



TEST REPORT

According to ANSI/IES LM-80-15

For

Limited liability company «Tekhnologiya»

Zvorykina str., 2, bldg. 2, room 3, Gusev, Kaliningrad region, 238050, Russian Federation

Model: LED GSLED 3030.V6A.10.40A.80.148

Report Type: 6000 Hours Test Report		Product Type: LED Package	
Reviewed By:	Pote Wang	<i>Pote Wang</i>	
Report Number:	DG3230420-20860E-EE-6000		
Test Date:	2023-04-25 to 2024-01-02		
Report Date:	2024-04-19		
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		

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1 - General Information

1.1 Description of LED Light Sources[#]

Sample Size:

50 PCS test samples were in good condition and received on 2023-04-20. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Limited liability company «Tekhnologiya»
Part Number:	LED GSLED 3030.V6A.10.40A.80.148
Part Type:	LED Package
Drive Level:	DC 150mA
Nominal CCT:	4000K
Power:	0.9W
Average Current Density per LED die:	163mA/mm ²
Average Power Density per LED die:	0.99W/mm ²
CRI:	80
Die Spacing:	0.3mm

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.

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	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	11090007	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°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 luminous flux and chromaticity coordinate u'v'. 2π measurement was used and sample was driven 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.

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=21K (K=2), at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°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, 150mA

Part Number: LED GSLED 3030.V6A.10.40A.80.148
Number of Units: 25
Case Temperature: >53°C
Ambient Temperature: >50°C
Life Test Drive Current: 150mA
Measurement Current: 150mA

Data Set 2: 85°C, 150mA

Part Number: LED GSLED 3030.V6A.10.40A.80.148
Number of Units: 25
Case Temperature: >83°C
Ambient Temperature: >80°C
Life Test Drive Current: 150mA
Measurement Current: 150mA

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	2.163E-06	1.003	>36000 hours
2	25	0	1000hrs	6000hrs	2.323E-06	1.003	>36000 hours

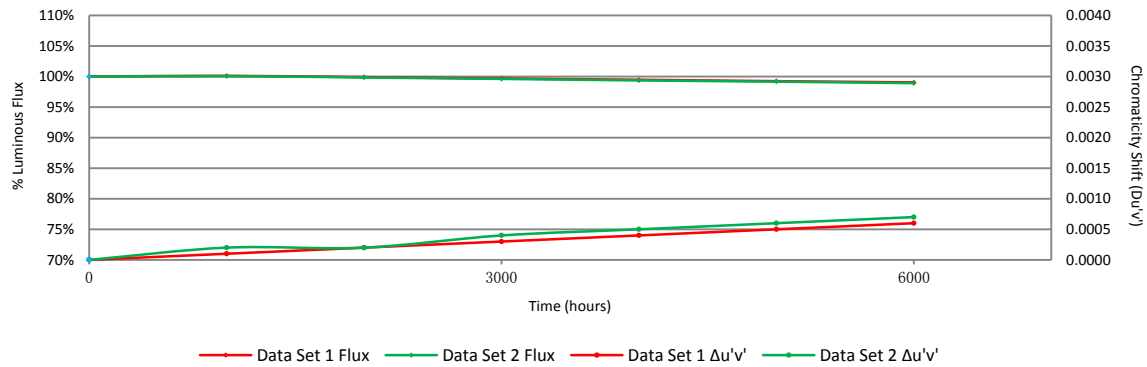
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	100.12%	99.91%	99.69%	99.48%	99.25%	99.05%
2	100.08%	99.85%	99.62%	99.37%	99.17%	98.92%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006
2	0.0002	0.0002	0.0004	0.0005	0.0006	0.0007

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 150mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	161.80	100.19	99.81	99.63	99.44	98.89	98.70
2	160.80	99.94	99.69	99.56	99.44	99.13	98.88
3	160.10	100.06	99.81	99.75	99.69	99.50	99.31
4	161.00	100.12	100.06	99.88	99.75	99.57	99.38
5	161.00	100.25	99.69	99.32	99.07	98.82	98.63
6	160.10	100.12	100.06	99.94	99.06	98.94	98.81
7	160.70	100.19	100.06	99.94	99.81	99.56	99.32
8	160.00	99.94	99.75	99.69	99.56	99.50	99.38
9	160.20	100.19	99.94	99.81	99.63	99.31	99.19
10	160.50	100.12	100.06	99.75	99.56	99.19	98.88
11	160.00	100.13	99.94	99.88	99.63	99.56	99.25
12	159.10	100.25	100.19	99.75	99.56	99.31	98.99
13	161.20	100.12	100.06	99.57	99.13	99.07	98.82
14	159.40	100.06	99.94	99.62	99.50	99.12	98.93
15	159.20	100.19	100.13	99.62	99.43	99.25	99.12
16	159.50	99.94	99.87	99.62	99.44	99.18	99.00
17	159.70	100.06	99.94	99.44	99.19	98.75	98.50
18	160.20	100.12	99.56	99.31	99.13	99.06	98.88
19	159.60	100.31	99.94	99.81	99.50	99.44	99.31
20	161.00	100.06	99.94	99.75	99.57	99.25	99.01
21	159.30	100.13	99.94	99.81	99.62	99.56	99.44
22	160.10	100.06	99.81	99.63	99.50	99.38	99.19
23	160.50	100.12	99.75	99.69	99.56	99.31	99.13
24	159.80	100.31	99.94	99.87	99.69	99.50	99.25
25	161.20	100.06	99.88	99.57	99.44	99.13	98.95
Avg.	160.24	100.12	99.91	99.69	99.48	99.25	99.05
Med.	160.10	100.12	99.94	99.69	99.50	99.25	99.01
st dev	0.71	0.10	0.15	0.17	0.21	0.24	0.25
Min.	159.10	99.94	99.56	99.31	99.06	98.75	98.50
Max.	161.80	100.31	100.19	99.94	99.81	99.57	99.44

3.2 Data Set 1, 55°C, 150mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	6.095	6.098	6.089	6.086	6.089	6.096	6.105
2	6.077	6.077	6.076	6.073	6.078	6.080	6.085
3	6.081	6.083	6.079	6.082	6.089	6.098	6.099
4	6.081	6.081	6.080	6.073	6.075	6.077	6.077
5	6.076	6.074	6.072	6.076	6.083	6.090	6.099
6	6.078	6.078	6.068	6.058	6.063	6.071	6.072
7	6.082	6.080	6.077	6.072	6.081	6.082	6.082
8	6.073	6.074	6.072	6.077	6.083	6.088	6.094
9	6.073	6.071	6.069	6.067	6.071	6.075	6.078
10	6.078	6.076	6.073	6.067	6.071	6.080	6.089
11	6.069	6.065	6.086	6.083	6.089	6.089	6.096
12	6.071	6.066	6.073	6.072	6.075	6.085	6.086
13	6.078	6.072	6.068	6.062	6.063	6.065	6.066
14	6.074	6.069	6.065	6.062	6.065	6.073	6.080
15	6.070	6.065	6.062	6.059	6.062	6.062	6.065
16	6.072	6.069	6.065	6.061	6.063	6.066	6.070
17	6.083	6.074	6.076	6.073	6.076	6.081	6.088
18	6.066	6.062	6.059	6.073	6.077	6.085	6.090
19	6.078	6.074	6.072	6.068	6.072	6.078	6.081
20	6.075	6.071	6.068	6.065	6.071	6.079	6.088
21	6.089	6.082	6.085	6.083	6.091	6.093	6.100
22	6.086	6.076	6.072	6.067	6.069	6.073	6.080
23	6.095	6.089	6.076	6.072	6.078	6.087	6.095
24	6.076	6.067	6.065	6.063	6.069	6.074	6.075
25	6.074	6.068	6.067	6.069	6.071	6.080	6.086
Avg.	6.078	6.074	6.073	6.071	6.075	6.080	6.085
Med.	6.077	6.074	6.072	6.072	6.075	6.080	6.086
st dev	0.007	0.008	0.007	0.008	0.009	0.009	0.011
Min.	6.066	6.062	6.059	6.058	6.062	6.062	6.065
Max.	6.095	6.098	6.089	6.086	6.091	6.098	6.105

3.3 Data Set 1, 55°C, 150mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs
1	0.2189	0.5075	4125	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006
2	0.2205	0.5089	4044	0.0001	0.0002	0.0004	0.0004	0.0004	0.0007
3	0.2211	0.5063	4068	0.0001	0.0003	0.0005	0.0006	0.0006	0.0003
4	0.2205	0.5099	4026	0.0000	0.0002	0.0002	0.0003	0.0004	0.0003
5	0.2195	0.5077	4100	0.0001	0.0002	0.0003	0.0003	0.0004	0.0002
6	0.2205	0.5071	4073	0.0001	0.0002	0.0003	0.0004	0.0004	0.0002
7	0.2202	0.5072	4085	0.0001	0.0003	0.0004	0.0004	0.0005	0.0002
8	0.2200	0.5070	4095	0.0003	0.0003	0.0004	0.0005	0.0006	0.0006
9	0.2213	0.5061	4062	0.0001	0.0003	0.0004	0.0004	0.0004	0.0004
10	0.2206	0.5095	4031	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008
11	0.2205	0.5069	4078	0.0001	0.0002	0.0003	0.0004	0.0005	0.0007
12	0.2213	0.5057	4068	0.0002	0.0004	0.0004	0.0005	0.0006	0.0006
13	0.2205	0.5093	4038	0.0001	0.0002	0.0004	0.0005	0.0006	0.0008
14	0.2191	0.5078	4114	0.0002	0.0004	0.0004	0.0005	0.0006	0.0010
15	0.2207	0.5056	4092	0.0001	0.0003	0.0005	0.0006	0.0007	0.0006
16	0.2207	0.5080	4053	0.0001	0.0001	0.0003	0.0003	0.0005	0.0003
17	0.2196	0.5061	4127	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008
18	0.2199	0.5074	4092	0.0001	0.0001	0.0002	0.0001	0.0002	0.0004
19	0.2202	0.5067	4092	0.0001	0.0001	0.0001	0.0001	0.0002	0.0006
20	0.2193	0.5095	4075	0.0001	0.0002	0.0004	0.0007	0.0007	0.0009
21	0.2197	0.5074	4098	0.0001	0.0002	0.0003	0.0004	0.0004	0.0003
22	0.2197	0.5055	4134	0.0001	0.0003	0.0003	0.0004	0.0005	0.0006
23	0.2197	0.5078	4092	0.0002	0.0002	0.0003	0.0005	0.0007	0.0009
24	0.2200	0.5078	4082	0.0002	0.0002	0.0003	0.0001	0.0002	0.0002
25	0.2194	0.5082	4095	0.0001	0.0002	0.0003	0.0003	0.0005	0.0008
Avg.	0.2201	0.5075	4082	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006
Med.	0.2202	0.5074	4085	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006
st dev	0.0007	0.0013	29	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2189	0.5055	4026	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002
Max.	0.2213	0.5099	4134	0.0003	0.0004	0.0005	0.0007	0.0007	0.0010

3.4 Data Set 2, 85°C, 150mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	160.30	100.06	99.94	99.31	99.06	98.94	98.75
27	160.50	99.75	99.63	99.38	99.13	99.00	98.69
28	158.80	99.94	99.81	99.62	99.37	99.12	98.80
29	159.70	100.19	100.06	99.75	99.62	99.19	98.87
30	159.60	100.13	99.94	99.87	99.69	99.50	99.19
31	158.50	100.25	100.13	99.87	99.50	99.24	98.99
32	160.20	100.12	99.94	99.69	99.50	99.31	99.13
33	160.10	100.25	100.19	99.94	99.75	99.38	99.13
34	159.10	100.06	99.75	99.69	99.43	99.12	98.81
35	159.30	99.87	99.81	99.62	99.31	99.00	98.74
36	157.50	99.94	99.49	99.37	99.11	98.67	98.35
37	161.40	100.06	99.94	99.81	99.50	99.19	98.88
38	159.90	100.19	99.94	99.44	99.12	99.06	98.69
39	159.00	100.19	99.87	99.75	99.43	99.25	99.12
40	160.20	100.06	99.75	99.44	99.25	99.19	98.94
41	160.80	100.06	99.94	99.88	99.69	99.63	99.44
42	160.70	100.19	100.12	99.94	99.69	99.63	99.50
43	160.60	100.06	99.94	99.69	99.44	99.38	99.25
44	160.90	99.94	99.69	99.25	99.07	98.88	98.69
45	160.70	99.94	99.32	99.07	98.82	98.69	98.38
46	160.10	100.06	99.88	99.75	99.56	99.50	99.13
47	158.30	100.19	99.81	99.62	99.37	99.18	98.86
48	160.50	100.31	99.75	99.56	99.13	99.07	98.94
49	154.20	100.26	100.06	99.81	99.61	99.55	99.35
50	159.70	99.94	99.62	99.31	99.06	98.56	98.37
Avg.	159.62	100.08	99.85	99.62	99.37	99.17	98.92
Med.	160.10	100.06	99.88	99.69	99.43	99.19	98.88
st dev	1.46	0.14	0.20	0.24	0.25	0.29	0.31
Min.	154.20	99.75	99.32	99.07	98.82	98.56	98.35
Max.	161.40	100.31	100.19	99.94	99.75	99.63	99.50

3.5 Data Set 2, 85°C, 150mA (Forward Voltage)

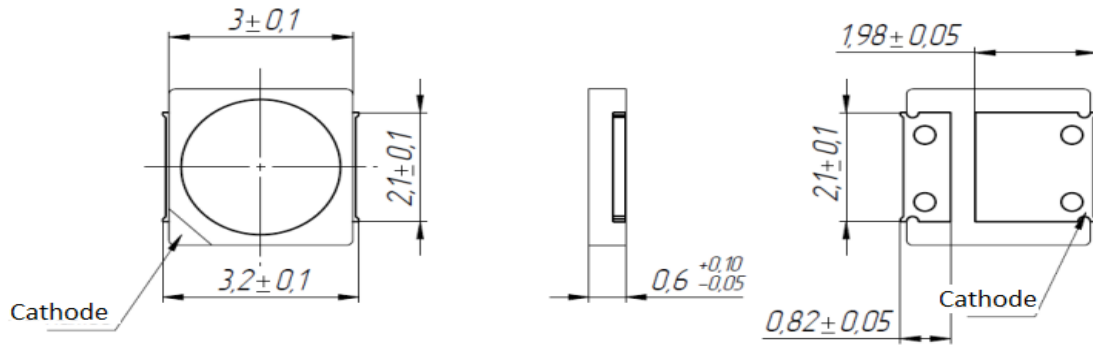
No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	6.072	6.065	6.067	6.063	6.069	6.077	6.083
27	6.079	6.074	6.059	6.067	6.069	6.078	6.085
28	6.078	6.072	6.069	6.063	6.064	6.064	6.070
29	6.074	6.068	6.073	6.077	6.080	6.085	6.088
30	6.078	6.065	6.063	6.083	6.092	6.100	6.105
31	6.080	6.075	6.059	6.076	6.082	6.082	6.090
32	6.077	6.072	6.073	6.067	6.069	6.070	6.071
33	6.076	6.071	6.068	6.082	6.085	6.087	6.089
34	6.068	6.064	6.067	6.072	6.081	6.082	6.086
35	6.072	6.070	6.069	6.073	6.076	6.080	6.082
36	6.067	6.063	6.058	6.053	6.059	6.063	6.063
37	6.074	6.069	6.065	6.067	6.068	6.076	6.080
38	6.091	6.084	6.082	6.073	6.076	6.082	6.084
39	6.072	6.068	6.065	6.063	6.067	6.072	6.080
40	6.081	6.077	6.072	6.067	6.071	6.080	6.086
41	6.076	6.073	6.069	6.067	6.075	6.079	6.083
42	6.077	6.073	6.067	6.065	6.072	6.080	6.081
43	6.084	6.081	6.076	6.072	6.075	6.081	6.090
44	6.081	6.079	6.073	6.071	6.076	6.079	6.087
45	6.085	6.083	6.059	6.057	6.064	6.073	6.081
46	6.072	6.067	6.059	6.057	6.067	6.075	6.076
47	6.079	6.073	6.072	6.068	6.076	6.079	6.079
48	6.079	6.075	6.073	6.065	6.070	6.072	6.081
49	6.087	6.084	6.082	6.083	6.089	6.096	6.105
50	6.076	6.067	6.083	6.084	6.088	6.091	6.100
Avg.	6.077	6.072	6.069	6.069	6.074	6.079	6.084
Med.	6.077	6.072	6.069	6.067	6.075	6.079	6.083
st dev	0.006	0.006	0.007	0.008	0.008	0.008	0.010
Min.	6.067	6.063	6.058	6.053	6.059	6.063	6.063
Max.	6.091	6.084	6.083	6.084	6.092	6.100	6.105

3.6 Data Set 2, 85°C, 150mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2196	0.5086	4082	0.0001	0.0001	0.0002	0.0002	0.0004	0.0005
27	0.2206	0.5085	4048	0.0002	0.0002	0.0004	0.0005	0.0005	0.0007
28	0.2201	0.5066	4100	0.0001	0.0003	0.0003	0.0001	0.0003	0.0006
29	0.2208	0.5066	4073	0.0001	0.0003	0.0003	0.0001	0.0002	0.0005
30	0.2197	0.5079	4089	0.0001	0.0001	0.0003	0.0002	0.0003	0.0002
31	0.2199	0.5084	4075	0.0001	0.0003	0.0005	0.0003	0.0005	0.0006
32	0.2192	0.5084	4098	0.0001	0.0001	0.0003	0.0003	0.0004	0.0006
33	0.2191	0.5081	4109	0.0002	0.0003	0.0004	0.0004	0.0006	0.0007
34	0.2207	0.5061	4085	0.0001	0.0003	0.0004	0.0002	0.0004	0.0006
35	0.2199	0.5076	4087	0.0001	0.0002	0.0002	0.0004	0.0006	0.0008
36	0.2201	0.5081	4071	0.0003	0.0004	0.0004	0.0004	0.0005	0.0008
37	0.2189	0.5098	4087	0.0002	0.0002	0.0003	0.0002	0.0004	0.0004
38	0.2205	0.5057	4098	0.0001	0.0001	0.0004	0.0001	0.0002	0.0001
39	0.2204	0.5060	4098	0.0001	0.0003	0.0004	0.0002	0.0003	0.0001
40	0.2198	0.5067	4107	0.0001	0.0001	0.0003	0.0004	0.0006	0.0007
41	0.2195	0.5099	4060	0.0001	0.0003	0.0003	0.0007	0.0008	0.0008
42	0.2196	0.5092	4073	0.0001	0.0001	0.0002	0.0004	0.0006	0.0009
43	0.2192	0.5091	4089	0.0002	0.0003	0.0004	0.0009	0.0010	0.0010
44	0.2201	0.5099	4041	0.0002	0.0004	0.0004	0.0008	0.0009	0.0011
45	0.2197	0.5081	4089	0.0003	0.0003	0.0004	0.0008	0.0009	0.0009
46	0.2197	0.5069	4107	0.0000	0.0001	0.0002	0.0009	0.0009	0.0011
47	0.2203	0.5061	4100	0.0003	0.0003	0.0004	0.0006	0.0007	0.0010
48	0.2201	0.5089	4058	0.0001	0.0001	0.0003	0.0006	0.0006	0.0009
49	0.2186	0.5048	4188	0.0002	0.0003	0.0005	0.0009	0.0010	0.0011
50	0.2209	0.5080	4046	0.0002	0.0002	0.0006	0.0013	0.0013	0.0015
Avg.	0.2199	0.5078	4086	0.0002	0.0002	0.0004	0.0005	0.0006	0.0007
Med.	0.2199	0.5081	4087	0.0001	0.0003	0.0004	0.0004	0.0006	0.0007
st dev	0.0006	0.0014	29	0.0001	0.0001	0.0001	0.0003	0.0003	0.0003
Min.	0.2186	0.5048	4041	0.0000	0.0001	0.0002	0.0001	0.0002	0.0001
Max.	0.2209	0.5099	4188	0.0003	0.0004	0.0006	0.0013	0.0013	0.0015

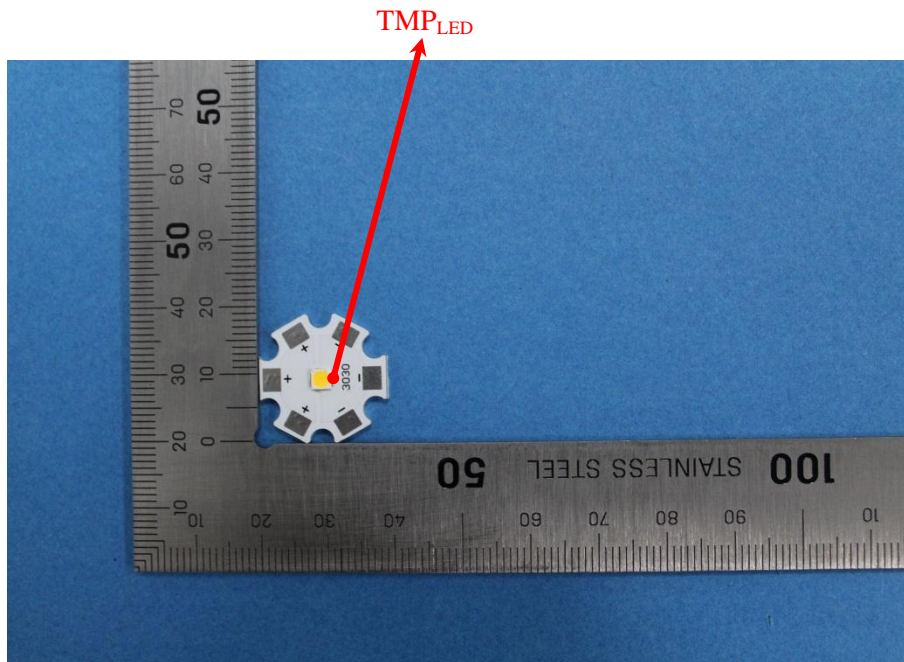
4 - DUT Photo

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