

Surface Mounted Chip LED

SP1606US0

◆ Features :

- Compatible with automatic placement equipment
- Compatible with reflow solder process

◆ Applications :

- Automotive_Telecommunication
- Indicators
- LCD Back-lights
- Illuminations

Dice Material	Light Color	Lens Color
AllInGaP	Ultra High Amber	Water Clear

◆ Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Maximum	Unit
Power Dissipation	P _D	75	mW
Continuous Forward Current	I _{Fmax}	30	mA
Peak Forward Current (1/10 Duty Cycle 0.1ms Pulse Width)	I _{FP}	80	mA
Reverse Voltage	V _R	5	V
Derating Linear From 25°C		0.4	mA/°C
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +85	°C

◆ Electrical/Optical Characteristics

(Ta=25°C)

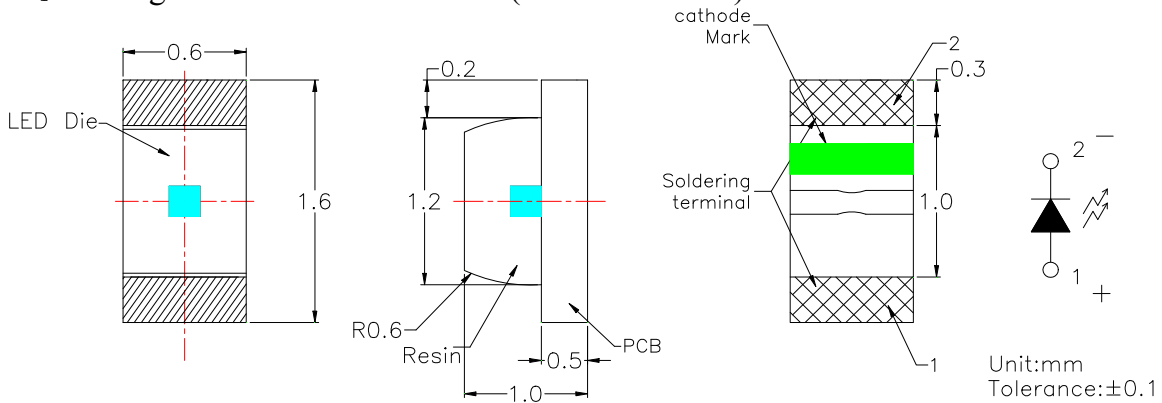
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V _F	I _F = 5mA				V
		I _F =20mA	1.9	2.1	2.3	
Reverse Current	I _R	V _R =5V			2	uA
Peak Emission Wavelength	λ _P	I _F =20mA		605		nm
Dominant Wavelength	λ _D	I _F =5mA				nm
		I _F =20mA	600	606	610	
Viewing Angle	2θ1/2	I _F =20mA		130		Deg
Luminous Intensity	I _V	I _F =5mA				mcd
		I _F =20mA	70	100	150	

※The measuring tolerance → Luminous intensity ±15%
Wavelength (λ_D) ±2nm

APPROVER	DIMENSION NO :	VERSION : A0	DATE : 2006/03/01
	ISSUE :	CHECKER :	ENGINEER :

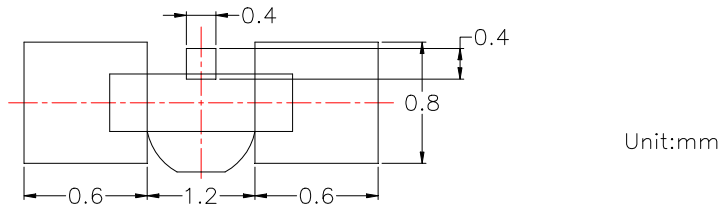
◆ Dimensions / Taping and Package Spec.

● Package Dimensions of Device (SP1606 Series)



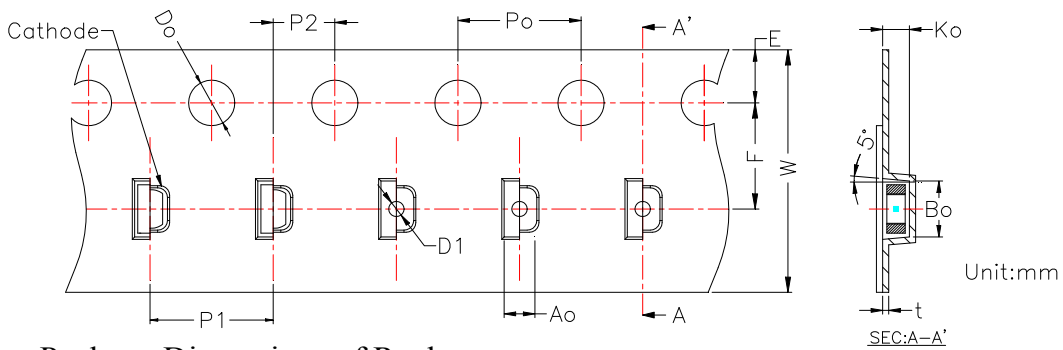
1. Soldering terminal may shift in x, y direction.

● Recommended Soldering Pad Dimensions

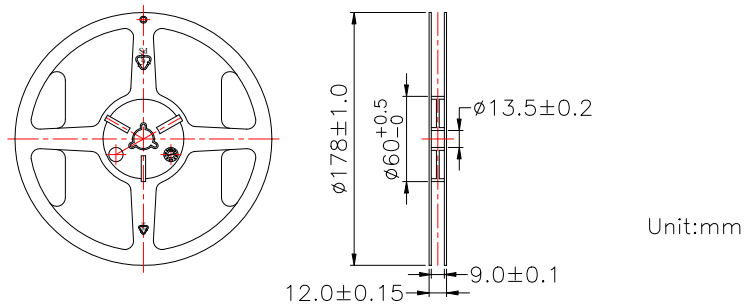


● Tape Specification : 4000pcs Per Reel

Packing Size													
Item	W	P1	E	F	Do	D1	Po	10Po	P2	Ao	Bo	Ko	t
Spec.	8.00	4.00	1.75	3.50	1.50	0.5	4.00	40.00	2.00	1.15	1.8	0.75	0.23
Tolerance	±0.20	±0.10	±0.10	±0.05	$^{+0.10}_{-0.00}$	±0.05	±0.05	±0.20	±0.05	±0.10	±0.10	±0.10	±0.05

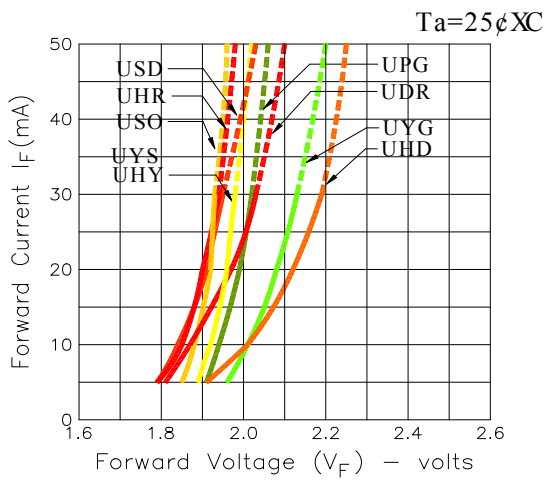


● Package Dimensions of Reel

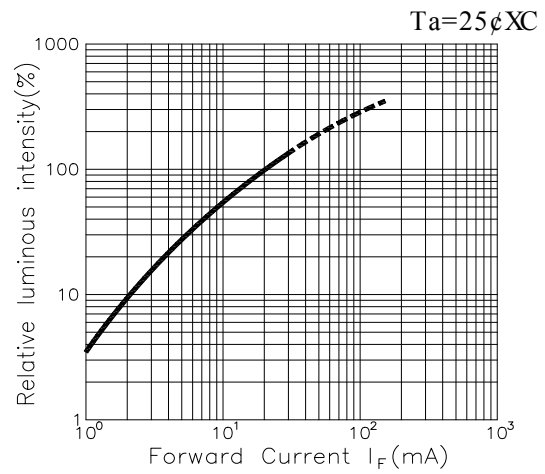


◆ **Typical Electro-Optical Characteristic Curves**
Ultra High Brightness Type

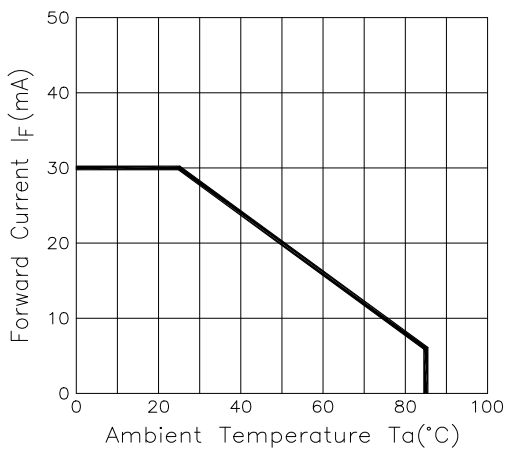
Forward Current Vs. Forward Voltage



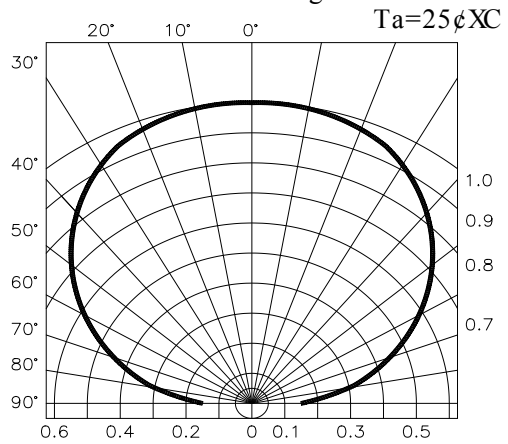
Luminous Intensity Vs. Forward Current



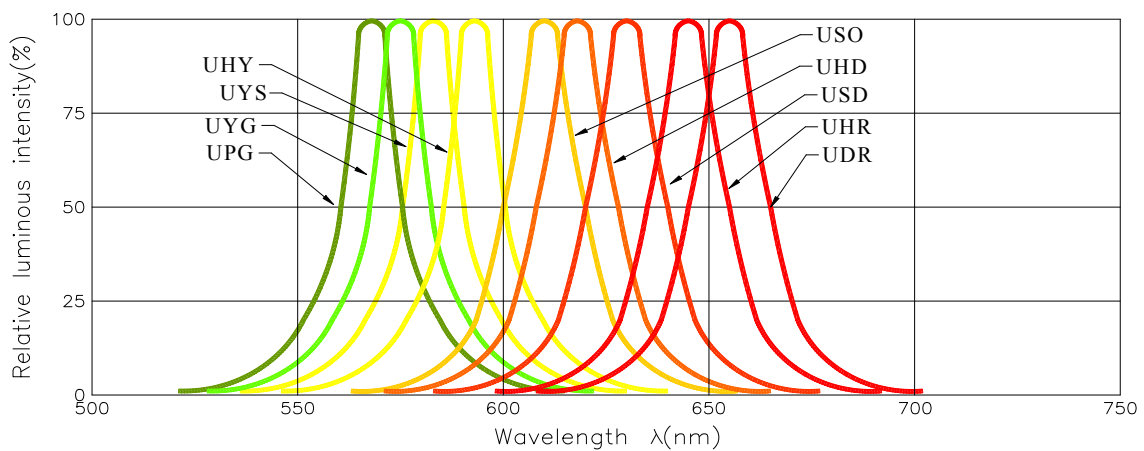
Forward Current Derating Curve



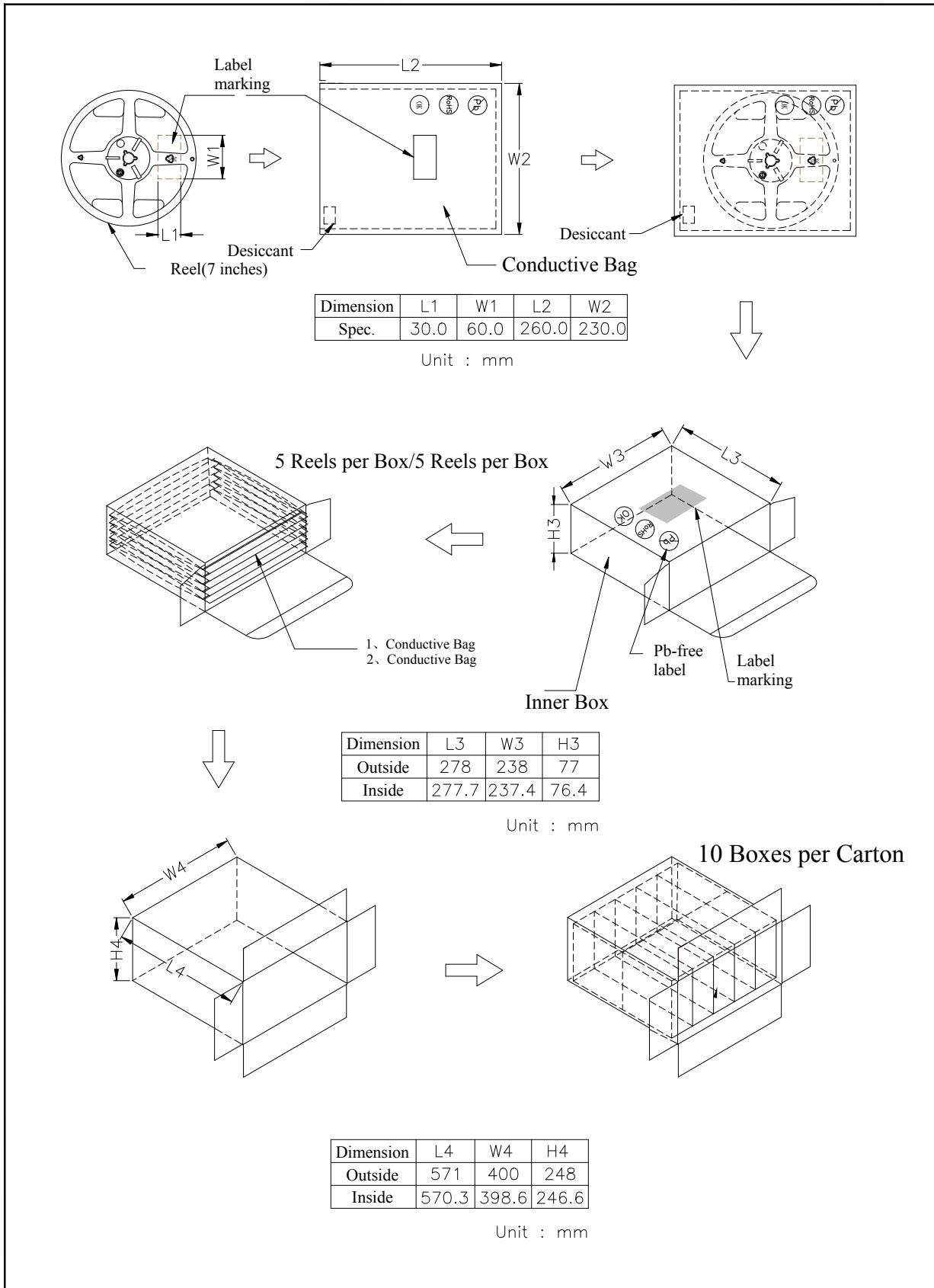
Radiation Diagram



Spectrum Distribution



◆ Packing and Shipping Instruction



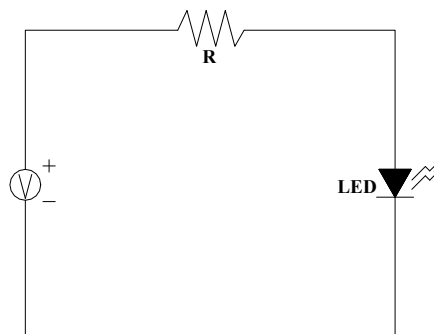
◆ **Descriptions :**

- The Chip-LED Taping is much smaller than lead frame type components, thus enable smaller board size, higher packing density, reduced storage space and finally smaller equipment to be obtained.
- Besides, lightweight makes them ideal for miniature application, etc.

◆ **Reliability Test Items And Conditions :**

No.	Item	Test Conditions	Test hr/cycle/time	Sample Q'ty	Ac / Re
1	Solder Heat	TEMP :260°C±5°C ;10±1 sec	2 times	30 pcs	0 / 1
2	Solderbility Test ※	TEMP :235°C±5°C ;3±1 sec	1 time	5 pcs	0 / 1
3	Temperature Cycle	H : +85°C 30min. ∫ 5min. L : -40°C 30min.	100 cycles	20 pcs	0 / 1
4	Thermal Shock	H : +85°C 5min. ∫ L : -40°C 5min.	50 cycles	20 pcs	0 / 1
5	High Temperature Storage	TEMP : 85°C	1000 hrs	20 pcs	0 / 1
6	Low Temperature Storage	TEMP : -40°C	1000 hrs	20 pcs	0 / 1
7	DC Operating Life	I _F = I _{Fmax}	1000 hrs	20 pcs	0 / 1
8	High Temperature High Humidity	85°C / 90~95%R.H.	1000 hrs	20 pcs	0 / 1
9	Shocking test	100~2000Hz ; 98.1m/s ² X,Y,Z direction	2 hrs	20 pcs	0 / 1
10	Dropping test	Put on pallet ; height : 75cm	3 times	20 pcs	0 / 1
Judgment Criteria					
Forward Voltage V _F		V _F Max-Increase < 1.1x			
Reverse Current I _R		I _R Max-Increase < I _{Rmax}			
Luminous Intensity I _v		I _v Decay < 40%			
※Solderbility test criteria : coverage is not less than 95%					
Note : Measurement shall be taken after the tested samples have been returned to normal ambient conditions (generally after two hours)					

◆ **Test Circuit**

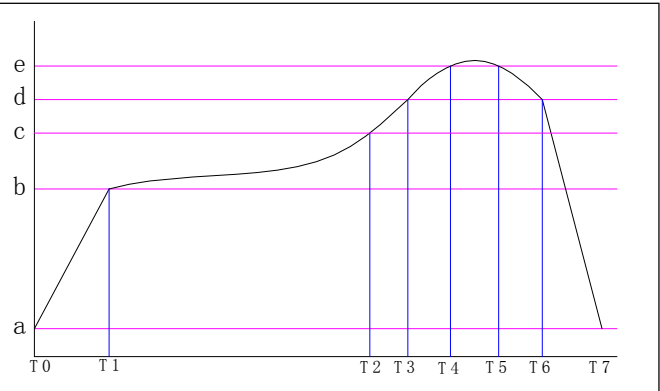


◆ **Precautions For Use :**

- Overdrive current proof
Customer must apply resistors for protection, otherwise slight voltage shift will cause current change with great deal. (Burn out will happen)
- Storage
 1. The operation of temperature and R.H. are : $5^{\circ}\text{C} \sim 30^{\circ}\text{C}$, 60%R.H. Max..
 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 desiccant. Considering the tape life, we suggest our customers to use our products within 1.5 year (from production date) .
 3. It's recommended to bake before soldering when the package is unsealed more than 72 hrs. The condition is : $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 15hrs.

◆ **Reflow Temp. / Time :**

TEMP ($^{\circ}\text{C}$)		TIME (sec)	
a	25	T0~T1	$5^{\circ}\text{C}/\text{sec max}$
b	150	T1~T2	90~130
c	200	T2~T3	$5^{\circ}\text{C}/\text{sec max}$
d	230	T3~T6	60~90
e	260	T4~T5	10 ± 1
		T6~T7	$-6^{\circ}\text{C}/\text{sec max}$
MSL level		Level 1	



◆ **Hand Soldering Iron :**

- Temperature at tip of iron : 400°C Max. (35W Max.)
- Soldering time : 3 ± 1 sec.

Model NO : SP1606USO
◆ Luminous Intensity BIN Limits

Test condition : @20mA		
BIN Code	I _{Vmin} (mcd)	I _{Vmax} (mcd)
O1	70	100
O2	100	150

◆ Dominant Wavelength BIN Limits

Test condition : @20mA		
BIN Code	λ _{Dmin} (nm)	λ _{Dmax} (nm)
1	600	602
2	602	604
3	604	606
4	606	608
5	608	610

◆ Forward Voltage BIN Limits

Test condition : @20mA		
BIN Code	V _{Fmin} (v)	V _{Fmax} (v)
1	1.9	2.0
2	2.0	2.1
3	2.1	2.2
4	2.2	2.3