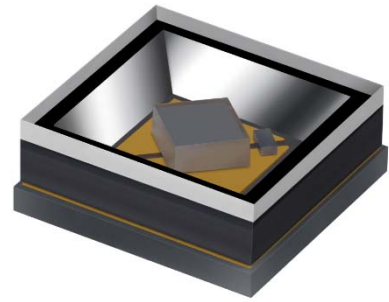


Deep UV LED

UC36FS

(SPMUVC36BE40V0W0P0)



Use of Samsung's deep ultraviolet light technology



Features & Benefits

- Deep ultraviolet LED
- Wavelength between 270nm to 280nm
- SMT solderable
- Lead Free product

Applications

- Surface disinfection
- Air disinfection
- Water disinfection

Table of Contents

1.	Characteristics	-----	3
2.	Product Code Information	-----	5
3.	Typical Characteristics Graphs	-----	6
4.	Outline Drawing & Dimension	-----	8
5.	Reliability Test Items & Condition	-----	9
6.	Soldering Conditions	-----	10
7.	Tape & Reel	-----	11
8.	Label Structure	-----	13
9.	Packing Structure	-----	14
10.	Precautions in Handling & Use	-----	16

1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +60	°C	-
Storage Temperature	T_{stg}	-40 ~ +100	°C	-
Junction Temperature	T_j	100	°C	-
Forward Current	I_F	500	mA	$T_s = 25^{\circ}\text{C}$
Assembly Process Temperature	-	260 <10	°C s	-
ESD	-	±2	kV	ANSI/ESDA/JEDEC JS-001(HBM)

Note:

Operating the LED beyond the listed maximum ratings may affect device reliability and cause permanent damage. These or any other conditions beyond those indicated under recommended operating conditions are not implied. The exposure to the absolute maximum rated conditions may affect device reliability. Sustained operation at absolute maximum current of 500mA will result in a reduction of device lifetime compared to typical forward drive current (350mA). Actual device lifetimes will also depend on junction temperature.

b) Electro-optical Characteristics ($I_F = 350\text{mA}$; $T_s = 25^{\circ}\text{C}$)

Item	Symbol	Value	Unit
Peak Wavelength	λ_p	275	nm
Radiant Flux	Φ_e	62	mW
Forward Voltage	V_F	5.8	V
Thermal resistance	$R_{\theta JS}$	7	K/W
Spectrum Half Width	$\Delta\lambda$	12	nm
Viewing Angle	$2\theta_{1/2}$	110	deg

Note:

1. Samsung maintains measurement tolerance of: Radiant flux = $\pm 10\%$, Forward voltage = $\pm 3\%$, Peak Wavelength = $\pm 3\text{nm}$
2. $R_{\theta JS}$ is the thermal resistance from the junction to the T_s measurement point (Solder point).
3. Although all LEDs are tested by Samsung equipment, some values may vary slightly depending on the conditions of the test equipment.

c) Bin Structure ($I_F = 350\text{mA}$; $T_S = 25^\circ\text{C}$)

Item	BIN Code	Min	Typ	Max
Forward Voltage, $V_F(\text{V})$	55	5.5		6.0
	60	6.0		6.5
	65	6.5		7.0
Peak Wavelength, $\lambda_p(\text{nm})$	70	270		280
Radiant Flux, $\Phi_e(\text{mW})$	50	50		60
	60	60		70
	70	70		80

Notes:

Samsung maintains measurement tolerance of: Radiant flux = $\pm 10\%$, Forward voltage = $\pm 3\%$, Peak Wavelength = $\pm 3\text{nm}$

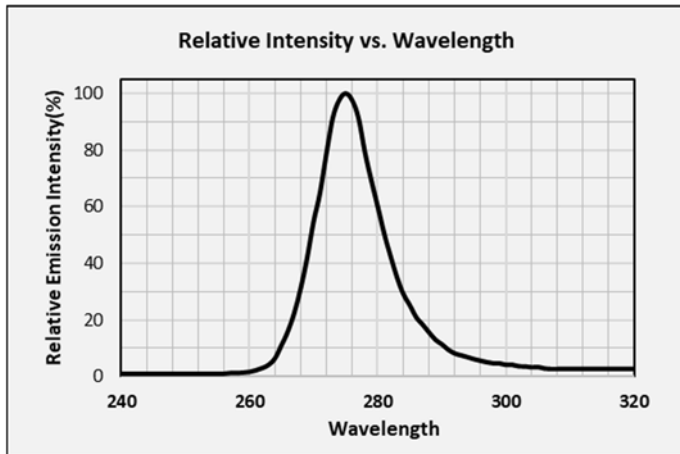
2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	M	U	V	C	3	6	B	E	4	0	V	0	W	0	P	0

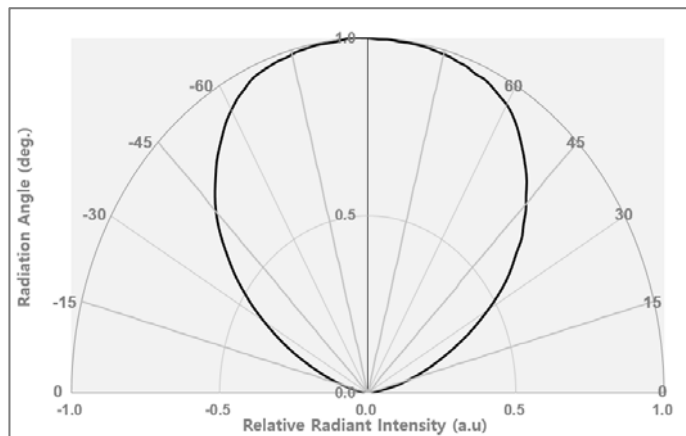
Digit	PKG Information	Code	Specification		
1 2 3	Product Family	SPM			
4 5	Product Color	UV	Ultra Violet		
6	Peak wavelength Range	C	UV-C		
7 8 9	Product Size & Type	36B	3.6 mm x 3.6 mm		
10	Radiant Flux Range (Typ.)	E			
11	Product Thickness	4			
12	Product Version	0			
13 14	Forward Voltage (V)	V0	V0 : 5.5 ~ 7.0 V	Bin Code	55 : 5.5 ~ 6.0 V 60 : 6.0 ~ 6.5 V 65 : 6.5 ~ 7.0 V
15 16	Peak Wavelength (nm)	W0	W0 : 270 ~ 280 nm	Bin Code	70 : 270 ~ 280 nm
17 18	Radiant Flux (mW)	P0	P0 : 50 ~ 80 mW	Bin Code	50 : 50 ~ 60 mW 60 : 60 ~ 70 mW 70 : 70 ~ 80 mW

3. Typical Characteristics Graphs

a) Relative Spectral Emission ($I_F = 350\text{mA}$, $T_s = 25^\circ\text{C}$)

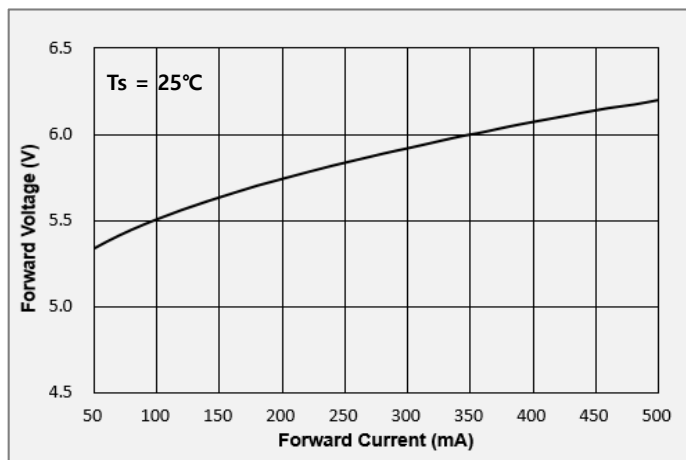


b) Radiation Characteristics ($I_F = 350\text{mA}$, $T_s = 25^\circ\text{C}$)

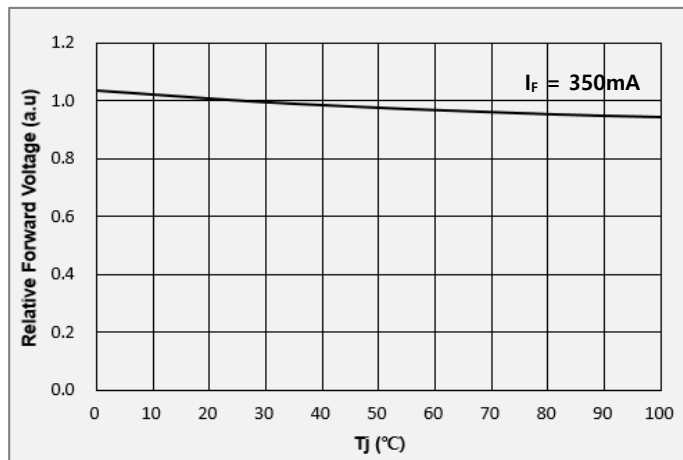


C) Optical & Electrical Characteristics

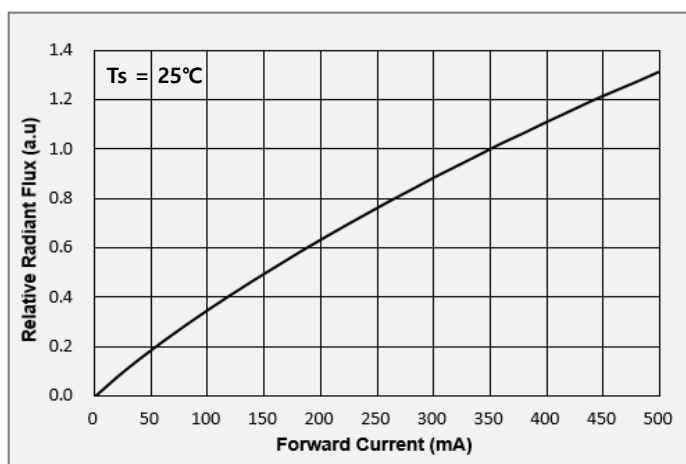
Forward Voltage vs. Forward Current



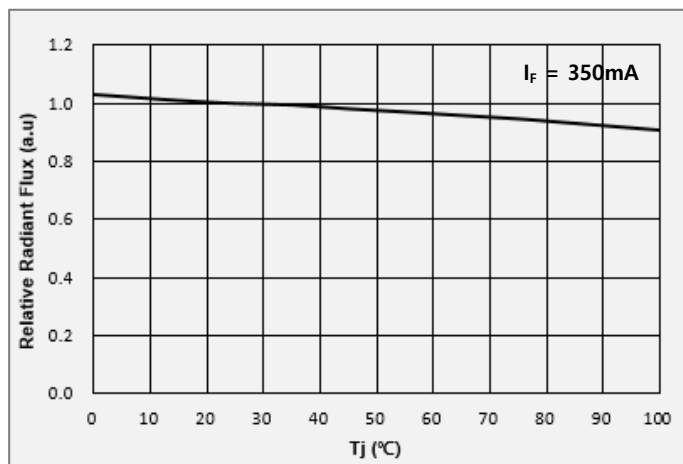
Relative Forward Voltage vs. Junction Temperature



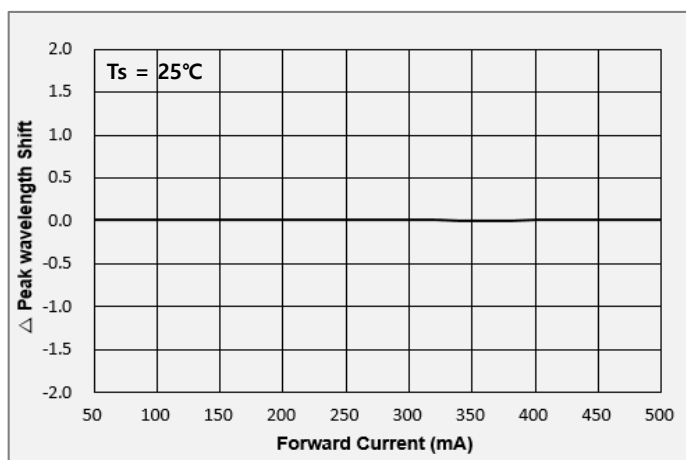
Relative Radiant Flux vs. Forward Current



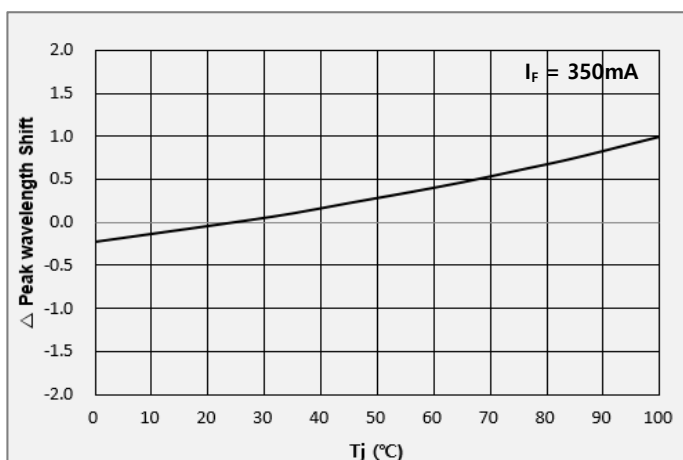
Relative Radiant Flux vs. Junction Temperature



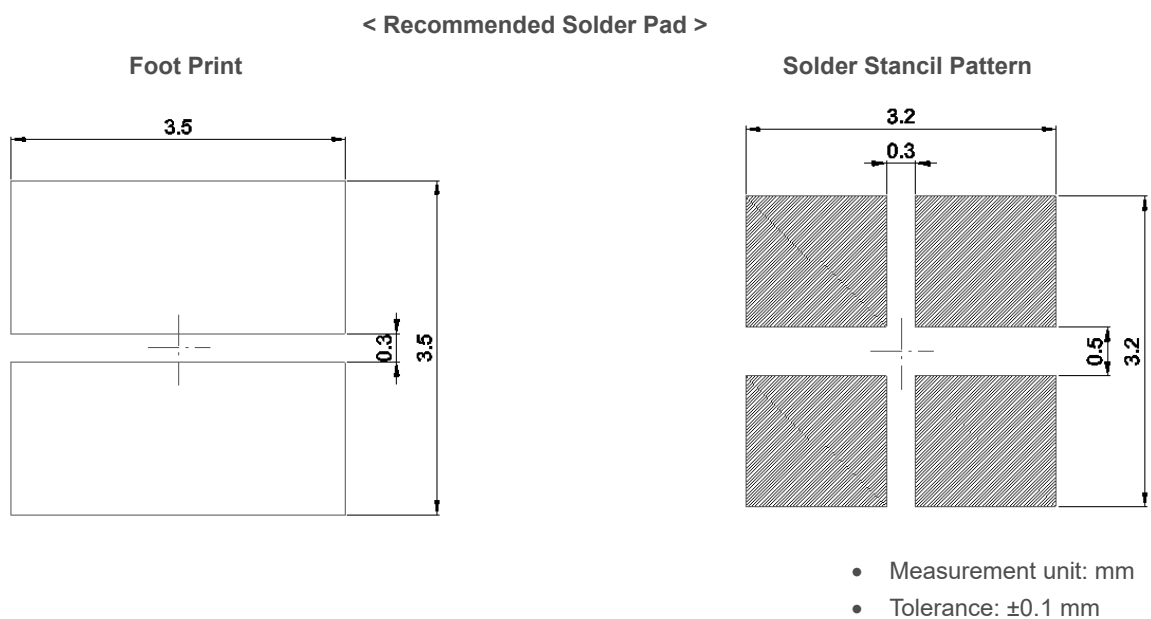
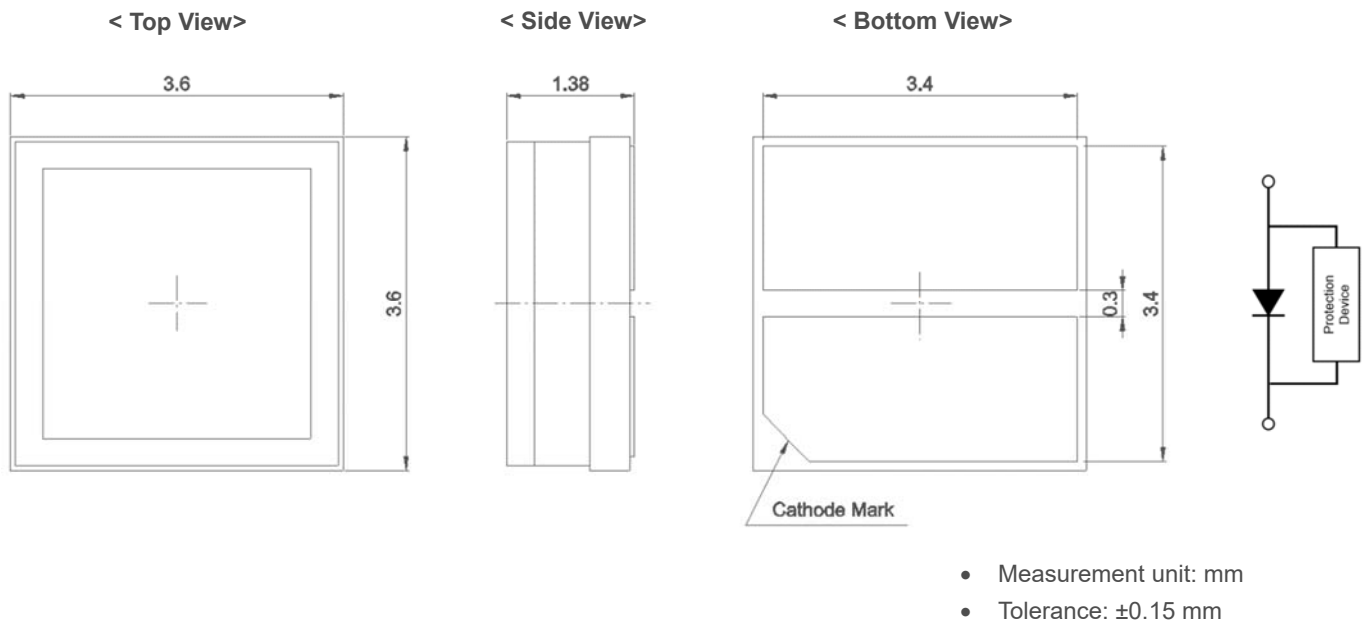
Δ Peak Wavelength Shift vs. Forward Current



Δ Peak Wavelength Shift vs. Junction Temperature



4. Outline Drawing & Dimension

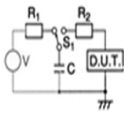


Precautions:

- 1) 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.
- 2) 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.
- 3) 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.
- 4) We recommend soldering under standard nitrogen atmosphere.

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample Size
Room Temperature Operating Life Test (I)	Ta 25°C, Typical driving current	1000 h	20
Room Temperature Operating Life Test (II)	Ta 25°C, Maximum rated driving current	1000 h	20
Wet High Temperature Operating Life Test	60°C/90%RH, Typical driving current	500 h	20
High Temperature Operating Life Test	Ta 60°C, Typical driving current	1000 h	20
Low Temperature Operating Life Test	-10°C, Maximum rated driving current	1000 h	20
High Temperature Storage Test	100°C	1000 h	20
Low Temperature Storage Test	-40°C	1000 h	20
Wet High Temperature Storage Test	60°C/90%RH	1000 h	20
Thermal Cycle	-40°C / 15 min ↔ 100°C / 15 min temperature change within 5 min	300 cycles	99
ESD (HBM)	 <div> R₁: 10 MΩ R₂: 1.5 kΩ C: 100 pF V: ±8 kV </div>	5 times	30
Reflow	260±5°C, 10±1sec	2 times	22

Notes:

All samples are tested using Samsung Standard Metal PCB.

b) Criteria for Judging the Damage

Item	Symbol	Test Condition (Ts = 25 °C)	Max or Min Allowable shift value
Forward Voltage	V _F	I _F = 350 mA	Max : Init. Value * 1.1
Radiant Flux	Φ _e	I _F = 350 mA	Min : Init. Value * 0.7

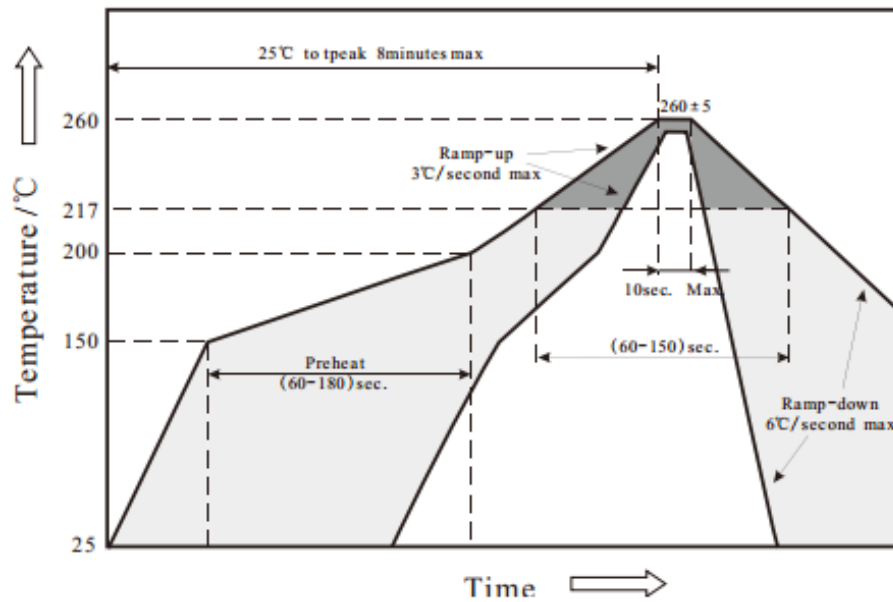
Notes:

The value is measured after the test sample is cooled down to the room temperature.

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



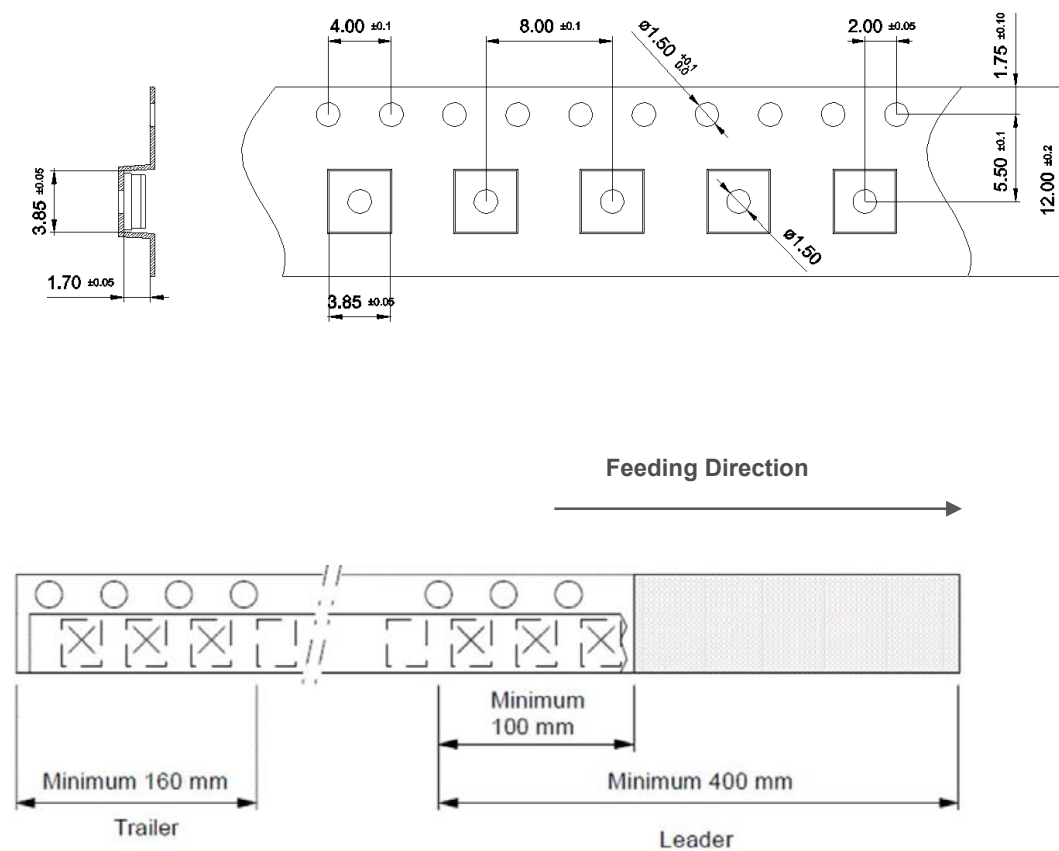
b) Manual Soldering Conditions

No more than 5 seconds @ max. 300 °C, under soldering iron.

7. Tape & Reel

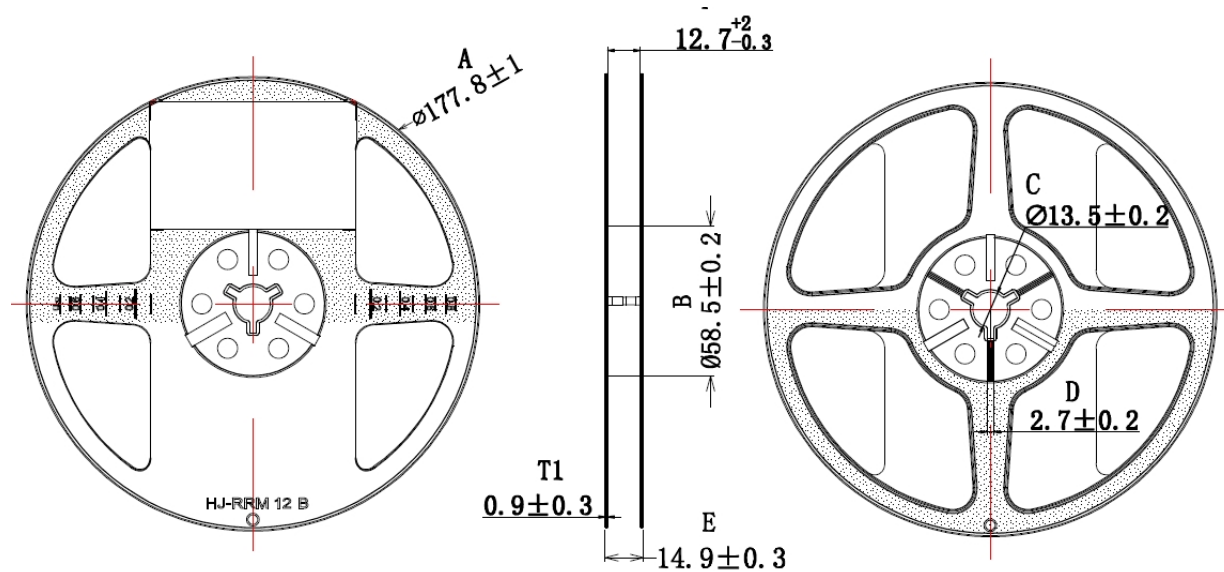
a) Taping Dimension

(unit: mm)



b) Reel Dimension

(unit: mm)

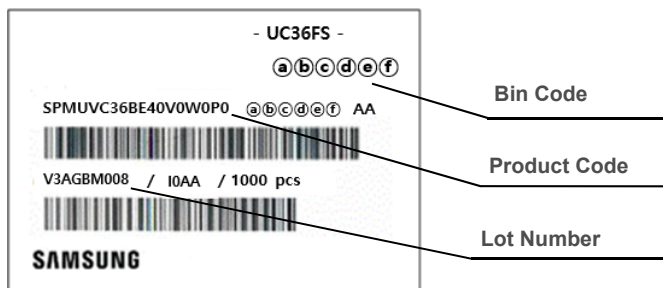


Notes:

- 1) Quantity: The quantity/reel is 1,000 pcs
- 2) Cumulative tolerance: Cumulative tolerance / 10 pitches is ± 0.2 mm
- 3) Adhesion strength of cover tape: Adhesion strength is 0.1-0.7 N when the cover tape is turned off from the carrier tape at 10° angle to the carrier tape
- 4) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

8. Label Structure

a) Label Structure (for Reel & AI Bag)



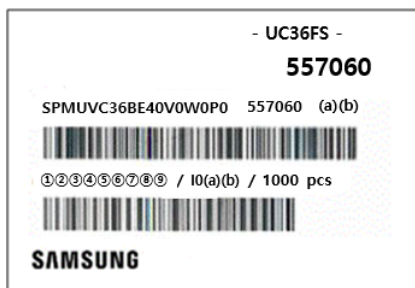
Note: Denoted bin code and product code above is only an example (see description on page 5)

Bin Code:

- ①②: Forward Voltage bin (refer to page 5)
- ③④: Peak Wavelength bin (refer to page 5)
- ⑤⑥: Radiant Flux bin (refer to page 5)

b) Lot Number

The lot number is composed of the following characters:



①②③④⑤⑥⑦⑧⑨ / I0(a)(b) / 1000 pcs

- ①, ② : Production site
- ③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
- ④ : Year (E: 2020, F: 2021, G : 2022, ...)
- ⑤ : Month (1~9, A, B, C)
- ⑥ : Day (1~9, A, B~V)
- ⑦⑧⑨ : Product serial number (001 ~ 999)
- (a)(b) : Reel number (AA, AB, AC, ...)

9. Packing Structure

a) Packing Process

Reel



Humidity Indicator Card



Desiccant



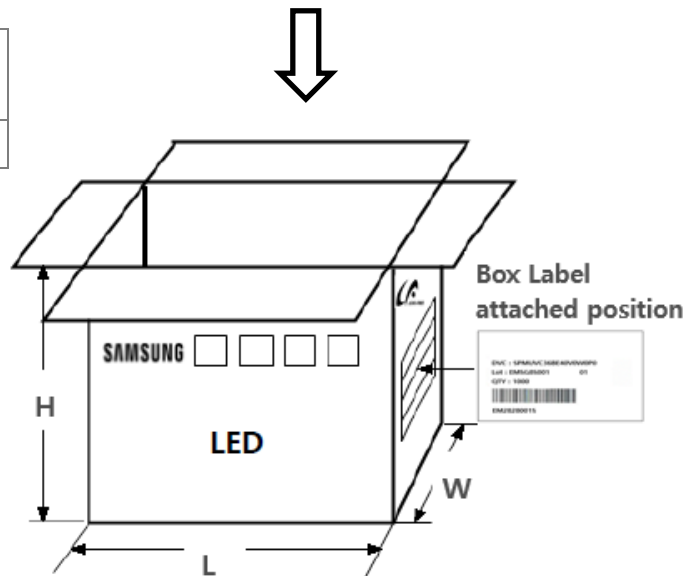
Aluminum Vinyl Packing



Outer Box

Material : Paper

Type	Size (mm)			Note
	L	W	H	
7 inch	245 ± 5	220 ± 5	182 ± 5	Up to 10 reels



b) Aluminum Vinyl Packing Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL

2a

1. Shelf life in sealed bag: 12 months at <40℃ and <90% relative humidity (RH)
2. Peak package body temperature: 240 ℃
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℃ /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℃, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5℃

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

- UC36FS -

557060

SPMUV36BE40V0W0P0 557060 AA



V3AGBM008 / I0AA / 1000 pcs



SAMSUNG





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■ Important

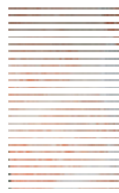
This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products, please ensure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

c) Humidity Indicator & Desiccant inside Aluminum Vinyl Bag

Humidity Indicator Card



Desiccant



10. Precautions in Handling & Use

- 1) For over-current protection, users are recommended to apply resistors connected in series with the LEDs to mitigate sudden change of the forward current caused by shift of forward voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When cleaning is required, IPA is recommended as the cleaning agent. Some solvent-based cleaning agent may damage the silicone resins used in the device.
- 3) When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and corresponding junction 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 with a nitrogen-filled container (shelf life of sealed bags is 12 months at temperature 0~40 °C, 0~90 % 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 devices 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 >60 % at 23 ± 5 °C.
- 8) Devices must be baked for 1 hour at 60 ± 5 °C, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge current. 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 leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- 10) VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those chemicals and they may lead to a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires. In order to prevent these problems, we recommend users to know the physical properties of materials used in luminaires and they must be carefully selected.

Revision History

[illegible]

Legal and additional information.

[About Samsung Electronics Co., Ltd.](#)

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