SPECIFICATION

Product : SZ8-Y11-WX-CX-X00000

Seoul Semiconductor			Customer
Drawn by	Checked by	Approved by	Approved by
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25.11.03	25.11.03	25.11.03	

New Generation of WICOP

SZ8-Y11-WX-CX-X00000

Middle-Power LED - WICOP Y11

MacAdam 3-Step | LM-80 | RoHS

Product Brief

Description

- The WICOP series is designed for high flux output applications with high current operation capability.
- Compact footprint(1.14x1.14mm) 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 2,100~7,000K
- Elip 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-Y11-WX-Cx-A00000 (3V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-A	00000	0W2653S000	70	0W2	65:6500K	3S: 3step	000
		0W2573S000		0W2	57:5700K		000
		0W2503S000		0W2	50:5000K		000
SZ8-Y11-WN-C7-A		0W2403S000		0W2	40:4000K		000
SZ8-Y11-WW-C7-A		0W1353S000		0W1	35:3500K		000
		0W1303S000		0W1	30:3000K		000
		0W1273S000		0W1	27:2700K		000
SZ8-Y11-W0-C8-A		0V3653S000	80	0V3	65:6500K	3S: 3step	000
		0V3573S000		0V3	57:5700K		000
		0V3503S000		0V3	50:5000K		000
SZ8-Y11-WN-C8-A		0V3403S000		0V3	40:4000K		000
SZ8-Y11-WW-C8-A		0V3353S000		0V3	35:3500K		000
		0V3303S000		0V3	30:3000K		000
		0V2273S000		0V2	27:2700K		000
SZ8-Y11-W0-C9-A		0V2653S000	90	0V2	65:6500K	3S: 3step	000
		0V2573S000		0V2	57:5700K		000
		0V1503S000		0V1	50:5000K		000
SZ8-Y11-WN-C9-A		0V1403S000		0V1	40:4000K		000
SZ8-Y11-WW-C9-A		0U3353S000		0U3	35:3500K		000
		0U2303S000		0U2	30:3000K		000
		0U2273S000		0U2	27:2700K		000
		0T2223S000		0T2	22:2200K		000

Table 1-2. Product selection table SZ8-Y11-WX-Cx-A00000 (3V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-A	00000	0W2653M000	70	0W2	65:6500K	3M: 3step Mixing	000
		0W2573M000		0W2	57:5700K		000
		0W2503M000		0W2	50:5000K		000
SZ8-Y11-WN-C7-A		0W2403M000		0W2	40:4000K		000
SZ8-Y11-WW-C7-A		0W1353M000		0W1	35:3500K		000
		0W1303M000		0W1	30:3000K		000
		0W1273M000		0W1	27:2700K		000
SZ8-Y11-W0-C8-A		0V3653M000	80	0V3	65:6500K	3M: 3step Mixing	000
		0V3573M000		0V3	57:5700K		000
		0V3503M000		0V3	50:5000K		000
SZ8-Y11-WN-C8-A		0V3403M000		0V3	40:4000K		000
SZ8-Y11-WW-C8-A		0V3353M000		0V3	35:3500K		000
		0V3303M000		0V3	30:3000K		000
		0V2273M000		0V2	27:2700K		000
SZ8-Y11-W0-C9-A		0V2653M000	90	0V2	65:6500K	3M: 3step Mixing	000
		0V2573M000		0V2	57:5700K		000
		0V1503M000		0V1	50:5000K		000
SZ8-Y11-WN-C9-A		0V1403M000		0V1	40:4000K		000
SZ8-Y11-WW-C9-A		0U3353M000		0U3	35:3500K		000
		0U2303M000		0U2	30:3000K		000
		0U2273M000		0U2	27:2700K		000
		0T2223M000		0T2	22:2200K		000

Table 1-3. Product selection table SZ8-Y11-WX-Cx-A00000 (3V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-A	00000	0W2654M000	70	0W2	65:6500K	4M: 4step Mixing	000
		0W2574M000		0W2	57:5700K		000
		0W2504M000		0W2	50:5000K		000
SZ8-Y11-WN-C7-A		0W2404M000		0W2	40:4000K		000
SZ8-Y11-WW-C7-A		0W1354M000		0W1	35:3500K		000
		0W1304M000		0W1	30:3000K		000
		0W1274M000		0W1	27:2700K		000
SZ8-Y11-W0-C8-A		0V3654M000	80	0V3	65:6500K	4M: 4step Mixing	000
		0V3574M000		0V3	57:5700K		000
		0V3504M000		0V3	50:5000K		000
SZ8-Y11-WN-C8-A		0V3404M000		0V3	40:4000K		000
SZ8-Y11-WW-C8-A		0V3354M000		0V3	35:3500K		000
		0V3304M000		0V3	30:3000K		000
		0V2274M000		0V2	27:2700K		000
SZ8-Y11-W0-C9-A		0V2654M000	90	0V2	65:6500K	4M: 4step Mixing	000
		0V2574M000		0V2	57:5700K		000
		0V1504M000		0V1	50:5000K		000
SZ8-Y11-WN-C9-A		0V1404M000		0V1	40:4000K		000
SZ8-Y11-WW-C9-A		0U3354M000		0U3	35:3500K		000
		0U2304M000		0U2	30:3000K		000
		0U2274M000		0U2	27:2700K		000
		0T2224M000		0T2	22:2200K		000

Table 1-4. Product selection table SZ8-Y11-WX-CX-C00000 (9V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-C	00000	0W1653S000	70	0W1	65:6500K	3S: 3step	000
		0W2573S000		0W2	57:5700K		000
		0W2503S000		0W2	50:5000K		000
SZ8-Y11-WN-C7-C		0W1403S000		0W1	40:4000K		000
SZ8-Y11-WW-C7-C		0W1353S000		0W1	35:3500K		000
		0V3303S000		0V3	30:3000K		000
		0V3273S000		0V3	27:2700K		000
SZ8-Y11-W0-C8-C		0V3653S000	80	0V3	65:6500K		000
		0V3573S000		0V3	57:5700K		000
		0V3503S000		0V3	50:5000K		000
SZ8-Y11-WN-C8-C		0V2403S000		0V2	40:4000K		000
SZ8-Y11-WW-C8-C		0V2353S000		0V2	35:3500K		000
		0V1303S000		0V1	30:3000K		000
		0V1273S000		0V1	27:2700K		000
SZ8-Y11-W0-C9-C		0U2653S000	90	0U2	65:6500K		000
		0U2573S000		0U2	57:5700K		000
		0U2503S000		0U2	50:5000K		000
SZ8-Y11-WN-C9-C		0U3403S000		0U3	40:4000K		000
SZ8-Y11-WW-C9-C		0U2353S000		0U2	35:3500K		000
		0U2303S000		0U2	30:3000K		000
		0U2273S000		0U2	27:2700K		000

Table 1-5. Product selection table SZ8-Y11-WX-CX-C00000 (9V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-C	00000	0W1653M000	70	0W1	65:6500K	3M: 3step Mixing	000
		0W2573M000		0W2	57:5700K		000
		0W2503M000		0W2	50:5000K		000
SZ8-Y11-WN-C7-C		0W1403M000		0W1	40:4000K		000
SZ8-Y11-WW-C7-C		0W1353M000		0W1	35:3500K		000
		0V3303M000		0V3	30:3000K		000
		0V3273M000		0V3	27:2700K		000
SZ8-Y11-W0-C8-C		0V3653M000	80	0V3	65:6500K		000
		0V3573M000		0V3	57:5700K		000
		0V3503M000		0V3	50:5000K		000
SZ8-Y11-WN-C8-C		0V2403M000		0V2	40:4000K		000
SZ8-Y11-WW-C8-C		0V2353M000		0V2	35:3500K		000
		0V1303M000		0V1	30:3000K		000
		0V1273M000		0V1	27:2700K		000
SZ8-Y11-W0-C9-C		0U2653M000	90	0U2	65:6500K		000
		0U2573M000		0U2	57:5700K		000
		0U2503M000		0U2	50:5000K		000
SZ8-Y11-WN-C9-C		0U3403M000		0U3	40:4000K		000
SZ8-Y11-WW-C9-C		0U2353M000		0U2	35:3500K		000
		0U2303M000		0U2	30:3000K		000
		0U2273M000		0U2	27:2700K		000

Table 1-6. Product selection table SZ8-Y11-WX-CX-C00000 (9V)

Product Name	SSC internal code	Order code	CRI	Flux bin	CCT	Step	VF bin
SZ8-Y11-W0-C7-C	00000	0W1654M000	70	0W1	65:6500K	4M: 4step Mixing	000
		0W2574M000		0W2	57:5700K		000
		0W2504M000		0W2	50:5000K		000
SZ8-Y11-WN-C7-C		0W1404M000		0W1	40:4000K		000
SZ8-Y11-WW-C7-C		0W1354M000		0W1	35:3500K		000
		0V3304M000		0V3	30:3000K		000
		0V3274M000		0V3	27:2700K		000
SZ8-Y11-W0-C8-C		0V3654M000	80	0V3	65:6500K		000
		0V3574M000		0V3	57:5700K		000
		0V3504M000		0V3	50:5000K		000
SZ8-Y11-WN-C8-C		0V2404M000		0V2	40:4000K		000
SZ8-Y11-WW-C8-C		0V2354M000		0V2	35:3500K		000
		0V1304M000		0V1	30:3000K		000
		0V1274M000		0V1	27:2700K		000
SZ8-Y11-W0-C9-C		0U2654M000	90	0U2	65:6500K		000
		0U2574M000		0U2	57:5700K		000
		0U2504M000		0U2	50:5000K		000
SZ8-Y11-WN-C9-C		0U3404M000		0U3	40:4000K		000
SZ8-Y11-WW-C9-C		0U2354M000		0U2	35:3500K		000
		0U2304M000		0U2	30:3000K		000
		0U2274M000		0U2	27:2700K		000

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Performance Characteristics

Table 2-1. Electro Optical Characteristics, I_F=150mA, T_j=85℃ (3V)

Min. CRI, R_a [4]	Nominal CCT [K] [1]	Min. Flux [lm]	Typ. Luminous Flux Φ_V [3] [lm]	Typ. Luminous Efficacy [lm/W]
70	6500	68	72	175
	5700	68	72	175
	5000	68	74	179
	4000	68	74	179
	3500	64	70	170
	3000	64	70	170
	2700	64	70	170
80	6500	60	65	158
	5700	60	65	158
	5000	60	67	162
	4000	60	67	162
	3500	56	63	153
	3000	56	62	150
	2700	56	61	148
90	6500	56	61	148
	5700	56	61	148
	5000	52	56	136
	4000	52	56	136
	3500	49	54	130
	3000	49	52	126
	2700	46	49	119
	2200	38	43	104

Notes :

(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 2-1. Electro Optical Characteristics, I_F=115mA, T_j=85℃ (9V)

Min. CRI, R_a [4]	Nominal CCT [K] [1]	Min. Flux [lm]	Typ. Luminous Flux Φ_V [3] [lm]	Typ. Luminous Efficacy [lm/W]
70	6500	133	142	142
	5700	142	142	142
	5000	142	147	147
	4000	133	147	147
	3500	125	141	141
	3000	125	139	139
	2700	125	136	136
80	6500	125	133	133
	5700	125	133	133
	5000	125	133	133
	4000	116	125	125
	3500	116	125	125
	3000	109	115	115
	2700	109	115	115
90	6500	102	114	114
	5700	102	114	114
	5000	102	112	112
	4000	102	112	112
	3500	96	105	105
	3000	96	104	104
	2700	96	102	102

Notes :

(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	I_F	-	150	700	mA
		-	115	230	
Power Dissipation	P_D	-	-	2.28	W
Junction Temperature	T_j	-	-	145	ºC
Storage Temperature	T_{stg}	- 40	-	125	ºC
Viewing angle	θ		150		degree
Thermal resistance (J to S) [2]	$R\theta_{J-S}$	-	10 [3]	-	K/W
ESD Sensitivity(HBM)			Class 2 JEDEC JS-001-2017		

Notes :

(1) At Junction Temperature 85℃ condition.

(2) $R\theta_{J-S}$ is tested at typical forward current.

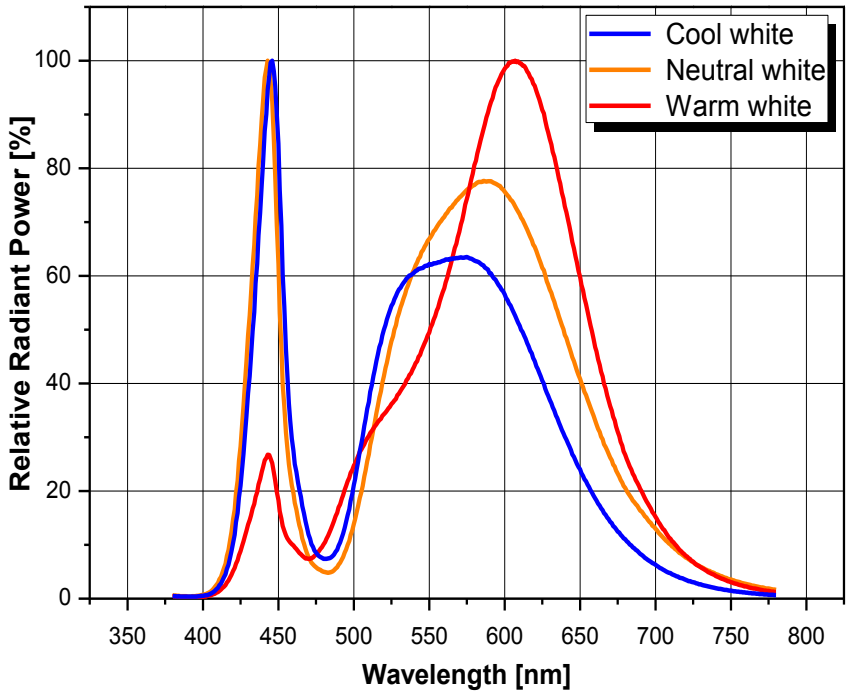
(3) Using Metal PCB (Normal type).

(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.

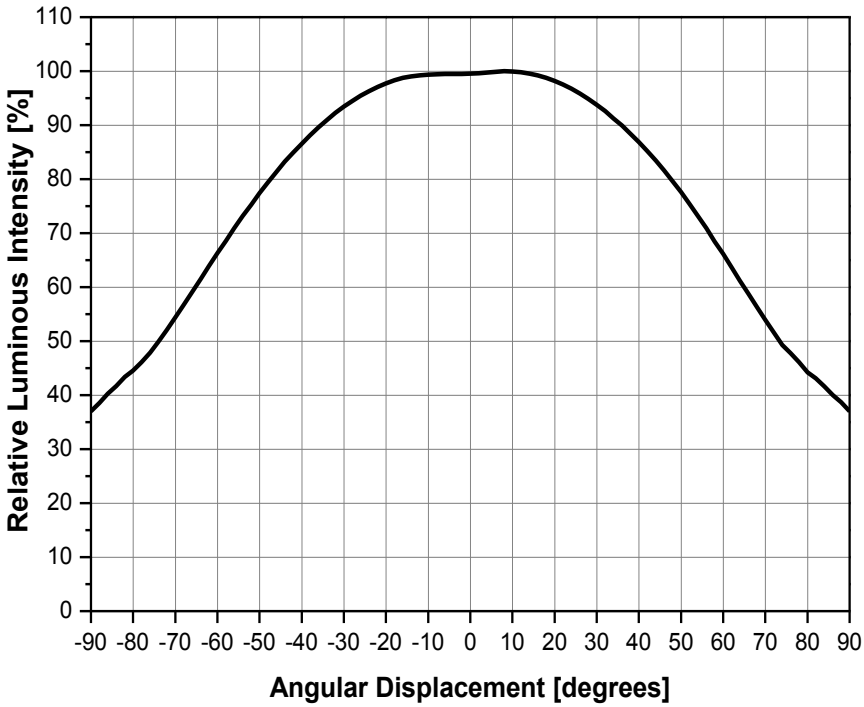
Characteristics Graph

Color Spectrum



(Fig 1)

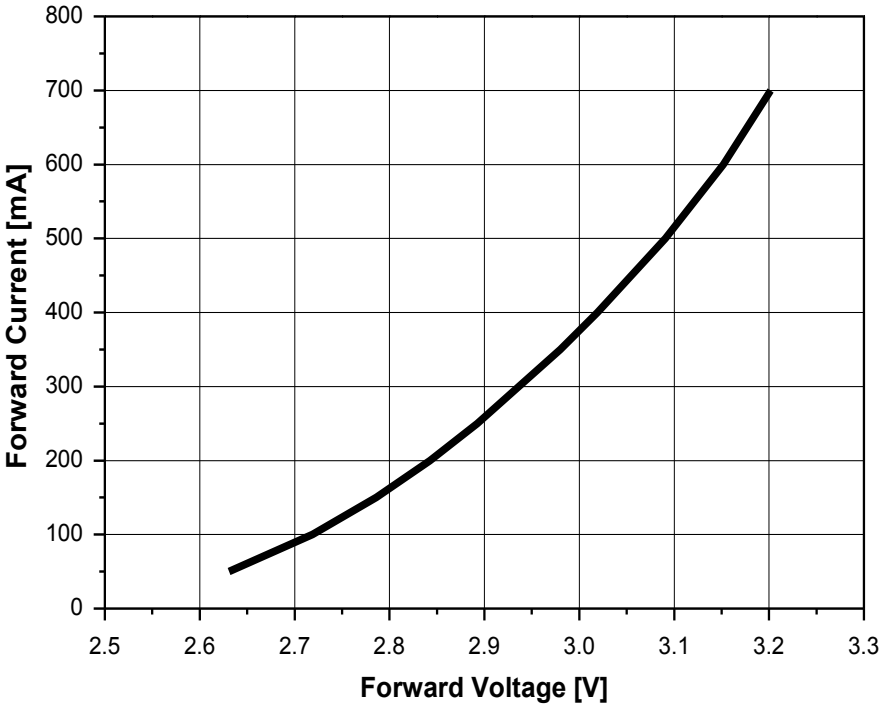
Typical Spatial Distribution



(Fig 2)

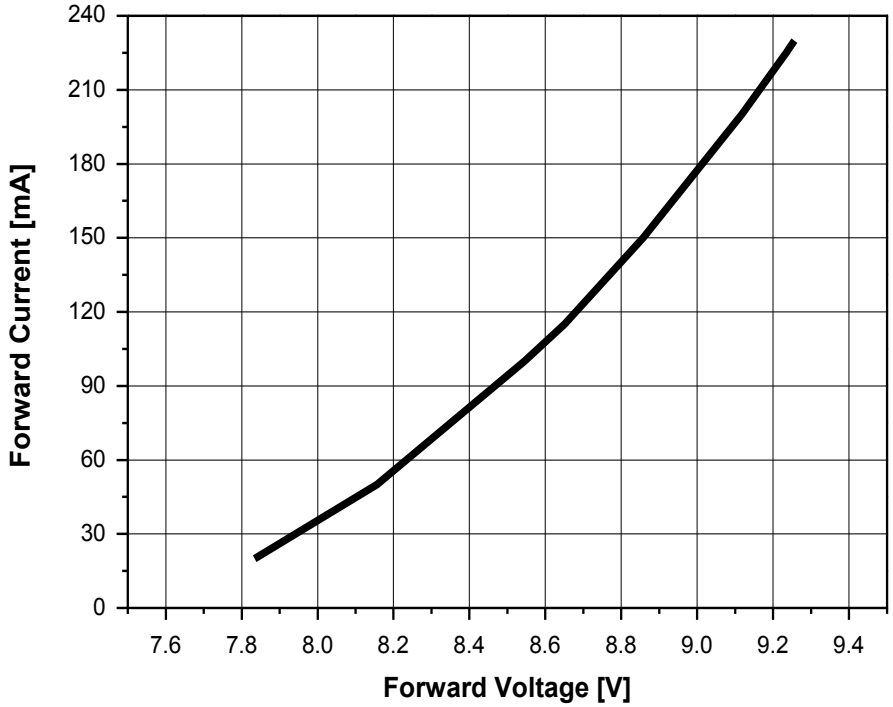
Characteristics Graph

Forward Voltage vs. Forward Current, T_j=85℃ (3V)



(Fig 3-1)

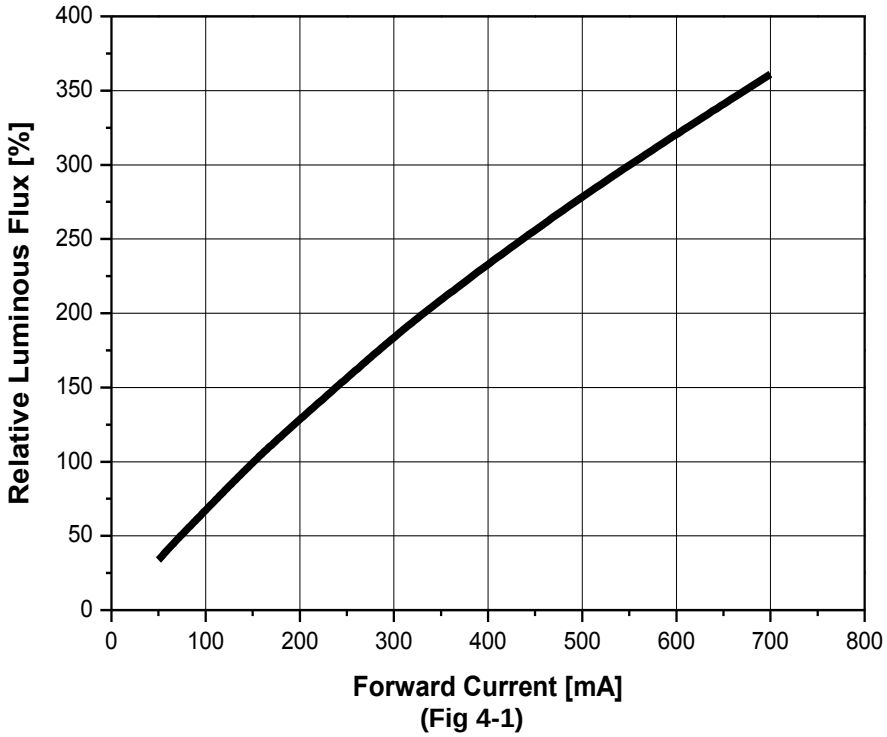
Forward Voltage vs. Forward Current, T_j=85℃ (9V)



(Fig 3-2)

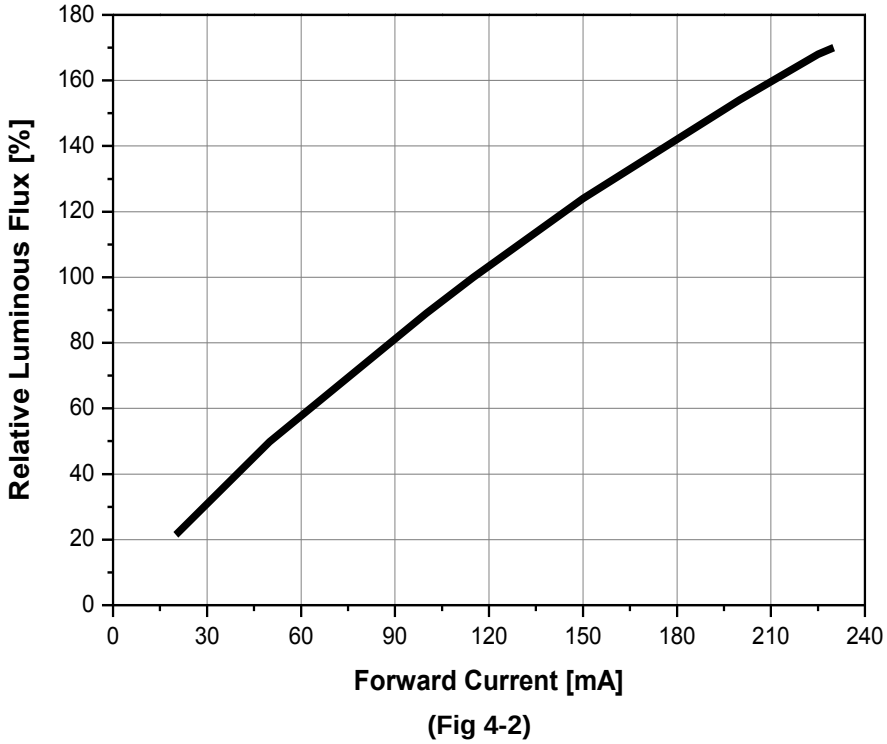
Characteristics Graph

Forward Current vs. Relative Luminous Flux, T_j=85℃ (3V)



(Fig 4-1)

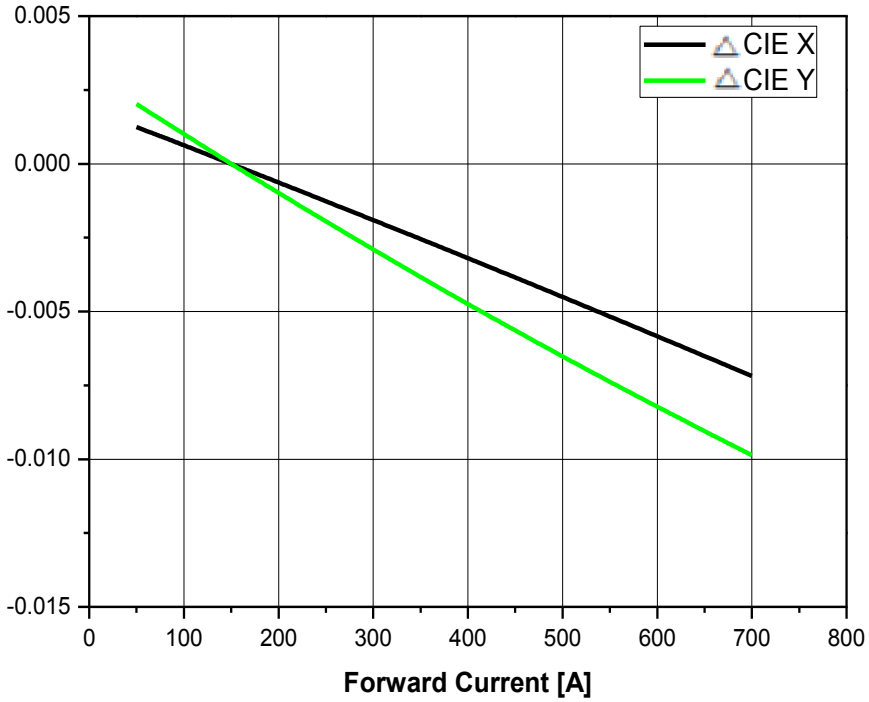
Forward Current vs. Relative Luminous Flux, T_j=85℃ (9V)



(Fig 4-2)

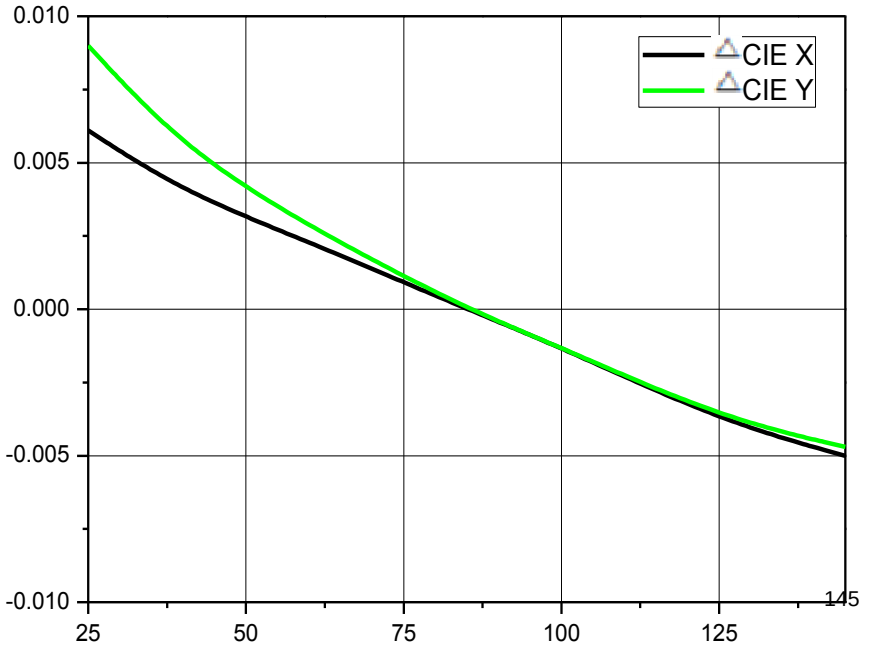
Characteristics Graph

Forward Current vs. CIE X, Y Shift



(Fig 5)

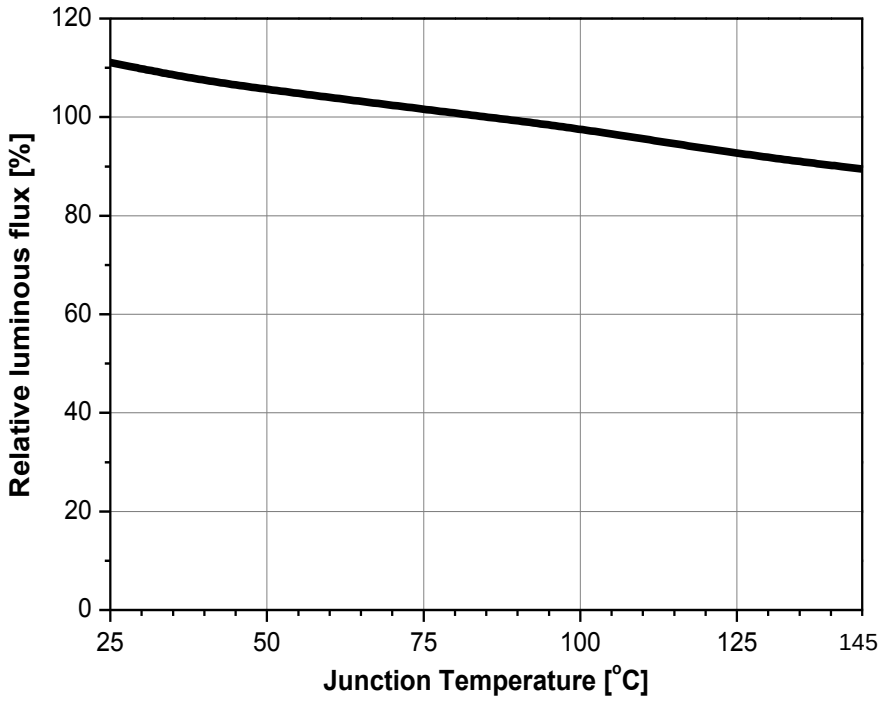
Junction Temp. vs. CIE X, Y Shift



(Fig 6)

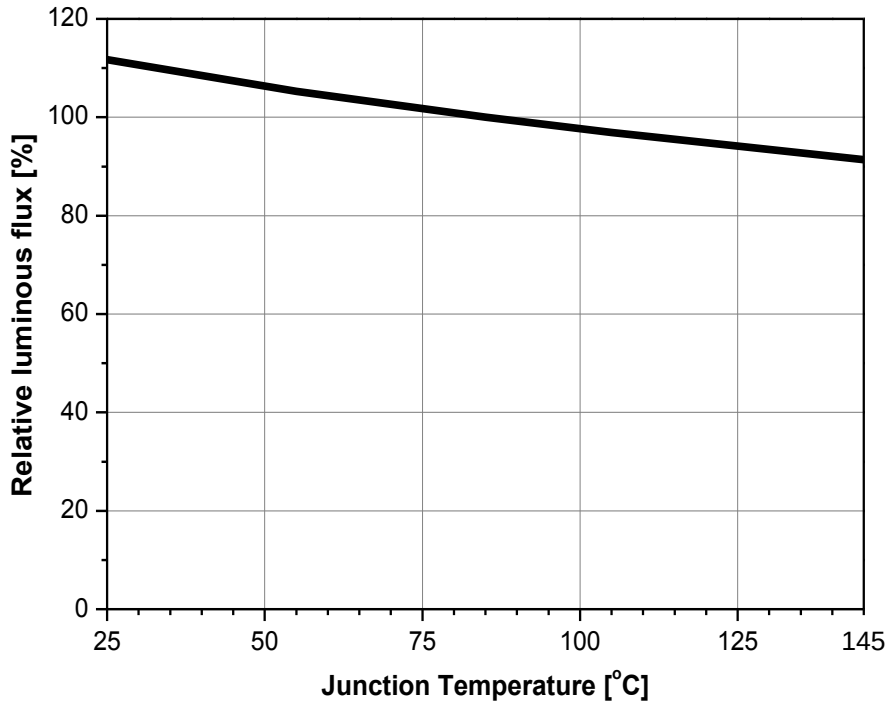
Characteristics Graph

Relative Light Output vs. Junction Temperature, I_F=150mA (3V)



(Fig 7-1)

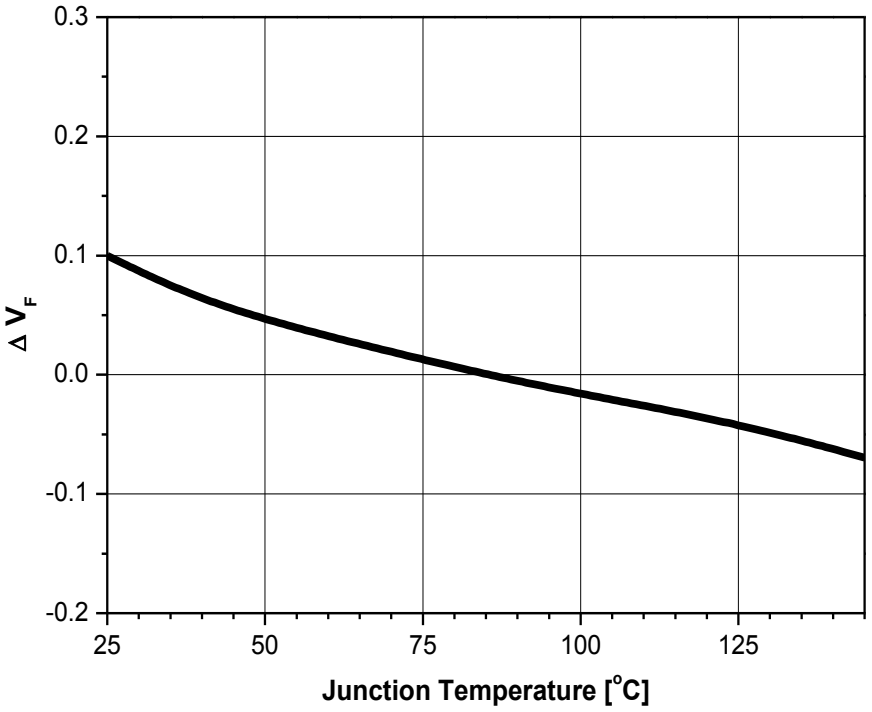
Relative Light Output vs. Junction Temperature, I_F=115mA (9V)



(Fig 7-2)

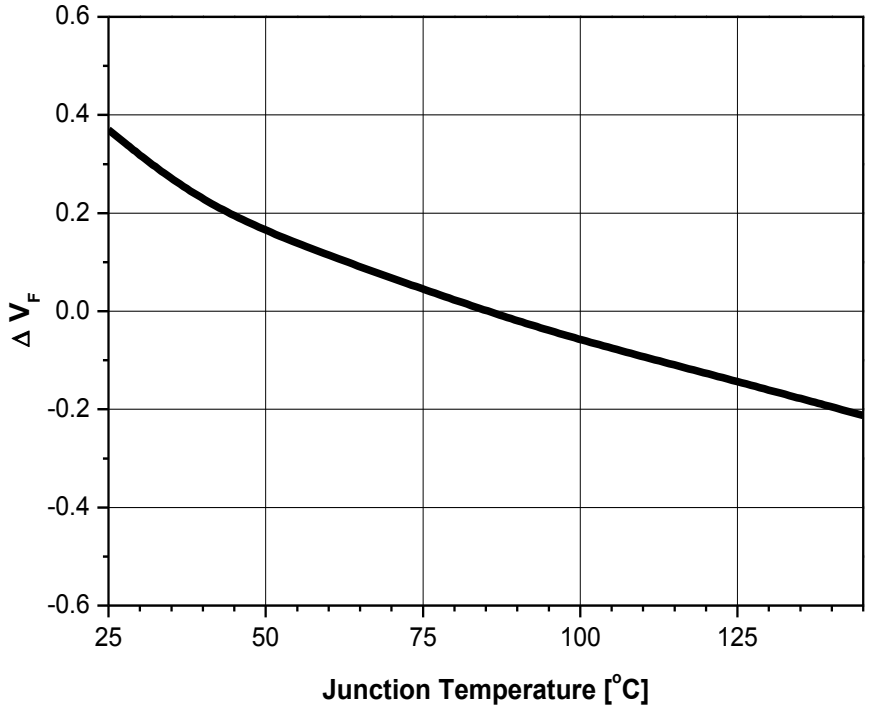
Characteristics Graph

Relative Forward Voltage vs. Junction Temperature, I_F=150mA (3V)



(Fig 8-1)

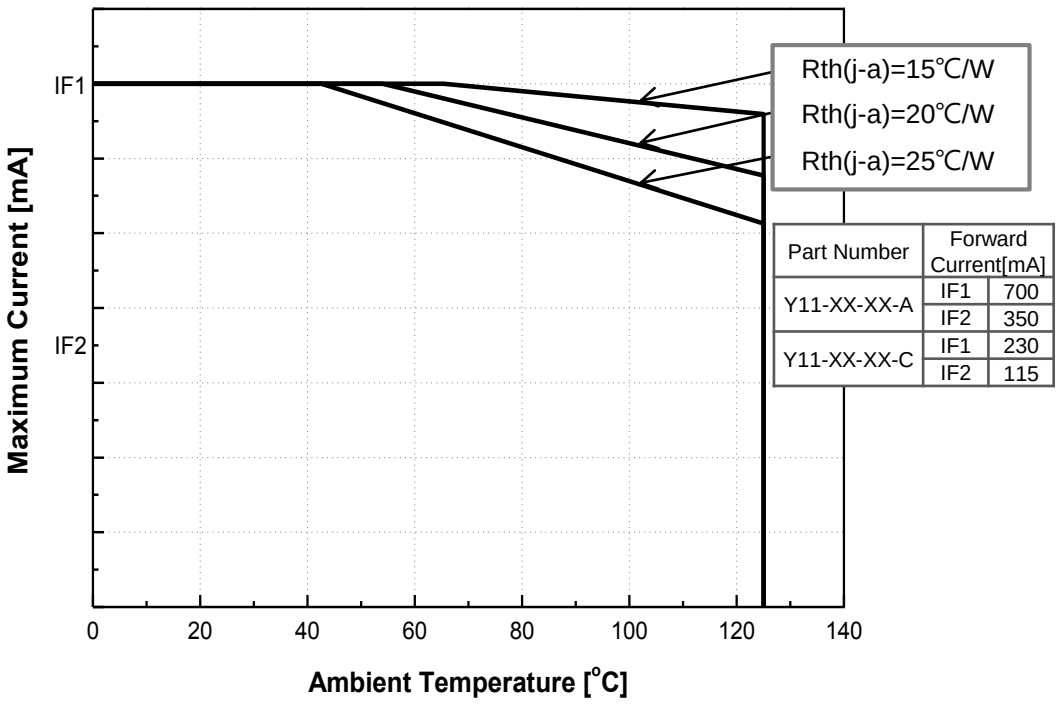
Relative Forward Voltage vs. Junction Temperature, I_F=115mA (9V)



(Fig 8-2)

Characteristics Graph

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



Part Number	Forward Current[mA]	
Y11-XX-XX-A	IF1	700
	IF2	350
Y11-XX-XX-C	IF1	230
	IF2	115

(Fig 9)

Performance Characteristics

Table 4-1. Bin Code description, I_F=150mA, T_j=85℃ (3V)

Part Number	Luminous Flux [lm]			Color Chromaticity Coordinate	Typical Forward Voltage [V_F] [1] *		
	Bin Code	Min.	Max.		Bin Code	Min.	Max.
SZ8-Y11-WX-Cx-A00000	W3	73	77	Refer to page. 17~26	G	2.55	2.80
	W2	68	73				
	W1	64	68				
	V3	60	64				
	V2	56	60				
	V1	52	56				
	U3	49	52		H	2.80	3.05
	U2	46	49				
	U1	43	46				
	T3	40	43				
	T2	37	40				

Table 5-1. Luminous Flux rank distribution

Available Rank

CRI	CCT	CIE	Luminous Flux Rank										
70	6,000 ~ 7,000K	A	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,900~ 3,200K	G	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,600~ 2,900K	H	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
80	6,000 ~ 7,000K	A	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,900 ~ 3,200K	G	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,600 ~ 2,900K	H	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
90	6,000 ~ 7,000K	A	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,900 ~ 3,200K	G	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,600 ~ 2,900K	H	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3
	2,100 ~ 2,300K	K	T2	T3	U1	U2	U3	V1	V2	V3	W1	W2	W3

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.

Performance Characteristics

Table 4-1. Bin Code description, I_F=115mA, T_j=85℃ (9V)

Part Number	Luminous Flux [lm]			Color Chromaticity Coordinate	Typical Forward Voltage [V_F] [1] *		
	Bin Code	Min.	Max.		Bin Code	Mn.	Max.
SZ8-Y11-WX-Cx-C00000	W3	152	160	Refer to page. 17~26	G	8.2	8.5
	W2	142	152				
	W1	133	142				
	V3	125	133		H	8.5	8.8
	V2	116	125				
	V1	109	116				
	U3	102	109		I	8.8	9.15
	U2	96	102				

Table 5-1. Luminous Flux rank distribution

Available Rank

CRI	CCT	CIE	Luminous Flux Rank							
70	6,000 ~ 7,000K	A	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	U2	U3	V1	V2	V3	W1	W2	W3
	2,900~ 3,200K	G	U2	U3	V1	V2	V3	W1	W2	W3
	2,600~ 2,900K	H	U2	U3	V1	V2	V3	W1	W2	W3
80	6,000 ~ 7,000K	A	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	U2	U3	V1	V2	V3	W1	W2	W3
	2,900 ~ 3,200K	G	U2	U3	V1	V2	V3	W1	W2	W3
	2,600 ~ 2,900K	H	U2	U3	V1	V2	V3	W1	W2	W3
90	6,000 ~ 7,000K	A	U2	U3	V1	V2	V3	W1	W2	W3
	5,300 – 6,000K	B	U2	U3	V1	V2	V3	W1	W2	W3
	4,700 ~ 5,300K	C	U2	U3	V1	V2	V3	W1	W2	W3
	3,700 ~ 4,200K	E	U2	U3	V1	V2	V3	W1	W2	W3
	3,200 ~ 3,700K	F	U2	U3	V1	V2	V3	W1	W2	W3
	2,900 ~ 3,200K	G	U2	U3	V1	V2	V3	W1	W2	W3
	2,600 ~ 2,900K	H	U2	U3	V1	V2	V3	W1	W2	W3

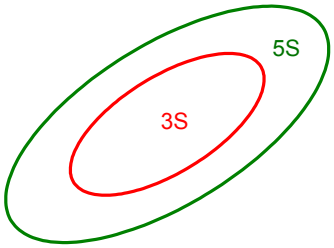
Notes :

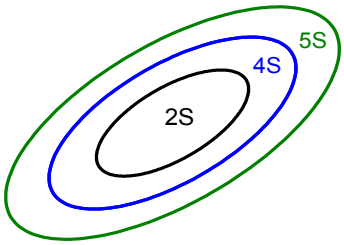
(1) Tolerance is ±0.06V on forward voltage measurements.

(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_a=25℃, I_F=65mA





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

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

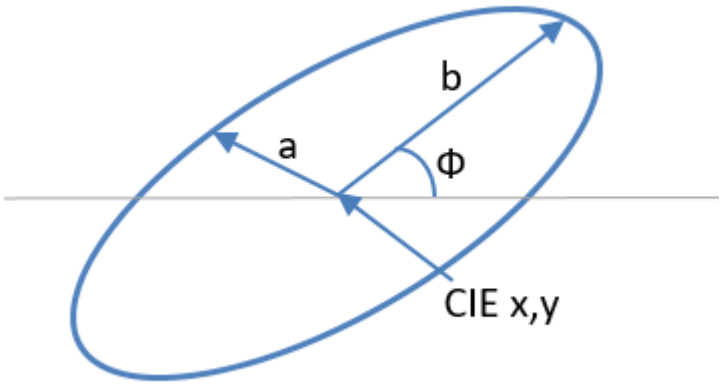
***Notes :**

1. xx2S Order is applicable only for 3M and 4M orders (2S shipping only is not allowed)
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

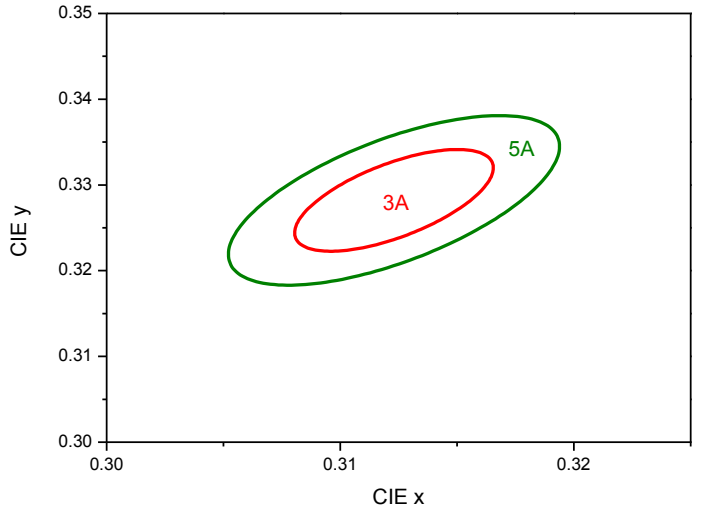
CIE Chromaticity Diagram, T_a=25℃, I_F=65mA

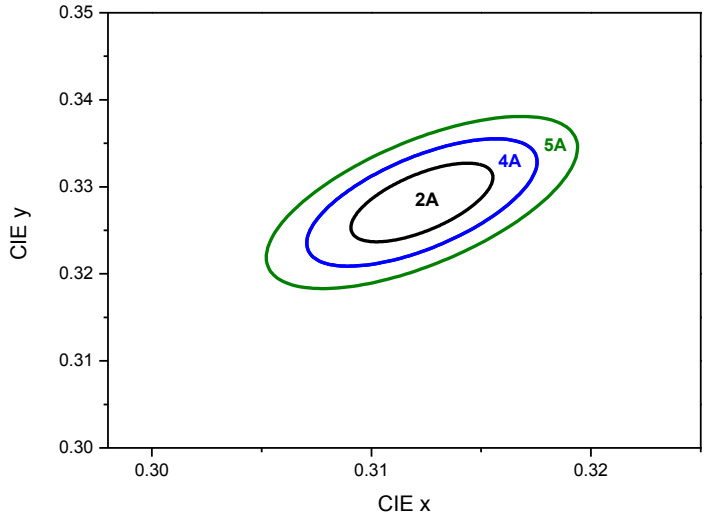


Macadam	CCT	Center Point		Major Axis	Minor Axis	Rotation Angle
	(K)	CIE x	CIE y	a	b	Φ
3 step	2700	0.4578	0.4101	0.0081	0.0042	54
	3000	0.4338	0.403	0.0083	0.0040	53
	3500	0.4073	0.3917	0.0093	0.0042	54
	4000	0.3818	0.3797	0.0094	0.0040	54
	5000	0.3447	0.3553	0.0082	0.0035	60
	5700	0.3287	0.3417	0.0076	0.0033	59
	6500	0.3123	0.3282	0.0067	0.0029	59
	2200	0.5018	0.4153	0.0086	0.004	49
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
	2200	0.5018	0.4153	0.0144	0.0066	49

Color Bin Structure

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



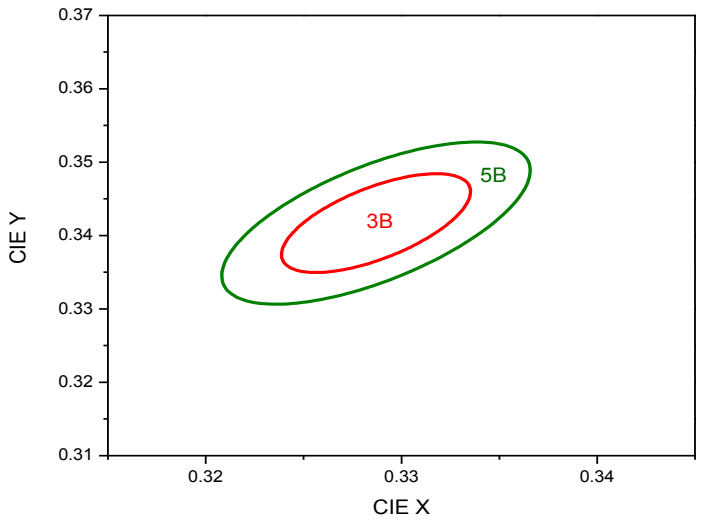


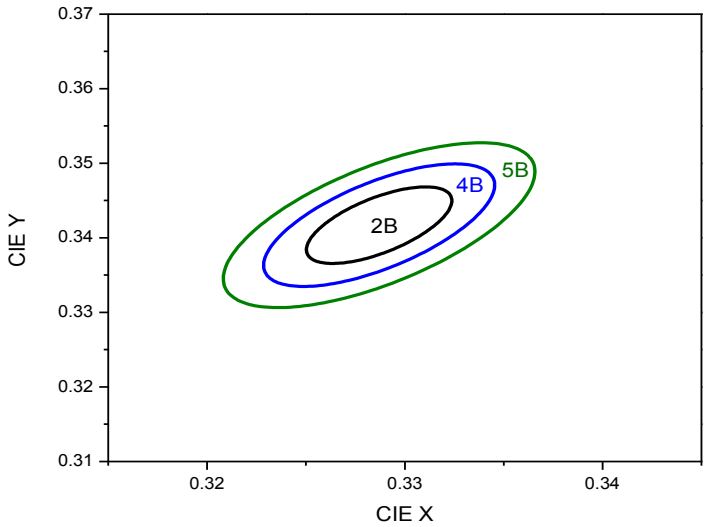
2A（2.3Step)		3A(3.0step)	
Center point	0.3123 :0.3282	Center point	0.3123 : 0.3282
Major Axis a	0.0051	Major Axis a	0.0067
Minor Axis b	0.0022	Minor Axis b	0.0029
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59

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

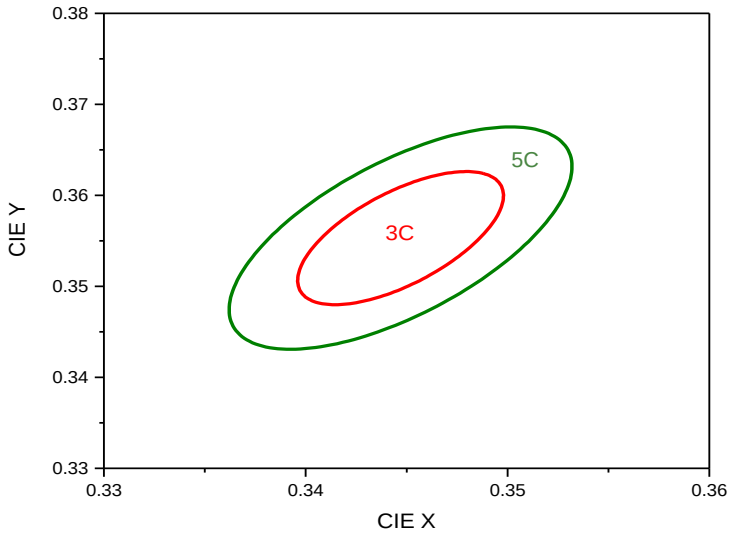


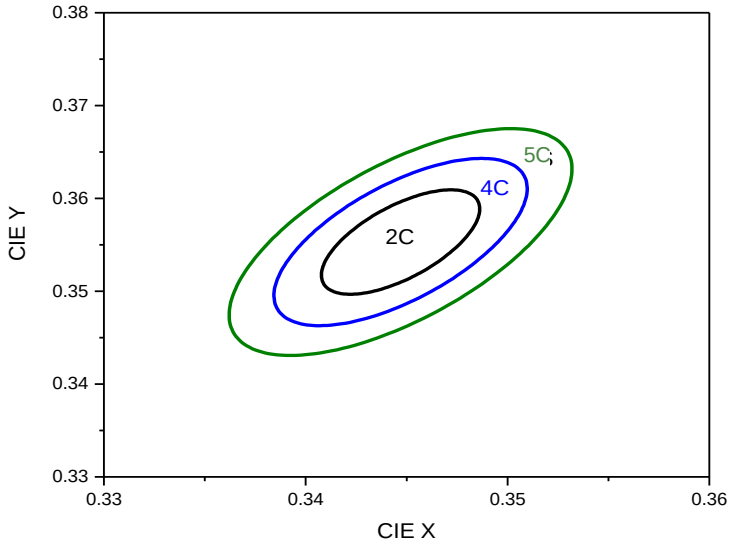


2B（2.3Step)		3B(3.0step)	
Center point	0.3287 : 0.3417	Center point	0.3287 : 0.3417
Major Axis a	0.0058	Major Axis a	0.0076
Minor Axis b	0.0025	Minor Axis b	0.0033
Ellipse Rotation Angle	59	Ellipse Rotation Angle	59
4B (3.7step)		**5B (5.0Step)**	
Center point	0.3287 : 0.3417	Center point	0.3287 : 0.3417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

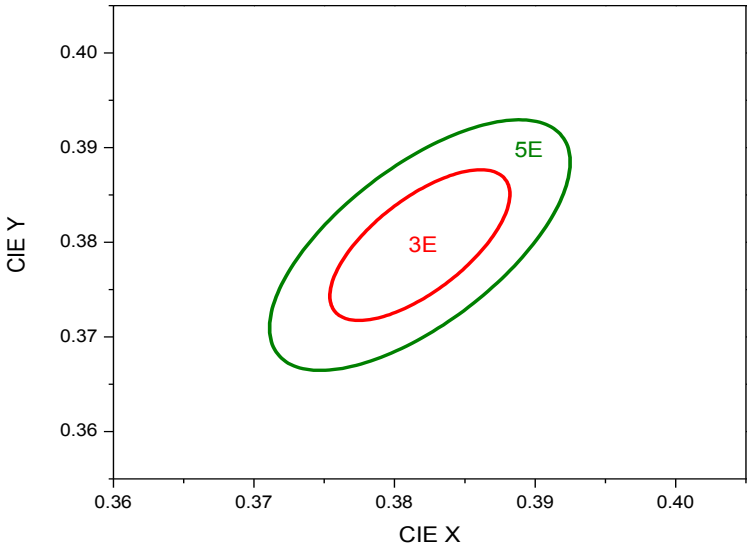


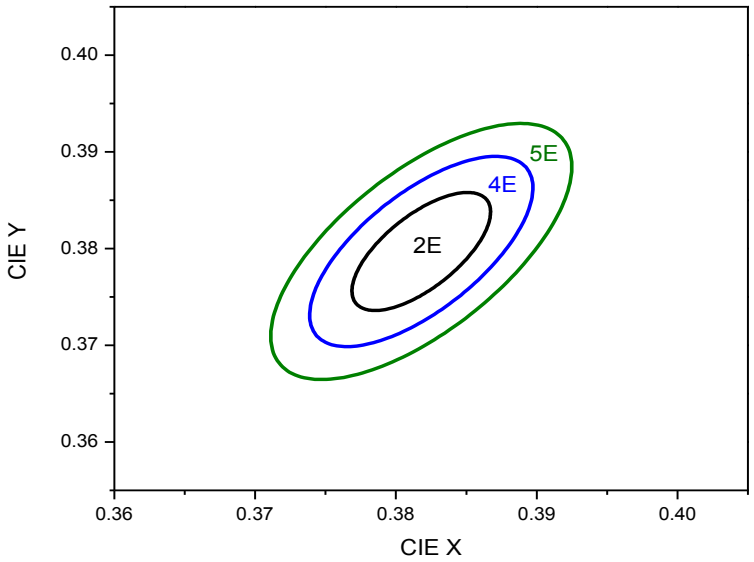


2C（2.3Step)		3C(3.0step)	
Center point	0.3447 : 0.3553	Center point	0.3447 : 0.3553
Major Axis a	0.0063	Major Axis a	0.0082
Minor Axis b	0.0027	Minor Axis b	0.0035
Ellipse Rotation Angle	60	Ellipse Rotation Angle	60
4C (3.7step)		**5C (5.0Step)**	
Center point	0.3447 : 0.3553	Center point	0.3447 : 0.3553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

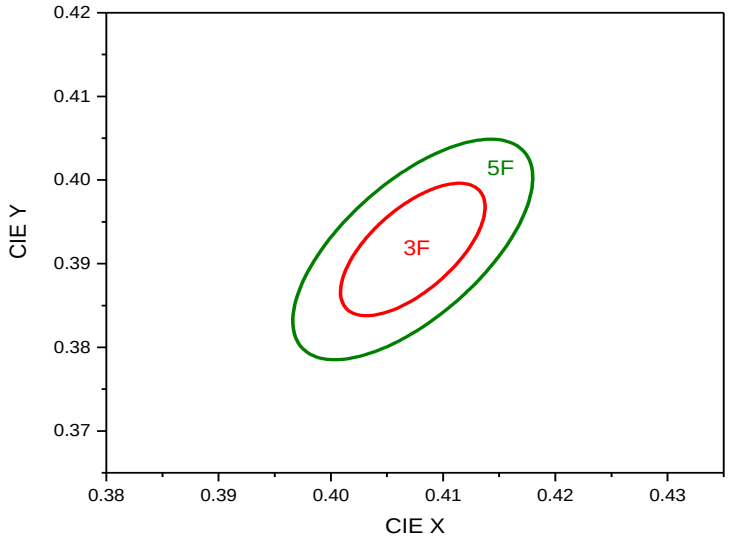


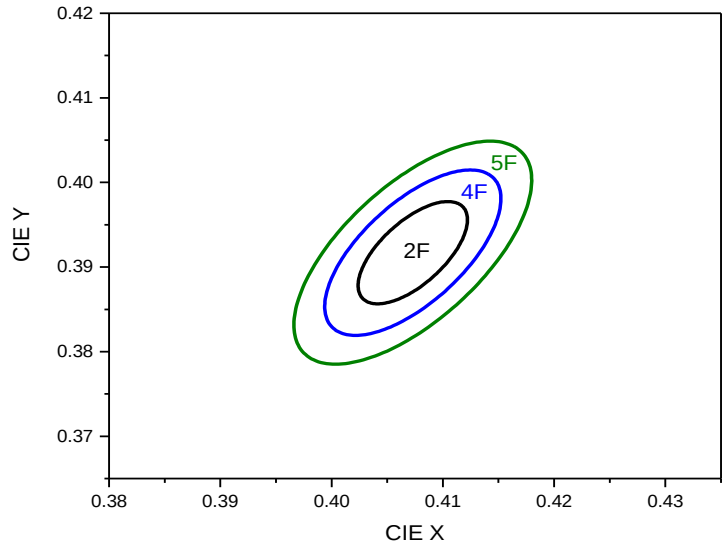


2E（2.3Step)		3E(3.0step)	
Center point	0.3818 : 0.3797	Center point	0.3818 : 0.3797
Major Axis a	0.0072	Major Axis a	0.0094
Minor Axis b	0.0031	Minor Axis b	0.0040
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4E (3.7step)		**5E (5.0Step)**	
Center point	0.3818 : 0.3797	Center point	0.3818 : 0.3797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

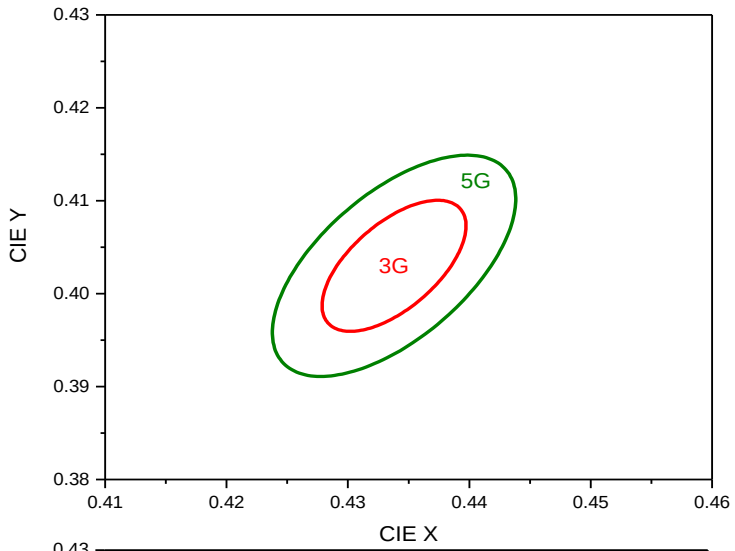


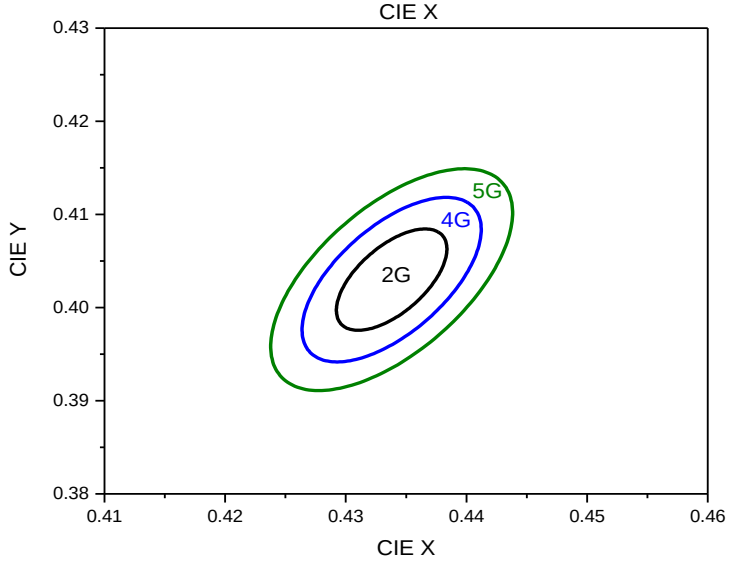


2F（2.3Step）		3F(3.0step)	
Center point	0.4073 : 0.3917	Center point	0.4073 : 0.3917
Major Axis a	0.0071	Major Axis a	0.0093
Minor Axis b	0.0032	Minor Axis b	0.0042
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4F (3.7step)		**5F (5.0Step)**	
Center point	0.4073 : 0.3917	Center point	0.4073 : 0.3917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

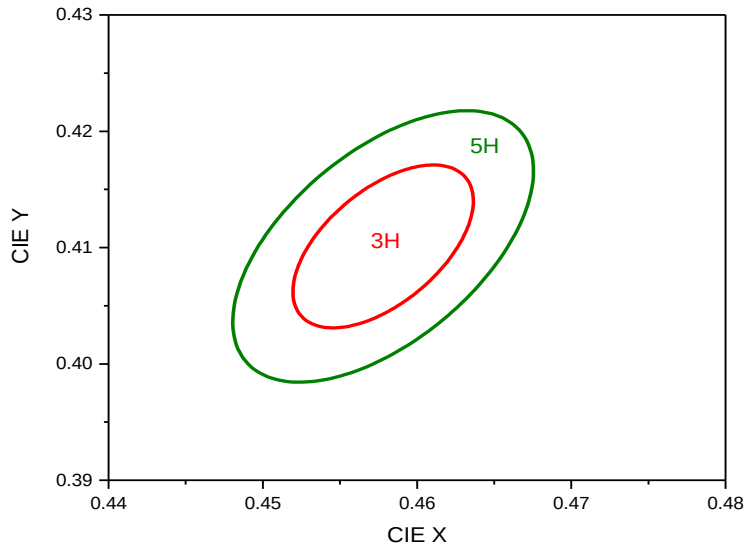


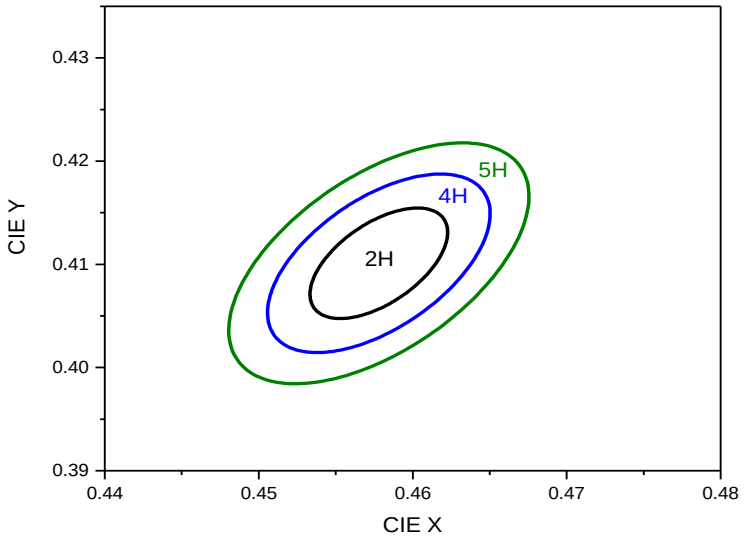


2G（2.3Step)		3G (3.0step)	
Center point	0.4338 : 0.4030	Center point	0.4338 : 0.4030
Major Axis a	0.0064	Major Axis a	0.0083
Minor Axis b	0.0031	Minor Axis b	0.0040
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53
4G 3.7step)		**5G (5.0Step)**	
Center point	0.4338 : 0.4030	Center point	0.4338 : 0.4030
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

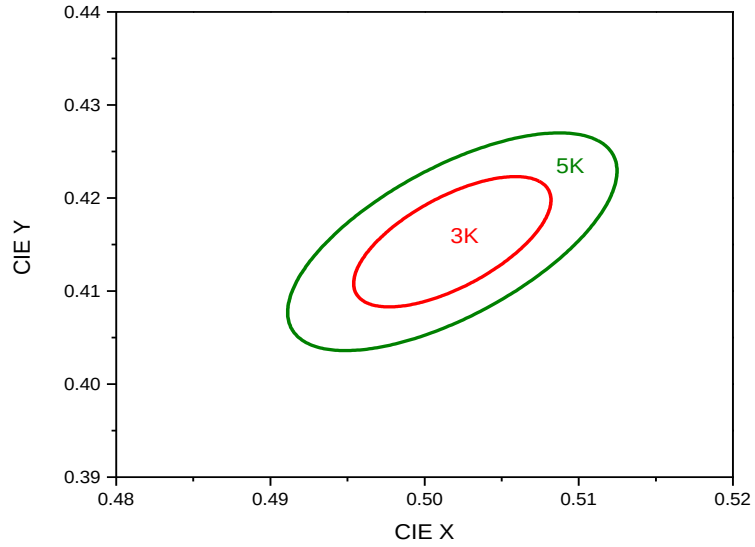


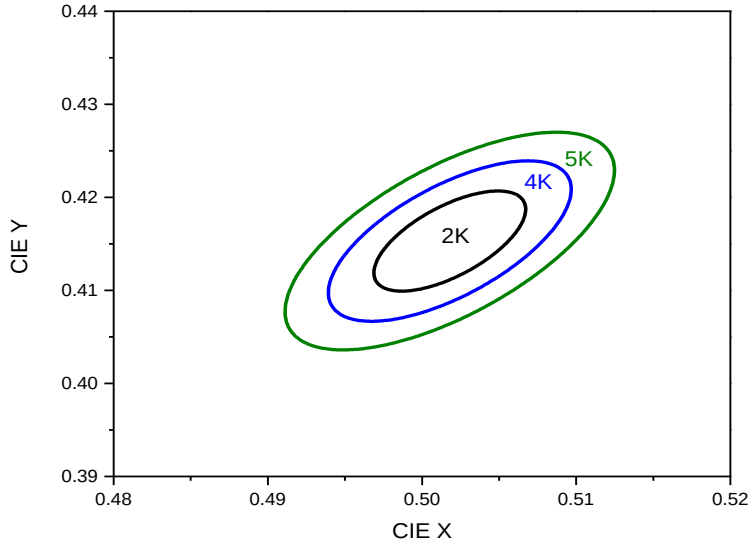


2H（2.3Step)		3H (3.0step)	
Center point	0.4578 : 0.4101	Center point	0.4578 : 0.4101
Major Axis a	0.0062	Major Axis a	0.0081
Minor Axis b	0.0032	Minor Axis b	0.0042
Ellipse Rotation Angle	54	Ellipse Rotation Angle	54
4H (3.7step)		**5H (5.0Step)**	
Center point	0.4578 : 0.4101	Center point	0.4578 : 0.4101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

Color Bin Structure

CIE Chromaticity Diagram, Ta=25℃, I_F=65mA, CCT=2200K





2K (2.3Step)		3K (3.0step)	
Center point	0.5018 : 0.4153	Center point	0.5018 : 0.4153
Major Axis a	0.0066	Major Axis a	0.0086
Minor Axis b	0.0031	Minor Axis b	0.0040
Ellipse Rotation Angle	49	Ellipse Rotation Angle	49
4K (3.7step)		**5K (5.0Step)**	
Center point	0.5018 : 0.4153	Center point	0.5018 : 0.4153
Major Axis a	0.0106	Major Axis a	0.0144
Minor Axis b	0.0049	Minor Axis b	0.0066
Ellipse Rotation Angle	49	Ellipse Rotation Angle	49

Mixing order kiting combination

Kiting Combination with xx3M

Part Number	Combination	Reel	FLUX	CIE	VF	Qty
SZ8-Y11-WX-Cx-A00000	Kiting_a	Reel 1	ALL	2S	ALL	3,000pcs
		Reel 2	ALL	2S	ALL	3,000pcs
	Kiting_b	Reel 1	ALL	2S	ALL	3,000pcs
		Reel 2	ALL	4S	ALL	3,000pcs
SZ8-Y11-WX-Cx-C00000	Kiting_a	Reel 1	ALL	2S	ALL	3,000pcs
		Reel 2	ALL	2S	ALL	3,000pcs
	Kiting_b	Reel 1	ALL	2S	ALL	3,000pcs
		Reel 2	ALL	4S	ALL	3,000pcs

Kiting Combination with xx4M

Part Number	Combination	Reel	FLUX	CIE	VF	Qty
SZ8-Y11-WX-Cx-A00000	Kiting_a	Reel 1	ALL	3S	ALL	3,000pcs
		Reel 2	ALL	3S	ALL	3,000pcs
	Kiting_b	Reel 1	ALL	3S	ALL	3,000pcs
		Reel 2	ALL	5S	ALL	3,000pcs
SZ8-Y11-WX-Cx-C00000	Kiting_a	Reel 1	ALL	3S	ALL	3,000pcs
		Reel 2	ALL	3S	ALL	3,000pcs
	Kiting_b	Reel 1	ALL	3S	ALL	3,000pcs
		Reel 2	ALL	5S	ALL	3,000pcs

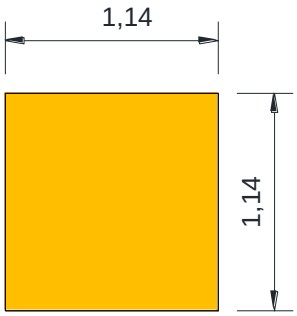
Product Nomenclature

Table 6. Nomenclature example

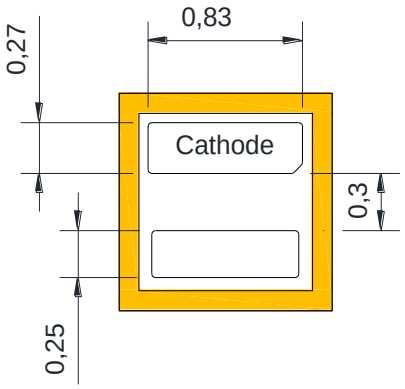
S	Z	8	-	Y	1	1	-	W	X	-	C	X	-	X	0	0	0	0	0	a	b	b	c	c	d	d	e	e	e
X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	X_{24}	X_{25}	X_{26}	X_{27}	X_{28}	X_{29}	X_{30}

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	11	1140x1140	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_{15}	X	A/C	X: A=3V/ C=9V
X_4, X_8, X_{11},X_{14}	-		
X_{16}~X_{20}	00000	internal code	
$X_{21}X_{22}X_{23}$	abb	Flux Bin	abb: 0T2, 0T3, 0U1,0U2, 0U3, 0V1, 0V2, 0V3, 0W1, 0W2, 0W3, 0W4
$X_{24}X_{25}$	cc	Color Temp.	65=6500K, 57=500K, 50=5000K, 40=4000K, 35= 3500K, 30=3000K, 27= 2700K, 22=2200K
$X_{26}X_{27}$	dd	step	3S: 3step single 3M: 3step Mixing / 4M: 4step Mixing
$X_{28}X_{29}X_{30}$	eee	VF Bin	000: All bin

Mechanical Dimensions

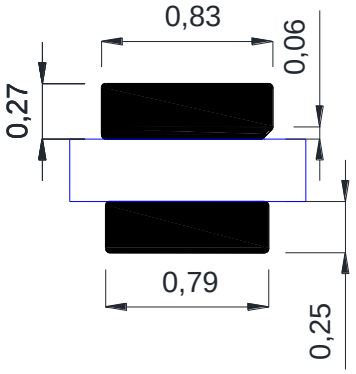


< Top >

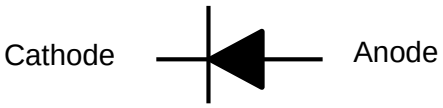


< Bottom >

< Side >



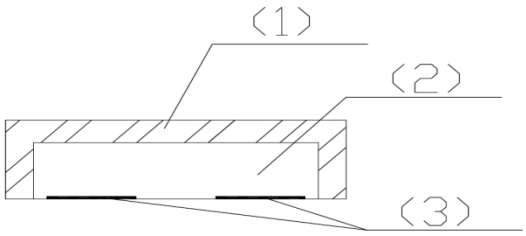
< Recommended Solder Pattern >



< Inner circuit >

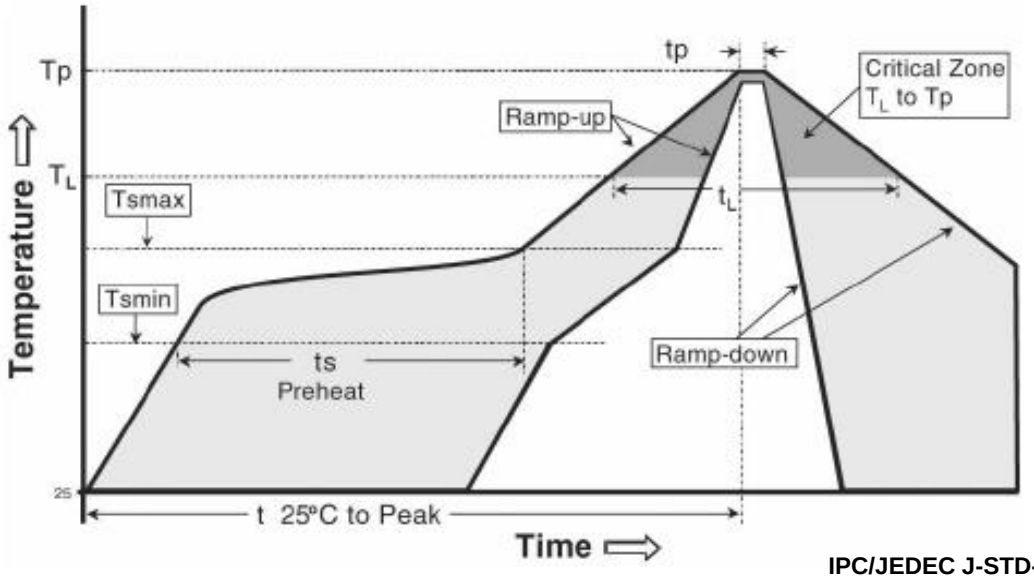
(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.13mm

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)

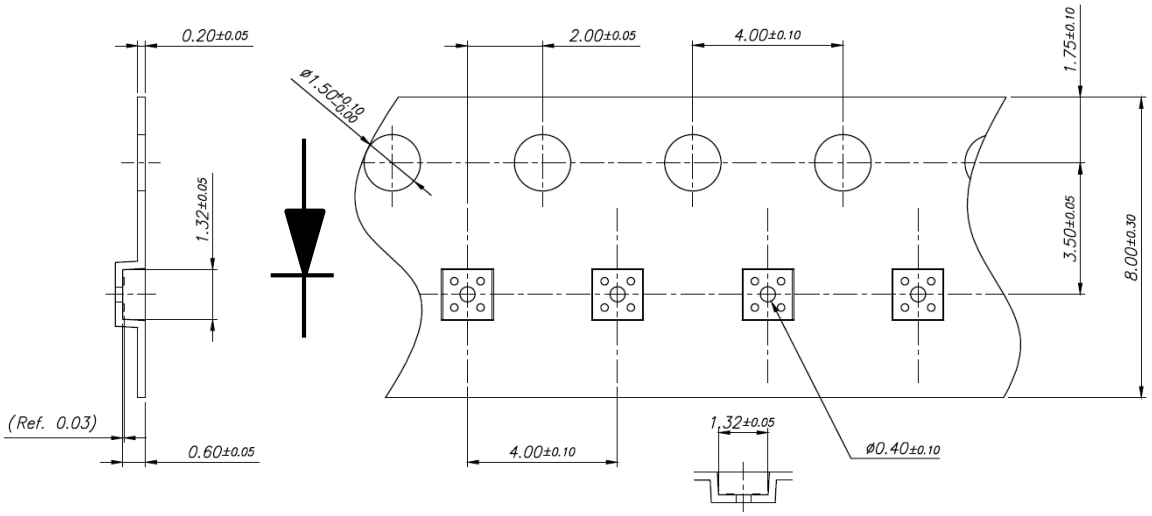
Caution

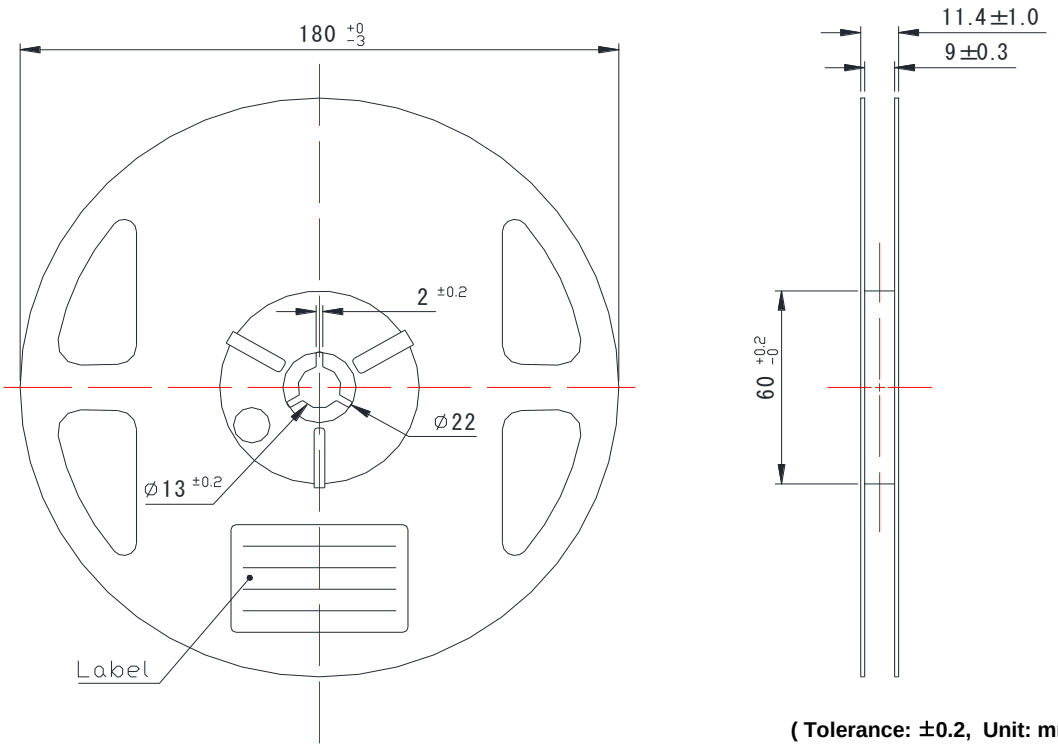
(1) Reflow soldering is recommended not to be done more than two times. When 24 hours passed after first soldering, following reflow soldering will make LED damaged.
(2) Re-soldering should not be done after the LED have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked on before and after such repair.
(3) Do not put stress on the LED during heating.
(4) After reflow, do not clean PCB with either water or solvent.

SMT recommendation

(1) After reflow, Over 80% reflectance of PSR is recommended.
(2) Solder paste materials (SAC 305, No Cleaning Paste)
(3) We recommend TOV Test 1.8V~2.8V at 1uA (per LED).
(4) We recommend IR Test 0~1uA at -5V (per LED) for 3V.
We recommend TOV Test 6.6V~8.5V at 30uA (per LED) for 9V.

Emitter Tape & Reel Packaging



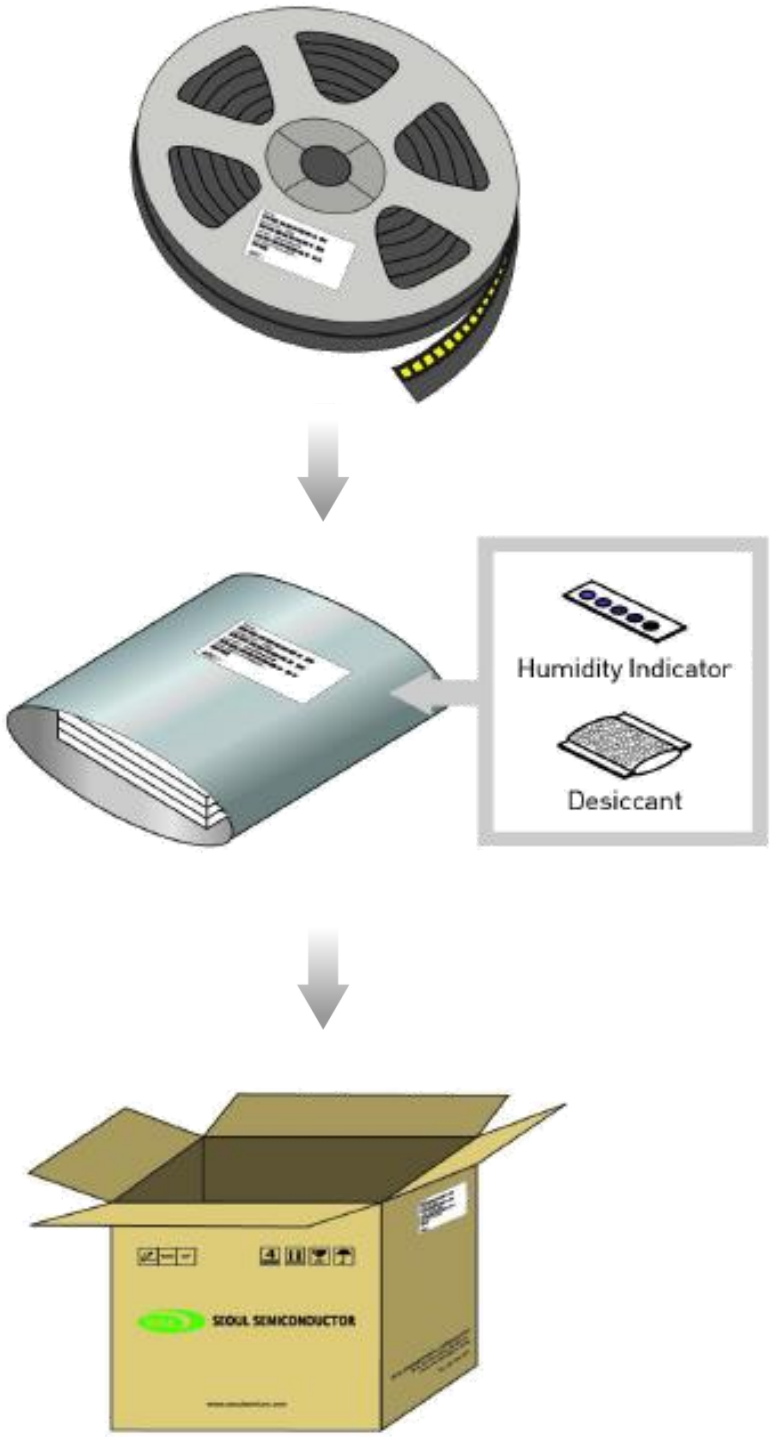


(Tolerance: ±0.2, Unit: mm)

Notes :

(1) Quantity : 3,000pcs/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 WICOP2 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 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 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 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 LED may c ause 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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