

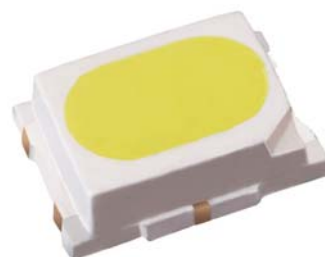
## Technical Data Sheet-Preliminary

## Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

## Features

- Top View White LEDs
- Wide viewing angle
- Soldering methods: IR reflow soldering
- Pb-free
- The product itself will remain within RoHS compliant version.



## Descriptions

- Due to the package design, 45-21S has wide viewing angle, low power consumption and white LEDs are devices which are materialized by combing blue chips and special phosphor. This feature makes the LED ideal for light guide application.

## Applications

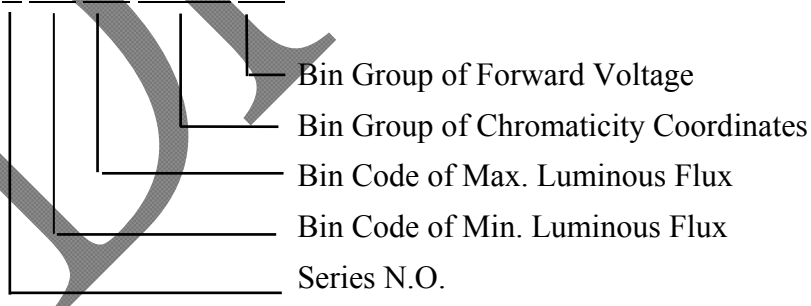
- Backlight for LCD Monitor/TV
- Light pipe application
- Indicator and backlight in office and family equipment
- General use

## Device Selection Guide

|                 |                      |                    |
|-----------------|----------------------|--------------------|
| <b>Chip</b>     | <b>Emitted Color</b> | <b>Resin Color</b> |
| <b>Material</b> |                      |                    |
| InGaN           | White                | Water Clear        |

### Coding:

45-21SCUM2C/L XX XX XXXX XX/TR8-T

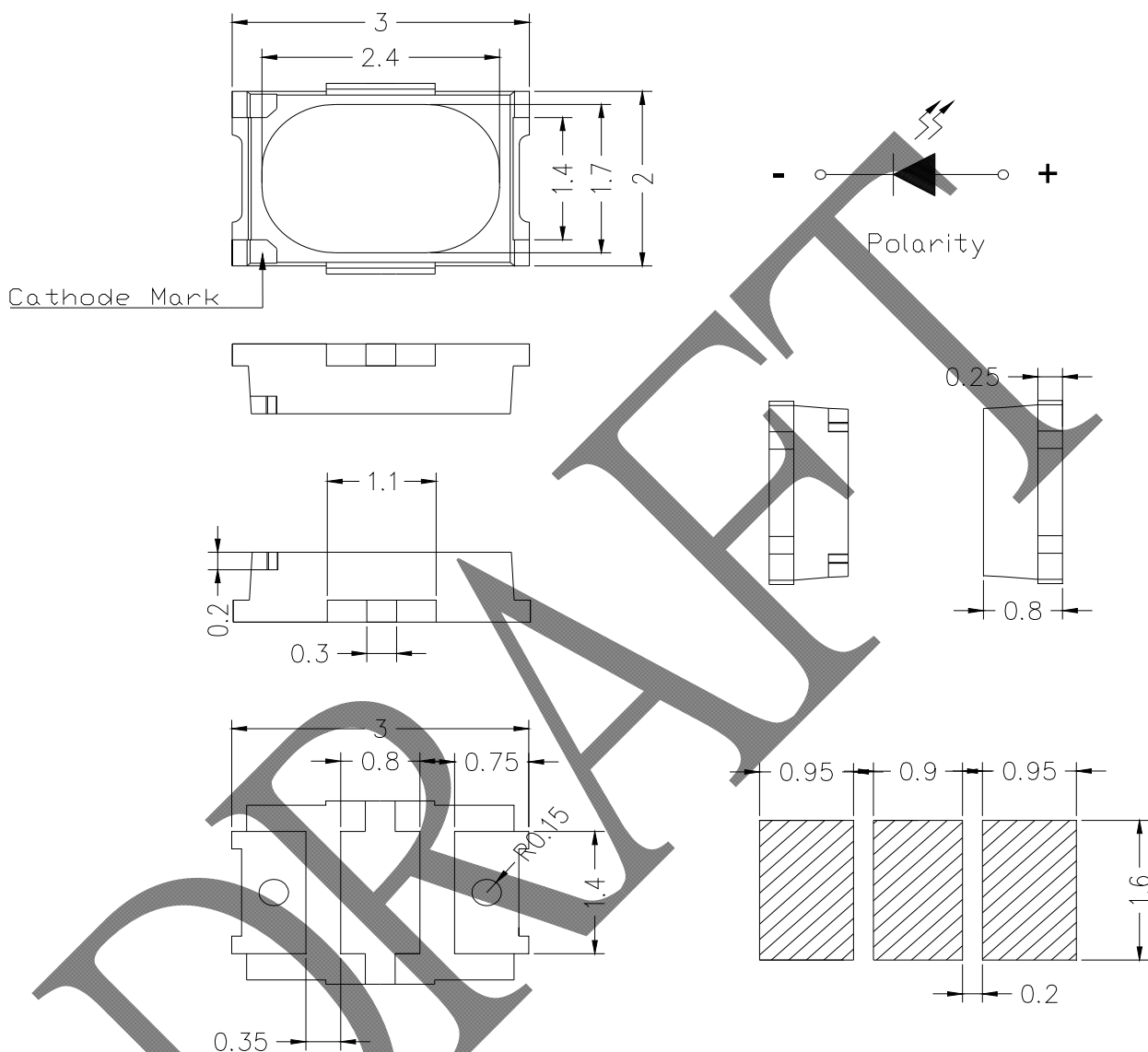


## Technical Data Sheet-Preliminary

## Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

## Package Outline Dimensions



**Note:** Tolerances unless dimension are  $\pm 0.1\text{mm}$ , unit = mm.

**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Absolute Maximum Ratings (Ta=25°C)**

| Parameter                                  | Symbol           | Rating                                                                | Unit |
|--------------------------------------------|------------------|-----------------------------------------------------------------------|------|
| Reverse Voltage                            | V <sub>R</sub>   | 5                                                                     | V    |
| Forward Current                            | I <sub>F</sub>   | 80                                                                    | mA   |
| Pulse Forward Current (Duty 1/10 @1KHz)    | I <sub>FP</sub>  | 240                                                                   | mA   |
| Power Dissipation                          | P <sub>d</sub>   | 280                                                                   | mW   |
| Electrostatic Discharge(HBM) <sup>*1</sup> | ESD              | 2000                                                                  | V    |
| LED Junction Temperature                   | T <sub>j</sub>   | 115                                                                   | °C   |
| Operating Temperature                      | T <sub>opr</sub> | -40 ~ +85                                                             | °C   |
| Storage Temperature                        | T <sub>stg</sub> | -40 ~ +90                                                             | °C   |
| Soldering Temperature                      | T <sub>sol</sub> | Reflow Soldering: 260°C for 10sec.<br>Hand Soldering: 350°C for 3sec. |      |

**Electro-Optical Characteristics (Ta=25°C)**

| Parameter       | Symbol            | Min. | Typ. | Max. | Unit | Condition            |
|-----------------|-------------------|------|------|------|------|----------------------|
| Luminous Flux   | Φ                 | 10.0 | ---  | 21.0 | lm   | I <sub>F</sub> =60mA |
| Viewing Angle   | 2θ <sub>1/2</sub> | ---  | 120  | ---  | deg  | I <sub>F</sub> =60mA |
| Forward Voltage | V <sub>F</sub>    | 2.90 | ---  | 3.50 | V    | I <sub>F</sub> =60mA |
| Reverse Current | I <sub>R</sub>    | ---  | ---  | 50   | μA   | V <sub>R</sub> =5V   |

**Notes:**

1. Tolerance of Luminous Flux: ± 7%
2. Tolerance of Forward Voltage: ± 0.05V

Technical Data Sheet-Preliminary

Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Range of Luminous Intensity**

| Bin Code | Min. | Max. | Unit | Condition            |
|----------|------|------|------|----------------------|
| L10      | 10   | 11   | lm   | I <sub>F</sub> =60mA |
| L11      | 11   | 12   |      |                      |
| L12      | 12   | 13   |      |                      |
| L13      | 13   | 14   |      |                      |
| L14      | 14   | 15   |      |                      |
| L15      | 15   | 16   |      |                      |
| L16      | 16   | 17   |      |                      |
| L17      | 17   | 18   |      |                      |
| L18      | 18   | 19   |      |                      |
| L19      | 19   | 20   |      |                      |
| L20      | 20   | 21   |      |                      |

**Note:** Tolerance of Luminous Flux:  $\pm 7\%$

Technical Data Sheet-Preliminary

Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Range of Forward Voltage**

| Bin Code | Min. | Max. | Unit | Condition         |
|----------|------|------|------|-------------------|
| A        | 2.90 | 3.00 | volt | $I_F=60\text{mA}$ |
| B        | 3.00 | 3.10 |      |                   |
| C        | 3.10 | 3.20 |      |                   |
| D        | 3.20 | 3.30 |      |                   |
| E        | 3.30 | 3.40 |      |                   |
| F        | 3.40 | 3.50 |      |                   |

**Note:** Tolerance of Forward Voltage:  $\pm 0.05\text{V}$

**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Code of Chromaticity Coordinates**

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| 81       | 0.2653 | 0.2419 | 86       | 0.2798 | 0.2249 | I <sub>F</sub> =60mA |
|          | 0.2624 | 0.2453 |          | 0.2769 | 0.2283 |                      |
|          | 0.2663 | 0.2528 |          | 0.2808 | 0.2358 |                      |
|          | 0.2692 | 0.2494 |          | 0.2837 | 0.2324 |                      |
| 82       | 0.2682 | 0.2385 | 91       | 0.2692 | 0.2494 |                      |
|          | 0.2653 | 0.2419 |          | 0.2663 | 0.2528 |                      |
|          | 0.2692 | 0.2494 |          | 0.2702 | 0.2603 |                      |
|          | 0.2721 | 0.2460 |          | 0.2731 | 0.2569 |                      |
| 83       | 0.2711 | 0.2351 | 92       | 0.2721 | 0.2460 |                      |
|          | 0.2682 | 0.2385 |          | 0.2692 | 0.2494 |                      |
|          | 0.2721 | 0.2460 |          | 0.2731 | 0.2569 |                      |
|          | 0.2750 | 0.2426 |          | 0.2760 | 0.2535 |                      |
| 84       | 0.2740 | 0.2317 | 93       | 0.2750 | 0.2426 |                      |
|          | 0.2711 | 0.2351 |          | 0.2721 | 0.2460 |                      |
|          | 0.2750 | 0.2426 |          | 0.2760 | 0.2535 |                      |
|          | 0.2779 | 0.2392 |          | 0.2789 | 0.2501 |                      |
| 85       | 0.2769 | 0.2283 | 94       | 0.2779 | 0.2392 |                      |
|          | 0.2740 | 0.2317 |          | 0.2750 | 0.2426 |                      |
|          | 0.2779 | 0.2392 |          | 0.2789 | 0.2501 |                      |
|          | 0.2808 | 0.2358 |          | 0.2818 | 0.2467 |                      |

**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Code of Chromaticity Coordinates**

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| 95       | 0.2808 | 0.2358 | A4       | 0.2818 | 0.2467 | I <sub>F</sub> =60mA |
|          | 0.2779 | 0.2392 |          | 0.2789 | 0.2501 |                      |
|          | 0.2818 | 0.2467 |          | 0.2828 | 0.2576 |                      |
|          | 0.2847 | 0.2433 |          | 0.2856 | 0.2539 |                      |
| 96       | 0.2837 | 0.2324 | A5       | 0.2847 | 0.2433 |                      |
|          | 0.2808 | 0.2358 |          | 0.2818 | 0.2467 |                      |
|          | 0.2847 | 0.2433 |          | 0.2856 | 0.2539 |                      |
|          | 0.2876 | 0.2399 |          | 0.2885 | 0.2505 |                      |
| A1       | 0.2731 | 0.2569 | A6       | 0.2876 | 0.2399 |                      |
|          | 0.2702 | 0.2603 |          | 0.2847 | 0.2433 |                      |
|          | 0.2741 | 0.2678 |          | 0.2885 | 0.2505 |                      |
|          | 0.2770 | 0.2644 |          | 0.2915 | 0.2474 |                      |
| A2       | 0.2760 | 0.2535 | B1       | 0.2770 | 0.2644 |                      |
|          | 0.2731 | 0.2569 |          | 0.2741 | 0.2678 |                      |
|          | 0.2770 | 0.2644 |          | 0.2780 | 0.2753 |                      |
|          | 0.2799 | 0.2610 |          | 0.2809 | 0.2719 |                      |
| A3       | 0.2789 | 0.2501 | B2       | 0.2799 | 0.2610 |                      |
|          | 0.2760 | 0.2535 |          | 0.2770 | 0.2644 |                      |
|          | 0.2799 | 0.2610 |          | 0.2809 | 0.2719 |                      |
|          | 0.2828 | 0.2576 |          | 0.2838 | 0.2685 |                      |

**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

Technical Data Sheet-Preliminary

Top View White LEDs

45-21SCUM2C/LXXXXXXXXXX/TR8-T

Bin Code of Chromaticity Coordinates

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| B3       | 0.2828 | 0.2576 | C2       | 0.2838 | 0.2685 | I <sub>F</sub> =60mA |
|          | 0.2799 | 0.2610 |          | 0.2809 | 0.2719 |                      |
|          | 0.2838 | 0.2685 |          | 0.2848 | 0.2794 |                      |
|          | 0.2867 | 0.2651 |          | 0.2877 | 0.2760 |                      |
| B4       | 0.2856 | 0.2539 | C3       | 0.2867 | 0.2651 |                      |
|          | 0.2828 | 0.2576 |          | 0.2838 | 0.2685 |                      |
|          | 0.2867 | 0.2651 |          | 0.2877 | 0.2760 |                      |
|          | 0.2895 | 0.2614 |          | 0.2906 | 0.2726 |                      |
| B5       | 0.2885 | 0.2505 | C4       | 0.2895 | 0.2614 |                      |
|          | 0.2856 | 0.2539 |          | 0.2867 | 0.2651 |                      |
|          | 0.2895 | 0.2614 |          | 0.2906 | 0.2726 |                      |
|          | 0.2924 | 0.2580 |          | 0.2934 | 0.2689 |                      |
| B6       | 0.2915 | 0.2474 | C5       | 0.2924 | 0.2580 |                      |
|          | 0.2885 | 0.2505 |          | 0.2895 | 0.2614 |                      |
|          | 0.2924 | 0.2580 |          | 0.2934 | 0.2689 |                      |
|          | 0.2954 | 0.2549 |          | 0.2963 | 0.2655 |                      |
| C1       | 0.2809 | 0.2719 | C6       | 0.2954 | 0.2549 |                      |
|          | 0.2780 | 0.2753 |          | 0.2924 | 0.2580 |                      |
|          | 0.2819 | 0.2828 |          | 0.2963 | 0.2655 |                      |
|          | 0.2848 | 0.2794 |          | 0.2992 | 0.2621 |                      |

**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$



**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Code of Chromaticity Coordinates**

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| D1       | 0.2848 | 0.2794 | D6       | 0.2992 | 0.2621 | I <sub>F</sub> =60mA |
|          | 0.2819 | 0.2828 |          | 0.2963 | 0.2655 |                      |
|          | 0.2858 | 0.2903 |          | 0.3002 | 0.2730 |                      |
|          | 0.2887 | 0.2869 |          | 0.3031 | 0.2696 |                      |
| D2       | 0.2877 | 0.2760 | E1       | 0.2887 | 0.2869 |                      |
|          | 0.2848 | 0.2794 |          | 0.2858 | 0.2903 |                      |
|          | 0.2887 | 0.2869 |          | 0.2897 | 0.2978 |                      |
|          | 0.2916 | 0.2835 |          | 0.2926 | 0.2944 |                      |
| D3       | 0.2906 | 0.2726 | E2       | 0.2916 | 0.2835 |                      |
|          | 0.2877 | 0.2760 |          | 0.2887 | 0.2869 |                      |
|          | 0.2916 | 0.2835 |          | 0.2926 | 0.2944 |                      |
|          | 0.2945 | 0.2801 |          | 0.2955 | 0.2910 |                      |
| D4       | 0.2934 | 0.2689 | E3       | 0.2945 | 0.2801 |                      |
|          | 0.2906 | 0.2726 |          | 0.2916 | 0.2835 |                      |
|          | 0.2945 | 0.2801 |          | 0.2955 | 0.2910 |                      |
|          | 0.2973 | 0.2764 |          | 0.2984 | 0.2876 |                      |
| D5       | 0.2963 | 0.2655 | E4       | 0.2973 | 0.2764 |                      |
|          | 0.2934 | 0.2689 |          | 0.2945 | 0.2801 |                      |
|          | 0.2973 | 0.2764 |          | 0.2984 | 0.2876 |                      |
|          | 0.3002 | 0.2730 |          | 0.3012 | 0.2839 |                      |

**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

Technical Data Sheet-Preliminary

Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Code of Chromaticity Coordinates**

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| E5       | 0.3002 | 0.2730 | F4       | 0.3012 | 0.2839 | I <sub>F</sub> =60mA |
|          | 0.2973 | 0.2764 |          | 0.2984 | 0.2876 |                      |
|          | 0.3012 | 0.2839 |          | 0.3023 | 0.2951 |                      |
|          | 0.3041 | 0.2805 |          | 0.3051 | 0.2914 |                      |
| E6       | 0.3031 | 0.2696 | F5       | 0.3041 | 0.2805 |                      |
|          | 0.3002 | 0.2730 |          | 0.3012 | 0.2839 |                      |
|          | 0.3041 | 0.2805 |          | 0.3051 | 0.2914 |                      |
|          | 0.3070 | 0.2771 |          | 0.3080 | 0.2880 |                      |
| F1       | 0.2926 | 0.2944 | F6       | 0.3070 | 0.2771 |                      |
|          | 0.2897 | 0.2978 |          | 0.3041 | 0.2805 |                      |
|          | 0.2936 | 0.3053 |          | 0.3080 | 0.2880 |                      |
|          | 0.2965 | 0.3019 |          | 0.3109 | 0.2846 |                      |
| F2       | 0.2955 | 0.2910 | G1       | 0.2965 | 0.3019 |                      |
|          | 0.2926 | 0.2944 |          | 0.2936 | 0.3053 |                      |
|          | 0.2965 | 0.3019 |          | 0.2975 | 0.3128 |                      |
|          | 0.2994 | 0.2985 |          | 0.3004 | 0.3094 |                      |
| F3       | 0.2984 | 0.2876 | G2       | 0.2994 | 0.2985 |                      |
|          | 0.2955 | 0.2910 |          | 0.2965 | 0.3019 |                      |
|          | 0.2994 | 0.2985 |          | 0.3004 | 0.3094 |                      |
|          | 0.3023 | 0.2951 |          | 0.3033 | 0.3060 |                      |

**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Bin Code of Chromaticity Coordinates**

| Bin code | CIE_x  | CIE_y  | Bin code | CIE_x  | CIE_y  | Condition            |
|----------|--------|--------|----------|--------|--------|----------------------|
| G3       | 0.3023 | 0.2951 | H2       | 0.3033 | 0.3060 | I <sub>F</sub> =60mA |
|          | 0.2994 | 0.2985 |          | 0.3004 | 0.3094 |                      |
|          | 0.3033 | 0.3060 |          | 0.3043 | 0.3169 |                      |
|          | 0.3062 | 0.3026 |          | 0.3072 | 0.3135 |                      |
| G4       | 0.3051 | 0.2914 | H3       | 0.3062 | 0.3026 |                      |
|          | 0.3023 | 0.2951 |          | 0.3033 | 0.3060 |                      |
|          | 0.3062 | 0.3026 |          | 0.3072 | 0.3135 |                      |
|          | 0.3090 | 0.2989 |          | 0.3101 | 0.3101 |                      |
| G5       | 0.3080 | 0.2880 | H4       | 0.3090 | 0.2989 |                      |
|          | 0.3051 | 0.2914 |          | 0.3062 | 0.3026 |                      |
|          | 0.3090 | 0.2989 |          | 0.3101 | 0.3101 |                      |
|          | 0.3119 | 0.2955 |          | 0.3129 | 0.3064 |                      |
| G6       | 0.3109 | 0.2846 | H5       | 0.3119 | 0.2955 |                      |
|          | 0.3080 | 0.2880 |          | 0.3090 | 0.2989 |                      |
|          | 0.3119 | 0.2955 |          | 0.3129 | 0.3064 |                      |
|          | 0.3148 | 0.2921 |          | 0.3158 | 0.3030 |                      |
| H1       | 0.3004 | 0.3094 | H6       | 0.3148 | 0.2921 |                      |
|          | 0.2975 | 0.3128 |          | 0.3119 | 0.2955 |                      |
|          | 0.3014 | 0.3203 |          | 0.3158 | 0.3030 |                      |
|          | 0.3043 | 0.3169 |          | 0.3187 | 0.2996 |                      |

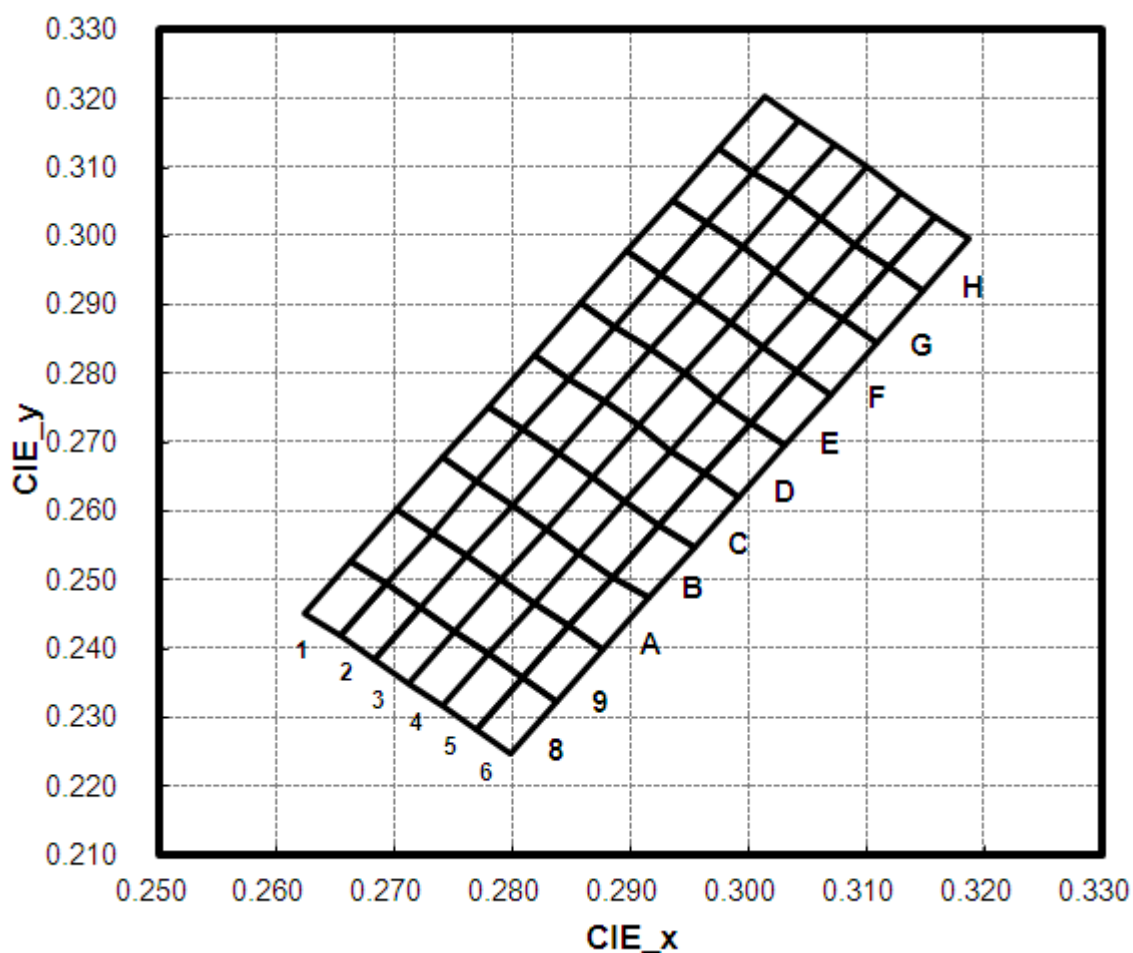
**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**The C.I.E. 1931 Chromaticity Diagram**



# Technical Data Sheet-Preliminary

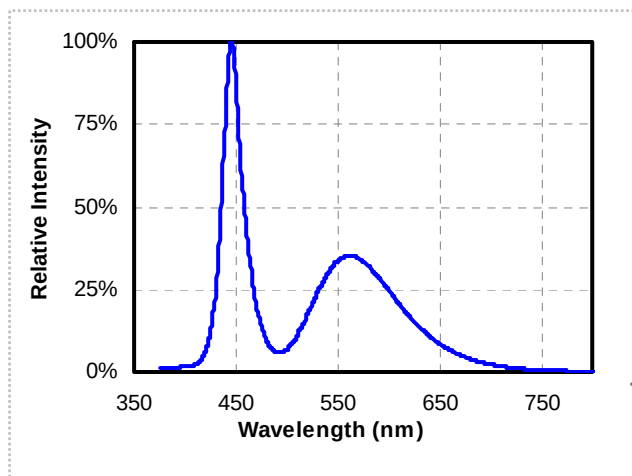
## Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

### Typical Electro-Optical-Thermal Characteristics Curves

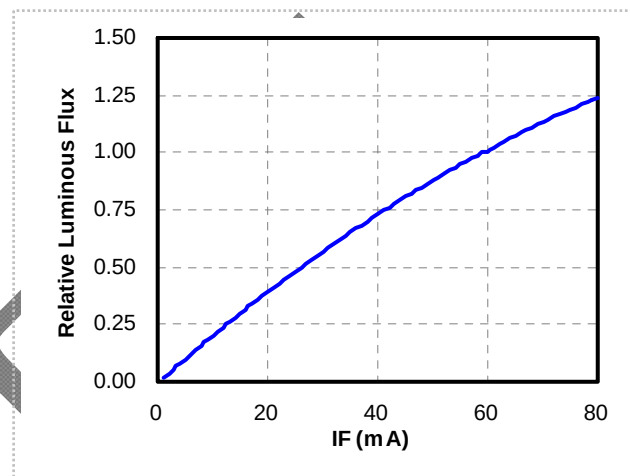
#### 1. Spectrum Distribution

( $T_A=25^{\circ}\text{C}$ ,  $I_F=60\text{mA}$ )



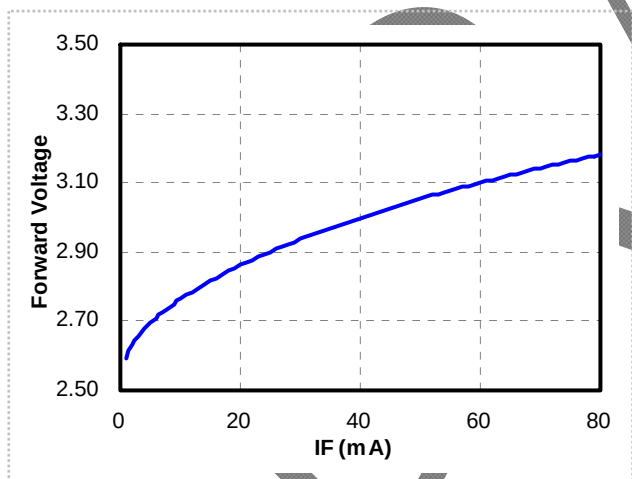
#### 2. Relative Luminous Flux vs. Forward Current

( $T_A=25^{\circ}\text{C}$ )



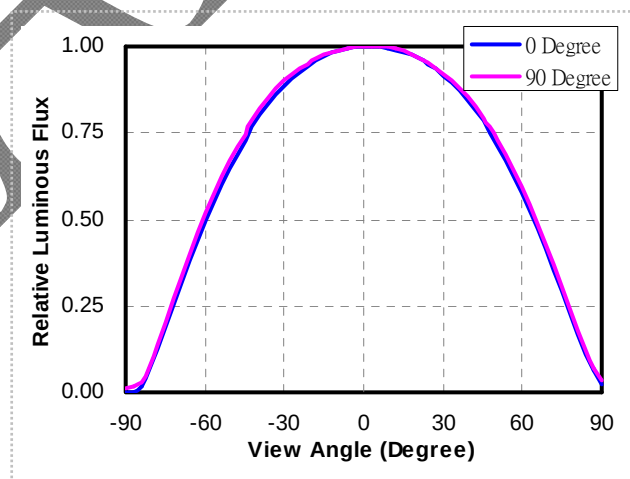
#### 3. Relative Forward Voltage vs. Forward Current

( $T_A=25^{\circ}\text{C}$ )



#### 4. Radiation Diagram

( $T_A=25^{\circ}\text{C}$ ,  $I_F=60\text{mA}$ )



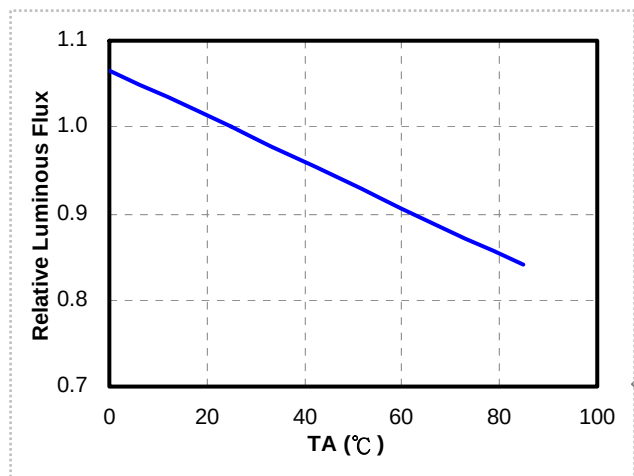
# Technical Data Sheet-Preliminary

## Top View White LEDs

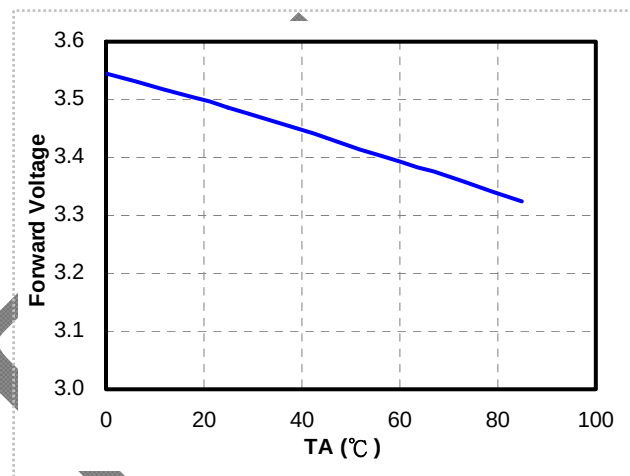
**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

### Typical Electro-Optical-Thermal Characteristics Curves

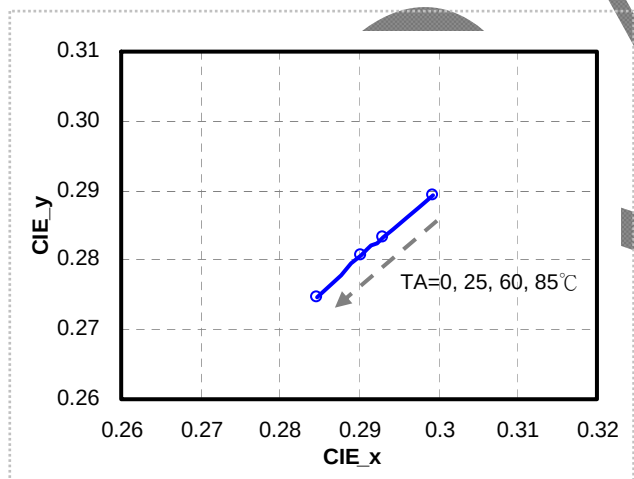
5. Relative Luminous Flux vs. Ambient Temperature  
( $I_F=60\text{mA}$ )



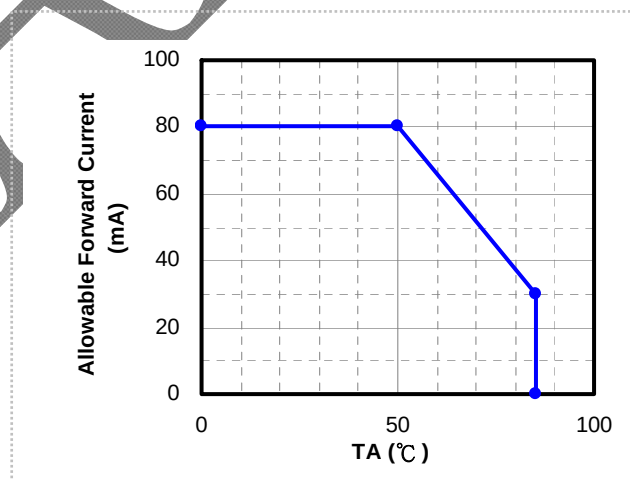
6. Forward Voltage vs. Ambient Temperature  
( $I_F=60\text{mA}$ )



7. Chromaticity Coordinates vs. Ambient Temperature  
( $I_F=60\text{mA}$ )



8. Forward Current De-rating Curve



# Technical Data Sheet-Preliminary

## Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

### Label Explanation

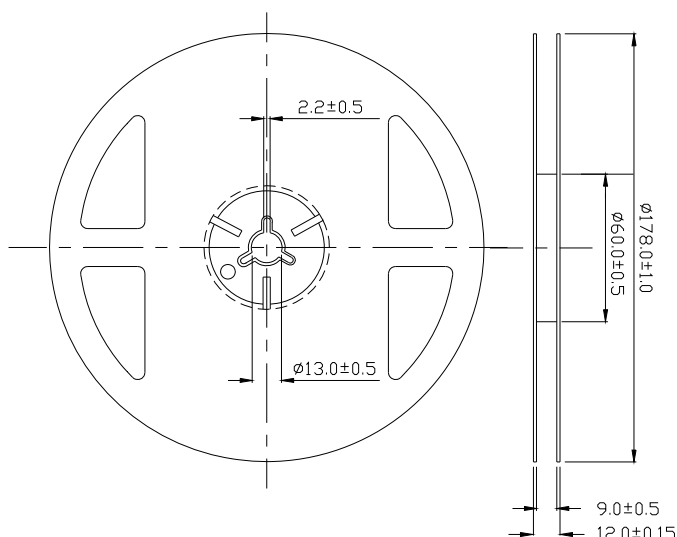
CAT: Luminous Intensity Rank

HUE: Chromaticity Coordinates

REF: Forward Voltage Rank



### Reel Dimensions



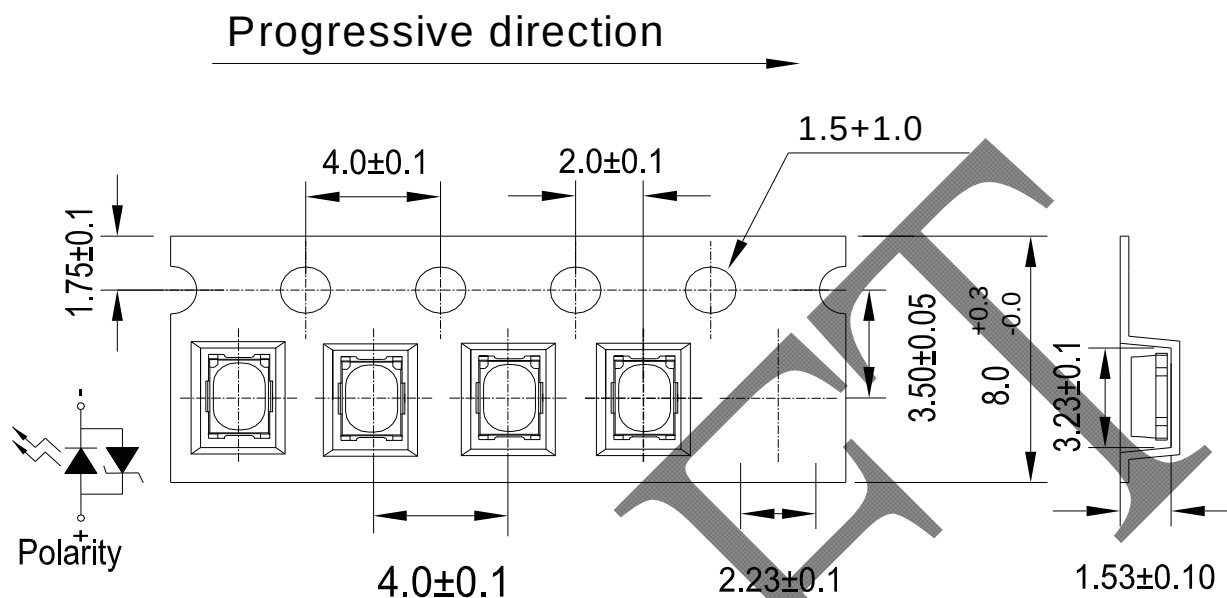
Note: The tolerances unless dimensions are  $\pm 0.1\text{mm}$ .

## Technical Data Sheet-Preliminary

## Top View White LEDs

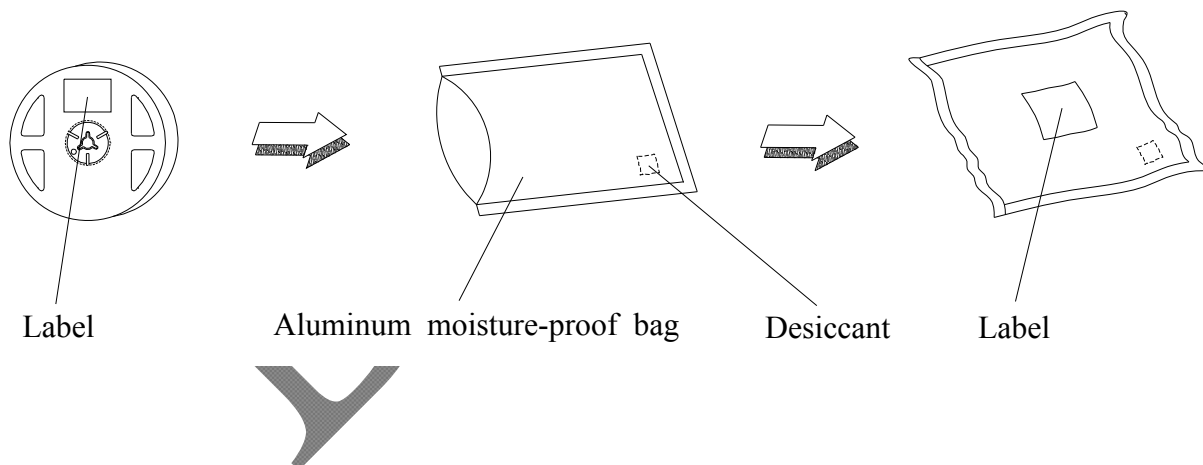
**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Carrier Tape Dimensions: Loaded Quantity 250 up/500/1000/2000 pcs. Per Reel**



Note: The tolerances unless dimensions are  $\pm 0.1\text{mm}$ .

## Moisture Resistant Packaging





**Technical Data Sheet-Preliminary**

**Top View White LEDs**

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

**Reliability Test Items and Conditions**

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

| No. | Item                                              | Test Conition                            |         | Test Hours/<br>Times | Criteria<br>(at std. IF) |
|-----|---------------------------------------------------|------------------------------------------|---------|----------------------|--------------------------|
|     |                                                   | Temp./ Humidity                          | IF (mA) |                      |                          |
| 1   | Reflow Soldering                                  | Temp.: 260°C±5°C<br>Max. 10 sec.         |         | 2 times              | △Iv < ±10%<br>△VF < ±10% |
| 2   | Thermal Cycle                                     | -40°C ~ 100°C<br>30min. (5min.) 30min.   |         | 200 cycles           | Iv > 70%,<br>VF < 110%,  |
| 3   | Thermal Shock                                     | -10°C ~ 100°C<br>20min. (<15sec.) 20min. |         | 200 cycles           |                          |
| 4   | Low Temp. Storage                                 | TA=-40°C                                 | --      | 1000 hrs             |                          |
| 5   | High Temp. Storage                                | TA=100°C                                 | --      | 1000 hrs             |                          |
| 6   | Temp. Humidity Storage                            | TA=60°C / 90%RH                          | --      | 1000 hrs             |                          |
| 7   | Steady State Operating Life of Low Temp.          | TA=-40°C                                 | 60      | 1000 hrs             |                          |
| 8   | Steady State Operating Life Condition 1           | TA=25°C / Room Hum.                      | 60      | 1000 hrs             |                          |
| 9   | Steady State Operating Life Condition 2           | TA=60°C                                  | 60      | 1000 hrs             |                          |
| 10  | Steady State Operating Life of High Temp.         | TA=85°C                                  | 20      | 1000 hrs             |                          |
| 11  | Steady State Operating Life of High Humidity Heat | TA=60°C / 90%RH                          | 60      | 1000 hrs             |                          |

※ Sampling for each test item: 22 (pcs.)

## Technical Data Sheet-Preliminary

### Top View White LEDs

**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

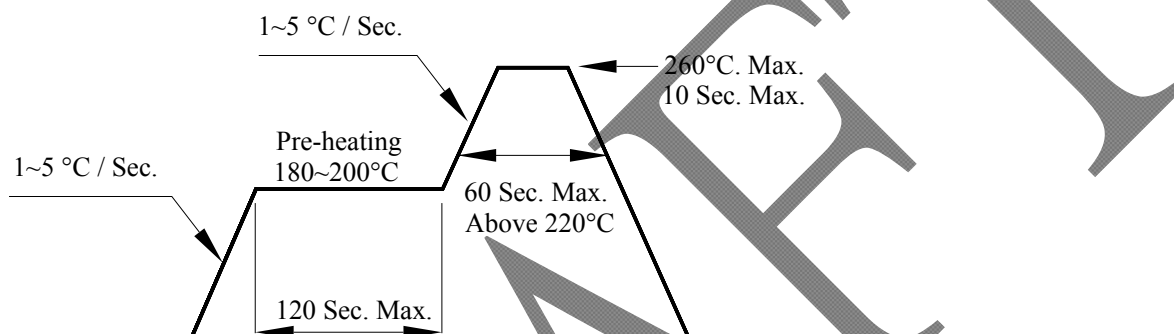
#### Precautions for Use

##### 1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change ( Burn out will happen ).

##### 2. Soldering Condition

###### 2.1 Pb-free solder temperature profile



2.2 Reflow soldering should not be done more than two times.

2.3 When soldering, do not put stress on the LEDs during heating.

2.4 After soldering, do not warp the circuit board.

## Technical Data Sheet-Preliminary

### Top View White LEDs

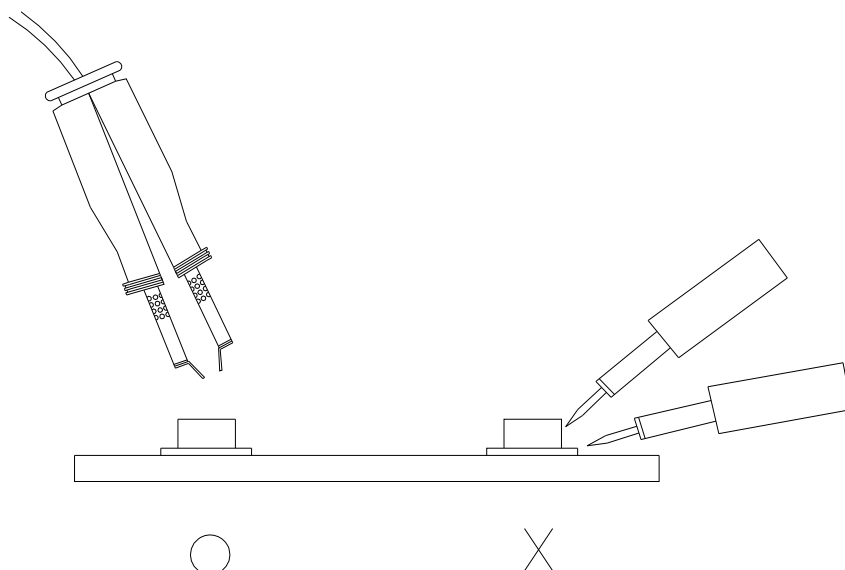
**45-21SCUM2C/LXXXXXXXXXX/TR8-T**

#### 3. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

#### 4. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



#### 5. Handling Indications

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

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