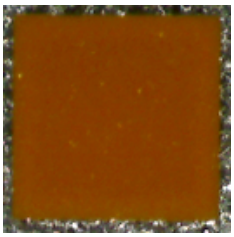
Customer : STD

PRE-SPECIFICATION [DA112DZ]

Seoul semiconductor			Customer
Drawn by	Checked by	Approved by	Approved by

Enabling High Flux system while reduces LED count

DA112DZ



RoHS

Product Brief

Description

- 1-chip and No-package
- SMT solder ability
- Own patent reserved
- RoHS Compliant
- Low Thermal Resistance
- Pb-free Reflow Soldering application
- WICOP 1100 is very useful Top View LED in small Flash application

Features and Benefits

- 1.4mm x 1.4mm x 0.23mm
- Chip on the Board

Key Applications

- Camera cell phones
- PDA's

Table of Contents

Performance Characteristics

Table 1. Absolute Maximum Ratings (T_a = 25ºC)

Parameter	Symbol	Value	Unit
Power Dissipation	P_d *1	1.19	W
DC Forward Current	I_F	350	mA
Peak Forward Current	I_{FM} *2*3	1200	mA
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
Junction Temperature	Tj max	125	ºC
ESD Sensitivity (HBM)	-	2	KV
MSL Level	-	2a	-

Notes :

(1) Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
(2) 1/10 Duty Cycle @ 300ms
(3) Maximum drive current depends on junction temperature.

Table 2. Electro Optical Characteristics (T_a = 25ºC)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage*1	V_F	I_F =1000mA	3.3	-	3.8	V
Turn on Voltage	V_{TO}	I_F =1μA	1.7	-	2.9	
Reverse Voltage	V_R	Not designed for reverse condition.				
Luminous Flux*2	Φ_v	I_F =1000mA	180	205	230	lm
Color Temperature	CCT	I_F =1000mA	2000	2200	2400	K
Viewing Angle	$2\theta_{1/2}$ *3	I_F =350mA		118		deg.

Notes :

(1) Forward voltage measurement allowance is ±0.1V
(2) Φv is total luminous flux output as measured with an integrating sphere.
Tolerance : Φv ±10 %, VF ±0.1 V, Color Coordinate ±0.01
Pulse condition: t = 20ms
(3) 2θ1/2 is the off-axis where the luminous intensity is 1/2 of the peak intensity.

Characteristic Diagram

Fig 1. Color Spectrum, T_a = 25℃, I_F =350mA, RH30%

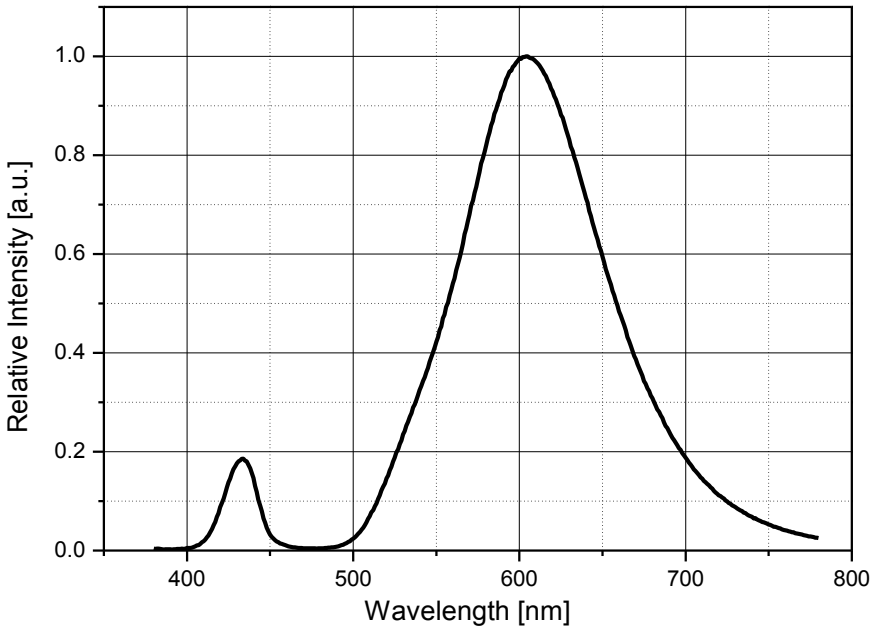
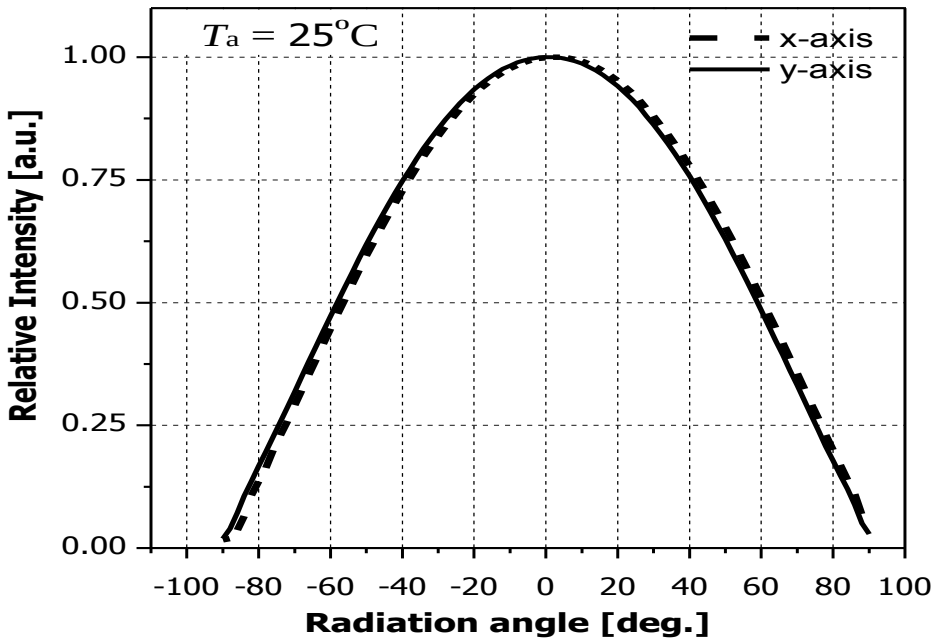


Fig 2. Radiant pattern, T_a = 25℃



Characteristic Diagram

Fig 3. Forward Voltage vs. Forward Current , T_a = 25℃

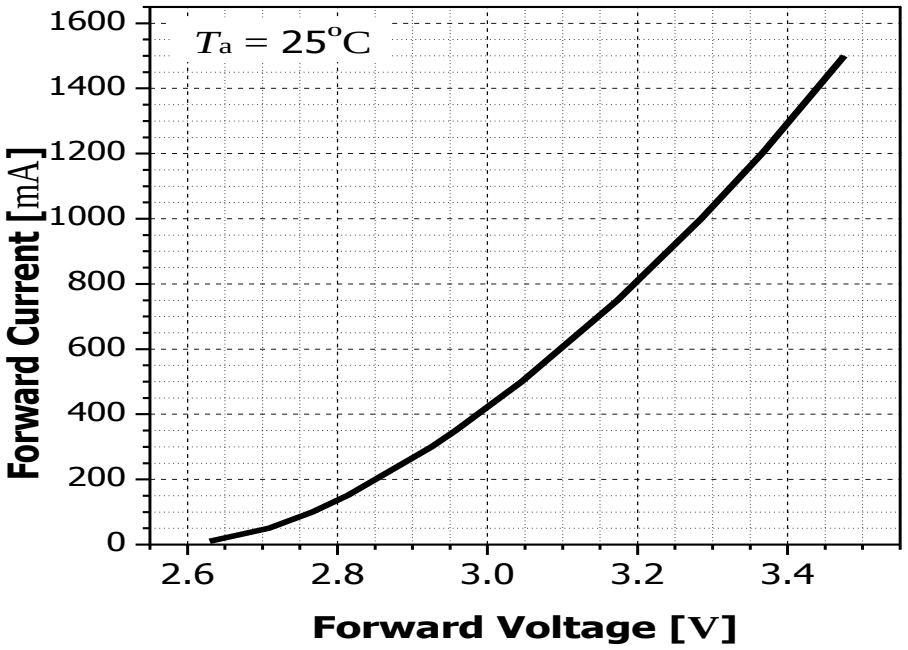
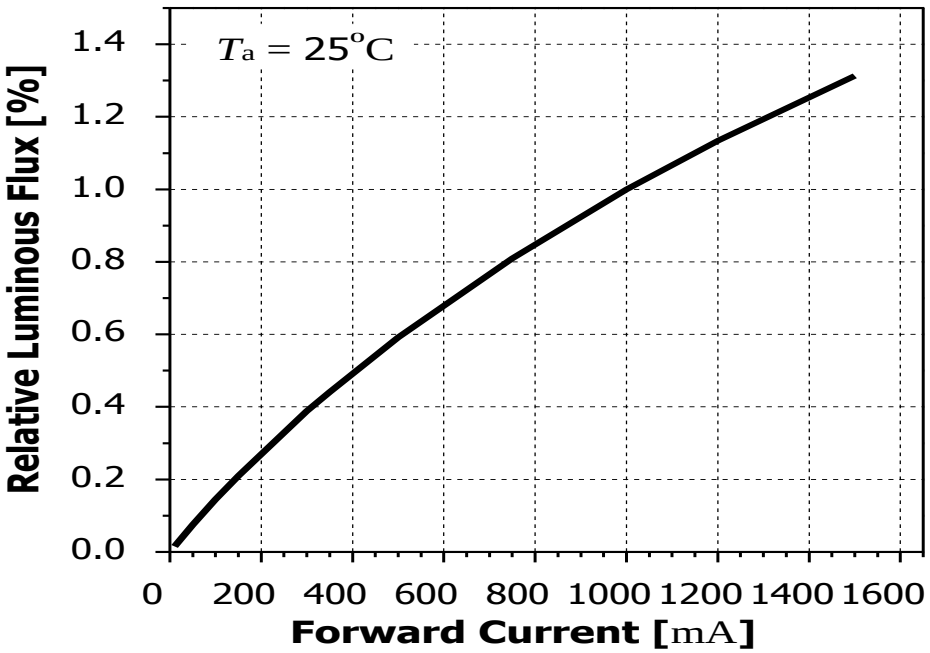
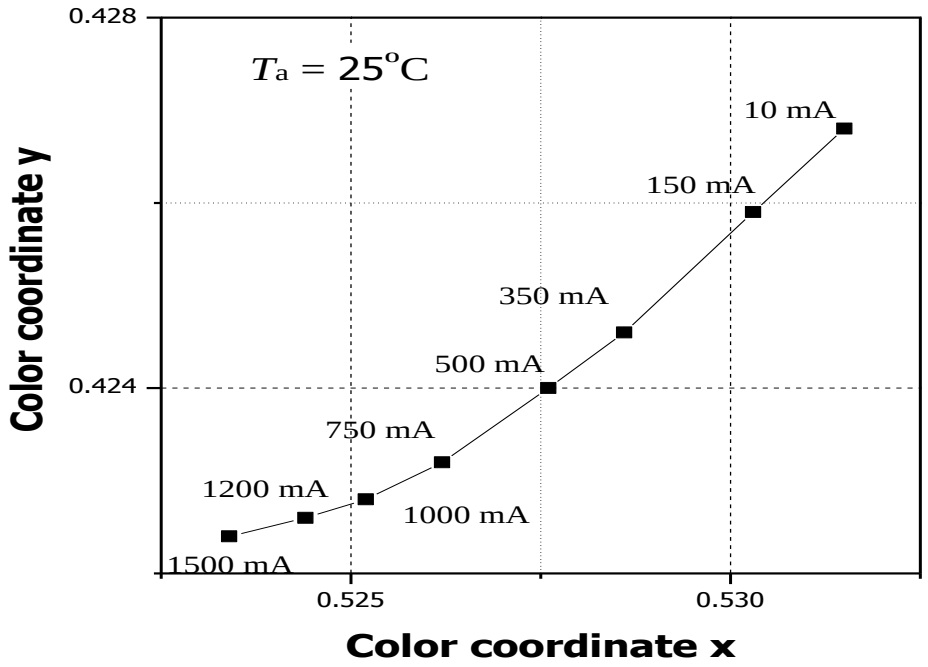


Fig 4. Forward Current vs. Relative Luminous Flux, T_a = 25℃



Characteristic Diagram

Fig 5. Forward Current vs. CIE X, Y Shift, T_a = 25℃



Characteristic Diagram

Fig 7. Forward Voltage vs. Ambient Temperature, I_F =350mA

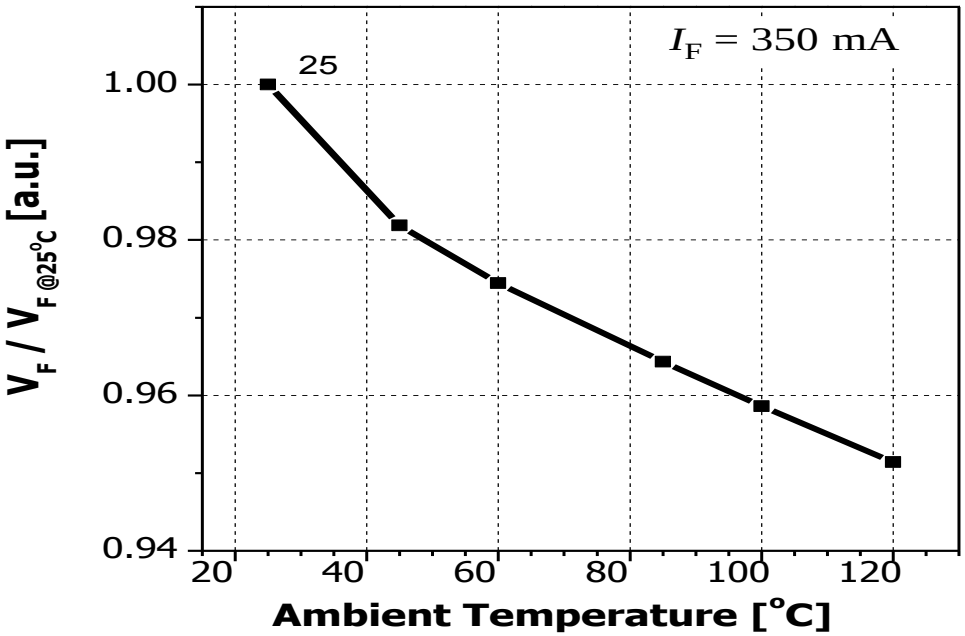
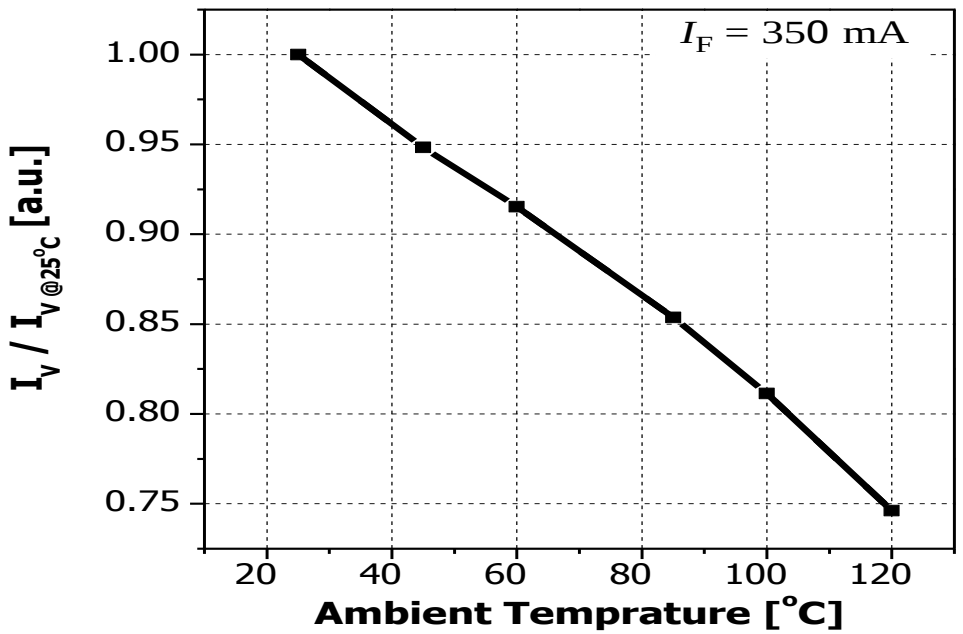


Fig 8. Relative Luminosity vs. Ambient Temperature, I_F =350mA



Characteristic Diagram

Fig 9. Allowable Forward Current vs. Ambient Temperature

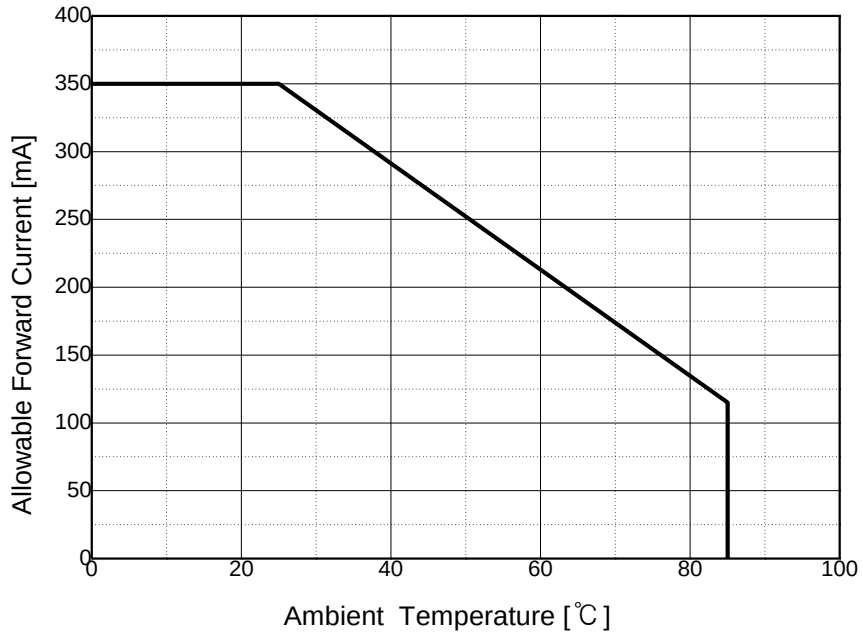
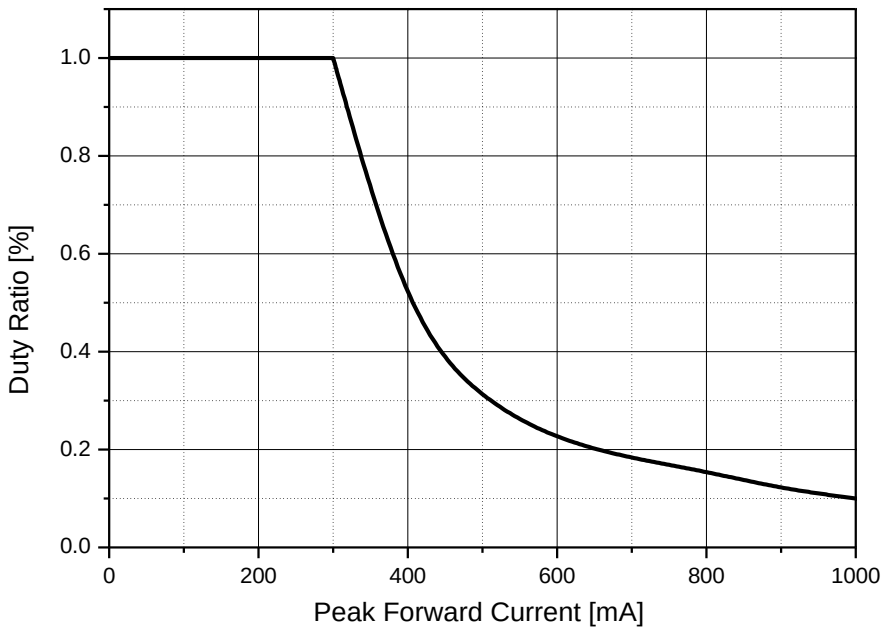


Fig 10. Allowable Forward Current vs. Duty Ratio, Ta = 25℃, Tw=0.3s



Reliability Test

Table 3. TEST ITEMS AND RESULTS

Item	Reference	Test Condition	Duration / Cycle	Number of Damage
High Temperature Operating	-	T_a = 85℃, I_F = 1000mA	1,000 Hours	0/20
Temp. Humi. Operating	JEITA ED-4701 100 102	T_a = 85℃, RH = 85%, I_F = 1000mA	168 Hours	0/20
High Humidity Heat Life Test	-	Room Temperature, I_F = 1000mA 150ms,1/10 duty	30,000 cycle	0/12
Thermal Shock	-	T_a = -40℃ (30MIN) ~ 85℃ (30MIN)	100 Cycle	0/50

Table 4. Criteria for Judging the Damage

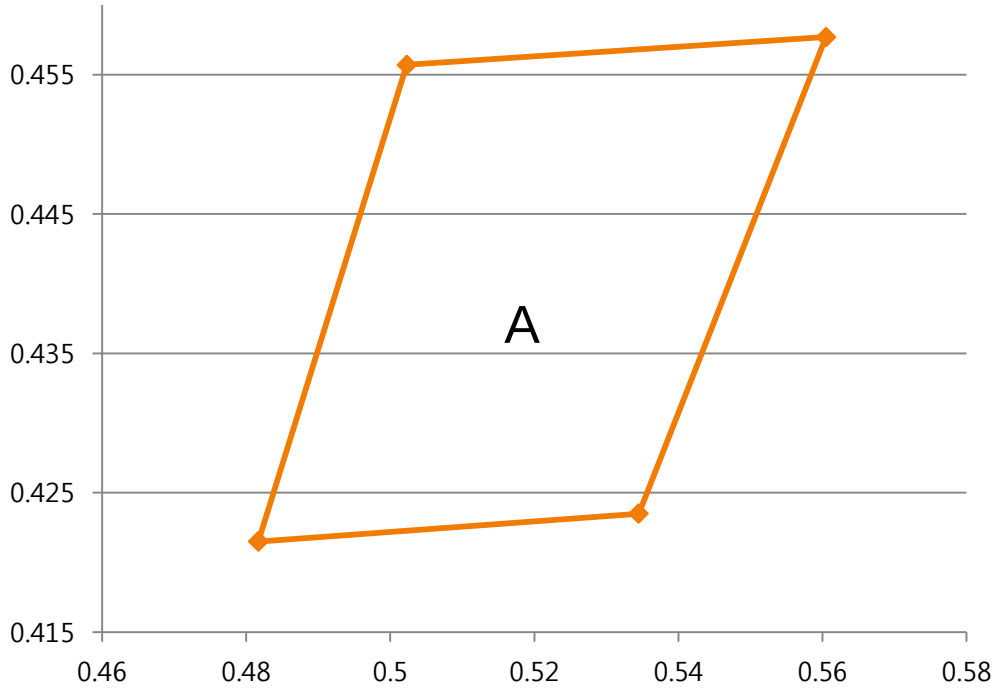
Item	Symbol	Condition	Criteria for Judgment	
			MIN	MAX
Forward Voltage	V_F	I_F =150mA	I.V. *1 - 0.2	I.V. *1 + 0.2
		I_F =1uA	1.7	-
Luminous Intensity	I_V	I_F =150mA	I.V. × 0.7	-

Notes :

*(1) I.V. : Initial Value

Color Bin Structure

CIE Chromaticity Diagram



RANK	x1	y1	x2	y2
	x3	y3	x4	y4
A	0.4817	0.4215	0.5023	0.4557
	0.5605	0.4577	0.5345	0.4235

* Measurement Uncertainty of the Color Coordinates is ±0.01

Color Bin Structure

Table 5. Bin Code description

Part Number : DA112DZ

Bin Code		
Luminous Intensity	CIE	Forward Voltage
A	A	A

Luminous Intensity (Im) @ I_F =1000mA		
Bin Code	Min.	Max.
A	180	230

Color Rank @ I_F = 1000mA
-
A

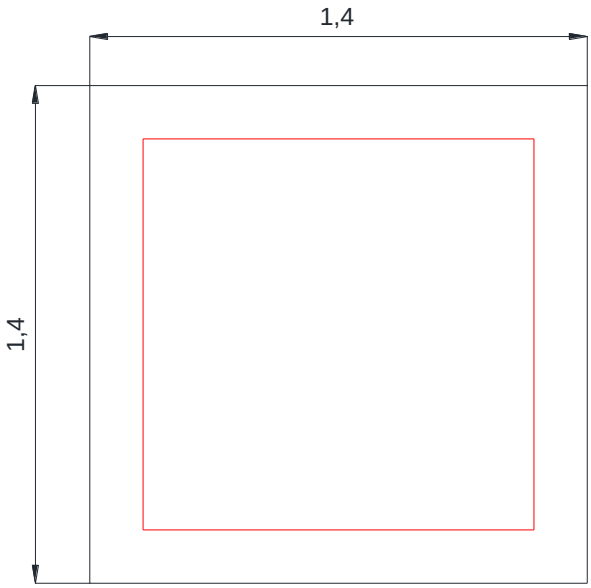
Forward Voltage (V) @ I_F = 1000mA		
Bin Code	Min.	Max.
A	3.3	3.8

Available Ranks

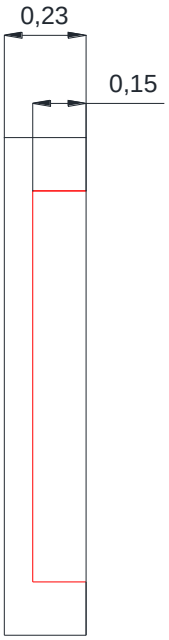
Mechanical Dimensions

Size Tolerance: ±0.10, Unit: mm
Thickness Tolerance : ±0.05, Unit: mm

PKG Outline dimension

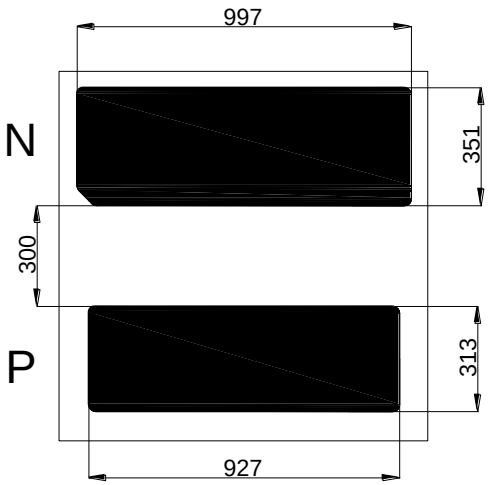


TOP

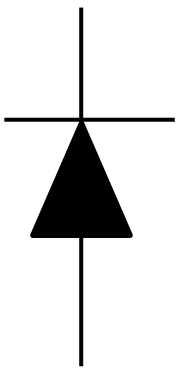


Side

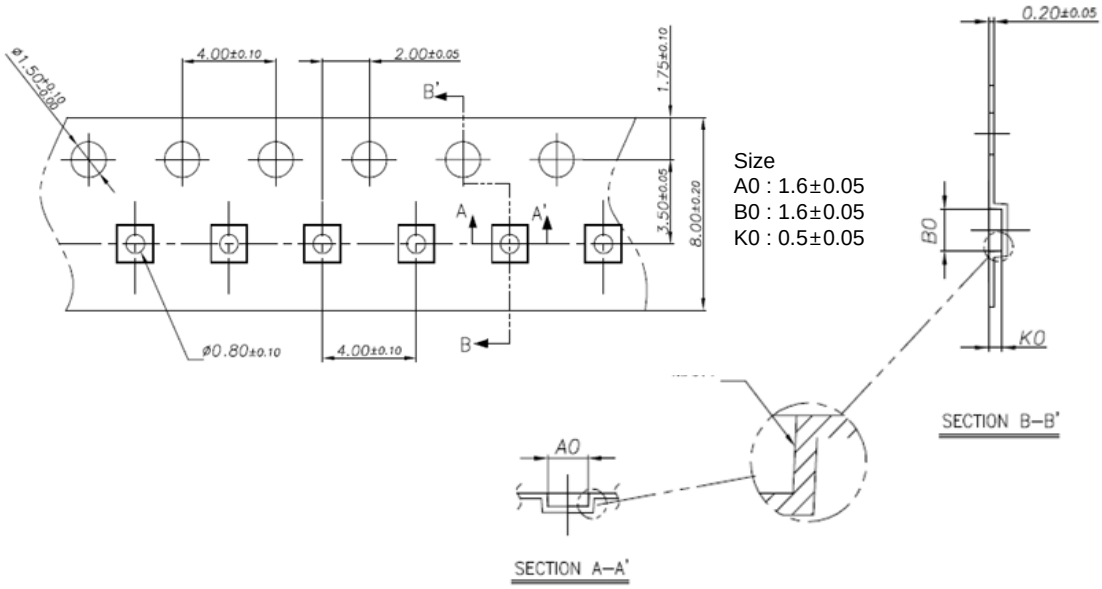
Recommended Solder Pattern

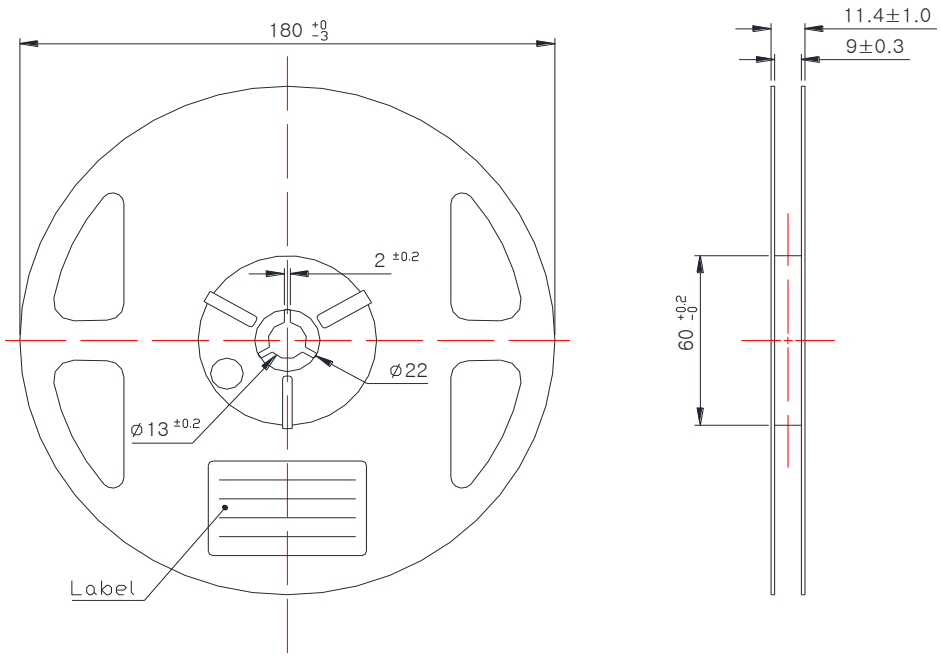


Inner circuit



Emitter Tape & Reel Packaging



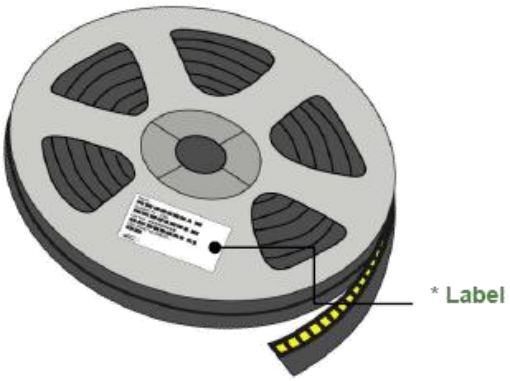


(Tolerance: ±0.2, Unit: mm)

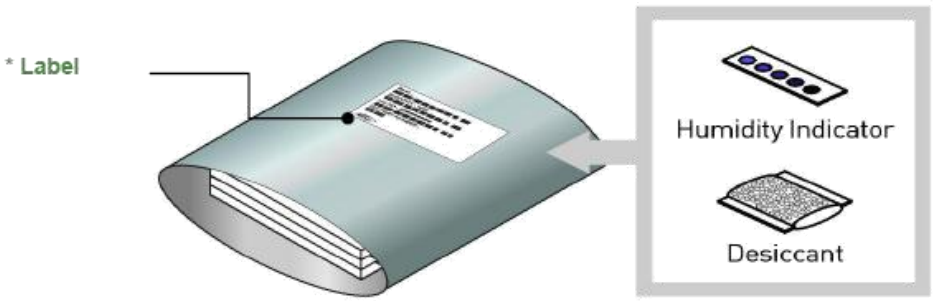
(1) Quantity : 1,500pcs/Reel, 3,000pcs/Reel
(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm
(3) Adhesion Strength of Cover Tape : Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of 10º to the carrier tape
(4) Package : P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package

Emitter Tape & Reel Packaging

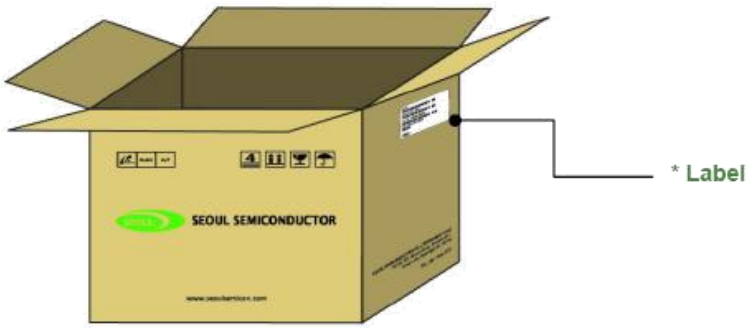
Reel



Aluminum Bag



Outer Box



Product Nomenclature

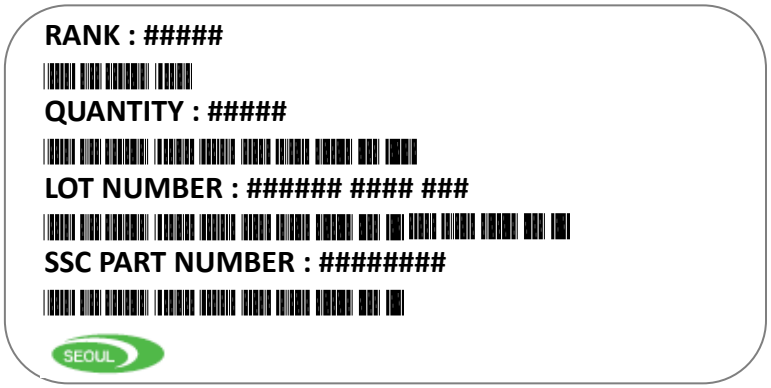
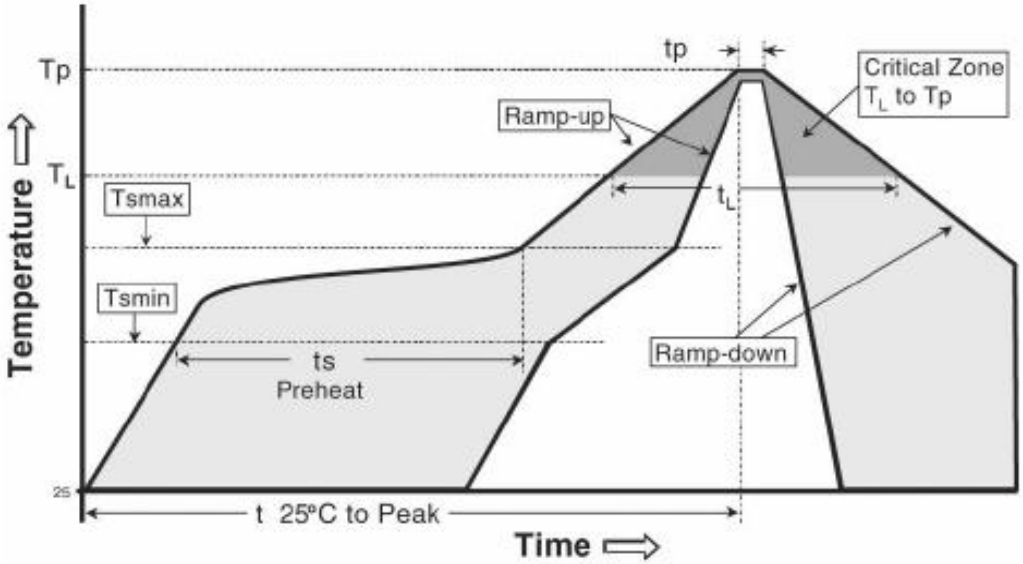


Table 4. Part Numbering System : $X_1X_2X_3$ - X_4X_5 - X_6X_7 - X_8X_9

The lot number is composed of the following characters aaaaabbbbb-ccc-ccc-ddddddd

Symbol	Meaning	Example
aaaaa	THE DATE	09A23 (Year : 09, A : Month, 23 : day)
bbbbb	SSC's Number	Ex) S0017 0001~9999 allowance
ccc-ccc	Order of Taping	014-001
ddddddd	SSC's Number	7300xxx(Automatic)

Reflow Soldering Characteristics



Profile Feature	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 150 °C 180 °C 80-120 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 217~220°C 80-100 seconds
Peak Temperature (Tp)	250~255℃
Time within 5°C of actual Peak Temperature (tp)2	20-40 seconds
Ramp-down Rate	6 °C/second max.
Time 25°C to Peak Temperature	8 minutes max.

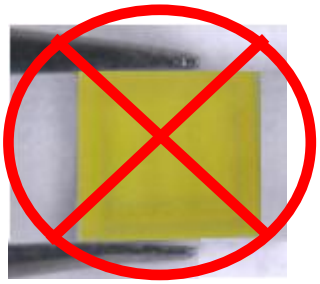
(1) Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
(2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair..
(3) Die slug is to be soldered.
(4) Do not put stress on the LEDs during heating.
(5) After reflow, do not clean PCB by water or solvent.

SMT recommendation

(1) Flux Cleaning recommendation
(2) Solder Paste materials (SAC 305, No Cleaning Paste)
• Senju M705-GRN360-KV
(3) We recommend on/off(@1mA) and TOV/IR test.

Handling of Silicone Resin for LEDs

(1) During processing, mechanical stress on the surface should be minimized as much as possible.
(2) Sharp objects of all types should not be used to pierce the sealing compound.



(3) When it is mounted WICOP on the PCB, material of the pick and place nozzle must be used soft form in SMT.
(4) It must be choosing a pick and place nozzle which is smaller than the WICOP's size.

(5) (2),(3) contents is necessary in SMT to prevent surface of WICOP

(6) In case WICOP is not recommended isopropyl alcohol and ultrasonic , solvent for cleaning . Isopropyl alcohol and ultrasonic, solvent cleaning may cause damage to the WICOP

(7) If you want to be cleaning particle on surface of WICOP, Seoul semiconductors suggests using cotton bud for cleaning after soldering of components

(8) Avoid leaving fingerprints on silicone resin parts.

Precaution for Use

(1) Storage conditions

Keep the product in a dry box or a desiccator with a desiccant in order to prevent moisture absorption.

a. Keep it at a temperature in the range from 5˚C to 30˚C and at a humidity of less than 50% RH. The product should be kept within a year.

(2) After opening the package .

When soldering, this could result in a decrease of the photoelectric effect or light intensity.

a. Soldering should be done right after mounting the product.
b. Keep the temperature in the range from 5˚C to 30˚C and the humidity at less than 60%.

Soldering should be done within 7 days after opening the desiccant package.
If the product has been exposed for more than 7 days after opening the package or the indicating color of the desiccator changes, the product must be baked at a temperature between 65 ± 5˚C for less than 24 hours.
An unused and unsealed product should be repacked in a desiccant package and kept sealed in a dry atmosphere.
Stored at a humidity of less than 10% RH.

(3) Precautions for use

Any external mechanical force or excessive vibration should not be applied to the product during cooling after soldering, and it is preferable to avoid rapid cooling.
The product should not be mounted on a distorted part of PCB.
Gloves or wrist bands for ESD(Electric Static Discharge) should be wore in order to prevent ESD and surge damage, and all devices and equipments must be grounded to the earth.
Turn on test is conducted only at room temperature. Also, Should not be turned on at high temperatures

(4) Miscellaneous

Radiation resistance is not considered.
When cleaning the product, any kind of fluid such as water, oil and organic solvent, IPA(Isopropyl Alcohol) must not be used
When using the product, operating current should be settled in consideration of the maximum ambient temperature.
Its appearance or specification for improvement is subject to change without notice.

Precaution for Use

(5) LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).
Below is a list of suggestions that Seoul Semiconductor purposes to minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LEDs may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current lowered turn-on voltage
- Abnormal emissions from the LED at low current

The following recommendations are suggested to help minimize the potential for an ESD event.
One or more recommended work area suggestions:

- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
- Antistatic wrist-strap
- Antistatic material shoes
- Antistatic clothes

Environmental controls:
- Humidity control (ESD gets worse in a dry environment)

Precaution for Use

b. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. The effects from an EOS event can be noticed through product performance like:

- Changes to the performance of the WICOP
- Changes to the light output of the luminaire from component failure
- Components on the board not operating at determined drive power

Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures. It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred:

- This damage usually appears due to the thermal stress produced during the EOS event.

c. To help minimize the damage from an EOS event Seoul Semiconductor recommends utilizing:

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device

Company Information

Published by

Company Information

Seoul Semiconductor (www.SeoulSemicon.com) manufacturers and packages a wide selection of light emitting diodes (LEDs) for the automotive, general illumination/lighting, Home appliance, signage and back lighting markets. The company is the world's fifth largest LED supplier, holding more than 10,000 patents globally, while offering a wide range of LED technology and production capacity in areas such as "nPola", "Acrich", the world's first commercially produced AC LED, and "Acrich MJT - Multi-Junction Technology" a proprietary family of high-voltage LEDs.

The company's broad product portfolio includes a wide array of package and device choices such as Acrich and Acirch2, high-brightness LEDs, mid-power LEDs, side-view LEDs, and through-hole type LEDs as well as custom modules, displays, and sensors.

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