EVERLIGHT ELECTRONICS CO.,LTD.

# Technical Data Sheet

# 1.3 mm Height Subminiature , Axial Flat Top LEDs

**28-21SUBC/S400-XX/XXX**

## Features

- Package in 12mm tape on 7" diameter reels.
- EIA Std. package.
- Mono-color type.
- Pb Free
- The product itself will remain within RoHS compliant version.

F8/TR8 28-21

## Descriptions

- The 28-21 SMD taping is much smaller than leaded components .Thus enable smaller board size. Higher packing density. Reduced storage space and finally smaller equipment to be obtained.
- Besides, light weight makes them ideal for miniature.
- Further more by automation assembly machines the accuracy is anticipated.

## Applications

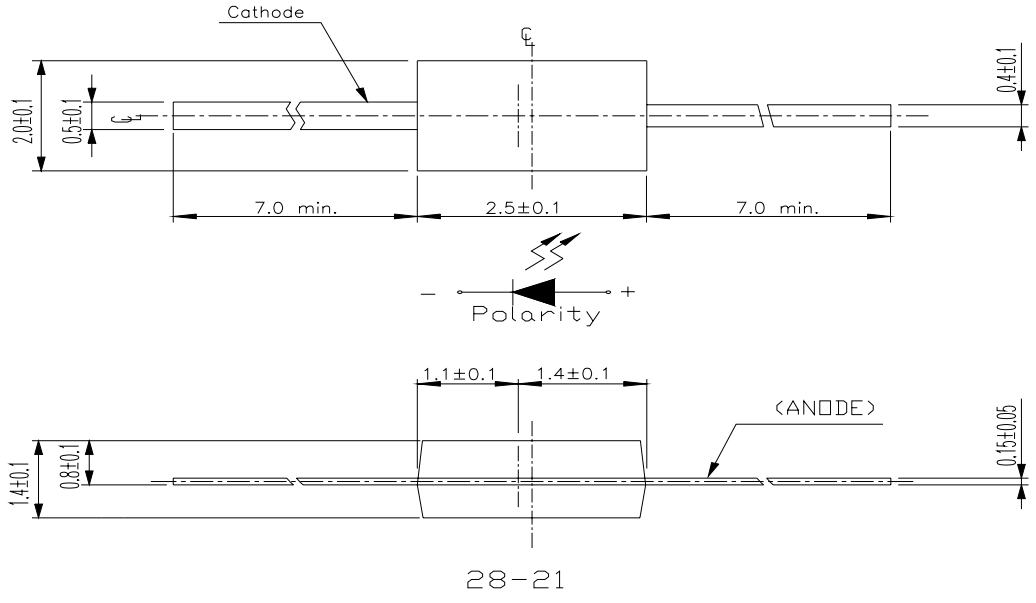
- Small indicator for outdoor applications.
- Flat backlight for LCD, switches and symbols.
- Indicator and backlight in office equipment.
- Indicator and backlight for battery driven equipment.
- Indicator and backlight for audio and video equipment.
- Automotive : backlighting in dashboards and switches.
- General use.

## Device Selection Guide

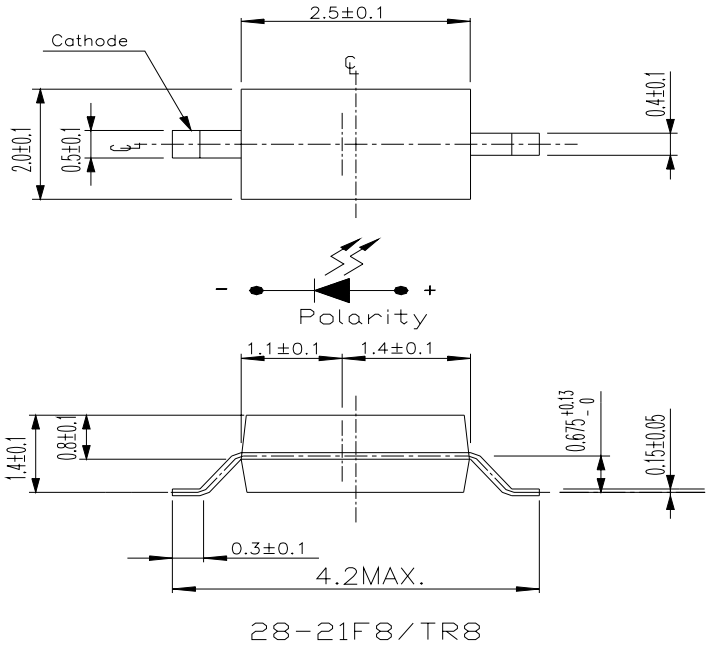
| Chip | | Lens Color |
|---|---|---|
| **Material** | **Emitted Color** | |
| InGaN | Super Blue | Water Clear |

**28-21SUBC/S400-XX/XXX**

## Package Outline Dimensions




28-21




28-21F8/TR8

Unit:mm

**28-21SUBC/S400-XX/XXX**

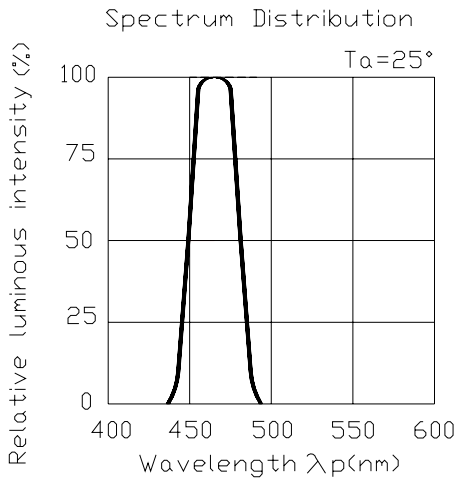
## Absolute Maximum Ratings (Ta=25℃)

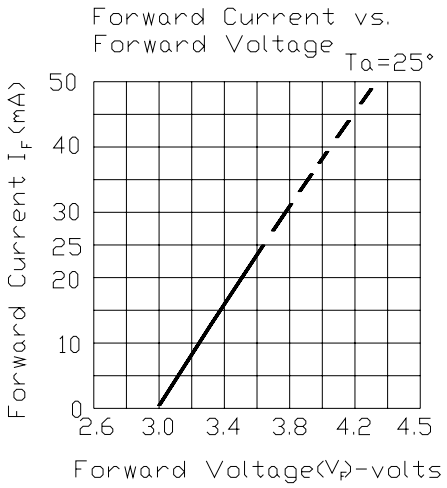
| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Reverse Voltage | $V_R$ | 5 | V |
| Forward Current | $I_F$ | 25 | mA |
| Operating Temperature | Topr | -40 ~ +85 | ℃ |
| Storage Temperature | Tstg | -40 ~ +100 | ℃ |
| Soldering Temperature | Tsol | 260 for 5 seconds | ℃ |
| Electrostatic Discharge | ESD | 150 | V |
| Power Dissipation | Pd | 110 | mW |
| Peak Forward Current(Duty 1/10 @ 1KHZ) | $I_{F\ (peak)}$ | 100 | mA |

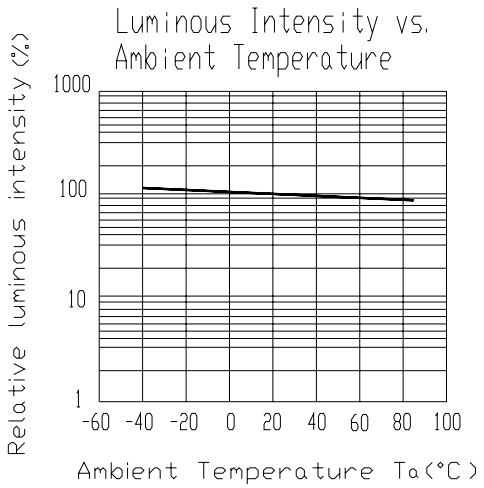
## Electro-Optical Characteristics (Ta=25℃)

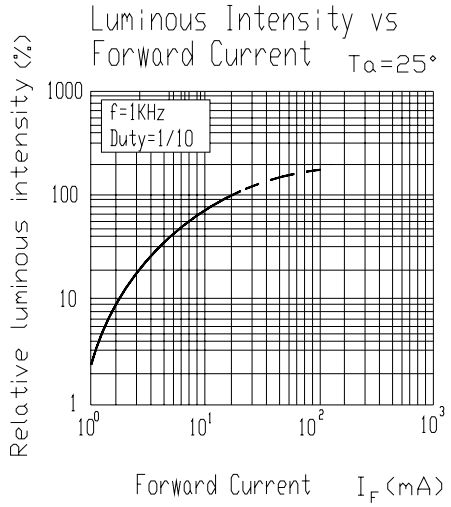
| Parameter | Symbol | Rank | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|---|
| Luminous Intensity | Iv | A4 | 20 | 26 | ------ | mcd | $I_F$=20mA |
| | | A5 | 25 | 29 | ------ | | |
| | | A6 | 30 | 36 | ------- | | |
| Viewing Angle | 2θ1/2 | ---- | ---- | 150 | ---- | deg | |
| Peak Wavelength | λp | ---- | ---- | 468 | ---- | nm | |
| Dominant Wavelength | λd | ---- | ---- | 470 | ---- | nm | |
| Spectrum Radiation Bandwidth | △λ | ---- | ---- | 35 | ---- | nm | |
| Forward Voltage | $V_F$ | ---- | ---- | 3.5 | 4.3 | V | |
| Reverse Current | $I_R$ | ---- | ---- | ---- | 50 | μA | $V_R$=5V |

## Typical Electro-Optical Characteristics Curves

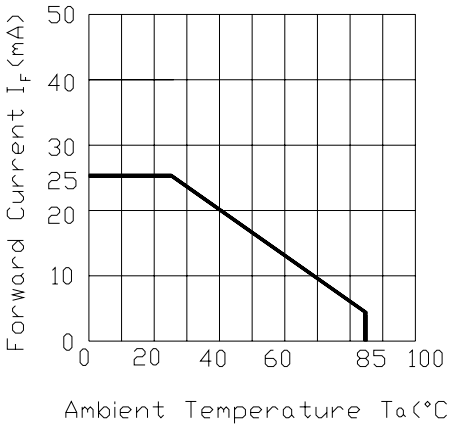


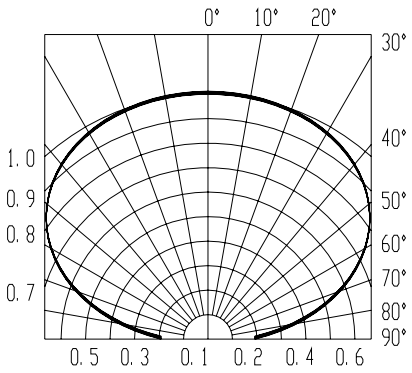




Forward Current Derating Curve




Radiation Diagram



# 28-21SUBC/S400-XX/XXX

## ■Material Descriptions

**28-21 SUBC / S400-XX / XXX**

1 2 3 4

1.production part no.:28-21

2.chip part no.& epoxy color
InGaN =SUB.
C = water clear

3.Chip size:S400(12mil)
Chip Rank:A4~A6

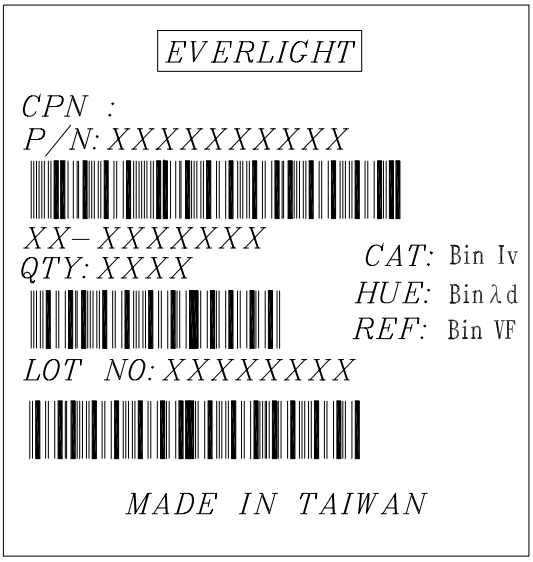
4.packing method:
(1)NONE,F8：Bulk
(2) TR8：Taping

## ■Label explanation

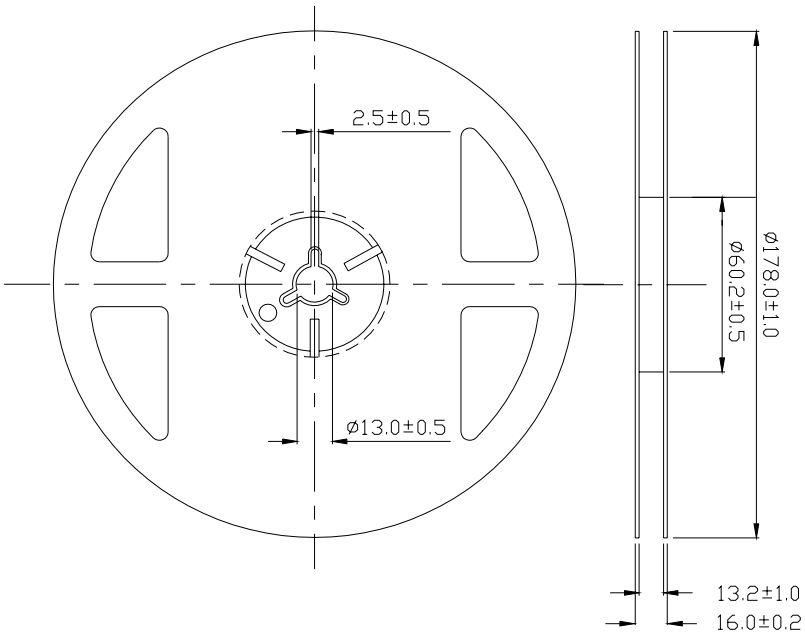
**CAT: Luminous Intensity (mcd)**

**HUE: Dom. Wavelength (nm)**

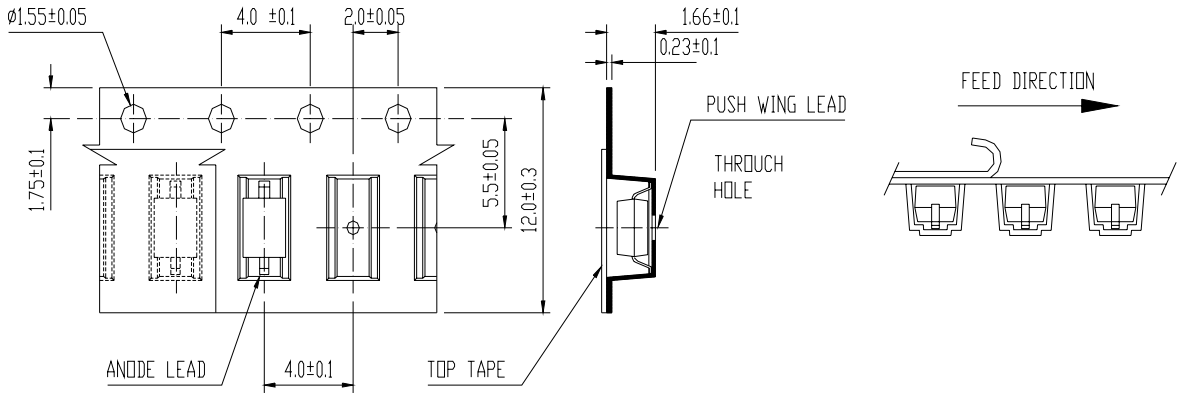
**REF: Forward Voltage (V)**




## ■Reel & Carrier Tape Dimensions



## ■Loaded quantity per reel 1000 PCS/reel




**TR8**

**Reliability Test Items And Conditions**

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

Confidence level : 90 %

LTPD : 10 %

| No. | Items | Test Condition | Test Hours/Cycles | Sample Size | Ac/Rc |
|---|---|---|---|---|---|
| 1 | Reflow | Temp. : 240℃±5℃<br>Min. 5 sec. | 6 min. | 22 Pcs. | 0/1 |
| 2 | Temperature Cycle | H : +100℃ 15 min.<br>∫ 5 min.<br>L : -40℃ 15 min. | 300 Cycles | 22 Pcs. | 0/1 |
| 3 | Thermal Shock | H : +100℃ 5 min.<br>∫ 10 sec.<br>L : -10℃ 5 min. | 300 Cycles | 22 Pcs. | 0/1 |
| 4 | High Temperature Storage | Temp. : 100℃ | 1000 Hrs. | 22 Pcs. | 0/1 |
| 5 | Low Temperature Storage | Temp. : -55℃ | 1000 Hrs. | 22 Pcs. | 0/1 |
| 6 | DC Operating Life | $I_F$ = 20 mA | 1000 Hrs. | 22 Pcs. | 0/1 |
| 7 | High Temperature / High Humidity | 85℃/RH 85% | 1000 Hrs. | 22 Pcs. | 0/1 |

**28-21SUBC/S400-XX/XXX**

## 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. Storage time

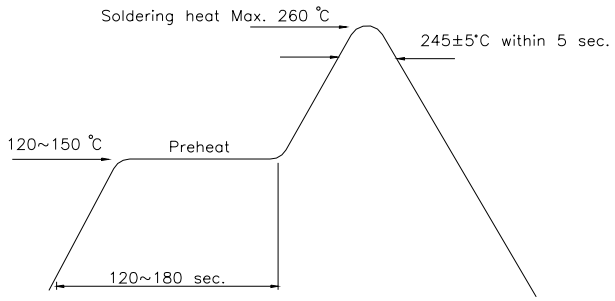
   2.1 The operation of Temperature and RH are : 5℃~35℃, RH60%.

   2.2 Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp proof box with descanting agent. Considering the tape life , we suggest our customers to use our products within a year(from production date).

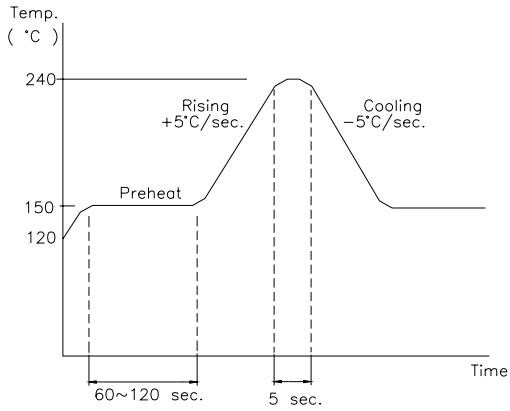
   2.3 If opened more than one week in an atmosphere 5℃~35℃, RH 60%, they should be treated at 60℃±5℃ for 15hrs.

   2.4 When you discover that the desiccant in the package has a pink color (Normal = blue) , you should treat them in the same conditions as 2.3.

## Soldering heat




## Reflow Temp / Time

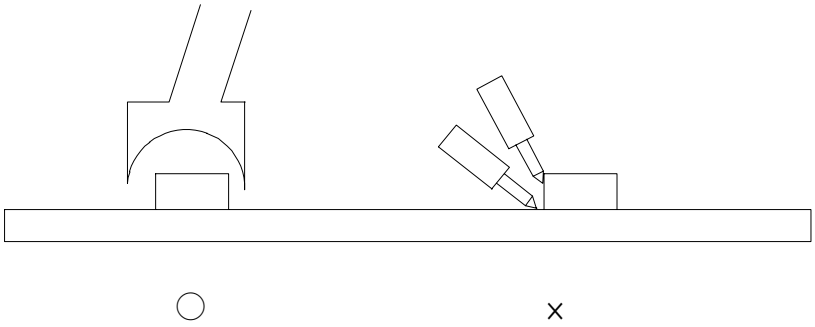


## Soldering Iron

Basic spec is ≦5 sec when 260℃.If temperature is higher, time should be shorter (+10℃→ -1sec). Power dissipation of Iron should be smaller than 15 W , and temperature should be controllable. Surface temperature of the device should be under 230 ℃.

## Rework

1. Customer must finish rework within 5 sec under 245℃.
2. The head of iron can not touch copper foil.
3. Twin-head type is preferred.




***EVERLIGHT ELECTRONICS CO., LTD.***
*Office: No 25, Lane 76, Sec 3, Chung Yang Rd,*
*Tucheng, Taipei 236, Taiwan, R.O.C*
*Tel: 886-2-2267-2000, 2267-9936*
*Fax: 886-2-2267-6244, 2267-6189, 2267-6306*
*http://www.everlight.com*