



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-C3535F77B1GA-ZW-FC

Report Type: 10000 Hours Test Report		Product Type: LED Package	
Reviewed By:	Pote Wang	<i>Pote Wang</i>	
Report Number:	SZ2230331-17240E-EE-10000		
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Approved by:	Blake Zhang / EE Engineer	<i>Blake Zhang</i>	
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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 2023-03-31. The samples were numbered from 1 to30 and 31 to 60.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-C3535F77B1GA-ZW-FC
Part Type:	LED Package
Drive Level:	DC 700mA
Wavelength:	450nm
Power:	2.1W
Average Current Density per LED die:	568mA/mm ²
Average Power Density per LED die:	1.71W/ mm ²
CRI:	/
Die Spacing:	/

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 type	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)
Test model	HL-C3535F77B1GA-ZW-FC	700	2.1	450	1	700	568	0.171	/
Multiple models	HL-C3535F**B**A-****-FC-**	≤700	≤2.1	450	1	≤700	≤568	≤0.171	/
Multiple models	HL-C3535F**B**A-****-ZW-FC-**	≤700	≤2.1	450	1	≤700	≤568	≤0.171	/
Multiple models	HL-C3535K**B**A-****-FC-**	≤700	≤2.1	450	1	≤700	≤568	≤0.171	/
Multiple models	HL-C3535K**B**A-****-ZW-FC**	≤700	≤2.1	450	1	≤700	≤568	≤0.171	/

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)
- ANSI/ASABE S642 SEP2018: Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2023-09-02	2024-09-11
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2023-09-02	2024-09-11
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2023-09-02	2024-09-11
Standard Light Source	EVERFINE	D062	M133799CM1381112	2023-05-12	2025-05-11
Multilayer aging machine	BACL	B2-270	20022	2023-10-16	2024-10-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	2023-09-02	2024-09-01

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 $2^{\circ}C$ below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to $5^{\circ}C$ 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 $25^{\circ}C \pm 2^{\circ}C$, 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 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 $25^{\circ}C \pm 2^{\circ}C$, 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. (Shenzhen) 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, 700mA

Part Number: HL-C3535F77B1GA-ZW-FC
Number of Units: 30
Case Temperature: >53°C
Ambient Temperature: >50°C
Life Test Drive Current: 700mA
Measurement Current: 700mA

Data Set 2: 105°C, 700mA

Part Number: HL-C3535F77B1GA-ZW-FC
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

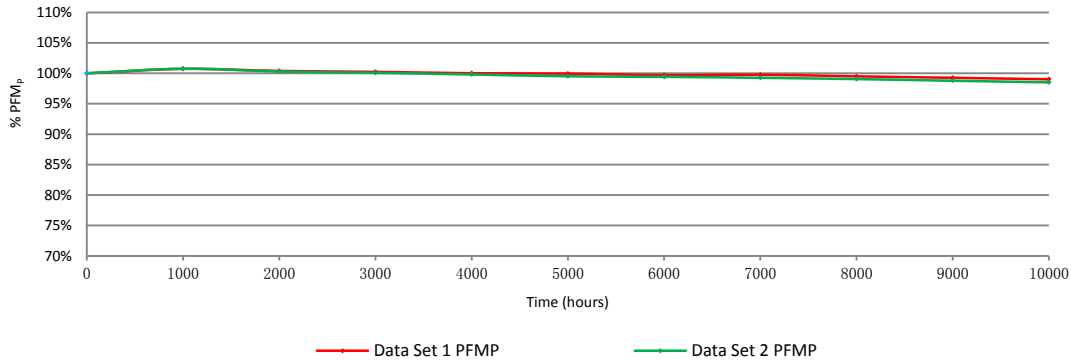
Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q ₇₀ Lifetime	Reported TM-21 Q ₉₀ Lifetime
1	30	0	1000hrs	10000hrs	1.789E-06	1.009	>60000 hours	>60000 hours
2	30	0	1000hrs	10000hrs	2.057E-06	1.006	>60000 hours	54000 hours

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.73%	100.39%	100.24%	100.01%	99.95%	99.70%	99.76%	99.50%	99.26%	99.02%
2	100.75%	100.30%	100.07%	99.81%	99.51%	99.42%	99.26%	99.05%	98.78%	98.51%

Average Wavelength

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	446.3	446.3	446.5	446.4	446.3	446.3	446.3	446.3	446.3	446.3
2	446.3	446.5	446.5	446.4	446.4	446.5	446.5	446.4	446.4	446.4



3 - Test Data

3.1 Data Set 1, 55°C, 700mA (400-700nm Photon Flux Maintenance)

No.	Φ_p ($\mu\text{mol} \times \text{s}^{-1}$)	400-700nm Photon Flux Maintenance (%)									
		0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	5.480	100.69	100.42	100.20	100.22	100.00	99.80	99.64	99.38	98.91	98.58
2	5.540	100.60	100.20	99.89	99.78	99.75	99.42	99.49	99.28	99.13	98.94
3	5.540	100.58	100.38	100.20	100.04	99.95	99.57	99.69	99.69	99.26	98.95
4	5.470	100.59	100.33	100.05	100.02	99.80	99.63	99.76	99.62	99.43	99.27
5	5.490	100.80	100.55	100.15	99.96	99.84	99.82	99.65	99.54	99.42	98.94
6	5.510	100.40	100.24	100.16	100.00	99.73	99.69	99.60	99.44	99.22	99.13
7	5.510	100.91	100.27	100.15	99.75	99.82	99.56	99.44	99.40	99.27	99.15
8	5.570	100.74	100.41	100.09	100.07	100.04	99.57	99.48	99.32	99.14	98.92
9	5.500	100.82	100.47	100.22	99.85	99.82	99.55	99.53	99.33	99.20	99.09
10	5.540	101.34	100.52	100.36	100.16	100.18	99.95	99.82	99.62	99.51	98.95
11	5.500	101.24	100.62	100.60	100.18	99.91	99.84	99.65	99.49	99.31	99.00
12	5.530	100.83	100.54	100.45	100.13	100.09	99.73	99.71	99.44	99.44	99.28
13	5.480	101.35	100.71	100.66	100.27	100.24	100.15	100.04	99.71	99.65	99.49
14	5.530	100.65	100.11	100.05	99.86	99.98	99.53	99.91	99.49	99.24	98.95
15	5.500	100.58	100.24	100.07	99.75	99.96	99.40	99.80	99.42	99.22	98.76
16	5.500	100.73	100.27	100.44	100.13	99.96	99.55	99.87	99.35	99.29	99.09
17	5.550	100.52	100.23	100.20	99.75	99.84	99.66	99.80	99.33	99.12	98.86
18	5.520	100.34	100.45	100.27	100.00	100.14	99.64	99.87	99.55	99.35	99.00
19	5.500	100.38	100.38	100.31	100.24	100.29	99.93	100.22	99.84	99.56	99.42
20	5.490	100.71	100.36	100.13	99.89	99.84	99.58	99.95	99.76	98.62	98.40
21	5.500	100.75	100.64	100.29	100.16	100.11	99.95	100.09	99.49	98.64	98.36
22	5.490	100.86	100.46	100.51	100.07	100.05	99.82	100.02	99.53	99.34	99.23
23	5.520	101.11	100.67	100.40	100.11	100.29	100.14	100.09	99.96	99.82	99.55
24	5.490	101.02	100.42	100.18	100.00	100.00	99.69	99.84	99.65	99.36	99.16
25	5.570	100.88	100.20	100.39	100.09	99.77	99.62	99.69	99.44	99.34	99.14
26	5.500	100.56	100.22	99.93	99.71	99.67	99.02	99.29	99.11	98.82	98.58
27	5.480	100.91	100.47	100.38	100.13	99.95	99.82	99.82	99.51	99.36	99.12
28	5.570	99.82	100.18	99.95	99.82	99.86	99.61	99.44	99.28	99.12	98.92
29	5.490	100.97	100.38	100.35	100.04	99.98	100.11	100.00	99.60	99.42	99.27
30	5.490	100.18	100.26	100.11	100.04	99.80	99.78	99.69	99.45	99.31	99.18
Avg.	5.512	100.73	100.39	100.24	100.01	99.95	99.70	99.76	99.50	99.26	99.02
Med.	5.500	100.73	100.38	100.20	100.04	99.95	99.67	99.78	99.49	99.30	99.05
st dev	0.028	0.33	0.16	0.19	0.16	0.17	0.24	0.22	0.18	0.26	0.28
Min.	5.470	99.82	100.11	99.89	99.71	99.67	99.02	99.29	99.11	98.62	98.36
Max.	5.570	101.35	100.71	100.66	100.27	100.29	100.15	100.22	99.96	99.82	99.55

3.2 Data Set 1, 55°C, 700mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	3.103	3.082	3.085	3.079	3.082	3.086	3.083	3.083	3.083	3.085	3.072
2	3.089	3.074	3.072	3.029	3.072	3.047	3.033	3.029	3.033	3.031	3.021
3	3.107	3.080	3.083	3.054	3.060	3.064	3.058	3.058	3.040	3.069	3.052
4	3.095	3.078	3.079	3.046	3.051	3.052	3.053	3.048	3.046	3.048	3.048
5	3.120	3.073	3.061	3.058	3.058	3.065	3.057	3.056	3.060	3.046	3.048
6	3.090	3.081	3.067	3.068	3.065	3.084	3.065	3.066	3.059	3.062	3.057
7	3.103	3.078	3.068	3.068	3.067	3.078	3.068	3.066	3.062	3.055	3.055
8	3.099	3.074	3.062	3.069	3.066	3.068	3.064	3.081	3.048	3.050	3.066
9	3.087	3.078	3.061	3.060	3.064	3.084	3.065	3.064	3.060	3.048	3.053
10	3.087	3.072	3.072	3.029	3.052	3.032	3.027	3.011	3.011	3.018	3.023
11	3.086	3.072	3.075	3.049	3.047	3.057	3.048	3.043	3.043	3.050	3.050
12	3.098	3.087	3.077	3.049	3.064	3.070	3.054	3.052	3.036	3.048	3.052
13	3.101	3.094	3.085	3.043	3.084	3.082	3.072	3.094	3.073	3.087	3.068
14	3.109	3.089	3.079	3.051	3.046	3.063	3.045	3.052	3.043	3.046	3.042
15	3.094	3.079	3.085	3.056	3.053	3.059	3.052	3.066	3.042	3.050	3.058
16	3.097	3.072	3.073	3.045	3.045	3.051	3.045	3.052	3.036	3.034	3.041
17	3.107	3.101	3.081	3.056	3.055	3.059	3.053	3.066	3.052	3.046	3.050
18	3.080	3.072	3.077	3.043	3.044	3.051	3.044	3.054	3.032	3.041	3.043
19	3.103	3.075	3.081	3.054	3.049	3.055	3.053	3.060	3.054	3.038	3.052
20	3.109	3.075	3.087	3.059	3.057	3.063	3.060	3.053	3.046	3.062	3.062
21	3.094	3.089	3.077	3.045	3.047	3.051	3.045	3.050	3.046	3.042	3.036
22	3.097	3.077	3.063	3.059	3.058	3.059	3.058	3.062	3.058	3.060	3.040
23	3.089	3.072	3.070	3.041	3.041	3.045	3.039	3.034	3.032	3.048	3.041
24	3.108	3.089	3.071	3.073	3.067	3.072	3.071	3.073	3.061	3.059	3.071
25	3.070	3.078	3.073	3.023	3.057	3.053	3.023	3.052	3.023	3.017	3.025
26	3.092	3.076	3.081	3.054	3.049	3.056	3.052	3.058	3.040	3.058	3.050
27	3.108	3.070	3.082	3.053	3.053	3.063	3.052	3.060	3.050	3.048	3.036
28	3.105	3.076	3.063	3.071	3.063	3.081	3.064	3.071	3.069	3.059	3.055
29	3.111	3.083	3.086	3.048	3.050	3.069	3.046	3.052	3.048	3.044	3.048
30	3.108	3.076	3.085	3.060	3.055	3.057	3.056	3.058	3.056	3.044	3.040
Avg.	3.098	3.079	3.075	3.053	3.057	3.063	3.054	3.057	3.048	3.050	3.049
Med.	3.099	3.078	3.077	3.054	3.056	3.061	3.053	3.058	3.047	3.048	3.050
st dev	0.011	0.007	0.008	0.013	0.011	0.013	0.013	0.016	0.015	0.015	0.013
Min.	3.070	3.070	3.061	3.023	3.041	3.032	3.023	3.011	3.011	3.017	3.021
Max.	3.120	3.101	3.087	3.079	3.084	3.086	3.083	3.094	3.083	3.087	3.072

3.3 Data Set 1, 55°C, 700mA (Wavelength)

No.	Wavelength (nm)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	446.4	446.2	446.6	446.6	446.6	446.3	446.6	446.6	446.5	446.6	446.5
2	446.6	446.2	445.9	446.6	445.9	446.1	446.5	446.0	446.1	446.6	446.6
3	445.9	446.1	445.9	446.6	446.5	445.9	445.9	445.9	445.9	445.8	446.1
4	445.5	446.0	445.8	446.0	445.8	445.8	446.1	446.0	445.9	445.9	446.0
5	446.4	446.2	445.9	447.0	446.5	446.5	445.9	445.9	446.5	446.2	445.9
6	446.7	447.0	446.9	446.6	446.7	447.2	446.7	447.3	446.9	446.7	446.8
7	446.7	446.3	446.9	446.1	446.7	446.9	446.9	446.7	446.7	446.6	446.8
8	446.5	446.2	446.5	446.6	446.3	445.9	446.3	446.5	445.9	445.9	446.0
9	446.3	446.1	446.0	446.5	445.9	445.9	446.1	446.0	446.1	446.1	445.9
10	446.2	446.0	446.0	447.0	445.9	445.8	445.8	445.8	445.8	446.1	445.9
11	446.3	445.9	446.0	445.9	445.9	445.8	446.0	445.9	445.8	445.9	446.0
12	446.1	446.0	446.5	446.8	446.3	445.8	445.9	445.9	445.9	446.3	445.9
13	447.3	447.4	447.3	446.0	447.2	447.2	447.2	447.4	446.9	447.4	447.4
14	445.5	446.1	445.9	446.6	445.8	445.8	445.8	445.8	445.9	445.8	446.0
15	446.6	446.9	446.7	446.6	446.6	446.6	446.9	446.6	446.7	446.8	446.8
16	445.5	445.8	445.8	446.6	445.8	445.9	445.8	445.6	445.8	445.8	445.8
17	446.1	445.5	445.8	446.9	445.8	445.8	445.8	445.6	445.9	445.8	445.8
18	445.9	446.1	445.9	446.6	445.9	445.9	446.0	445.9	445.8	446.0	445.9
19	446.4	446.2	445.9	446.6	446.2	445.9	445.9	445.9	446.5	445.9	446.0
20	446.6	446.6	446.6	446.6	446.9	446.6	447.2	446.9	446.8	446.6	446.6
21	446.1	446.1	445.5	446.6	446.2	445.8	445.8	445.7	445.8	445.9	445.9
22	446.8	446.6	446.9	445.8	446.6	446.9	446.6	446.6	446.6	446.7	446.6
23	445.9	445.9	445.9	446.6	445.8	445.8	445.9	445.8	445.8	445.8	445.8
24	447.3	447.0	447.4	447.3	447.4	447.3	447.3	447.0	447.2	447.3	447.4
25	446.6	446.5	446.7	446.6	446.4	446.6	446.6	446.6	446.5	446.6	446.6
26	445.6	446.0	445.8	446.0	445.8	445.8	445.9	445.8	445.8	445.8	445.8
27	447.1	446.7	447.3	446.7	447.0	447.3	447.0	447.4	447.2	446.9	446.8
28	446.2	445.9	446.6	445.9	446.6	445.9	446.4	445.9	446.6	446.5	446.6
29	446.6	446.2	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6
30	447.0	446.9	446.7	445.8	447.2	447.3	446.7	446.7	446.7	446.9	446.9
Avg.	446.4	446.3	446.3	446.5	446.4	446.3	446.3	446.3	446.3	446.3	446.3
Med.	446.4	446.2	446.3	446.6	446.4	445.9	446.2	446.0	446.3	446.3	446.1
st dev	0.5	0.4	0.5	0.4	0.5	0.6	0.5	0.6	0.5	0.5	0.5
Min.	445.5	445.5	445.5	445.8	445.8	445.8	445.8	445.6	445.8	445.8	445.8
Max.	447.3	447.4	447.4	447.3	447.4	447.3	447.3	447.4	447.2	447.4	447.4

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

No.	Φ_p ($\mu\text{mol} \times \text{s}^{-1}$)	400-700nm Photon Flux Maintenance (%)									
		0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	5.500	100.60	100.31	99.93	99.82	99.93	99.58	99.62	99.29	99.02	98.91
32	5.490	100.98	100.69	100.64	100.11	99.98	99.71	99.64	99.34	99.00	98.82
33	5.530	100.72	100.54	100.43	99.87	99.71	99.64	99.62	99.19	99.08	98.93
34	5.530	100.71	100.40	100.24	99.87	99.84	99.57	99.40	98.95	98.28	98.01
35	5.480	100.97	100.71	100.58	100.22	99.98	99.78	99.58	99.29	99.14	98.94
36	5.570	100.72	100.25	99.89	99.86	99.05	99.43	99.12	98.94	98.78	98.47
37	5.460	100.86	100.27	100.07	100.16	99.58	99.41	99.21	99.05	98.86	98.50
38	5.480	100.97	100.36	100.15	100.05	99.65	99.40	99.31	99.12	98.92	98.65
39	5.510	100.64	100.29	99.93	99.78	99.17	99.33	99.24	98.98	98.80	98.40
40	5.460	100.79	100.29	100.18	100.07	99.65	99.52	99.29	98.92	98.63	98.26
41	5.480	101.00	100.51	100.29	100.02	99.91	99.64	99.42	99.09	98.81	98.45
42	5.530	100.58	100.11	100.02	99.84	99.60	99.37	99.13	98.90	98.75	98.23
43	5.540	100.92	100.42	100.16	99.77	99.46	99.21	99.13	99.04	98.90	98.74
44	5.450	100.70	100.39	100.31	100.09	99.60	99.47	99.25	99.30	99.05	98.94
45	5.480	100.71	100.24	100.04	99.71	99.53	99.42	99.22	99.05	98.54	98.30
46	5.460	100.84	100.20	100.04	99.52	99.47	99.40	99.12	99.07	98.57	98.21
47	5.490	100.71	100.35	100.07	99.71	99.67	99.45	99.23	99.07	98.78	98.40
48	5.490	100.86	100.46	100.22	99.91	99.73	99.40	99.25	99.09	98.82	98.58
49	5.500	100.89	100.29	99.96	99.65	99.36	99.29	99.15	99.04	98.55	98.36
50	5.520	100.80	100.14	99.93	99.71	99.33	99.26	99.00	98.97	98.66	98.37
51	5.460	100.75	100.27	100.15	99.76	99.41	99.47	99.19	98.94	98.57	98.39
52	5.510	100.83	100.25	99.98	99.55	99.26	99.27	98.97	98.91	98.71	98.40
53	5.490	100.77	100.07	99.78	99.45	99.23	99.23	98.91	98.58	98.42	98.09
54	5.440	101.05	100.40	100.00	99.69	99.43	99.41	99.34	99.19	98.97	98.62
55	5.490	100.40	99.93	99.62	99.56	99.07	98.98	99.02	98.67	98.45	98.03
56	5.510	100.42	100.16	99.96	99.85	99.46	99.46	99.31	99.09	98.89	98.62
57	5.530	100.40	100.13	99.87	99.66	99.29	99.33	99.29	99.19	98.97	98.70
58	5.490	100.36	100.09	99.71	99.47	99.16	99.22	99.14	99.18	98.83	98.72
59	5.460	100.81	100.16	99.91	99.76	99.43	99.56	99.38	99.08	98.96	98.57
60	5.530	100.67	100.16	100.05	99.80	99.42	99.49	99.26	99.06	98.77	98.59
Avg.	5.495	100.75	100.30	100.07	99.81	99.51	99.42	99.26	99.05	98.78	98.51
Med.	5.490	100.76	100.28	100.04	99.79	99.46	99.41	99.24	99.06	98.81	98.49
st dev	0.031	0.18	0.18	0.23	0.20	0.26	0.17	0.19	0.17	0.21	0.26
Min.	5.440	100.36	99.93	99.62	99.45	99.05	98.98	98.91	98.58	98.28	98.01
Max.	5.570	101.05	100.71	100.64	100.22	99.98	99.78	99.64	99.34	99.14	98.94

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

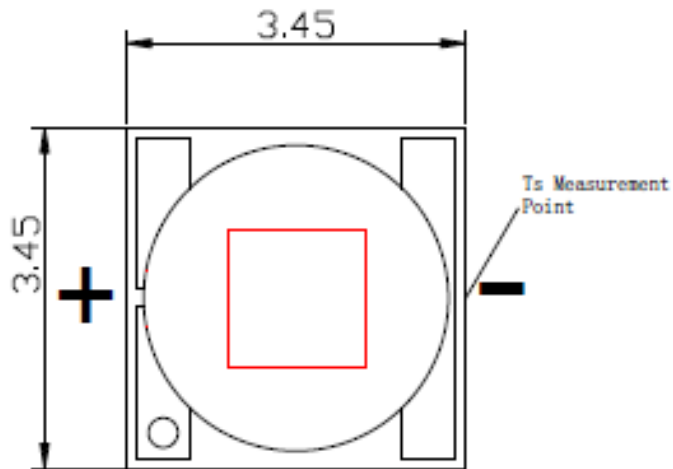
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
31	3.097	3.074	3.082	3.051	3.052	3.057	3.052	3.056	3.038	3.056	3.054
32	3.104	3.097	3.082	3.079	3.072	3.074	3.075	3.079	3.063	3.063	3.065
33	3.083	3.079	3.083	3.053	3.051	3.055	3.052	3.038	3.038	3.042	3.050
34	3.107	3.073	3.063	3.061	3.061	3.063	3.062	3.062	3.062	3.055	3.055
35	3.087	3.076	3.087	3.055	3.058	3.059	3.058	3.060	3.056	3.053	3.050
36	3.103	3.098	3.092	3.059	3.052	3.057	3.058	3.098	3.080	3.090	3.087
37	3.098	3.084	3.076	3.053	3.047	3.055	3.032	3.034	3.034	3.050	3.050
38	3.098	3.071	3.071	3.048	3.046	3.045	3.039	3.046	3.036	3.038	3.048
39	3.098	3.091	3.071	3.069	3.075	3.082	3.063	3.061	3.057	3.065	3.081
40	3.082	3.085	3.083	3.058	3.054	3.053	3.038	3.048	3.048	3.042	3.064
41	3.083	3.071	3.078	3.068	3.047	3.047	3.030	3.034	3.030	3.043	3.048
42	3.082	3.087	3.071	3.067	3.069	3.073	3.064	3.071	3.064	3.071	3.061
43	3.085	3.078	3.088	3.056	3.055	3.061	3.042	3.075	3.052	3.054	3.048
44	3.098	3.088	3.073	3.045	3.042	3.046	3.039	3.043	3.041	3.046	3.043
45	3.109	3.097	3.060	3.057	3.055	3.064	3.052	3.054	3.058	3.060	3.060
46	3.098	3.068	3.081	3.055	3.053	3.067	3.052	3.050	3.050	3.046	3.054
47	3.095	3.071	3.077	3.047	3.048	3.049	3.032	3.032	3.046	3.036	3.046
48	3.090	3.083	3.074	3.041	3.039	3.043	3.035	3.039	3.043	3.028	3.030
49	3.081	3.074	3.081	3.051	3.051	3.054	3.036	3.034	3.043	3.043	3.036
50	3.095	3.073	3.073	3.044	3.045	3.055	3.039	3.034	3.032	3.041	3.034
51	3.083	3.072	3.079	3.052	3.055	3.053	3.056	3.050	3.050	3.054	3.054
52	3.088	3.084	3.079	3.039	3.040	3.045	3.043	3.041	3.048	3.032	3.032
53	3.085	3.071	3.086	3.057	3.058	3.070	3.062	3.053	3.044	3.060	3.062
54	3.101	3.093	3.082	3.079	3.080	3.084	3.067	3.081	3.075	3.085	3.082
55	3.108	3.079	3.067	3.067	3.066	3.069	3.059	3.064	3.062	3.069	3.079
56	3.062	3.060	3.077	3.040	3.044	3.044	3.030	3.028	3.030	3.041	3.052
57	3.091	3.083	3.079	3.080	3.080	3.085	3.075	3.065	3.065	3.077	3.087
58	3.098	3.072	3.083	3.048	3.049	3.051	3.058	3.046	3.046	3.034	3.062
59	3.081	3.076	3.079	3.045	3.045	3.066	3.032	3.032	3.041	3.043	3.058
60	3.091	3.096	3.076	3.073	3.074	3.077	3.073	3.069	3.075	3.081	3.087
Avg.	3.092	3.080	3.078	3.057	3.055	3.060	3.050	3.053	3.050	3.053	3.057
Med.	3.093	3.079	3.079	3.055	3.053	3.057	3.052	3.050	3.048	3.052	3.054
st dev	0.010	0.010	0.007	0.012	0.012	0.012	0.014	0.017	0.014	0.016	0.016
Min.	3.062	3.060	3.060	3.039	3.039	3.043	3.030	3.028	3.030	3.028	3.030
Max.	3.109	3.098	3.092	3.080	3.080	3.085	3.075	3.098	3.080	3.090	3.087

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

No.	Wavelength (nm)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
31	446.6	446.1	446.6	446.6	446.3	446.6	446.6	446.6	446.6	446.6	446.6
32	446.6	446.3	446.6	446.6	446.6	446.6	446.6	446.5	446.6	446.5	446.5
33	446.6	446.2	446.5	446.6	446.5	446.6	446.6	446.6	446.6	446.6	446.6
34	446.5	446.1	445.9	446.0	445.9	445.9	446.3	446.0	446.0	446.6	446.0
35	446.7	446.6	447.0	447.0	446.7	446.7	446.7	446.7	446.6	446.8	446.6
36	446.6	446.6	446.6	446.6	446.5	446.5	446.6	446.3	446.6	446.5	446.5
37	446.6	446.2	446.0	446.1	445.9	445.8	445.9	446.0	446.1	445.9	446.0
38	446.6	446.0	446.6	446.6	446.5	446.6	446.3	446.6	446.5	446.2	446.5
39	446.6	446.0	446.4	446.5	446.6	445.9	446.4	446.6	446.5	446.3	445.9
40	446.8	446.5	447.3	447.0	446.7	446.7	446.9	446.7	446.7	446.7	446.7
41	446.4	445.9	445.9	445.9	445.8	445.8	445.9	446.0	445.8	445.8	445.9
42	446.6	446.3	446.8	446.8	446.6	446.7	446.6	446.6	446.6	446.7	446.8
43	446.5	446.5	446.5	446.0	446.6	446.5	446.5	446.6	446.6	446.6	446.6
44	446.7	446.9	446.6	446.6	446.6	446.7	446.6	446.7	446.6	446.6	446.8
45	446.6	446.3	446.8	446.6	446.6	446.7	446.6	446.6	446.6	446.6	446.6
46	446.6	446.5	446.5	446.6	446.6	446.6	446.7	446.6	446.6	446.5	446.6
47	446.6	446.6	446.8	446.9	446.7	446.8	446.7	446.9	446.6	446.9	447.2
48	446.4	446.2	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6
49	446.5	446.3	446.7	446.6	446.7	446.8	446.6	446.6	446.6	446.6	446.7
50	446.6	446.3	446.6	446.6	446.6	446.6	446.6	446.7	446.6	446.6	446.6
51	446.5	446.3	446.6	446.6	446.9	446.7	446.6	446.6	446.6	446.6	446.5
52	445.7	445.8	445.8	445.8	445.6	446.0	445.8	445.8	445.9	445.8	446.1
53	446.7	446.3	446.6	446.6	446.7	446.6	446.6	446.6	446.6	446.6	446.6
54	446.7	446.9	447.3	447.3	447.2	447.2	446.6	446.8	446.8	446.7	446.9
55	446.7	446.5	446.6	446.6	446.6	446.7	446.9	446.8	446.6	446.7	446.6
56	445.5	446.0	445.8	446.0	445.8	445.9	445.8	445.7	445.9	445.9	445.9
57	446.7	446.4	446.7	446.7	446.8	446.6	446.7	446.8	446.6	446.8	446.6
58	445.6	445.9	446.0	445.9	445.8	445.8	445.8	445.8	445.8	445.9	445.8
59	446.6	446.5	446.5	446.6	446.6	446.6	446.6	446.6	446.1	446.3	446.5
60	445.5	446.0	445.8	445.8	445.8	445.6	445.8	445.8	445.7	445.8	445.6
Avg.	446.5	446.3	446.5	446.5	446.4	446.4	446.5	446.5	446.4	446.4	446.4
Med.	446.6	446.3	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6
st dev	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4
Min.	445.5	445.8	445.8	445.8	445.6	445.6	445.8	445.7	445.7	445.8	445.6
Max.	446.8	446.9	447.3	447.3	447.2	447.2	446.9	446.9	446.8	446.9	447.2

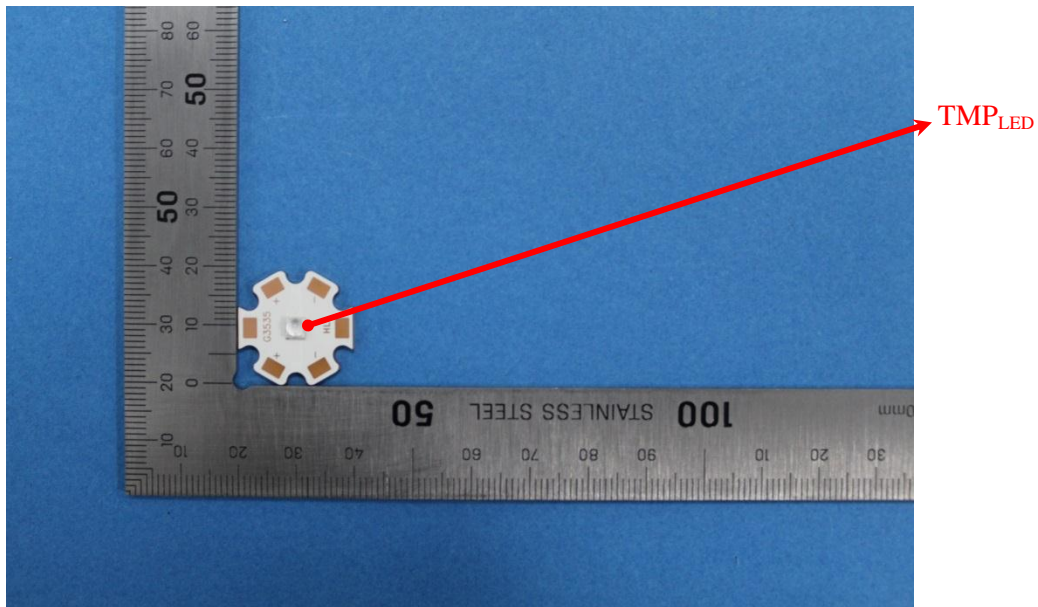
4 - DUT Photo

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 $K=2$ 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*****