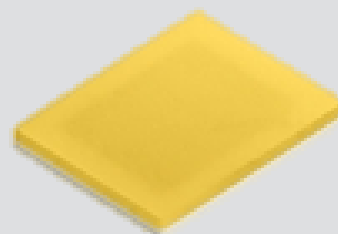


High Power LED Series Flip Chip Package

LH141A



Samsung flip chip provides optimized solution
for torch / flash light



Features & Benefits

- 2 W class high power LED
- Phosphor film directly attached to flip chip surface
- Plastic-free structure delivers low thermal resistance
- Compact footprint (1.46 x 1.46 mm)

Applications

Torch light

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_a	-40 ~ +85	°C	-
Storage Temperature	T_{stg}	-40 ~ +120	°C	-
LED Junction Temperature	T_j	130	°C	-
Forward Current	I_F	1000	mA	-
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	±2	kV	-

b) Electro-optical Characteristics

Item	Unit	Nominal CCT (K)	Condition		Value		
			I _F (mA)	T _J (°C)	Min.	Typ.	Max.
Luminous Flux (Φ _v)	lm	7600 (68 CRI)	350	25	110	120	
			700	25	200	210	
			1000	25	280	290	
Forward Voltage (V _F)	V		350	25	2.70	2.95	3.40
			700	25	2.90	3.15	3.60
			1000	25	3.00	3.25	3.70
Reverse Voltage (@ 10 μA)	V		350	25	8		
Color Rendering Index (Ra)	-		350	25	68		
Thermal Resistance (junction to solder point)	°C/W		350	25		5	
Beam Angle	°		350	25		120	

Note:

Samsung maintains measurement tolerance of: luminous flux = ±7 %, forward voltage = ±0.1 V, CRI = ±3

2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	C	S	6	N	T	B	6	E	F	L	1	N	0	F	Z	6	K

Digit	PKG Information	Code	Specification
1 2 3	Samsung Chip	SCS	
4	CRI	6	Min. 68
5	CCT (K)	R J N	5000 6000 7600
6	Chip Shape	T	FCOM Square
7 8 9	Chip Size (μm)	B6E	1160 x 1160 x 170 μm
10 11 12	Product Purpose	FL1	FCOM for Lighting
13 14	Color Rank	R0 J0 N0	R Rank R1, R2, R3, R4 J Rank Bin Code: J1, J2, J3, J4 N Rank N1, N2, N3, N4, N5, N6, M2, M4, M6
15 16	Luminous Flux (lm)	FZ	110~ Bin Code: FH 110~120 HZ 120~
17 18	Forward Voltage (V)	6K	2.7~3.4

a) Luminous Flux Bins ($I_f = 350 \text{ mA}$, $T_j = 25 \text{ }^\circ\text{C}$)

Nominal CCT (K)	CRI (R_a) Min.	Product Code	Flux Rank	Flux Bin	Flux Range (Φ_v , lm)
5000	68	SCS6RTB6EFL1R0FZ6K	FZ	FH	110 ~ 120
				HZ	120 ~
6000	68	SCS6JTB6EFL1J0FZ6K	FZ	FH	110 ~ 120
				HZ	120 ~
7600	68	SCS6NTB6EFL1N0FZ6K	FZ	FH	110 ~ 120
				HZ	120 ~

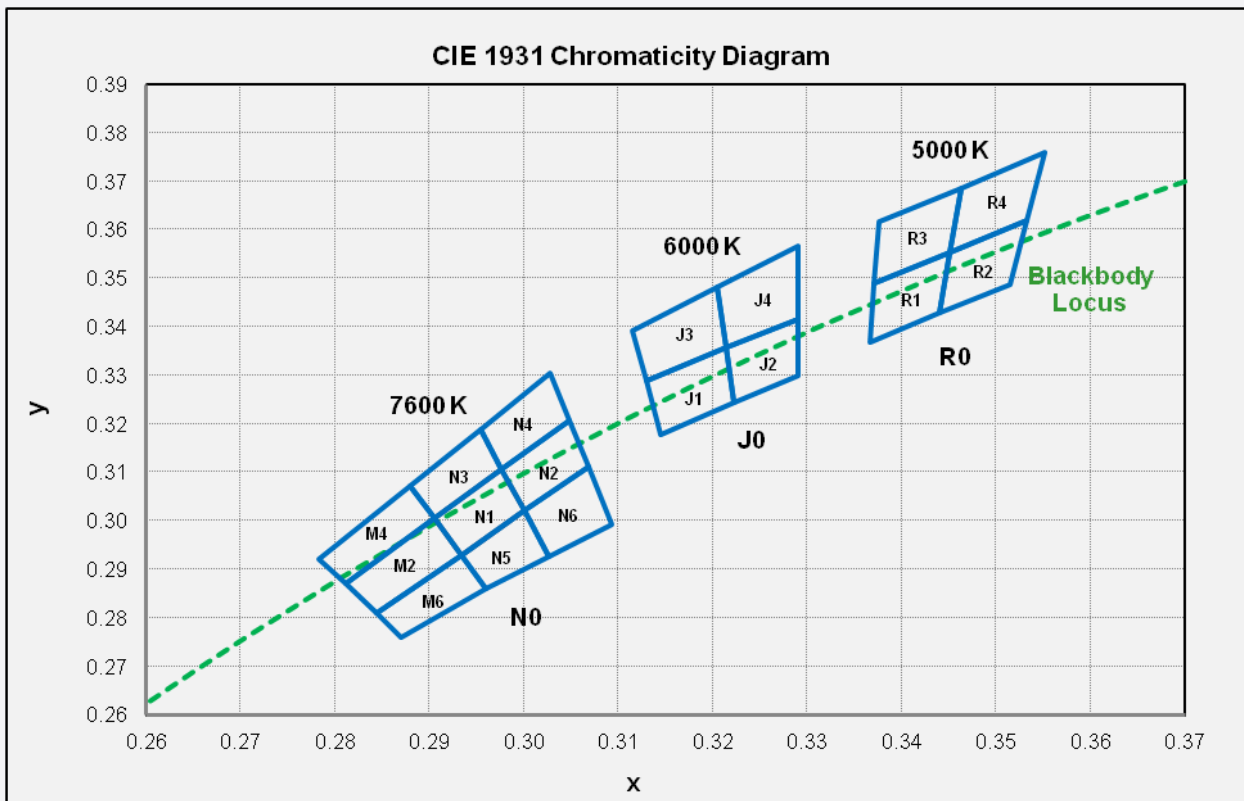
b) Color Bins ($I_f = 350 \text{ mA}$, $T_j = 25 \text{ }^\circ\text{C}$)

Nominal CCT (K)	CRI (R_a) Min.	Product Code	Color Rank	Chromaticity Bins
5000	68	SCS6RTB6EFL1R0FZ6K	R0	R1, R2, R3, R4
6000	68	SCS6JTB6EFL1J0FZ6K	J0	J1, J2, J3, J4
7600	68	SCS6NTB6EFL1N0FZ6K	N0	N1, N2, N3, N4, N5, N6, M2, M4, M6

c) Voltage Bins ($I_f = 350 \text{ mA}$, $T_j = 25 \text{ }^\circ\text{C}$)

Nominal CCT (K)	CRI (R_a) Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
5000	68	SCS6RTB6EFL1R0FZ6K			
6000	68	SCS6JTB6EFL1J0FZ6K	6K	-	2.7 ~ 3.4
7600	68	SCS6NTB6EFL1N0FZ6K			

d) Chromaticity Region & Coordinates ($I_f = 350 \text{ mA}$, $T_j = 25 \text{ }^\circ\text{C}$)



Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y
N rank (7600 K)								
N1	0.2933	0.2930	N3	0.2905	0.3005	N5	0.2959	0.2860
	0.3000	0.3021		0.2976	0.3106		0.3026	0.2927
	0.2976	0.3106		0.2954	0.3188		0.3000	0.3021
	0.2905	0.3005		0.2879	0.3072		0.2933	0.2930
N2	0.3000	0.3021	N4	0.2976	0.3106	N6	0.3026	0.2927
	0.3068	0.3113		0.3048	0.3207		0.3093	0.2993
	0.3048	0.3207		0.3028	0.3304		0.3068	0.3113
	0.2976	0.3106		0.2954	0.3188		0.3000	0.3021
M2	0.2811	0.2872	M4	0.2782	0.2922	M6	0.2844	0.2810
	0.2905	0.3005		0.2879	0.3072		0.2933	0.2930
	0.2933	0.2930		0.2905	0.3005		0.2959	0.2860
	0.2844	0.2810		0.2811	0.2872		0.2870	0.2760

Region	CIE x	CIE y
J rank (6000 K)		
J1	0.3145	0.3178
	0.3222	0.3243
	0.3214	0.3357
	0.3130	0.3290
J2	0.3145	0.3178
	0.3222	0.3243
	0.3214	0.3357
	0.3290	0.3417
J3	0.3290	0.3300
	0.3222	0.3243
	0.3130	0.3290
	0.3214	0.3357
J4	0.3205	0.3481
	0.3115	0.3391
	0.3130	0.3290
	0.3214	0.3357

Region	CIE x	CIE y
R rank (5000 K)		
R1	0.3366	0.3369
	0.3371	0.3490
	0.3451	0.3554
	0.3440	0.3427
R2	0.3366	0.3369
	0.3440	0.3427
	0.3451	0.3554
	0.3533	0.3620
R3	0.3371	0.3490
	0.3376	0.3616
	0.3463	0.3687
	0.3457	0.3620
R4	0.3451	0.3554
	0.3451	0.3554
	0.3463	0.3687
	0.3551	0.3760

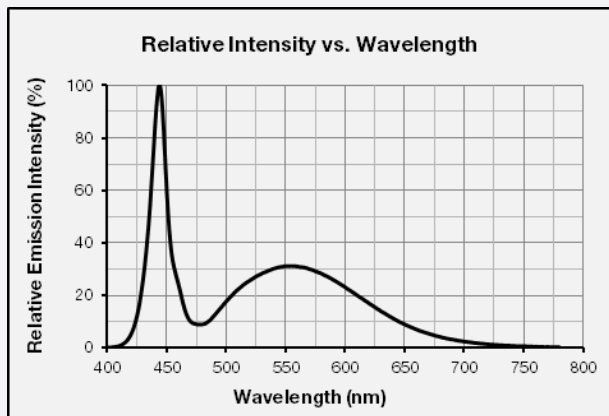
Note:

Samsung maintains measurement tolerance of: $C_x, C_y = \pm 0.005$

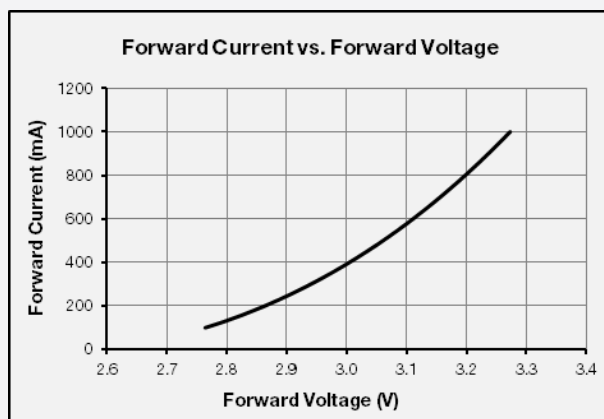
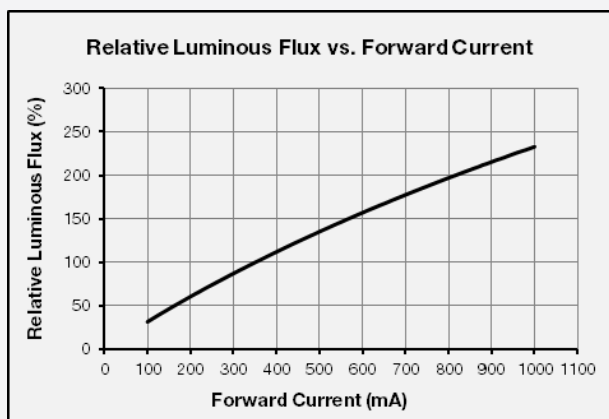


3. Typical Characteristics Graphs

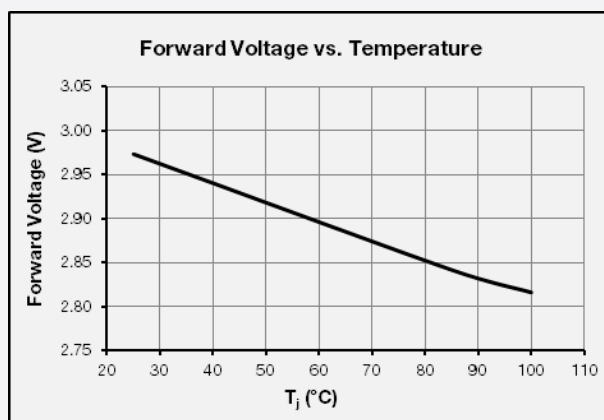
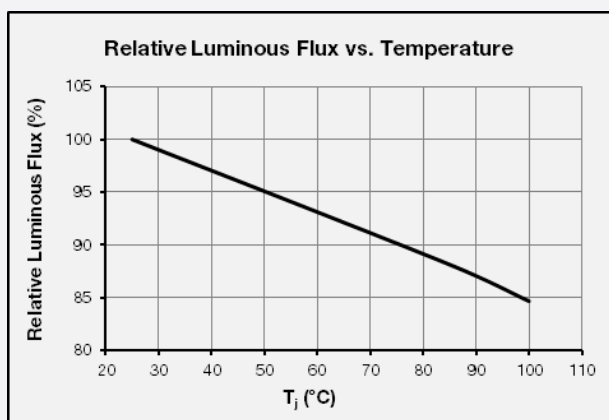
a) Spectrum Distribution ($I_F = 350 \text{ mA}$, $T_j = 25^\circ\text{C}$)



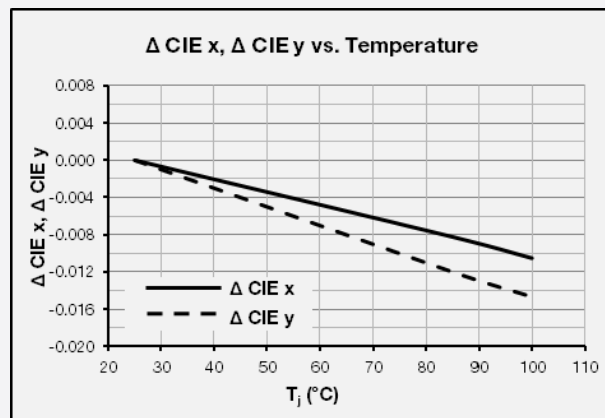
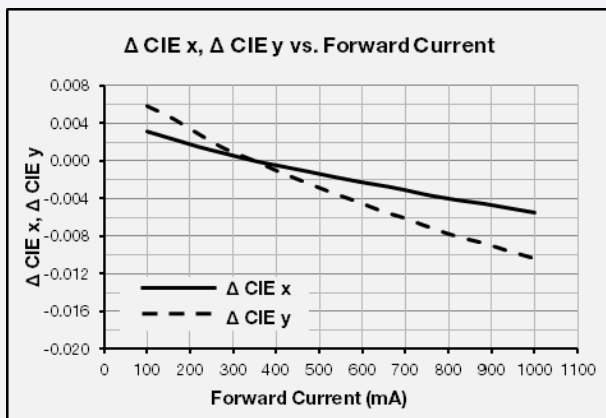
b) Forward Current Characteristics ($T_j = 25^\circ\text{C}$)



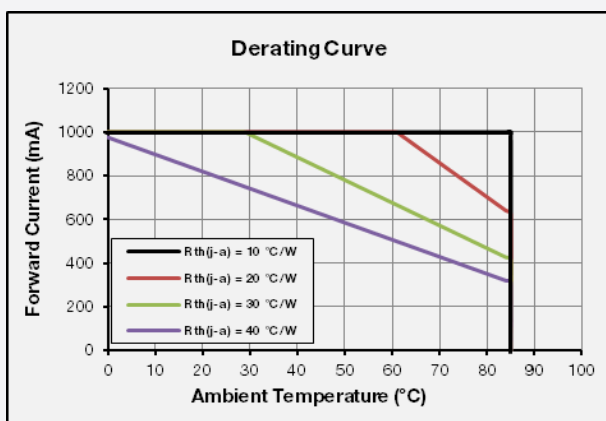
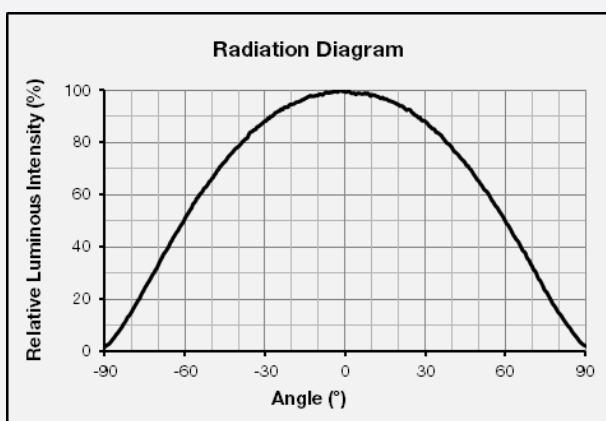
c) Temperature Characteristics ($I_F = 350 \text{ mA}$)



d) Color Shift Characteristics

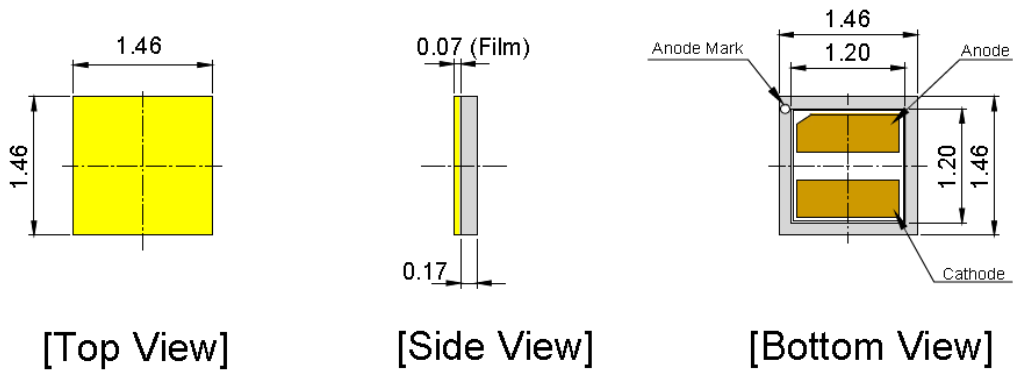
 $T_j = 25\text{ }^\circ\text{C}$ $I_F = 350\text{ mA}$ 

e) Derating Curve

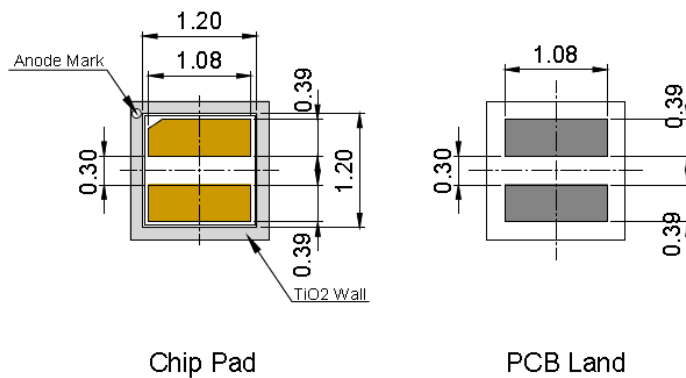
f) Beam Angle Characteristics ($I_F = 350\text{ mA}$, $T_j = 25\text{ }^\circ\text{C}$)

4. Outline Drawing & Dimension

1. Tolerance is ± 0.10 mm
2. Do not place LEDs with pressure



RECOMMENDED PCB SOLDER PAD

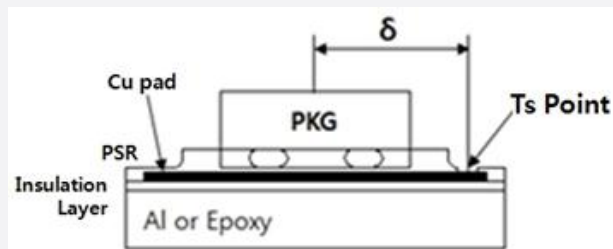


T_s Point & Measurement Method

Measure nearest point from the center of LED chip (δ) as shown below.

Distance between chip center and T_s point (δ) = 3.5 mm

$T_j = T_s + \text{Power} \times \text{Thermal resistance at } T_s (R_{j-s})$

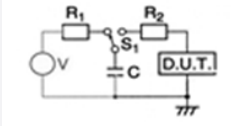


Precautions:

- 1) This LED chip PKG does not contain built-in ESD protection device.
- 2) Pressure on the LEDs will influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the LEDs. Do not put stress on the LEDs during heating.
- 3) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED's characteristics should be carefully checked before and after such repair.
- 4) Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might cause catastrophic failure of the LEDs.

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample Size
Room Temperature Life Test	25 °C, DC 1000 mA	1000 h	22
High Temperature Life Test	85 °C, DC 1000 mA	1000 h	22
High Temperature Humidity Life Test	85 °C, 85 % RH, DC 1000 mA	1000 h	22
Low Temperature Life Test	-40 °C, DC 1000 mA	1000 h	22
Temperature Humidity Cycle Test	-10 °C ↔ 25 °C 95 % RH ↔ 65 °C 95 % RH DC 1000 mA, 24 h / 1 cycle	10 cycles	11
Powered Temperature Cycle Test	-40 °C / 85 °C each 20 min, 100 min transfer power on/off each 5 min, DC 1000 mA	100 cycles	11
Thermal Shock	-45 °C / 15 min ↔ 125 °C / 15 min temperature change within 5 min	500 cycles	100
High Temperature Storage	120 °C	1000 h	11
Low Temperature Storage	-40 °C	1000 h	11
ESD (HBM)	 <p> R_1: 10 MΩ R_2: 1.5 kΩ C: 100 pF V: ± 2 kV </p>	5 times	5

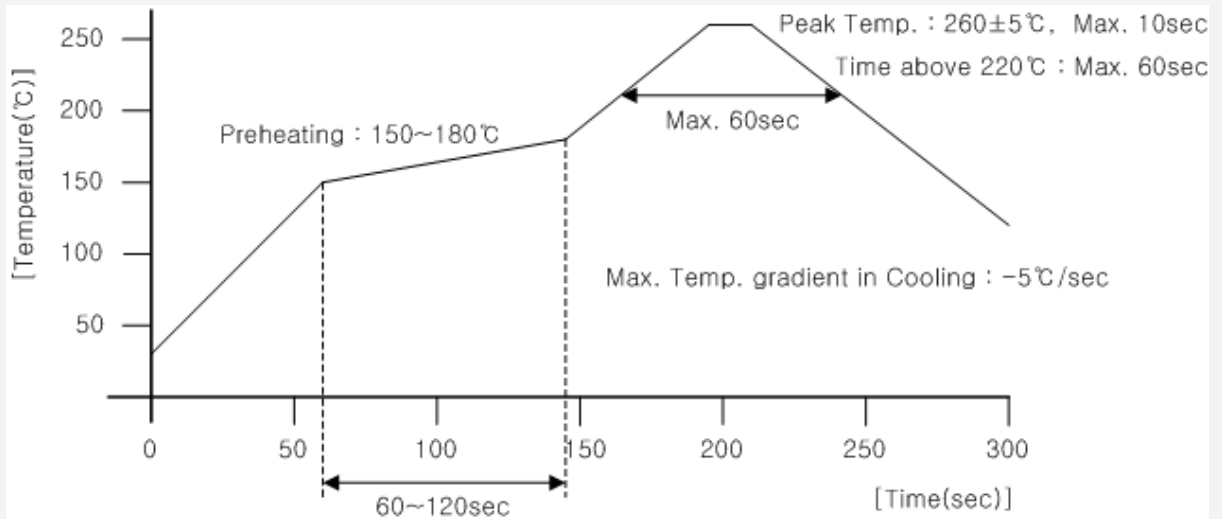
b) Criteria for Judging the Damage

Item	Symbol	Test Condition ($T_j = 25$ °C)	Limit	
			Min.	Max.
Forward Voltage	V_f	$I_f = 350$ mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	$I_f = 350$ mA	Init. Value * 0.7	Init. Value * 1.1

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.

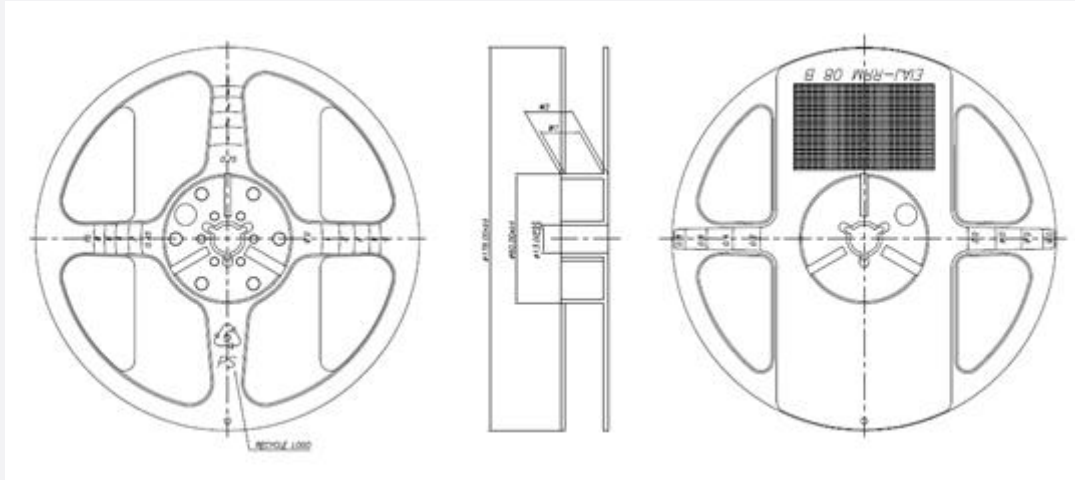


b) Manual Soldering Conditions

Not more than 5 seconds @ max. 300 °C, under soldering iron.

b) Reel Dimension

(unit: mm)



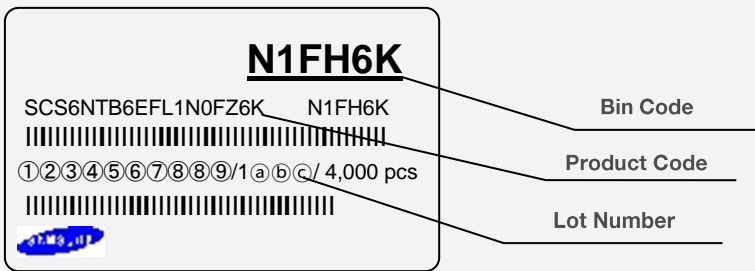
Width	W1	W2
8mm	9 ±0.3	11.9 ±1.0

Notes:

- 1) Quantity: The quantity/reel is 4,000 pcs
- 2) Cumulative Tolerance: Cumulative tolerance / 10 pitches is ± 0.2 mm
- 3) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

8. Label Structure

a) Label Structure



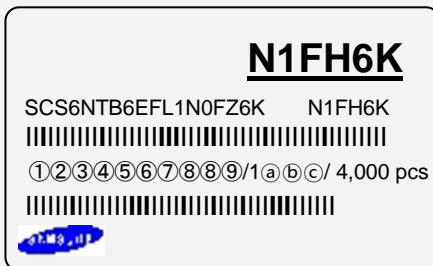
Note: Denoted bin code and product code above is only an example (see description on page 5)

Bin Code:

- ⒶⒷ: Chromaticity bin (refer to page 7)
- ⒸⒹ: Luminous Flux bin (refer to page 6)
- ⒺⒻ: Forward Voltage rank (refer to page 6)

b) Lot Number

The lot number is composed of the following characters:



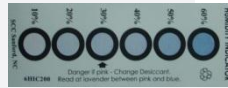
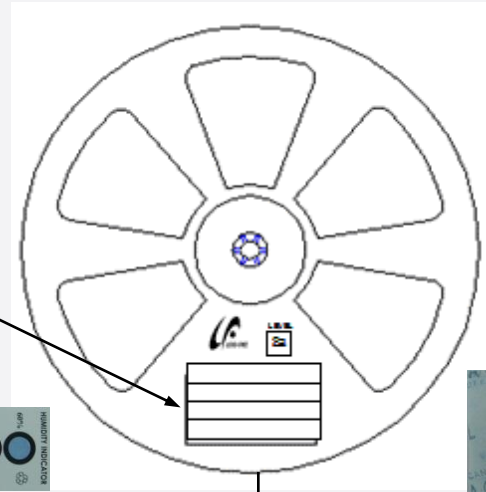
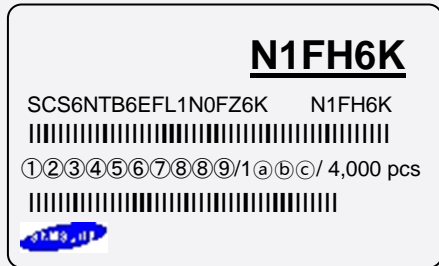
①②③④⑤⑥⑦⑧⑨ / 1ⒶⒷⒸ / 4,000 pcs

- ① : Product state (T: Taping)
- ③ : Production site (1: KC1)
- ③ : Year (E: 2014, F: 2015, ...)
- ④ : Month (1~9, A, B, C)
- ⑤ : Day (1~9, A, B~V)
- ⑥⑦⑧⑨ : Product serial number (0001 ~ 0009, A001 ~ ZZZZ)
- ⒶⒷⒸ : Reel number (001 ~ 999)

9. Packing Structure

a) Packing Process

Reel



Aluminum Vinyl Bag

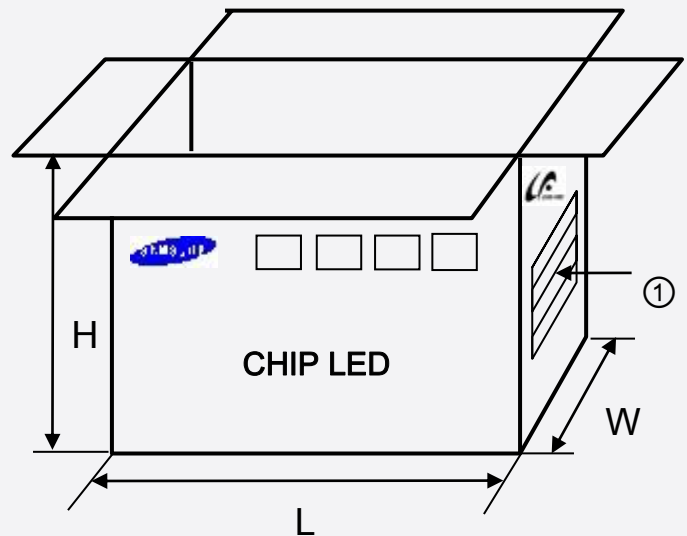


Outer Box

Material: Paper (SW3B(A))

Type	Size (mm)			Note
	L	W	H	
7 inch	295 ± 5	290 ± 5	260 ± 5	Up to 7 reels max.

① Side Label



b) Aluminum Vinyl Packing Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL
2a

1. Shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
2. Peak package body temperature: 240 °C
3. After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
 - a. Mounted within 672 hours at factory conditions of equal to or less than 30°C /60% RH, or
 - b. Stored at <10% RH
4. Devices require bake, before mounting, if:
 - a. Humidity Indicator Card is >65% when read at 23±5°C, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5°C

Note: If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure.

Bag seal due date: _____
(If blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020

N1FH6K

SCS6NTB6EFL1N0FZ6K N1FH6K

①②③④⑤⑥⑦⑧⑨/1 a b c / 4,000 pcs









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■ Important

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products., please ensure the zip-lock is completely sealed with the dry pack left inside.

c) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Bag



HUMISAFE™

10% 20% 30% 40% 50% 60%



READ AT TOP OF GREEN COLOR
CHANGE BETWEEN YELLOW AND GREEN

Warning If Green
Change Desiccant

GP&E Co., Ltd.
6CF-60NS

10. Precautions in Handling & Use

- 1) For over-current-proof function, customers are recommended to apply resistors to prevent sudden change of the current caused by slight shift of the voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.
- 3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.
- 4) LEDs must be stored in a clean environment. If the LEDs are to be stored for three months or more after being shipped from Samsung, they should be packed by a sealed container with nitrogen gas injected (shelf life of sealed bags: 12 months, temperature $\sim 40^{\circ}\text{C}$, $\sim 90\%$ RH).
- 5) After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
 - a. Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30°C / 60% RH, or
 - b. Stored at $<10\%$ RH
- 6) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
- 7) Devices require baking before mounting, if humidity card reading is $>65\%$ at $23 \pm 5^{\circ}\text{C}$.
- 8) Devices must be baked for 1 hour at $60 \pm 5^{\circ}\text{C}$, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices. Damaged LEDs may show some unusual characteristics such as increase in leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

Legal and additional information.

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