Solid-State Light. Done Right.

APPROVAL SHEET

AOT MODEL NAME	5030PCT
AOT PART NUMBER	5030C-W301
CUSTOMER NAME	General
DATE	2021 / Oct.
VERSION	01

MAKER			CUSTOMER			
Prepared	Checked	Approved				
Joy Wu	***Chris Huang***					

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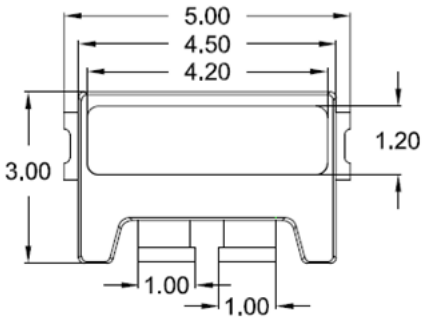
Revision Note

Date	Revision	Page	Version
2021-10-15	Initiate Document	22	1

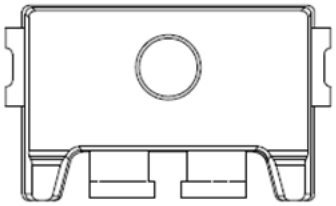
Package Outline

Type Number:5030C-B401
Unit: mm, Tolerance: ± 0.2mm

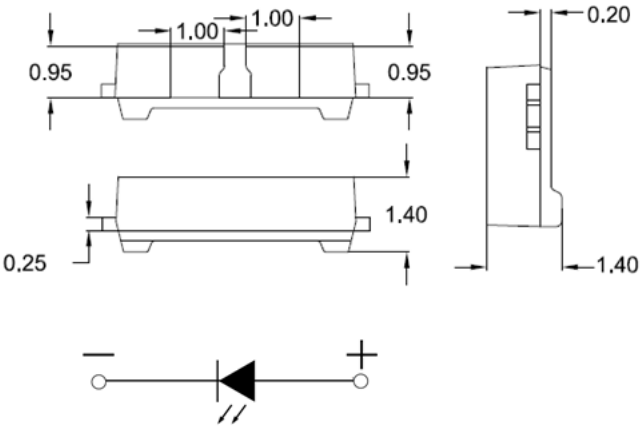
Top view



Bottom view



Front view



Item	Materials
Package	Heat-Resistant Polymer
Encapsulating Material	Silicone Resin(with phosphor)
Electrode	Ag Plating Copper Alloy

- Single blue chip.
- High brightness SMD.
- Compact package outline (LxWxH) of 5.0 mm x 3.0 mm x 1.4 mm.
- Compatible with reflow soldering.
- Complies with RoHS Directive.

Optical/Electronic Characteristics (T_A=25°C)

AOT Reading Standards						
Item	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Forward Voltage	V_F	I_F = 60mA	2.7	-	3.1	V
Luminous Flux	φ_V	I_F = 60mA	18	-	38	lm
Thermal Resistance	R_{thj-s}	I_F = 140mA	-	-	34	˚C/W

* Tolerance of measurements of the Forward Voltage is ± 0.05 V.

* Tolerance of measurements of the Luminous Flux is ± 7%

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Absolute Maximum Ratings (T_S=25°C)

Item	**Symbol**	**Maximum Value**	**Unit**
Forward Current	I_F	190	mA
* Peak Pulse Forward Current	I_{FP}	285	mA
Power Dissipation	P_D	589	mW
Operating Temperature.	T_{opr}	-40~+85	˚C
Storage Temperature.	T_{stg}	-40~+100	˚C
Soldering Temperature	T_{sld}	Reflow Soldering : 260˚C for 10sec	
LED Junction Temperature	T_j	115	˚C
Forward Voltage at Low Current	V_{F2}	>1.9 (@1uA)	V

* I_{FP} Conditions : Pulse Width ≤ 10msec, and duty ≤ 1/10

* Max condition is not guarantee for life time

Group Definition of Forward Voltage

Rank	Condition	V_F(V)
S3	T_A=25˚C I_F=60mA	2.7~2.8
S4		2.8~2.9
S5		2.9~3.0
S6		3.0~3.1

Group Definition of Brightness

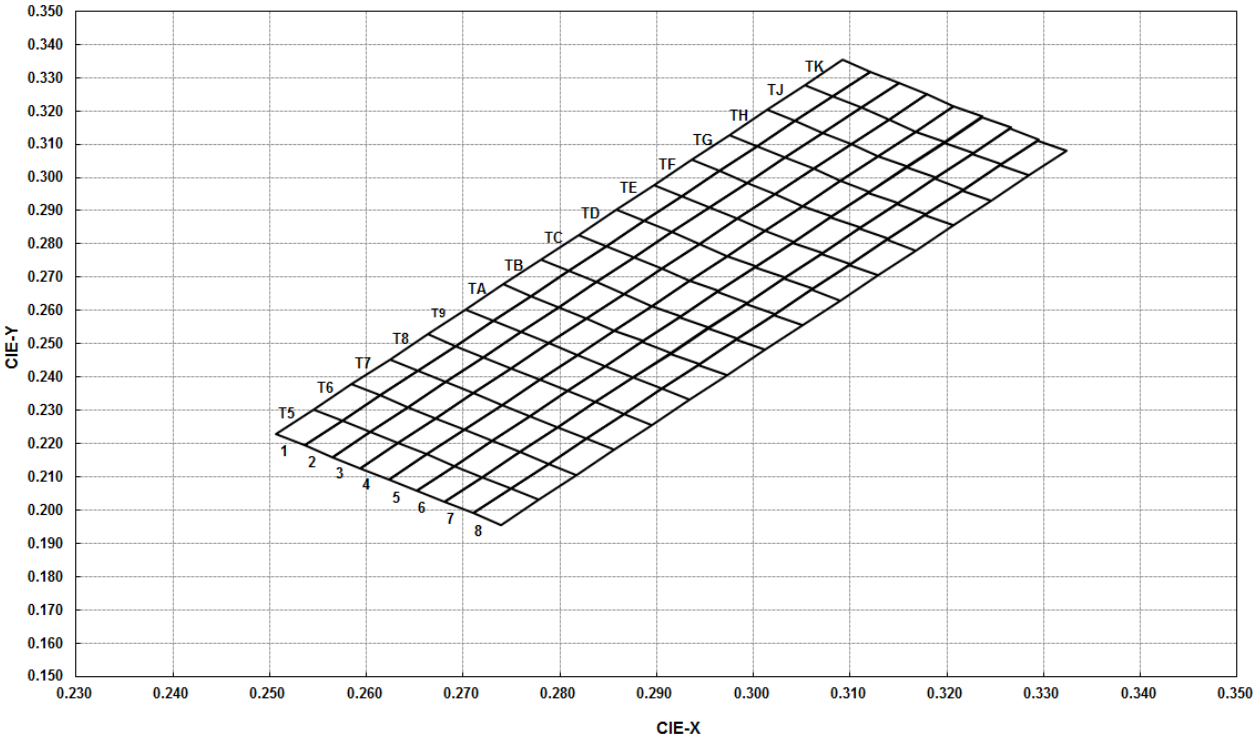
Rank	Condition	Luminous Flux(lm)
A18	T_A=25˚C I_F=60mA	18 ~ 22
A22		22 ~ 26
A26		26 ~ 30
A30		30 ~ 34
A34		34 ~ 38

*A shipment shall consist of LEDs in a combination of above ranks.

*The percentage of each rank in the shipment shall be determined by AOT.

*The ranking information of LEDs can be found on the reel label.

Group Definition of Chromaticity Coordinate



Color Rank

Rank	x	y	Rank	x	y	Rank	x	y
T51	0.2507	0.2228	T55	0.2623	0.2092	T61	0.2546	0.2303
	0.2546	0.2303		0.2662	0.2167		0.2585	0.2378
	0.2575	0.2269		0.2691	0.2133		0.2614	0.2344
	0.2536	0.2194		0.2652	0.2058		0.2575	0.2269
T52	0.2536	0.2194	T56	0.2652	0.2058	T62	0.2575	0.2269
	0.2575	0.2269		0.2691	0.2133		0.2614	0.2344
	0.2604	0.2235		0.2720	0.2099		0.2643	0.2310
	0.2565	0.2160		0.2681	0.2024		0.2604	0.2235
T53	0.2565	0.2160	T57	0.2681	0.2024	T63	0.2604	0.2235
	0.2604	0.2235		0.2720	0.2099		0.2643	0.2310
	0.2633	0.2201		0.2749	0.2065		0.2672	0.2276
	0.2594	0.2216		0.2710	0.1990		0.2633	0.2201
T54	0.2594	0.2126	T58	0.2710	0.1990	T64	0.2633	0.2201
	0.2633	0.2201		0.2749	0.2065		0.2672	0.2276
	0.2662	0.2167		0.2778	0.2031		0.2701	0.2242
	0.2623	0.2092		0.2739	0.1956		0.2662	0.2167

Rank	x	y	Rank	x	y	Rank	x	y
T65	0.2662	0.2167	T75	0.2701	0.2242	T85	0.2740	0.2317
	0.2701	0.2242		0.2740	0.2317		0.2779	0.2392
	0.2730	0.2208		0.2769	0.2283		0.2808	0.2358
	0.2691	0.2133		0.2730	0.2208		0.2769	0.2283
T66	0.2691	0.2133	T76	0.2730	0.2208	T86	0.2769	0.2283
	0.2730	0.2208		0.2769	0.2283		0.2808	0.2358
	0.2759	0.2174		0.2798	0.2249		0.2837	0.2324
	0.2720	0.2099		0.2759	0.2174		0.2798	0.2249
T67	0.2720	0.2099	T77	0.2759	0.2174	T87	0.2798	0.2249
	0.2759	0.2174		0.2798	0.2249		0.2837	0.2324
	0.2788	0.2140		0.2827	0.2215		0.2866	0.2290
	0.2749	0.2065		0.2788	0.2140		0.2827	0.2215
T68	0.2749	0.2065	T78	0.2788	0.2140	T88	0.2827	0.2215
	0.2788	0.2140		0.2827	0.2215		0.2866	0.2290
	0.2817	0.2106		0.2856	0.2181		0.2895	0.2256
	0.2778	0.2031		0.2817	0.2106		0.2856	0.2181
T71	0.2585	0.2378	T81	0.2624	0.2453	T91	0.2663	0.2528
	0.2624	0.2453		0.2663	0.2528		0.2702	0.2603
	0.2653	0.2419		0.2692	0.2494		0.2731	0.2569
	0.2614	0.2344		0.2653	0.2419		0.2692	0.2494
T72	0.2614	0.2344	T82	0.2653	0.2419	T92	0.2692	0.2494
	0.2653	0.2419		0.2692	0.2494		0.2731	0.2569
	0.2682	0.2385		0.2721	0.2460		0.2760	0.2535
	0.2643	0.2310		0.2682	0.2385		0.2721	0.2460
T73	0.2643	0.2310	T83	0.2682	0.2385	T93	0.2721	0.2460
	0.2682	0.2385		0.2721	0.2460		0.2760	0.2535
	0.2711	0.2351		0.2750	0.2426		0.2789	0.2501
	0.2672	0.2276		0.2711	0.2351		0.2750	0.2426
T74	0.2672	0.2276	T84	0.2711	0.2351	T94	0.2750	0.2426
	0.2711	0.2351		0.2750	0.2426		0.2789	0.2501
	0.2740	0.2317		0.2779	0.2392		0.2818	0.2467
	0.2701	0.2242		0.2740	0.2317		0.2779	0.2392

Rank	x	y	Rank	x	y	Rank	x	y
T95	0.2779	0.2392	TA5	0.2818	0.2467	TB5	0.2856	0.2539
	0.2818	0.2467		0.2856	0.2539		0.2895	0.2614
	0.2847	0.2433		0.2886	0.2508		0.2925	0.2583
	0.2808	0.2358		0.2847	0.2433		0.2886	0.2508
T96	0.2808	0.2358	TA6	0.2847	0.2433	TB6	0.2885	0.2505
	0.2847	0.2433		0.2885	0.2505		0.2924	0.2580
	0.2876	0.2399		0.2915	0.2474		0.2954	0.2549
	0.2837	0.2324		0.2876	0.2399		0.2915	0.2474
T97	0.2837	0.2324	TA7	0.2876	0.2399	TB7	0.2914	0.2471
	0.2876	0.2399		0.2914	0.2471		0.2953	0.2546
	0.2905	0.2365		0.2944	0.2440		0.2983	0.2515
	0.2866	0.2290		0.2905	0.2365		0.2944	0.2440
T98	0.2866	0.2290	TA8	0.2905	0.2365	TB8	0.2943	0.2437
	0.2905	0.2365		0.2943	0.2437		0.2982	0.2512
	0.2934	0.2331		0.2973	0.2406		0.3012	0.2481
	0.2895	0.2256		0.2934	0.2331		0.2973	0.2406
TA1	0.2702	0.2603	TB1	0.2741	0.2678	TC1	0.2780	0.2753
	0.2741	0.2678		0.2780	0.2753		0.2819	0.2828
	0.2770	0.2644		0.2809	0.2719		0.2848	0.2794
	0.2731	0.2569		0.2770	0.2644		0.2809	0.2719
TA2	0.2731	0.2569	TB2	0.2770	0.2644	TC2	0.2809	0.2719
	0.2770	0.2644		0.2809	0.2719		0.2848	0.2794
	0.2799	0.2610		0.2838	0.2685		0.2877	0.2760
	0.2760	0.2535		0.2799	0.2610		0.2838	0.2685
TA3	0.2760	0.2535	TB3	0.2799	0.2610	TC3	0.2838	0.2685
	0.2799	0.2610		0.2838	0.2685		0.2877	0.2760
	0.2828	0.2576		0.2867	0.2651		0.2906	0.2726
	0.2789	0.2501		0.2828	0.2576		0.2867	0.2651
TA4	0.2789	0.2501	TB4	0.2828	0.2576	TC4	0.2867	0.2651
	0.2828	0.2576		0.2867	0.2651		0.2906	0.2726
	0.2856	0.2539		0.2895	0.2614		0.2934	0.2689
	0.2818	0.2467		0.2856	0.2539		0.2895	0.2614

Rank	x	y	Rank	x	y	Rank	x	y
TC5	0.2895	0.2614	TD5	0.2934	0.2689	TE5	0.2973	0.2764
	0.2934	0.2689		0.2973	0.2764		0.3012	0.2839
	0.2964	0.2658		0.3003	0.2733		0.3042	0.2808
	0.2925	0.2583		0.2964	0.2658		0.3003	0.2733
TC6	0.2924	0.2580	TD6	0.2963	0.2655	TE6	0.3002	0.2730
	0.2963	0.2655		0.3002	0.2730		0.3041	0.2805
	0.2993	0.2624		0.3032	0.2699		0.3071	0.2774
	0.2954	0.2549		0.2993	0.2624		0.3032	0.2699
TC7	0.2953	0.2546	TD7	0.2992	0.2621	TE7	0.3031	0.2696
	0.2992	0.2621		0.3031	0.2696		0.3070	0.2771
	0.3022	0.2590		0.3061	0.2665		0.3100	0.2740
	0.2983	0.2515		0.3022	0.2590		0.3061	0.2665
TC8	0.2982	0.2512	TD8	0.3021	0.2587	TE8	0.3060	0.2662
	0.3021	0.2587		0.3060	0.2662		0.3099	0.2737
	0.3051	0.2556		0.3090	0.2631		0.3129	0.2706
	0.3012	0.2481		0.3051	0.2556		0.3090	0.2631
TD1	0.2819	0.2828	TE1	0.2858	0.2903	TF1	0.2897	0.2978
	0.2858	0.2903		0.2897	0.2978		0.2936	0.3053
	0.2887	0.2869		0.2926	0.2944		0.2965	0.3019
	0.2848	0.2794		0.2887	0.2869		0.2926	0.2944
TD2	0.2848	0.2794	TE2	0.2887	0.2869	TF2	0.2926	0.2944
	0.2887	0.2869		0.2926	0.2944		0.2965	0.3019
	0.2916	0.2835		0.2955	0.2910		0.2994	0.2985
	0.2877	0.2760		0.2916	0.2835		0.2955	0.2910
TD3	0.2877	0.2760	TE3	0.2916	0.2835	TF3	0.2955	0.2910
	0.2916	0.2835		0.2955	0.2910		0.2994	0.2985
	0.2945	0.2801		0.2984	0.2876		0.3023	0.2951
	0.2906	0.2726		0.2945	0.2801		0.2984	0.2876
TD4	0.2906	0.2726	TE4	0.2945	0.2801	TF4	0.2984	0.2876
	0.2945	0.2801		0.2984	0.2876		0.3023	0.2951
	0.2973	0.2764		0.3012	0.2839		0.3051	0.2914
	0.2934	0.2689		0.2973	0.2764		0.3012	0.2839

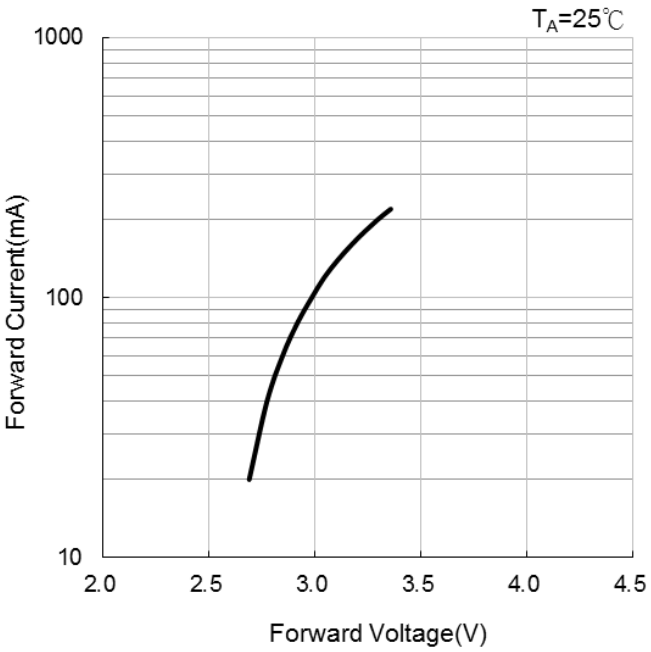
Rank	x	y	Rank	x	y	Rank	x	y
TF5	0.3012	0.2839	TG5	0.3051	0.2914	TH5	0.3090	0.2989
	0.3051	0.2914		0.3090	0.2989		0.3129	0.3064
	0.3081	0.2883		0.3120	0.2958		0.3159	0.3033
	0.3042	0.2808		0.3081	0.2883		0.3120	0.2958
TF6	0.3041	0.2805	TG6	0.3080	0.2880	TH6	0.3119	0.2955
	0.3080	0.2880		0.3119	0.2955		0.3158	0.3030
	0.3110	0.2849		0.3149	0.2924		0.3188	0.2999
	0.3071	0.2774		0.3110	0.2849		0.3149	0.2924
TF7	0.3070	0.2771	TG7	0.3109	0.2846	TH7	0.3148	0.2921
	0.3109	0.2846		0.3148	0.2921		0.3187	0.2996
	0.3139	0.2815		0.3178	0.2890		0.3217	0.2965
	0.3100	0.2740		0.3139	0.2815		0.3178	0.2890
TF8	0.3099	0.2737	TG8	0.3138	0.2812	TH8	0.3177	0.2887
	0.3138	0.2812		0.3177	0.2887		0.3216	0.2962
	0.3168	0.2781		0.3207	0.2856		0.3246	0.2931
	0.3129	0.2706		0.3168	0.2781		0.3207	0.2856
TG1	0.2936	0.3053	TH1	0.2975	0.3128	TJ1	0.3014	0.3203
	0.2975	0.3128		0.3014	0.3203		0.3053	0.3278
	0.3004	0.3094		0.3043	0.3169		0.3082	0.3244
	0.2965	0.3019		0.3004	0.3094		0.3043	0.3169
TG2	0.2965	0.3019	TH2	0.3004	0.3094	TJ2	0.3043	0.3169
	0.3004	0.3094		0.3043	0.3169		0.3082	0.3244
	0.3033	0.3060		0.3072	0.3135		0.3111	0.3210
	0.2994	0.2985		0.3033	0.3060		0.3072	0.3135
TG3	0.2994	0.2985	TH3	0.3033	0.3060	TJ3	0.3072	0.3135
	0.3033	0.3060		0.3072	0.3135		0.3111	0.3210
	0.3062	0.3026		0.3101	0.3101		0.3140	0.3176
	0.3023	0.2951		0.3062	0.3026		0.3101	0.3101
TG4	0.3023	0.2951	TH4	0.3062	0.3026	TJ4	0.3101	0.3101
	0.3062	0.3026		0.3101	0.3101		0.3140	0.3176
	0.3090	0.2989		0.3129	0.3064		0.3168	0.3139
	0.3051	0.2914		0.3090	0.2989		0.3129	0.3064

Rank	x	y	Rank	x	y	Rank	x	y
TJ5	0.3129	0.3064	TK1	0.3053	0.3278	TK5	0.3168	0.3139
	0.3168	0.3139		0.3092	0.3353		0.3207	0.3214
	0.3198	0.3108		0.3121	0.3319		0.3237	0.3183
	0.3159	0.3033		0.3082	0.3244		0.3198	0.3108
TJ6	0.3158	0.3030	TK2	0.3082	0.3244	TK6	0.3197	0.3105
	0.3197	0.3105		0.3121	0.3319		0.3236	0.3180
	0.3227	0.3074		0.3150	0.3285		0.3266	0.3149
	0.3188	0.2999		0.3111	0.3210		0.3227	0.3074
TJ7	0.3187	0.2996	TK3	0.3111	0.3210	TK7	0.3226	0.3071
	0.3226	0.3071		0.3150	0.3285		0.3265	0.3146
	0.3256	0.3040		0.3179	0.3251		0.3295	0.3115
	0.3217	0.2965		0.3140	0.3176		0.3256	0.3040
TJ8	0.3216	0.2962	TK4	0.3140	0.3176	TK8	0.3255	0.3037
	0.3255	0.3037		0.3179	0.3251		0.3294	0.3112
	0.3285	0.3006		0.3207	0.3214		0.3324	0.3081
	0.3246	0.2931		0.3168	0.3139		0.3285	0.3006

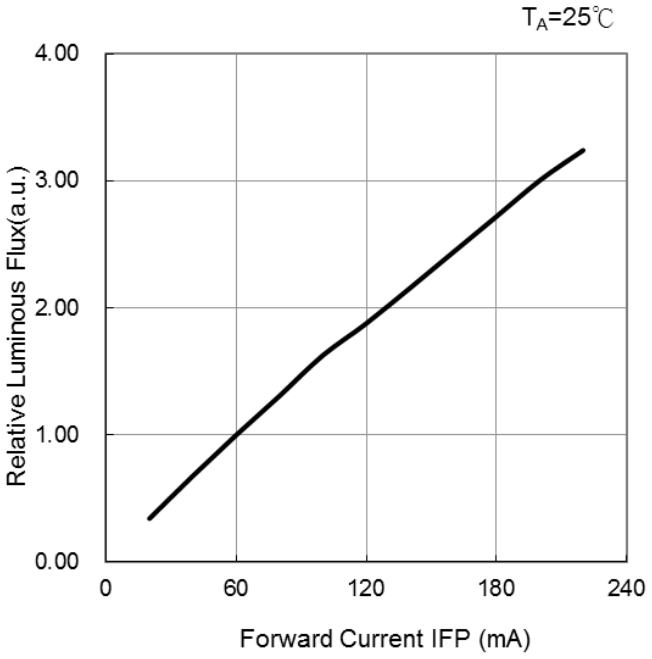
Note:Chromaticity coordinate groups are measured with an accuracy of ±0.005.

Optical and electrical characteristics

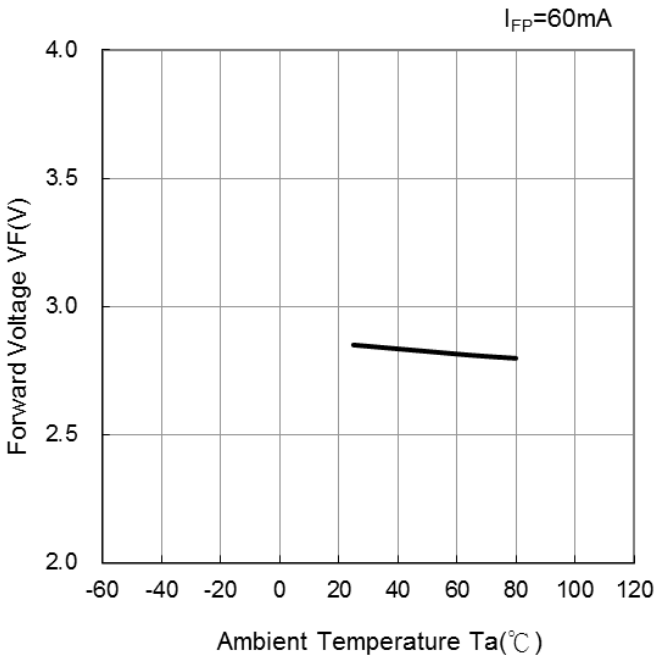
Forward Voltage vs. Forward Current



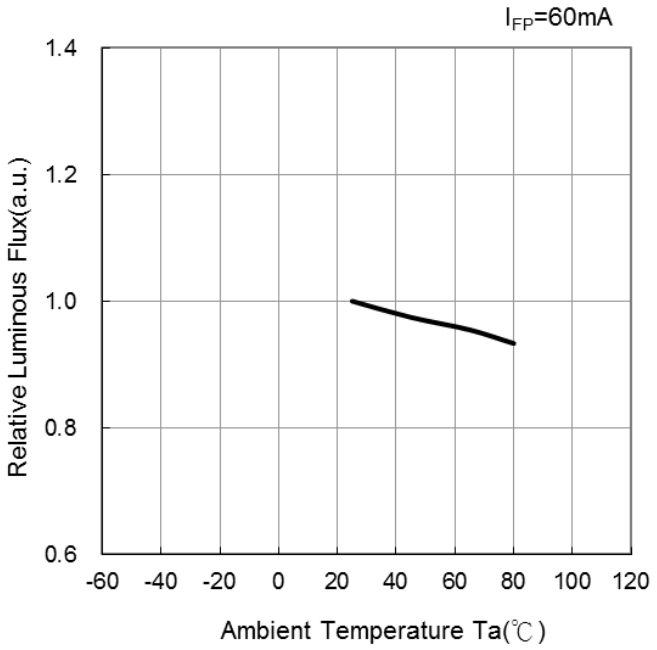
Forward Current vs. Relative Luminous Flux



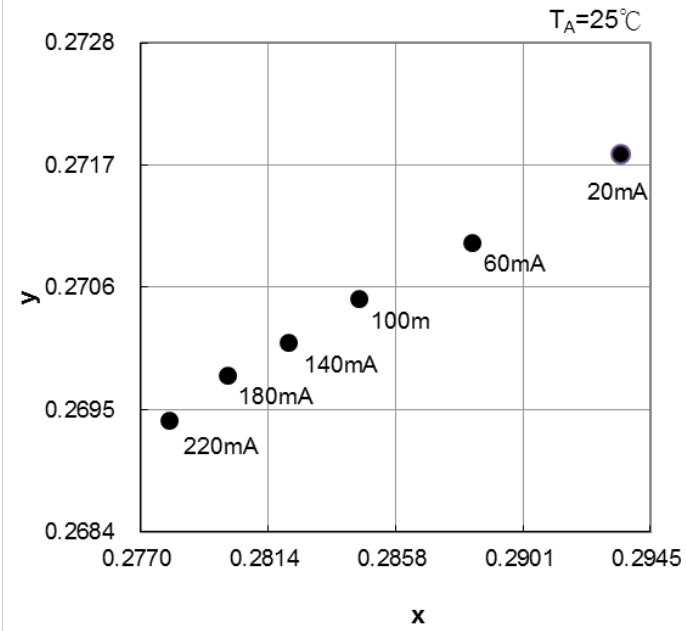
Ambient Temperature vs. Forward Voltage



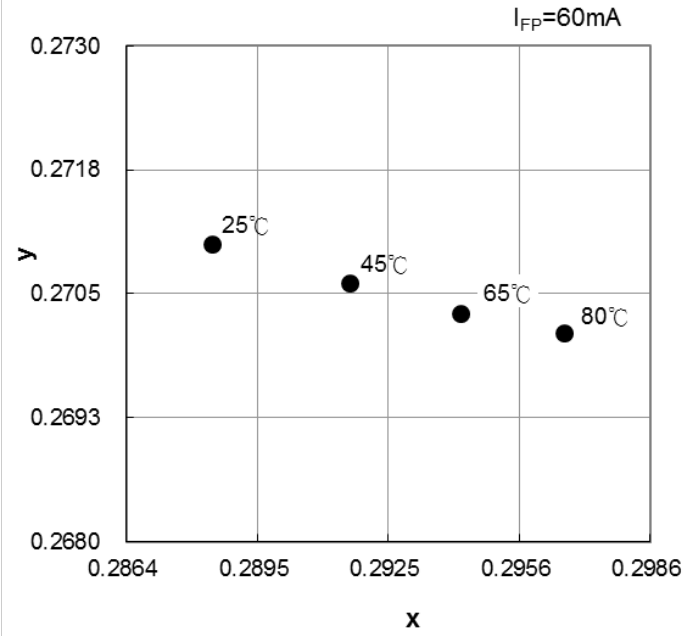
Ambient Temperature vs. Relative Luminous



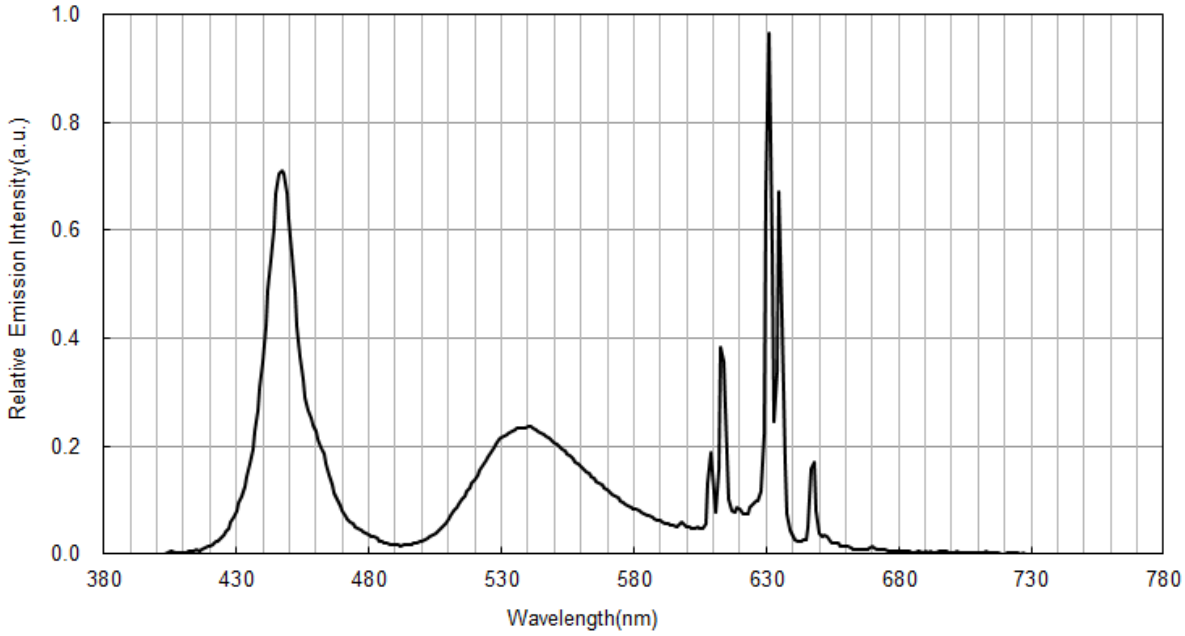
Forward Current vs.Chromaticity Coordinate



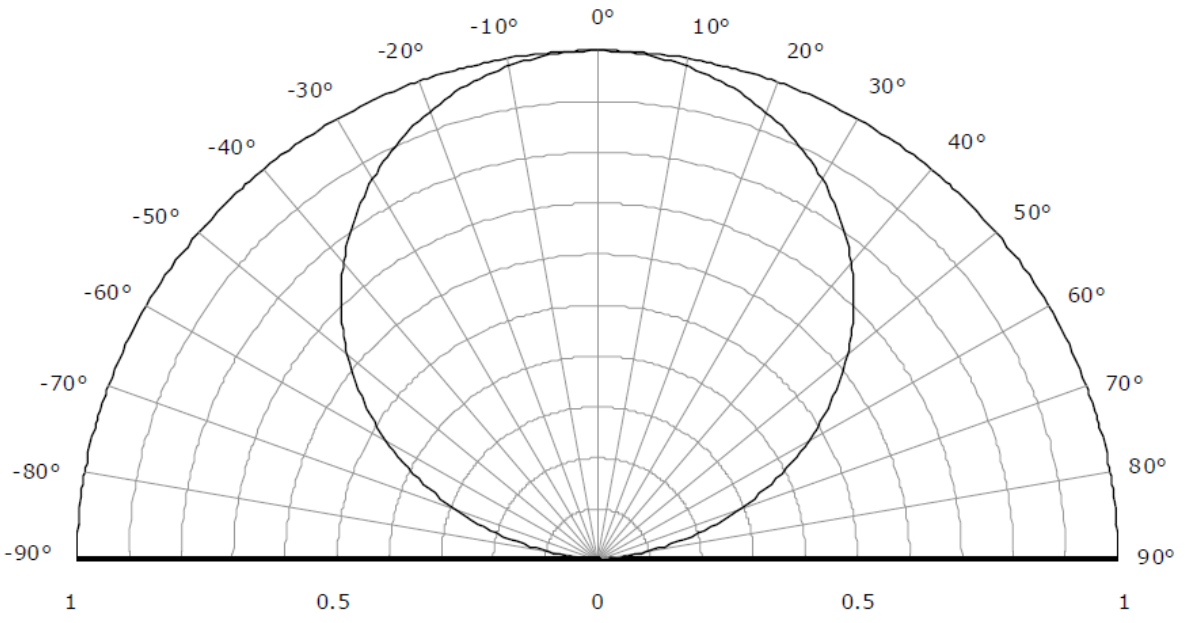
Ambient Temperature vs. Chromaticity Coordinate



Spectrum(T_A=25℃,I_{FP}=60mA)



Radiation Pattern(T_A=25℃,I_{FP}=60mA)



Recommended Reflow Soldering Conditions

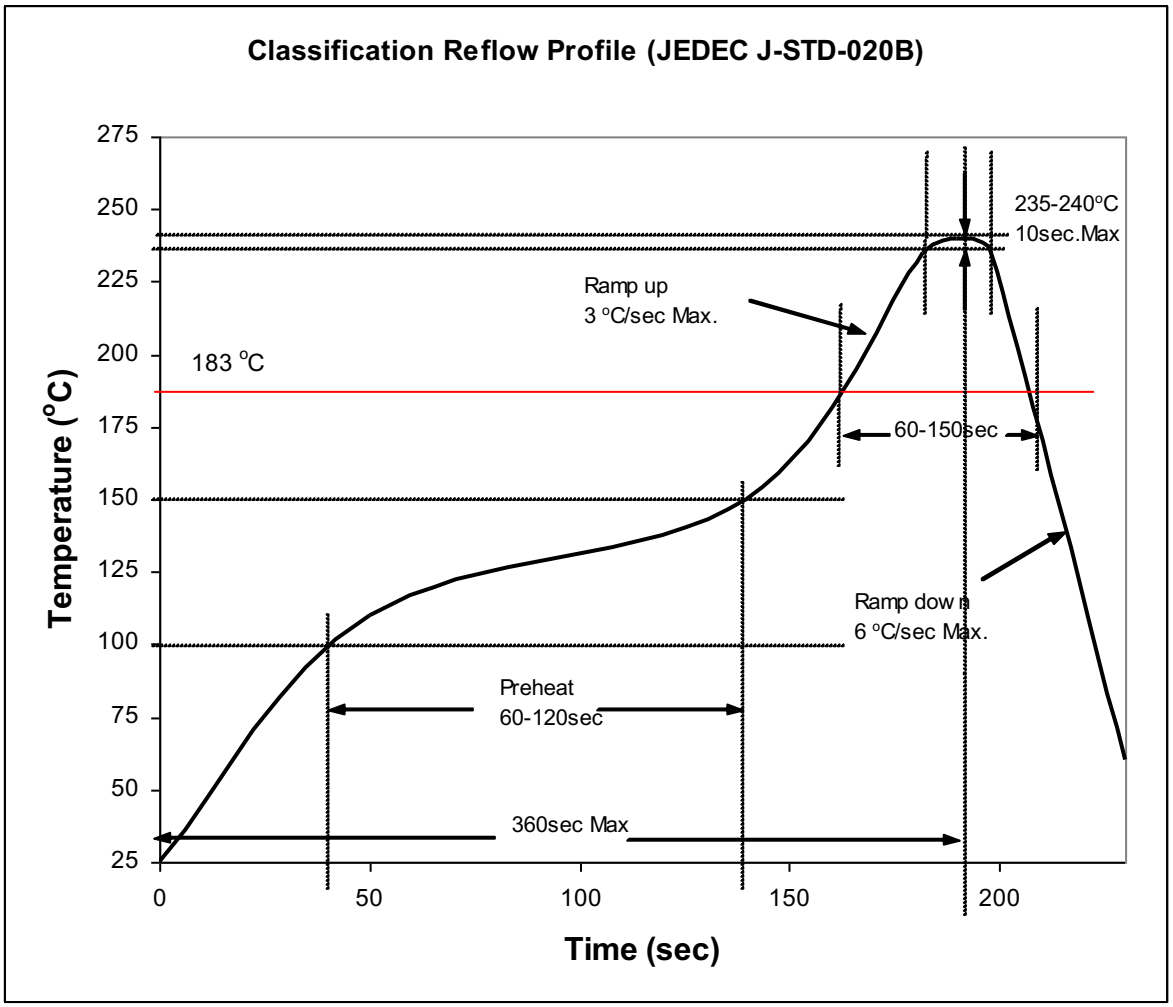
Surface Mounting Condition

In automatic mounting of the SMD LEDs on printed circuit boards, any bending, expanding and pulling forces or shock against the SMD LEDs should be kept min. to prevent them from electrical failures and mechanical damages of the devices.

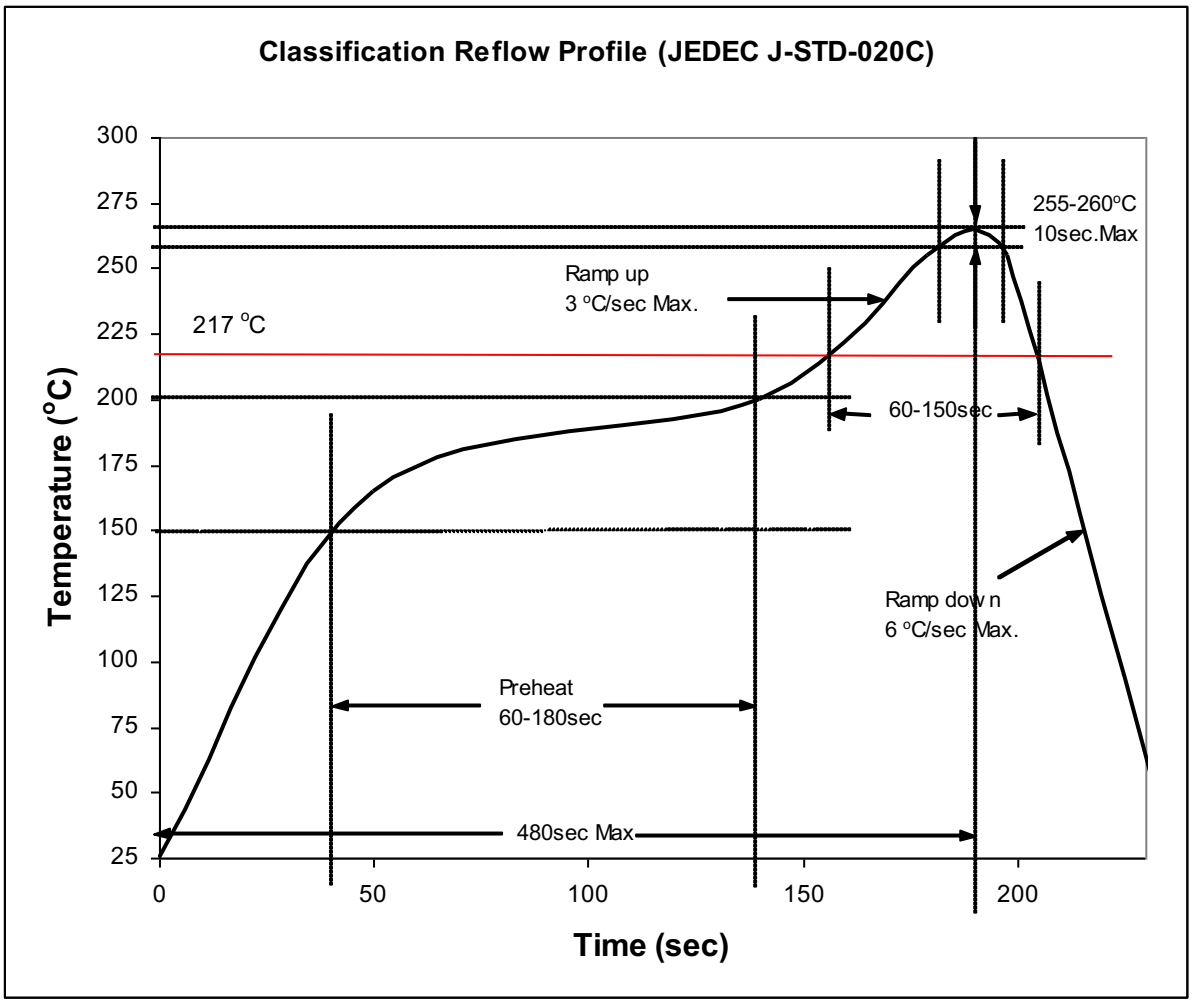
Soldering Reflow

-Soldering of the SMD LEDs should conform to the soldering condition in the individual specifications.
-SMD LEDs are designed for Reflow Soldering.
-In the reflow soldering, too high temperature and too large temperature gradient such as rapid heating/cooling may cause electrical & optical failures and damages of the devices.
-AOT cannot guarantee the LEDs after they have been assembled using the solder dipping method.

1) Lead Solder



2) Lead-free Solder



3) Manual Soldering Conditions

- Lead Solder

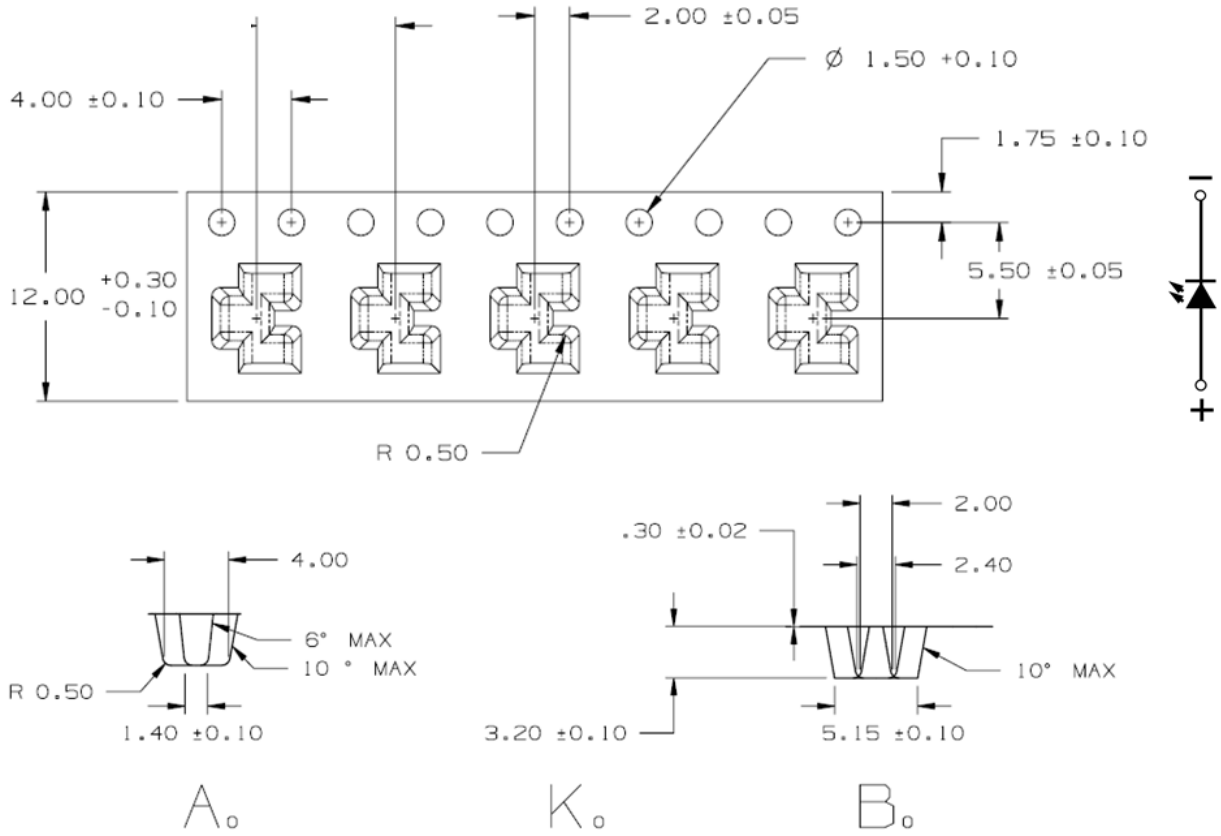
  Max. 300˚C for Max. 3sec, and only one time.

- Lead-free Solder

  Max. 350˚C for Max. 3sec, and only one time.

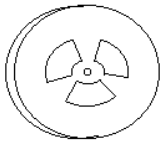
- There is possibility that the brightness of LEDs is decreased, which is influenced by heat or ambient atmosphere during reflow. It is recommended to use the nitrogen reflow method.
- After LEDs have been soldered, repair should not be done. As repair is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will be damaged by repairing or not.
- Reflow soldering should not be done more than two times.

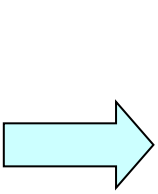
Dimensions (Unit :mm)

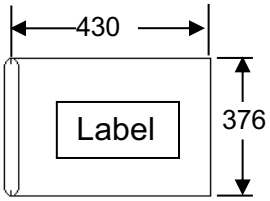


Item	Spec.	Tolerance(mm)	Item	Spec.	Tolerance(mm)
W	12.00	+0.30/-0.10	**P2**	2.00	±0.05
E	1.75	±0.10	**T**	0.30	±0.02
F	5.50	±0.10	**A0**	1.40	±0.10
D0	1.50	±0.10,-0.00	**B0**	5.15	±0.10
P0	4.00	±0.10	**K0**	3.20	±0.10
P1	8.00	±0.10			

Packing Formation



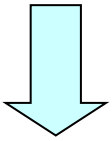


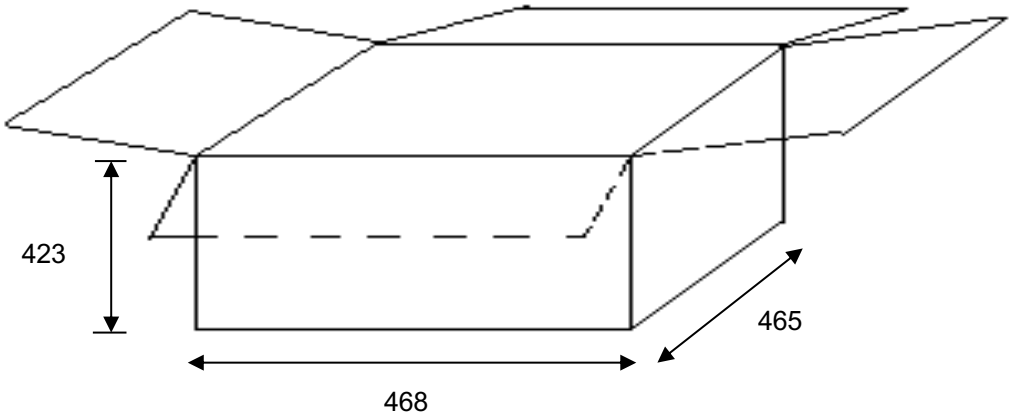


Diameter : 330 mm
Width : 13 mm
2500 pcs/Reel
Antistatic Reel

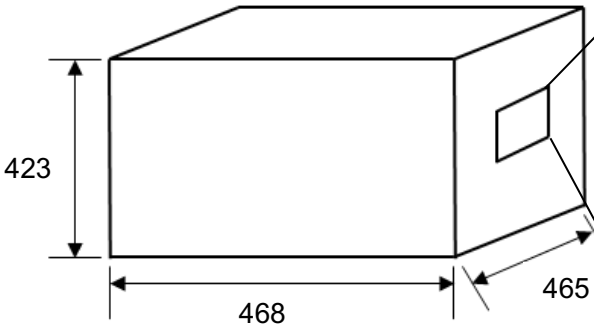
MBB Bag
+5g drying agent
+Humidity card
1 Reel / Bag

22 Bags / 1 Carton
⇒ 55000 pcs/ 1Carton





Package Outlook



AOT Solid-State Light. Done Right. Advanced Optoelectronic Technology Inc.	
Customer	
PO No.	
Part No.	
Quantity	
Packing Date	
Carton No.	
Ship No.	
QC Check	
備註	

Solid-State Light. Done Right.

Reel Label Definition

SAP. No.

SMD LED .
Part Number : XXXXX-XXXX
Brightness : A
CIE : B
VF : C
Quantity : nn ea
Serial No : SM0yymmddxxxx
Cust. PN. : XXXXX-XXXX

A : Iv value.
B : CIE value noted
C : Vf value.
nn : Quantity of LED

SM0yymmddxxx : yy : year, mm : month, dd : day, xxxx : reel no.

*Reel Label to fill in practice data of all LED characteristic

Reliability Test

No.	Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
1	Room Temp. Life Test	Internal Ref.	T_A=25 ˚C,I_F=60mA	1000 hrs	20
2	High Temp. Operating Life Test	JESD22-A108	T_A=65 ˚C,I_F=60mA	1000 hrs	20
3	High Temp. Operating Life Test	JESD22-A108	T_A=85 ˚C,I_F=60mA	1000 hrs	20
4	High Temp. Storage Test	JESD22-A103	T_A=85 ˚C	1000 hrs	20
5	Low Temp. Operating Life Test	JESD22-A108	T_A=-40 ˚C,I_F=60mA	1000 hr	20
6	Wet High Temp. Operating Life Test	JESD22-A119	60 ˚C 95%RH,I_F=60mA	1000 hr	20
7	Temperature and humidity cycle test	IEC68-2-38	25℃~65℃~-10℃,90% RH 24hr per cycle	10 cycles	20
8	Thermal Cycling Test	JESD22-A106	-40C ~ 100C ,30min Transform time 5min	300 cycles	50

Criteria for Judging Damage

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	V_F	I_F =60mA	-	*U.S.L×1.1
Luminous Flux	Φ v	I_F =60mA	*L.S.L×0.7	-

* U.S.L: Upper Standard Level

* L.S.L: Lower Standard Level

Cautions

(1) Moisture Proof Package

The moisture proof package should be used to prevent moisture in the package as the moisture may Cause damage to optical characteristics of the LEDs.

The aluminum bag with zipper is used for moisture proof package. And, the moisture absorbent Material, Silica gel, is inserted into aluminum bag.

(2) Storage:

Storage Conditions

Before opening the package:

The LEDs should be kept at 30˚C or less than 90%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material is recommended.

After opening the package:

After open the package, the LED should be kept at 30˚C, 60%RH or less. The LED should be soldered within 168 hours (7 days) after opening the package. If unused LEDs remain, it should be stored in moisture proof condition.

(3) Heat Generation

Thermal design of the end products is of paramount importance. The heat generation must be taken into design consideration when using the LED. The coefficient of the temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components.

(4) Static Electricity

Static electricity or surge voltage damages the LEDs. All equipment and machinery must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handing the LEDs. When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test or a Vf test at a lower current. (Below 1mA is recommended).

Criteria: Vf >1.9V at If=1uA

(5) Cleaning

Use isopropyl alcohol as a solvent for cleaning the LEDs. The other solvent may dissolve the LEDs package and the epoxy.

Ultrasonic cleaning should not be done.

(6) Electrostatic Discharge (ESD)

The products are sensitive to static electricity or surge voltage, An ESD event may damage its die or reduce its reliability performance. When handling the products, measures against electro static discharge, including the followings, are strongly recommended.

Eliminating the charge;

Wrist strap, ESD footwear and garments, ESD floors

Grounding the equipment and tools at workstation

ESD table / shelf mat (conductive materials)

Proper grounding techniques are required for all devices, equipment and machinery used in the assembly of the products, Also note that surge protection should be considered in the design of customer products.
If tools or equipment contain insulating materials, such as glass or plastic, proper measures against electro static discharge, including the followings are strongly recommended.

Dissipating the charge with conductive materials

Preventing the charge generation with moisture

Neutralizing the charge with ionizer

(7) Others

When using the LEDs, it must care that the reverse voltage will not exceed the absolute maximum rating.
The LED light is enough to injure human eyes, so it should avoid looking at LED light directly.

NOTE.

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