

Light is OSRAM



DURIS[®] S 8 White (CCT 4000 K – 6500 K)

IES LM-80-15 Test Report

Test Documentation No.: 180258W7 (Document No.: OSRM020-01-220) – 20th Jan 2021



LM80 17000 Hour Interval Test Report

IES LM-80-15 Approved Method for Measuring Lumen
Maintenance of LED Light Sources

CSA Group Report: OSRM020-01-220

December 18, 2020

Manufacturer: **OSRAM**

Models tested: **GW P9LT31.PM**

Test conditions: 24 devices @ 55.0 C, 0.065 A
24 devices @ 85.0 C, 0.065 A
24 devices @ 105.0 C, 0.065 A

Prepared for:

OSRAM Opto Semiconductors (Malaysia) Sdn.
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Attn:

Test report prepared by:



Project Engineer,
Test and Measurement Services

Testing performed by:

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14833 NE 87th St
Redmond, WA 98052
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Test report approved by:



Project Manager,
Test and Measurement Services

1.0 Statement of test conditions, summary of results, and reporting requirements:

Part number: GW P9LT31.PM					
Life test conditions				Summary of results	
Test condition	Drive current (A)	Case temperature (°C)	Elapsed life test time (hrs)	Average lumen maintenance (%)	Average chromaticity shift ($\Delta u'v'$)
TC1	0.065	55	17000	101.2	0.0004
TC2	0.065	85	17000	99.3	0.0011
TC3	0.065	105	17000	95.9	0.0030
LM80-15 Reporting requirements					
1. Number of samples tested:			24 per test condition		
2. Description of LED light sources			LED Package ¹		
3. Description of auxiliary equipment			see section 6.1 below		
4. Operating cycle			LED packages are driven at constant current for life test and are pulsed for photometric test.		
5. Ambient conditions, airflow, relative humidity			LED's are operated on controlled thermal plates in an environment that complies with the requirements given in Section 4.4 of LM80-15. Case temperature (Ts): controlled to within -2°C, Surrounding air temp: controlled to within -5°C of Ts, Humidity: < 65 RH, No forced air flow		
6. Case temperature (test point temperature)			See summary table above for test conditions. The temperature measurement point is shown in Sec. 6.3.		
7. Drive current during life test			see summary table above		
8. Initial luminous flux and forward voltage			see data tables for individual test conditions		
9. Lumen maintenance data for each individual LED light source			see data tables for individual test conditions		
10. Observation of LED light source failures			see data tables for individual test conditions		
11. LED light source monitoring intervals			see data tables for individual test conditions		
12. Photometric measurement uncertainty			k=2 expanded measurement uncertainty for relative luminous flux measurements is $\pm 2.0\%$		
13. Chromaticity shift reported over the measurement time			see data tables for individual test conditions		
14. Test start date			August 11, 2017		
15. ANSI target and calculated CCT values			see data tables		

Notes:

- per ANSI/IESNA RP-16-05 Addendum b, *Nomenclature and Definitions for Illuminating Engineering*

TABLE 1.1 - Initial ANSI Target & Calculated CCT Results

GW P9LT31.PM

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
2A0000109518031C	D2	3985±275	4010
	D5	3985±275	4020
	D6	3985±275	3943
	D7	3985±275	3995
5F0000109023031C	D1	3985±275	4001
	D2	3985±275	3977
	D3	3985±275	3997
	D4	3985±275	3981
	D5	3985±275	3971
	D6	3985±275	3955
	D7	3985±275	3971
	D8	3985±275	4005
7200001078CD031C	D1	3985±275	3985
	D2	3985±275	3969
	D4	3985±275	3975
	D5	3985±275	3963
	D6	3985±275	3979
	D7	3985±275	3995
	D8	3985±275	3939
270000107E62031C	D4	3985±275	3965
	D5	3985±275	3977
	D7	3985±275	3985
	D8	3985±275	3977
3D0000107F32031C	D1	3985±275	3951
	D2	3985±275	3979
	D3	3985±275	3952
	D6	3985±275	3969
	D8	3985±275	3964
530000108B52031C	D1	3985±275	3984
	D2	3985±275	4002
	D3	3985±275	3981
	D4	3985±275	3971
	D5	3985±275	3967
	D6	3985±275	3986
	D7	3985±275	3947
	D8	3985±275	3963
0C0000109714031C	D2	3985±275	3991
	D3	3985±275	4014
	D4	3985±275	3999
	D5	3985±275	3985
	D6	3985±275	3992
	D7	3985±275	3995
6E00001090FC031C	D1	3985±275	4008
	D2	3985±275	4016
	D3	3985±275	4018
	D4	3985±275	4031
	D6	3985±275	4002
	D7	3985±275	4010
	D8	3985±275	4002
AC0000109557031C	D1	3985±275	4004
	D2	3985±275	3951
	D3	3985±275	4001
	D4	3985±275	3989
	D6	3985±275	3963
	D7	3985±275	3956

* target CCT as defined in ANSI C78.377-2008

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
BC0000108EEE031C	D2	3985±275	4014
	D3	3985±275	3975
	D4	3985±275	3967
	D5	3985±275	4003
	D8	3985±275	3896

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
7A0000107484031C	D1	3985±275	4021
	D3	3985±275	3999
	D4	3985±275	3997
	D5	3985±275	3978
	D6	3985±275	3971
	D7	3985±275	3979
	D8	3985±275	3992

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
BF00001078CC031C	D4	3985±275	3987
	D5	3985±275	3972
	D6	3985±275	3953
	D7	3985±275	3980
	D8	3985±275	3984

* target CCT as defined in ANSI C78.377-2008

Test Condition 1 55 °C 0.065 A														
TABLE 2.0 - LUMEN MAINTENANCE RESULTS														
Test Condition 1 55 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
2A0000109518031C	D2	304.94	28.50	99.6	100.2	100.3	100.4	100.5	100.4	100.6	100.6	100.6	100.6	100.5
	D5	299.14	28.45	98.9	99.6	99.7	99.8	99.9	99.8	100.0	100.1	100.0	100.0	100.0
	D6	302.75	28.57	99.7	100.2	100.4	100.5	100.6	100.6	100.8	100.9	100.9	100.9	100.9
	D7	301.09	28.48	98.9	99.5	99.7	99.8	99.9	99.8	99.9	100.1	100.0	100.0	100.0
5F0000109023031C	D1	299.49	28.44	100.0	100.6	100.7	100.7	100.9	100.8	100.8	101.0	101.0	100.9	101.0
	D2	302.95	28.49	100.2	100.7	100.8	100.8	100.9	100.9	100.9	101.1	101.1	101.1	101.1
	D3	303.22	28.49	100.0	100.5	100.6	100.7	100.7	100.7	100.7	100.9	100.9	100.9	100.9
	D4	308.82	28.49	99.2	99.9	100.0	100.1	100.2	100.2	100.2	100.4	100.4	100.4	100.4
	D5	300.74	28.48	100.2	100.8	100.9	101.0	101.1	101.0	101.0	101.3	101.3	101.2	101.3
	D6	301.60	28.35	99.9	100.4	100.4	100.5	100.6	100.5	100.5	100.8	100.7	100.7	100.7
	D7	302.80	28.48	100.2	100.8	100.8	100.9	101.0	101.0	101.0	101.2	101.2	101.2	101.2
	D8	310.28	28.48	99.9	100.4	100.4	100.5	100.6	100.5	100.6	100.7	100.7	100.7	100.7
7200001078CD031C	D1	303.46	28.41	99.3	99.9	99.9	100.0	100.0	100.0	100.0	100.2	100.2	100.2	100.2
	D2	310.35	28.51	99.5	100.1	100.2	100.3	100.4	100.4	100.5	100.7	100.6	100.6	100.7
	D4	317.78	28.51	99.7	100.3	100.4	100.5	100.6	100.5	100.5	100.5	100.7	100.7	100.7
	D5	318.20	28.49	99.7	100.3	100.3	100.3	100.4	100.4	100.3	100.5	100.5	100.4	100.4
	D6	309.85	28.49	99.9	100.4	100.4	100.5	100.6	100.5	100.5	100.7	100.7	100.7	100.7
	D7	312.55	28.50	99.9	100.4	100.4	100.5	100.5	100.5	100.5	100.7	100.7	100.6	100.6
	D8	320.20	28.51	99.8	100.2	100.3	100.3	100.4	100.3	100.3	100.5	100.4	100.4	100.4

TABLE 2.0 - LUMEN MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 1	55 °C	0.065 A
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Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
BC0000108EEEC031C	D2	300.90	28.46	99.8	100.4	100.5	100.5	100.6	100.5	100.6	100.8	100.7	100.7	100.7
	D3	300.16	28.48	100.3	101.0	101.0	101.1	101.2	101.2	101.2	101.5	101.4	101.3	101.4
	D4	310.44	28.47	99.5	100.2	100.2	100.3	100.5	100.4	100.4	100.6	100.5	100.5	100.5
	D5	309.26	28.43	99.7	100.1	100.1	100.2	100.4	100.4	100.4	100.7	100.7	100.6	100.6
	D8	299.99	28.50	99.9	100.5	100.5	100.5	100.6	100.6	100.6	100.9	100.8	100.8	100.8
n				24	24	24	24	24	24	24	24	24	24	24
mean				99.7	100.3	100.4	100.5	100.5	100.5	100.5	100.7	100.7	100.7	100.7
median				99.8	100.3	100.4	100.5	100.6	100.5	100.5	100.7	100.7	100.7	100.7
std. dev.				0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4
min				98.9	99.5	99.7	99.8	99.9	99.8	99.9	100.1	100.0	100.0	100.0
max				100.3	101.0	101.0	101.1	101.2	101.2	101.2	101.5	101.4	101.3	101.4

Test Condition 1 55 °C 0.065 A														
TABLE 2.0 - LUMEN MAINTENANCE RESULTS														
Test Condition 1 55 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				12000	13000	14000	15000	16000	17000					
2A0000109518031C	D2	304.94	28.50	100.8	100.7	100.9	100.8	100.9	101.0					
	D5	299.14	28.45	100.1	100.1	100.3	100.3	100.4	100.4					
	D6	302.75	28.57	101.1	101.1	101.2	101.3	101.4	101.4					
	D7	301.09	28.48	100.2	100.2	100.4	100.3	100.4	100.5					
5F0000109023031C	D1	299.49	28.44	101.1	101.1	101.3	101.3	101.3	101.4					
	D2	302.95	28.49	101.2	101.2	101.4	101.4	101.4	101.5					
	D3	303.22	28.49	101.1	101.1	101.3	101.3	101.4	101.5					
	D4	308.82	28.49	100.5	100.5	100.7	100.7	100.8	100.9					
	D5	300.74	28.48	101.4	101.4	101.6	101.6	101.6	101.8					
	D6	301.60	28.35	100.8	100.8	101.0	101.0	101.1	101.1					
	D7	302.80	28.48	101.4	101.4	101.5	101.5	101.6	101.7					
	D8	310.28	28.48	100.9	100.9	101.0	101.0	101.1	101.2					
7200001078CD031C	D1	303.46	28.41	100.4	100.3	100.5	100.4	100.5	100.6					
	D2	310.35	28.51	100.9	100.9	101.0	101.1	101.2	101.2					
	D4	317.78	28.51	100.9	100.9	101.0	101.0	101.1	101.2					
	D5	318.20	28.49	100.5	100.5	100.6	100.6	100.7	100.7					
	D6	309.85	28.49	100.9	100.9	101.0	101.0	101.1	101.2					
	D7	312.55	28.50	100.8	100.8	100.9	100.9	101.0	101.1					
	D8	320.20	28.51	100.6	100.5	100.7	100.7	100.8	100.8					

TABLE 2.0 - LUMEN MAINTENANCE RESULTS **GW P9LT31.PM**

Test Condition 1 55 °C 0.065 A													
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none									
		Flux (lm)	Vf (V)	Lumen Maintenance (%)									
				12000	13000	14000	15000	16000	17000				
BC0000108EEE031C	D2	300.90	28.46	100.9	100.8	101.0	101.0	101.1	101.2				
	D3	300.16	28.48	101.6	101.7	101.8	101.8	101.8	102.0				
	D4	310.44	28.47	100.7	100.7	100.8	100.9	100.9	101.0				
	D5	309.26	28.43	100.8	100.8	101.0	101.0	101.0	101.1				
	D8	299.99	28.50	101.1	101.0	101.1	101.2	101.2	101.4				
n				24	24	24	24	24	24				
mean				100.9	100.8	101.0	101.0	101.1	101.2				
median				100.9	100.9	101.0	101.0	101.1	101.2				
std. dev.				0.4	0.4	0.4	0.4	0.4	0.4				
min				100.1	100.1	100.3	100.3	100.4	100.4				
max				101.6	101.7	101.8	101.8	101.8	102.0				

Test Condition 1 55 °C 0.065 A															
TABLE 2.1 - CHROMATICITY SHIFT RESULTS															
Test Condition 1 55 °C 0.065 A															
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift ($\Delta u'v'$)										
					1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
2A0000109518031C	D2	0.2246	0.5020		0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002
	D5	0.2250	0.5007		0.0005	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002
	D6	0.2250	0.5052		0.0003	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	D7	0.2258	0.5004		0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
5F0000109023031C	D1	0.2244	0.5031		0.0005	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	D2	0.2249	0.5035		0.0004	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	D3	0.2247	0.5027		0.0004	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
	D4	0.2247	0.5035		0.0004	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
	D5	0.2249	0.5036		0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002
	D6	0.2256	0.5032		0.0005	0.0003	0.0003	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
	D7	0.2250	0.5034		0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	D8	0.2244	0.5027		0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
7200001078CD031C	D1	0.2241	0.5047		0.0005	0.0003	0.0003	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0003
	D2	0.2243	0.5051		0.0004	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0002	0.0002	0.0002
	D4	0.2248	0.5038		0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003
	D5	0.2250	0.5040		0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	D6	0.2245	0.5041		0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	D7	0.2246	0.5030		0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003
	D8	0.2255	0.5044		0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002

TABLE 2.1 - CHROMATICITY SHIFT RESULTS
GW P9LT31.PM
Test Condition 1 55 °C 0.065 A

Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift (Δu'v')										
					1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
BC0000108EE031C	D2	0.2240	0.5031		0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
	D3	0.2247	0.5040		0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003	0.0002
	D4	0.2247	0.5044		0.0004	0.0002	0.0001	0.0001	0.0001	0.0000	0.0002	0.0001	0.0001	0.0001	0.0002
	D5	0.2243	0.5031		0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
	D8	0.2264	0.5051		0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002

Test Condition 1 55 °C 0.065 A														
TABLE 2.1 - CHROMATICITY SHIFT RESULTS														
Test Condition 1 55 °C 0.065 A														
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none									
		u'	v'		Chromaticity shift ($\Delta u'v'$)									
					12000	13000	14000	15000	16000	17000				
2A0000109518031C	D2	0.2246	0.5020		0.0002	0.0002	0.0003	0.0003	0.0003	0.0004				
	D5	0.2250	0.5007		0.0003	0.0003	0.0003	0.0003	0.0004	0.0004				
	D6	0.2250	0.5052		0.0001	0.0001	0.0002	0.0002	0.0002	0.0002				
	D7	0.2258	0.5004		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003				
5F0000109023031C	D1	0.2244	0.5031		0.0002	0.0002	0.0002	0.0002	0.0003	0.0004				
	D2	0.2249	0.5035		0.0002	0.0003	0.0003	0.0003	0.0003	0.0004				
	D3	0.2247	0.5027		0.0002	0.0002	0.0002	0.0002	0.0003	0.0003				
	D4	0.2247	0.5035		0.0002	0.0002	0.0002	0.0002	0.0003	0.0003				
	D5	0.2249	0.5036		0.0003	0.0003	0.0003	0.0003	0.0003	0.0004				
	D6	0.2256	0.5032		0.0003	0.0003	0.0003	0.0003	0.0004	0.0004				
	D7	0.2250	0.5034		0.0002	0.0002	0.0003	0.0003	0.0003	0.0004				
	D8	0.2244	0.5027		0.0002	0.0002	0.0002	0.0003	0.0003	0.0003				
7200001078CD031C	D1	0.2241	0.5047		0.0003	0.0003	0.0003	0.0003	0.0003	0.0004				
	D2	0.2243	0.5051		0.0002	0.0002	0.0002	0.0002	0.0003	0.0003				
	D4	0.2248	0.5038		0.0003	0.0003	0.0003	0.0003	0.0003	0.0004				
	D5	0.2250	0.5040		0.0002	0.0003	0.0003	0.0003	0.0003	0.0004				
	D6	0.2245	0.5041		0.0002	0.0003	0.0003	0.0003	0.0003	0.0004				
	D7	0.2246	0.5030		0.0003	0.0003	0.0003	0.0003	0.0004	0.0004				
	D8	0.2255	0.5044		0.0002	0.0002	0.0003	0.0003	0.0003	0.0004				

TABLE 2.1 - CHROMATICITY SHIFT RESULTS
GW P9LT31.PM
Test Condition 1 55 °C 0.065 A

Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none									
		u'	v'		Chromaticity shift ($\Delta u'v'$)									
					12000	13000	14000	15000	16000	17000				
BC0000108EEE031C	D2	0.2240	0.5031		0.0002	0.0002	0.0002	0.0003	0.0003	0.0003				
	D3	0.2247	0.5040		0.0002	0.0003	0.0003	0.0003	0.0003	0.0004				
	D4	0.2247	0.5044		0.0001	0.0002	0.0001	0.0002	0.0002	0.0003				
	D5	0.2243	0.5031		0.0002	0.0003	0.0002	0.0003	0.0003	0.0003				
	D8	0.2264	0.5051		0.0002	0.0002	0.0002	0.0003	0.0003	0.0004				
n					24	24	24	24	24	24				
mean					0.0002	0.0002	0.0003	0.0003	0.0003	0.0004				
median					0.0002	0.0002	0.0003	0.0003	0.0003	0.0004				
std. dev.					0.0000	0.0001	0.0000	0.0000	0.0000	0.0000				
min					0.0001	0.0001	0.0001	0.0002	0.0002	0.0002				
max					0.0003	0.0003	0.0003	0.0003	0.0004	0.0004				

Test Condition 1 55 °C 0.065 A														
TABLE 2.2 - FORWARD VOLTAGE MAINTENANCE RESULTS														
Test Condition 1 55 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)		Forward Voltage Maintainence (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
2A0000109518031C	D2		28.50	99.88	99.94	99.92	99.93	99.93	99.93	99.94	99.95	99.95	99.96	99.95
	D5		28.45	100.00	100.03	100.04	100.04	100.05	100.05	100.05	100.06	100.06	100.07	100.06
	D6		28.57	99.93	99.98	99.99	100.00	100.01	100.01	100.01	100.03	100.04	100.04	100.04
	D7		28.48	100.00	100.03	100.03	100.04	100.04	100.04	100.04	100.05	100.05	100.06	100.06
5F0000109023031C	D1		28.44	100.01	100.05	100.07	100.07	100.08	100.07	100.08	100.09	100.10	100.10	100.11
	D2		28.49	100.03	100.07	100.09	100.10	100.11	100.12	100.13	100.14	100.15	100.16	100.17
	D3		28.49	99.92	99.95	99.97	99.98	99.99	100.00	100.01	100.02	100.03	100.04	100.05
	D4		28.49	99.97	100.01	100.02	100.02	100.03	100.03	100.04	100.05	100.06	100.06	100.06
	D5		28.48	100.01	100.07	100.09	100.10	100.11	100.12	100.13	100.14	100.15	100.16	100.16
	D6		28.35	99.98	100.03	100.05	100.06	100.07	100.08	100.09	100.10	100.11	100.12	100.13
	D7		28.48	100.03	100.09	100.12	100.13	100.14	100.15	100.16	100.18	100.19	100.19	100.20
	D8		28.48	99.96	100.01	100.03	100.05	100.06	100.07	100.08	100.09	100.10	100.11	100.12
7200001078CD031C	D1		28.41	100.00	100.05	100.05	100.06	100.05	100.07	100.07	100.07	100.08	100.08	100.09
	D2		28.51	99.94	100.00	100.02	100.04	100.05	100.06	100.07	100.09	100.10	100.11	100.12
	D4		28.51	99.92	99.96	99.98	99.99	99.99	99.99	100.00	99.98	100.02	100.02	100.03
	D5		28.49	99.88	99.92	99.93	99.94	99.95	99.96	99.97	99.97	100.00	100.00	100.01
	D6		28.49	99.92	99.95	99.97	99.98	99.99	100.00	100.00	100.01	100.02	100.03	100.04
	D7		28.50	99.91	99.96	99.97	99.98	99.99	100.00	100.01	100.01	100.03	100.03	100.04
	D8		28.51	99.92	99.98	100.00	100.02	100.03	100.04	100.06	100.07	100.09	100.10	100.11

TABLE 2.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 1			55 °C	0.065 A										
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)	Forward Voltage Maintenance (%)											
			1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	
BC0000108EEE031C	D2		28.46	100.00	100.05	100.06	100.06	100.07	100.07	100.08	100.09	100.09	100.10	100.10
	D3		28.48	100.02	100.08	100.10	100.11	100.13	100.13	100.14	100.16	100.17	100.18	100.19
	D4		28.47	99.98	100.04	100.05	100.06	100.07	100.08	100.08	100.10	100.10	100.11	100.12
	D5		28.43	99.98	100.03	100.05	100.06	100.07	100.08	100.09	100.10	100.11	100.12	100.12
	D8		28.50	99.92	99.97	99.98	99.99	100.00	100.01	100.02	100.03	100.04	100.05	100.05
n				24	24	24	24	24	24	24	24	24	24	24
mean				100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.1	100.1	100.1	100.1
median				100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.1	100.1	100.1	100.1
std. dev.				0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
min				99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	100.0	100.0	99.9
max				100.0	100.1	100.1	100.1	100.1	100.2	100.2	100.2	100.2	100.2	100.2

Test Condition 1 55 °C 0.065 A													
TABLE 2.2 - FORWARD VOLTAGE MAINTENANCE RESULTS													GW P9LT31.PM
Test Condition 1 55 °C 0.065 A													
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none									
		Vf (V)		Forward Voltage Maintenance (%)									
				12000	13000	14000	15000	16000	17000				
2A0000109518031C	D2		28.50	99.97	99.97	99.98	99.97	99.98	99.99				
	D5		28.45	100.08	100.08	100.08	100.07	100.08	100.09				
	D6		28.57	100.06	100.06	100.07	100.06	100.07	100.08				
	D7		28.48	100.07	100.06	100.07	100.06	100.07	100.07				
5F0000109023031C	D1		28.44	100.12	100.12	100.13	100.11	100.12	100.13				
	D2		28.49	100.18	100.18	100.19	100.19	100.19	100.20				
	D3		28.49	100.06	100.07	100.08	100.07	100.08	100.09				
	D4		28.49	100.07	100.07	100.08	100.07	100.08	100.09				
	D5		28.48	100.18	100.18	100.19	100.18	100.19	100.20				
	D6		28.35	100.14	100.14	100.15	100.15	100.16	100.17				
	D7		28.48	100.22	100.22	100.23	100.22	100.23	100.24				
	D8		28.48	100.13	100.13	100.15	100.15	100.15	100.16				
7200001078CD031C	D1		28.41	100.10	100.10	100.11	100.10	100.10	100.11				
	D2		28.51	100.13	100.14	100.15	100.15	100.15	100.16				
	D4		28.51	100.04	100.04	100.05	100.04	100.05	100.05				
	D5		28.49	100.03	100.03	100.04	100.04	100.05	100.06				
	D6		28.49	100.05	100.05	100.06	100.06	100.07	100.07				
	D7		28.50	100.05	100.05	100.06	100.06	100.06	100.07				
	D8		28.51	100.13	100.13	100.15	100.14	100.16	100.17				

TABLE 2.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 1			55 °C	0.065 A										
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)	Forward Voltage Maintenance (%)											
			12000	13000	14000	15000	16000	17000						
BC0000108EEE031C	D2		28.46	100.11	100.10	100.12	100.11	100.12	100.13					
	D3		28.48	100.21	100.20	100.22	100.22	100.22	100.23					
	D4		28.47	100.13	100.12	100.14	100.14	100.14	100.15					
	D5		28.43	100.14	100.13	100.14	100.14	100.15	100.16					
	D8		28.50	100.07	100.06	100.08	100.07	100.09	100.11					
n				24	24	24	24	24	24					
mean				100.1	100.1	100.1	100.1	100.1	100.1					
median				100.1	100.1	100.1	100.1	100.1	100.1					
std. dev.				0.1	0.1	0.1	0.1	0.1	0.1					
min				100.0	100.0	100.0	100.0	100.0	100.0					
max				100.2	100.2	100.2	100.2	100.2	100.2					

Test Condition 2 85 °C 0.065 A														
TABLE 3.0 - LUMEN MAINTENANCE RESULTS														GW P9LT31.PM
Test Condition 2 85 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
270000107E62031C	D4	318.36	28.42	99.6	99.8	99.8	99.9	99.7	99.5	99.6	99.6	99.4	99.2	99.2
	D5	319.18	28.49	99.5	99.8	99.6	99.7	99.4	99.2	99.1	99.3	99.0	98.8	98.7
	D7	313.41	28.46	99.5	100.0	99.9	100.0	99.8	99.6	99.7	99.8	99.6	99.4	99.4
	D8	313.65	28.50	99.5	100.0	99.8	99.9	99.6	99.5	99.4	99.5	99.4	99.1	99.1
3D0000107F32031C	D1	313.62	28.51	99.6	100.0	100.0	100.0	99.9	99.7	99.7	99.8	99.6	99.4	99.4
	D2	306.07	28.47	99.6	99.8	99.7	99.7	99.6	99.4	99.4	99.4	99.2	99.1	99.1
	D3	318.00	28.44	99.9	100.1	99.9	99.9	99.8	99.5	99.7	99.6	99.4	99.3	99.3
	D6	319.65	28.45	99.6	99.8	99.7	99.7	99.6	99.3	99.3	99.4	99.2	99.0	99.1
	D8	308.90	28.49	99.8	100.1	100.0	100.0	99.9	99.6	99.6	99.7	99.4	99.3	99.4
530000108B52031C	D1	307.04	28.48	99.2	99.5	99.5	99.6	99.5	99.3	99.4	99.3	99.1	99.0	99.0
	D2	296.14	28.46	99.1	99.4	99.3	99.4	99.2	99.0	99.0	99.2	98.9	98.8	98.8
	D3	294.47	28.45	99.6	100.0	99.9	99.9	99.8	99.6	99.6	99.8	99.6	99.5	99.4
	D4	296.79	28.47	99.5	99.7	99.8	99.8	99.6	99.4	99.5	99.6	99.4	99.2	99.2
	D5	308.44	28.47	99.9	100.2	100.1	100.2	100.1	100.0	100.0	100.1	99.8	99.7	99.7
	D6	295.38	28.48	100.1	100.4	100.4	100.4	100.3	100.1	100.1	100.2	100.0	99.8	99.9
	D7	301.87	28.48	99.9	100.2	100.1	100.2	100.0	99.8	99.7	99.9	99.6	99.4	99.5
	D8	305.39	28.38	99.9	100.3	100.3	100.3	100.2	100.0	100.0	100.1	99.9	99.7	99.8

TABLE 3.0 - LUMEN MAINTENANCE RESULTS
GW P9LT31.PM
Test Condition 2 85 °C 0.065 A

Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
7A000107484031C	D1	304.49	28.44	99.1	99.5	99.5	99.5	99.4	99.2	99.3	99.1	99.1	99.0	99.0
	D3	300.40	28.59	98.3	98.7	98.7	98.7	98.6	98.4	98.5	98.4	98.4	98.2	98.3
	D4	306.80	28.52	99.5	100.0	99.9	100.0	99.9	99.7	99.8	99.6	99.6	99.5	99.6
	D5	304.54	28.37	100.0	100.3	100.2	100.2	100.0	99.8	100.0	99.8	99.7	99.5	99.6
	D6	308.99	28.41	99.9	100.2	100.2	100.2	100.0	99.8	100.0	99.8	99.7	99.6	99.7
	D7	307.53	28.44	99.4	99.8	99.7	99.8	99.6	99.4	99.6	99.4	99.3	99.1	99.0
	D8	306.37	28.51	99.4	99.8	99.8	99.9	99.8	99.5	99.9	99.5	99.5	99.4	99.5
n				24	24	24	24	24	24	24	24	24	24	24
mean				99.6	99.9	99.8	99.9	99.7	99.5	99.6	99.6	99.4	99.3	99.3
median				99.6	100.0	99.9	99.9	99.8	99.5	99.6	99.6	99.4	99.3	99.3
std. dev.				0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
min				98.3	98.7	98.7	98.7	98.6	98.4	98.5	98.4	98.4	98.2	98.3
max				100.1	100.4	100.4	100.4	100.3	100.1	100.1	100.2	100.0	99.8	99.9

Test Condition 2 85 °C 0.065 A														
TABLE 3.0 - LUMEN MAINTENANCE RESULTS														
Test Condition 2 85 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				12000	13000	14000	15000	16000	17000					
270000107E62031C	D4	318.36	28.42	99.2	99.1	99.3	99.2	99.3	99.3					
	D5	319.18	28.49	98.6	98.6	98.6	98.7	98.7	98.7					
	D7	313.41	28.46	99.4	99.2	99.4	99.3	99.3	99.4					
	D8	313.65	28.50	99.0	98.9	99.1	99.0	99.1	99.1					
3D0000107F32031C	D1	313.62	28.51	99.2	99.3	99.4	99.4	99.4	99.5					
	D2	306.07	28.47	99.0	98.9	99.0	99.0	99.0	99.0					
	D3	318.00	28.44	99.3	99.1	99.3	99.2	99.3	99.3					
	D6	319.65	28.45	98.9	98.8	99.0	98.9	99.0	99.0					
	D8	308.90	28.49	99.2	99.2	99.3	99.3	99.3	99.3					
530000108B52031C	D1	307.04	28.48	99.0	98.6	98.7	98.7	98.7	98.8					
	D2	296.14	28.46	98.7	98.6	98.7	98.7	98.7	98.8					
	D3	294.47	28.45	99.4	99.4	99.6	99.5	99.6	99.6					
	D4	296.79	28.47	99.1	99.1	99.2	99.2	99.2	99.3					
	D5	308.44	28.47	99.7	99.5	99.7	99.6	99.7	99.8					
	D6	295.38	28.48	99.7	99.7	99.8	99.8	99.9	99.9					
	D7	301.87	28.48	99.3	99.2	99.4	99.3	99.4	99.5					
	D8	305.39	28.38	99.6	99.6	99.8	99.7	99.8	99.8					

TABLE 3.0 - LUMEN MAINTENANCE RESULTS
GW P9LT31.PM
Test Condition 2 85 °C 0.065 A

Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				12000	13000	14000	15000	16000	17000					
7A000107484031C	D1	304.49	28.44	98.9	98.8	98.9	98.8	98.9	98.9					
	D3	300.40	28.59	98.1	98.1	98.2	98.0	98.3	98.3					
	D4	306.80	28.52	99.5	99.4	99.5	99.5	99.6	99.6					
	D5	304.54	28.37	99.5	99.4	99.5	99.5	99.5	99.6					
	D6	308.99	28.41	99.6	99.5	99.6	99.5	99.6	99.6					
	D7	307.53	28.44	99.1	98.9	99.0	99.0	99.0	99.1					
	D8	306.37	28.51	99.5	99.3	99.5	99.4	99.4	99.5					
n				24	24	24	24	24	24					
mean				99.2	99.1	99.2	99.2	99.2	99.3					
median				99.2	99.1	99.3	99.2	99.3	99.3					
std. dev.				0.4	0.4	0.4	0.4	0.4	0.4					
min				98.1	98.1	98.2	98.0	98.3	98.3					
max				99.7	99.7	99.8	99.8	99.9	99.9					

Test Condition 2 85 °C 0.065 A															
TABLE 3.1 - CHROMATICITY SHIFT RESULTS															GW P9LT31.PM
Test Condition 2 85 °C 0.065 A															
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift ($\Delta u'v'$)										
					1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
270000107E62031C	D4	0.2249	0.5041		0.0005	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007	0.0007
	D5	0.2249	0.5034		0.0005	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006	0.0009	0.0009	0.0009	0.0010
	D7	0.2246	0.5036		0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0007	0.0007
	D8	0.2245	0.5042		0.0005	0.0002	0.0004	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007	0.0007	0.0008
3D0000107F32031C	D1	0.2249	0.5049		0.0004	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
	D2	0.2248	0.5035		0.0006	0.0004	0.0004	0.0005	0.0006	0.0007	0.0006	0.0008	0.0008	0.0008	0.0010
	D3	0.2252	0.5043		0.0004	0.0004	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008
	D6	0.2245	0.5048		0.0005	0.0003	0.0004	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
	D8	0.2251	0.5037		0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
530000108B52031C	D1	0.2247	0.5035		0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007	0.0007	0.0008
	D2	0.2242	0.5036		0.0005	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0007	0.0007	0.0008	0.0009
	D3	0.2248	0.5034		0.0005	0.0003	0.0004	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0008
	D4	0.2247	0.5041		0.0005	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0007	0.0007	0.0008	0.0009
	D5	0.2249	0.5040		0.0004	0.0002	0.0003	0.0004	0.0004	0.0005	0.0004	0.0006	0.0006	0.0007	0.0007
	D6	0.2247	0.5032		0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0008
	D7	0.2254	0.5041		0.0005	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006	0.0008	0.0008	0.0009	0.0009
	D8	0.2251	0.5037		0.0004	0.0002	0.0003	0.0003	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007	0.0007

TABLE 3.1 - CHROMATICITY SHIFT RESULTS

GW P9LT31.PM

Test Condition 2 85 °C 0.065 A

Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift ($\Delta u'v'$)										
					1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
7A0000107484031C	D1	0.2245	0.5017		0.0004	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006	0.0007	0.0006	0.0007	0.0007
	D3	0.2255	0.5008		0.0006	0.0004	0.0005	0.0005	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009
	D4	0.2254	0.5012		0.0004	0.0002	0.0002	0.0003	0.0003	0.0003	0.0005	0.0006	0.0005	0.0006	0.0006
	D5	0.2253	0.5025		0.0004	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0007	0.0008
	D6	0.2255	0.5025		0.0004	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0006	0.0005	0.0006	0.0007
	D7	0.2254	0.5022		0.0004	0.0003	0.0003	0.0003	0.0004	0.0004	0.0005	0.0007	0.0007	0.0008	0.0008
	D8	0.2252	0.5018		0.0004	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0007
n					24	24	24	24	24	24	24	24	24	24	24
mean					0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0007	0.0008
median					0.0005	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
std. dev.					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
min					0.0004	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0005	0.0006	0.0006
max					0.0006	0.0004	0.0005	0.0005	0.0006	0.0007	0.0007	0.0009	0.0009	0.0009	0.0010

Test Condition 2															85 °C		0.065 A		
TABLE 3.1 - CHROMATICITY SHIFT RESULTS																	GW P9LT31.PM		
Test Condition 2															85 °C		0.065 A		
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none														
		u'	v'		Chromaticity shift (Δu'v')														
					12000	13000	14000	15000	16000	17000									
270000107E62031C	D4	0.2249	0.5041		0.0007	0.0008	0.0009	0.0009	0.0009	0.0010									
	D5	0.2249	0.5034		0.0010	0.0011	0.0012	0.0012	0.0013	0.0013									
	D7	0.2246	0.5036		0.0007	0.0009	0.0010	0.0010	0.0011	0.0012									
	D8	0.2245	0.5042		0.0007	0.0009	0.0010	0.0011	0.0011	0.0012									
3D0000107F32031C	D1	0.2249	0.5049		0.0008	0.0009	0.0010	0.0011	0.0012	0.0012									
	D2	0.2248	0.5035		0.0009	0.0010	0.0011	0.0012	0.0012	0.0013									
	D3	0.2252	0.5043		0.0009	0.0010	0.0010	0.0011	0.0011	0.0011									
	D6	0.2245	0.5048		0.0008	0.0009	0.0010	0.0011	0.0011	0.0011									
	D8	0.2251	0.5037		0.0008	0.0009	0.0010	0.0011	0.0011	0.0012									
530000108B52031C	D1	0.2247	0.5035		0.0008	0.0010	0.0010	0.0011	0.0010	0.0011									
	D2	0.2242	0.5036		0.0008	0.0010	0.0010	0.0011	0.0011	0.0012									
	D3	0.2248	0.5034		0.0007	0.0009	0.0009	0.0010	0.0010	0.0010									
	D4	0.2247	0.5041		0.0008	0.0010	0.0011	0.0011	0.0012	0.0012									
	D5	0.2249	0.5040		0.0007	0.0008	0.0009	0.0010	0.0010	0.0010									
	D6	0.2247	0.5032		0.0008	0.0009	0.0010	0.0010	0.0010	0.0011									
	D7	0.2254	0.5041		0.0009	0.0011	0.0012	0.0012	0.0012	0.0013									
	D8	0.2251	0.5037		0.0007	0.0008	0.0009	0.0009	0.0009	0.0010									

TABLE 3.1 - CHROMATICITY SHIFT RESULTS

GW P9LT31.PM

Test Condition 2 85 °C 0.065 A

Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none									
		u'	v'		Chromaticity shift ($\Delta u'v'$)									
					12000	13000	14000	15000	16000	17000				
7A0000107484031C	D1	0.2245	0.5017		0.0008	0.0009	0.0009	0.0010	0.0010	0.0011				
	D3	0.2255	0.5008		0.0009	0.0010	0.0011	0.0012	0.0012	0.0012				
	D4	0.2254	0.5012		0.0007	0.0007	0.0008	0.0008	0.0009	0.0010				
	D5	0.2253	0.5025		0.0008	0.0009	0.0010	0.0010	0.0010	0.0012				
	D6	0.2255	0.5025		0.0006	0.0008	0.0009	0.0009	0.0009	0.0010				
	D7	0.2254	0.5022		0.0007	0.0009	0.0010	0.0011	0.0011	0.0012				
	D8	0.2252	0.5018		0.0006	0.0008	0.0009	0.0009	0.0010	0.0011				
n					24	24	24	24	24	24				
mean					0.0008	0.0009	0.0010	0.0010	0.0011	0.0011				
median					0.0008	0.0009	0.0010	0.0011	0.0011	0.0011				
std. dev.					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001				
min					0.0006	0.0007	0.0008	0.0008	0.0009	0.0010				
max					0.0010	0.0011	0.0012	0.0012	0.0013	0.0013				

Test Condition 2 85 °C 0.065 A														
TABLE 3.2 - FORWARD VOLTAGE MAINTENANCE RESULTS														
Test Condition 2 85 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)		Forward Voltage Maintainence (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
270000107E62031C	D4		28.42	99.95	100.03	100.08	100.10	100.13	100.14	100.20	100.19	100.21	100.23	100.26
	D5		28.49	99.94	100.01	100.04	100.07	100.09	100.10	100.16	100.15	100.16	100.18	100.21
	D7		28.46	100.00	100.06	100.08	100.11	100.12	100.13	100.16	100.16	100.18	100.18	100.20
	D8		28.50	99.92	99.98	100.00	100.02	100.03	100.05	100.08	100.08	100.09	100.10	100.12
3D0000107F32031C	D1		28.51	100.07	100.16	100.18	100.20	100.22	100.23	100.27	100.26	100.28	100.29	100.28
	D2		28.47	100.03	100.09	100.11	100.13	100.14	100.15	100.18	100.18	100.19	100.20	100.19
	D3		28.44	99.95	100.04	100.08	100.12	100.15	100.17	100.23	100.23	100.25	100.27	100.28
	D6		28.45	99.92	100.00	100.04	100.08	100.10	100.12	100.17	100.16	100.19	100.21	100.22
	D8		28.49	99.93	99.98	100.00	100.03	100.04	100.04	100.07	100.07	100.09	100.09	100.10
530000108B52031C	D1		28.48	100.01	100.11	100.07	100.08	100.08	100.08	100.09	100.11	100.12	100.12	100.12
	D2		28.46	100.00	100.05	100.06	100.07	100.08	100.09	100.10	100.10	100.12	100.12	100.12
	D3		28.45	100.01	100.07	100.09	100.11	100.12	100.12	100.15	100.15	100.16	100.16	100.19
	D4		28.47	100.06	100.13	100.16	100.19	100.21	100.21	100.25	100.24	100.27	100.27	100.30
	D5		28.47	100.00	100.06	100.07	100.10	100.11	100.12	100.15	100.15	100.16	100.18	100.20
	D6		28.48	100.06	100.15	100.16	100.19	100.21	100.22	100.26	100.26	100.28	100.29	100.31
	D7		28.48	100.01	100.07	100.10	100.11	100.12	100.13	100.16	100.15	100.17	100.18	100.19
	D8		28.38	100.00	100.08	100.12	100.13	100.15	100.17	100.21	100.19	100.21	100.22	100.25

TABLE 3.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 2				85 °C		0.065 A									
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none											
		Vf (V)		Forward Voltage Maintenance (%)											
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	
7A0000107484031C	D1		28.44	100.00	100.04	100.05	100.05	100.05	100.06	100.07	100.07	100.08	100.08	100.10	
	D3		28.59	99.98	100.01	100.02	100.03	100.03	100.03	100.04	100.04	100.05	100.05	100.06	
	D4		28.52	100.01	100.08	100.11	100.14	100.15	100.17	100.19	100.20	100.22	100.23	100.24	
	D5		28.37	100.00	100.08	100.10	100.12	100.14	100.15	100.19	100.18	100.20	100.21	100.23	
	D6		28.41	100.01	100.09	100.11	100.13	100.15	100.17	100.20	100.19	100.22	100.23	100.24	
	D7		28.44	100.01	100.06	100.07	100.08	100.09	100.09	100.12	100.11	100.12	100.12	100.13	
	D8		28.51	100.02	100.06	100.07	100.08	100.09	100.09	100.12	100.11	100.12	100.12	100.13	
n				24	24	24	24	24	24	24	24	24	24	24	
mean				100.0	100.1	100.1	100.1	100.1	100.1	100.2	100.2	100.2	100.2	100.2	
median				100.0	100.1	100.1	100.1	100.1	100.1	100.2	100.2	100.2	100.2	100.2	
std. dev.				0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
min				99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.1	
max				100.1	100.2	100.2	100.2	100.2	100.2	100.3	100.3	100.3	100.3	100.3	

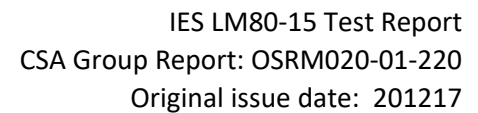
Test Condition 2 85 °C 0.065 A														
TABLE 3.2 - FORWARD VOLTAGE MAINTENANCE RESULTS														
Test Condition 2 85 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A										
				Photometric test ambient temperature: 25 ± 2 °C										
				Failures observed: none										
		Vf (V)		Forward Voltage Maintenance (%)										
				12000	13000	14000	15000	16000	17000					
270000107E62031C	D4		28.42	100.28	100.27	100.29	100.31	100.33	100.34					
	D5		28.49	100.23	100.22	100.23	100.25	100.27	100.28					
	D7		28.46	100.23	100.22	100.22	100.23	100.25	100.26					
	D8		28.50	100.15	100.13	100.14	100.15	100.16	100.17					
3D0000107F32031C	D1		28.51	100.32	100.32	100.33	100.33	100.35	100.36					
	D2		28.47	100.21	100.22	100.23	100.23	100.25	100.25					
	D3		28.44	100.32	100.33	100.35	100.36	100.39	100.40					
	D6		28.45	100.26	100.26	100.29	100.29	100.32	100.33					
	D8		28.49	100.12	100.12	100.14	100.14	100.15	100.15					
530000108B52031C	D1		28.48	100.14	100.13	100.14	100.14	100.15	100.15					
	D2		28.46	100.13	100.13	100.14	100.14	100.15	100.15					
	D3		28.45	100.19	100.18	100.19	100.19	100.22	100.21					
	D4		28.47	100.31	100.30	100.31	100.31	100.35	100.34					
	D5		28.47	100.21	100.21	100.22	100.22	100.24	100.25					
	D6		28.48	100.34	100.33	100.35	100.35	100.37	100.38					
	D7		28.48	100.21	100.21	100.22	100.22	100.25	100.24					
	D8		28.38	100.27	100.26	100.28	100.28	100.31	100.31					

TABLE 3.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 2			85 °C	0.065 A											
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none											
		Vf (V)	Forward Voltage Maintenance (%)												
			12000	13000	14000	15000	16000	17000							
7A0000107484031C	D1		28.44	100.09	100.10	100.10	100.09	100.10	100.11						
	D3		28.59	100.06	100.06	100.06	100.03	100.07	100.08						
	D4		28.52	100.25	100.26	100.27	100.26	100.28	100.30						
	D5		28.37	100.26	100.24	100.26	100.25	100.27	100.28						
	D6		28.41	100.27	100.26	100.28	100.28	100.29	100.30						
	D7		28.44	100.14	100.14	100.14	100.15	100.15	100.16						
	D8		28.51	100.14	100.14	100.14	100.15	100.15	100.16						
n				24	24	24	24	24	24						
mean				100.2	100.2	100.2	100.2	100.2	100.2						
median				100.2	100.2	100.2	100.2	100.2	100.3						
std. dev.				0.1	0.1	0.1	0.1	0.1	0.1						
min				100.1	100.1	100.1	100.0	100.1	100.1						
max				100.3	100.3	100.3	100.4	100.4	100.4						

Test Condition 3 105 °C 0.065 A														
TABLE 4.0 - LUMEN MAINTENANCE RESULTS														GW P9LT31.PM
Test Condition 3 105 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
OC0000109714031C	D2	307.04	28.47	99.4	99.0	98.5	98.2	97.8	97.5	97.3	97.1	97.0	96.8	96.7
	D3	299.64	28.48	98.8	98.6	97.9	97.7	97.3	97.0	96.8	96.7	96.5	96.3	96.1
	D4	304.38	28.44	98.9	98.5	98.1	97.8	97.4	97.1	96.9	96.7	96.5	96.3	96.2
	D5	306.56	28.48	99.4	99.0	98.5	98.2	97.8	97.5	97.3	97.2	97.0	96.7	96.6
	D6	313.36	28.46	98.6	98.3	97.9	97.7	97.4	97.1	96.9	96.7	96.6	96.4	96.2
	D7	309.27	28.43	99.0	98.6	98.2	97.9	97.6	97.3	97.1	96.9	96.8	96.5	96.4
6E00001090FC031C	D1	300.55	28.53	98.2	97.9	97.4	97.1	96.8	96.5	96.3	96.2	96.0	95.8	95.7
	D2	301.73	28.52	98.3	98.1	97.6	97.3	97.0	96.6	96.5	96.3	96.1	95.9	95.8
	D3	305.20	28.48	98.9	98.7	98.2	97.7	97.6	97.3	97.2	97.0	96.9	96.7	96.6
	D4	302.34	28.51	98.2	97.9	97.5	97.0	96.9	96.6	96.4	96.2	96.1	95.9	95.7
	D6	306.17	28.48	98.5	97.7	97.8	97.4	97.3	96.9	96.7	96.6	96.5	96.3	96.1
	D7	304.10	28.47	98.8	98.1	98.1	97.7	97.6	97.3	97.0	96.9	96.8	96.6	96.4
	D8	302.97	28.45	98.6	97.9	97.8	97.3	97.2	96.8	96.6	96.5	96.2	96.0	95.9
AC0000109557031C	D1	305.56	28.25	99.2	99.0	98.5	98.3	98.0	97.7	97.6	97.4	97.3	97.1	97.0
	D2	301.43	28.49	99.4	99.0	98.3	98.2	97.8	97.5	97.3	97.1	96.9	96.7	96.6
	D3	292.81	28.47	98.7	98.4	97.9	97.7	97.3	97.1	96.9	96.7	96.5	96.4	96.3
	D4	304.99	28.49	99.3	99.0	98.4	98.1	97.7	97.3	97.2	97.0	96.7	96.5	96.4
	D6	304.40	28.37	99.4	99.0	98.4	98.1	97.8	97.5	97.2	97.1	96.9	96.7	96.6
	D7	309.57	28.46	99.5	99.2	98.7	98.5	98.2	97.9	97.7	97.5	97.3	97.2	97.1



GW P9LT31.PM

Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
BF00001078CC031C	D4	319.94	28.41	98.8	98.4	98.0	97.7	97.4	97.0	96.8	96.7	96.5	96.3	96.1
	D5	309.18	28.46	99.2	98.7	98.1	97.8	97.4	97.0	96.7	96.6	96.4	96.1	96.0
	D6	308.02	28.50	99.1	98.7	98.3	98.0	97.7	97.3	97.1	97.0	96.8	96.5	96.3
	D7	310.41	28.53	99.1	98.8	98.2	97.9	97.5	97.1	96.9	96.7	96.5	96.3	96.1
	D8	313.66	28.41	99.1	98.5	98.0	97.7	97.3	96.9	96.7	96.6	96.4	96.2	96.0
n				24	24	24	24	24	24	24	24	24	24	24
	mean			98.9	98.6	98.1	97.8	97.5	97.2	97.0	96.8	96.6	96.4	96.3
	median			99.0	98.6	98.1	97.8	97.5	97.1	96.9	96.7	96.6	96.4	96.3
	std. dev.			0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4
	min			98.2	97.7	97.4	97.0	96.8	96.5	96.3	96.2	96.0	95.8	95.7
	max			99.5	99.2	98.7	98.5	98.2	97.9	97.7	97.5	97.3	97.2	97.1

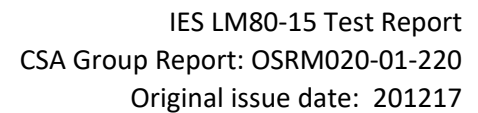
Test Condition 3 105 °C 0.065 A														
TABLE 4.0 - LUMEN MAINTENANCE RESULTS														
Test Condition 3 105 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Flux (lm)	Vf (V)	Lumen Maintenance (%)										
				12000	13000	14000	15000	16000	17000					
0C0000109714031C	D2	307.04	28.47	96.4	96.3	96.3	96.2	96.2	96.1					
	D3	299.64	28.48	96.0	95.9	96.0	95.9	95.9	95.9					
	D4	304.38	28.44	96.0	95.9	95.9	95.9	95.8	95.7					
	D5	306.56	28.48	96.5	96.3	96.4	96.3	96.3	96.3					
	D6	313.36	28.46	96.1	95.9	96.1	95.9	95.9	95.9					
	D7	309.27	28.43	96.5	96.0	96.2	96.0	96.0	95.9					
6E00001090FC031C	D1	300.55	28.53	95.5	95.5	95.5	95.4	95.4	95.4					
	D2	301.73	28.52	95.7	95.5	95.6	95.5	95.4	95.4					
	D3	305.20	28.48	96.5	96.3	96.3	96.2	96.2	96.2					
	D4	302.34	28.51	95.6	95.4	95.5	95.4	95.4	95.3					
	D6	306.17	28.48	96.1	95.8	95.8	95.7	95.7	95.7					
	D7	304.10	28.47	96.5	96.3	96.3	96.2	96.2	96.1					
	D8	302.97	28.45	95.9	95.7	95.7	95.6	95.5	95.5					
AC0000109557031C	D1	305.56	28.25	97.0	96.6	96.7	96.6	96.5	96.5					
	D2	301.43	28.49	96.4	96.3	96.3	96.2	96.2	96.1					
	D3	292.81	28.47	96.1	96.0	96.1	96.0	96.0	96.0					
	D4	304.99	28.49	96.3	96.1	96.2	96.1	96.1	96.0					
	D6	304.40	28.37	96.4	96.3	96.3	96.2	96.2	96.2					
	D7	309.57	28.46	97.2	96.8	96.7	96.6	96.6	96.5					

TABLE 4.0 - LUMEN MAINTENANCE RESULTS **GW P9LT31.PM**

Test Condition 3				105 °C		0.065 A									
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none											
		Flux (lm)	Vf (V)	Lumen Maintenance (%)											
				12000	13000	14000	15000	16000	17000						
BF00001078CC031C	D4	319.94	28.41	96.1	95.9	95.9	95.8	95.8	95.7						
	D5	309.18	28.46	95.9	95.7	95.7	95.6	95.6	95.6						
	D6	308.02	28.50	96.4	96.0	96.1	95.9	95.9	95.8						
	D7	310.41	28.53	96.0	95.8	95.8	95.8	95.7	95.7						
	D8	313.66	28.41	96.2	95.7	95.8	95.7	95.7	95.6						
n				24	24	24	24	24	24						
mean				96.2	96.0	96.1	95.9	95.9	95.9						
median				96.2	96.0	96.1	95.9	95.9	95.9						
std. dev.				0.4	0.3	0.3	0.3	0.3	0.3						
min				95.5	95.4	95.5	95.4	95.4	95.3						
max				97.2	96.8	96.7	96.6	96.6	96.5						

Test Condition 3 105 °C 0.065 A															
TABLE 4.1 - CHROMATICITY SHIFT RESULTS														GW P9LT31.PM	
Test Condition 3 105 °C 0.065 A															
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift (Δu'v')										
					1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
0C0000109714031C	D2	0.2245	0.5035		0.0007	0.0009	0.0012	0.0013	0.0015	0.0016	0.0019	0.0020	0.0021	0.0022	0.0024
	D3	0.2241	0.5030		0.0007	0.0009	0.0011	0.0012	0.0014	0.0015	0.0017	0.0018	0.0019	0.0021	0.0022
	D4	0.2243	0.5033		0.0007	0.0009	0.0012	0.0013	0.0015	0.0016	0.0018	0.0019	0.0021	0.0022	0.0023
	D5	0.2250	0.5027		0.0007	0.0009	0.0011	0.0012	0.0014	0.0015	0.0018	0.0019	0.0020	0.0021	0.0022
	D6	0.2244	0.5037		0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0019	0.0021	0.0021	0.0023
	D7	0.2247	0.5027		0.0007	0.0009	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0021	0.0022	0.0023
6E00001090FC031C	D1	0.2253	0.5007		0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024	0.0025	0.0026
	D2	0.2253	0.5004		0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0021	0.0022	0.0023	0.0025	0.0026
	D3	0.2250	0.5009		0.0007	0.0009	0.0011	0.0014	0.0015	0.0016	0.0019	0.0020	0.0021	0.0022	0.0023
	D4	0.2252	0.4997		0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024	0.0025	0.0026
	D6	0.2254	0.5008		0.0007	0.0006	0.0011	0.0013	0.0014	0.0016	0.0018	0.0019	0.0021	0.0022	0.0023
	D7	0.2252	0.5009		0.0006	0.0006	0.0011	0.0013	0.0014	0.0015	0.0018	0.0019	0.0020	0.0021	0.0022
	D8	0.2252	0.5014		0.0007	0.0007	0.0012	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023	0.0025	0.0025
AC0000109557031C	D1	0.2245	0.5025		0.0007	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018	0.0019	0.0020	0.0021	0.0022
	D2	0.2252	0.5042		0.0008	0.0011	0.0013	0.0014	0.0016	0.0018	0.0019	0.0020	0.0022	0.0023	0.0024
	D3	0.2242	0.5036		0.0006	0.0008	0.0010	0.0012	0.0014	0.0015	0.0017	0.0018	0.0019	0.0020	0.0021
	D4	0.2248	0.5029		0.0008	0.0010	0.0013	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0025
	D6	0.2253	0.5032		0.0007	0.0009	0.0012	0.0013	0.0015	0.0016	0.0018	0.0019	0.0021	0.0022	0.0023
	D7	0.2254	0.5034		0.0006	0.0008	0.0011	0.0011	0.0014	0.0015	0.0016	0.0018	0.0019	0.0021	0.0021

Test Condition 3															105 °C		0.065 A		
TABLE 4.1 - CHROMATICITY SHIFT RESULTS																	GW P9LT31.PM		
Test Condition 3															105 °C		0.065 A		
Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none														
		u'	v'		Chromaticity shift (Δu'v')														
					12000	13000	14000	15000	16000	17000									
0C0000109714031C	D2	0.2245	0.5035		0.0024	0.0026	0.0027	0.0027	0.0029	0.0030									
	D3	0.2241	0.5030		0.0022	0.0024	0.0024	0.0025	0.0026	0.0027									
	D4	0.2243	0.5033		0.0024	0.0025	0.0027	0.0027	0.0028	0.0029									
	D5	0.2250	0.5027		0.0023	0.0025	0.0026	0.0026	0.0027	0.0028									
	D6	0.2244	0.5037		0.0023	0.0024	0.0026	0.0027	0.0028	0.0028									
	D7	0.2247	0.5027		0.0024	0.0025	0.0026	0.0027	0.0028	0.0029									
6E00001090FC031C	D1	0.2253	0.5007		0.0027	0.0028	0.0030	0.0031	0.0031	0.0032									
	D2	0.2253	0.5004		0.0027	0.0028	0.0030	0.0030	0.0031	0.0032									
	D3	0.2250	0.5009		0.0024	0.0025	0.0026	0.0027	0.0028	0.0030									
	D4	0.2252	0.4997		0.0027	0.0028	0.0029	0.0030	0.0031	0.0032									
	D6	0.2254	0.5008		0.0023	0.0025	0.0026	0.0027	0.0028	0.0029									
	D7	0.2252	0.5009		0.0023	0.0024	0.0026	0.0026	0.0027	0.0029									
	D8	0.2252	0.5014		0.0026	0.0027	0.0029	0.0030	0.0031	0.0032									
AC0000109557031C	D1	0.2245	0.5025		0.0023	0.0024	0.0026	0.0027	0.0028	0.0029									
	D2	0.2252	0.5042		0.0024	0.0026	0.0027	0.0029	0.0029	0.0030									
	D3	0.2242	0.5036		0.0022	0.0023	0.0025	0.0026	0.0026	0.0028									
	D4	0.2248	0.5029		0.0025	0.0026	0.0028	0.0029	0.0029	0.0030									
	D6	0.2253	0.5032		0.0023	0.0025	0.0027	0.0028	0.0028	0.0029									
	D7	0.2254	0.5034		0.0021	0.0023	0.0025	0.0026	0.0026	0.0028									



GW P9LT31.PM

Load board ID	Device number	Zero hour measurements			Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		u'	v'		Chromaticity shift (Δu'v')										
					12000	13000	14000	15000	16000	17000					
BF00001078CC031C	D4	0.2245	0.5037		0.0023	0.0024	0.0026	0.0026	0.0027	0.0028					
	D5	0.2244	0.5048		0.0023	0.0025	0.0026	0.0027	0.0027	0.0029					
	D6	0.2249	0.5047		0.0025	0.0027	0.0028	0.0029	0.0030	0.0031					
	D7	0.2247	0.5036		0.0026	0.0028	0.0029	0.0030	0.0031	0.0032					
	D8	0.2247	0.5035		0.0026	0.0029	0.0030	0.0031	0.0031	0.0033					
	n				24	24	24	24	24	24					
	mean				0.0024	0.0026	0.0027	0.0028	0.0029	0.0030					
	median				0.0024	0.0025	0.0027	0.0027	0.0028	0.0029					
	std. dev.				0.0002	0.0002	0.0002	0.0002	0.0002	0.0002					
	min				0.0021	0.0023	0.0024	0.0025	0.0026	0.0027					
	max				0.0027	0.0029	0.0030	0.0031	0.0031	0.0033					

Test Condition 3 105 °C 0.065 A														
TABLE 4.2 - FORWARD VOLTAGE MAINTENANCE RESULTS														GW P9LT31.PM
Test Condition 3 105 °C 0.065 A														
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)		Forward Voltage Maintenance (%)										
				1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
OC0000109714031C	D2		28.47	100.13	100.25	100.33	100.41	100.47	100.51	100.56	100.60	100.65	100.69	100.73
	D3		28.48	100.05	100.08	100.10	100.12	100.13	100.14	100.15	100.17	100.18	100.19	100.20
	D4		28.44	100.07	100.11	100.15	100.17	100.19	100.20	100.22	100.24	100.25	100.27	100.28
	D5		28.48	99.96	100.01	100.03	100.06	100.08	100.09	100.10	100.12	100.13	100.14	100.16
	D6		28.46	100.00	100.05	100.06	100.08	100.09	100.10	100.12	100.12	100.13	100.15	100.16
	D7		28.43	100.03	100.10	100.13	100.16	100.19	100.20	100.23	100.24	100.25	100.27	100.29
6E00001090FC031C	D1		28.53	100.00	100.04	100.05	100.06	100.07	100.07	100.08	100.10	100.13	100.11	100.11
	D2		28.52	99.99	100.03	100.04	100.06	100.07	100.06	100.07	100.09	100.10	100.09	100.09
	D3		28.48	100.02	100.07	100.08	100.10	100.11	100.12	100.12	100.13	100.14	100.15	100.16
	D4		28.51	99.99	100.03	100.04	100.05	100.06	100.06	100.07	100.07	100.08	100.08	100.09
	D6		28.48	100.00	100.06	100.05	100.06	100.07	100.08	100.09	100.10	100.10	100.12	100.12
	D7		28.47	100.00	100.05	100.05	100.06	100.07	100.07	100.09	100.10	100.11	100.32	100.12
	D8		28.45	100.01	100.05	100.06	100.08	100.09	100.09	100.11	100.12	100.13	100.33	100.14
AC0000109557031C	D1		28.25	100.05	100.09	100.12	100.14	100.16	100.17	100.20	100.22	100.23	100.24	100.27
	D2		28.49	100.05	100.10	100.13	100.16	100.18	100.20	100.23	100.25	100.26	100.28	100.31
	D3		28.47	100.02	100.07	100.09	100.11	100.13	100.13	100.14	100.15	100.16	100.17	100.18
	D4		28.49	99.96	100.02	100.05	100.08	100.10	100.12	100.14	100.15	100.17	100.18	100.20
	D6		28.37	100.04	100.12	100.16	100.19	100.22	100.24	100.26	100.28	100.30	100.32	100.34
	D7		28.46	100.02	100.09	100.13	100.15	100.17	100.19	100.22	100.24	100.26	100.28	100.30

TABLE 4.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 3			105 °C	0.065 A										
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)	Forward Voltage Maintenance (%)											
			1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	
BF00001078CC031C	D4		28.41	100.02	100.12	100.16	100.21	100.25	100.29	100.33	100.36	100.40	100.43	100.47
	D5		28.46	100.07	100.14	100.17	100.18	100.20	100.22	100.23	100.24	100.25	100.26	100.28
	D6		28.50	100.03	100.06	100.09	100.10	100.12	100.15	100.15	100.17	100.18	100.20	100.21
	D7		28.53	100.06	100.14	100.20	100.23	100.26	100.29	100.32	100.33	100.36	100.38	100.40
	D8		28.41	100.07	100.13	100.18	100.20	100.21	100.24	100.26	100.27	100.28	100.30	100.32
n				24	24	24	24	24	24	24	24	24	24	24
mean				100.0	100.1	100.1	100.1	100.2	100.2	100.2	100.2	100.2	100.2	100.2
median				100.0	100.1	100.1	100.1	100.1	100.1	100.2	100.2	100.2	100.3	100.2
std. dev.				0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
min				100.0	100.0	100.0	100.1	100.1	100.1	100.1	100.1	100.1	100.1	100.1
max				100.1	100.3	100.3	100.4	100.5	100.5	100.6	100.6	100.6	100.7	100.7

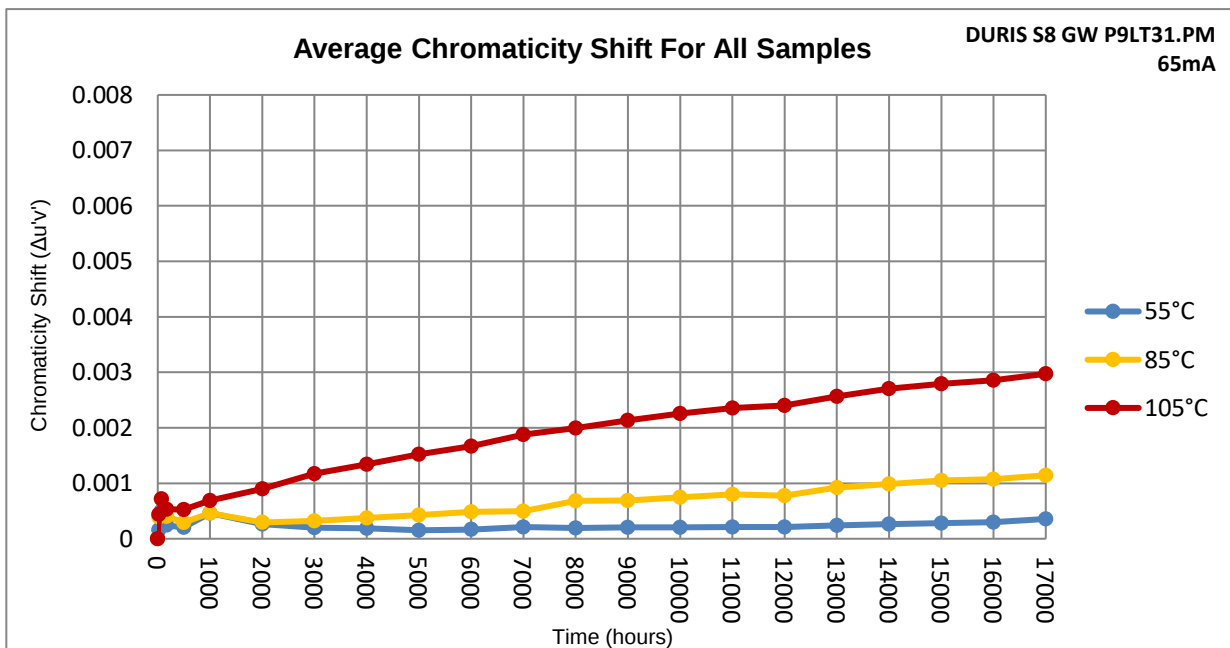
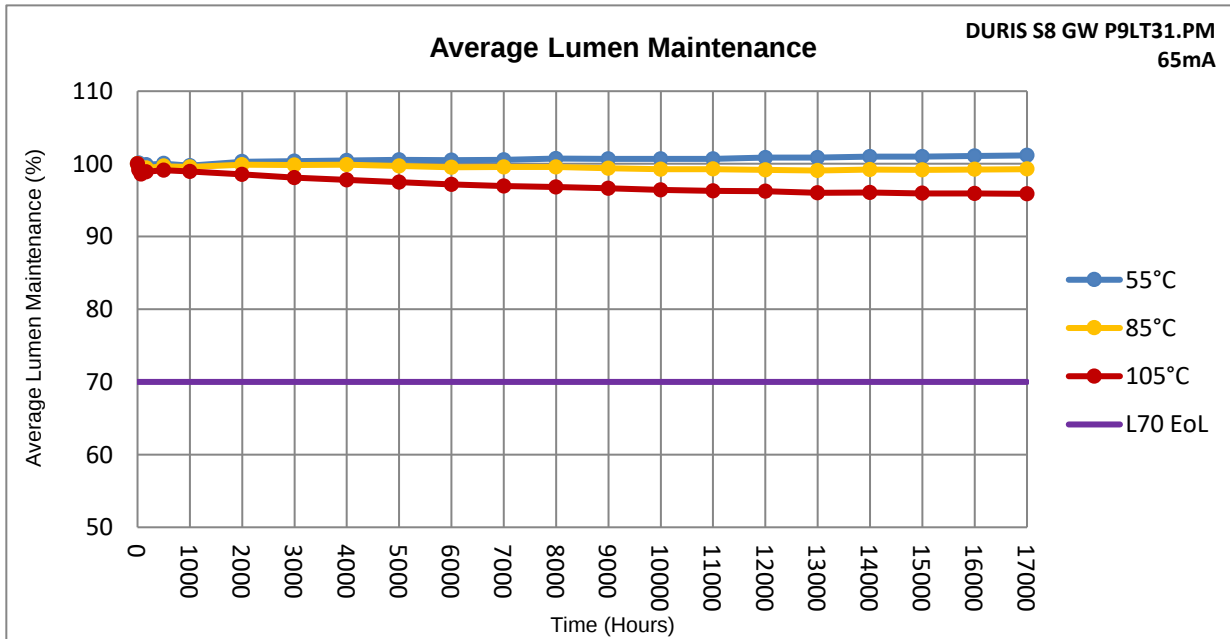
Test Condition 3				105 °C	0.065 A											
TABLE 4.2 - FORWARD VOLTAGE MAINTENANCE RESULTS															GW P9LT31.PM	
Test Condition 3				105 °C	0.065 A											
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none												
		Vf (V)		Forward Voltage Maintainence (%)												
				12000	13000	14000	15000	16000	17000							
0C0000109714031C	D2		28.47	100.76	100.82	100.88	100.91	100.95	100.99							
	D3		28.48	100.20	100.22	100.24	100.24	100.25	100.26							
	D4		28.44	100.29	100.30	100.33	100.33	100.34	100.36							
	D5		28.48	100.19	100.18	100.20	100.21	100.22	100.23							
	D6		28.46	100.18	100.18	100.19	100.20	100.21	100.23							
	D7		28.43	100.32	100.33	100.34	100.35	100.37	100.39							
6E00001090FC031C	D1		28.53	100.12	100.14	100.14	100.15	100.16	100.20							
	D2		28.52	100.11	100.11	100.12	100.12	100.14	100.16							
	D3		28.48	100.18	100.19	100.20	100.22	100.22	100.22							
	D4		28.51	100.09	100.10	100.10	100.13	100.12	100.12							
	D6		28.48	100.13	100.14	100.15	100.14	100.15	100.16							
	D7		28.47	100.77	100.14	100.15	100.14	100.15	100.16							
	D8		28.45	100.77	100.17	100.18	100.17	100.19	100.18							
AC0000109557031C	D1		28.25	100.29	100.30	100.31	100.32	100.34	100.35							
	D2		28.49	100.33	100.34	100.35	100.36	100.38	100.39							
	D3		28.47	100.20	100.22	100.22	100.22	100.24	100.24							
	D4		28.49	100.23	100.25	100.26	100.26	100.29	100.29							
	D6		28.37	100.38	100.38	100.39	100.41	100.43	100.46							
	D7		28.46	100.33	100.34	100.40	100.37	100.39	100.41							

TABLE 4.2 - FORWARD VOLTAGE MAINTENANCE RESULTS

GW P9LT31.PM

Test Condition 3			105 °C	0.065 A										
Load board ID	Device number	Zero hour measurements		Photometric test drive current: 0.065 A Photometric test ambient temperature: 25 ± 2 °C Failures observed: none										
		Vf (V)	Forward Voltage Maintenance (%)											
			12000	13000	14000	15000	16000	17000						
BF00001078CC031C	D4		28.41	100.51	100.52	100.55	100.57	100.60	100.63					
	D5		28.46	100.30	100.29	100.31	100.32	100.33	100.35					
	D6		28.50	100.23	100.23	100.25	100.26	100.28	100.30					
	D7		28.53	100.44	100.45	100.47	100.49	100.51	100.53					
	D8		28.41	100.35	100.35	100.36	100.39	100.39	100.45					
n				24	24	24	24	24	24					
mean				100.3	100.3	100.3	100.3	100.3	100.3					
median				100.3	100.2	100.3	100.3	100.3	100.3					
std. dev.				0.2	0.2	0.2	0.2	0.2	0.2					
min				100.1	100.1	100.1	100.1	100.1	100.1					
max				100.8	100.8	100.9	100.9	101.0	101.0					

5.0 Charts:



6.0 Additional Information

6.1 Auxilliary Equipment

Lifetest thermal chamber:	Orb Optronix Thermal Platform - resistive heating, liquid cooling, no forced air flow
Lifetest current source:	Orb Optronix 12-channel driver
Photometric test current source:	Keithley 2425
Photometric test thermal control:	Orb Optronix TEC-100
Spectrometer:	Instrument Systems, CAS 140CT
Integrating Sphere:	Gamma Scientific 20"
Photometric reference standards:	LabSphere SCL-50

6.2 Additional Test Information

6.3 Photographs



Fig. 1 DURIS S8 load board example.

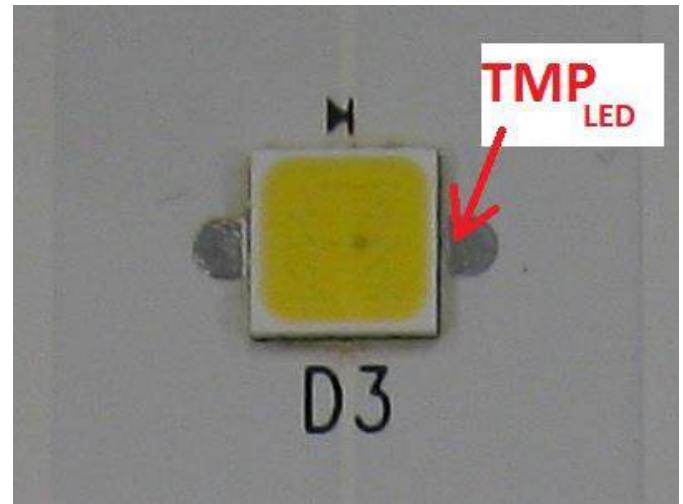


Fig. 2 DURIS S8 type LED model GW P9LT31.PM and temperature measurement point.

6.4 Dimensional Drawing*

* all dimension in millimeters

This report alone may not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- END OF REPORT -

Appendix A:

Energy Star® LM-80 Application

ENERGY STAR® LM-80 Cover Page

Administrative Information

Tested subcomponent series	DURIS® S 8
Tested subcomponent model number	GW P9LT31.PM
Report issue date	18 th Dec 2020
Report revision date (if applicable)	Not Applicable
Testing start date	11 th August 2017
Testing completion date	18 th Dec 2020
DUT sampling method	According to ANSI/IES LM-80 Test Method

DUT Identification

DUT manufacturer's name	OSRAM Opto Semiconductors (Malaysia) Sdn Bhd
DUT identification	GW P9LT31.PM
Description of DUT	LED Package

DUT Characteristics

Total input power (W)	1.85
Average current density per LED die (mA/mm ²)	130
Average power density per LED Package (W/mm ²)	0.07
Representative CRI (Ra) of the tested sample set	70
Minimum die edge to die edge spacing (mm)	0.2

Appendix B:

Lumen Maintenance Projection (IES TM-21-11)

For Information Only!

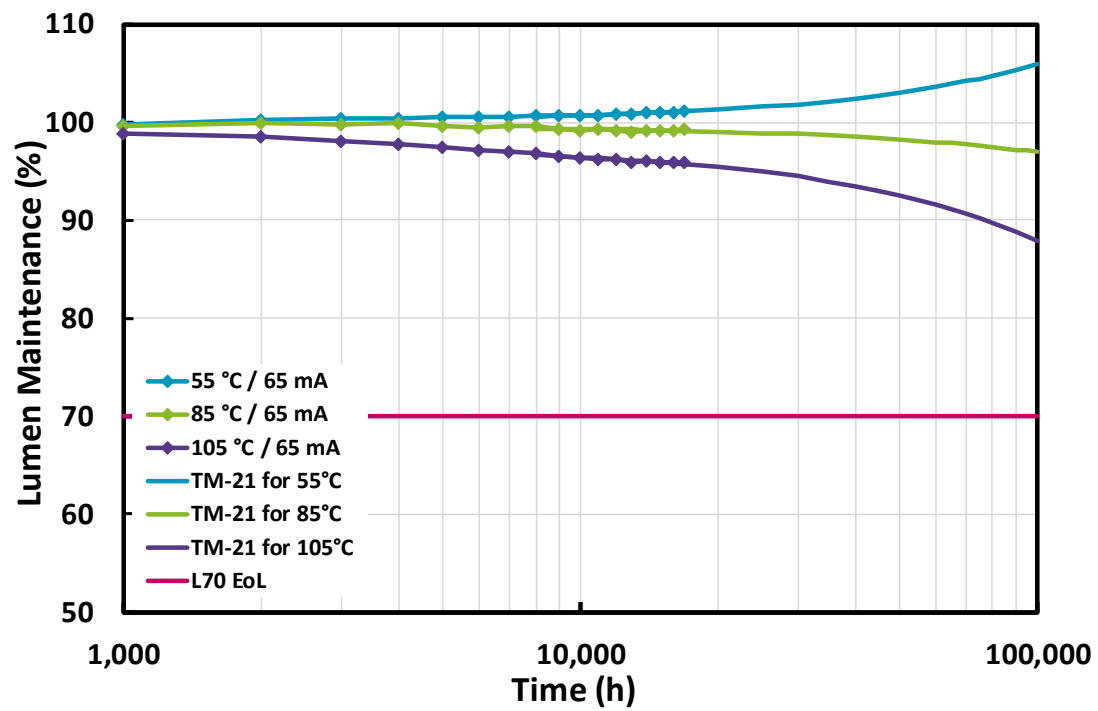
1. General Information

Description of LED light source tested	DURIS® S 8 GW P9LT31.PM
Sample size per temperature	24
LED drive current used in the test	65 mA
Current per die	65 mA
Test duration	17,000 hours
Test duration used for projection	8,000 hours to 17,000 hours

2. Projection Data

	I	II	III
Case temperature (solder point)	$T_s = 55\text{ °C}$	$T_s = 85\text{ °C}$	$T_s = 105\text{ °C}$
α	-5.632E-07	2.670E-07	1.034E-06
B	1.002E+00	9.960E-01	9.747E-01
Reported L70	> 102,000 hours	> 102,000 hours	> 102,000 hours
Reported L80	> 102,000 hours	> 102,000 hours	> 102,000 hours
Reported L90	> 102,000 hours	> 102,000 hours	77,107 hours

3. Graphic chart



Appendix C: Additional Models Covered By Testing

The 28 September 2017 *ENERGY STAR® Requirements for the Use of LM-80 Data defines conditions for which a LM-80 report is applied to cover models that have not been directly tested.*

The test results in this report applies to the following list of models:

- | | |
|--------------------------------|--------------------------------------|
| • DURIS® S 8 GW P9LT31.PM | with CCT 4000 K – 6500 K up to 65mA |
| • DURIS® S 8 GW P9LR31.PM | with CCT 4000 K – 6500 K up to 65mA |
| • DURIS® S 8 GW P9LT32.PM | with CCT 4000 K – 6500 K up to 325mA |
| • DURIS® S 8 GW P9LR34.PM | with CCT 4000 K – 6500 K up to 74mA |
| • DURIS® S 8 GW P9LR34.PM Gen5 | with CCT 4000 K – 6500 K up to 74mA |
| • DURIS® S 8 GW P9LR35.PM | with CCT 4000 K – 6500 K up to 296mA |
| • DURIS® S 8 GW P9LR35.PM Gen5 | with CCT 4000 K – 6500 K up to 296mA |

Note: The devices are stressed and tested at average current density per LED die of 130mA/mm². This report can be referenced when the current employed in application is lower than the specified current of the respective devices as stated above.

Disclaimer

Please carefully read the below terms and conditions before using the Information.
If you do not agree with any of these terms and conditions, do not use the Information.

The Information contained in this document does not constitute an independent warranty. The committed behavior is described in the Product data sheet.

Further explanations:

Data: The Data used in this Document consider the reliability test results under the mentioned driving conditions only. For Product information on the maximum operating conditions please refer to the Product data sheet or contact your local sales partner.

Conditions: The conditions for the generation of the data are as follows:

1. The Data and curves shown in this Document are based on experiments carried out under laboratory conditions on a random sample size of LED with readouts at discrete readout times (where applicable). Thus, the Data above represent a limited number of production lots only and may differ between different assembly lots over time (including chip or package changes). Thus, the behavior of the LED in the final application may differ from the Data. The behavior of the LED at conditions or readout times deviating from those stated above may not be deduced from the Data.
2. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.
3. Possible differences in the thermal management of OSRAM OS and customer's setup may lead to a different aging behavior.
4. The lifetime projection data presented in this Document has been evaluated in accordance with the lifetime extrapolation method described and defined in IES TM-21-11. The lifetime projection is based on the Data shown in this Document. The Data had been collected and assembled according to IES LM-80-15.

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