

SPECIFICATION

ISSUED DATE : 2012.12.13

DOCUMENT NO : KP5450F00E6F

CUSTOMER :

DESCRIPTION : 5450 6 Pin Top View Full Color LED

MODEL NO. : KP5450F00E6F

[AUK CORP.]

| ISSUE DEPT. | | | PRODUCTION | | Q/A | |
|-------------|--------|--------|------------|--------|--------|--------|
| ISSUE | REVIEW | APPR'L | REVIEW | APPR'L | REVIEW | APPR'L |
| | | | | | | |

[CUSTOMER APPROVAL]

| ISSUE | REVIEW | | | | | |
|-------|--------|--|--|--|--|--|
| | | | | | | |

[REVISION]

| NO | DATE | REVISION ITEMS | ISSUED BY | APPR'D BY |
|----|------------|----------------|-----------|-----------|
| O | 2012.11.13 | Spec. Update | K.Lim | J.S.HEO |
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◆ PL

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AUK takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet.

Please obey the instructions mentioned below for actual use of this device.

① This device is designed for general electronic equipment.

Main use of this device are as follows;

- * Computer * OA equipment * Telecommunication equipment(Terminal)
- * Measuring instrument * Machine tool * Industrial robot
- * AV equipment * Home appliance,etc.

② Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.

- * Unit concerning control and safety of a vehicle (air plane,train,automobile, etc.)
- * Traffic signal * Gas leak detection breaker
- * Fire box and burglar alarm box * Other safety equipment,etc.

③ Please don't use for the uses mentioned below which require extremely high reliability.

- * Space equipment * Telecommunication equipment(Trunk)
- * Nuclear control equipment * Medical equipment(relating to any fatal element),etc.

1. Descriptions

The KP5450F00E6F is a Full Color LED consisting of small and thin form plastic leaded chip carrier (PLCC) 6-pin package, AlGaInP red chip, GaN Green, InGaN blue chip.

2. Features

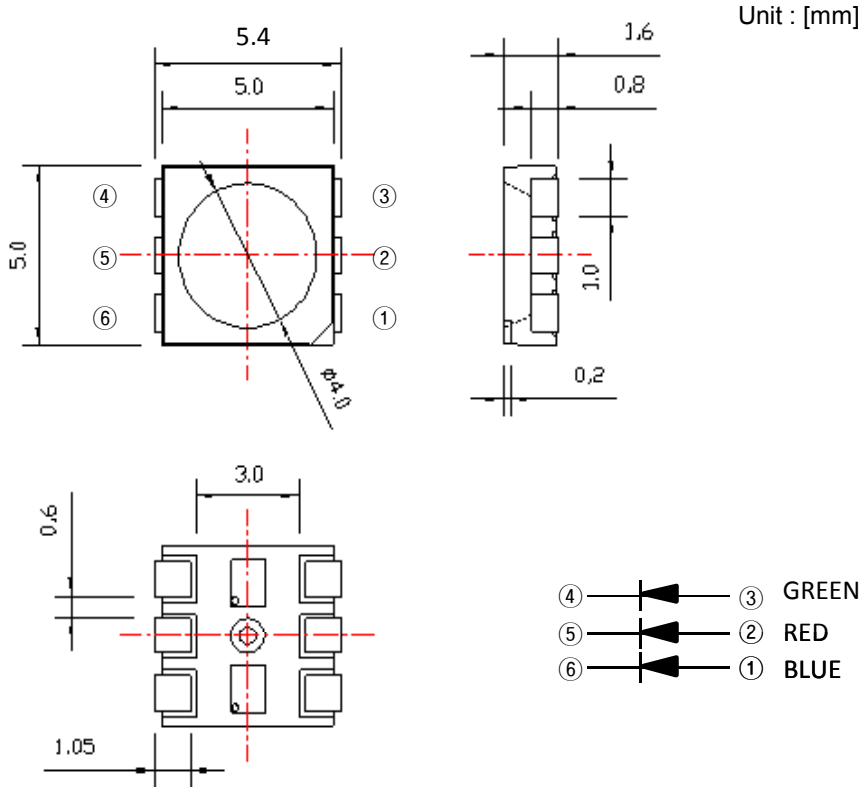
- ◆ Small Footprint Surface Mount Package (5.4 L × 5.0 W × 1.6 H [mm³])
- ◆ Typical Forward Voltage(V_F) : Blue : 3.3V @ Forward Current(I_F)=20mA
Green : 3.2V @ Forward Current(I_F)=20mA
Red : 2.2V @ Forward Current(I_F)=20mA
- ◆ Operation Temperature from -40°C to +85°C
- ◆ Soldering methods : IR reflow soldering
- ◆ Taping : 12mm conductive black carrier tape & antistatic clear cover tape

3. Applications

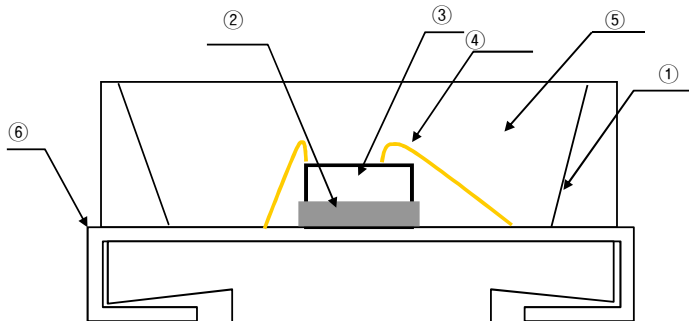
- ◆ LCD Backlighting
- ◆ Out Door/ In Door Display
- ◆ Front panel indicator lamp
- ◆ Symbol Backlighting

4. Outline Dimensions and Material Descriptions

◆ Outline Dimensions



◆ Material Descriptions



| No. | Item | Material |
|-----|--------------|---------------------|
| ① | Package | PPA |
| ② | Die Adhesive | Clear Silicone |
| ③ | LED Chip | InGaN, Gap, AlGaInP |
| ④ | Wire | Au |
| ⑤ | Encapsulant | Silicone |
| ⑥ | Lead | Cu Alloy |

5. Absolute Maximums

| Parameter | Symbol | Ratings | | | Unit |
|-------------------------------------|------------|------------|-------|------|------|
| | | Red | Green | Blue | |
| Forward current | I_F | 30 | 30 | 30 | mA |
| Pulse forward current ^{*1} | I_{FP} | 90 | 100 | | mA |
| Power dissipation | P_D | 80 | 110 | 110 | mW |
| Operating temperature | $T_{opr.}$ | -30 ~ +85 | | | °C |
| Storage temperature | $T_{stg.}$ | -40 ~ +100 | | | °C |
| Soldering Temperature ^{*2} | $T_{sol.}$ | 260 | | | °C |

*1. IFP was measured at $T_w \leq 1$ msec of pulse width and $D \leq 1/10$ of duty ratio.

*2. Soldering time : 5 Sec

6. Electro-Optical Characteristics ($T_A = 25^\circ\text{C}$)

| Parameter | | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------------------|-------|-----------------------|-------------------|------|-------|------|--------------------------------------------------------------|
| Forward voltage | Red | V_F | $I_F=20\text{mA}$ | 1.8 | - | 2.5 | V |
| | Green | | | 2.8 | - | 3.6 | |
| | Blue | | | 2.8 | - | 3.6 | |
| Dominant Wavelength | Red | W_D | $I_F=20\text{mA}$ | 615 | - | 630 | nm |
| | Green | | | 510 | - | 530 | |
| | Blue | | | 455 | - | 475 | |
| Luminous Intensity | Red | I_v | $I_F=20\text{mA}$ | 200 | - | 600 | mcd |
| | Green | | | 600 | - | 1800 | |
| | Blue | | | 120 | - | 400 | |
| Luminous intensity ^{*1,3} | R,G,B | I_v | 700 | 1000 | 1500 | mcd | Red_ I_F =12mA, Green_ I_F =10mA, Blue_ I_F =7mA |
| Chromaticity coordiante ^{*3} | R,G,B | x | 0.250 | - | 0.350 | - | Red_ I_F =12mA, Green_ I_F =10mA, Blue_ I_F =7mA |
| | | y | 0.250 | - | 0.350 | - | |
| Reverse Current | | I_R | $V_R=5\text{V}$ | - | - | 10 | uA |
| Half angle ^{*2} | | $2\Delta\theta_{1/2}$ | $I_F=60\text{mA}$ | - | 120 | - | deg. |

*1. The luminous intensity I_v was measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.

*2. $2\theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.

7. Ranks

◆ I_v , Color Rank Table^{*1}

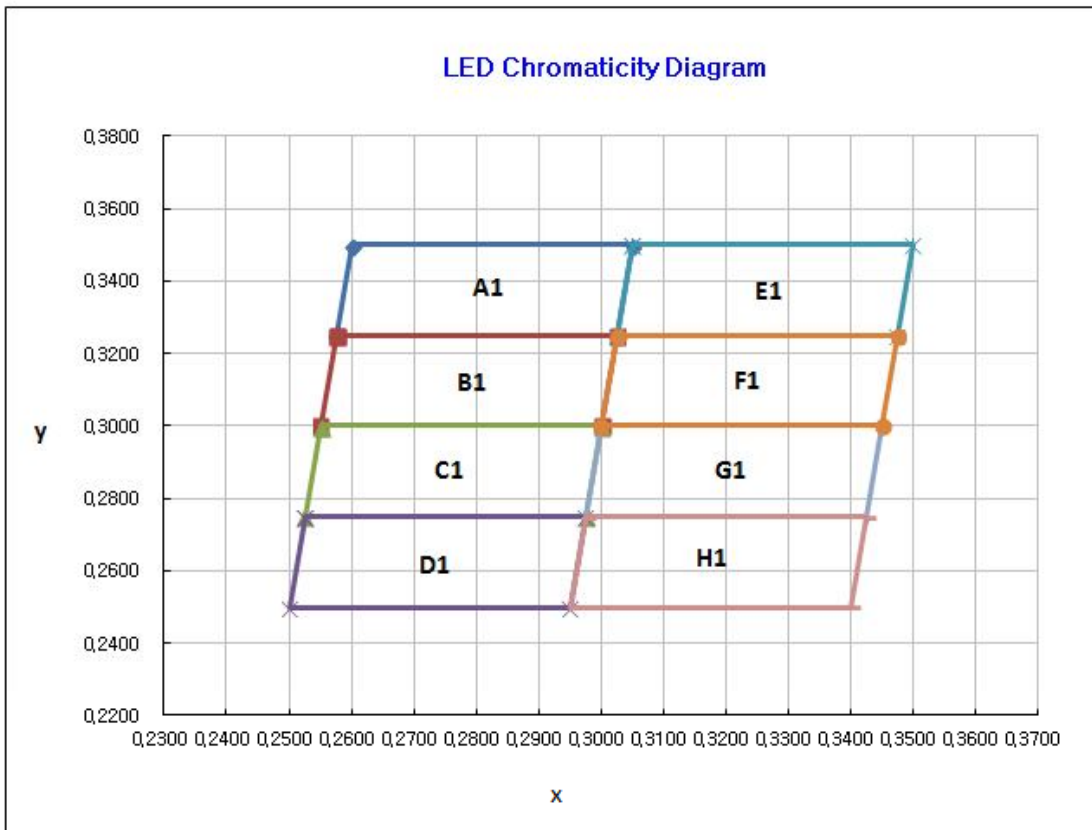
| I_v , Color Rank @ Red I_F = 12 mA, Green I_F = 10 mA, Blue I_F = 7 mA | | | |
|--------------------------------------------------------------------------------|--------------|----|---|
| Luminous Intensity [mcd] | Chromaticity | | - |
| T : 700 ~ 1000 | A1 | E1 | - |
| U : 1000 ~ 1200 | B1 | F1 | - |
| V : 1200 ~ 1500 | C1 | G1 | - |
| - | D1 | H1 | - |

*1. KP5450F00E6F marked as TA1(I_v , Color Rank) has the I_v range 0.7~1.0cd and Color range A1 area.

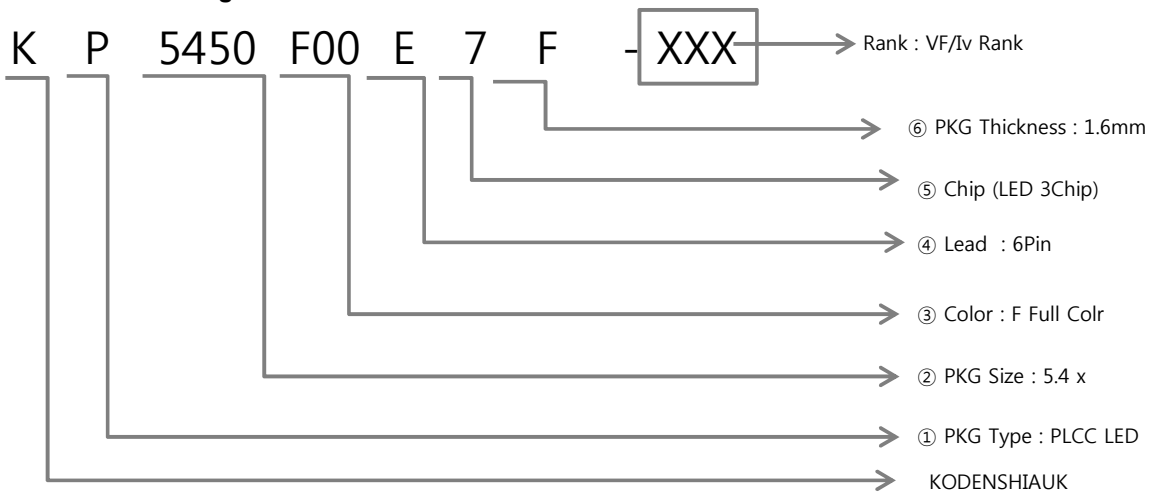
◆ Color Coordinate Rank

| A1 | | B1 | | C1 | | D1 | |
|--------|--------|--------|--------|--------|--------|--------|--------|
| x | y | x | y | x | y | x | y |
| 0.2600 | 0.3500 | 0.2575 | 0.3250 | 0.2550 | 0.3000 | 0.2525 | 0.2750 |
| 0.2575 | 0.3250 | 0.2550 | 0.3000 | 0.2525 | 0.2750 | 0.2500 | 0.2500 |
| 0.3025 | 0.3250 | 0.3000 | 0.3000 | 0.2975 | 0.2750 | 0.2950 | 0.2500 |
| 0.3050 | 0.3500 | 0.3025 | 0.3250 | 0.3000 | 0.3000 | 0.2975 | 0.2750 |
| E1 | | F1 | | G1 | | H1 | |
| x | y | x | y | x | y | x | y |
| 0.2525 | 0.2250 | 0.3025 | 0.3250 | 0.3000 | 0.3000 | 0.2975 | 0.2750 |
| 0.2650 | 0.2250 | 0.3000 | 0.3000 | 0.2975 | 0.2750 | 0.2950 | 0.2500 |
| 0.2800 | 0.2550 | 0.3450 | 0.3000 | 0.3425 | 0.2750 | 0.3400 | 0.2500 |
| 0.2675 | 0.2550 | 0.3475 | 0.3250 | 0.3450 | 0.3000 | 0.3425 | 0.2750 |

◆ The CIE(x, y) Chromaticity Diagram

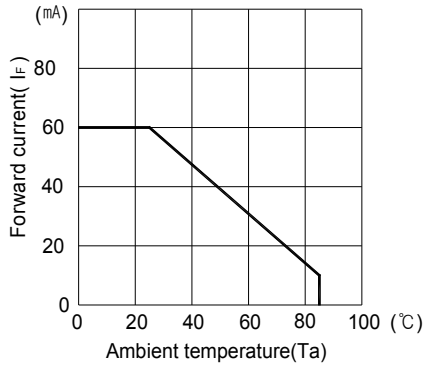


8. Part Numbering

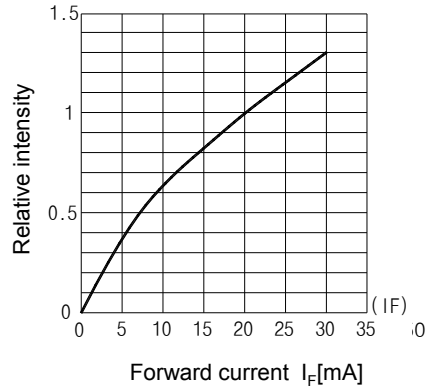


9. Characteristic Graphs

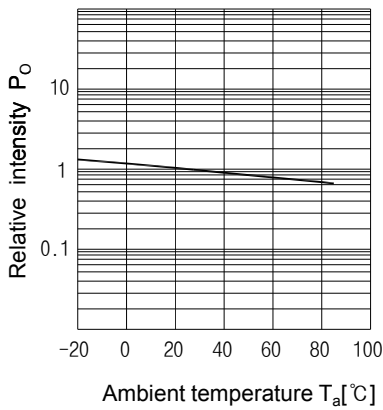
Forward current vs. Ambient temperature



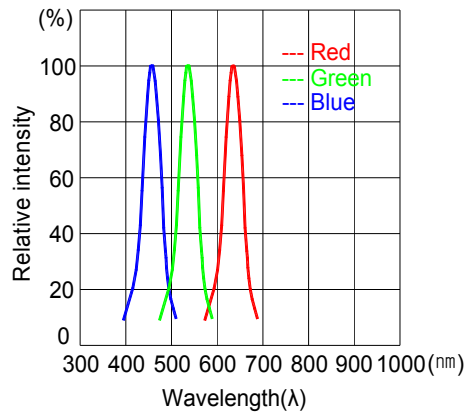
luminous Intensity vs. Forward current



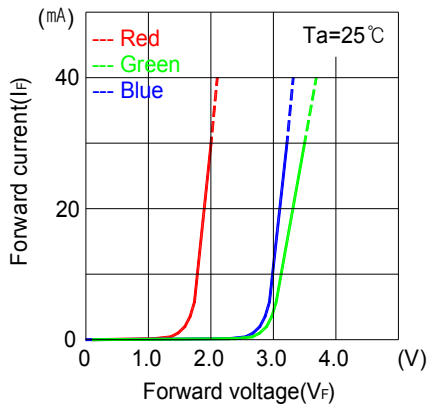
Relative luminous intensity vs. Ambient temperature



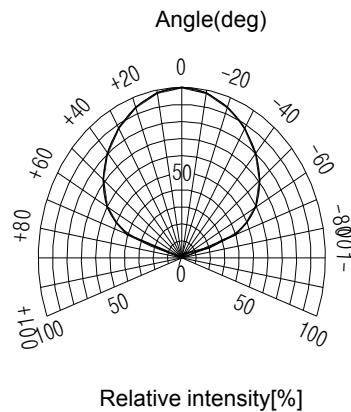
Relative intensity vs. Wavelength



Forward current vs. Forward voltage



Radiant Pattern



10. Reliability Test

◆ Criteria

| ITEM | Symbol | Test Conditions | Criteria for Judgement | |
|--------------------|--------|---------------------|------------------------|---------------------|
| | | | Min. | Max. |
| Forward Voltage | V_F | $I_F = 60\text{mA}$ | - | U.S.L. $\times 1.2$ |
| Reverse Current | I_R | $V_R = 5\text{V}$ | - | U.S.L. $\times 2.0$ |
| Luminous Intensity | I_V | $I_F = 60\text{mA}$ | L.S.L. $\times 0.5$ | - |

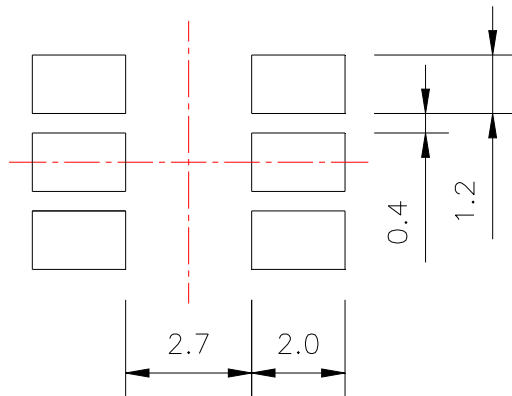
U.S.L. : Upper Standard Level

L.S.L. : Lower Standard Level

◆ Test Conditions

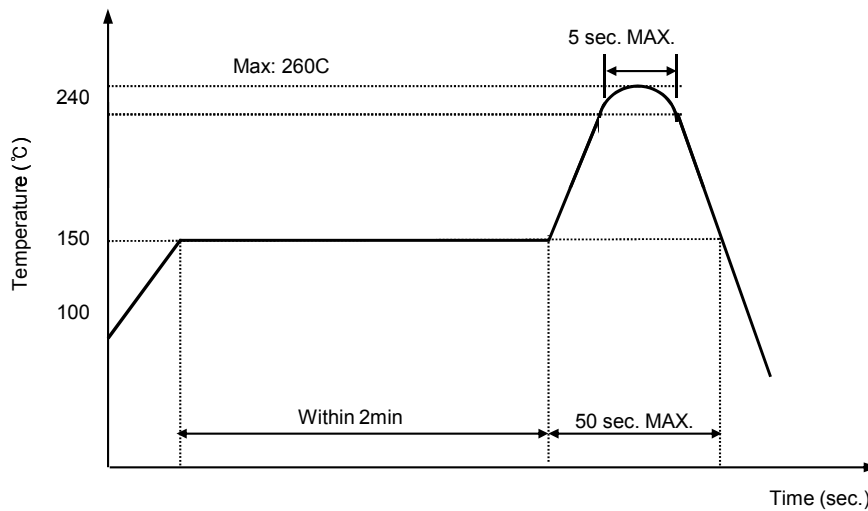
| No. | Test ITEM | Standard Test Method | Test Conditions | Note | #of Damaged/ Test No. |
|-----|----------------------------------------------|----------------------------------------------------------------------------|-----------------|--------|--------------------------|
| 1 | Resistance to Solder Heat (Reflow Soldering) | $T_{\text{slid}} = 260^\circ\text{C}$, 10sec. | 6 Min | 22 PCS | 0/1 |
| 2 | Temperature Cycle | H : $+100^\circ\text{C}$ 15min ↓ 5 min L : -40°C 15min | 300 Cycles | 22 PCS | 0/1 |
| 3 | Thermal Shock | H : $+100^\circ\text{C}$ 5min ↓ 10 sec L : -10°C 5min | 300 Cycles | 22 PCS | 0/1 |
| 4 | High Temperature Storage | $T_a = 100^\circ\text{C}$ | 1000 hrs. | 22 PCS | 0/1 |
| 5 | Low Temperature Storage | $T_a = -40^\circ\text{C}$ | 1000 hrs. | 22 PCS | 0/1 |
| 6 | DC Operating Life | 25°C , $I_F = 60\text{mA}$ | 1000 hrs. | 22 PCS | 0/1 |
| 7 | High Temperature / High Humidity | $85^\circ\text{C} / 85\%\text{RH}$ | 1000 hrs. | 22 PCS | 0/1 |

11. Recommended Soldering Pattern



Unit : [mm]

12. Reflow Soldering Profile



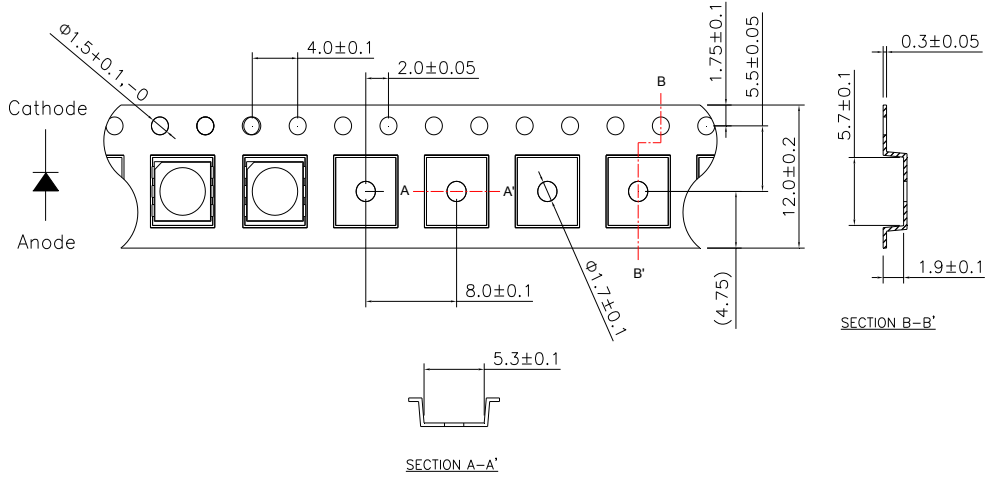
13. Manual Soldering Codition

For manual soldring, you have to complete soldering within 3 seconds under 260°C.
 (The temperature at tip of solder iron).

14. Tape and Reel Specifications

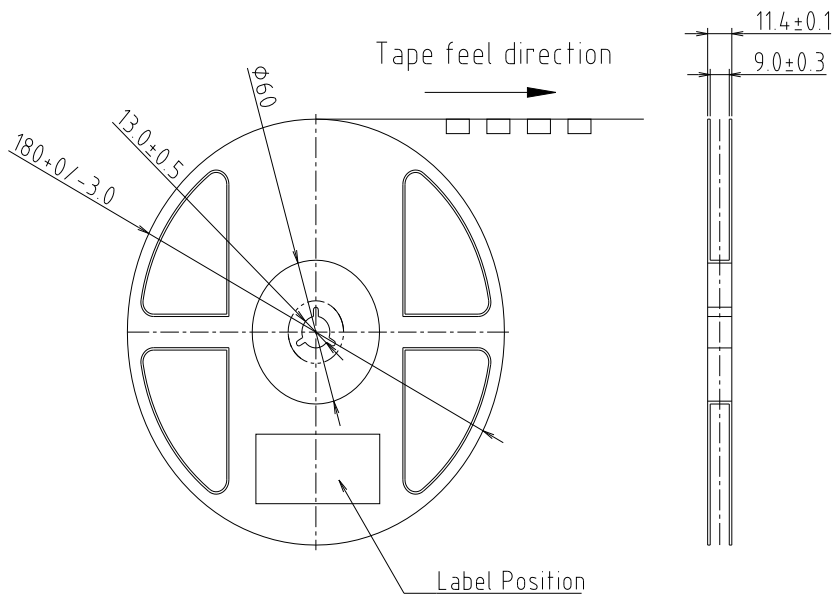
◆ Tape

UNIT : [mm]



◆ Reel

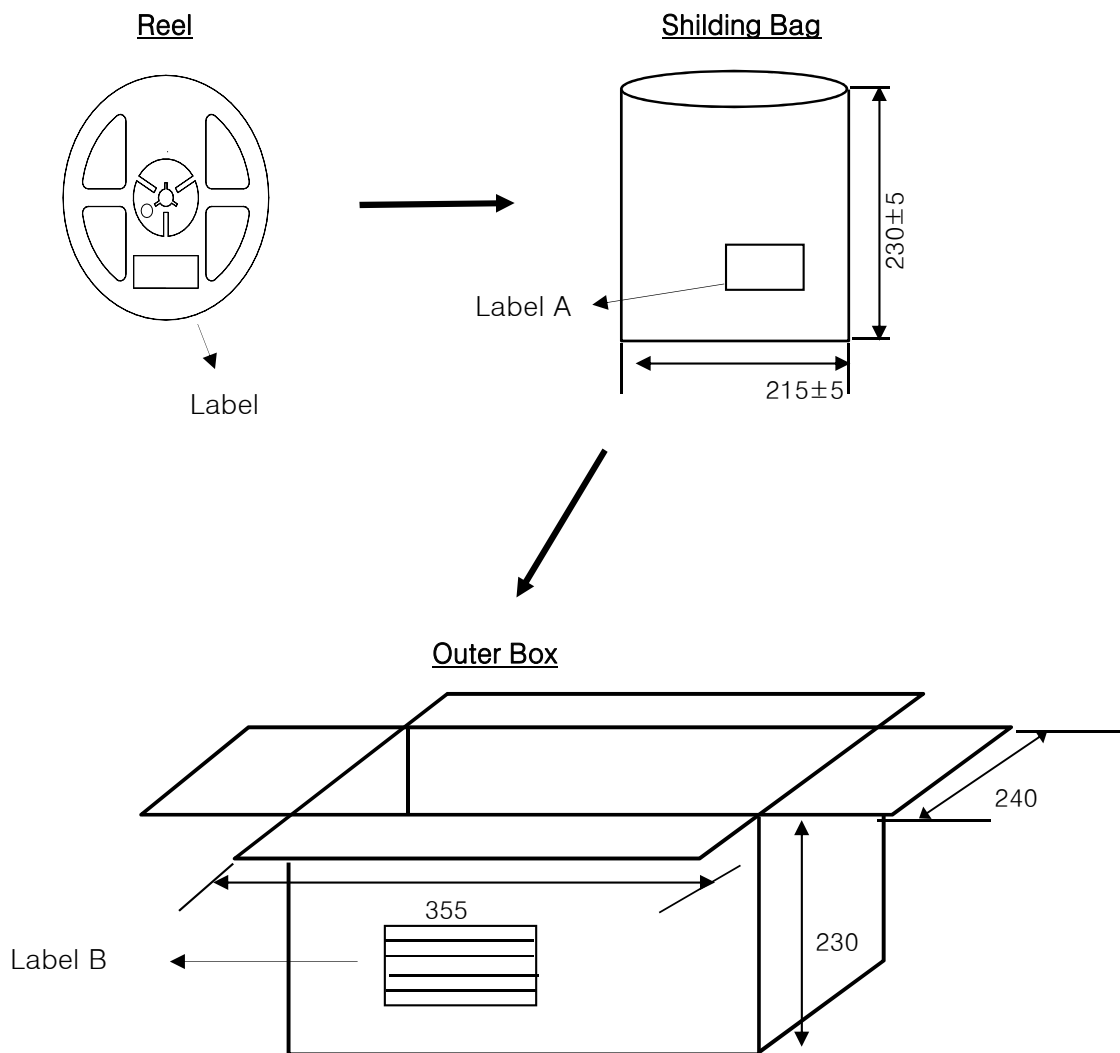
UNIT : [mm]



- ◆ Quantity : 1,000pcs/Reel
- ◆ Cover Tape Adhesion : 0.1 ~ 0.7N for 45° pulling up.

15. Packing Specifications

UNIT : [mm]

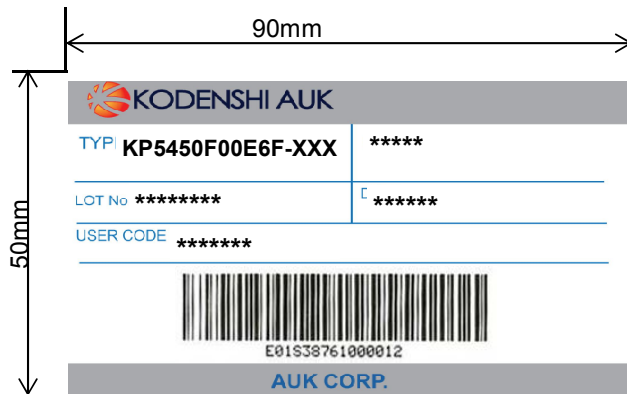


◆ Specifications of Carrier Tape, Reel and Shilding Bag

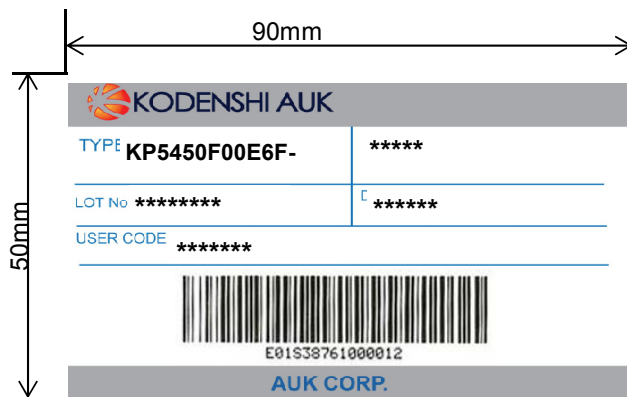
| Item | Carrier Tape | Reel | Shilding Bag | |
|----------------------|------------------------------------|-----------------|------------------------------------------|------------------------------------------|
| | | | Outside | Inside |
| Surface Conductivity | $1 \times 10^4 \sim 1 \times 10^6$ | 1×10^8 | $1 \times 10^{10} \sim 1 \times 10^{12}$ | $1 \times 10^{11} \sim 1 \times 10^{13}$ |

16. Label

◆ Label A



◆ Label B



17. Cautions

◆ Cautions in Usage

- Store and use where there is no exterior force that will cause change in shape.
- Store and use where there is no Hydrogen Sulfide gas, or any other corrosive gas.
- Once the package is opened, the products should be used within 3 days. Otherwise, they should be kept in a damp proof box with desiccating agent. Considering the tape life, we suggest our customers to use our products within a year(from production date)
- If opened more than 3 days in an atmosphere 5 °C ~35 °C, RH 60%, they should be treated at 60 °C ±5 °C for 15 hrs.
- Solder the lead pin under conditions of the absolute maximum rating chart and do not apply force on the solder pin after soldering.

◆ Guarantee Period and Scope

- Period
One year after delivery to the desired place.
- Scope
Replacement of products will be done if any problems lie in our company's products. However, we are not liable for your damage due to lack of caution.

◆ Others

- Any doubts concerning this specification should be discussed fully by both parties.