

3.2 Data Set 1, 85°C, 700mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3.434	3.451	3.462	3.469	3.480	3.456	3.483	3.467	3.475	3.478
2	3.433	3.455	3.460	3.461	3.459	3.447	3.496	3.453	3.464	3.466
3	3.438	3.444	3.464	3.491	3.453	3.445	3.489	3.450	3.464	3.466
4	3.415	3.431	3.440	3.468	3.479	3.430	3.474	3.438	3.451	3.451
5	3.421	3.412	3.430	3.495	3.426	3.420	3.474	3.425	3.438	3.439
6	3.445	3.449	3.455	3.481	3.475	3.454	3.502	3.463	3.474	3.465
7	3.438	3.444	3.458	3.454	3.477	3.448	3.475	3.453	3.468	3.467
8	3.434	3.434	3.452	3.477	3.468	3.442	3.481	3.442	3.464	3.455
9	3.436	3.432	3.443	3.491	3.481	3.436	3.464	3.444	3.460	3.454
10	3.436	3.439	3.459	3.487	3.468	3.453	3.471	3.450	3.489	3.461
11	3.447	3.441	3.451	3.472	3.455	3.481	3.506	3.455	3.468	3.467
12	3.428	3.431	3.446	3.459	3.457	3.447	3.458	3.449	3.470	3.465
13	3.436	3.430	3.434	3.460	3.468	3.460	3.459	3.442	3.457	3.455
14	3.431	3.433	3.439	3.457	3.482	3.450	3.469	3.447	3.481	3.472
15	3.435	3.433	3.453	3.458	3.472	3.443	3.467	3.445	3.455	3.457
16	3.423	3.427	3.433	3.460	3.492	3.439	3.454	3.443	3.465	3.454
17	3.424	3.431	3.441	3.459	3.484	3.448	3.466	3.450	3.479	3.468
18	3.432	3.430	3.443	3.495	3.480	3.445	3.457	3.445	3.459	3.457
19	3.451	3.442	3.446	3.478	3.470	3.463	3.462	3.459	3.479	3.467
20	3.422	3.427	3.440	3.460	3.450	3.440	3.454	3.447	3.463	3.453
21	3.463	3.436	3.440	3.472	3.457	3.446	3.459	3.447	3.464	3.458
22	3.441	3.443	3.451	3.481	3.471	3.460	3.468	3.457	3.473	3.471
23	3.446	3.434	3.438	3.451	3.460	3.447	3.476	3.445	3.461	3.456
24	3.439	3.442	3.452	3.468	3.469	3.454	3.497	3.456	3.486	3.467
25	3.429	3.431	3.438	3.464	3.465	3.450	3.459	3.452	3.485	3.457
26	3.433	3.438	3.453	3.481	3.478	3.458	3.476	3.466	3.472	3.472
27	3.426	3.428	3.440	3.445	3.446	3.442	3.466	3.455	3.475	3.464
28	3.435	3.439	3.446	3.463	3.465	3.456	3.484	3.464	3.485	3.463
29	3.434	3.432	3.444	3.455	3.457	3.451	3.471	3.464	3.484	3.462
30	3.439	3.441	3.457	3.459	3.461	3.452	3.478	3.466	3.479	3.467
Avg.	3.435	3.436	3.447	3.469	3.467	3.449	3.473	3.451	3.470	3.462
Med.	3.435	3.434	3.446	3.466	3.468	3.448	3.471	3.450	3.469	3.464
st dev	0.010	0.009	0.009	0.014	0.014	0.011	0.014	0.010	0.012	0.008
Min.	3.415	3.412	3.430	3.445	3.426	3.420	3.454	3.425	3.438	3.439
Max.	3.463	3.455	3.464	3.495	3.492	3.481	3.506	3.467	3.489	3.478

3.3 Data Set 1, 85°C, 700mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	434.7	434.6	434.7	434.5	434.9	434.7	434.9	434.6	433.9	434.5
2	433.9	433.9	433.9	433.9	433.9	434.0	433.9	433.8	433.7	433.9
3	433.8	433.8	433.8	433.8	433.9	433.8	434.0	433.6	433.8	433.8
4	433.9	433.9	433.9	434.6	434.0	433.9	433.9	433.9	433.9	434.2
5	435.6	435.3	435.1	435.1	435.7	435.1	435.4	434.7	434.6	435.1
6	433.8	433.8	433.7	433.7	433.8	433.8	433.8	433.4	432.9	433.4
7	434.9	434.7	434.7	435.0	434.7	434.8	435.0	434.7	433.9	434.7
8	433.8	433.9	433.8	433.8	433.7	433.8	433.8	433.8	433.1	433.8
9	434.0	434.6	433.9	434.6	433.9	433.9	433.9	433.9	433.8	434.4
10	434.6	434.7	434.7	434.8	434.7	434.9	434.7	434.6	433.9	434.7
11	434.7	434.6	434.7	434.7	434.4	434.6	434.8	434.6	433.9	434.4
12	433.9	433.9	433.9	433.9	433.9	434.0	433.9	433.8	433.8	434.1
13	433.8	433.9	433.8	433.9	433.9	433.9	433.8	433.8	433.6	433.8
14	434.7	435.0	435.0	434.9	434.7	434.7	434.7	434.9	434.6	434.7
15	434.6	434.4	434.7	434.7	434.7	434.6	434.7	434.6	433.9	434.4
16	434.6	433.9	434.6	434.6	433.9	434.6	434.6	433.9	434.0	434.4
17	434.9	434.8	434.7	434.9	434.7	434.9	434.9	434.7	434.8	434.7
18	434.9	434.8	434.7	434.7	434.9	434.7	434.7	434.7	434.6	435.0
19	434.9	434.9	434.7	435.0	435.0	434.7	435.0	435.2	434.7	435.0
20	434.7	433.9	434.6	434.6	433.9	434.0	433.9	433.9	433.8	434.2
21	434.7	435.0	434.9	434.7	434.9	434.8	434.7	435.0	434.0	435.0
22	433.9	434.0	433.9	434.4	434.3	433.9	433.9	433.8	434.0	434.2
23	434.7	434.9	434.7	434.7	434.8	434.9	434.9	434.6	433.9	434.7
24	434.9	434.7	434.9	434.7	435.0	434.7	435.1	434.7	433.9	435.2
25	434.7	434.7	435.0	435.0	434.7	434.7	434.9	434.7	434.5	434.7
26	435.0	434.9	434.7	434.7	435.0	434.8	434.9	434.7	434.6	434.4
27	433.8	433.8	433.1	433.8	433.7	433.1	433.5	433.4	432.4	432.9
28	434.8	434.8	435.0	434.9	434.9	435.0	434.7	434.9	434.6	435.0
29	434.7	434.7	434.7	434.9	434.7	434.7	434.9	434.7	434.2	434.6
30	434.7	434.0	434.6	434.7	434.6	434.2	434.6	434.6	433.9	434.5
Avg.	434.5	434.4	434.4	434.5	434.5	434.4	434.5	434.3	434.0	434.4
Med.	434.7	434.6	434.7	434.7	434.7	434.7	434.7	434.6	433.9	434.5
st dev	0.4869	0.4719	0.5136	0.4296	0.5170	0.4955	0.5202	0.5184	0.5343	0.5237
Min.	433.8	433.8	433.1	433.7	433.7	433.1	433.5	433.4	432.4	432.9
Max.	435.6	435.3	435.1	435.1	435.7	435.1	435.4	435.2	434.8	435.2

3.4 Data Set 2, 105°C, 700mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	3.561	99.80	99.52	99.19	98.85	98.65	98.40	98.26	97.81	97.47
32	3.620	99.67	99.28	98.98	98.59	98.15	97.79	97.71	97.35	97.04
33	3.657	98.74	98.39	98.09	97.79	97.57	97.18	96.75	96.42	96.23
34	3.690	99.38	99.02	98.73	98.29	97.91	97.67	97.15	96.69	96.31
35	3.707	100.08	99.68	99.30	99.03	98.73	98.33	98.08	97.79	97.46
36	3.706	100.30	99.92	99.62	99.22	98.92	98.54	98.27	97.98	97.76
37	3.620	100.75	100.28	99.97	99.72	99.28	99.03	98.56	98.23	97.82
38	3.744	99.60	99.23	98.90	98.58	98.16	97.70	97.44	97.14	96.90
39	3.721	98.93	98.50	98.12	97.80	97.47	97.12	96.69	96.40	96.02
40	3.650	100.33	100.05	99.67	99.34	99.18	98.90	98.27	97.92	97.62
41	3.625	99.78	99.37	98.87	98.57	98.18	97.96	97.77	97.32	96.99
42	3.628	100.22	99.92	99.70	99.48	99.06	98.81	98.21	97.79	97.46
43	3.741	98.80	98.45	98.08	97.59	97.43	97.01	96.95	96.66	96.26
44	3.623	99.83	99.53	99.23	98.90	98.62	98.18	97.74	97.32	96.91
45	3.765	99.10	98.67	98.38	98.14	97.93	97.64	97.24	96.81	96.52
46	3.681	98.91	98.51	98.18	97.94	97.66	97.28	96.96	96.69	96.36
47	3.777	99.47	99.18	98.76	98.49	98.15	97.93	97.86	97.48	97.03
48	3.701	99.70	99.49	99.11	98.78	98.57	98.27	97.78	97.41	96.97
49	3.652	100.33	99.95	99.59	99.29	99.04	98.71	98.14	97.89	97.56
50	3.595	99.86	99.47	99.14	98.66	98.30	98.00	97.77	97.41	97.05
51	3.610	99.39	99.03	98.73	98.42	98.01	97.65	97.59	97.29	96.95
52	3.655	99.32	98.93	98.36	98.08	97.76	97.46	97.35	96.94	96.50
53	3.625	100.06	99.59	99.26	98.95	98.73	98.51	98.07	97.60	97.27
51	3.614	100.22	99.70	99.36	99.03	98.81	98.45	97.84	97.43	97.12
55	3.589	99.41	99.00	98.61	98.30	97.91	97.66	97.41	97.05	96.63
56	3.698	99.51	99.16	98.81	98.38	98.08	97.81	97.57	97.27	96.89
57	3.577	99.78	99.27	98.94	98.60	98.24	97.90	97.51	97.04	96.73
58	3.685	98.94	98.59	98.15	97.83	97.53	97.20	97.18	96.96	96.74
59	3.677	99.05	98.69	98.40	97.96	97.61	97.23	97.06	96.76	96.46
60	3.719	98.92	98.57	98.31	97.98	97.58	97.23	96.99	96.56	96.34
Avg.	3.664	99.61	99.23	98.88	98.55	98.24	97.92	97.61	97.25	96.91
Med.	3.656	99.63	99.25	98.89	98.57	98.15	97.86	97.65	97.30	96.93
st dev	0.057	0.53	0.53	0.54	0.56	0.56	0.58	0.50	0.50	0.49
Min.	3.561	98.74	98.39	98.08	97.59	97.43	97.01	96.69	96.40	96.02
Max.	3.777	100.75	100.28	99.97	99.72	99.28	99.03	98.56	98.23	97.82

3.5 Data Set 2, 105°C, 700mA (Forward Voltage)

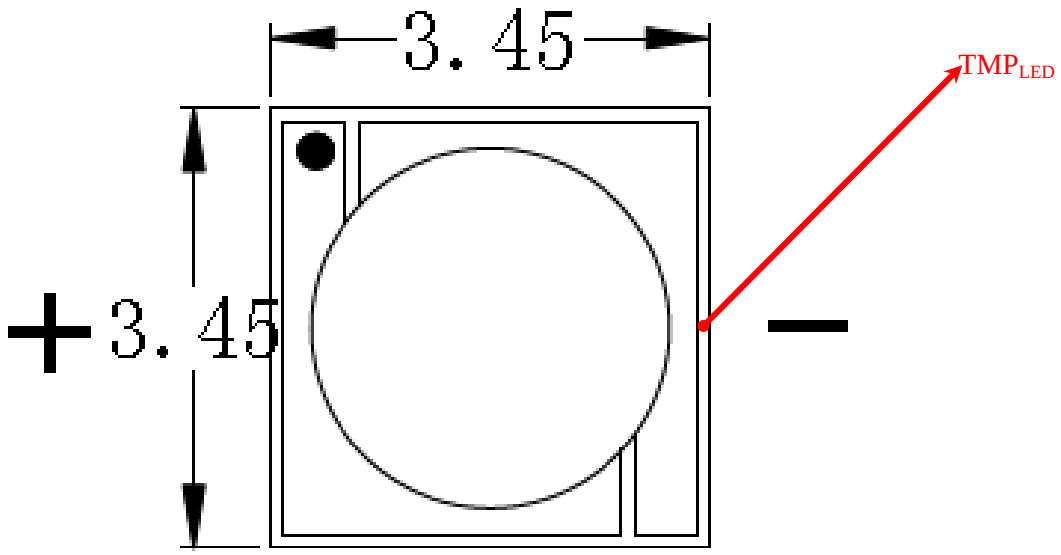
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	3.425	3.428	3.440	3.472	3.444	3.444	3.448	3.448	3.469	3.463
32	3.436	3.437	3.466	3.479	3.456	3.452	3.457	3.458	3.476	3.477
33	3.424	3.426	3.444	3.488	3.447	3.441	3.450	3.444	3.466	3.465
34	3.419	3.423	3.454	3.488	3.446	3.459	3.450	3.441	3.462	3.461
35	3.429	3.431	3.448	3.488	3.452	3.465	3.485	3.455	3.477	3.468
36	3.435	3.442	3.460	3.478	3.476	3.479	3.473	3.461	3.490	3.479
37	3.424	3.434	3.450	3.509	3.462	3.491	3.461	3.458	3.487	3.484
38	3.432	3.439	3.451	3.464	3.464	3.483	3.461	3.457	3.492	3.482
39	3.435	3.446	3.458	3.508	3.469	3.466	3.459	3.460	3.490	3.487
40	3.428	3.432	3.449	3.481	3.466	3.462	3.455	3.455	3.472	3.481
41	3.430	3.430	3.448	3.469	3.486	3.461	3.455	3.453	3.478	3.485
42	3.438	3.444	3.464	3.481	3.486	3.475	3.466	3.465	3.475	3.481
43	3.431	3.451	3.452	3.482	3.472	3.489	3.461	3.457	3.481	3.477
44	3.436	3.441	3.448	3.478	3.500	3.460	3.460	3.461	3.488	3.479
45	3.433	3.441	3.452	3.485	3.501	3.468	3.463	3.461	3.488	3.479
46	3.437	3.449	3.457	3.493	3.501	3.476	3.466	3.464	3.487	3.485
47	3.436	3.446	3.453	3.499	3.502	3.462	3.474	3.467	3.486	3.489
48	3.423	3.429	3.440	3.511	3.445	3.451	3.462	3.454	3.479	3.467
49	3.428	3.448	3.443	3.479	3.470	3.458	3.459	3.463	3.501	3.471
50	3.425	3.433	3.452	3.483	3.465	3.454	3.456	3.455	3.471	3.471
51	3.425	3.429	3.452	3.484	3.473	3.457	3.451	3.469	3.488	3.478
52	3.424	3.431	3.448	3.497	3.448	3.459	3.452	3.487	3.472	3.474
53	3.483	3.489	3.451	3.497	3.459	3.467	3.466	3.467	3.506	3.478
51	3.439	3.447	3.462	3.495	3.466	3.469	3.469	3.466	3.485	3.479
55	3.412	3.465	3.447	3.468	3.453	3.453	3.450	3.462	3.508	3.484
56	3.437	3.446	3.455	3.493	3.472	3.466	3.479	3.492	3.500	3.500
57	3.432	3.443	3.454	3.495	3.471	3.463	3.456	3.481	3.506	3.487
58	3.420	3.425	3.437	3.499	3.451	3.460	3.447	3.477	3.499	3.481
59	3.436	3.441	3.458	3.501	3.464	3.466	3.462	3.489	3.496	3.492
60	3.428	3.440	3.449	3.494	3.455	3.456	3.455	3.492	3.503	3.482
Avg.	3.431	3.440	3.451	3.488	3.467	3.464	3.460	3.464	3.486	3.479
Med.	3.431	3.441	3.452	3.488	3.466	3.462	3.460	3.461	3.487	3.479
st dev	0.012	0.013	0.007	0.012	0.017	0.012	0.009	0.013	0.013	0.009
Min.	3.412	3.423	3.437	3.464	3.444	3.441	3.447	3.441	3.462	3.461
Max.	3.483	3.489	3.466	3.511	3.502	3.491	3.485	3.492	3.508	3.500

3.6 Data Set 2, 105°C, 700mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	433.9	433.9	433.8	433.9	433.8	433.9	433.8	433.8	433.7	433.5
32	433.9	433.9	433.9	433.9	434.6	433.9	433.9	433.7	433.8	434.4
33	433.9	433.9	433.8	433.9	433.9	433.9	433.8	433.8	433.9	434.0
34	434.6	434.6	434.7	433.9	434.6	434.7	434.0	433.9	433.8	434.4
35	433.9	434.0	433.9	433.9	433.9	433.9	433.9	433.9	433.9	433.8
36	434.8	434.9	434.6	434.7	434.9	434.7	434.9	434.7	434.6	434.7
37	434.9	434.7	434.7	435.0	434.9	434.7	434.9	434.7	434.7	435.0
38	434.9	435.0	434.7	434.8	434.7	435.0	434.9	434.8	434.5	434.7
39	435.0	435.0	435.1	435.3	435.0	435.0	434.7	434.9	434.9	435.0
40	435.0	435.0	435.0	434.7	434.8	435.0	435.2	434.7	434.7	434.7
41	433.8	433.8	433.8	433.8	433.7	433.6	433.7	433.6	433.4	433.8
42	434.6	434.6	434.1	433.9	434.4	433.9	434.6	434.4	433.9	434.4
43	434.8	434.7	434.6	434.8	434.9	434.6	434.9	434.5	433.9	434.4
44	434.6	434.6	434.6	434.8	434.7	434.7	434.6	434.6	433.9	434.4
45	434.7	434.5	434.6	433.9	434.7	434.2	434.7	434.6	433.9	434.4
46	433.9	434.6	434.0	434.6	433.9	434.0	434.6	434.6	433.8	434.4
47	434.6	434.6	434.6	434.7	434.7	434.6	434.6	434.6	433.9	434.5
48	433.8	434.0	433.9	433.9	433.9	433.9	433.9	433.8	433.7	433.8
49	433.9	433.9	433.8	433.9	433.9	433.9	433.9	433.8	433.7	433.8
50	434.7	434.6	434.7	434.7	434.4	434.7	434.2	434.6	433.9	434.7
51	434.6	434.7	434.7	434.3	434.7	434.1	434.7	434.6	433.9	434.5
52	433.8	433.9	433.9	433.8	433.9	433.8	433.9	433.7	433.7	433.8
53	435.3	435.3	434.9	435.1	434.9	434.7	434.5	434.7	433.9	434.7
51	435.0	435.0	435.4	435.0	435.0	435.0	434.8	435.4	434.7	434.7
55	434.7	434.9	434.6	434.6	434.2	434.6	434.2	433.9	433.9	434.4
56	434.1	434.7	434.6	434.6	434.7	433.9	434.6	434.6	433.9	434.4
57	434.1	433.9	434.1	433.9	433.9	433.9	433.9	433.8	433.8	434.4
58	434.9	434.7	434.9	434.9	435.0	435.0	435.0	435.4	434.7	435.0
59	434.9	435.0	434.7	434.7	434.9	434.8	435.0	434.7	434.4	435.0
60	433.9	433.9	433.8	433.9	433.8	433.9	434.0	433.8	433.9	433.9
Avg.	434.5	434.5	434.4	434.4	434.4	434.4	434.4	434.4	434.0	434.4
Med.	434.6	434.6	434.6	434.6	434.7	434.4	434.6	434.6	433.9	434.4
st dev	0.4776	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
Min.	433.8	433.8	433.8	433.8	433.7	433.6	433.7	433.6	433.4	433.5
Max.	435.3	435.3	435.4	435.3	435.0	435.0	435.2	435.4	434.9	435.0

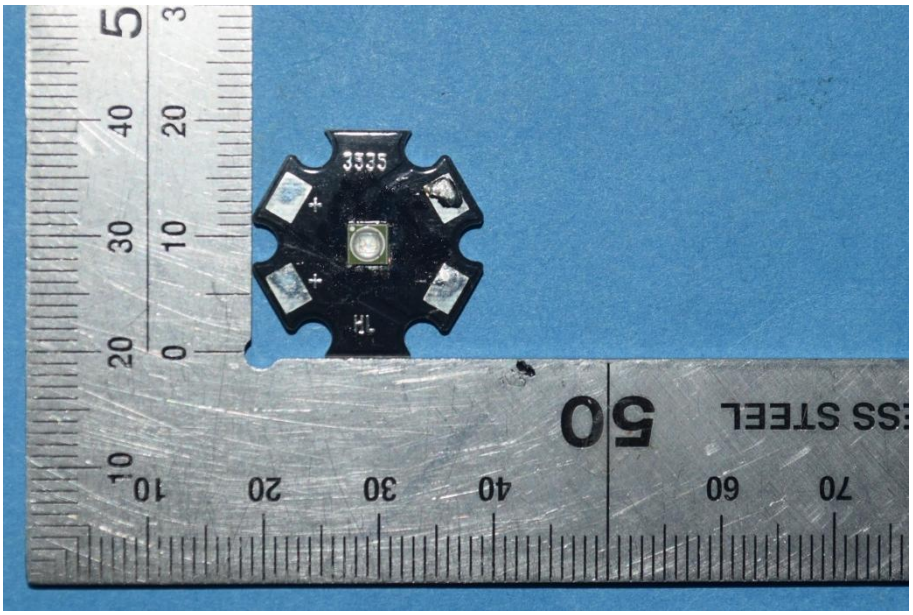
4 - DUT Photo

4.1 #Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



5 - Report Revision

Report Number	Report Date	Contents
RSZ190428536-10-9000	2021-03-05	Original report.
RSZ190428536-10-9000-M1	2021-12-02	Update the Family products covered.
RSZ190428536-10-9000-M2	2022-08-30	Update the Family products covered.

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=2 with the 95 confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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**********END OF REPORT**********