SPECIFICATION

Product : SZ8-Y22-WX-CX-00A000

Seoul Semiconductor			Customer
Drawn by	Checked by	Approved by	Approved by
Jaden	Baron	Lee, SangPil	
25.10.03	25.10.03	25.10.03	

New Generation of WICOP

SZ8-Y22-WX-CX-00A000

High-Power LED - WICOP Y22

LM-80

Product Brief

Description

- The WICOP series is designed for high flux output applications with high current operation capability.
- Compact footprint(2.21x2.21mm) enables system level cost saving
- It incorporates state of the art SMD design and low thermal resistant material.

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- The WICOP is ideal light sources for directional lighting applications such as Spot Lights, various outdoor applications, automotive lightings and high performance torches .

Features and Benefits

- Designed for high current operation
- Low Thermal Resistance
- A wide CCT range of 2,600~7,000K
- ANSI compliant Binning
- RoHS compliant
- Phosphor film directly attached to chip surface

Key Applications

- Residential - Replacement lamps
- Commercial/Industrial – Retail Display
- Outdoor area - Flood/Street light, High Bay

Table 1-1. Product selection table SZ8-Y22-WX-CX-00A000

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y22-W0-C7	00A000	0W5653S000	70	0W5	65:6500K	3S: 3step	000
		0W5573S000		0W5	57:5700K		000
		0W6503S000		0W6	50:5000K		000
SZ8-Y22-WN-C7		0W6403S000		0W6	40:4000K		000
SZ8-Y22-WW-C7		0W5353S000		0W5	35:3500K		000
		0W4303S000		0W4	30:3000K		000
		0W4273S000		0W4	27:2700K		000
SZ8-Y22-W0-C8		0W3653S000	80	0W3	65:6500K		000
		0W3573S000		0W3	57:5700K		000
		0W3503S000		0W3	50:5000K		000
SZ8-Y22-WN-C8		0W3403S000		0W3	40:4000K		000
SZ8-Y22-WW-C8		0W3353S000		0W3	35:3500K		000
		0W2303S000		0W2	30:3000K		000
		0W2273S000		0W2	27:2700K		000
SZ8-Y22-W0-C9		0V3653S000	90	0V3	65:6500K		000
		0W1573S000		0W1	57:5700K		000
		0W1503S000		0W1	50:5000K		000
SZ8-Y22-WN-C9		0W1403S000		0W1	40:4000K		000
SZ8-Y22-WW-C9		0V3353S000		0V3	35:3500K		000
		0V2303S000		0V2	30:3000K		000
		0V2273S000		0V2	27:2700K		000

Table 1-2. Product selection table SZ8-Y22-WX-CX-00A000

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y22-W0-C7	00A000	0W5655S000	70	0W5	65:6500K	5S: 5step	000
		0W5575S000		0W5	57:5700K		000
		0W6505S000		0W6	50:5000K		000
SZ8-Y22-WN-C7		0W6405S000		0W6	40:4000K		000
SZ8-Y22-WW-C7		0W5355S000		0W5	35:3500K		000
		0W4305S000		0W4	30:3000K		000
		0W4275S000		0W4	27:2700K		000
SZ8-Y22-W0-C8		0W3655S000	80	0W3	65:6500K		000
		0W3575S000		0W3	57:5700K		000
		0W3505S000		0W3	50:5000K		000
SZ8-Y22-WN-C8		0W3405S000		0W3	40:4000K		000
SZ8-Y22-WW-C8		0W3355S000		0W3	35:3500K		000
		0W2305S000		0W2	30:3000K		000
		0W2275S000		0W2	27:2700K		000
SZ8-Y22-W0-C9		0V3655S000	90	0V3	65:6500K		000
		0W1575S000		0W1	57:5700K		000
		0W1505S000		0W1	50:5000K		000
SZ8-Y22-WN-C9		0W1405S000		0W1	40:4000K		000
SZ8-Y22-WW-C9		0V3355S000		0V3	35:3500K		000
		0V2305S000		0V2	30:3000K		000
		0V2275S000		0V2	27:2700K		000

Table 1-3. Product selection table SZ8-Y22-WX-CX-00A000

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y22-W0-C7	00A000	0W5654M000	70	0W5	65:6500K	4M: 4step Mixing	000
		0W5574M000		0W5	57:5700K		000
		0W6504M000		0W6	50:5000K		000
SZ8-Y22-WN-C7		0W6404M000		0W6	40:4000K		000
SZ8-Y22-WW-C7		0W5354M000		0W5	35:3500K		000
		0W4304M000		0W4	30:3000K		000
		0W4274M000		0W4	27:2700K		000
SZ8-Y22-W0-C8		0W3654M000	80	0W3	65:6500K		000
		0W3574M000		0W3	57:5700K		000
		0W3504M000		0W3	50:5000K		000
SZ8-Y22-WN-C8		0W3404M000		0W3	40:4000K		000
SZ8-Y22-WW-C8		0W3354M000		0W3	35:3500K		000
		0W2304M000		0W2	30:3000K		000
		0W2274M000		0W2	27:2700K		000
SZ8-Y22-W0-C9		0V3654M000	90	0V3	65:6500K		000
		0W1574M000		0W1	57:5700K		000
		0W1504M000		0W1	50:5000K		000
SZ8-Y22-WN-C9		0W1404M000		0W1	40:4000K		000
SZ8-Y22-WW-C9		0V3354M000		0V3	35:3500K		000
		0V2304M000		0V2	30:3000K		000
		0V2274M000		0V2	27:2700K		000

Table 1-4. Product selection table SZ8-Y22-WX-CX-00A000

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y22-W0-C7	00A000	0W5655M000	70	0W5	65:6500K	5M: 5step Mixing	000
		0W5575M000		0W5	57:5700K		000
		0W6505M000		0W6	50:5000K		000
SZ8-Y22-WN-C7		0W6405M000		0W6	40:4000K		000
SZ8-Y22-WW-C7		0W5355M000		0W5	35:3500K		000
		0W4305M000		0W4	30:3000K		000
		0W4275M000		0W4	27:2700K		000
SZ8-Y22-W0-C8		0W3655M000	80	0W3	65:6500K		000
		0W3575M000		0W3	57:5700K		000
		0W3505M000		0W3	50:5000K		000
SZ8-Y22-WN-C8		0W3405M000		0W3	40:4000K		000
SZ8-Y22-WW-C8		0W3355M000		0W3	35:3500K		000
		0W2305M000		0W2	30:3000K		000
		0W2275M000		0W2	27:2700K		000
SZ8-Y22-W0-C9		0V3655M000	90	0V3	65:6500K		000
		0W1575M000		0W1	57:5700K		000
		0W1505M000		0W1	50:5000K		000
SZ8-Y22-WN-C9		0W1405M000		0W1	40:4000K		000
SZ8-Y22-WW-C9		0V3355M000		0V3	35:3500K		000
		0V2305M000		0V2	30:3000K		000
		0V2275M000		0V2	27:2700K		000

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Performance Characteristics

Table 2. Electro Optical Characteristics, I_F = 700mA, T_j=85℃

Min. CRI, R_a [4]	Nominal CCT [K] [1]	Min. Flux [lm]	Typ. Luminous Flux Φ_V [3] [lm]			Typ. Luminous Efficacy [lm/W]
			700mA	1000mA	1500mA	@700mA
70	6500	285	306	416	578	157
	5700	299	316	430	597	162
	5000	299	322	438	609	165
	4000	299	322	438	609	165
	3500	285	306	416	578	157
	3000	285	302	411	571	155
	2700	271	294	400	556	151
80	6500	271	285	388	539	146
	5700	271	287	390	542	147
	5000	271	289	393	546	149
	4000	271	289	393	546	149
	3500	254	277	377	524	142
	3000	254	272	370	514	140
	2700	237	261	355	493	131
90	6500	223	246	335	465	126
	5700	237	252	343	476	129
	5000	237	252	343	476	129
	4000	237	252	343	476	129
	3500	223	232	315	438	119
	3000	208	225	306	425	116
	2700	208	214	291	403	110

Note :

[1] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.

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

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

[3] Φ_V is the total luminous flux output as measured with an integrating sphere.

[4] Tolerance is ±2.0 on CRI measurements.

Performance Characteristics

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max. [4]	
Forward Current [1]	I_F	-	0.7	2.0 [3]	A
Power Dissipation	P_D	-	-	6.5	W
Junction Temperature	T_j	-	-	145	ºC
Storage Temperature	T_{stg}	- 40	-	125	ºC
Viewing angle	θ		140		degree
Forward voltage (700mA, 85℃)	V_F		2.78	3.00	V
Thermal resistance (J to S) [2]	$R\theta_{J-S}$	-	4.0 [3]	-	K/W
ESD Sensitivity(HBM)	Class 2 JEDEC JS-001-2017				

Note :

[1] At Junction Temperature 85℃ condition.

[2] $R\theta_{J-S}$ is tested at 700mA.

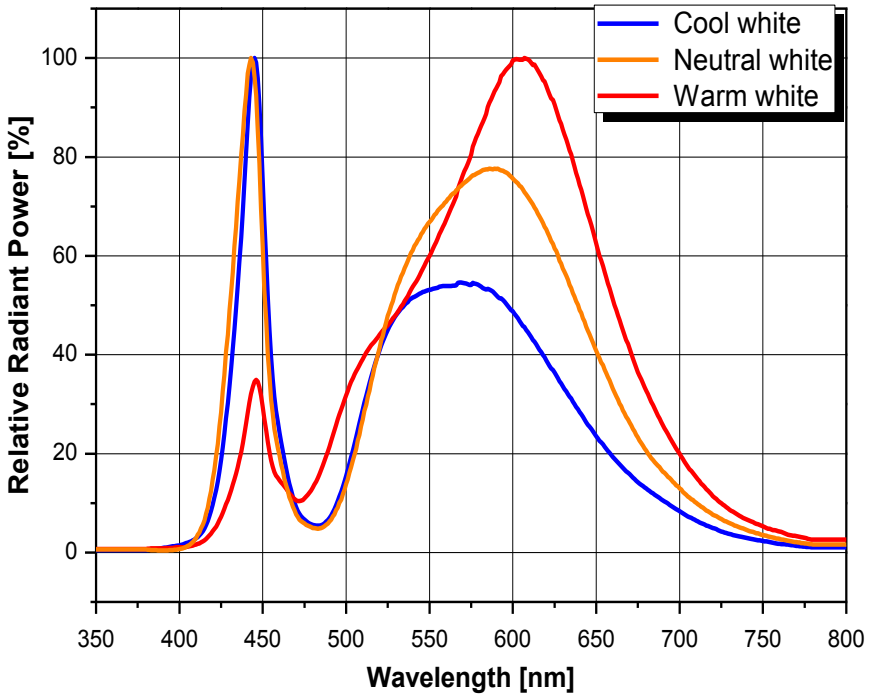
[3] Using Metal PCB (Normal type).

[4] It is recommended to use it in the condition that the reliability is secured within the Max value.

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

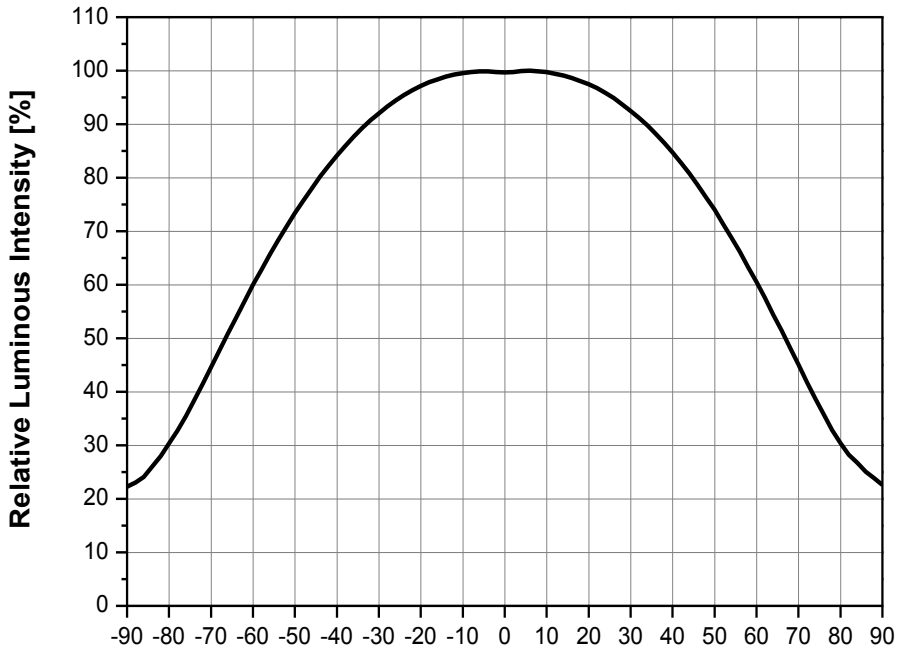
Characteristics Graph

Color Spectrum



(Fig 1)

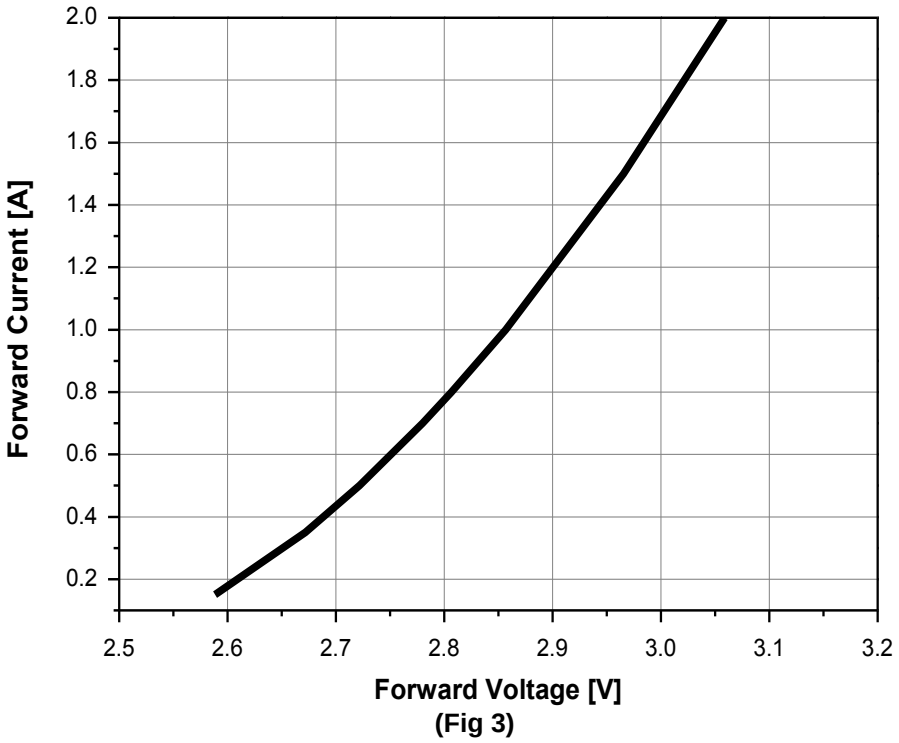
Typical Spatial Distribution



(Fig 2)

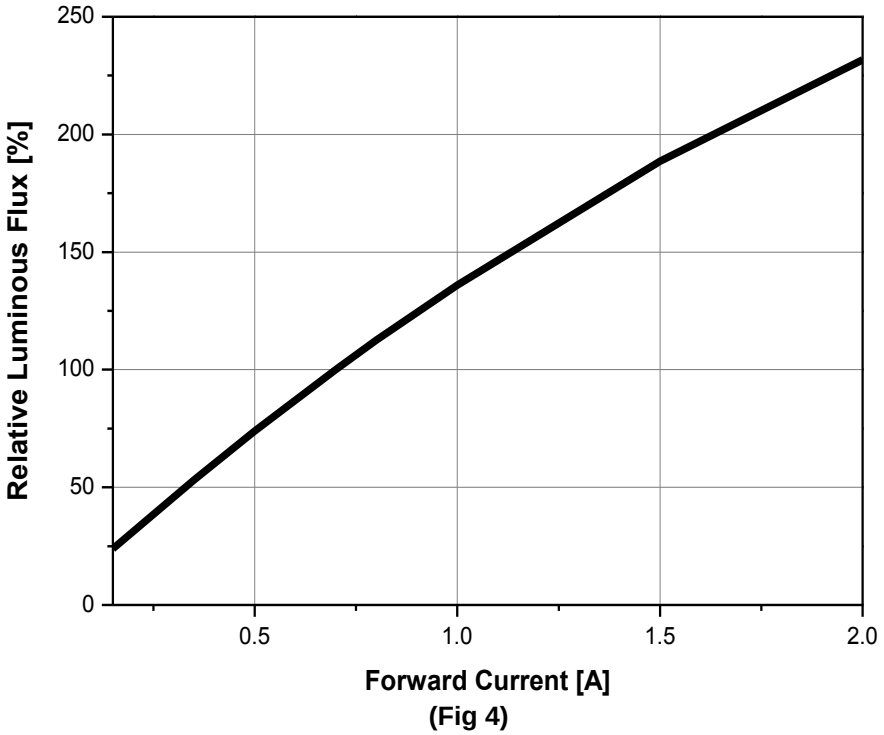
Characteristics Graph

Forward Voltage vs. Forward Current, T_j=85℃



(Fig 3)

Forward Current vs. Relative Luminous Flux, T_j=85℃

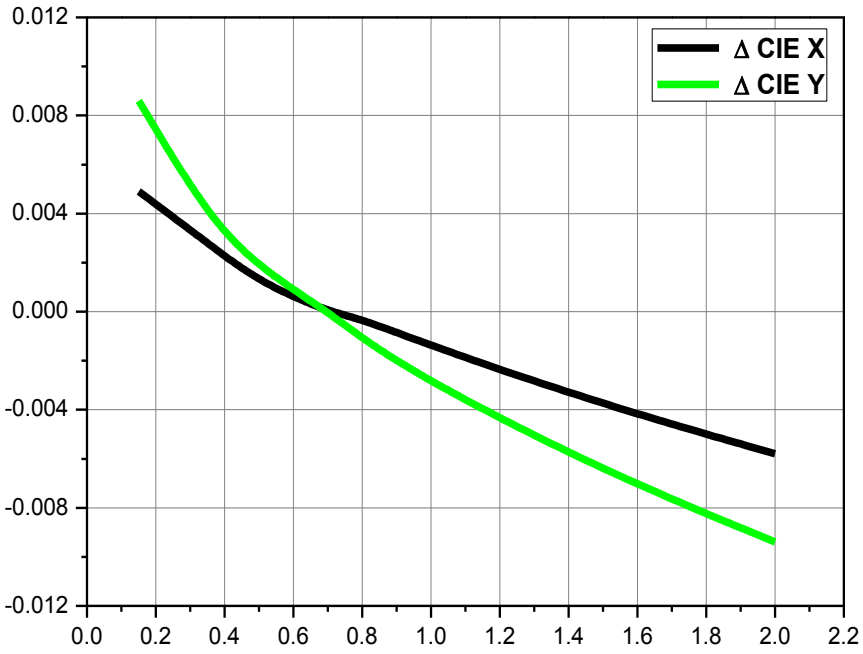


(Fig 4)

• Using less than 100mA is not recommended

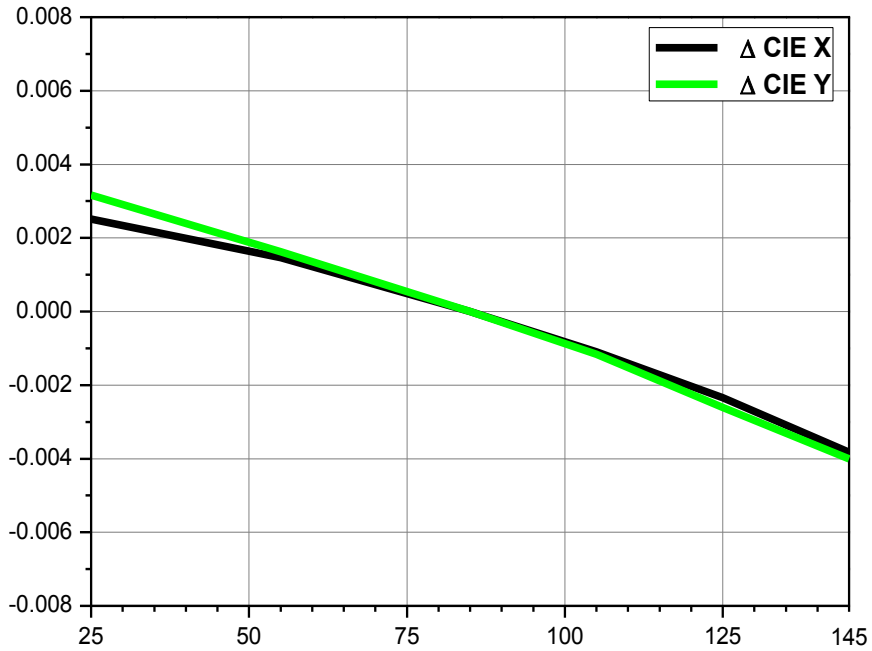
Characteristics Graph

Forward Current. vs. CIE X, Y Shift, T_j=85℃



(Fig 5)

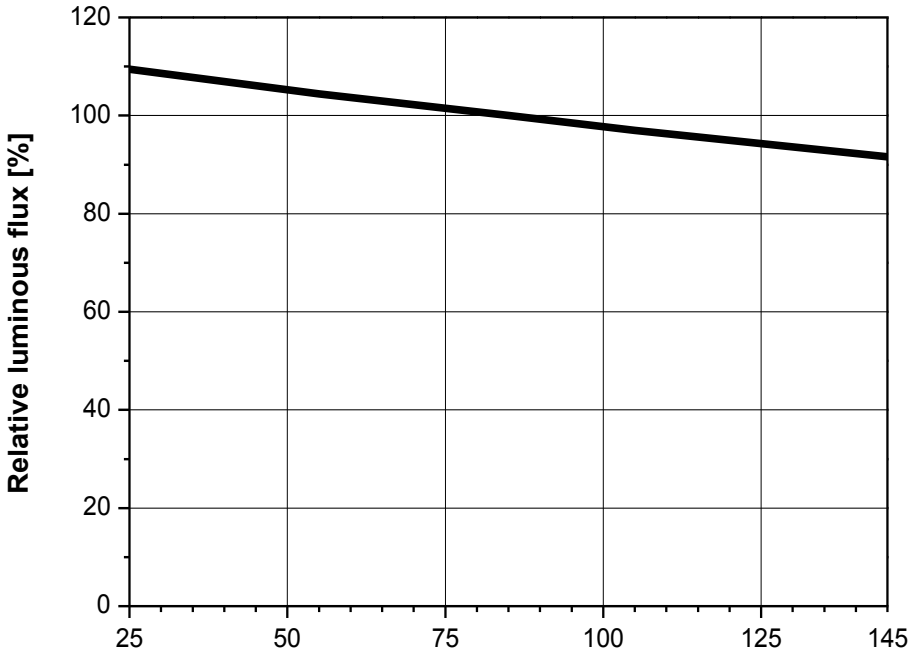
Junction Temp. vs. CIE X, Y Shift, I_F=700mA



(Fig 6)

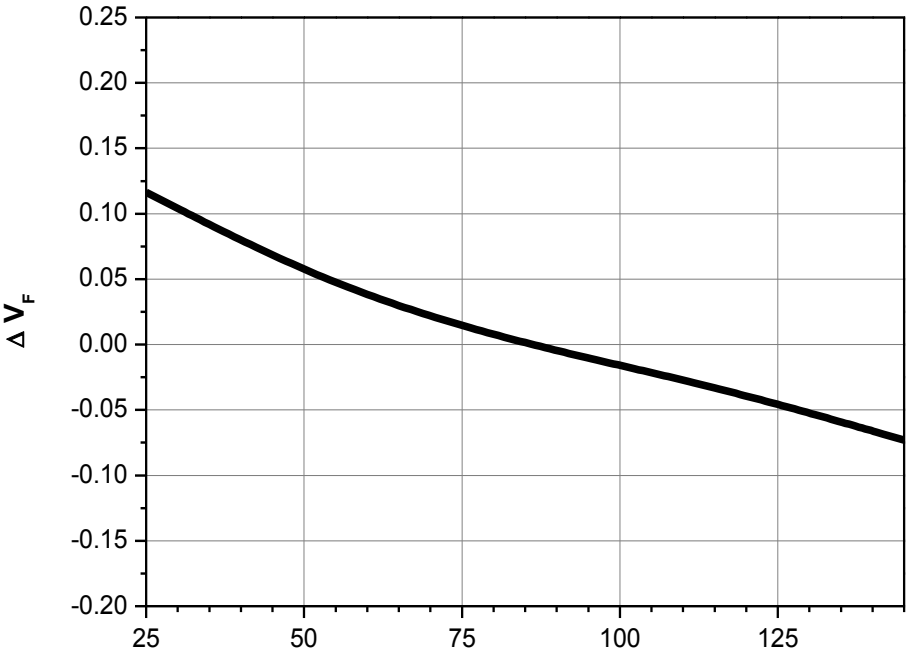
Characteristics Graph

Junction Temp. vs. Relative Luminous Flux, I_F=700mA



(Fig 7)

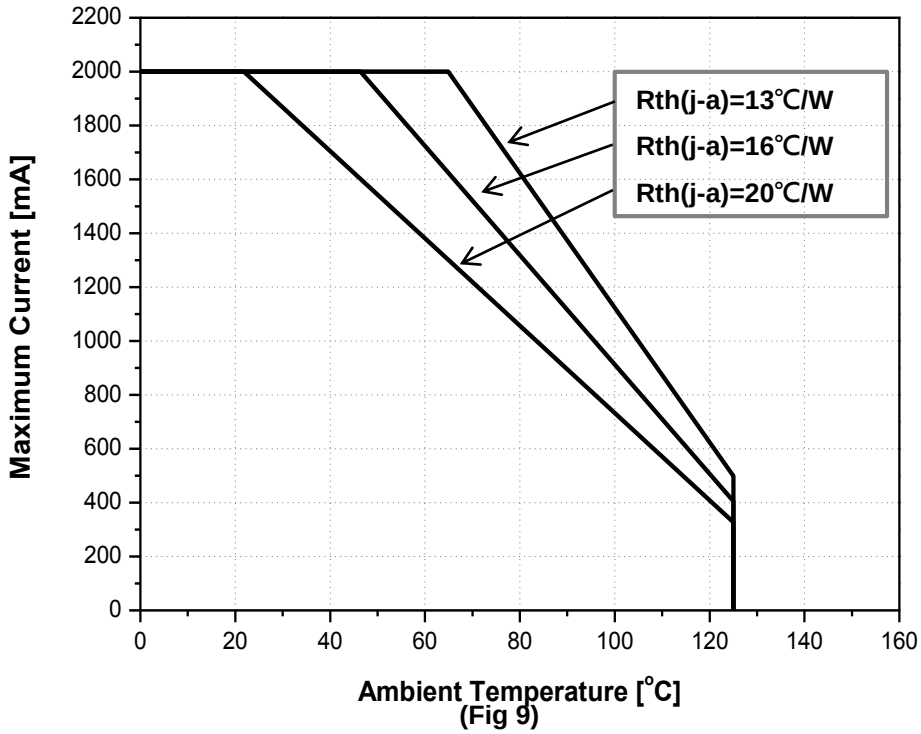
Junction Temp. vs. Relative Forward Voltage, I_F=700mA



(Fig 8)

Characteristics Graph

Ambient Temperature vs. Maximum Forward Current, T_j(max.)=145℃, I_F=2.0A



(Fig 9)

Performance Characteristics

Table 4. Bin Code description, I_F=700mA, T_j=85℃

Part Number	Luminous Flux [lm]			Color Chromaticity Coordinate	Typical Forward Voltage [V_F] [1] *		
	Bin Code	Min.	Max.		Bin Code	Min.	Max.
SZ8-Y22-WX-Cx-00A000	V2	208	223	Refer to page. 14~22	F	2.5	2.75
	V3	223	237				
	W1	237	254				
	W2	254	271				
	W3	271	285		G	2.75	3.00
	W4	285	299				
	W5	299	313				
	W6	313	327				
	W7	327	342				

Table 5. Luminous Flux rank distribution

Available Rank

CRI	CCT	CIE	Luminous Flux Rank								
70	6,000 ~ 7,000K	A	V2	V3	W1	W2	W3	W4	W5	W6	W7
	5,300 – 6,000K	B	V2	V3	W1	W2	W3	W4	W5	W6	W7
	4,700 ~ 5,300K	C	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,700 ~ 4,200K	E	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,200 ~ 3,700K	F	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,900 ~ 3,200K	G	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,600 ~ 2,900K	H	V2	V3	W1	W2	W3	W4	W5	W6	W7
80	6,000 ~ 7,000K	A	V2	V3	W1	W2	W3	W4	W5	W6	W7
	5,300 – 6,000K	B	V2	V3	W1	W2	W3	W4	W5	W6	W7
	4,700 ~ 5,300K	C	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,700 ~ 4,200K	E	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,200 ~ 3,700K	F	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,900 ~ 3,200K	G	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,600 ~ 2,900K	H	V2	V3	W1	W2	W3	W4	W5	W6	W7
90	6,000 ~ 7,000K	A	V2	V3	W1	W2	W3	W4	W5	W6	W7
	5,300 – 6,000K	B	V2	V3	W1	W2	W3	W4	W5	W6	W7
	4,700 ~ 5,300K	C	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,700 ~ 4,200K	E	V2	V3	W1	W2	W3	W4	W5	W6	W7
	3,200 ~ 3,700K	F	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,900 ~ 3,200K	G	V2	V3	W1	W2	W3	W4	W5	W6	W7
	2,600 ~ 2,900K	H	V2	V3	W1	W2	W3	W4	W5	W6	W7

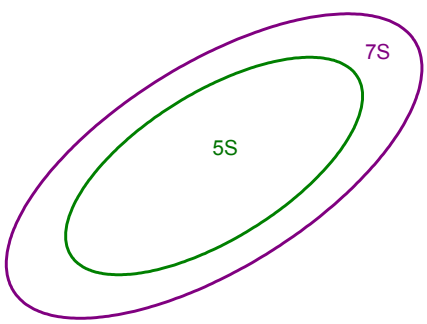
Notes :

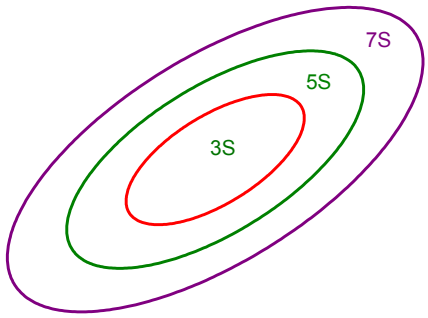
(1) Tolerance is ±0.06V on forward voltage measurements.

(2) 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=85℃, I_F=700mA





Order	Box Packing Method
xx5S	5S(5Step) Single

Order	Box Packing Method
xx3S	3S(3Step) Single
xx4M	3S(3Step) & 5S (5Step) Mixing
xx5M	3S(3Step) & 7S (7Step) Mixing

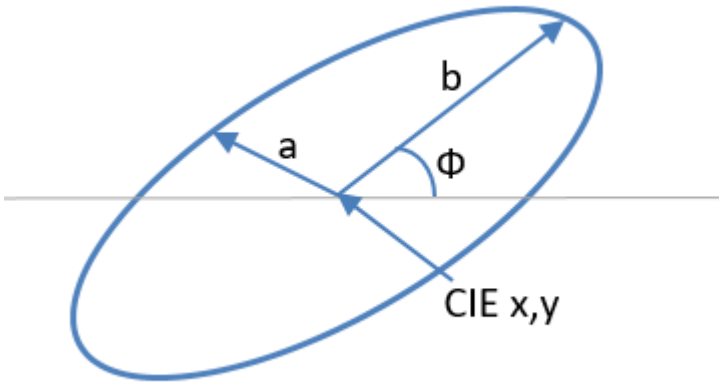
***Notes :**

1. xx3S Order will ship 3S only
2. xx4M Order will ship 3S & 5S (=also include 3S)
3. xx5S Order will ship 5S(=also include 3S)
4. xx5M Order will ship 3S & 7S (=also include 5S, 3S)
5. Doughnut Bin will not ship alone(=Will ship with mixing bin)

- 'xx' can be 65=6500K, 56=5600K, 50=5000K, 40=4000K, 35= 3500K, 30=3000K, 27= 2700K

Color Bin Structure

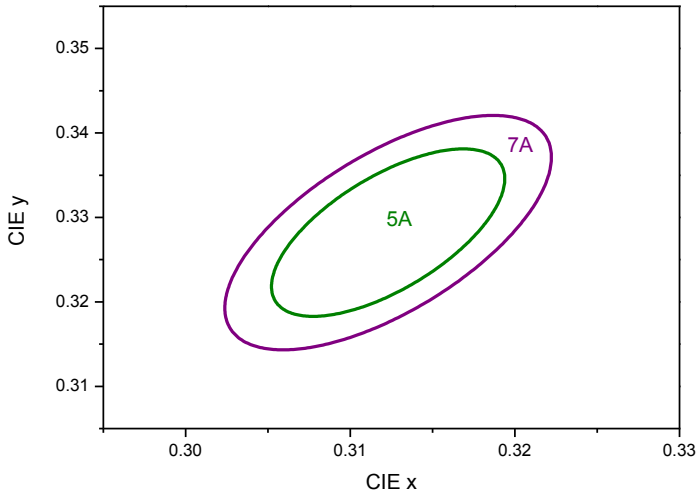
CIE Chromaticity Diagram, T_j=85℃, I_F=700mA

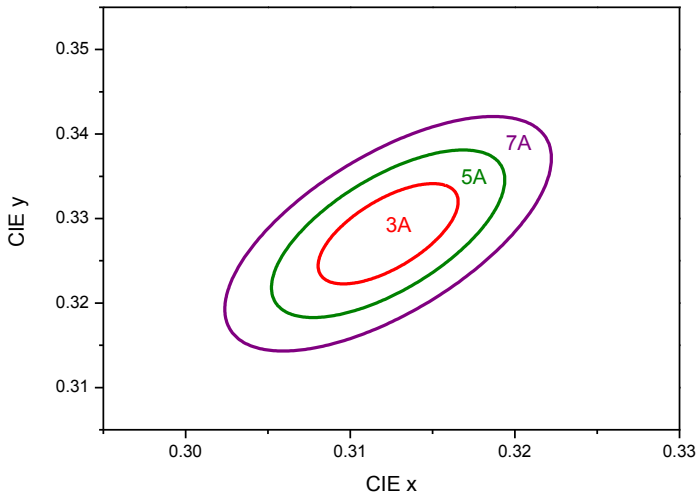


Macadam	CCT	Center Point		Major Axis	Minor Axis	Rotation Angle
	(K)	CIE x	CIE y	a	b	Φ
3 step	2700	0.4578	0.4101	0.0081	0.0042	54
	3000	0.4338	0.4030	0.0083	0.0040	53
	3500	0.4073	0.3917	0.0093	0.0042	54
	4000	0.3818	0.3797	0.0094	0.0040	54
	5000	0.3447	0.3553	0.0082	0.0035	60
	5700	0.3287	0.3417	0.0076	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	0.4030	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
7 step	2700	0.4578	0.4101	0.0189	0.0098	54
	3000	0.4338	0.4030	0.0196	0.0095	53
	3500	0.4073	0.3917	0.0217	0.0097	54
	4000	0.3818	0.3797	0.0218	0.0095	54
	5000	0.3447	0.3553	0.0192	0.0081	60
	5700	0.3287	0.3417	0.0175	0.0074	59
	6500	0.3123	0.3282	0.0157	0.0067	59

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=6500K



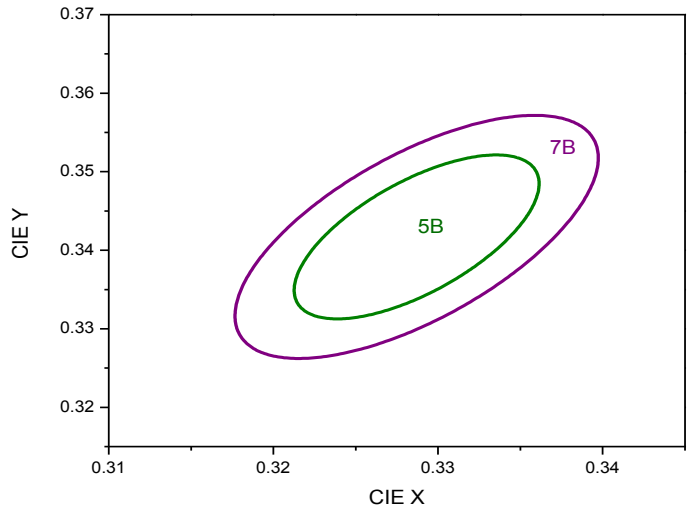


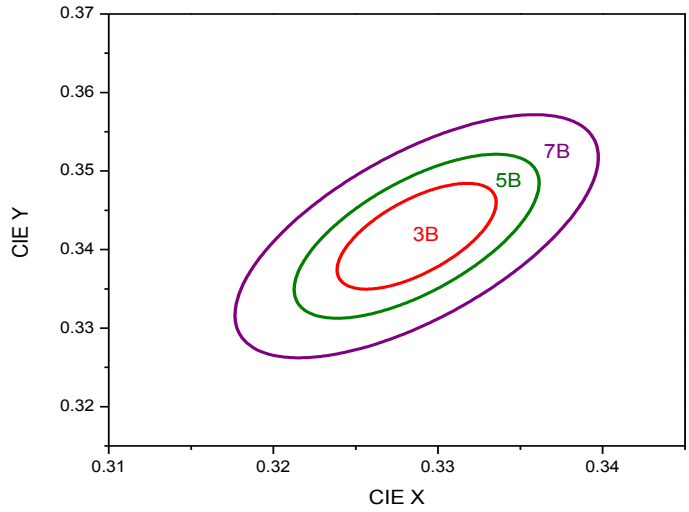
3A(3.0Step)		5A (5.0Step)	
Center point	0.3123 : 0.3282	Center point	0.3123 : 0.3282
Major Axis a	0.0067	Major Axis a	0.0112
Minor Axis b	0.0029	Minor Axis b	0.0048
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

7A(7.0Step)	
Center point	0.3123 : 0.3282
Major Axis a	0.0157
Minor Axis b	0.0067
Ellipse Rotation Angle	59

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=5700K



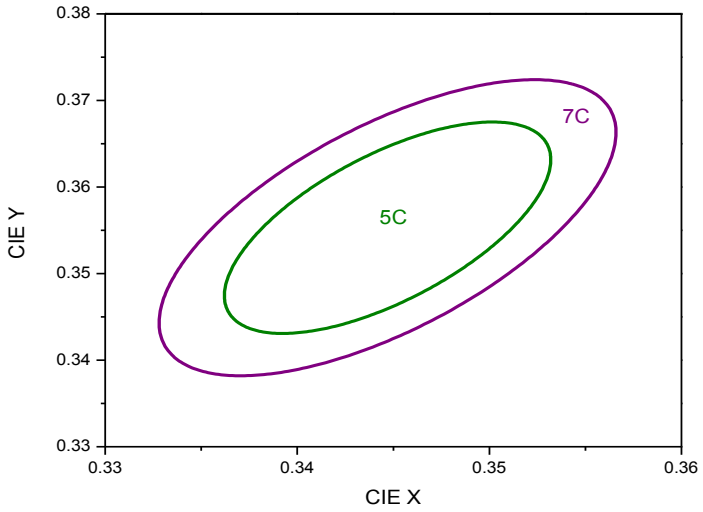


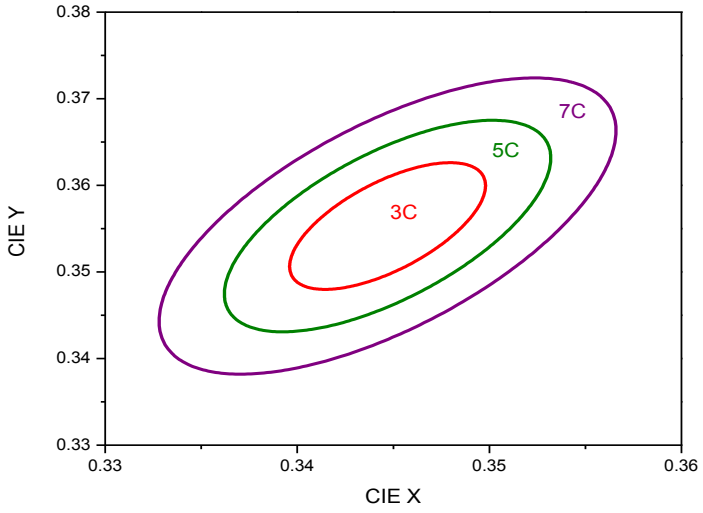
3B(3.0Step)		5B (5.0Step)	
Center point	0.3287 : 0.3417	Center point	0.3287 : 0.3417
Major Axis a	0.0076	Major Axis a	0.0125
Minor Axis b	0.0033	Minor Axis b	0.0053
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

7B(7.0Step)	
Center point	0.3287 : 0.3417
Major Axis a	0.0175
Minor Axis b	0.0074
Ellipse Rotation Angle	59

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=5000K



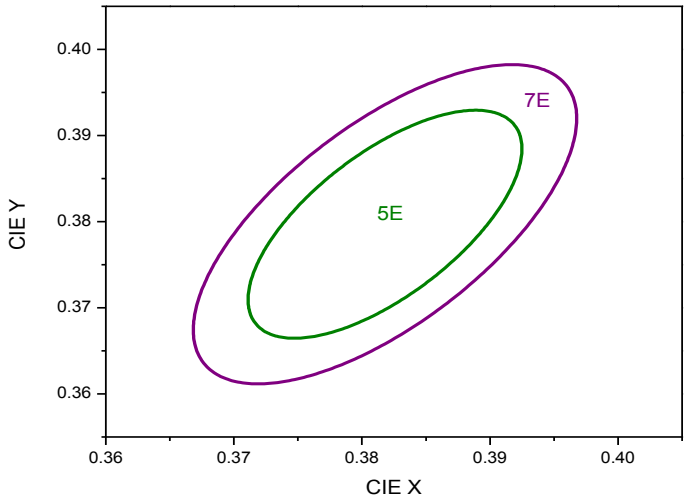


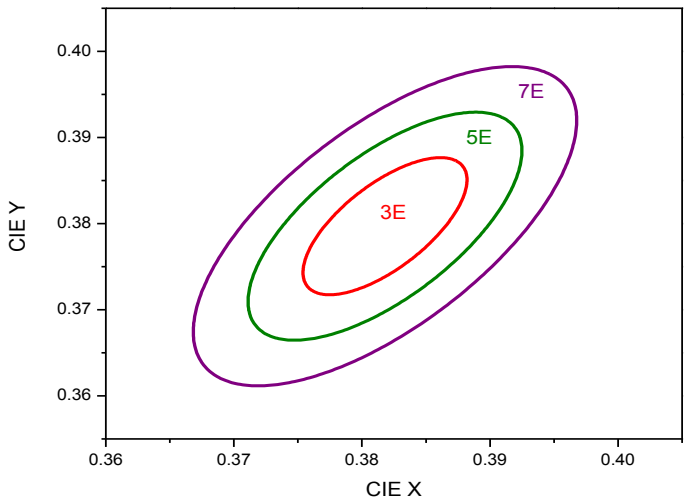
3C(3.0Step)		5C (5.0Step)	
Center point	0.3447 : 0.3553	Center point	0.3447 : 0.3553
Major Axis a	0.0082	Major Axis a	0.0137
Minor Axis b	0.0035	Minor Axis b	0.0058
Ellipse Rotation Angle	60	Ellipse Rotation Angle	60

7C(7.0Step)	
Center point	0.3447 : 0.3553
Major Axis a	0.0192
Minor Axis b	0.0081
Ellipse Rotation Angle	60

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=4000K



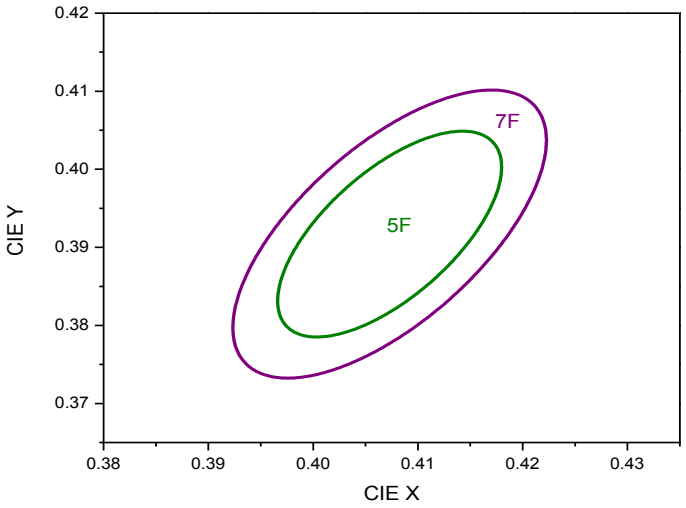


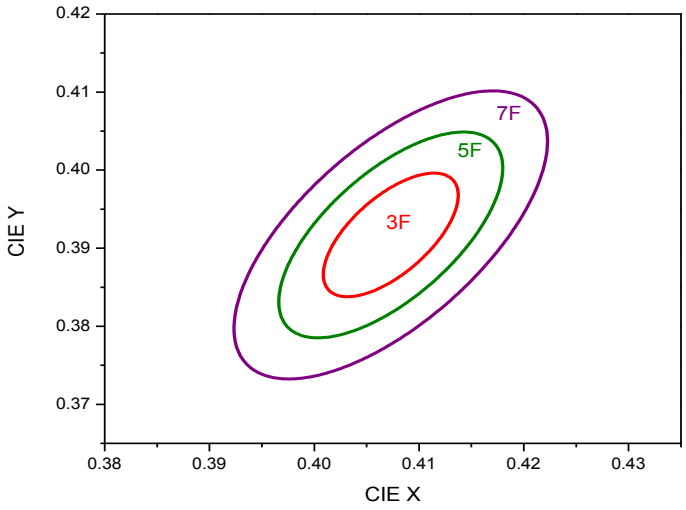
3E(3.0Step)		5E (5.0Step)	
Center point	0.3818 : 0.3797	Center point	0.3818 : 0.3797
Major Axis a	0.0094	Major Axis a	0.0156
Minor Axis b	0.0040	Minor Axis b	0.0068
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

7E(7.0Step)	
Center point	0.3818 : 0.3797
Major Axis a	0.0218
Minor Axis b	0.0095
Ellipse Rotation Angle	54

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=3500K



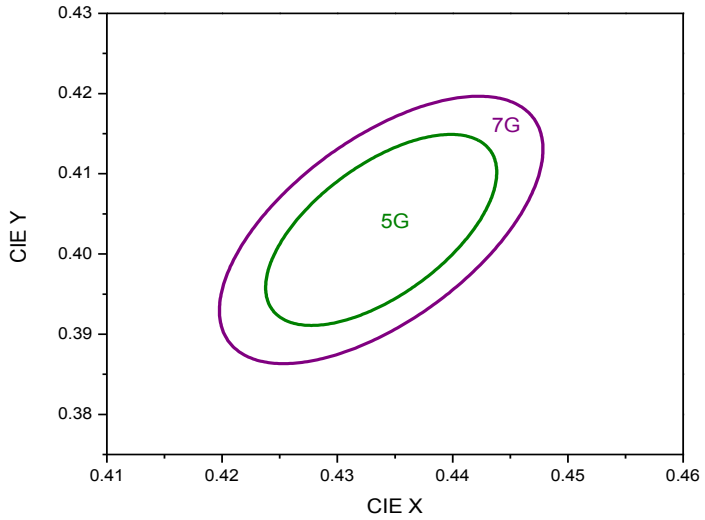


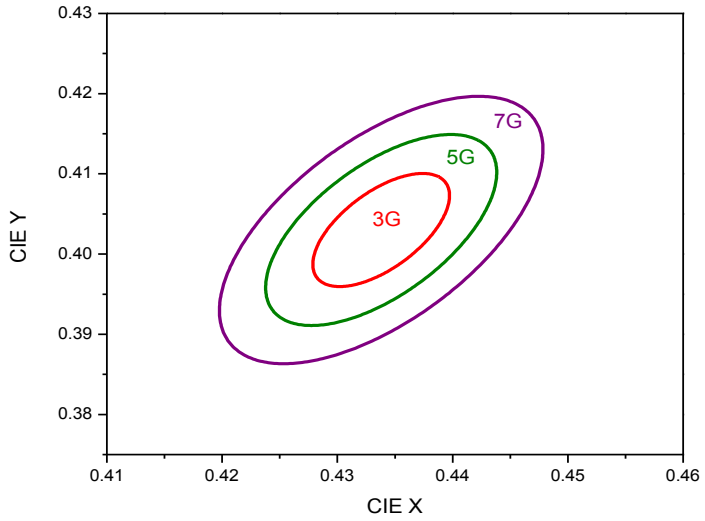
3F(3.0Step)		5F (5.0Step)	
Center point	0.4073 : 0.3917	Center point	0.4073 : 0.3917
Major Axis a	0.0093	Major Axis a	0.0155
Minor Axis b	0.0042	Minor Axis b	0.0069
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

7F(7.0Step)	
Center point	0.4073 : 0.3917
Major Axis a	0.0217
Minor Axis b	0.0097
Ellipse Rotation Angle	54

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=3000K



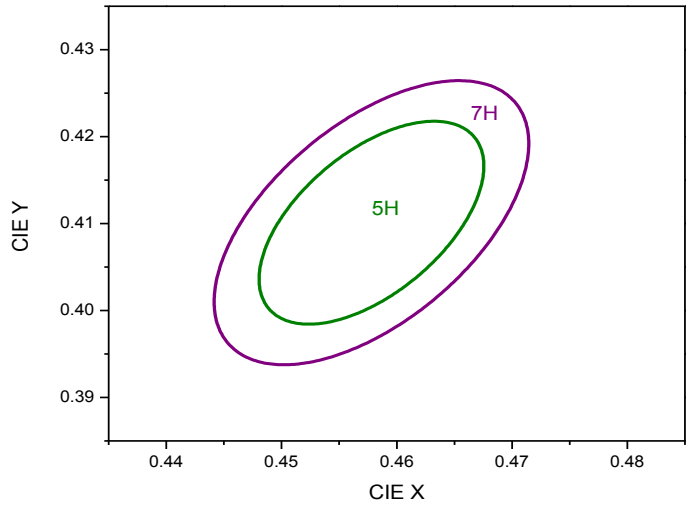


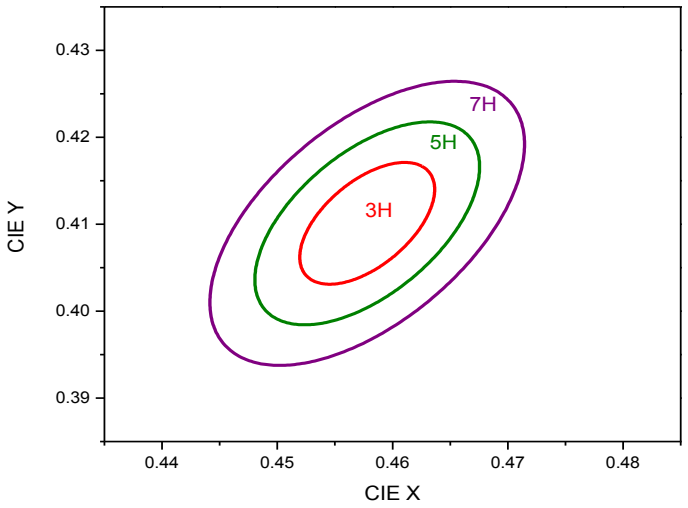
3G (3.0Step)		5G (5.0Step)	
Center point	0.4338 : 0.4030	Center point	0.4338 : 0.4030
Major Axis a	0.0083	Major Axis a	0.0140
Minor Axis b	0.0040	Minor Axis b	0.0068
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53

7G(7.0Step)	
Center point	0.4338 : 0.4030
Major Axis a	0.0196
Minor Axis b	0.0095
Ellipse Rotation Angle	53

Color Bin Structure

CIE Chromaticity Diagram, T_j=85℃, I_F=700mA, CCT=2700K





3H (3.0Step)		5H (5.0Step)	
Center point	0.4578 : 0.4101	Center point	0.4578 : 0.4101
Major Axis a	0.0081	Major Axis a	0.0135
Minor Axis b	0.0042	Minor Axis b	0.0070
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54

7H(7.0Step)	
Center point	0.4578 : 0.4101
Major Axis a	0.0189
Minor Axis b	0.0098
Ellipse Rotation Angle	54

Mixing order kiting combination

Kiting Combination with xx4M

Part Number	Combination	Reel	FLUX	CIE	VF	Qty
SZ8-Y19-WX-Cx-00A000	Kiting_a	Reel 1	ALL	3S	ALL	1,500pcs
		Reel 2	ALL	3S	ALL	1,500pcs
	Kiting_b	Reel 1	ALL	3S	ALL	1,500pcs
		Reel 2	ALL	5S	ALL	1,500pcs

Kiting Combination with xx5M

Part Number	Combination	Reel	FLUX	CIE	VF	Qty
SZ8-Y19-WX-Cx-00A000	Kiting_c	Reel 1	ALL	5S	ALL	1,500pcs
		Reel 2	ALL	5S	ALL	1,500pcs
	Kiting_d	Reel 1	ALL	3S	ALL	1,500pcs
		Reel 2	ALL	7S	ALL	1,500pcs

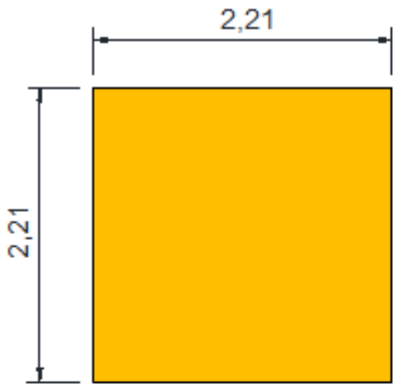
Product Nomenclature

Table 6. Nomenclature example

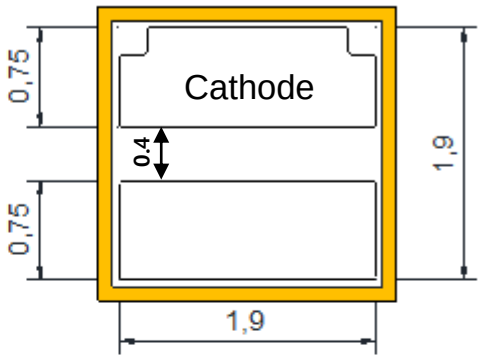
S	Z	8	-	Y	2	2	-	W	x	-	C	x	-	0	0	A	0	0	0	a	b	b	c	c	d	d	e	e	e
X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}	X_{25}	X_{26}	X_{27}	X_{28}	X_{29}	X_{30}

Part Number Code	Value	References	Description
X_1	S	Seoul Semiconductor	Company
X_2	Z	Division	Z-POWER
X_3	8		WICOP
X_5	Y		WICOP CHIP
X_6X_7	22	2210x2210	Package series
X_9,X_{10}	WX	Color	W0: Cool White / WN: Neutral white/ WW: Warm white
X_{12},X_{13}	Cx	CRI	C7: CRI 70/ C8: CRI 80/ C9: CRI 90
X_4, X_8, X_{11}, X_{14}, X_{15}	-		
X_{16}~X_{20}	00A000	internal code	
$X_{21}X_{22}X_{23}$	abb	Flux Bin	abb: 0U3, 0V1, 0V2, 0V3, 0W1, 0W2, 0W3, 0W4, 0W5, 0W6, 0W7
$X_{24}X_{25}$	cc	Color Temp.	65=6500K, 56=5600K, 50=5000K, 40=4000K, 30=3000K, 35= 3500K, 27= 2700K
$X_{26}X_{27}$	dd	step	3S: 3Step single / 5S: 5Step single 4M: 4Step Mixing / 5M: 5Step Mixing
$X_{28}X_{29}X_{30}$	eee	VF Bin	000: All bin

Mechanical Dimensions

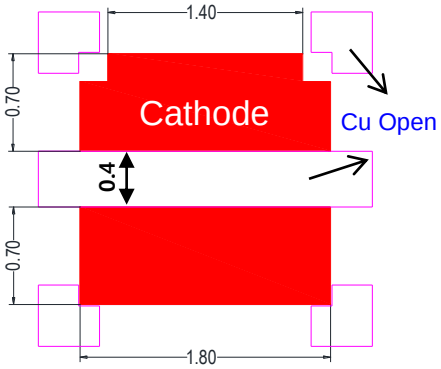


< Top >

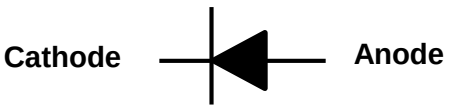


< Bottom >

< Side >



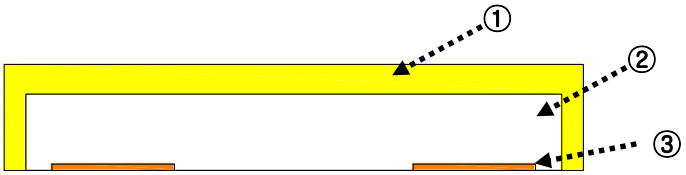
< Recommended Solder Pattern >



< Inner circuit >

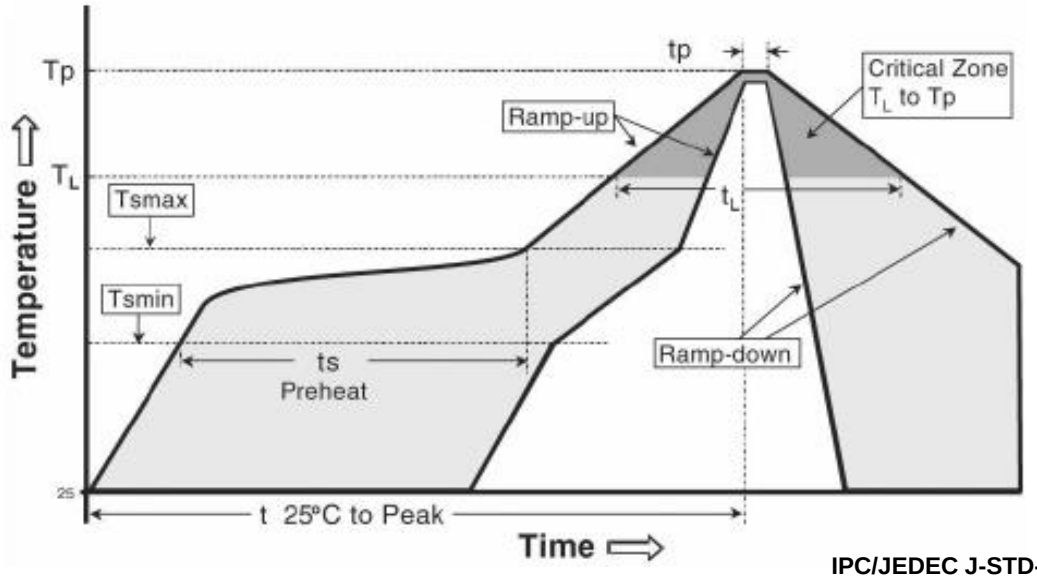
(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.13mm

Material Structure



No.	List	Material
①	Encapsulation	Silicone, Phosphor
②	Chip Source	GaN ON SAPPHIRE
③	Solder-PAD	Metal (Au)

Reflow Soldering Characteristics



IPC/JEDEC J-STD-020

Profile Feature	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 150 °C 180 °C 80-120 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 217~220°C 80-100 seconds
Peak Temperature (Tp)	250~255℃
Time within 5°C of actual Peak Temperature (tp)2	20-40 seconds
Ramp-down Rate	6 °C/second max.
Time 25°C to Peak Temperature	8 minutes max.
Atmosphere	Nitrogen (O2<1000ppm)

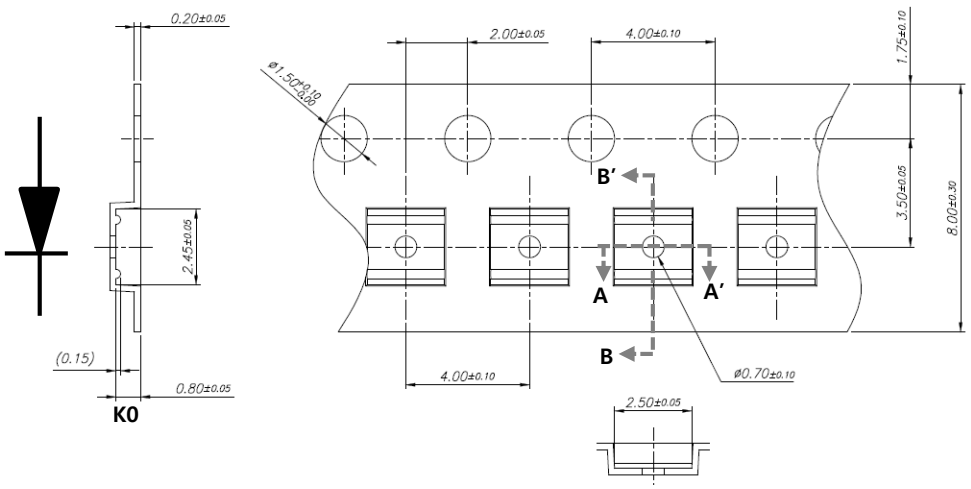
Caution

(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, LED will be damaged.
(2) Re-soldering should not be done after the LED have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair..
(3) Do not put stress on the LED during heating.
(4) After reflow, do not clean PCB by water or solvent.

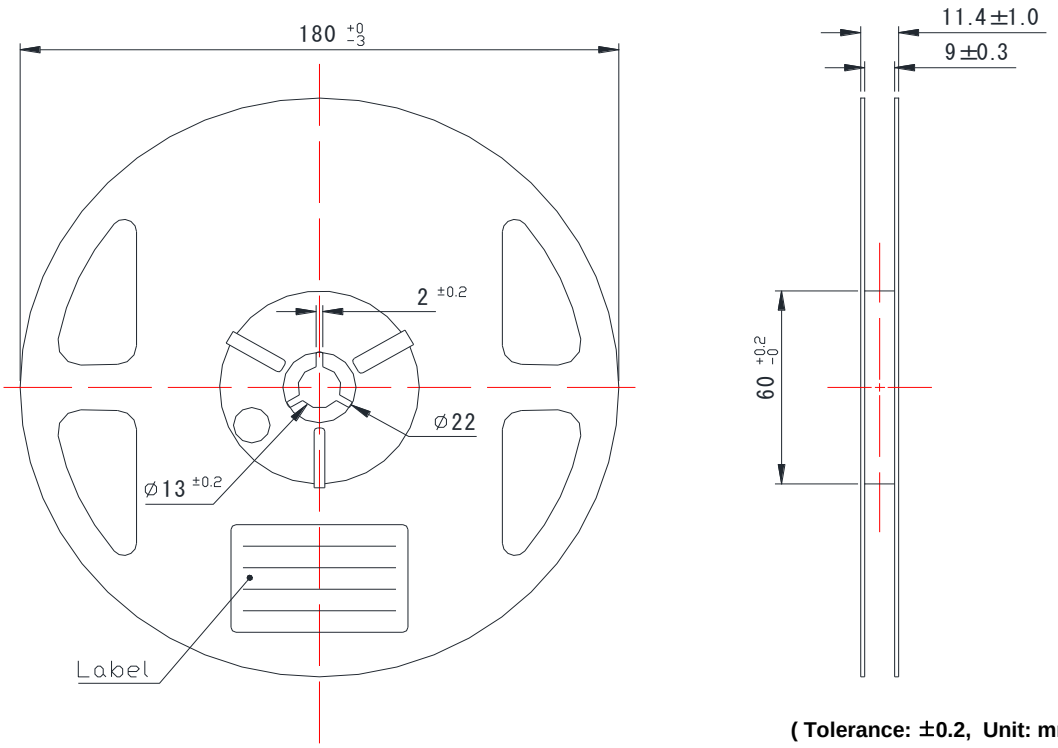
SMT recommendation

(1) After reflow, Over 80% reflectance of PSR is recommended. → Tamura RPW-8000-xx
(2) Solder paste materials (SAC 305, No Cleaning Paste) → Senju M705-GRN360-K2-V
(3) We recommend Turn On Voltage(TOV) Test 1.8v~2.8v at 1uA (per LED)
(4) We recommend IR Test 0~1uA at -5V (per LED)

Emitter Tape & Reel Packaging



Size
A0 : 2.50±0.05
B0 : 2.45±0.05
K0 : 0.80±0.05

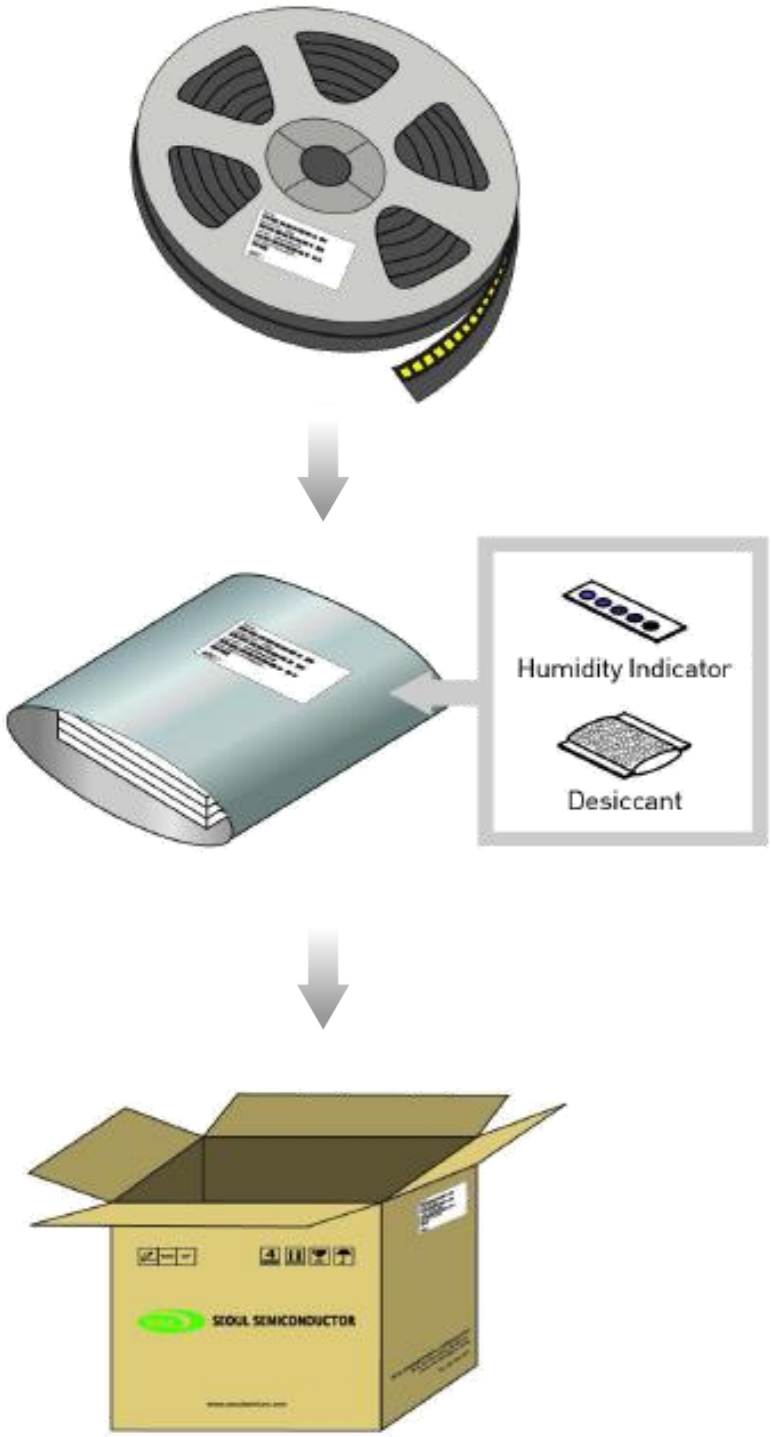


(Tolerance: ±0.2, Unit: mm)

Notes :

(1) Quantity : 1,000pcs/Reel
(empty slot possible in taping 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 10º to the carrier tape
(4) Package : P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package

Packaging Information



Handling of Silicone Resin for LED

(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) Do not use tweezers to pick up or handle WICOP LED.
A vacuum pick up should only be used.

(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 smaller than the LED's area.

(4) Silicone differs from materials conventionally used for the manufacturing of LED. 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.

(5) 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.

(6) Avoid leaving fingerprints on silicone resin parts.

Precaution for Use

(1) Storage

To avoid the moisture penetration, we recommend storing LED 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 SMD 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 1 year (MSL 2) 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.

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

(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.

Precaution for Use

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

(13) Attaching LED, 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 rev erse voltage is applied to LED, migration can be generated resulting in LED damage.

(15) LED is sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). Below is a li st 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:

- 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

(16) When separating PCBs from array panels with WICOP PKG, follow these precautions to avoid stress-induced failures:
- Never depanel manually by hand bending or snapping. Use dedicated depaneling machines with proper fixture support.
- Fix the PCB firmly during the cutting process to prevent flex or vibration from transferring to WICOP solder joints.
- Ensure that WICOP PKG is located at least 10 mm away from depaneling lines or routed edges.
- Do not use scissors or hand tools for cutting, as they generate uneven mechanical force.
- For FPCB, mount the panel on a support carrier before depaneling to prevent local bending or twisting.
- After depaneling, inspect under magnification for microcracks or lifted joints around WICOP chips.

Precaution for Use

(17) After cutting or depaneling PCB/module with WICOP PKG, follow these mandatory inspection steps
- Perform visual inspection under magnification around each WICOP chip to detect cracks, delamination, or lifted pads.
- Conduct a 100% lighting test to check for failures such as dim, flickering, or non-lighting LEDs.
- Reject any chip showing cracks, white spots, or haze.
- Optionally combine with forward voltage (VF) testing to detect hidden internal damage.
- Record and separate NG parts before assembly into final modules.

Company Information

Published by

Company Information

Seoul Semiconductor (www.SeoulSemicon.com) manufacturers and packages a wide selection of light emitting diodes (LED) 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 LED.

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

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