



OCTA LIGHT BULGARIA Plc



**BULLSTAR**

SERIES

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**HIGH POWER  
LED**

**TEST RELIABILITY AND  
SENSITIVITY CLASSIFICATION**

**HIGH TEMPERATURE HIGH HUMIDITY TEST**

## INTRODUCTION

This document contains information about the reliability classification level of Octa Light BullStar series, that are sensitive to moisture-induced stress. Once identified they can be properly packaged, stored and handled to avoid thermal and mechanical damage during assembly and/or repair operations. Passing the criteria in these tests shows that LEDs are sufficient by itself to provide assurance of long term reliability. Most of them are considered and recommended by JEDEC and ASSIST.

## BACKGROUND

Octa Light LEDs exhibit very long operational life characteristics, typically 50,000 hours or longer. Like all light sources, LEDs slowly decrease in light output over time. Because they rarely fail, situations can occur where LEDs are emitting less light than intended by the specifier, yet still appear to be operating. LEDs can also undergo gradual shifts in color that result in an unacceptable appearance.



## TESTING PROCEDURE:

This experiment is made to determine the ability of a device to withstand alternate exposures at high temperature & high humidity extremes with operating units periodically applied and removed.

## USED APPARATUS:

Controlled temperature chamber capable of producing the specified temperatures within the specified humidity.

## CONDITIONS:

*JEDEC moisture sensitivity*

Level	Floor life		Soak requirements	
	Time	Condiiti	Time	Standard Conditions
1	Unlimited	$\leq 30^{\circ}\text{C}/85\%\text{RH}$	168h +5/-0	85°C / 85%RH

Operating current: 350mA

## FAILURE CRITERIA:

A device is considered a failure if it exhibits any of the following:

- External crack visible using 40X optical microscope.
- Electrical test failure.
- Internal crack that intersects a bond wire, ball bond, or wedge bond.
- Internal crack extending from any lead finger to any other internal feature (lead finger, chip, die attach paddle).
- Internal crack extending more than  $2/3$  the distance from any internal feature to the outside of the package.
- Changes in package body flatness caused by warpage, swelling or bulging invisible to the naked eye per JESD22-B101.

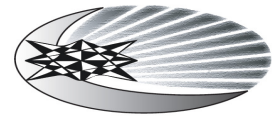
If parts still meet co-planarity and standoff dimensions as measured at room temperature per JESD22-B108, they shall be considered passing.

**\* For additional information you can see IPC/JEDEC J-STD-020D.1**

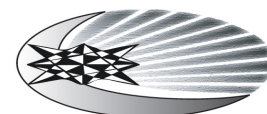


*High Temperature High Humidity Test - Data Before test*

Sample - UNIT	Premold leads	Body width	Body thickness	Lens thickness	Lens width	Lead length 1	Lead length 2	VF 1(V)	x	y	CCT(K)	CRI	Ef(W)	Fv(lm)
Sample-1	8.2078	8.8569	2.3948	2.9595	5.2991	2.7825	2.8023	3.3160	0.3075	0.3254	6871.7456	69.3840	0.2979	108.9654
Sample-2	8.2099	8.8615	2.3970	2.9617	5.3253	2.7843	2.7924	3.3227	0.3091	0.3282	6751.2620	69.0186	0.2792	102.9946
Sample-3	8.2001	8.8683	2.4014	2.9639	5.3024	2.7879	2.7773	3.3020	0.3073	0.3223	6921.6218	68.1974	0.2890	104.9829
Sample-4	8.1979	8.8577	2.3916	2.9639	5.2969	2.7909	2.7814	3.3050	0.3077	0.3230	6888.4775	68.1369	0.2875	104.7136
Sample-5	8.2034	8.8652	2.3883	2.9705	5.3089	2.8046	2.7644	3.4041	0.3108	0.3313	6622.9394	68.4233	0.3014	111.0781
Sample-6	8.1968	8.8600	2.3894	2.9694	5.3374	2.8144	2.7734	3.3100	0.3096	0.3279	6724.1867	68.2780	0.2841	104.6101
Sample-7	8.1968	8.8600	2.4003	2.9540	5.2969	2.7768	2.7914	3.2862	0.3077	0.3252	6864.0031	69.1823	0.2926	106.9135
Sample-8	8.2045	8.8613	2.3937	2.9661	5.2947	2.7899	2.7853	3.2978	0.3093	0.3298	6721.7806	69.6741	0.2941	108.5555
Sample-9	8.2132	8.8640	2.3959	2.9650	5.3024	2.7685	2.8115	3.2929	0.3085	0.3244	6824.8008	68.1442	0.2808	102.6833
Sample-10	8.2012	8.8623	2.3927	2.9595	5.3144	2.7916	2.7944	3.3599	0.3122	0.3342	6526.3211	68.4208	0.2776	103.7813
Sample-11	8.1925	8.8527	2.3927	2.9770	5.3024	2.7923	2.8135	3.2054	0.3105	0.3311	6645.1419	68.8462	0.2812	104.5615
Sample-12	8.2001	8.8646	2.3883	2.9628	5.2925	2.7755	2.8093	3.1470	0.3071	0.3219	6939.6405	68.4100	0.2863	104.1181
Sample-13	8.1990	8.8576	2.3937	2.9551	5.2892	2.7825	2.8065	3.2092	0.3096	0.3291	6710.6531	68.7626	0.2919	107.8847
Sample-14	8.2067	8.8590	2.3927	2.9639	5.3144	2.7763	2.8115	3.2488	0.3070	0.3229	6932.9969	69.0422	0.2952	107.5615
Sample-15	8.1990	8.8498	2.3937	2.9617	5.3002	2.7818	2.8155	3.1804	0.3084	0.3262	6813.0284	68.8754	0.2946	108.0947
Sample-16	8.2023	8.8503	2.3948	2.9595	5.2936	2.7805	2.8173	3.2113	0.3078	0.3255	6854.1848	69.2867	0.2880	105.7055
Sample-17	8.1958	8.8657	2.3959	2.9464	5.3210	2.7698	2.8013	3.2363	0.3064	0.3215	6992.7928	69.0749	0.2979	108.0865
Sample-18	8.2056	8.8475	2.3981	2.9595	5.2936	2.7845	2.8055	3.2115	0.3063	0.3213	7001.5210	69.0675	0.2968	107.6764
Sample-19	8.2154	8.8511	2.4014	2.9650	5.3429	2.8006	2.7974	3.2139	0.3066	0.3214	6981.3424	68.8807	0.2868	104.2562
Sample-20	8.2088	8.8498	2.3970	2.9705	5.3013	2.7758	2.8115	3.1917	0.3050	0.3196	7104.4361	69.7108	0.2782	101.0467
Sample-21	8.1958	8.8455	2.3916	2.9540	5.3122	2.7982	2.7973	3.2873	0.3063	0.3235	6969.8048	69.9029	0.2801	102.4404
Sample-22	8.2078	8.8438	2.3970	2.9508	5.2892	2.8026	2.8023	3.2879	0.3105	0.3321	6632.0032	69.2512	0.2824	105.1890
Sample-23	8.2099	8.8607	2.4025	2.9628	5.2914	2.7906	2.8023	3.3037	0.3081	0.3263	6828.0327	69.3108	0.2772	102.0714
Sample-24	8.2099	8.8596	2.3872	2.9497	5.2881	2.7835	2.8033	3.3255	0.3087	0.3270	6788.7697	69.0919	0.2785	102.6281
Sample-25	8.2099	8.8631	2.3916	2.9540	5.2958	2.7825	2.7854	3.2895	0.3075	0.3245	6885.3278	69.3477	0.2790	102.2366
Sample-26	8.2132	8.8592	2.3948	2.9540	5.2925	2.7785	2.8063	3.2294	0.3107	0.3317	6629.8197	68.9867	0.2785	103.8523
Sample-27	8.2034	8.8590	2.3937	2.9562	5.2914	2.7795	2.7904	3.2905	0.3071	0.3237	6920.7027	69.4122	0.2798	102.3269
Sample-28	8.2165	8.8579	2.3927	2.9617	5.2969	2.7705	2.8015	3.2734	0.3068	0.3222	6956.2576	68.9814	0.2834	103.1198
Sample-29	8.1990	8.8552	2.4014	2.9705	5.3013	2.7708	2.8145	3.3363	0.3066	0.3219	6969.2486	69.2371	0.2844	103.4115
Sample-30	8.1979	8.8545	2.3959	2.9705	5.3232	2.7823	2.8082	3.2931	0.3077	0.3248	6873.4704	68.9956	0.2835	103.8204
Sample-31	8.2088	8.8479	2.4003	2.9628	5.3538	2.7595	2.8125	3.3326	0.3074	0.3204	6942.8734	67.3334	0.2925	105.1687
Sample-32	8.2088	8.8524	2.4080	2.9573	5.2936	2.7916	2.7983	3.3043	0.3090	0.3248	6792.9571	67.4915	0.2915	106.0289
Sample-33	8.2088	8.8607	2.4211	2.9530	5.3002	2.7795	2.8043	3.3287	0.3107	0.3283	6660.7500	67.2431	0.2885	105.8075
Sample-34	8.2034	8.8496	2.3970	2.9639	5.2980	2.7986	2.8033	3.3018	0.3081	0.3228	6868.8863	67.6983	0.2897	104.9715
Sample-35	8.2045	8.8576	2.3992	2.9639	5.2969	2.7795	2.7963	3.3179	0.3068	0.3192	6996.2137	67.3283	0.2889	103.6106
Sample-36	8.2012	8.8534	2.3992	2.9694	5.3045	2.7825	2.8115	3.3342	0.3072	0.3203	6957.6378	67.3522	0.2878	103.5776
Sample-37	8.1979	8.8507	2.3948	2.9694	5.3199	2.7785	2.8092	3.3028	0.3029	0.3146	7323.2050	70.8604	0.2932	104.7533
Sample-38	8.1979	8.8534	2.3937	2.9617	5.2848	2.7785	2.8063	3.3389	0.3098	0.3279	6716.1210	68.5024	0.2814	103.7714
Sample-39	8.1859	8.8607	2.3872	2.9716	5.2947	2.7865	2.7904	3.3466	0.3086	0.3270	6791.7215	69.1780	0.2786	102.1323
Sample-40	8.2165	8.8673	2.3894	2.9738	5.3089	2.7595	2.8065	3.3050	0.3091	0.3256	6780.5464	67.8193	0.2924	106.5613
Sample-41	8.2078	8.8529	2.3981	2.9573	5.3078	2.7805	2.8045	3.3631	0.3103	0.3298	6666.5077	68.5663	0.2764	102.4586
Sample-42	8.2012	8.8417	2.3970	2.9595	5.2903	2.7828	2.8218	3.3350	0.3090	0.3263	6777.9611	68.4471	0.2781	102.1875
Sample-43	8.1958	8.8692	2.3992	2.9573	5.3024	2.7698	2.8005	3.3527	0.3096	0.3288	6716.8878	68.7106	0.2773	102.6047
Sample-44	8.2023	8.8592	2.3959	2.9650	5.2969	2.7875	2.8098	3.4617	0.3108	0.3281	6652.2713	67.0778	0.2790	102.7089
Sample-45	8.2012	8.8618	2.4113	2.9519	5.3166	2.7893	2.7943	3.2912	0.3086	0.3257	6808.5293	68.7347	0.2820	103.3048
Sample-46	8.1925	8.8576	2.4014	2.9650	5.2969	2.7788	2.8105	3.3145	0.3105	0.3314	6643.0462	69.0361	0.2786	103.6203
Sample-47	8.2067	8.8598	2.4003	2.9530	5.2936	2.7775	2.8055	3.3594	0.3098	0.3293	6699.7377	68.9095	0.2774	102.7379



Sample-48	8.2252	8.8692	2.4036	2.9497	5.2914	2.7919	2.7914	3.3078	0.3086	0.3257	6808.5121	68.6186	0.2826	103.6611
Sample-49	8.2088	8.8440	2.4025	2.9628	5.3352	2.8020	2.8015	3.3728	0.3073	0.3247	6895.2043	69.3697	0.2850	104.3142
Sample-50	8.1936	8.8637	2.4058	2.9475	5.3188	2.7896	2.7984	3.3276	0.3100	0.3302	6678.3257	69.1759	0.2830	104.7071
Sample-51	8.1990	8.7978	2.9694	2.9694	5.2980	2.7845	2.8063	3.3453	0.3106	0.3331	6680.3678	68.7637	0.2896	105.8077
Sample-52	8.1979	8.8110	2.9606	2.9606	5.3002	2.7625	2.8033	3.3559	0.3121	0.3362	6569.6023	68.7729	0.2863	105.4247
Sample-53	8.1881	8.8044	2.9705	2.9705	5.3078	2.7818	2.8055	3.3535	0.3104	0.3326	6695.3026	68.8847	0.2881	105.2662
Sample-54	8.1925	8.8073	2.9661	2.9661	5.2936	2.7603	2.7983	3.3561	0.3120	0.3366	6567.1852	69.0470	0.2882	106.3439
Sample-55	8.1979	8.8023	2.9562	2.9562	5.3024	2.7585	2.8113	3.3575	0.3109	0.3330	6666.7424	68.7385	0.2865	104.7456
Sample-56	8.2012	8.8036	2.9661	2.9661	5.3002	2.8006	2.7964	3.3619	0.3076	0.3275	6922.4701	69.5013	0.2928	105.6541
Sample-57	8.2067	8.8044	2.9628	2.9628	5.2892	2.7785	2.7963	3.3609	0.3060	0.3237	7070.0272	69.6144	0.2897	103.5679
Sample-58	8.2045	8.7980	2.9595	2.9595	5.3199	2.7383	2.8112	3.3608	0.3116	0.3361	6595.9170	69.0685	0.2911	107.2340
Sample-59	8.2056	8.7851	2.9716	2.9716	5.2903	2.7615	2.7995	3.3607	0.3086	0.3293	6837.2949	69.2725	0.2909	105.3998
Sample-60	8.2132	8.8153	2.9727	2.9727	5.3407	2.7883	2.7894	3.3652	0.3063	0.3245	7044.8468	69.5687	0.2915	104.4220
<b>Min</b>	8.1859	8.7851	2.3872	2.9464	5.2848	2.7383	2.7644	3.1470	0.3029	0.3146	6526.3211	67.0778	0.2764	101.0467
<b>Max</b>	8.2252	8.8692	2.9727	2.9770	5.3538	2.8144	2.8218	3.4617	0.3122	0.3366	7323.2050	70.8604	0.3014	111.0781
<b>Average</b>	8.2033	8.8481	2.4917	2.9618	5.3043	2.7818	2.8011	3.3074	0.3086	0.3266	6816.2328	68.8003	0.2861	104.6987

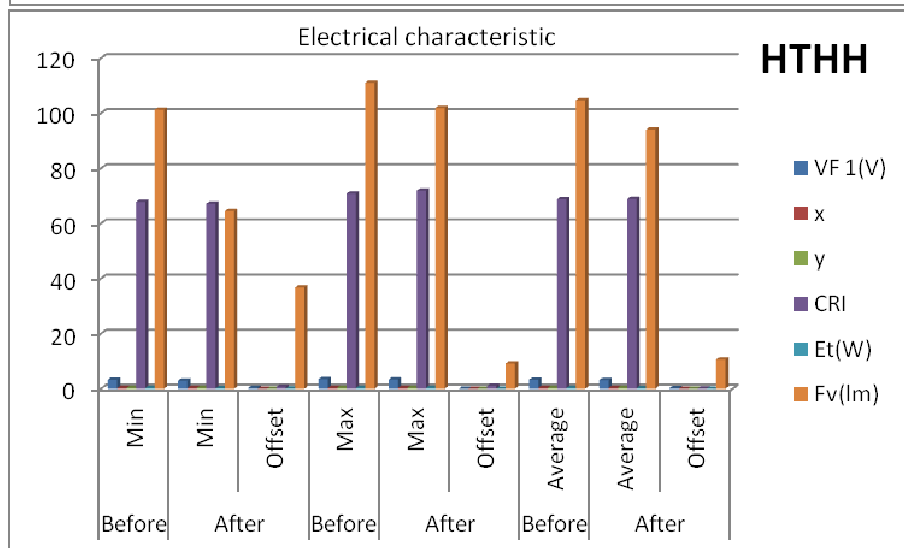
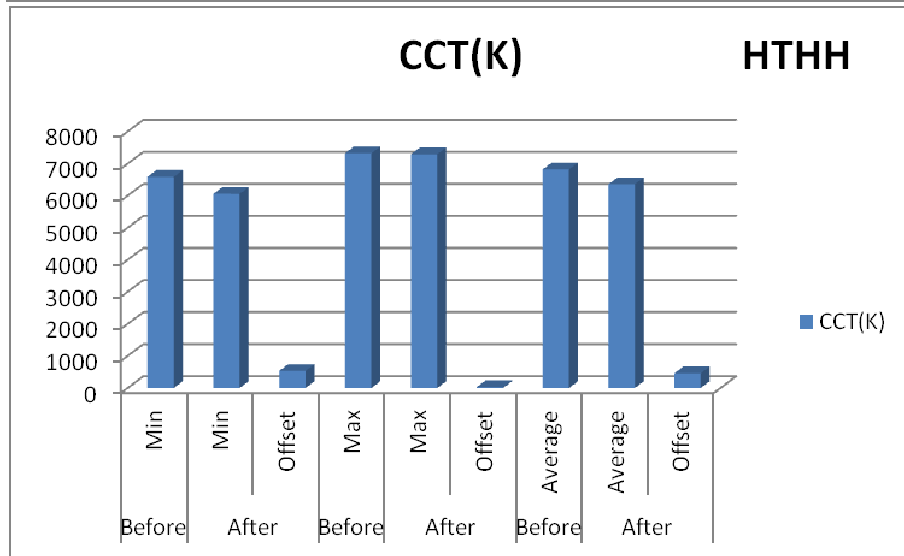
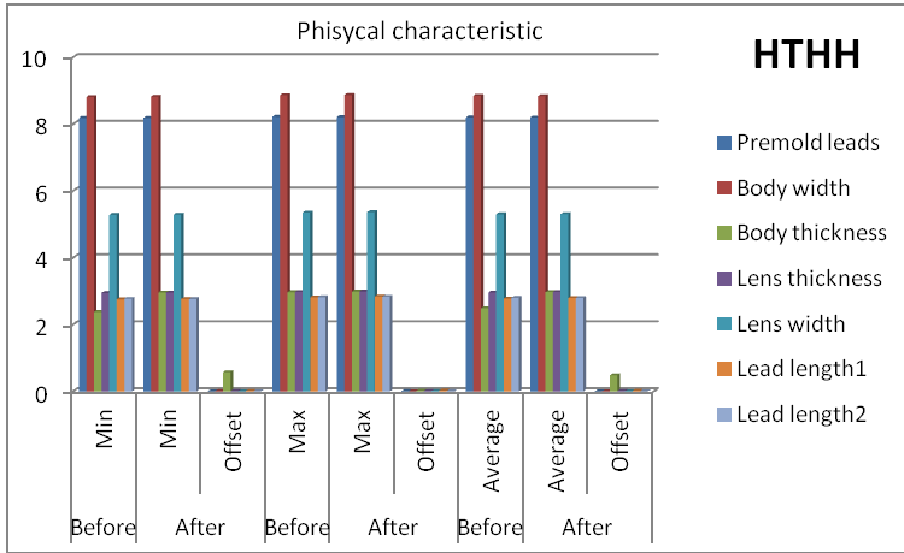
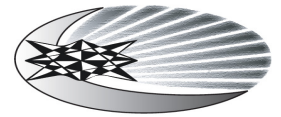


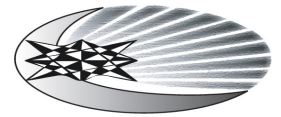
High Temperature High Humidity Test - Data After test

Sample - UNIT	Premold leads	Body width	Body thickness	Lens thickness	Lens width	Lead length 1	Lead length 2	VF (V)	x	y	CCT(K)	CRI	Ef(W)	Fv(lm)
Sample-1	8.2056	8.8339	2.9738	2.9738	5.3056	2.8064	2.7863	3.2407	0.3152	0.333	6415.017	69.2433	0.2652	101.7489
Sample-2	8.199	8.8353	2.976	2.976	5.3067	2.8034	2.7913	3.2392	0.3175	0.3365	6268.7274	68.8717	0.2435	95.1839
Sample-3	8.1936	8.8483	2.9858	2.9858	5.3188	2.807	2.7794	3.2148	0.3156	0.331	6405.7386	68.0859	0.2552	97.9255
Sample-4	8.1903	8.8396	2.9836	2.9836	5.3067	2.8106	2.7823	3.1391	0.3166	0.3323	6344.0904	68.0987	0.2519	97.085
Sample-5	8.1881	8.8368	2.988	2.988	5.3243	2.8287	2.7683	3.3977	0.3199	0.3412	6118.5514	68.2582	0.2618	101.9096
Sample-6	8.1958	8.8219	2.9836	2.9836	5.3275	2.8435	2.7764	3.3135	0.3188	0.3374	6192.8222	68.2821	0.246	96.0131
Sample-7	8.2023	8.841	2.9727	2.9727	5.3024	2.7845	2.7824	3.1625	0.3168	0.335	6315.5255	69.0723	0.2563	99.0316
Sample-8	8.2067	8.8551	2.9803	2.9803	5.3024	2.7976	2.7853	3.1525	0.3178	0.3388	6236.6216	69.5161	0.2596	100.9421
Sample-9	8.2001	8.8583	2.9803	2.9803	5.3089	2.7708	2.8095	3.1515	0.317	0.333	6314.4221	68.125	0.2471	95.6671
Sample-10	8.1925	8.8431	2.9792	2.9792	5.3429	2.8056	2.8033	3.2631	0.321	0.3432	6055.2101	68.3379	0.2392	94.8081
Sample-11	8.1979	8.832	2.9803	2.9803	5.3133	2.7966	2.8115	2.9871	0.3173	0.3328	6303.8905	70.0076	0.1805	73.6657
Sample-12	8.2121	8.8319	2.9814	2.9814	5.3034	2.8046	2.8013	2.9389	0.3155	0.3291	6425.6046	68.6794	0.243	93.6401
Sample-13	8.1979	8.8326	2.977	2.977	5.298	2.8006	2.7983	2.9478	0.3175	0.3352	6272.468	68.9901	0.2475	96.4046
Sample-14	8.2034	8.8353	2.977	2.977	5.3199	2.7885	2.8113	2.9488	0.3149	0.3295	6456.4515	69.1432	0.2514	96.5989
Sample-15	8.1968	8.8249	2.977	2.977	5.298	2.8076	2.8123	2.9578	0.3148	0.3285	6472.2407	69.7217	0.2097	82.6623
Sample-16	8.2023	8.8364	2.976	2.976	5.2969	2.8006	2.8013	2.9503	0.316	0.3332	6370.8581	69.2809	0.251	97.1578
Sample-17	8.2121	8.8263	2.9639	2.9639	5.3232	2.8104	2.7973	2.9548	0.3142	0.3288	6501.3734	69.0554	0.2588	98.9239
Sample-18	8.2045	8.8297	2.9694	2.9694	5.2958	2.7979	2.8075	2.9503	0.313	0.3272	6585.4429	69.0523	0.2629	99.9752
Sample-19	8.2056	8.8337	2.9836	2.9836	5.3451	2.809	2.7984	2.9673	0.3144	0.3283	6496.8713	69.0794	0.2481	95.2303
Sample-20	8.199	8.8385	2.9924	2.9924	5.3078	2.7815	2.8115	2.9851	0.3136	0.3276	6546.0972	69.7414	0.2376	91.698
Sample-21	8.1979	8.8382	2.976	2.976	5.3166	2.8013	2.8114	3.2298	0.3153	0.332	6415.4745	69.9255	0.2346	91.4402
Sample-22	8.2056	8.8409	2.9617	2.9617	5.2947	2.8006	2.8043	3.1954	0.3202	0.342	6102.7529	69.1586	0.2391	94.6988
Sample-23	8.1958	8.8525	2.976	2.976	5.3089	2.7798	2.7954	3.2094	0.3172	0.3349	6295.0695	69.3398	0.2353	92.2297
Sample-24	8.199	8.8462	2.965	2.965	5.2947	2.806	2.8003	3.2327	0.3171	0.3333	6307.9483	69.8028	0.1977	79.3502
Sample-25	8.2023	8.8715	2.9738	2.9738	5.298	2.7795	2.7964	3.2133	0.3165	0.3335	6339.3263	69.4426	0.2338	91.4126
Sample-26	8.2099	8.8399	2.976	2.976	5.3002	2.8044	2.7953	2.9936	0.3196	0.3409	6137.409	68.8779	0.2424	95.7845
Sample-27	8.2045	8.8435	2.9716	2.9716	5.2903	2.7996	2.7884	3.0744	0.3153	0.3314	6420.5284	69.4265	0.2441	94.4169
Sample-28	8.1903	8.8357	2.9803	2.9803	5.298	2.7933	2.7995	3.0499	0.3152	0.3299	6437.3217	69.1018	0.2459	94.681
Sample-29	8.1979	8.8364	2.9924	2.9924	5.3013	2.7954	2.8027	3.052	0.3154	0.3307	6422.7876	69.0944	0.2477	95.4717
Sample-30	8.2012	8.8336	2.9836	2.9836	5.3243	2.7906	2.8073	3.0559	0.3163	0.3325	6358.8438	69.077	0.2467	95.4833
Sample-31	8.2132	8.843	2.9803	2.9803	5.3691	2.7853	2.8133	3.1126	0.316	0.3292	6399.22	67.3599	0.2534	96.5737
Sample-32	8.2078	8.8506	2.9705	2.9705	5.2903	2.7979	2.7947	3.1261	0.3179	0.3338	6262.4636	67.5681	0.2522	97.1446
Sample-33	8.2023	8.8274	2.965	2.965	5.3013	2.8174	2.8013	3.1157	0.3187	0.336	6205.2622	67.3013	0.2532	97.8986
Sample-34	8.2078	8.8313	2.976	2.976	5.31	2.8187	2.7993	3.1043	0.3164	0.3307	6365.1322	67.8134	0.2522	96.5607
Sample-35	8.2088	8.8364	2.9781	2.9781	5.2991	2.7996	2.7903	3.1311	0.3146	0.3271	6495.6669	67.384	0.255	96.6778
Sample-36	8.2143	8.8395	2.9869	2.9869	5.31	2.7946	2.7983	3.1426	0.316	0.3289	6399.5223	67.5431	0.2491	95.083
Sample-37	8.2001	8.8334	2.9902	2.9902	5.3264	2.7939	2.8105	3.1934	0.3058	0.3101	7293.0754	71.909	0.2604	95.4883
Sample-38	8.2012	8.8355	2.977	2.977	5.2914	2.7973	2.8053	3.1844	0.3181	0.3355	6243.3841	68.6539	0.2456	95.6734
Sample-39	8.2012	8.8368	2.9869	2.9869	5.2991	2.802	2.7947	3.1461	0.3172	0.3354	6289.0337	69.0871	0.2434	94.4897
Sample-40	8.2099	8.8405	2.9902	2.9902	5.3133	2.7765	2.8333	3.1351	0.3173	0.3337	6296.577	67.8157	0.2527	97.31
Sample-41	8.2078	8.8428	2.9694	2.9694	5.3078	2.7906	2.8115	3.2327	0.319	0.3384	6178.0692	68.4598	0.2478	96.953
Sample-42	8.2001	8.8243	2.9749	2.9749	5.2958	2.7959	2.8225	3.2492	0.317	0.3343	6307.7764	68.3884	0.2445	95.015
Sample-43	8.2001	8.841	2.9694	2.9694	5.3024	2.7956	2.8063	3.2312	0.3175	0.3368	6267.1448	68.6079	0.2534	98.5217
Sample-44	8.1958	8.8287	2.9792	2.9792	5.3013	2.8016	2.8105	3.2412	0.3191	0.3367	6183.6113	67.1177	0.2498	97.0833
Sample-45	8.2001	8.8482	2.965	2.965	5.3166	2.8016	2.8023	3.1875	0.3133	0.324	6602.7507	70.0594	0.1696	68.7976
Sample-46	8.2034	8.8266	2.977	2.977	5.3034	2.8076	2.8065	3.2472	0.3138	0.3277	6536.0791	70.5125	0.1547	64.4973
Sample-47	8.2034	8.843	2.9683	2.9683	5.2914	2.8006	2.7943	3.2846	0.3179	0.3374	6242.7586	68.852	0.2478	96.7852
Sample-48	8.211	8.8448	2.9705	2.9705	5.3144	2.8157	2.7893	3.1899	0.3161	0.3333	6365.0809	68.5202	0.2598	99.8733



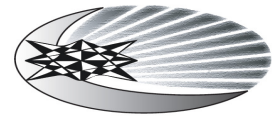
Sample-49	8.2023	8.8333	2.976	2.976	5.3483	2.8187	2.7887	3.1875	0.3153	0.3327	6407.8837	69.3662	0.2498	96.5865
Sample-50	8.1903	8.8554	2.9606	2.9606	5.3243	2.8013	2.8003	3.1864	0.3184	0.3389	6205.4801	69.042	0.2461	96.4235
Sample-51	8.1925	8.9139	2.9804	2.9804	5.3045	2.7337	2.7441	3.1386	0.3164	0.3338	6340.5121	69.0882	0.2496	96.701
Sample-52	8.2056	8.895	2.9695	2.9695	5.31	2.7408	2.7431	3.1605	0.3181	0.3375	6229.9427	69.0431	0.239	93.8616
Sample-53	8.1859	8.902	2.9728	2.9728	5.3177	2.7327	2.7452	3.1421	0.3162	0.3329	6361.8386	69.1978	0.2503	96.7573
Sample-54	8.1892	8.9177	2.9793	2.9793	5.3067	2.7154	2.7573	3.1461	0.3178	0.3375	6245.2718	69.1404	0.252	98.1992
Sample-55	8.2001	8.9035	2.9695	2.9695	5.3067	2.7217	2.7543	3.1556	0.3182	0.3372	6226.2178	68.6426	0.2477	96.6718
Sample-56	8.2012	8.9101	2.9771	2.9771	5.3034	2.7509	2.7311	3.1087	0.3137	0.3291	6530.7901	69.5403	0.2584	98.7566
Sample-57	8.2056	8.9098	2.9728	2.9728	5.3024	2.7307	2.7452	3.1072	0.3122	0.3256	6651.2996	69.7804	0.2569	97.4331
Sample-58	8.2056	8.9074	2.9618	2.9618	5.3199	2.7215	2.7523	3.1102	0.3171	0.3376	6278.494	69.1436	0.2575	100.047
Sample-59	8.1914	8.9069	2.9793	2.9793	5.2925	2.7424	2.7421	3.1222	0.3145	0.3316	6461.0245	69.1812	0.2604	99.8509
Sample-60	8.211	8.9074	2.9804	2.9804	5.3593	2.7457	2.7411	3.1082	0.3123	0.3261	6641.0683	69.7695	0.2602	98.6714
<b>Min</b>	8.1881	8.8219	2.9606	2.9606	5.2903	2.7708	2.7683	2.9389	0.3058	0.3101	6055.2101	67.1177	0.1547	64.4973
<b>Max</b>	8.2143	8.8715	2.9924	2.9924	5.3691	2.8435	2.8333	3.3977	0.321	0.3432	7293.0754	71.909	0.2652	101.9096
<b>Average</b>	8.2018	8.8387	2.9770	2.9770	5.3098	2.8004	2.7998	3.1360	0.3164	0.3329	6357.6292	68.8650	0.2425	94.0935





## TEST SUMMARY AND CONCLUSIONS

With this document we are providing prove that the product can withstand alternate exposures at high temperature & high humidity extremes. The test satisfies all failure criteria. It is considered to a Jedec standards for moisture sensitivity classification, it is classified as not moisture sensitive and does not require dry pack.



## COMPANY INFORMATION

Octa Light Bulgaria Plc is the first Bulgarian Manufacturer of High Power Light Emitting Diodes for general lighting applications. The long year company experience in artificial lighting on LED basis has made possible the creation of the first European LED specially designed for reaching best performance in light output, optical efficacy and thermal management. Octa Light Products help reduce CO<sub>2</sub> emissions and reduce the need for power plant expansion.

Thanks to its advanced optical properties, the BullStar series enable never before possible applications in outdoor, indoor, industrial, architectural and general lighting when pure white light is necessary. The sophisticated optical properties allow strong package light concentration suitable for most general lighting applications without the need of any secondary optics.

Octa Light is a fully integrated supplier, offering core Light emitting devices in all three base colors - Red, Green, Blue and white, as well as exotic colors as Pink, Cyan, Yellow, Purple and other on basis of client requirements. Octa Light Bulgaria PLC is entirely based within Europe, with R&D and manufacturing center in Bulgaria. Founded in 2010, Octa Light commits to continuously rise the lumen efficiency of its products and to bring its light emitting diodes closer to mass usage within next years.

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