Enabling the Best lm/W in Mid Power Range

Mid-Power LED - 5630 Series

SAW8Q24D (Cool, Neutral, Warm)

RoHS

Product Brief

Description

- This White Colored surface-mount LED comes in standard package dimension. Package Size: 5.6x3.0x0.65mm
- It has a substrate made up of a molded plastic reflector sitting on top of a lead frame.
- The die is attached within the reflector cavity and the cavity is encapsulated by silicone.
- The package design coupled with careful selection of component materials allow these products to perform with high reliability.

Features and Benefits

- Market Standard 5630 Package Size
- High Color Quality, CRI Min. 80
- ANSI & MacAdam 3 Step compliant
- RoHS compliant

Key Applications

- Interior lighting
- General lighting
- Indoor and outdoor displays
- Architectural / Decorative lighting

Table 1. Product Selection Table

Part Number	CCT			
	Color	Min.	Typ.	Max.
SAW8Q24D	Cool White	4,700K	5,600K	7,000K
SAW8Q24D	Neutral White	3,700K	4,200K	4,700K
SAW8Q24D	Warm White	2,600K	3,000K	3,700K

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Table 2. Electro Optical Characteristics, I_F =32mA, T_j=25ºC, RH30%

Part Number	CCT (K) [1]	RANK	Luminous Intensity [2] I_V (cd)		Luminous Flux [3] Φ_V (lm)		CRI R_a
	Typ.		Min	Max	Min	Max	Min.
SAW8Q24D	6500	T5	10.5	11.0	33.5	35.0	80
		U0	11.0	11.3	35.0	36.0	80
		U3	11.3	11.7	36.0	37.3	80
	5600	T5	10.5	11.0	33.5	35.0	80
		U0	11.0	11.3	35.0	36.0	80
		U3	11.3	11.7	36.0	37.3	80
	5000	T5	10.5	11.0	33.5	35.0	80
		U0	11.0	11.3	35.0	36.0	80
		U3	11.3	11.7	36.0	37.3	80
		U7	11.7	12.5	37.3	39.8	80
	4500	T5	10.5	11.0	33.1	34.7	80
		U0	11.0	11.3	34.7	35.6	80
		U3	11.3	11.7	35.6	36.9	80
		U7	11.7	12.5	36.9	39.4	80
	4000	T5	10.5	11.0	33.1	34.7	80
		U0	11.0	11.3	34.7	35.6	80
		U3	11.3	11.7	35.6	36.9	80
		U7	11.7	12.5	36.9	39.4	80
	3500	T0	10.0	10.5	31.2	32.8	80
		T5	10.5	11.0	32.8	34.4	80
		U0	11.0	11.3	34.4	35.3	80
	3000	T0	10.0	10.5	31.2	32.8	80
		T5	10.5	11.0	32.8	34.4	80
		U0	11.0	11.3	34.4	35.3	80
	2700	T0	10.0	10.5	31.2	32.8	80
		T5	10.5	11.0	32.8	34.4	80
		U0	11.0	11.3	34.4	35.3	80

Notes :

(1) Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.

(2) Seoul Semiconductor maintains a tolerance of ±7% on Intensity and power measurements.
The luminous intensity IV was measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.

(3) The lumen table is only for reference.

(4) Solid angle 0.01sr (reference)

Performance Characteristics

Table 3. Characteristics, I_F=32mA, T_j= 25ºC, RH30%

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Forward Current	I_F	-	32	100	mA
Luminous Intensity[1] (5,000K)[2]	I_v	10.5	11.3	-	cd
CRI [3]	R_a	80	83	90	
Viewing Angle	$2\Theta_{1/2}$	-	120	-	Deg.
Thermal resistance (J to S) [4]	$R\theta_{J-S}$	-	7	-	℃/W
ESD Sensitivity(HBM)	-	Class 3A JESD22-A114-E			

Table 4. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	100	mA
Froward Voltage	V_F	6.0	V
Power Dissipation	P_D	0.6	W
Junction Temperature	T_j	125	ºC
Operating Temperature	T_{opr}	-40 ~ + 85	ºC
Storage Temperature	T_{stg}	-40 ~ + 100	ºC

Notes :

(1) Seoul Semiconductor maintains a tolerance of ±7% on Intensity and power measurements.

(2) Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.

Color coordinate : ±0.005, CCT ±5% tolerance.

(3) Tolerance is ±2.0 on CRI measurements.

(4) Thermal resistance is junction to Solder.

(5) I_{FP} conditions with pulse width ≤10ms and duty cycle ≤10%

- **Calculated performance values are for reference only.**
- **All measurements were made under the standardized environment of Seoul Semiconductor.**

Characteristics Graph

Fig 1. Color Spectrum, T_j = 25ºC, I_F=32mA

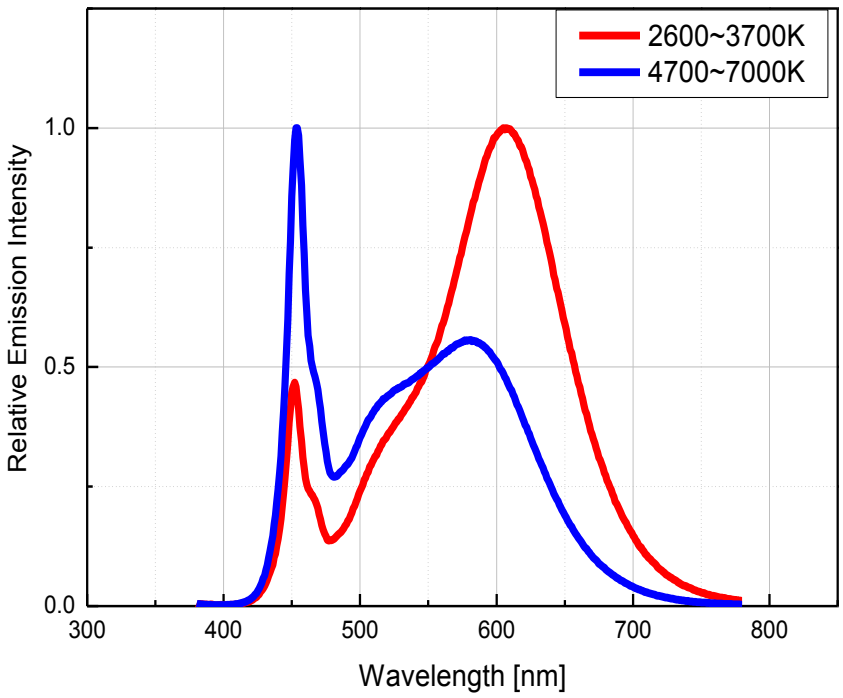
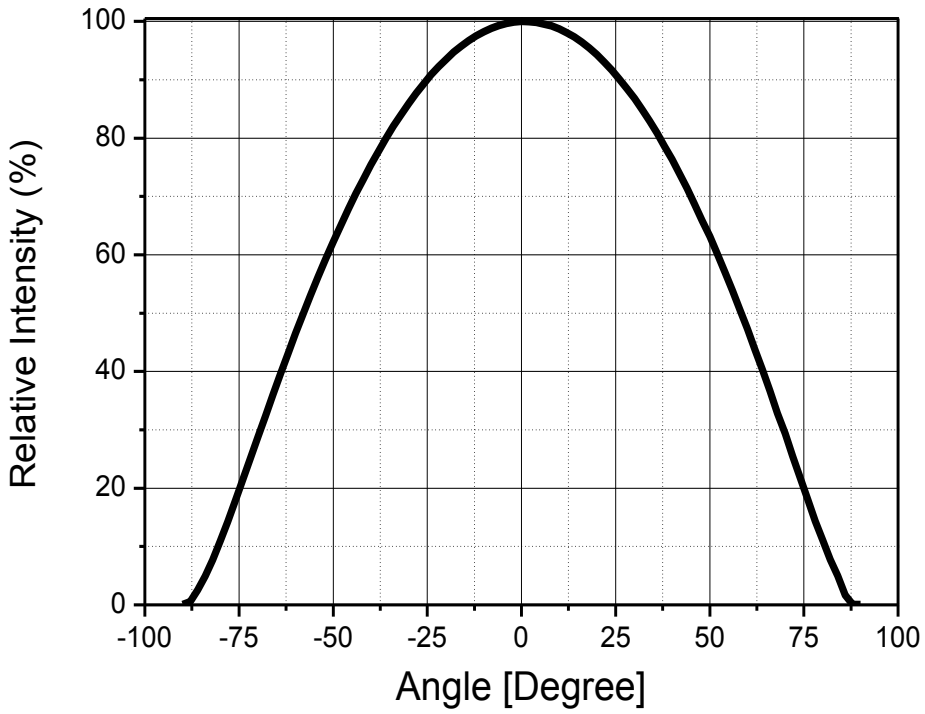


Fig 2. Radiant Pattern, T_j = 25ºC, I_F=32mA



Characteristics Graph

Fig 3. Forward Voltage vs. Forward Current, T_j = 25ºC

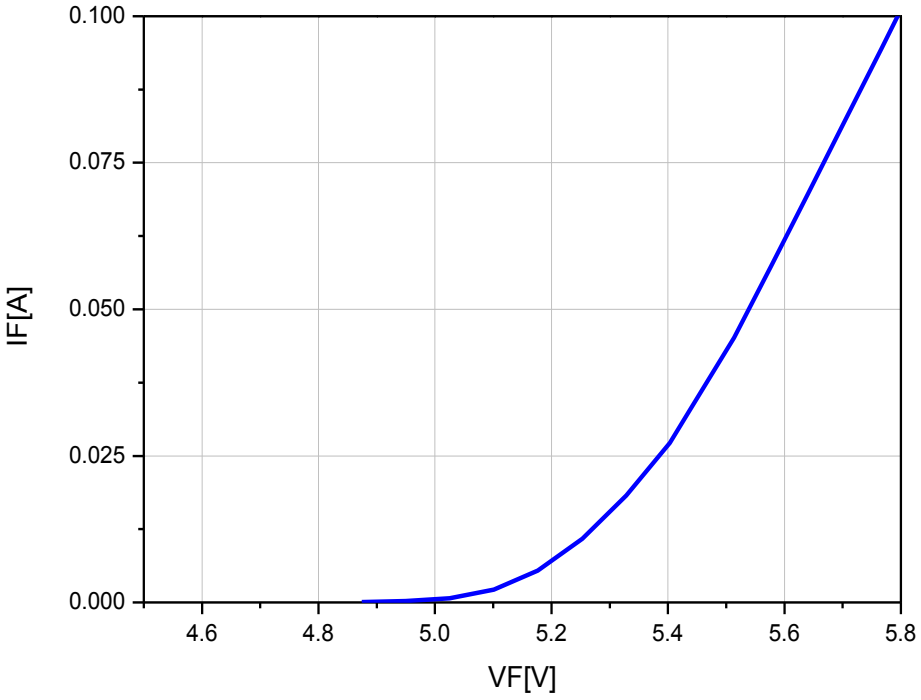
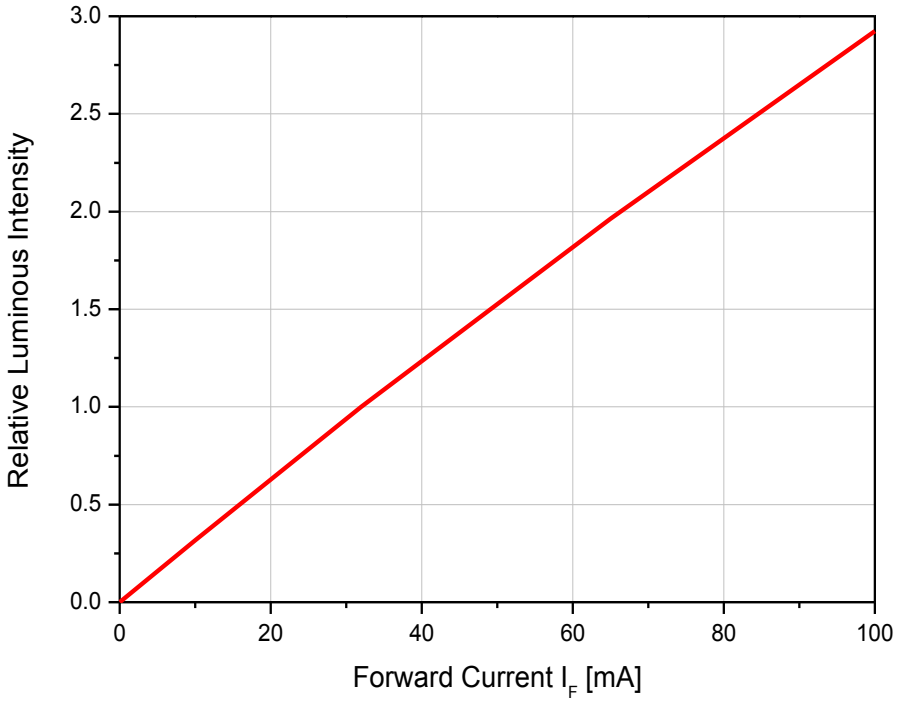


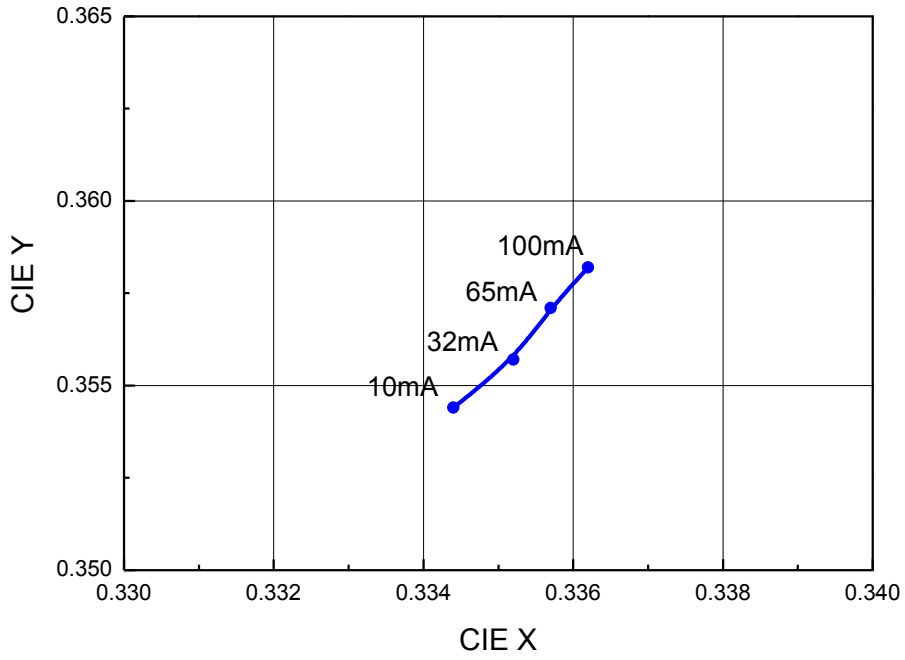
Fig 4. Forward Current vs. Relative Luminous Intensity, T_j = 25ºC



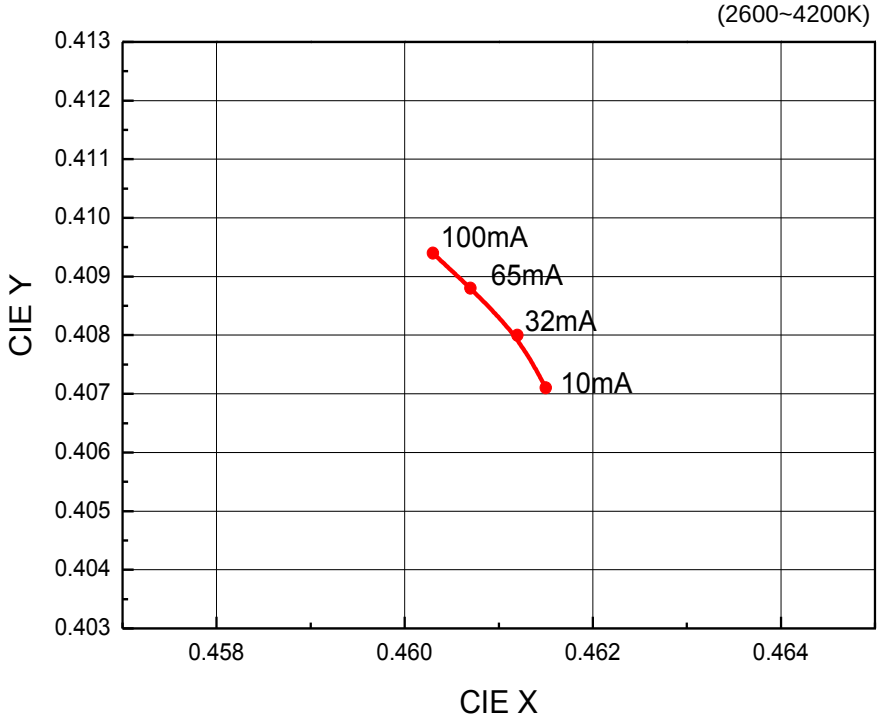
Characteristics Graph

Fig 5. Forward Current vs. CIE X,Y Shift, T_j = 25ºC

(4200~7000K)



(2600~4200K)



Characteristics Graph

Fig 6. Junction Temperature vs. Relative Luminous Intensity, I_F=32mA

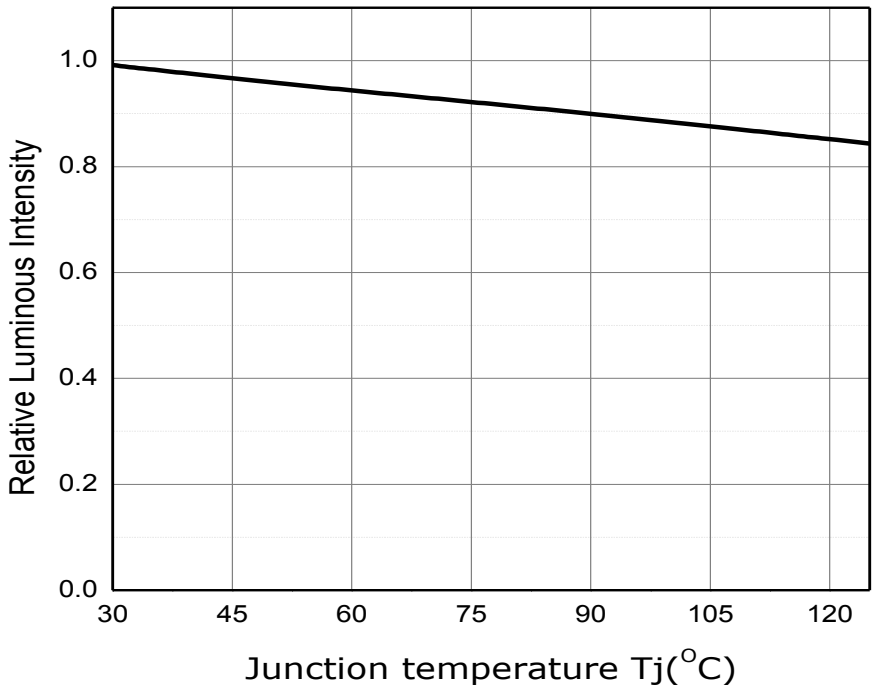
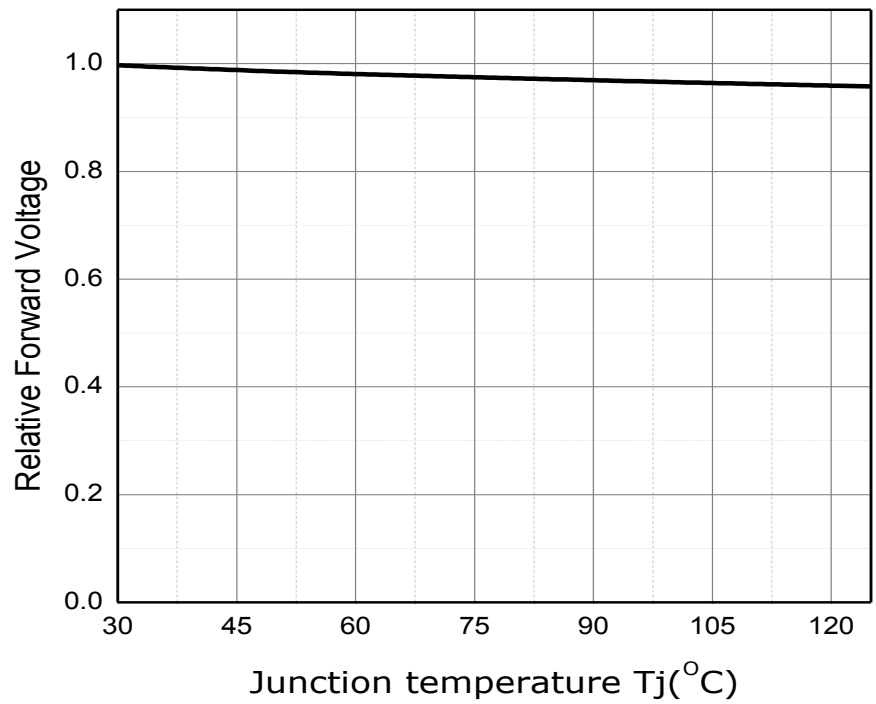
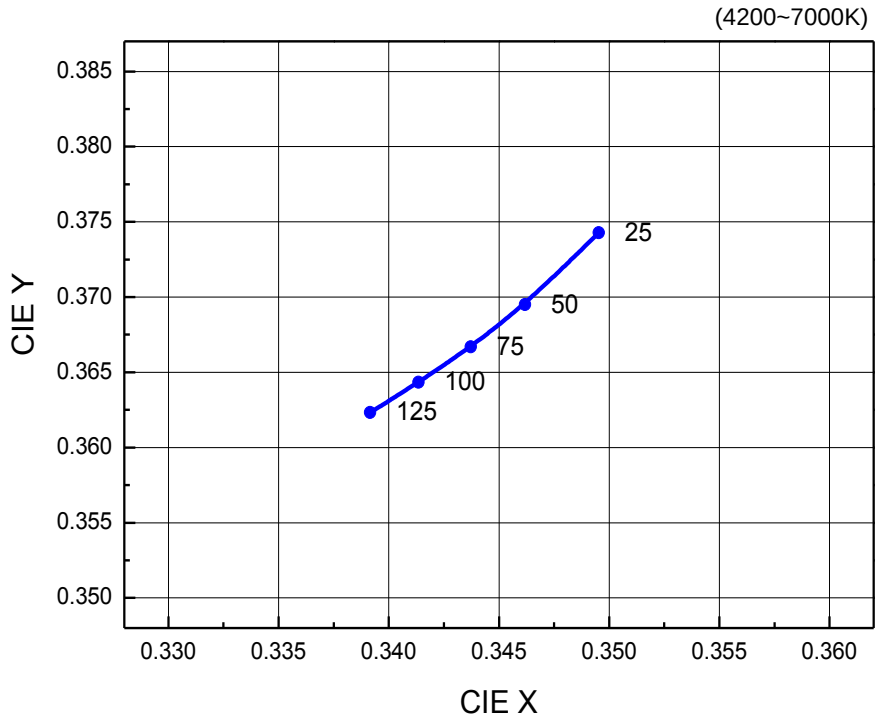


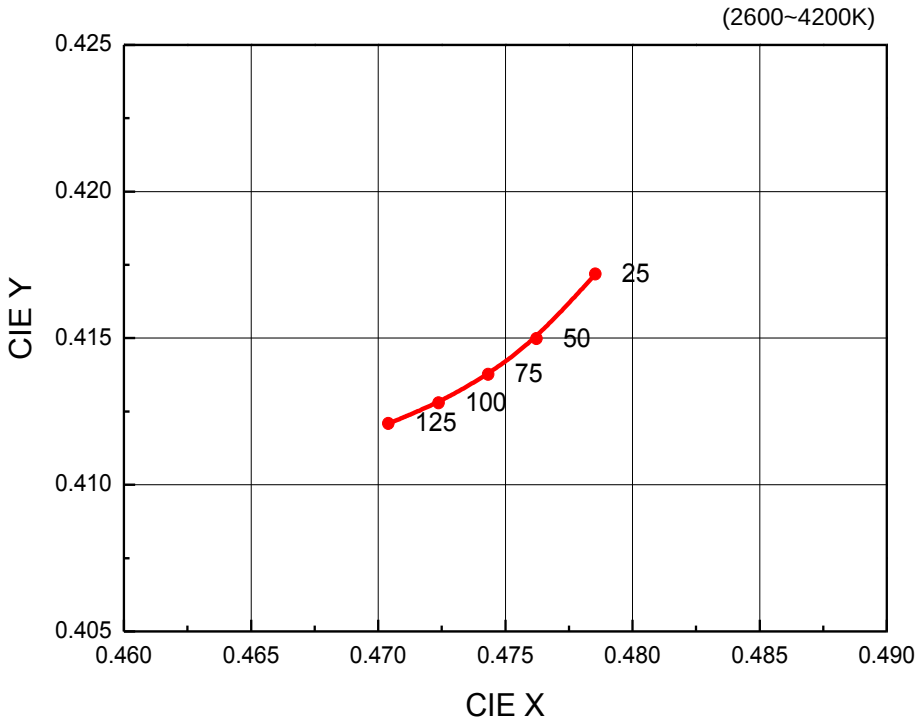
Fig 7. Junction Temperature vs. Relative Forward Voltage, I_F=32mA



Characteristics Graph

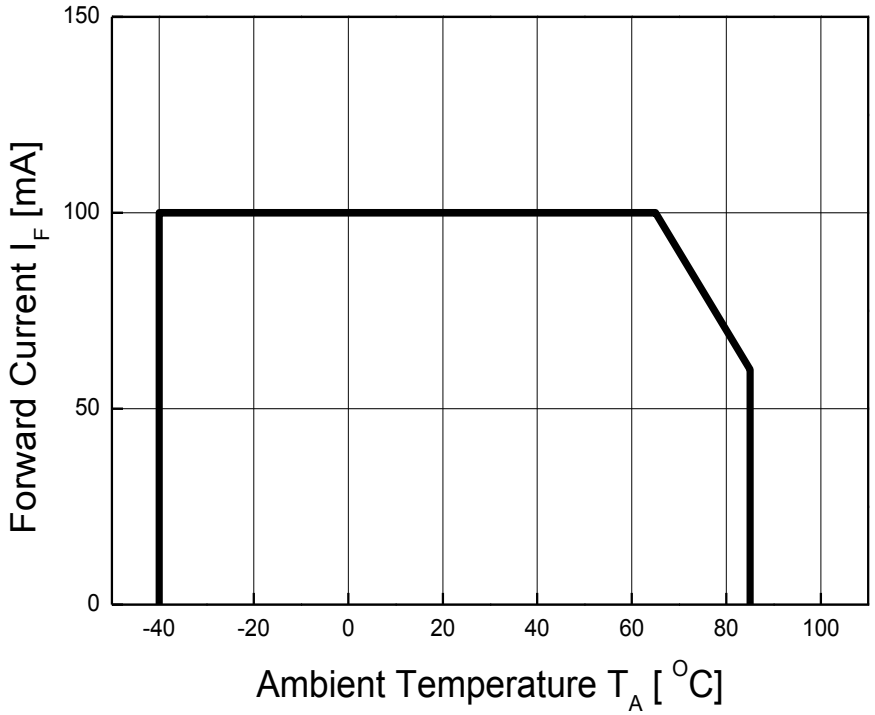
Fig 8. Chromaticity Coordinate vs. Junction Temperature, I_F=32mA





Characteristics Graph

Fig 9. Ambient Temperature vs. Maximum Forward Current, T_{j_max} = 125℃



Performance Characteristics

Table 5. Bin Code description, T_j=25℃, I_F=32mA

Part Number	Luminous Intensity (cd)			Color Chromaticity Coordinate	Typical Forward Voltage (V)		
	Bin Code	Min.	Max.		Bin Code	Min.	Max.
SAW8Q24D	T0	10.0	10.5	Refer to Page. 12	Z52	5.2	5.4
	T5	10.5	11.0		Z54	5.4	5.6
	U0	11.0	11.3		Z56	5.6	5.8
	U3	11.3	11.7				

Table 6. Intensity rank distribution

Available ranks

CCT	CIE	IV Rank			
6000 ~ 7000K	A	T0	T5	U0	U3
5300 – 6000K	B	T0	T5	U0	U3
4700 ~ 5300K	C	T0	T5	U0	U3
4200 ~ 4700K	D	T0	T5	U0	U3
3700 ~ 4200K	E	T0	T5	U0	U3
3200 ~ 3700K	F	T0	T5	U0	U3
2900 ~ 3200K	G	T0	T5	U0	U3
2600 ~ 2900K	H	T0	T5	U0	U3

***Notes :**

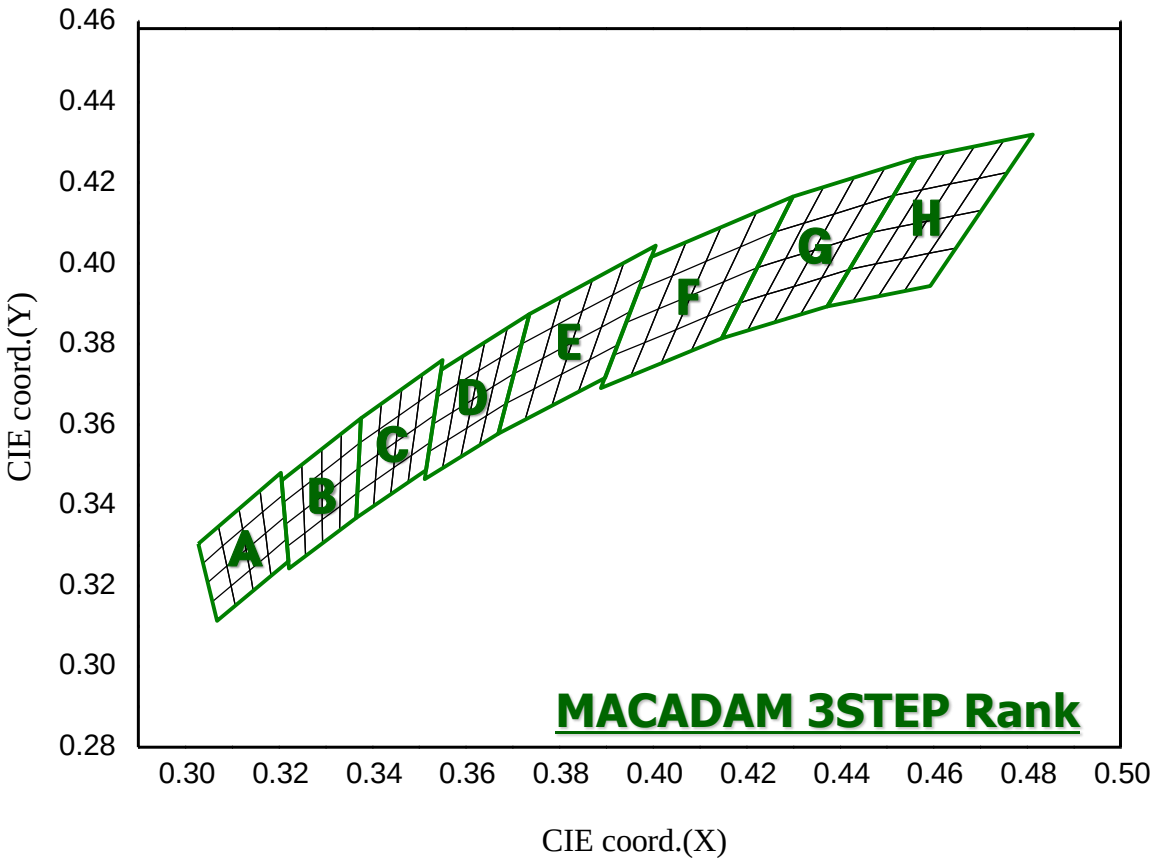
(1) Calculated performance values are for reference only.

- **All measurements were made under the standardized environment of Seoul Semiconductor.**

  In order to ensure availability, single color rank will not be orderable.

Color Bin Structure

CIE Chromaticity Diagram T_j=25℃, I_F=32mA

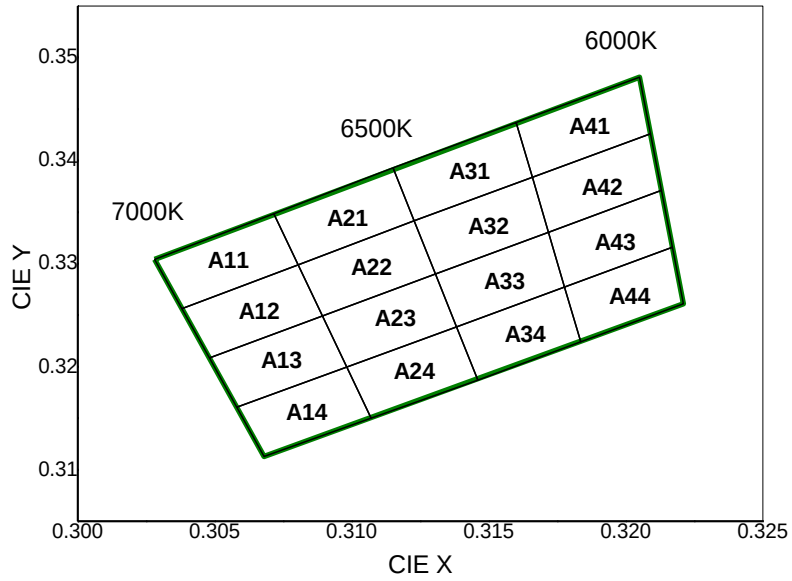


***Notes :**

- Energy Star binning applied to all 2600~7000K.
- Measurement Uncertainty of the Color Coordinates : ± 0.005

Color Bin Structure

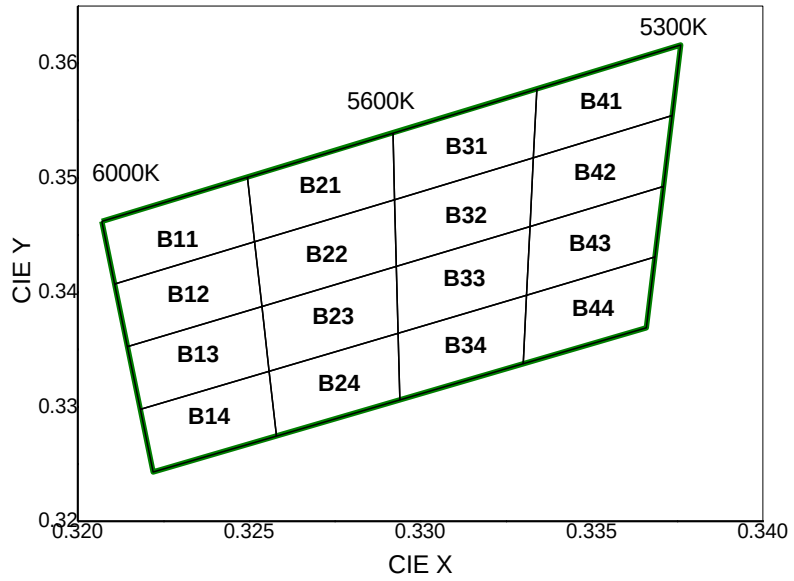
CIE Chromaticity Diagram (Cool white), T_j=25℃, I_F=32mA



A11		A21		A31		A41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3028	0.3304	0.3072	0.3349	0.3115	0.3393	0.3160	0.3437
0.3038	0.3256	0.3080	0.3299	0.3123	0.3342	0.3166	0.3384
0.3080	0.3299	0.3123	0.3342	0.3166	0.3384	0.3209	0.3426
0.3072	0.3349	0.3115	0.3393	0.3160	0.3437	0.3205	0.3481
A12		**A22**		**A32**		**A42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3038	0.3256	0.3080	0.3299	0.3123	0.3342	0.3166	0.3384
0.3048	0.3209	0.3089	0.3249	0.3131	0.3290	0.3172	0.3331
0.3089	0.3249	0.3131	0.3290	0.3172	0.3331	0.3213	0.3371
0.3080	0.3299	0.3123	0.3342	0.3166	0.3384	0.3209	0.3426
A13		**A23**		**A33**		**A43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3048	0.3209	0.3089	0.3249	0.3131	0.3290	0.3172	0.3331
0.3058	0.3161	0.3098	0.3200	0.3138	0.3239	0.3178	0.3277
0.3098	0.3200	0.3138	0.3239	0.3178	0.3277	0.3217	0.3316
0.3089	0.3249	0.3131	0.3290	0.3172	0.3331	0.3213	0.3371
A14		**A24**		**A34**		**A44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3058	0.3161	0.3098	0.3200	0.3138	0.3239	0.3178	0.3277
0.3068	0.3113	0.3107	0.3150	0.3146	0.3187	0.3184	0.3224
0.3107	0.3150	0.3146	0.3187	0.3184	0.3224	0.3221	0.3261
0.3098	0.3200	0.3138	0.3239	0.3178	0.3277	0.3217	0.3316

Color Bin Structure

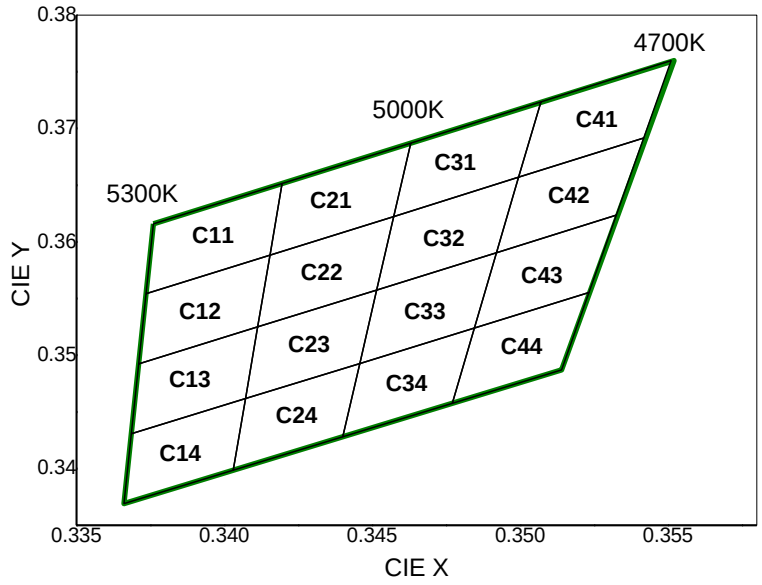
CIE Chromaticity Diagram (Cool white), T_j=25℃, I_F=32mA



B11		B21		B31		B41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3207	0.3462	0.3250	0.3501	0.3292	0.3539	0.3334	0.3578
0.3211	0.3407	0.3252	0.3444	0.3293	0.3481	0.3333	0.3518
0.3252	0.3444	0.3293	0.3481	0.3333	0.3518	0.3374	0.3554
0.3250	0.3501	0.3292	0.3539	0.3334	0.3578	0.3376	0.3616
B12		**B22**		**B32**		**B42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3211	0.3407	0.3252	0.3444	0.3293	0.3481	0.3333	0.3518
0.3215	0.3353	0.3254	0.3388	0.3293	0.3423	0.3332	0.3458
0.3254	0.3388	0.3293	0.3423	0.3332	0.3458	0.3371	0.3493
0.3252	0.3444	0.3293	0.3481	0.3333	0.3518	0.3374	0.3554
B13		**B23**		**B33**		**B43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3215	0.3353	0.3254	0.3388	0.3293	0.3423	0.3332	0.3458
0.3218	0.3298	0.3256	0.3331	0.3294	0.3364	0.3331	0.3398
0.3256	0.3331	0.3294	0.3364	0.3331	0.3398	0.3369	0.3431
0.3254	0.3388	0.3293	0.3423	0.3332	0.3458	0.3371	0.3493
B14		**B24**		**B34**		**B44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3218	0.3298	0.3256	0.3331	0.3294	0.3364	0.3331	0.3398
0.3222	0.3243	0.3258	0.3275	0.3294	0.3306	0.3330	0.3338
0.3258	0.3275	0.3294	0.3306	0.3330	0.3338	0.3366	0.3369
0.3256	0.3331	0.3294	0.3364	0.3331	0.3398	0.3369	0.3431

Color Bin Structure

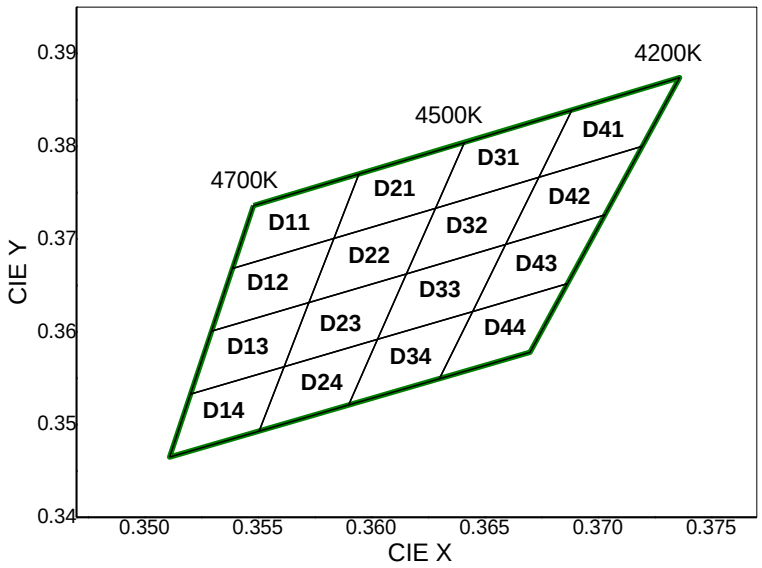
CIE Chromaticity Diagram (Cool white), T_j=25℃, I_F=32mA



C11		C21		C31		C41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3376	0.3616	0.3420	0.3652	0.3463	0.3687	0.3507	0.3724
0.3374	0.3554	0.3415	0.3588	0.3457	0.3622	0.3500	0.3657
0.3415	0.3588	0.3457	0.3622	0.3500	0.3657	0.3542	0.3692
0.3420	0.3652	0.3463	0.3687	0.3507	0.3724	0.3551	0.3760
C12		**C22**		**C32**		**C42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3374	0.3554	0.3415	0.3588	0.3457	0.3622	0.3500	0.3657
0.3371	0.3493	0.3411	0.3525	0.3452	0.3558	0.3492	0.3591
0.3411	0.3525	0.3452	0.3558	0.3492	0.3591	0.3533	0.3624
0.3415	0.3588	0.3457	0.3622	0.3500	0.3657	0.3542	0.3692
C13		**C23**		**C33**		**C43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3371	0.3493	0.3411	0.3525	0.3452	0.3558	0.3492	0.3591
0.3369	0.3431	0.3407	0.3462	0.3446	0.3493	0.3485	0.3524
0.3407	0.3462	0.3446	0.3493	0.3485	0.3524	0.3523	0.3555
0.3411	0.3525	0.3452	0.3558	0.3492	0.3591	0.3533	0.3624
C14		**C24**		**C34**		**C44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3369	0.3431	0.3407	0.3462	0.3446	0.3493	0.3485	0.3524
0.3366	0.3369	0.3403	0.3399	0.3440	0.3428	0.3477	0.3458
0.3403	0.3399	0.3440	0.3428	0.3477	0.3458	0.3514	0.3487
0.3407	0.3462	0.3446	0.3493	0.3485	0.3524	0.3523	0.3555

Color Bin Structure

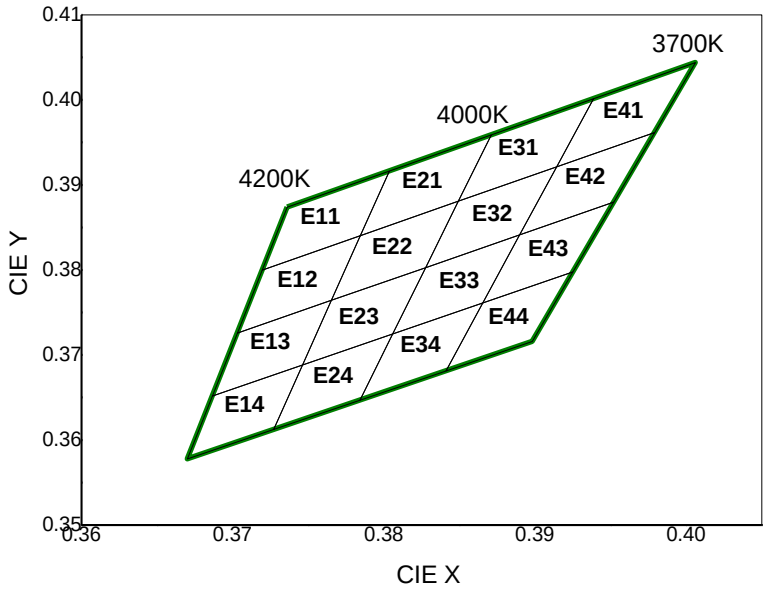
CIE Chromaticity Diagram (Neutral white), T_j=25℃, I_F=32mA



D11		D21		D31		D41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3548	0.3736	0.3595	0.3770	0.3641	0.3804	0.3689	0.3839
0.3539	0.3668	0.3584	0.3701	0.3628	0.3733	0.3674	0.3767
0.3584	0.3701	0.3628	0.3733	0.3674	0.3767	0.3720	0.3800
0.3595	0.3770	0.3641	0.3804	0.3689	0.3839	0.3736	0.3874
D12		**D22**		**D32**		**D42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3539	0.3668	0.3584	0.3701	0.3628	0.3733	0.3674	0.3767
0.3530	0.3601	0.3573	0.3632	0.3616	0.3663	0.3659	0.3694
0.3573	0.3632	0.3616	0.3663	0.3659	0.3694	0.3703	0.3726
0.3584	0.3701	0.3628	0.3733	0.3674	0.3767	0.3720	0.3800
D13		**D23**		**D33**		**D43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3530	0.3601	0.3573	0.3632	0.3616	0.3663	0.3659	0.3694
0.3520	0.3533	0.3562	0.3562	0.3603	0.3592	0.3645	0.3622
0.3562	0.3562	0.3603	0.3592	0.3645	0.3622	0.3687	0.3652
0.3573	0.3632	0.3616	0.3663	0.3659	0.3694	0.3703	0.3726
D14		**D24**		**D34**		**D44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3520	0.3533	0.3562	0.3562	0.3603	0.3592	0.3645	0.3622
0.3511	0.3465	0.3551	0.3493	0.3590	0.3521	0.3630	0.3550
0.3551	0.3493	0.3590	0.3521	0.3630	0.3550	0.3670	0.3578
0.3562	0.3562	0.3603	0.3592	0.3645	0.3622	0.3687	0.3652

Color Bin Structure

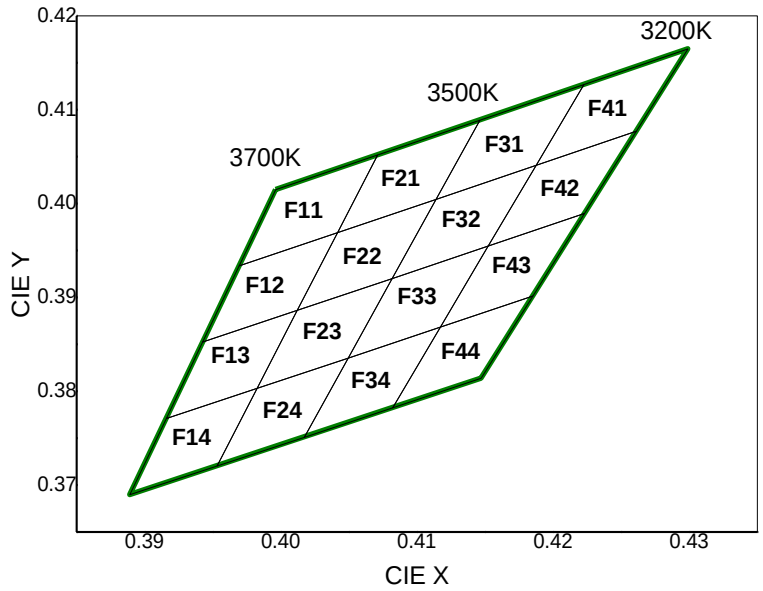
CIE Chromaticity Diagram (Neutral white), T_j=25℃, I_F=32mA



E11		E21		E31		E41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3736	0.3874	0.3804	0.3917	0.3871	0.3959	0.3939	0.4002
0.3720	0.3800	0.3784	0.3841	0.3849	0.3881	0.3914	0.3922
0.3784	0.3841	0.3849	0.3881	0.3914	0.3922	0.3979	0.3962
0.3804	0.3917	0.3871	0.3959	0.3939	0.4002	0.4006	0.4044
E12		**E22**		**E32**		**E42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3720	0.3800	0.3784	0.3841	0.3849	0.3881	0.3914	0.3922
0.3703	0.3726	0.3765	0.3765	0.3828	0.3803	0.3890	0.3842
0.3765	0.3765	0.3828	0.3803	0.3890	0.3842	0.3952	0.3880
0.3784	0.3841	0.3849	0.3881	0.3914	0.3922	0.3979	0.3962
E13		**E23**		**E33**		**E43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3703	0.3726	0.3765	0.3765	0.3828	0.3803	0.3890	0.3842
0.3687	0.3652	0.3746	0.3689	0.3806	0.3725	0.3865	0.3762
0.3746	0.3689	0.3806	0.3725	0.3865	0.3762	0.3925	0.3798
0.3765	0.3765	0.3828	0.3803	0.3890	0.3842	0.3952	0.3880
E14		**E24**		**E34**		**E44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3687	0.3652	0.3746	0.3689	0.3806	0.3725	0.3865	0.3762
0.3670	0.3578	0.3727	0.3613	0.3784	0.3647	0.3841	0.3682
0.3727	0.3613	0.3784	0.3647	0.3841	0.3682	0.3898	0.3716
0.3746	0.3689	0.3806	0.3725	0.3865	0.3762	0.3925	0.3798

Color Bin Structure

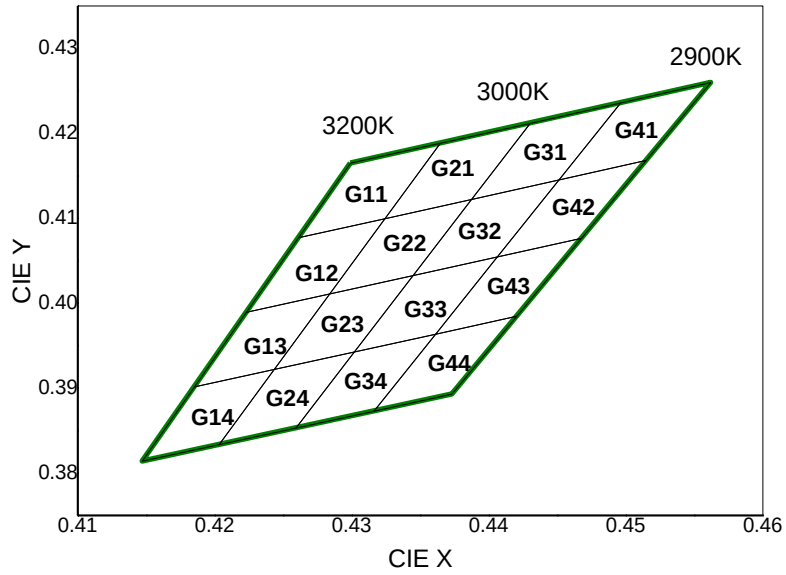
CIE Chromaticity Diagram (Warm white), T_j=25℃, I_F=32mA



F11		F21		F31		F41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3996	0.4015	0.4071	0.4052	0.4146	0.4089	0.4223	0.4127
0.3969	0.3934	0.4042	0.3969	0.4114	0.4005	0.4187	0.4041
0.4042	0.3969	0.4114	0.4005	0.4187	0.4041	0.4261	0.4077
0.4071	0.4052	0.4146	0.4089	0.4223	0.4127	0.4299	0.4165
F12		**F22**		**F32**		**F42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3969	0.3934	0.4042	0.3969	0.4114	0.4005	0.4187	0.4041
0.3943	0.3853	0.4012	0.3886	0.4082	0.3920	0.4152	0.3955
0.4012	0.3886	0.4082	0.3920	0.4152	0.3955	0.4223	0.3990
0.4042	0.3969	0.4114	0.4005	0.4187	0.4041	0.4261	0.4077
F13		**F23**		**F33**		**F43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3943	0.3853	0.4012	0.3886	0.4082	0.3920	0.4152	0.3955
0.3916	0.3771	0.3983	0.3803	0.4049	0.3836	0.4117	0.3869
0.3983	0.3803	0.4049	0.3836	0.4117	0.3869	0.4185	0.3902
0.4012	0.3886	0.4082	0.3920	0.4152	0.3955	0.4223	0.3990
F14		**F24**		**F34**		**F44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3916	0.3771	0.3983	0.3803	0.4049	0.3836	0.4117	0.3869
0.3889	0.3690	0.3953	0.3721	0.4017	0.3751	0.4082	0.3783
0.3953	0.3721	0.4017	0.3751	0.4082	0.3783	0.4147	0.3814
0.3983	0.3803	0.4049	0.3836	0.4117	0.3869	0.4185	0.3902

Color Bin Structure

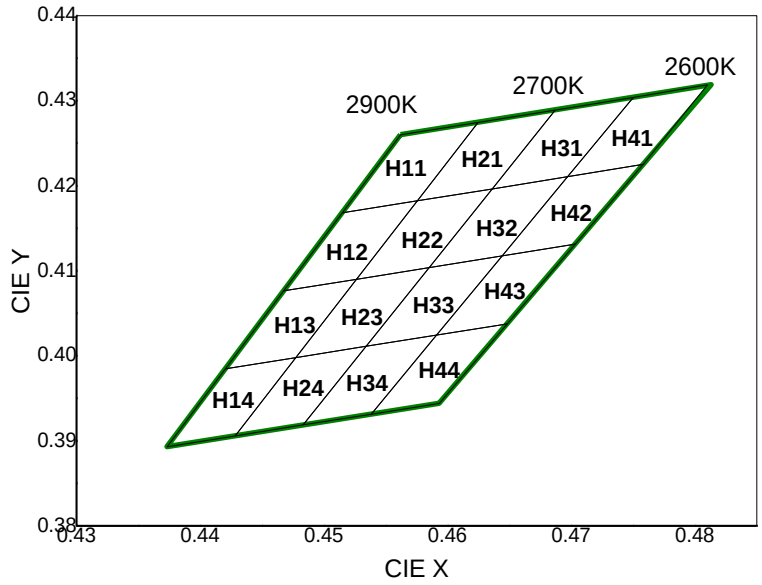
CIE Chromaticity Diagram (Warm white), T_j=25℃, I_F=32mA



G11		G21		G31		G41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4299	0.4165	0.4364	0.4188	0.4430	0.4212	0.4496	0.4236
0.4261	0.4077	0.4324	0.4099	0.4387	0.4122	0.4451	0.4145
0.4324	0.4100	0.4387	0.4122	0.4451	0.4145	0.4514	0.4168
0.4365	0.4189	0.4430	0.4212	0.4496	0.4236	0.4562	0.4260
G12		**G22**		**G32**		**G42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4261	0.4077	0.4324	0.4100	0.4387	0.4122	0.4451	0.4145
0.4223	0.3990	0.4284	0.4011	0.4345	0.4033	0.4406	0.4055
0.4284	0.4011	0.4345	0.4033	0.4406	0.4055	0.4468	0.4077
0.4324	0.4100	0.4387	0.4122	0.4451	0.4145	0.4515	0.4168
G13		**G23**		**G33**		**G43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4223	0.3990	0.4284	0.4011	0.4345	0.4033	0.4406	0.4055
0.4185	0.3902	0.4243	0.3922	0.4302	0.3943	0.4361	0.3964
0.4243	0.3922	0.4302	0.3943	0.4361	0.3964	0.4420	0.3985
0.4284	0.4011	0.4345	0.4033	0.4406	0.4055	0.4468	0.4077
G14		**G24**		**G34**		**G44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4243	0.3922	0.4302	0.3943	0.4302	0.3943	0.4361	0.3964
0.4203	0.3834	0.4259	0.3853	0.4259	0.3853	0.4316	0.3873
0.4147	0.3814	0.4203	0.3834	0.4316	0.3873	0.4373	0.3893
0.4185	0.3902	0.4243	0.3922	0.4361	0.3964	0.4420	0.3985

Color Bin Structure

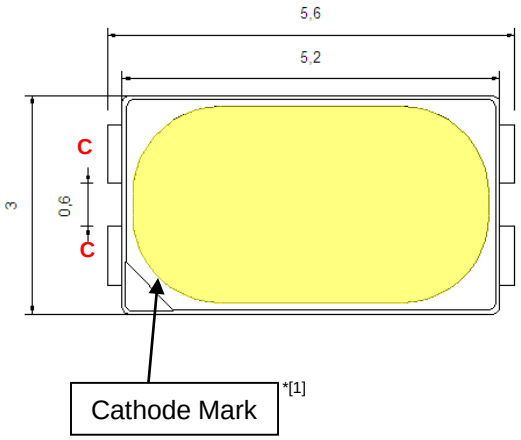
CIE Chromaticity Diagram (Warm white), T_j=25℃, I_F=32mA



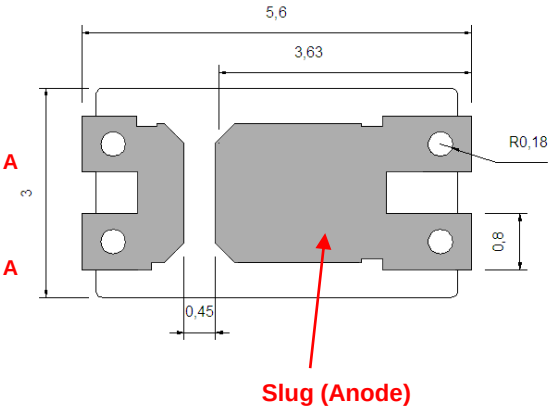
H11		H21		H31		H41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4562	0.4260	0.4625	0.4275	0.4687	0.4289	0.4750	0.4304
0.4515	0.4168	0.4575	0.4182	0.4636	0.4197	0.4697	0.4211
0.4575	0.4182	0.4636	0.4197	0.4697	0.4211	0.4758	0.4225
0.4625	0.4275	0.4687	0.4289	0.4750	0.4304	0.4810	0.4319
H12		**H22**		**H32**		**H42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4515	0.4168	0.4575	0.4182	0.4636	0.4197	0.4697	0.4211
0.4468	0.4077	0.4526	0.4090	0.4585	0.4104	0.4644	0.4118
0.4526	0.4090	0.4585	0.4104	0.4644	0.4118	0.4703	0.4132
0.4575	0.4182	0.4636	0.4197	0.4697	0.4211	0.4758	0.4225
H13		**H23**		**H33**		**H43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4468	0.4077	0.4526	0.4090	0.4585	0.4104	0.4644	0.4118
0.4420	0.3985	0.4477	0.3998	0.4534	0.4012	0.4591	0.4025
0.4477	0.3998	0.4534	0.4012	0.4591	0.4025	0.4648	0.4038
0.4526	0.4090	0.4585	0.4104	0.4644	0.4118	0.4703	0.4132
H14		**H24**		**H34**		**H44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4420	0.3985	0.4477	0.3998	0.4534	0.4012	0.4591	0.4025
0.4373	0.3893	0.4428	0.3906	0.4483	0.3919	0.4538	0.3932
0.4428	0.3906	0.4483	0.3919	0.4538	0.3932	0.4593	0.3944
0.4477	0.3998	0.4534	0.4012	0.4591	0.4025	0.4648	0.4038

Mechanical Dimensions

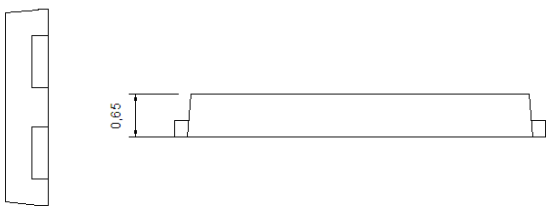
Top View



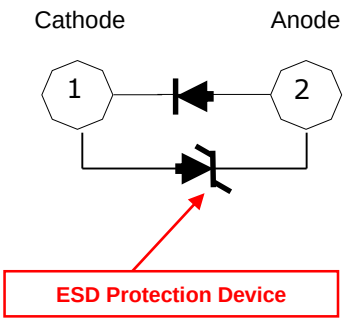
Bottom View



Side View



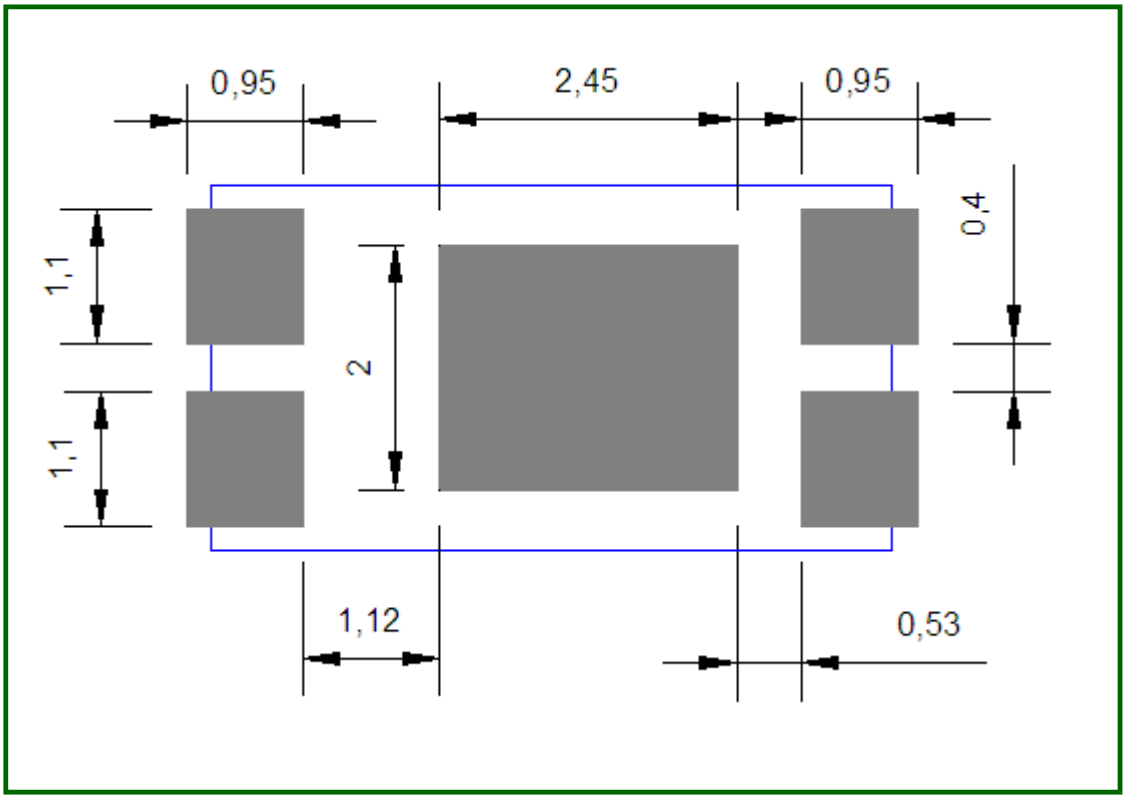
Circuit



Notes :

(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.2mm

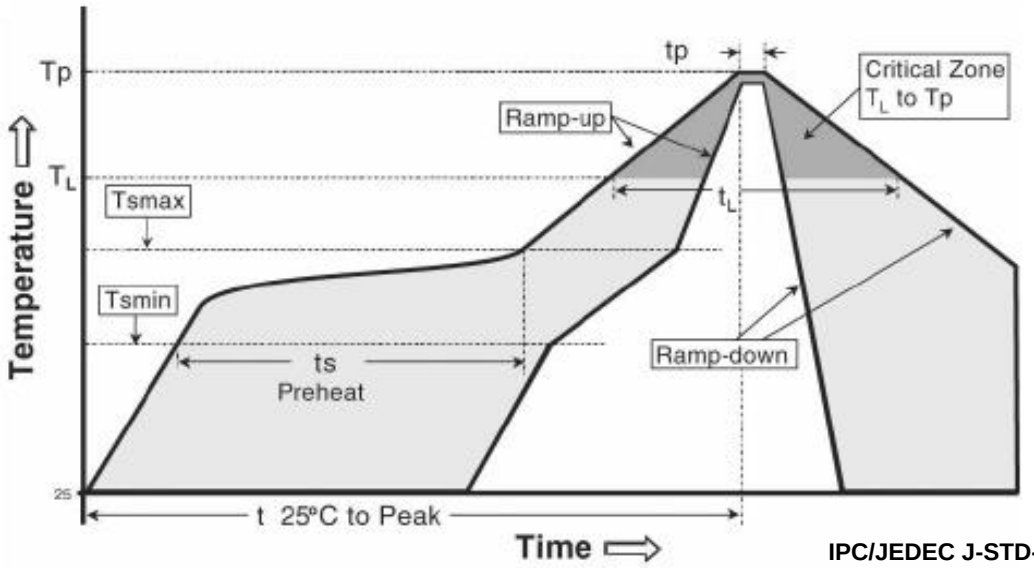
Recommended Solder Pad



Notes :

(1) All dimensions are in millimeters.
(2) Scale : none
(3) This drawing without tolerances are for reference only
(4) Undefined tolerance is ±0.1mm
(5) The appearance and specifications of the product may be changed for improvement without notice.

Reflow Soldering Characteristics



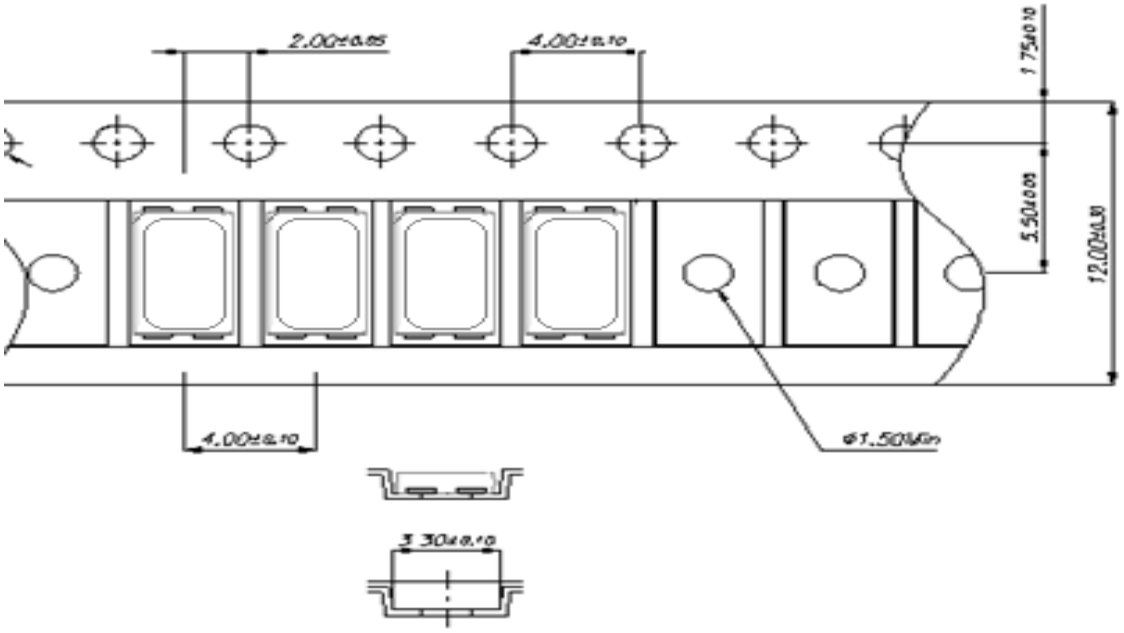
IPC/JEDEC J-STD-020

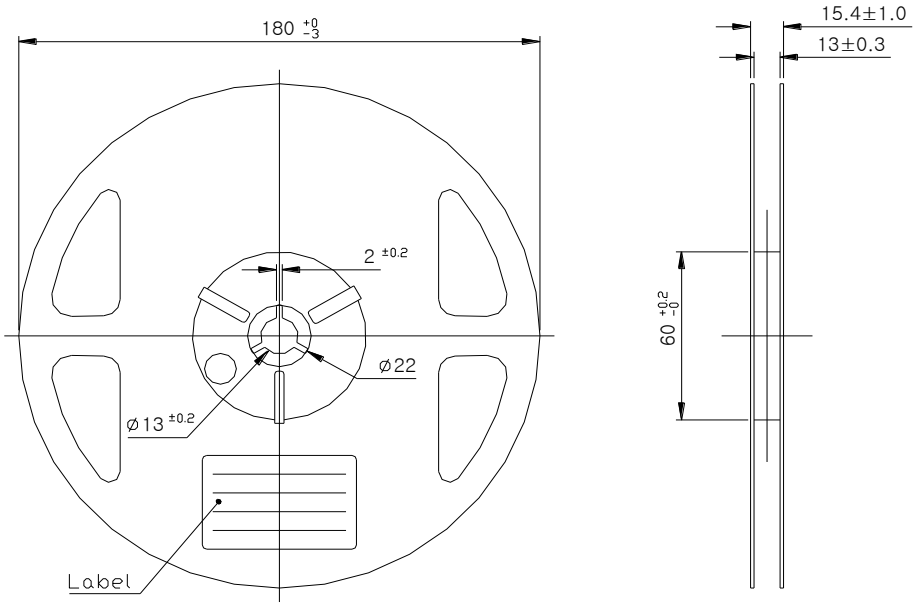
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_{s_max} to T_p)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (T_{s_min}) - Temperature Max (T_{s_max}) - Time (T_{s_min} to T_{s_max}) (t_s)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (T_L) - Time (t_L)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (T_p)	215℃	260℃
Time within 5°C of actual Peak Temperature (t_p)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 °C/second max.	6 °C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Caution :

(1) Reflow soldering is recommended not to be done more than two times
In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
(2) Repairs should not be done after the LEDs have been soldered
When repair is unavoidable, suitable tools must be used.
(3) Die slug is to be soldered.
(4) When soldering, do not put stress on the LEDs during heating.
(5) After soldering, do not warp the circuit board.

Emitter Tape & Reel Packaging





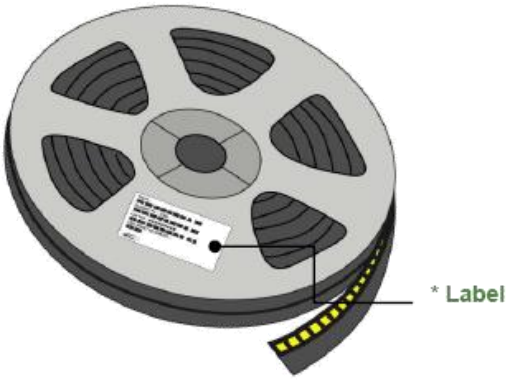
(Tolerance: ±0.2, Unit: mm)

Notes :

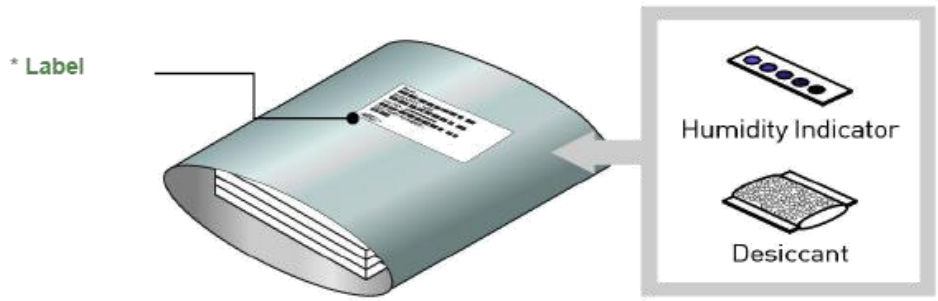
(1) Quantity : Max 4,500pcs/Reel
(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm
(3) Adhesion Strength of Cover Tape
Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of 10° to the carrier tape.
(4) Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.

Emitter Tape & Reel Packaging

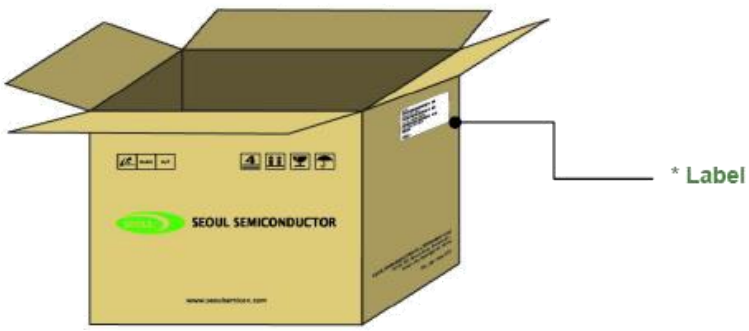
Reel



Aluminum Bag



Outer Box



Product Nomenclature

Table 7. Part Numbering System : $X_1X_2X_3X_4X_5X_6X_7X_8$

Part Number Code	Description	Part Number	Value
X_1	Company	S	SSC
X_2	Top View LED series	A	Acrich
X_3	Color Specification	W8	CRI 80
X_4	Package series	Q	5630 Series
X_5X_6	Characteristic code	24	
X_7	Revision	D	

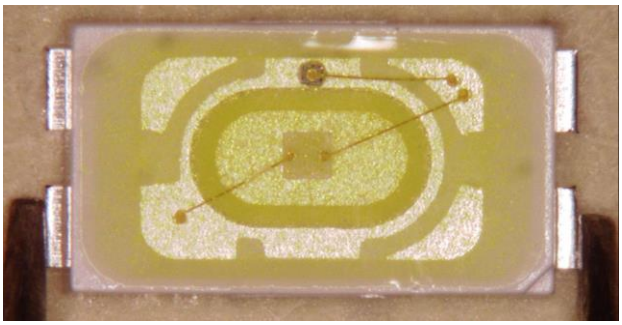
Table 8. Lot Numbering System :$Y_1Y_2Y_3Y_4Y_5Y_6Y_7Y_8Y_9Y_{10}$–$Y_{11}Y_{12}Y_{13}Y_{14}Y_{15}Y_{16}Y_{17}$

Lot Number Code	Description	Lot Number	Value
Y_1Y_2	Year		
Y_3	Month		
Y_4Y_5	Day		
Y_6	Top View LED series		
$Y_7Y_8Y_9Y_{10}$	Mass order		
$Y_{11}Y_{12}Y_{13}Y_{14}Y_{15}Y_{16}Y_{17}$	Internal Number		

Handling of Silicone Resin for LEDs

(1) During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.

(2) In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.



(3) When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented. This is assured by choosing a pick and place nozzle which is larger than the LED's reflector area.

(4) Silicone differs from materials conventionally used for the manufacturing of LEDs. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust.

As mentioned previously, the increased sensitivity to dust requires special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

(5) SSC suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin.
Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.

(6) Please do not mold this product into another resin (epoxy, urethane, etc) and do not handle this. product with acid or sulfur material in sealed space.

Precaution for Use

(1) Storage

To avoid the moisture penetration, we recommend store in a dry box with a desiccant.
The recommended storage temperature range is 5℃ to 30℃ and a maximum humidity of RH50%.

(2) Use Precaution after Opening the Packaging

Use SMT techniques properly when you solder the LED as separation of the lens may affect the light output efficiency.

Pay attention to the following: a. Recommend conditions after opening the package

- Sealing
- Temperature : 5 ~ 30℃ Humidity : less than RH60%

b. If the package has been opened more than 4 week(MSL_2a) or the color of the desiccant changes, components should be dried for 10-24hr at 65±5℃

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

(4) Do not rapidly cool device after soldering.

(5) Components should not be mounted on warped (non coplanar) portion of PCB.

(6) Radioactive exposure is not considered for the products listed here in.

(7) Gallium arsenide is used in some of the products listed in this publication.
These products are dangerous if they are burned or shredded in the process of disposal.
It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed of.

(8) This device should not be used in any type of fluid such as water, oil, organic solvent and etc.
When washing is required, IPA (Isopropyl Alcohol) should be used.

(9) When the LEDs are in operation the maximum current should be decided after measuring the package temperature.

Precaution for Use

(10) The appearance and specifications of the product may be modified for improvement without notice.

(11) Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.

(12) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues.

(13) Attaching LEDs, do not use adhesives that outgas organic vapor.

(14) The driving circuit must be designed to allow forward voltage only when it is ON or OFF.
If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.

(15) Similar to most Solid state devices;
LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).
Below is a list of suggestions that Seoul Semiconductor purposes to minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LEDs may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current lowered turn-on voltage
- Abnormal emissions from the LED at low current

The following recommendations are suggested to help minimize the potential for an ESD event.
One or more recommended work area suggestions:

- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
- Antistatic wrist-strap
- Antistatic material shoes
- Antistatic clothes

Environmental controls:
- Humidity control (ESD gets worse in a dry environment)

Precaution for Use

b. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. The effects from an EOS event can be noticed through product performance like:

- Changes to the performance of the LED package
  (If the damage is around the bond pad area and since the package is completely encapsulated the package may turn on but flicker show severe performance degradation.)
- Changes to the light output of the luminaire from component failure
- Components on the board not operating at determined drive power

Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures. It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred:

- Damaged may be noticed to the bond wires (appearing similar to a blown fuse)
- Damage to the bond pads located on the emission surface of the LED package
  (shadowing can be noticed around the bond pads while viewing through a microscope)
- Anomalies noticed in the encapsulation and phosphor around the bond wires.
- This damage usually appears due to the thermal stress produced during the EOS event.

c. To help minimize the damage from an EOS event Seoul Semiconductor recommends utilizing:

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device