Mid-Power LED - 3030W Series
STW#C12C-Wx00C1ZP000

Product Brief

Description

- This White Colored surface-mount LED comes in standard package dimension. Package Size : 3.3x3.0x0.75mm
- 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

- Thermally Enhanced Package Design
- Mid Power to High Power up to 0.6W
- Max. Driving Current 200mA
- Compact Package Size
- Pb-free Reflow Soldering Application

Key Applications

- Commercial
- Industrial
- Residential
- Replacement lamps – Bulb, Tube

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Performance Characteristics

Table 2. Product Selection Guide, I_F = 65mA , T_j = 25ºC, RH30%

CRI min	CCT	Performance	Flux & Lm/w(typ) I_F=65mA	
			W1	W2
80	6500K	Flux	37.0	37.7
		lm/w	211.6	216.3
	5700K	Flux	37.5	38.2
		lm/w	214.5	219.3
	5000K	Flux	37.7	38.4
		lm/w	215.6	220.4
	4000K	Flux	37.7	38.4
		lm/w	215.6	220.4
	3500K	Flux	36.8	37.5
		lm/w	210.5	215.2
	3000K	Flux	36.4	37.1
		lm/w	208.2	213.0
	2700K	Flux	34.7	35.3
		lm/w	198.5	202.9
90	6500K	Flux	30.8	31.5
		lm/w	176.2	180.6
	5700K	Flux	31.1	31.7
		lm/w	177.9	181.8
	5000K	Flux	31.6	32.2
		lm/w	180.8	184.8
	4000K	Flux	31.9	32.5
		lm/w	182.4	186.5
	3500K	Flux	31.3	31.9
		lm/w	179.0	183.1
	3000K	Flux	29.8	30.3
		lm/w	170.4	173.8
	2700K	Flux	29.3	29.8
		lm/w	167.4	170.9

Notes :

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

(2) Seoul Semiconductor maintains a tolerance of ±5% on flux and power measurements.

Performance Characteristics

Table 3. Characteristics, I_F=65mA, T_j= 25ºC, RH30%

Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.[6]	
Forward Current		I_F	-	65	-	mA
Forward Voltage[1]	W1	V_F	2.65	2.69	2.80	V
	W2		2.64	2.68	2.80	
Viewing Angle [2]		$2\Theta_{1/2}$	-	120	-	Deg.
Thermal resistance (J to S) [3]		$R\theta_{J\text{-}S}$	-	7.5		℃/W
Turn-on voltage		V_F (1uA)	1.9	-	2.7	V
ESD Sensitivity(HBM) [4]		-	Class 3A JEDEC JS-001-2017			

Table 4. Absolute Maximum Ratings[6]

Parameter	Symbol	Value	Unit
Forward Current	I_F	200	mA
Power Dissipation	P_D	0.6	W
Junction Temperature[5]	T_j	125	ºC
Operating Temperature	T_{opr}	-40 ~ + 85	ºC
Storage Temperature	T_{stg}	-40 ~ + 100	ºC

Notes :

[1] Tolerance : VF :±0.1V, Flux :±5%, Ra :±2, x,y :±0.005

[2] $2\Theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.

[3] Thermal resistance : Rth_{JS} (Junction / solder)

[4] A zener diode is included for ESD Protection.

[5] $T_J = T_S + R\theta_{J\text{-}S} * P$
T_J [℃] = LED Junction Temperature
T_S [℃] = LED Solder Temperature
P [W] = $I_F * V_F$

[6] It is recommended to use it in the condition that the reliability is secured within the Max value.
- Calculated performance values are for reference only
- All measurements were made under the standardized environment of seoul semiconductor

- LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power *dissipation does not* exceed the absolute maximum rating of the product.

- Thermal resistance can be increased substantially depending on the heat sink design/operating condition, and the maximum possible driving current will decrease accordingly.

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

Characteristics Graph

Fig 1. Color Spectrum, $T_j = 25$ºC

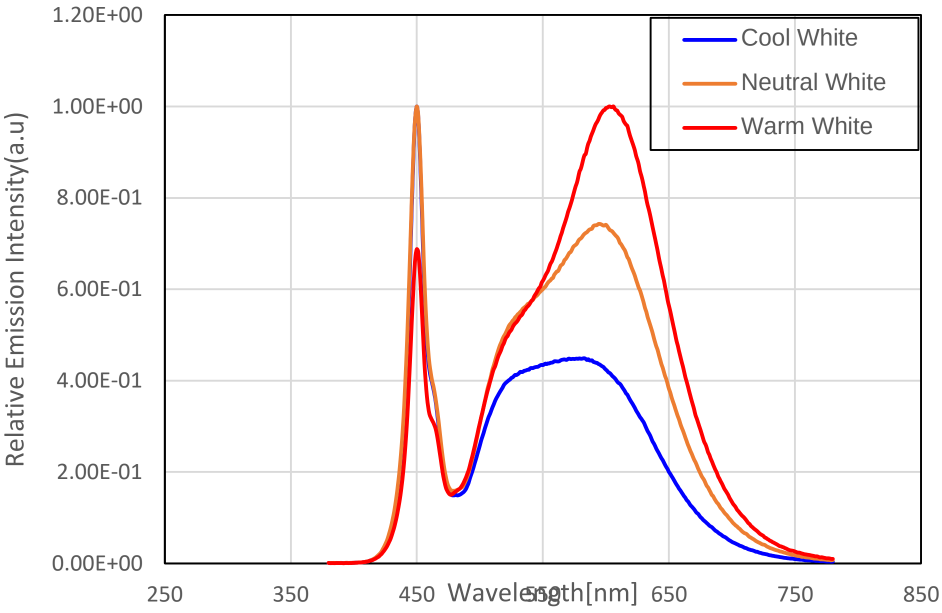
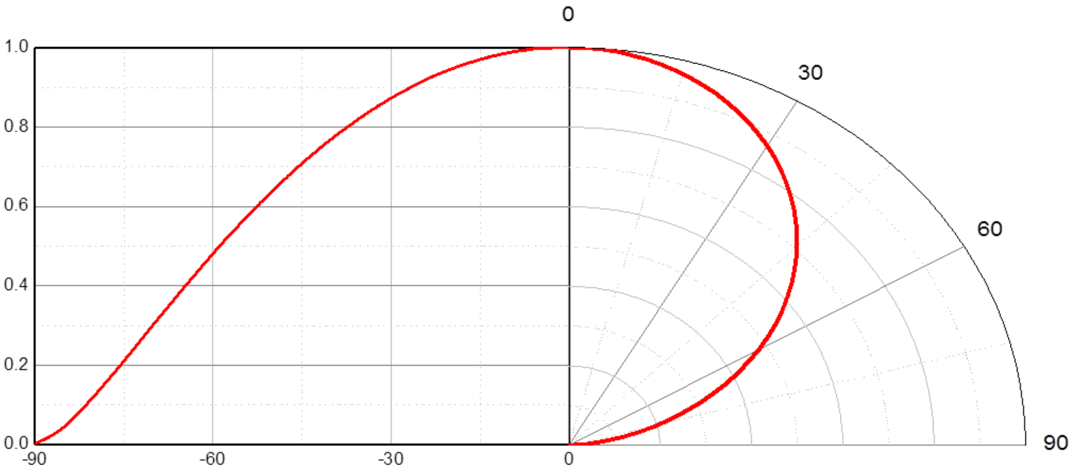


Fig 2. Radiant Pattern, $T_j = 25$ºC



Characteristics Graph

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

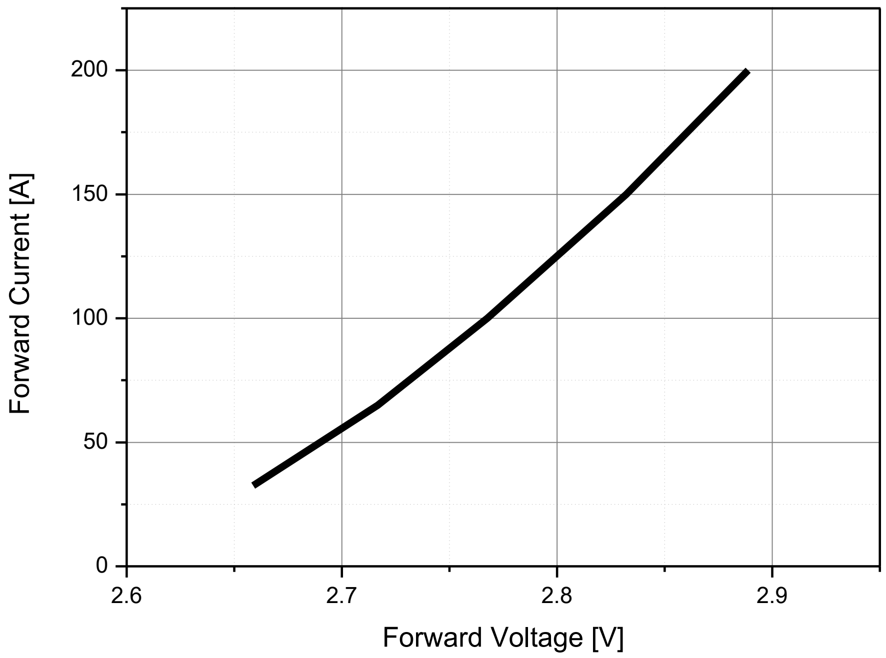
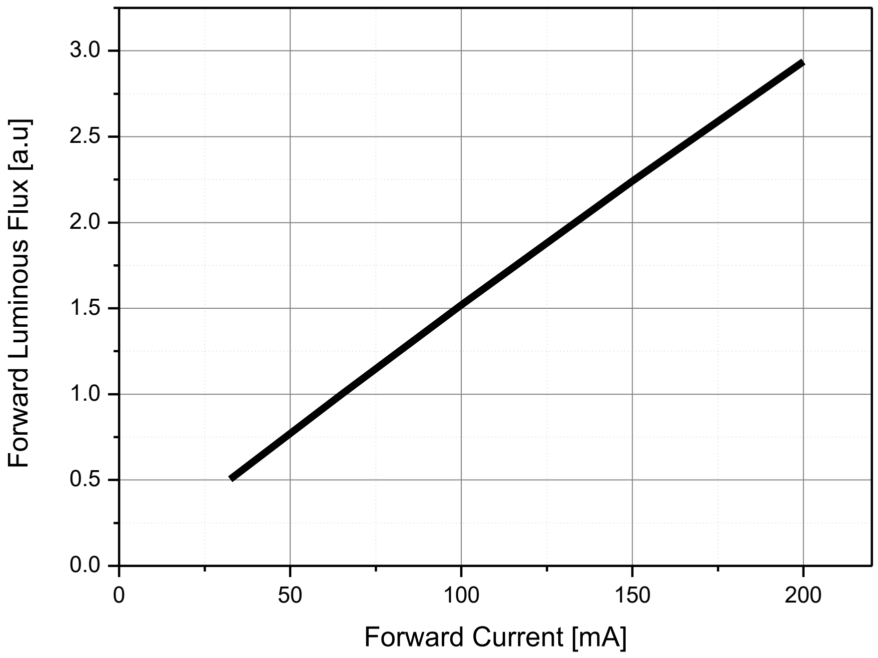


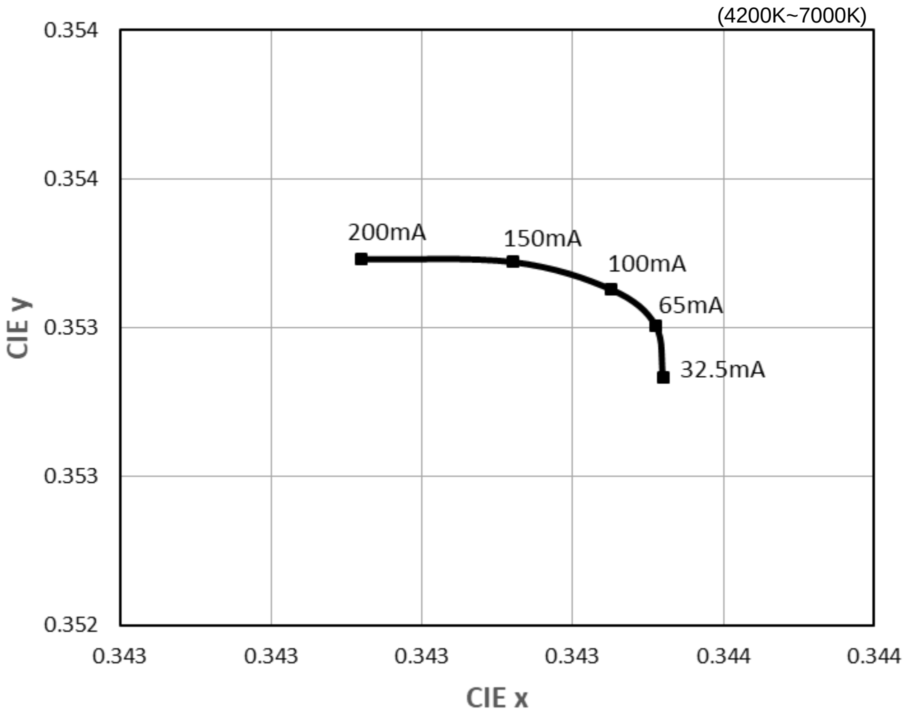
Fig 4. Forward Current vs. Relative Luminous Flux, T_j = 25ºC

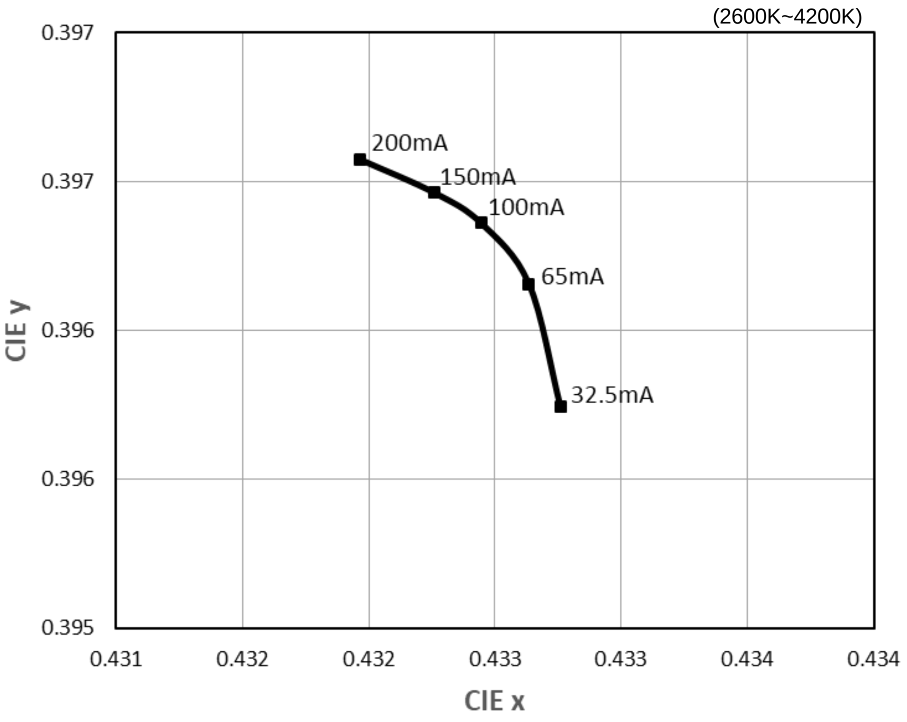


- Use of less than 5mA is not recommended

Characteristics Graph

Fig 5. Forward Current vs. CIE x, y Shift, T_j = 25ºC





Characteristics Graph

Fig 6. Junction Temperature vs. Relative Luminous Flux, I_F=65mA

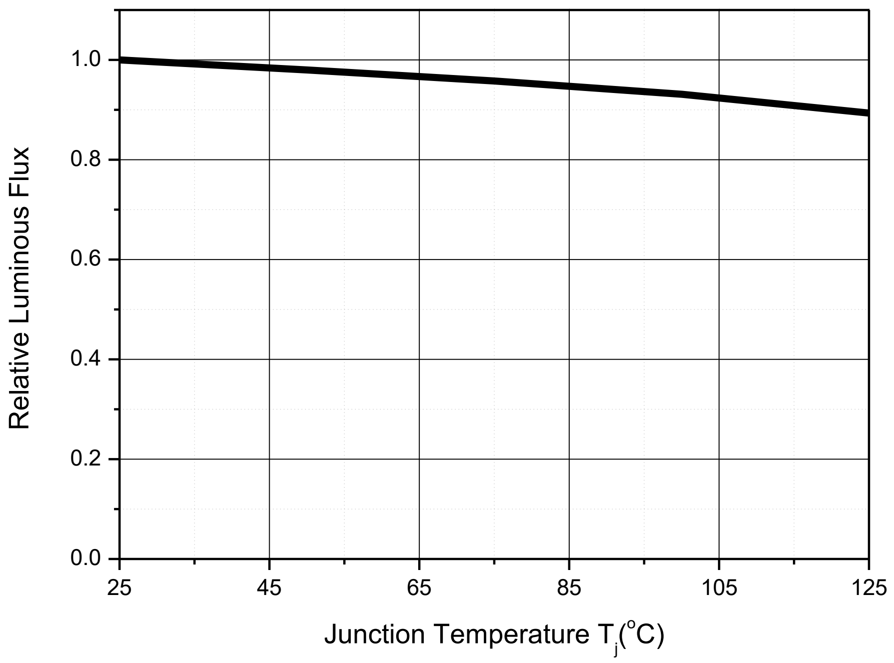
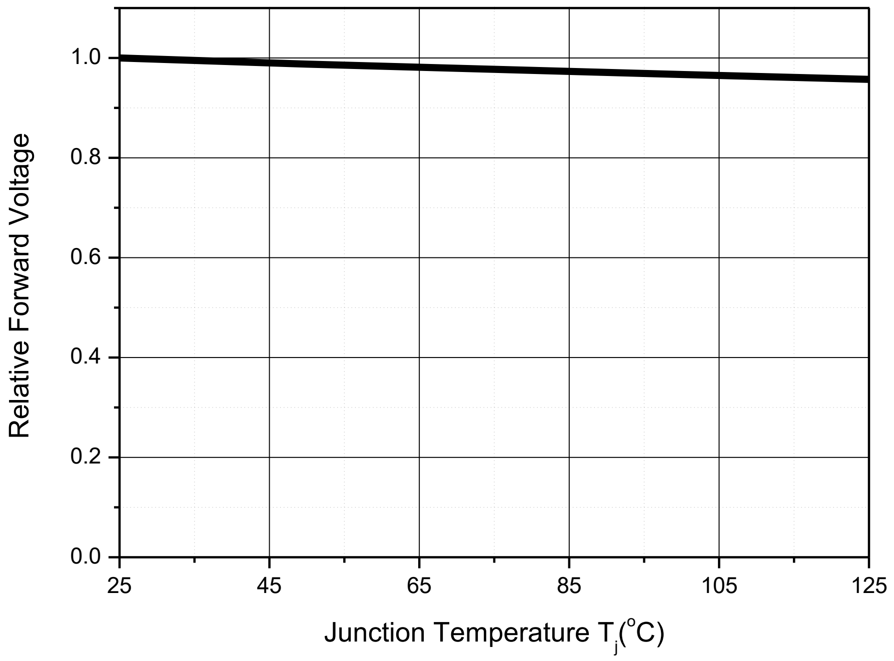
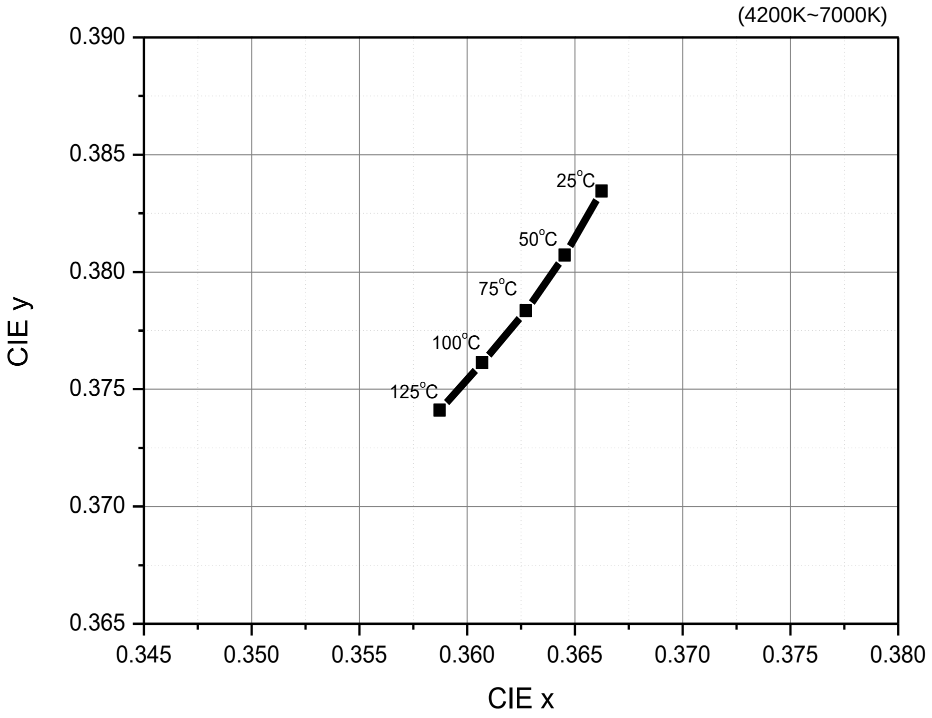


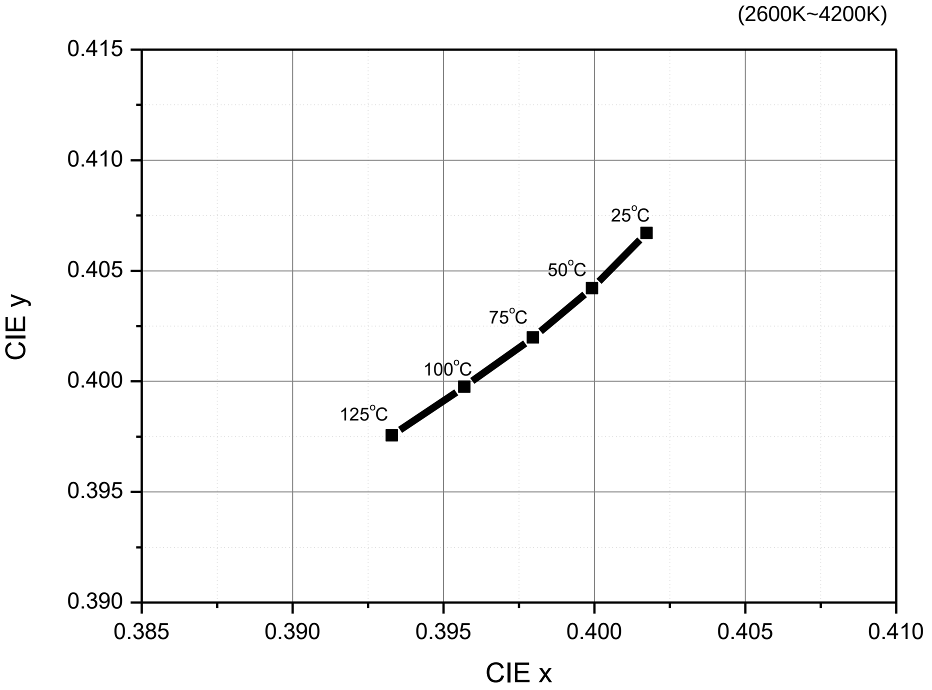
Fig 7. Junction Temperature vs. Relative Forward Voltage, I_F=65mA



Characteristics Graph

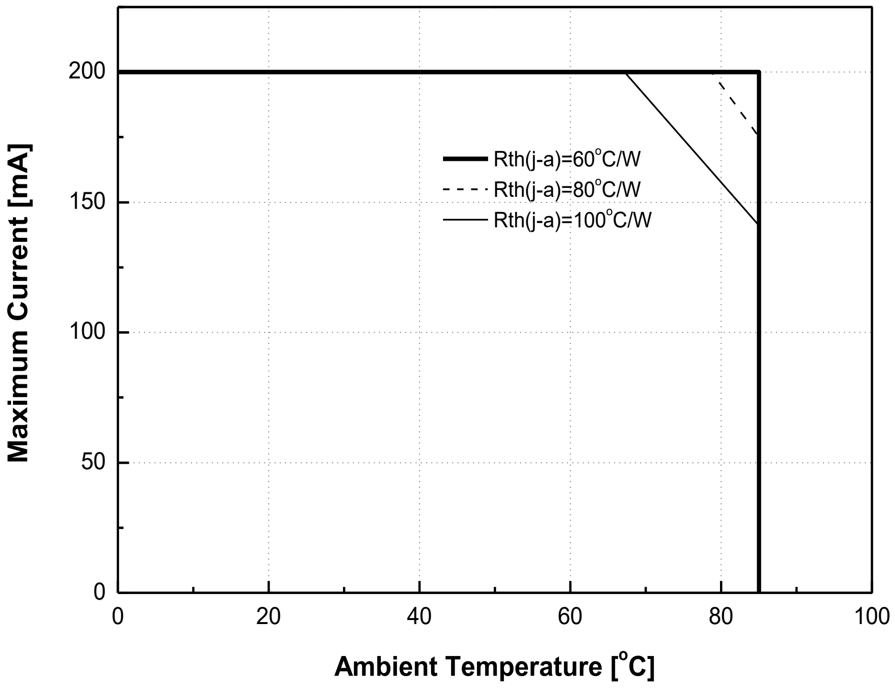
Fig 8. Chromaticity Coordinate vs. Junction Temperature, I_F=65mA





Characteristics Graph

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



Color Bin Structure

Table 5. Available Flux Rank, T_j=25℃, I_F=65mA

CRI	Product	STW8C12C-W1				STW8C12C-W2			
	Flux Bin	W1L		W1U		W2L		W2U	
	CCT	min	max	min	max	min	max	min	max
80	6500K	36.0	37.5	37.5	39.0	37.0	38.5	38.5	40.0
	5700K	36.0	37.5	37.5	39.0	37.0	38.5	38.5	40.0
	5000K	36.0	37.5	37.5	39.0	37.0	38.5	38.5	40.0
	4000K	36.0	37.5	37.5	39.0	37.0	38.5	38.5	40.0
	3500K	35.0	36.5	36.5	38.0	36.0	37.5	37.5	39.0
	3000K	34.5	36.0	36.0	37.5	35.5	37.0	37.0	38.5
	2700K	33.0	34.5	34.5	36.0	34.0	35.5	35.5	37.0

CRI	Product	STW9C12C-W1				STW9C12C-W2			
	Flux Bin	W1L		W1U		W2L		W2U	
	CCT	min	max	min	max	min	max	min	max
90	6500K	29.5	31.0	31.0	32.5	30.0	31.5	31.5	33.0
	5700K	29.5	31.0	31.0	32.5	30.0	31.5	31.5	33.0
	5000K	30.0	31.5	31.5	33.0	30.5	32.0	32.0	33.5
	4000K	30.5	32.0	32.0	33.5	31.0	32.5	32.5	34.0
	3500K	29.5	31.0	31.0	32.5	30.0	31.5	31.5	33.0
	3000K	28.5	30.0	30.0	31.5	29.0	30.5	30.5	32.0
	2700K	28.0	29.5	29.5	31.0	28.5	30.0	30.0	31.5

Table 6. Available VF Rank, T_j=25℃, I_F=65mA

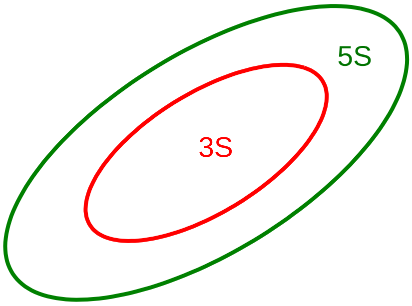
Item	Unit	Bin Code	A		B	
			Min.	Max.	Min.	Max.
Forward Voltage (VF)	V	W1x	2.65	2.75	2.75	2.80
		W2x	2.64	2.74	2.74	2.80

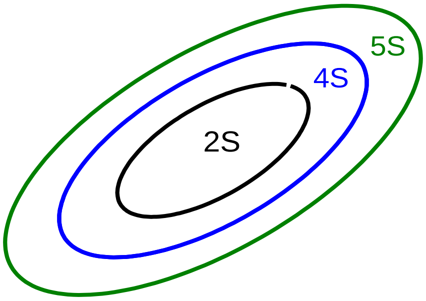
*Notes :

1) 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_a=25℃, I_F=65mA





Order	Box Packing Method
xx3S	3S(3step) Single
xx4M	3S(3step) & 5S (5step) Mixing

Order	Box Packing Method
xx2S	2S(2.3 step) Single
xx3M	2S(2.3step) & 4S(3.7step) Mixing
xx4M	2S(2.3step) & 5S(5step) Mixing

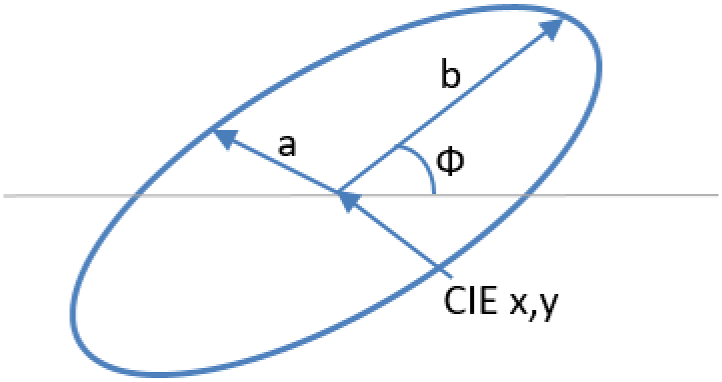
***Notes :**

1. xx2S Order will ship 2S only
2. xx3S Order will ship 3S (=also include 2S)
3. xx3M Order will ship 2S & 4S Mixing(=also include 2S and 3S)
4. xx4M Order will ship 3S & 5S Or 2S & 5S Mixing(=also include 2S, 3S and 3M)
5. Doughnut Bin will not ship alone(=Will ship with mixing bin)

* ’xx’ can be 65=6500K, 56=5600K, 50=5000K, 40=4000K, 30=3000K, 27= 2700K, 22=2200K

Color Bin Structure

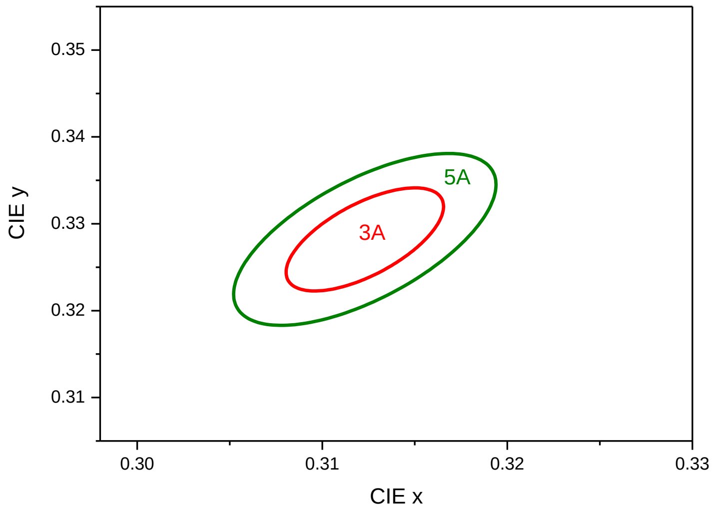
CIE Chromaticity Diagram, T_a=25℃, I_F=65mA

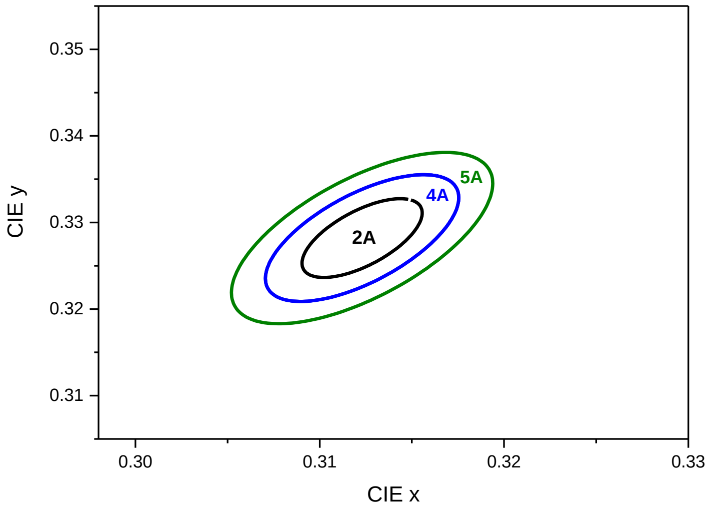


Macadam	CCT	Center Point		Major Axis	Minor Axis	Rotation Angle
	(K)	CIE x	CIE y	a	b	Φ
3 step	2700	0.4578	0.4101	0.0081	0.0042	54
	3000	0.4338	0.403	0.0083	0.0040	53
	3500	0.4073	0.3917	0.0093	0.0042	54
	4000	0.3818	0.3797	0.0094	0.0040	54
	5000	0.3447	0.3553	0.0082	0.0035	60
	5700	0.3287	0.3417	0.0076	0.0033	59
	6500	0.3123	0.3282	0.0067	0.0029	59
5 step	2700	0.4578	0.4101	0.0135	0.0070	54
	3000	0.4338	0.403	0.0140	0.0068	53
	3500	0.4073	0.3917	0.0155	0.0069	54
	4000	0.3818	0.3797	0.0156	0.0068	54
	5000	0.3447	0.3553	0.0137	0.0058	60
	5700	0.3287	0.3417	0.0125	0.0053	59
	6500	0.3123	0.3282	0.0112	0.0048	59

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=6500K



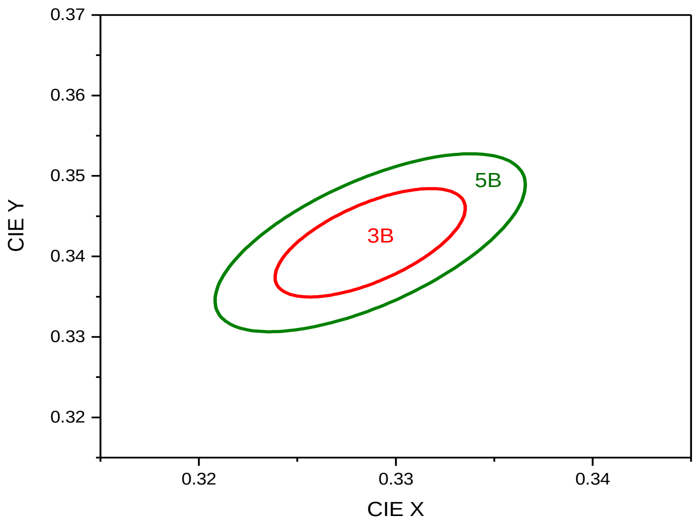


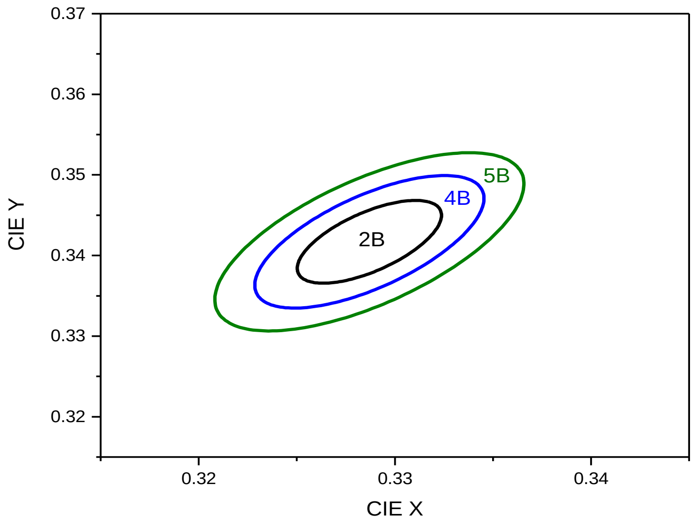
2A（2.3Step)		3A(3.0step)	
Center point	0.3123 :0.3282	Center point	0.3123 : 0.3282
Major Axis a	0.0051	Major Axis a	0.0067
Minor Axis b	0.0022	Minor Axis b	0.0029
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

4A (3.7step)		5A (5.0Step)	
Center point	0.3123 : 0.3282	Center point	0.3123 : 0.3282
Major Axis a	0.0083	Major Axis a	0.0112
Minor Axis b	0.0036	Minor Axis b	0.0048
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=5700K

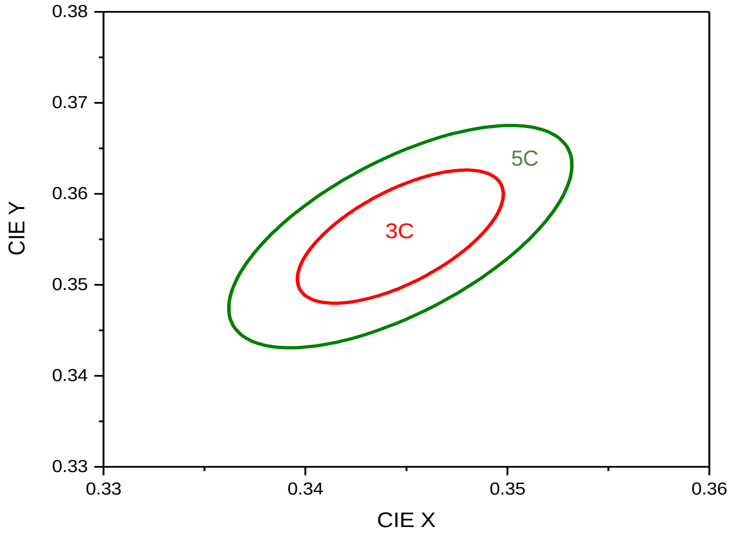


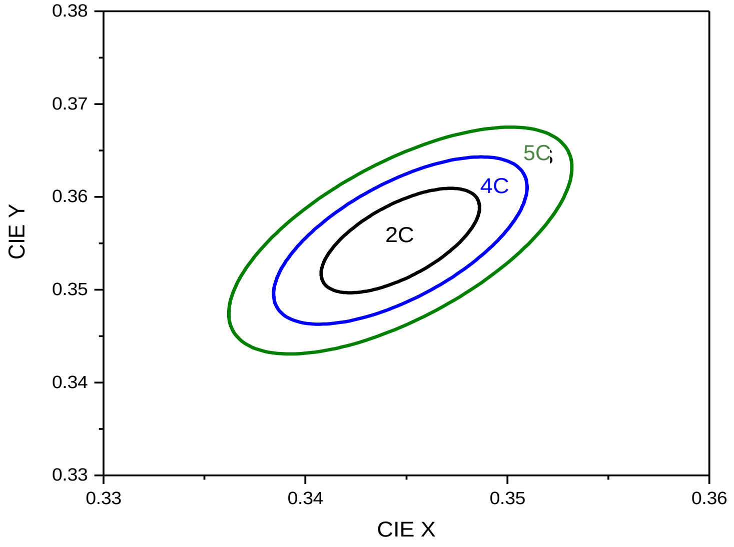


2B（2.3Step)		3B(3.0step)	
Center point	0.3287 : 0.3417	Center point	0.3287 : 0.3417
Major Axis a	0.0058	Major Axis a	0.0076
Minor Axis b	0.0025	Minor Axis b	0.0033
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59
4B (3.7step)		**5B (5.0Step)**	
Center point	0.3287 : 0.3417	Center point	0.3287 : 0.3417
Major Axis a	0.0093	Major Axis a	0.0125
Minor Axis b	0.0039	Minor Axis b	0.0053
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=5000K

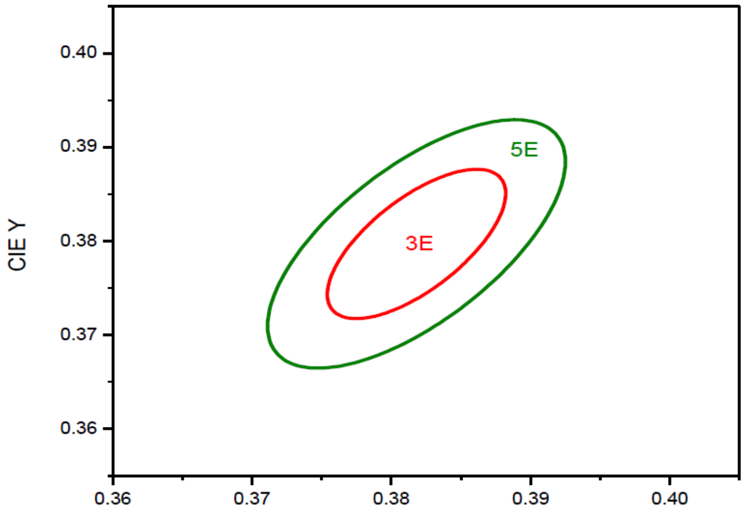


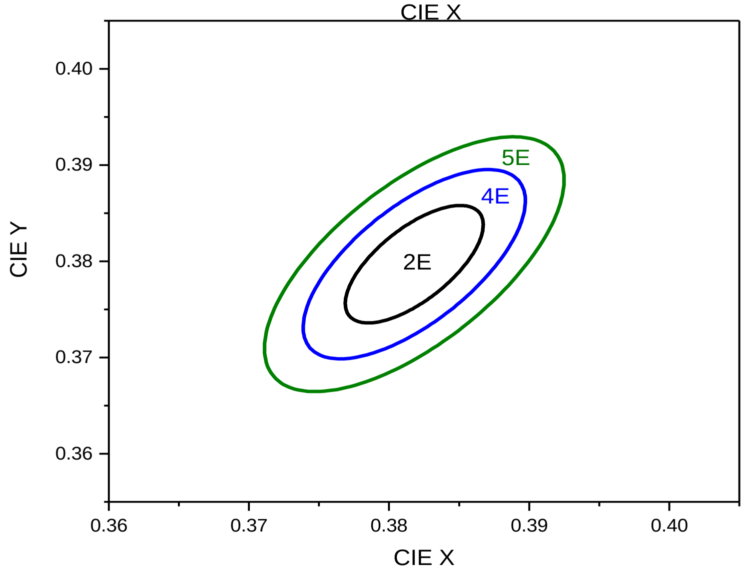


2C（2.3Step)		3C(3.0step)	
Center point	0.3447 : 0.3553	Center point	0.3447 : 0.3553
Major Axis a	0.0063	Major Axis a	0.0082
Minor Axis b	0.0027	Minor Axis b	0.0035
Ellipse Rotation Angle	60	Ellipse Rotation Angle	60
4C (3.7step)		**5C (5.0Step)**	
Center point	0.3447 : 0.3553	Center point	0.3447 : 0.3553
Major Axis a	0.0101	Major Axis a	0.0137
Minor Axis b	0.0043	Minor Axis b	0.0058
Ellipse Rotation Angle	60	Ellipse Rotation Angle	60

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=4000K

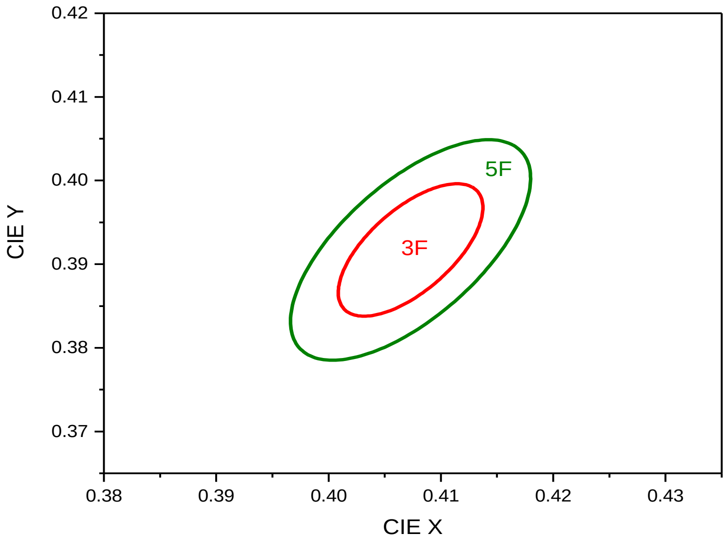


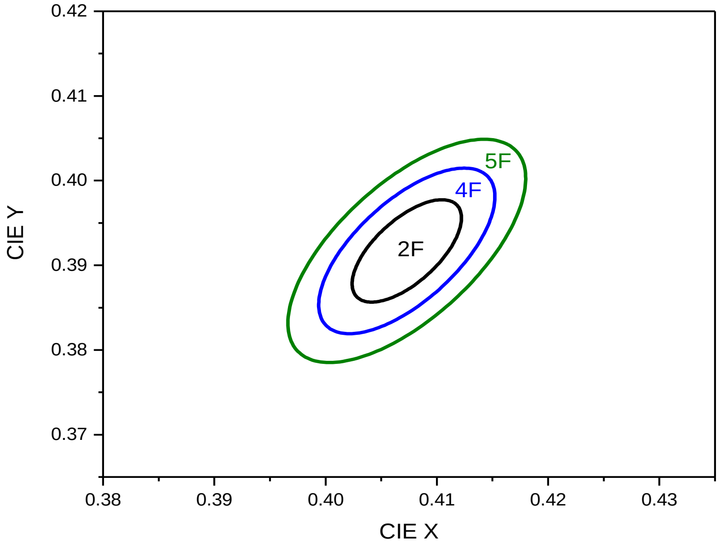


2E（2.3Step)		3E(3.0step)	
Center point	0.3818 : 0.3797	Center point	0.3818 : 0.3797
Major Axis a	0.0072	Major Axis a	0.0094
Minor Axis b	0.0031	Minor Axis b	0.0040
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4E (3.7step)		**5E (5.0Step)**	
Center point	0.3818 : 0.3797	Center point	0.3818 : 0.3797
Major Axis a	0.0116	Major Axis a	0.0156
Minor Axis b	0.0050	Minor Axis b	0.0068
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=3500K

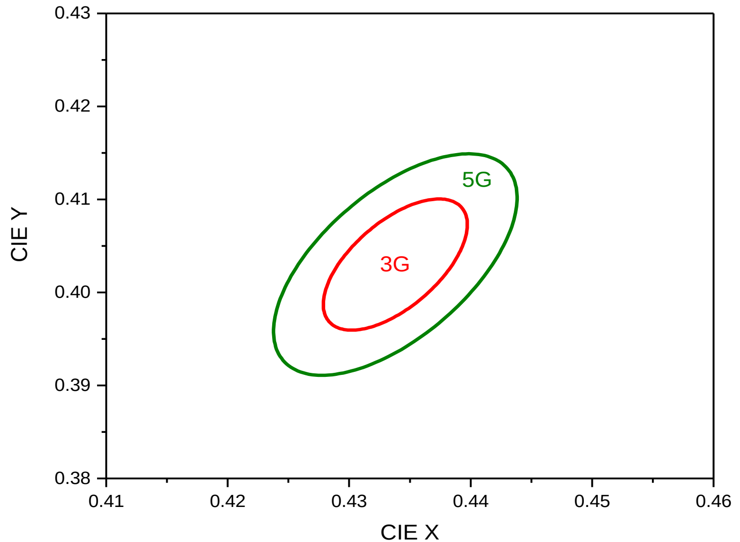


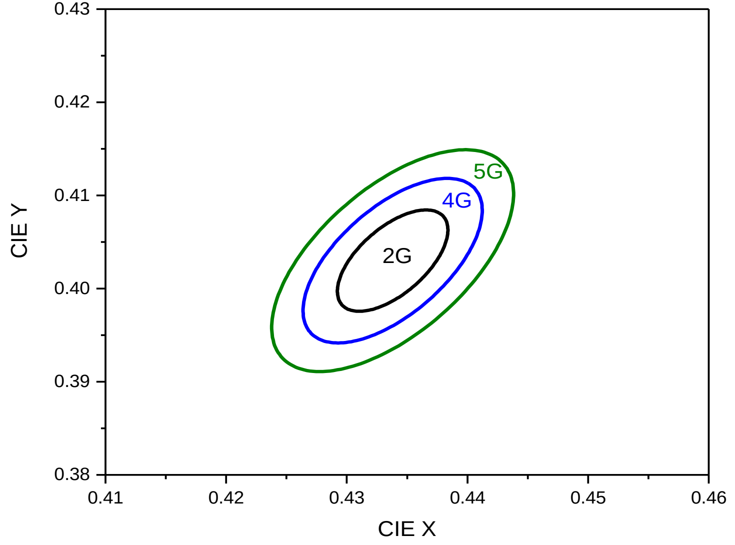


2F（2.3Step)		3F(3.0step)	
Center point	0.4073 : 0.3917	Center point	0.4073 : 0.3917
Major Axis a	0.0071	Major Axis a	0.0093
Minor Axis b	0.0032	Minor Axis b	0.0042
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4F (3.7step)		**5F (5.0Step)**	
Center point	0.4073 : 0.3917	Center point	0.4073 : 0.3917
Major Axis a	0.0115	Major Axis a	0.0155
Minor Axis b	0.0051	Minor Axis b	0.0069
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=3000K



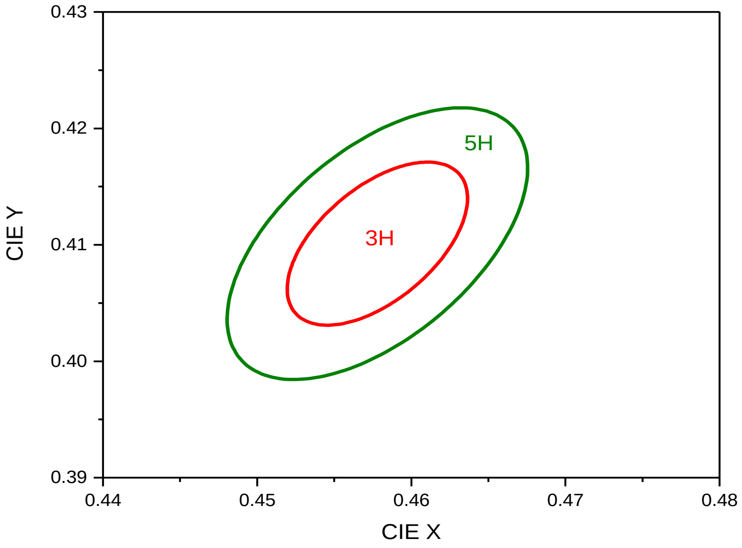


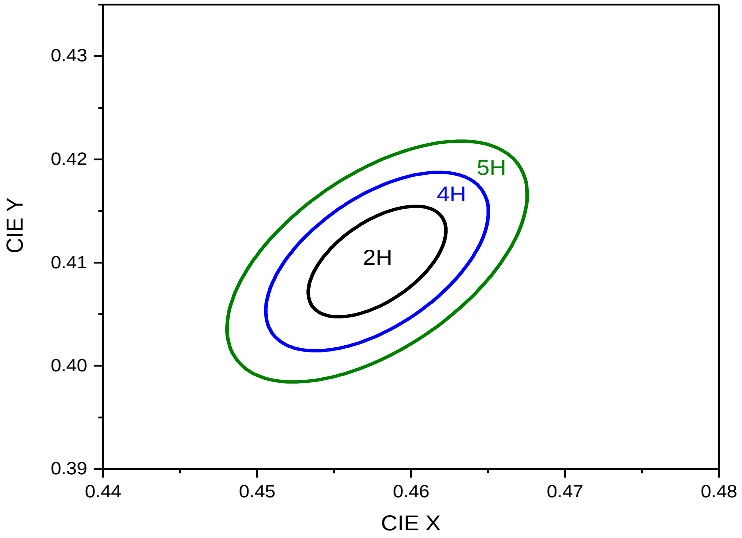
2G（2.3Step)		3G (3.0step)	
Center point	0.4338 : 0.4030	Center point	0.4338 : 0.4030
Major Axis a	0.0064	Major Axis a	0.0083
Minor Axis b	0.0031	Minor Axis b	0.0040
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53

4G 3.7step)		5G (5.0Step)	
Center point	0.4338 : 0.4030	Center point	0.4338 : 0.4030
Major Axis a	0.0104	Major Axis a	0.0140
Minor Axis b	0.0050	Minor Axis b	0.0068
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=2700K





2H（2.3Step)		3H (3.0step)	
Center point	0.4578 : 0.4101	Center point	0.4578 : 0.4101
Major Axis a	0.0062	Major Axis a	0.0081
Minor Axis b	0.0032	Minor Axis b	0.0042
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4H (3.7step)		**5H (5.0Step)**	
Center point	0.4578 : 0.4101	Center point	0.4578 : 0.4101
Major Axis a	0.0100	Major Axis a	0.0135
Minor Axis b	0.0052	Minor Axis b	0.0070
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

Mixing order kiting combination

1. Kiting Combination with xx3M

Combination	Reel	FLUX	VF	CIE	Qty
Kiting_a	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxA	2S	12,000pcs
Kiting_b	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxB	2S	12,000pcs
Kiting_c	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxA	4S	12,000pcs
Kiting_d	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxB	4S	12,000pcs
Kiting_e	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxA	2S	12,000pcs
Kiting_f	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxB	2S	12,000pcs
Kiting_g	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxA	4S	12,000pcs
Kiting_h	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxB	4S	12,000pcs

Mixing order kiting combination

2. Kiting Combination with xx4M

Combination	Reel	FLUX	VF	CIE	Qty
Kiting_a	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxA	2S	12,000pcs
Kiting_b	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxB	2S	12,000pcs
Kiting_c	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxA	5S	12,000pcs
Kiting_d	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxU	WxB	5S	12,000pcs
Kiting_e	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxA	2S	12,000pcs
Kiting_f	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxB	2S	12,000pcs
Kiting_g	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxA	5S	12,000pcs
Kiting_h	Reel 1	WxU	WxA	2S	12,000pcs
	Reel 2	WxL	WxB	5S	12,000pcs
Kiting_j	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxU	WxA	2S	12,000pcs
Kiting_k	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxU	WxB	3S	12,000pcs
Kiting_l	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxU	WxA	5S	12,000pcs
Kiting_m	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxU	WxB	5S	12,000pcs
Kiting_n	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxL	WxA	3S	12,000pcs
Kiting_o	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxL	WxB	3S	12,000pcs
Kiting_p	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxL	WxA	5S	12,000pcs
Kiting_q	Reel 1	WxU	WxA	3S	12,000pcs
	Reel 2	WxL	WxB	5S	12,000pcs

Order Code Nomenclature

Table 6. Nomenclature example

S	T	W	#	C	1	2	C	-	W	x	0	0	C	1	Z	P	0	0	0	a	b	b	c	c	d	d	e	e	e
X_{1}	X_{2}	X_{3}	X_{4}	X_{5}	X_{6}	X_{7}	X_{8}	X_{9}	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}	X_{25}	X_{26}	X_{27}	X_{28}	X_{29}	X_{30}

Part Number Code	Value	References	Description
X_{1}	S	Seoul Semiconductor	Company
X_{2}	T	Top lighting	Top View LED series
X_{3}	W	White	
X_{4}	#	CRI	8: CRI 80, 9:CRI90
X_{5}	C	3030	Package series
$X_{6}X_{7}$	12	Characteristic code	2pad
X_{8}	C		Version
X_{9}	-		
$X_{10}X_{11}$	Wx	internal code	W1, W2
X_{12}~X_{20}	00C1ZP000	internal code	
$X_{21}X_{22}X_{23}$	abb	Flux Bin	a: M: Typical Mix Bin bb: W1, W2
$X_{24}X_{25}$	cc	Color Temp.	65=6500K, 57=5700K, 50=5000K, 40=4000K, 30=3000K, 27= 2700K
$X_{26}X_{27}$	dd	step	2S:2step single /3S: 3step single / 3M: 3step Mixing / 4M: 4step Mixing
$X_{28}X_{29}X_{30}$	eee	VF Bin	000: All bin

Table 7. Product Selection Table

Reference P/N	Order code	Flux bin	CCT	Step	VF bin
STW#C12C-Wx00C1ZP000	MWx65xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	65:6500K	2S: 2step 3S: 3step	WxA
	MWx57xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	57:5700K		WxA
	MWx50xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	50:5000K		WxA
	MWx40xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	40:4000K		WxA
	MWx35xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	35:3500K		WxA
	MWx30xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	30:3000K		WxA
	MWx27xSWxA	MW1 (W1L, W1U) MW2 (W2L, W2U)	27:2700K		WxA

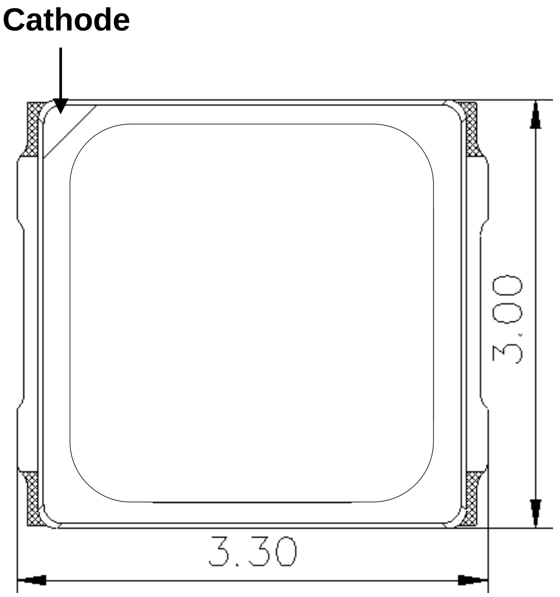
Order Code Nomenclature

Table 8. Product Selection Table

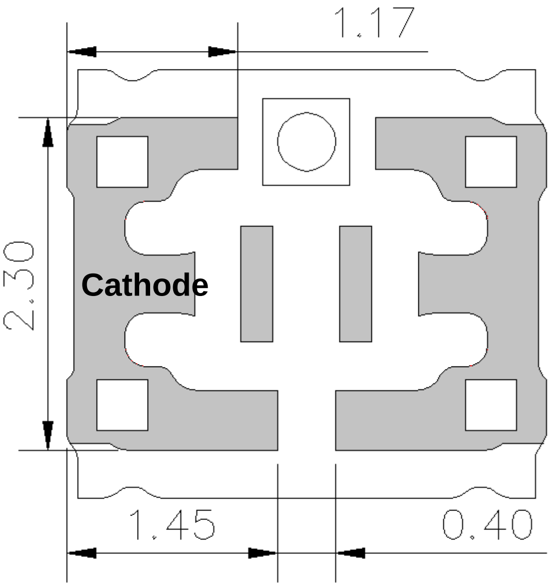
Reference P/N	Order code	Flux bin	CCT	Step	VF bin
STW#C12C-Wx00C1ZP000	MWx65xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	65:6500K	3M: 3step Mixing 4M: 4step Mixing	ALL
	MWx57xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	57:5700K		ALL
	MWx50xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	50:5000K		ALL
	MWx40xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	40:4000K		ALL
	MWx35xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	35:3500K		ALL
	MWx30xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	30:3000K		ALL
	MWx27xM000	MW1 (W1L, W1U) MW2 (W2L, W2U)	27:2700K		ALL

Mechanical Dimensions

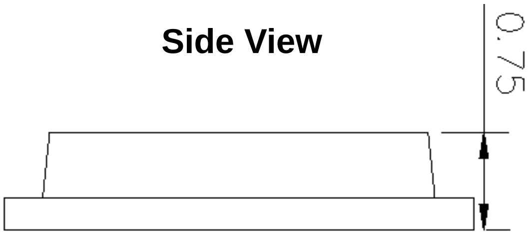
Top View



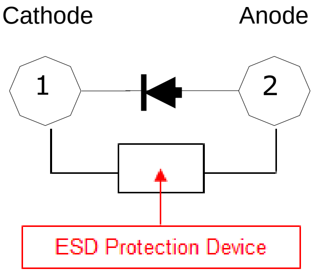
Bottom (Transmittance) View



Side View

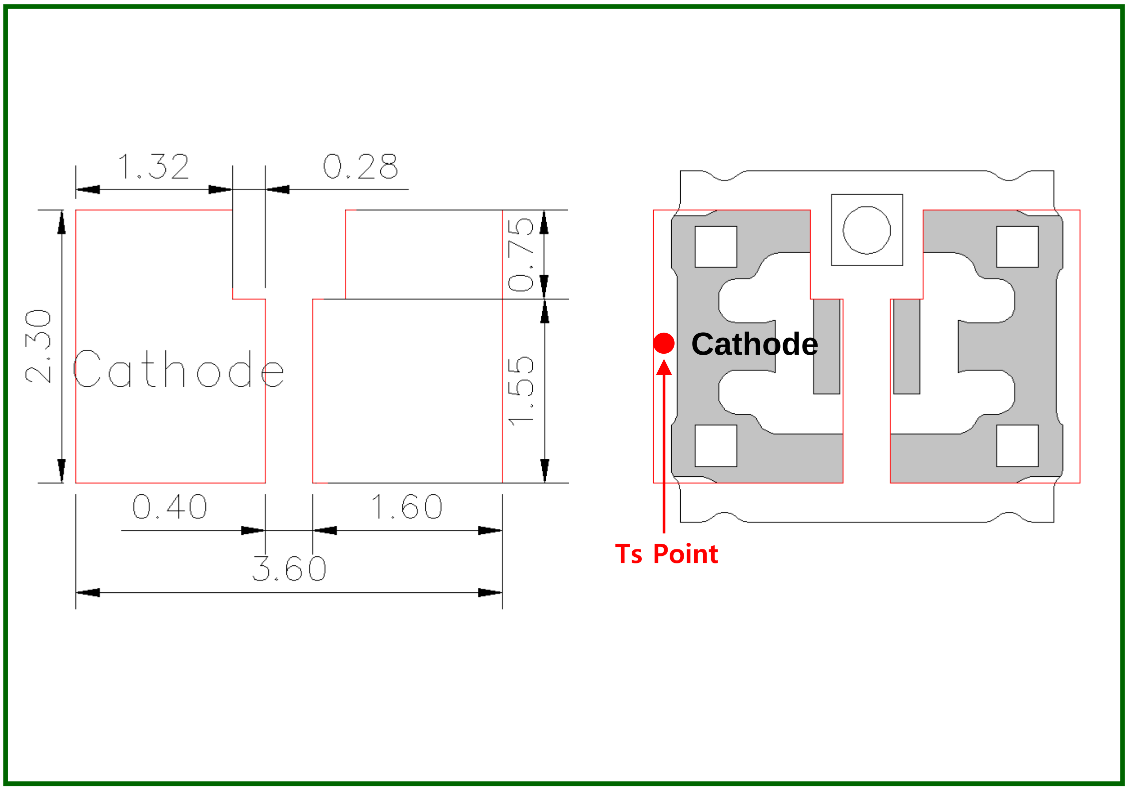


Circuit



(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.07mm

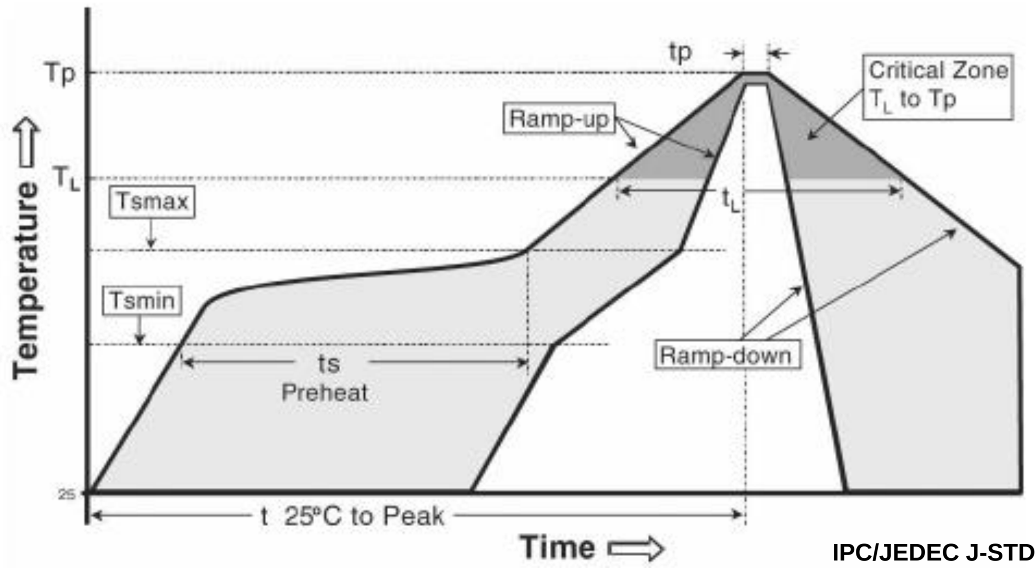
Recommended Solder Pad



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

Reflow Soldering Characteristics



IPC/JEDEC J-STD-020

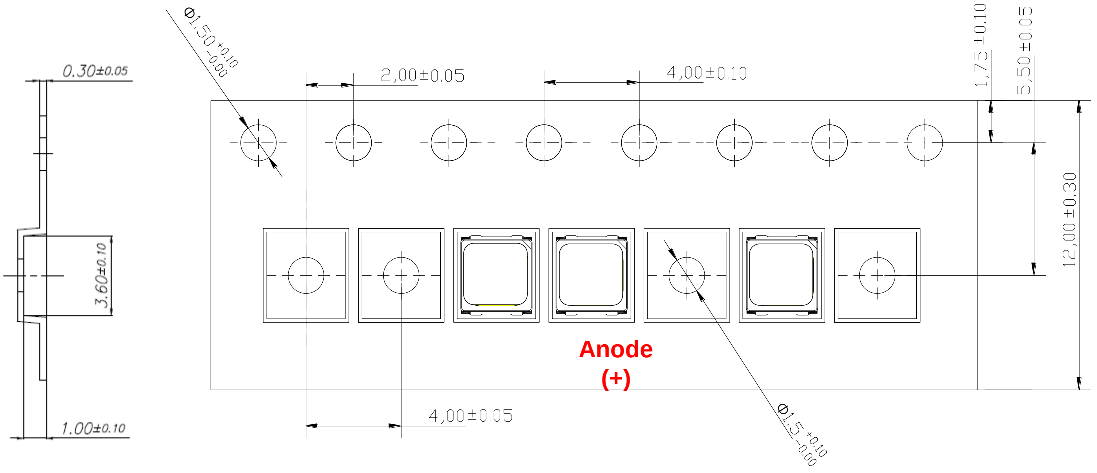
Table 9.

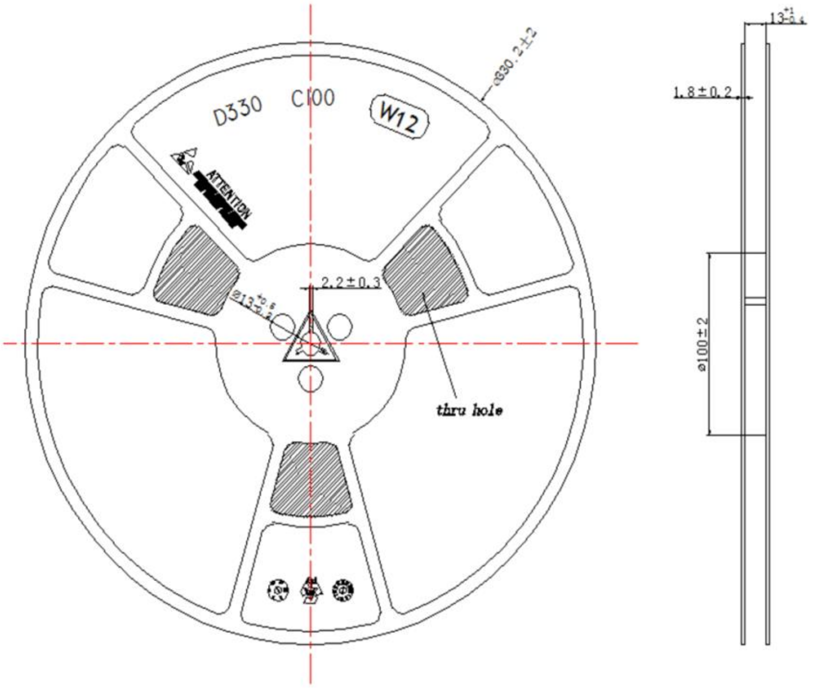
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (Tp)	215℃	260℃
Time within 5°C of actual Peak Temperature (tp)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 Packing





(Tolerance: ±0.2, Unit: mm)

Note :

(1) Quantity : 12,000pcs/Reel

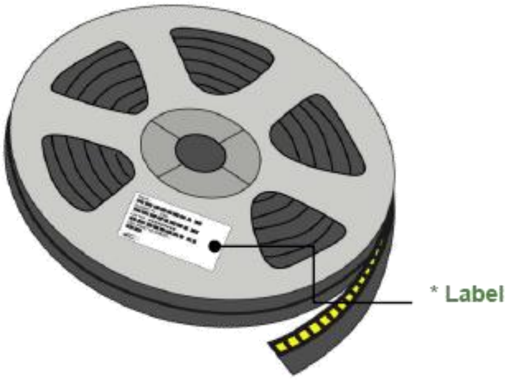
(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm

(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.

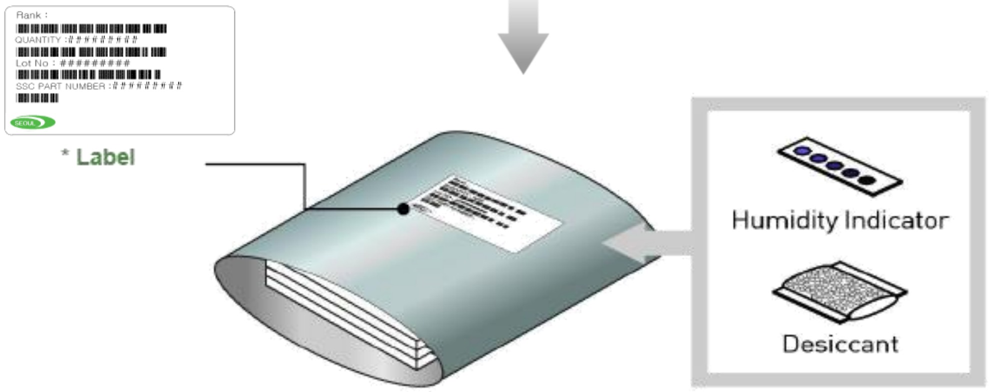
(4) Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.

Emitter Tape & Reel Packing

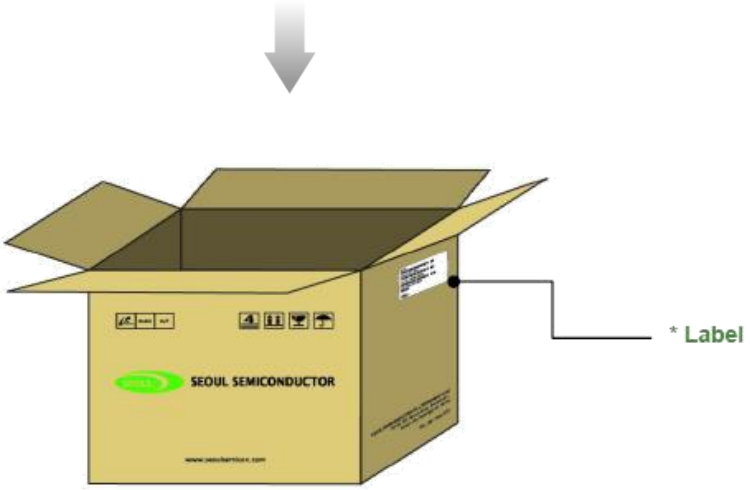
Reel



Aluminum Bag



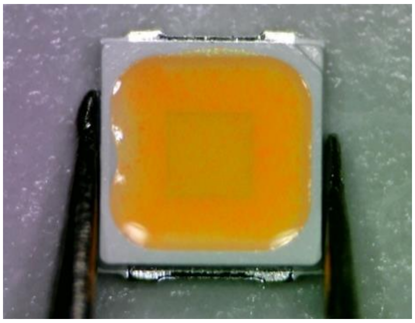
Outer Box



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 proper SMT techniques when the LED is to be soldered dipped 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

Company Information

Published by

Company Information

Seoul Semiconductor (www.SeoulSemicon.com) manufacturers and packages a wide selection of light emitting diodes (LEDs) for the automotive, general illumination/lighting, Home appliance, signage and back lighting markets. The company is the world's fifth largest LED supplier, holding more than 10,000 patents globally, while offering a wide range of LED technology and production capacity in areas such as “nPola”, "Acrich", the world's first commercially produced AC LED, and "Acrich MJT - Multi-Junction Technology" a proprietary family of high-voltage LEDs.

The company's broad product portfolio includes a wide array of package and device choices such as Acrich and Acirch2, high-brightness LEDs, mid-power LEDs, side-view LEDs, and through-hole type LEDs as well as custom modules, displays, and sensors.

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