

## Technical Data Sheet

### Side View LEDs (Height 0.6mm)

#### 99-616LM2C/L8085S96/TR8-T

#### Features

- Side view white LED
- White SMT package
- Lead frame package with individual 2 pins
- 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, 99-616 has wide viewing angle, low power consumption and white LEDs are devices which are materialized by combing blue chip and special phosphor. This feature makes the LED ideal for light guide application.

#### Applications

- LCD Back Light
- Mobile phones
- Indicators
- Illuminations
- Switch Lights

#### Device Selection Guide

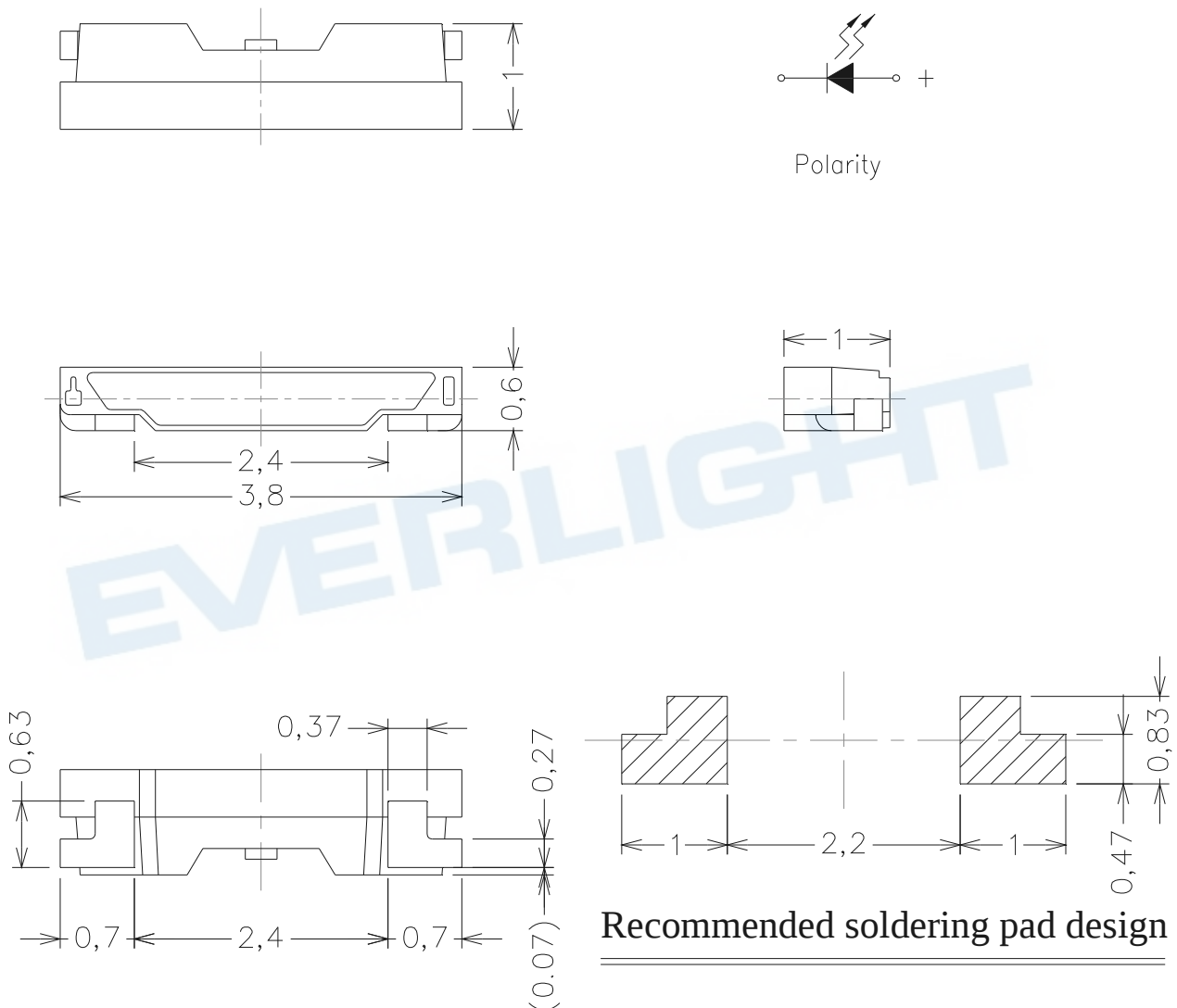
| Chip     | Emitted Color | Resin Color |
|----------|---------------|-------------|
| Material |               |             |
| InGaN    | Pure White    | Water Clear |

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#### Package Outline Dimensions



**Note:** The tolerances unless mentioned are  $\pm 0.1\text{mm}$ , unit = mm.

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

| Parameter                              | Symbol           | Rating                                                                    | Unit |
|----------------------------------------|------------------|---------------------------------------------------------------------------|------|
| Reverse Voltage                        | V <sub>R</sub>   | 5                                                                         | V    |
| Forward Current                        | I <sub>F</sub>   | 30                                                                        | mA   |
| Peak Forward Current (Duty 1/10 @10ms) | I <sub>FP</sub>  | 100                                                                       | mA   |
| Power Dissipation                      | P <sub>d</sub>   | 110                                                                       | mW   |
| 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 10 sec.<br>Hand Soldering: 350 °C for 3 sec. |      |

**Note:** The products are sensitive to static electricity and must be carefully taken when handling products.

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

| Parameter       | Symbol         | Min.  | Typ.  | Max.  | Unit | Condition            |
|-----------------|----------------|-------|-------|-------|------|----------------------|
| Luminous Flux   | Φ              | 8.00  | ----- | 8.75  | lm   | I <sub>F</sub> =20mA |
| Viewing Angle   | 2θ1/2          | ----- | 115   | ----- | deg  |                      |
| Forward Voltage | V <sub>F</sub> | 2.95  | ----- | 3.45  | volt |                      |
| 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

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#### Bin Range of Luminous Flux

| Bin Code | Min. | Max. | Unit | Condition            |
|----------|------|------|------|----------------------|
| 80       | 8.00 | 8.25 | Lm   | I <sub>F</sub> =20mA |
| 82       | 8.25 | 8.50 |      |                      |
| 85       | 8.50 | 8.75 |      |                      |

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

#### Bin Range of Forward Voltage

| Bin Code | Min. | Max. | Unit | Condition            |
|----------|------|------|------|----------------------|
| 6-1      | 2.95 | 3.05 | volt | I <sub>F</sub> =20mA |
| 6-2      | 3.05 | 3.15 |      |                      |
| 7-1      | 3.15 | 3.25 |      |                      |
| 7-2      | 3.25 | 3.35 |      |                      |
| 8-1      | 3.35 | 3.45 |      |                      |

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

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## Side View LEDs (Height 0.6mm)

### 99-616LM2C/L8085S96/TR8-T

#### Chromaticity Coordinates of Bin Code

| Bin Code | CIE_x  | CIE_y  | Bin Code | CIE_x  | CIE_y  |
|----------|--------|--------|----------|--------|--------|
| NB5-3-1  | 0.2935 | 0.2815 | NB5-3-2  | 0.2975 | 0.2885 |
|          | 0.2910 | 0.2870 |          | 0.2950 | 0.2940 |
|          | 0.2950 | 0.2940 |          | 0.2990 | 0.3010 |
|          | 0.2975 | 0.2885 |          | 0.3015 | 0.2955 |
| NB5-3-3  | 0.2960 | 0.2760 | NB5-3-4  | 0.3000 | 0.2830 |
|          | 0.2935 | 0.2815 |          | 0.2975 | 0.2885 |
|          | 0.2975 | 0.2885 |          | 0.3015 | 0.2955 |
|          | 0.3000 | 0.2830 |          | 0.3040 | 0.2900 |
| NB5-4-1  | 0.3015 | 0.2955 | NB5-4-2  | 0.3055 | 0.3025 |
|          | 0.2990 | 0.3010 |          | 0.3030 | 0.3080 |
|          | 0.3030 | 0.3080 |          | 0.3070 | 0.3150 |
|          | 0.3055 | 0.3025 |          | 0.3095 | 0.3095 |
| NB5-4-3  | 0.3040 | 0.2900 | NB5-4-4  | 0.3080 | 0.2970 |
|          | 0.3015 | 0.2955 |          | 0.3055 | 0.3025 |
|          | 0.3055 | 0.3025 |          | 0.3095 | 0.3095 |
|          | 0.3080 | 0.2970 |          | 0.3120 | 0.3040 |

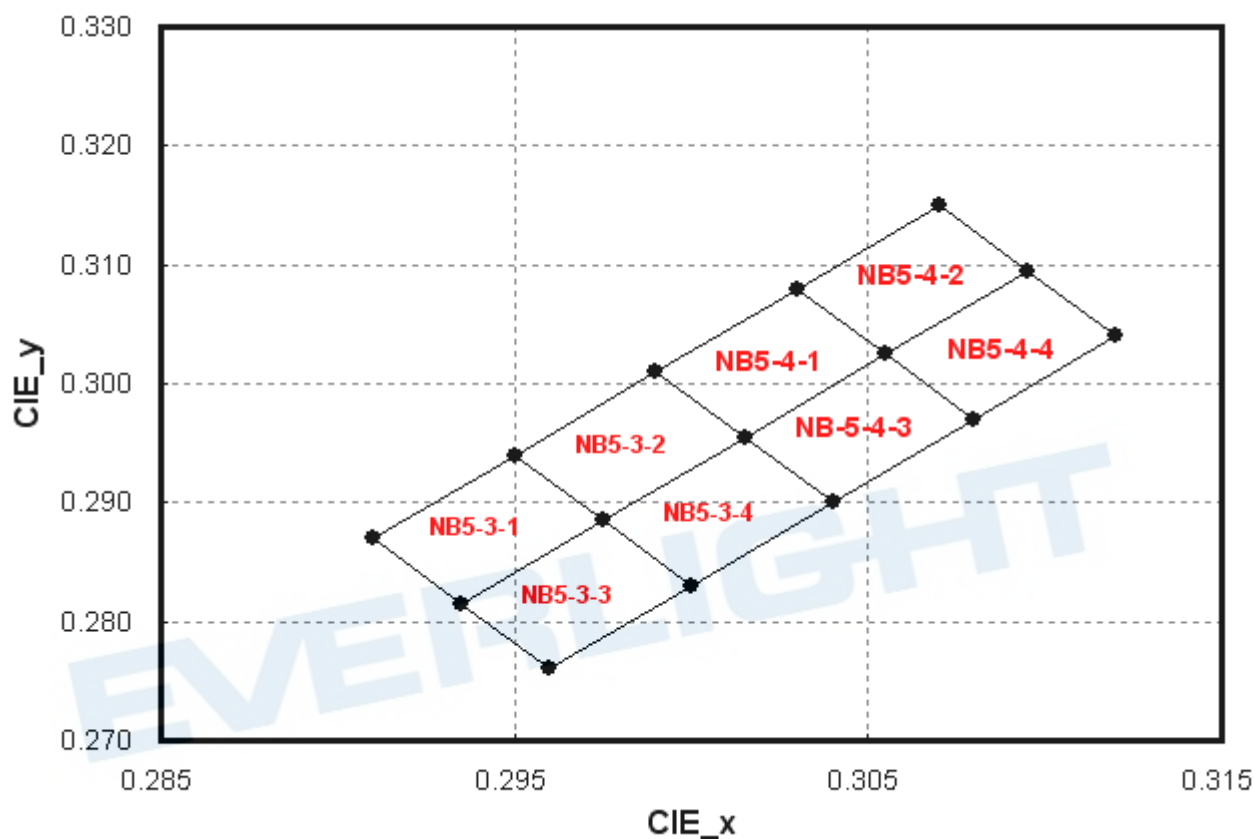
**Note:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

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



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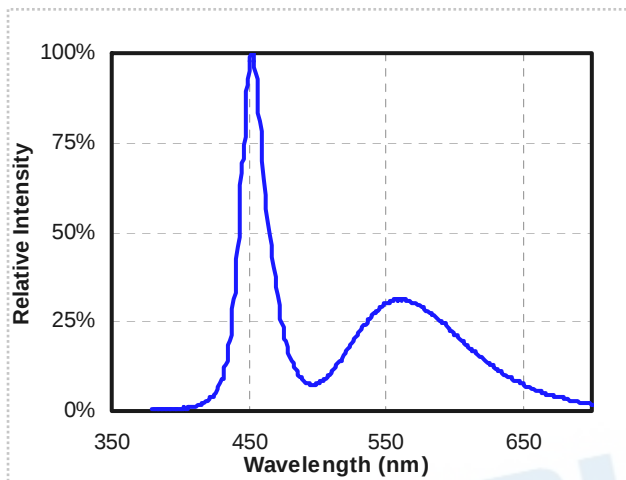
### Side View LEDs (Height 0.6mm)

#### 99-616LM2C/L8085S96/TR8-T

### Typical Electro-Optical Characteristics Curves

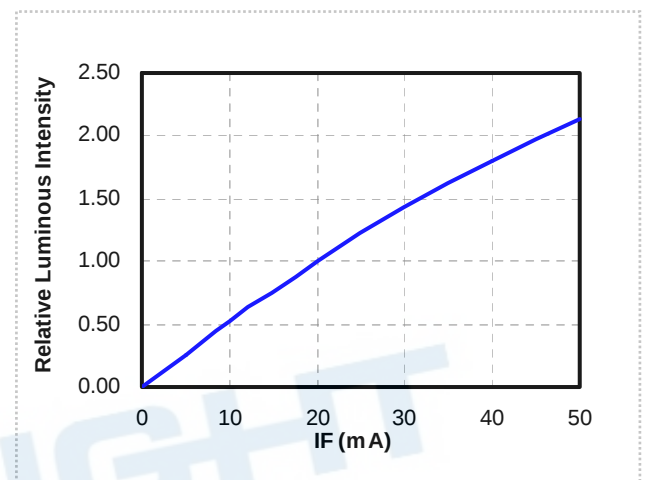
#### 1. Spectrum Distribution

( $T_s=25^{\circ}\text{C}$ ,  $I_F=20\text{mA}$ )



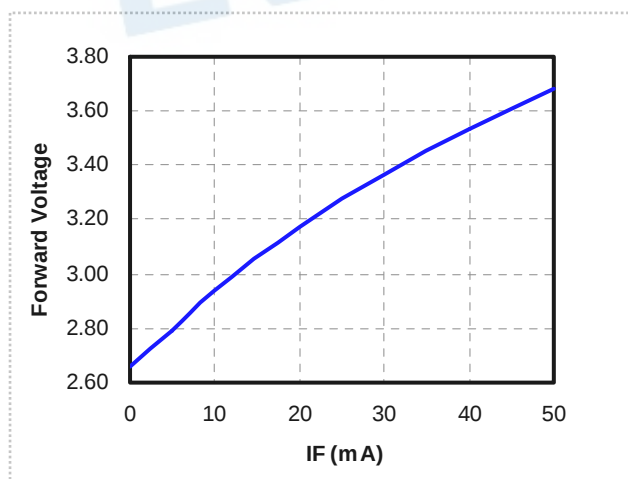
#### 2. Relative Luminous Flux vs. Forward Current

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



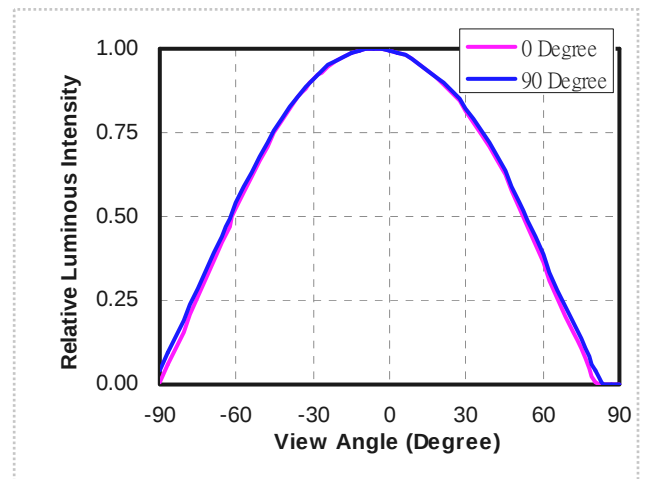
#### 3. Relative Forward Voltage vs. Forward Current

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



#### 4. Radiation Diagram

( $T_s=25^{\circ}\text{C}$ ,  $I_F=20\text{mA}$ )



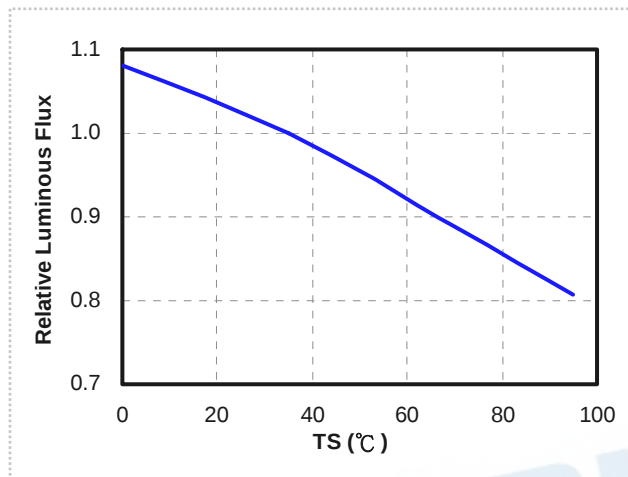
## Technical Data Sheet

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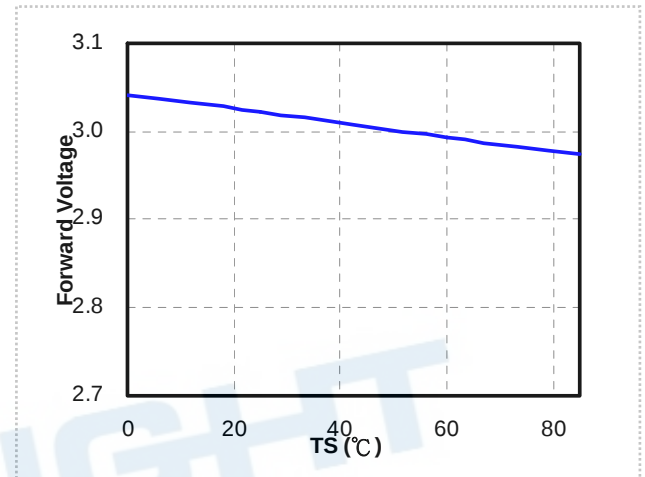
#### 99-616LM2C/L8085S96/TR8-T

#### Typical Electro-Optical-Thermal Characteristics Curves

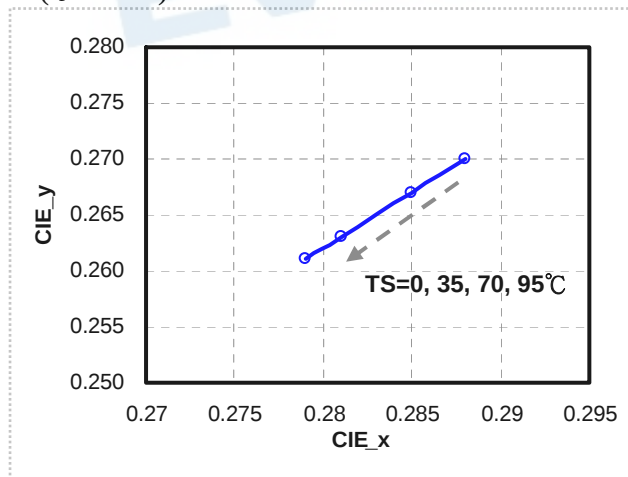
5. Relative Luminous Flux vs. Ambient Temperature  
( $I_F=20\text{mA}$ )



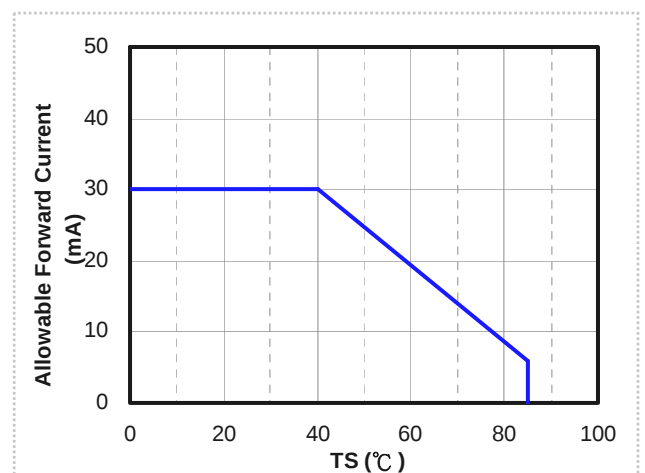
6. Forward Voltage vs. Ambient Temperature  
( $I_F=20\text{mA}$ )



7. Chromaticity Coordinates vs. Ambient Temperature  
( $I_F=20\text{mA}$ )



8. Forward Current De-rating Curve



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#### Label Explanation

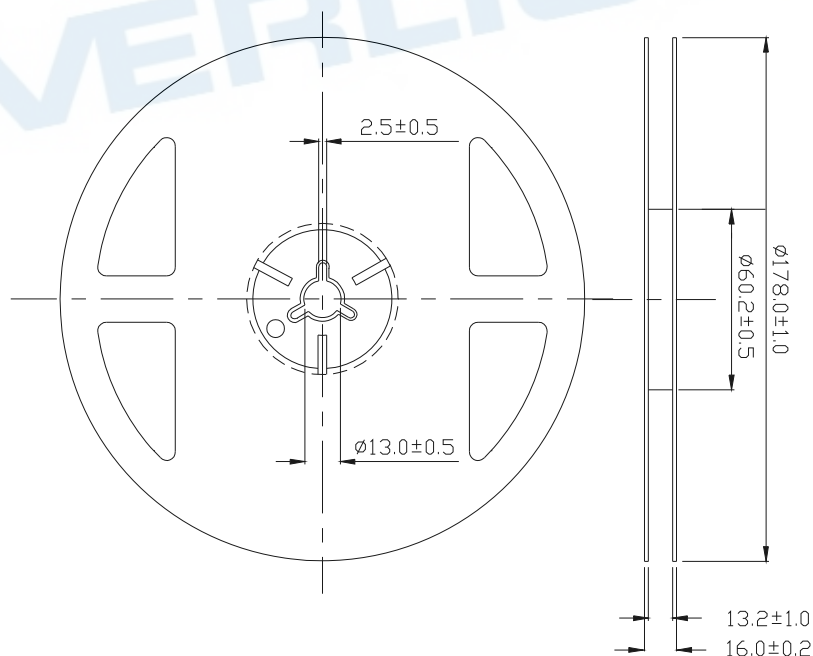
CAT: Luminous Flux Rank

HUE: Chromaticity Coordinates

REF: Forward Voltage Rank



#### Reel Dimensions



**Note:** The tolerance unless mentioned is  $\pm 0.1\text{mm}$ , unit = mm.

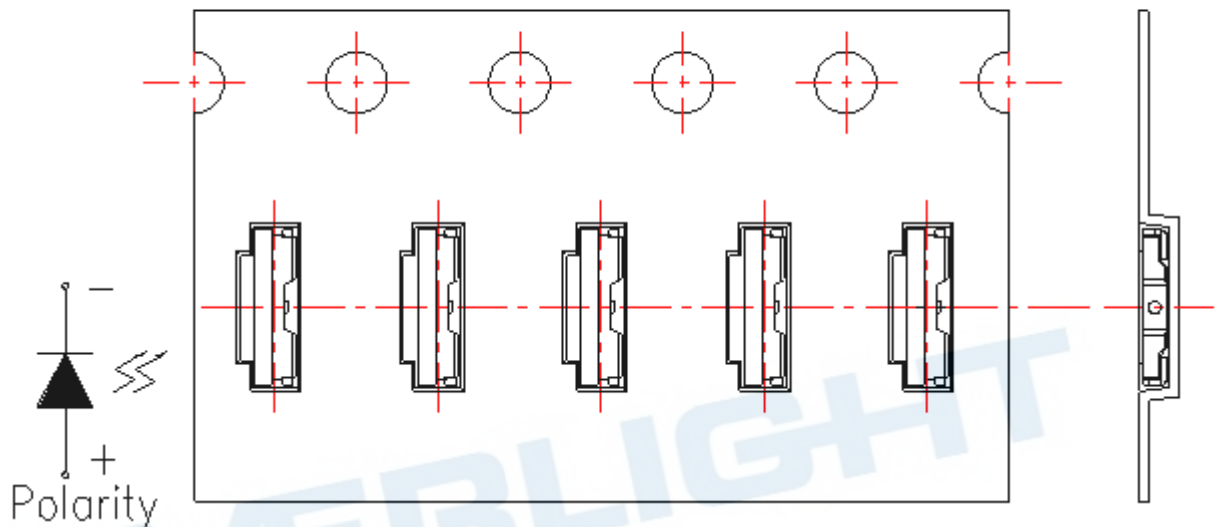
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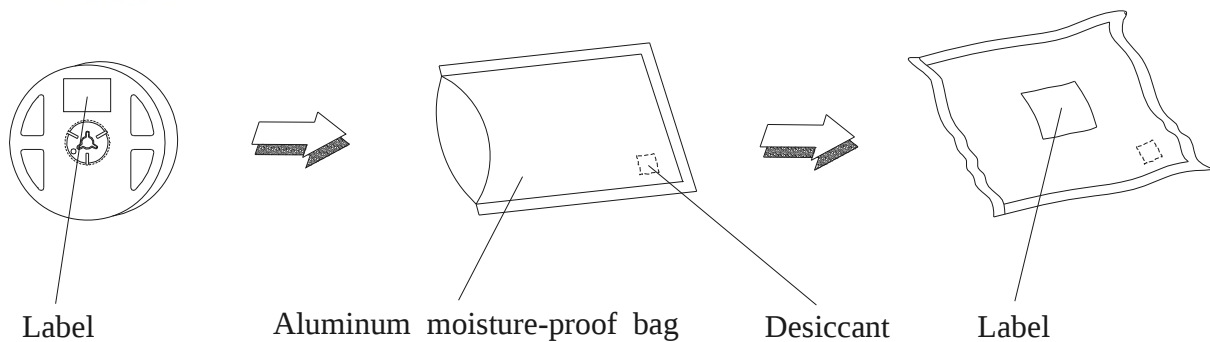
**Carrier Tape Dimensions: Loaded Quantity 1000/2000/3000 pcs. Per Reel**

Progressive direction



**Note:** The tolerance unless mentioned is  $\pm 0.1\text{mm}$ , unit = mm.

### Moisture Resistant Packaging



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#### Reliability Test Items and Conditions

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

Confidence level : 90%

LTPD : 10%

| NO | Item                                              | Test Condition                           |                     | Test Hours / Times | Criteria                                        |                       |
|----|---------------------------------------------------|------------------------------------------|---------------------|--------------------|-------------------------------------------------|-----------------------|
|    |                                                   | Temp./ Humidity                          | I <sub>F</sub> (mA) |                    | I <sub>v</sub> @ 20mA                           | V <sub>F</sub> @ 20mA |
| 1  | Reflow Soldering                                  | TSld = 260°C, Max. 10sec.                |                     | 2 times            | <±10%                                           | <±10%                 |
| 2  | Thermal Cycle                                     | -40°C ~ 100°C<br>30min. (5min.) 30min.   |                     | 200 cycles         | I <sub>v</sub> > 70%,<br>V <sub>F</sub> < 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                                | 20                  | 1000 hrs           |                                                 |                       |
| 8  | Steady State Operating Life Condition 1           | Ta= 25°C / Room Humidity                 | 20                  | 1000 hrs           |                                                 |                       |
| 9  | Steady State Operating Life Condition 2           | Ta= 60°C                                 | 20                  | 1000 hrs           |                                                 |                       |
| 10 | Steady State Operating Life of High Temp.         | Ta= 85°C                                 | 5                   | 1000 hrs           |                                                 |                       |
| 11 | Steady State Operating Life of High Humidity Heat | Ta= 60°C / 90%RH                         | 20                  | 1000 hrs           |                                                 |                       |

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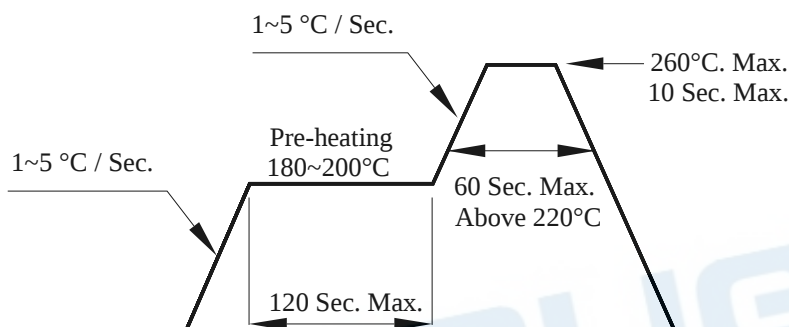
**99-616LM2C/L8085S96/TR8-T**

#### 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.

##### 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. Storage

5.1 Do not open moisture proof bag before the products are ready to use.

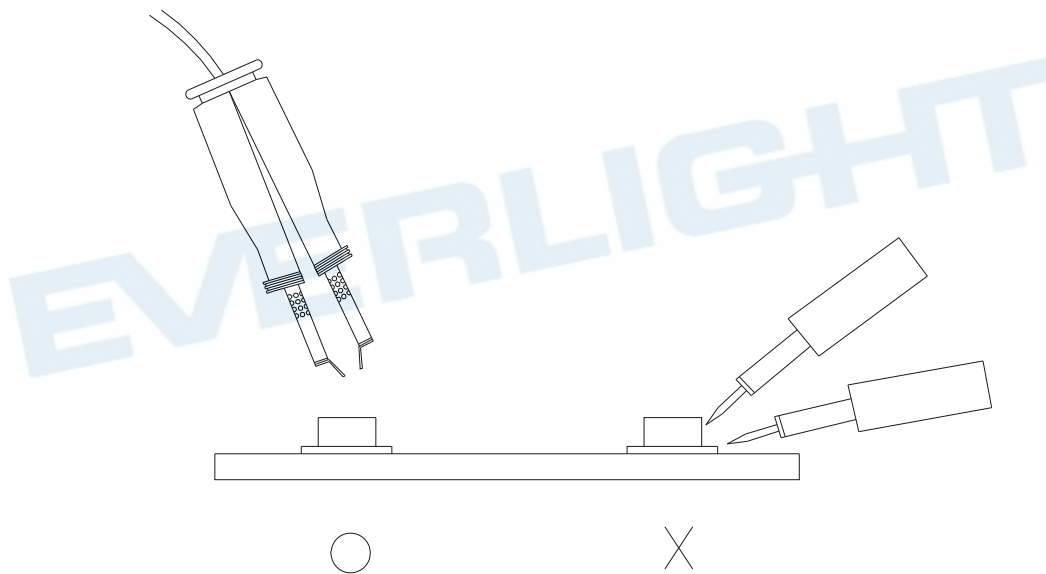
5.2 Before opening the package: The LEDs should be **used within one year** and kept at 30°C or less and **70%RH** or less.

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- 5.3 After opening the package: **We recommend that the LED should be soldered quickly (within 3 days). The soldering condition is 30°C or less and 60%RH or less.** If unused LEDs remain, it should be stored in moisture proof packages.
- 5.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.  
Baking treatment: 60±5°C for 24 hours. **(One time only)**



## 6. 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