

Surface - Mount Ambient Light Sensor

ALS-PDIC17-77C/TR8

Features

- Close responsively to the human eye spectrum
- Light to Current, analog output
- Good output linearity across wide illumination range
- Low sensitivity variation across various light sources
- Operating temperature performance, -40°C to 85°C
- Wide supply voltage range, 1.8V to 5.5V
- Size : 1.6mm(L)*1.6mm(W)*0.55mm(H)
- RoHS compliant, Pb Free and halogen free package

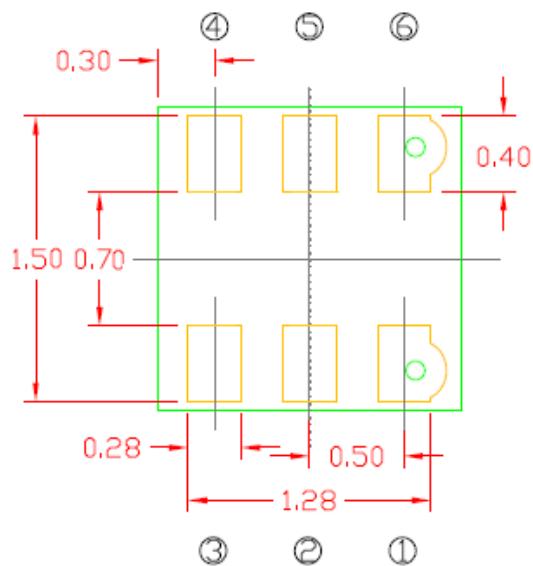
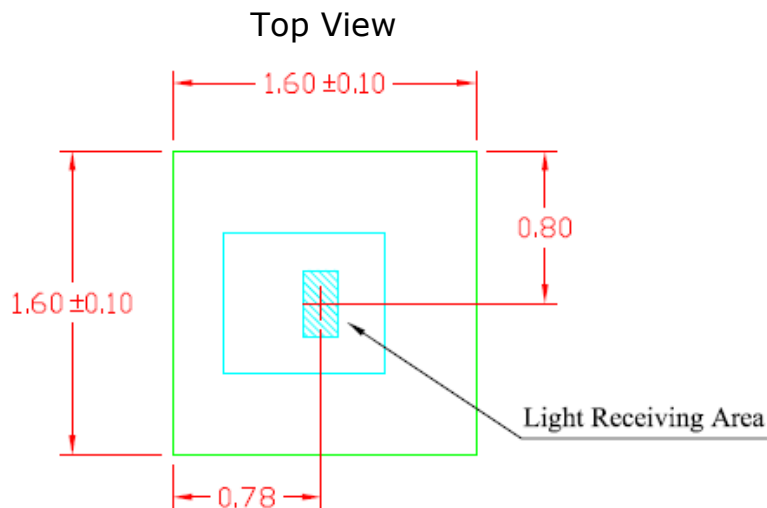
Description

The ALS-PDIC17-77C/TR8 is consisting of a photodiode and a current amplification IC. EVERLIGHT ALS series product is a good effective solution to the power saving of display backlighting of mobile appliances, such as the mobile phones, NB and PDAs. Due to the high rejection ratio of infrared radiation, the spectral response of the ambient light sensor is close to that of human eyes.

Applications

- Detection of ambient light to control display backlighting
 - Mobile devices – mobile phones, PDAs
 - Computing device – TFT LCD monitor for Notebook computer
 - Consumer device – TFT LCD TV, Plasma TV, Video camera, Digital camera, Toys
- Automatic residential and commercial management
- Automatic contrast enhancement for electronic signboard
- Ambient light monitoring device for daylight and artificial light
 - Street light, CCD/CCTV

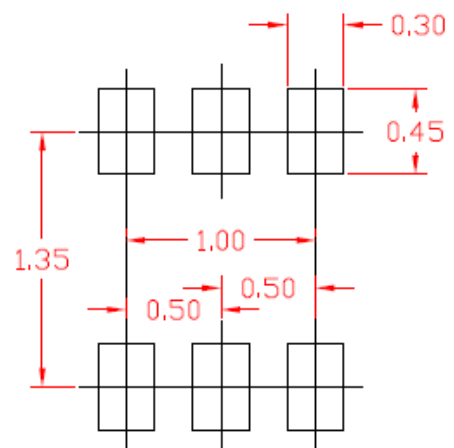
Package Dimensions



Bottom View

- ① Vcc
- ② GND
- ③ GND
- ④ GND
- ⑤ GND
- ⑥ Out

Recommended soldering pattern



Unit: mm

Tolerances: ±0.1mm

Absolute Maximum Ratings (Ta=25 °C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V _{CC}	-0.5~6.0	V
Output Voltage	V _O	0 ~ V _{CC} -0.8	V
Output Photo Current	I _{PH}	0 ~ 5	mA
Operating Temperature Range	T _{opr}	-40 ~ +85	°C
Storage Temperature Range	T _{stg}	-40 ~ +100	°C
Soldering Temperature Range [Note1]	T _{sol}	260	°C

Note1: For detail reflow time and the recommended temperature profile, please refer to page 9.

Recommended Operating Conditions (Ta=25 °C)

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	T _{opr}	-40	+85	°C
Supply Voltage	V _{CC}	1.8	5.5	V

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Electrical and Optical Characteristics (Ta=25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Supply Current		I _{CC}	—	480	950	μA	V _{CC} = 3V, E _v = 1000Lux R _L = 1kΩ [Note2]
Dark Current		I _D	—	—	100	nA	V _{CC} =3V E _v = 0Lux
Light Current		I _{PH1}	2.7	4	5.4	μA	V _{CC} =3V; E _v =10Lux [Note1]
		I _{PH2}	27	40	54	μA	V _{CC} =3V; E _v = 100Lux [Note1]
		I _{PH3}	—	48	92	μA	V _{CC} =3V; E _v = 100Lux [Note2]
		I _{PH4}	—	400	540	μA	V _{CC} =3V; E _v =1000Lux [Note1]
Photocurrent Ratio		I _{PH3} / I _{PH2}	—	1.2	1.7	—	
Saturation Output Voltage		V _O	2.20	2.35	—	V	V _{CC} =3V; E _v = 100Lx, R _L =150KΩ [Fig.3]
Peak Sensitivity Wavelength		λ _p	—	550	—	nm	
Switching Time	Rise Time	t _r	—	11	1000	μs	V _{CC} =3V, R _L =5kΩ [Fig.4]
	Fall Time	t _f	—	400	2000	μs	
	Delay Time	t _d	—	250	—	μs	
	Storage Time	t _s	—	35	—	μs	

Note:

1. Fluorescent light (Color Temperature = 6500K) is used as light source. However, White LED is substituted in mass production.
2. Illuminance by CIE standard illuminant-A 2856K of incandescent lamp.

Fig.1 Block Diagram

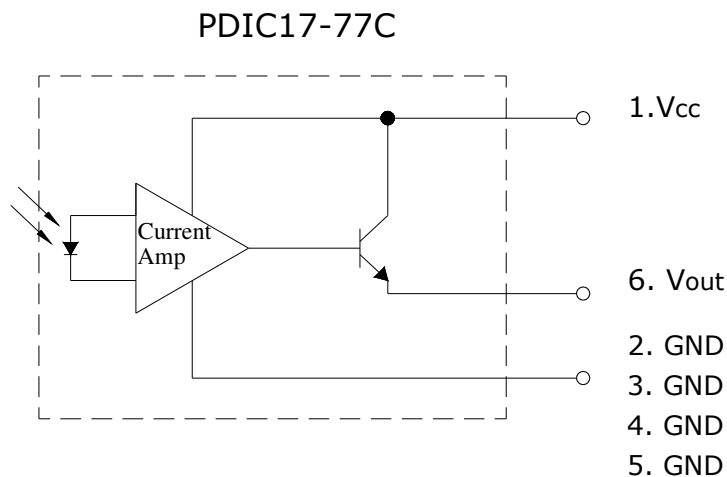


Fig.2 Measurement Method of Light Current

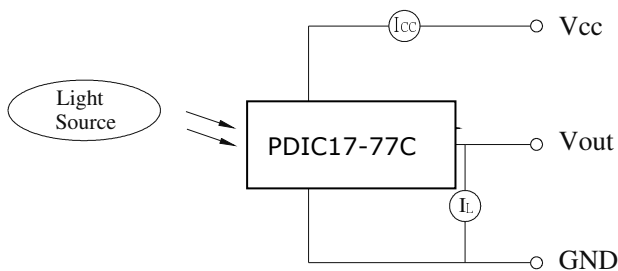


Fig.3 Measurement Method of Saturation Output Voltage

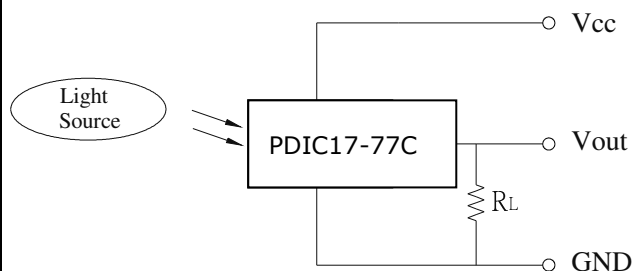
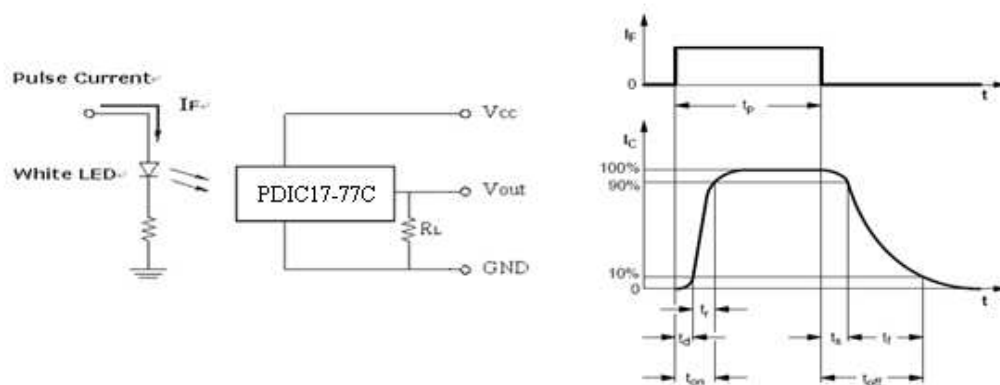


Fig.4 Switching Time Measurement Method



Typical Electrical and Optical Characteristics Curves

Fig.5 Light Current vs. Illuminance

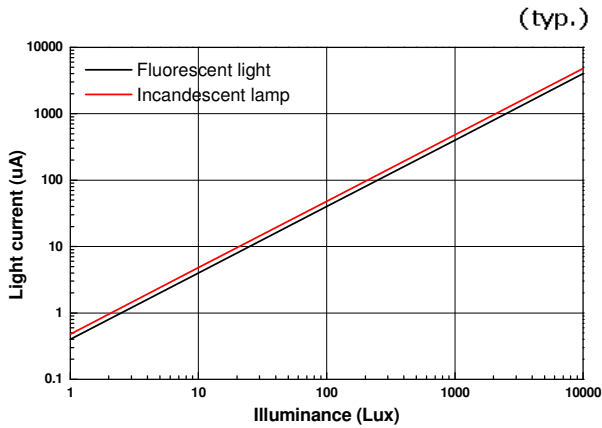


Fig.6 Dark Current vs. Temperature

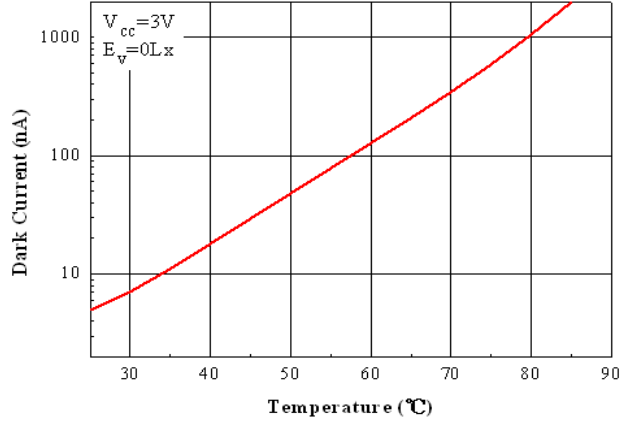


Fig.7 Light current vs. Temperature

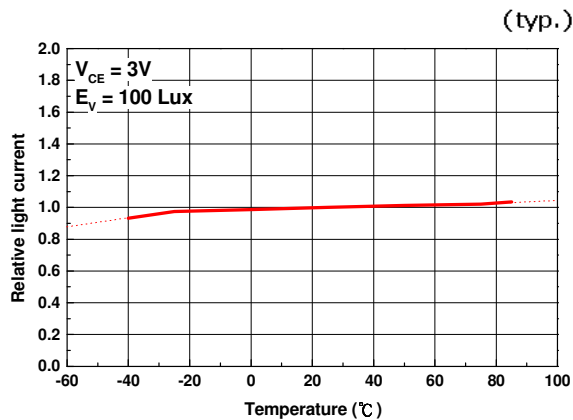


Fig.8 Light current vs. Supply Voltage

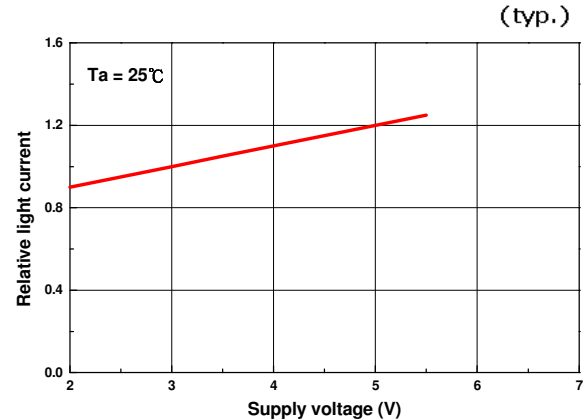


Fig.9 Spectral Response

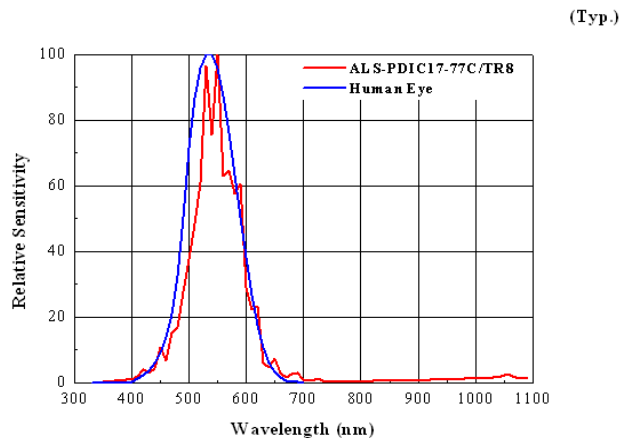
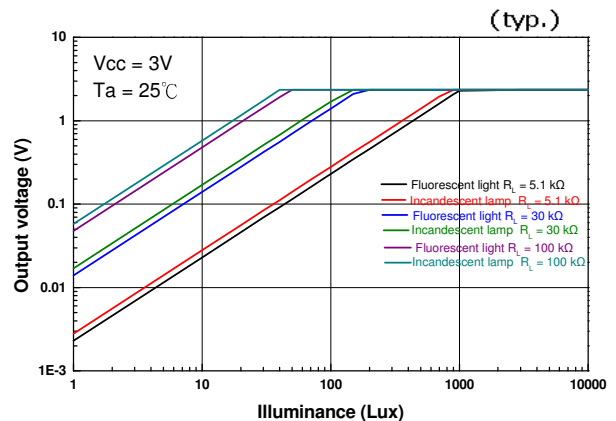


Fig.10 Output Voltage vs. Illuminance



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Fig.11 Consumption current vs. Illuminance

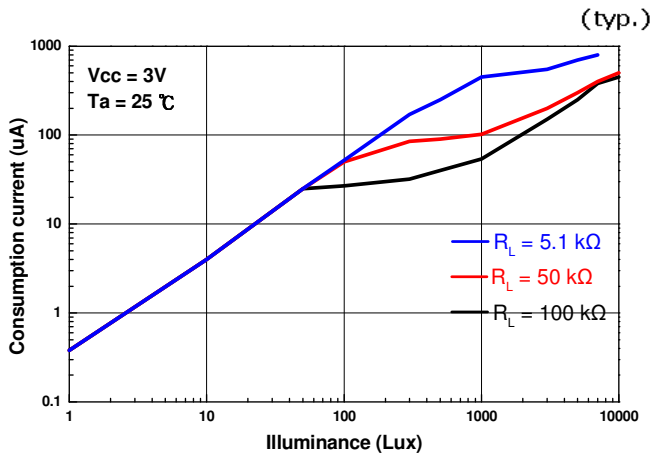
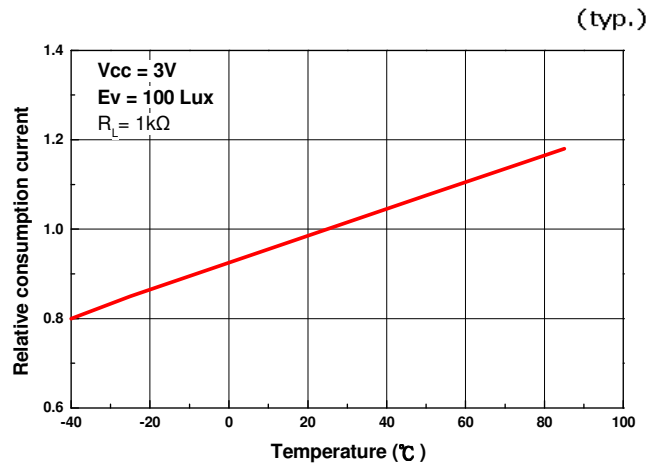
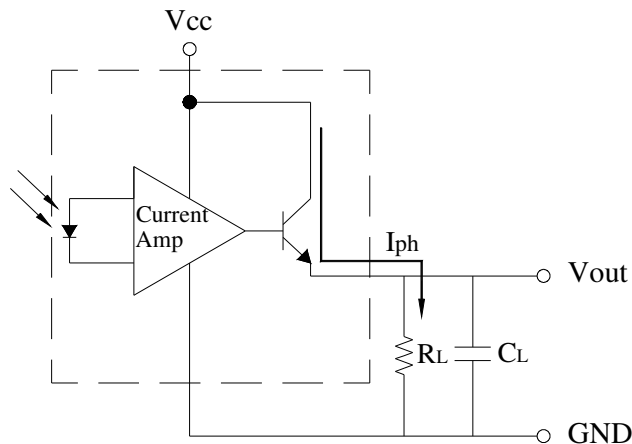


Fig.12 Relative consumption current vs. Temperature



Converting Photocurrent to Voltage



Note:

1. The output voltage (V_{out}) is the product of photocurrent (I_{PH}) and loading resistor (R_L)
2. A right loading resistor shall be chosen to meet the requirement of maximum ambient light and output saturation voltage:

$$V_{out(max.)} = I_{out(max.)} \times R_L \leq V_{out(saturation)} = V_{cc} - 0.6V$$

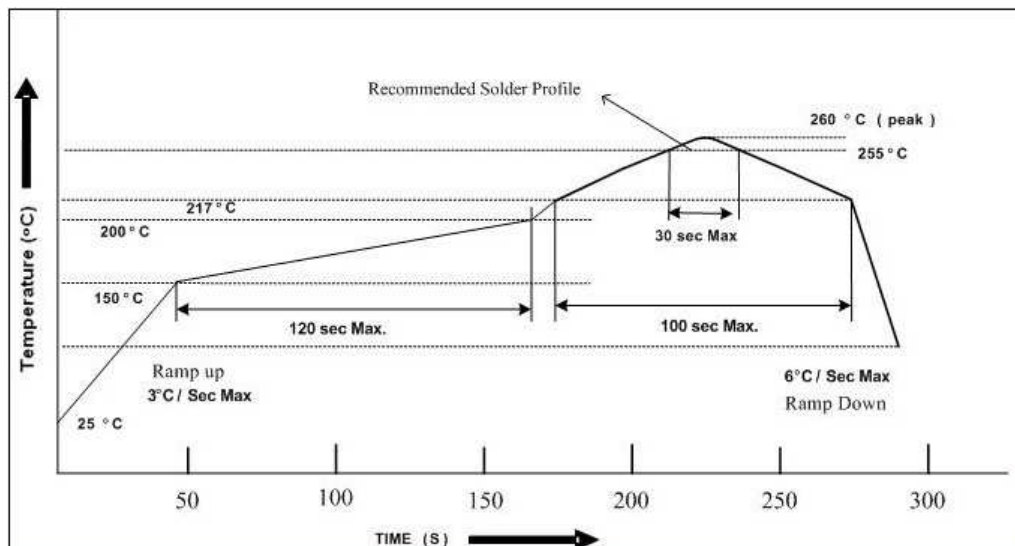
3. To avoid 60Hz ripple from fluorescent lamps, we suggest that the time constant must be greater than 0.5 second:

$$R_L \times C_L \geq 0.5 \quad (\text{empirical data})$$

Recommended method of storage

1. Do not open moisture proof bag before devices are ready to use.
2. Shelf life in sealed bag from the bag seal date:
18 months at 10 °C~30 °C and < 90% RH.
3. After opening the package, the devices must be stored at 10 °C~30 °C and $\leq 60\%RH$, and used within 1 year (floor life).
4. If the moisture absorbent material (desiccant material) has faded or unopened bag has exceeded the shelf life or devices (out of bag) have exceeded the floor life, baking treatment is required.
5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure or recommend the following conditions:
192 hours at 40 °C +5/-0 °C and < 5 % RH (reeled/tubed/loose units) or
96 hours at 60 °C \pm 5 °C and < 5 % RH (reeled/tubed/loose units) or
24 hours at 125 °C \pm 5 °C, not suitable for reel or tubes.

Recommended Solder Profile



Notice:

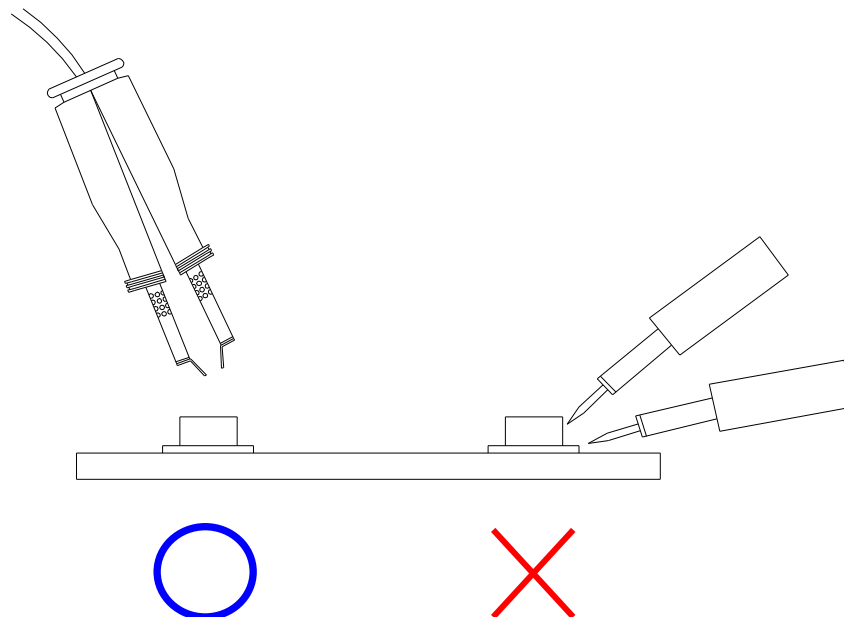
- (1) Reflow soldering frequency is based on JEDEC-020D.
- (2) When soldering, do not put stress on the devices during heating.
- (3) After soldering, do not warp the circuit board.

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.

Repairing

Repair should not be done after the device 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 device will or will not be damaged by repairing.



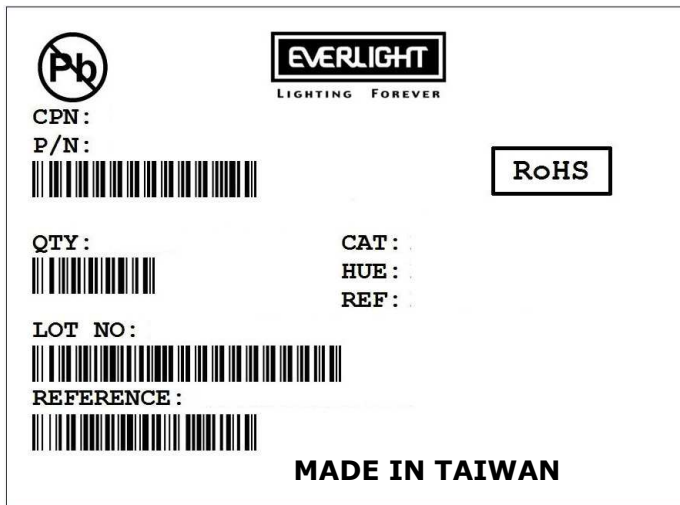
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Packing Quantity Specification

3000 PCS/ 1 Reel

Label Format



CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Ranks

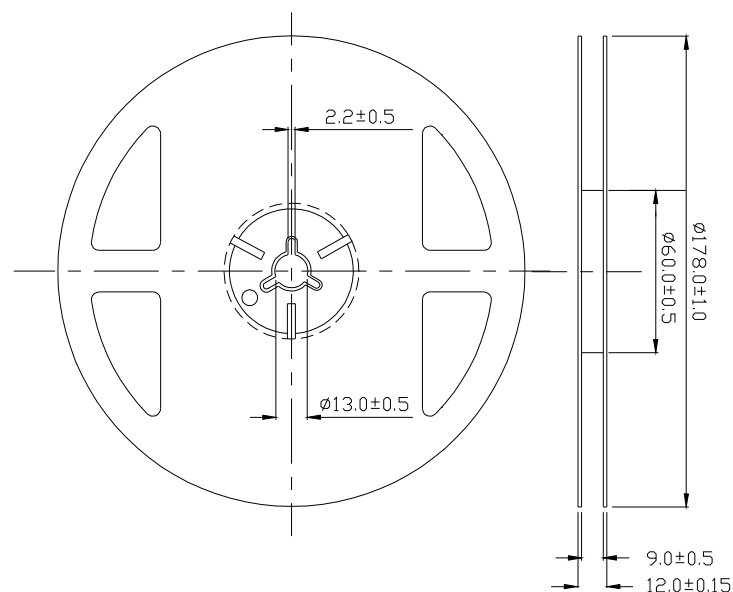
HUE: Peak Wavelength

REF: Reference

LOT No: Lot Number

MADE IN TAIWAN: Production place

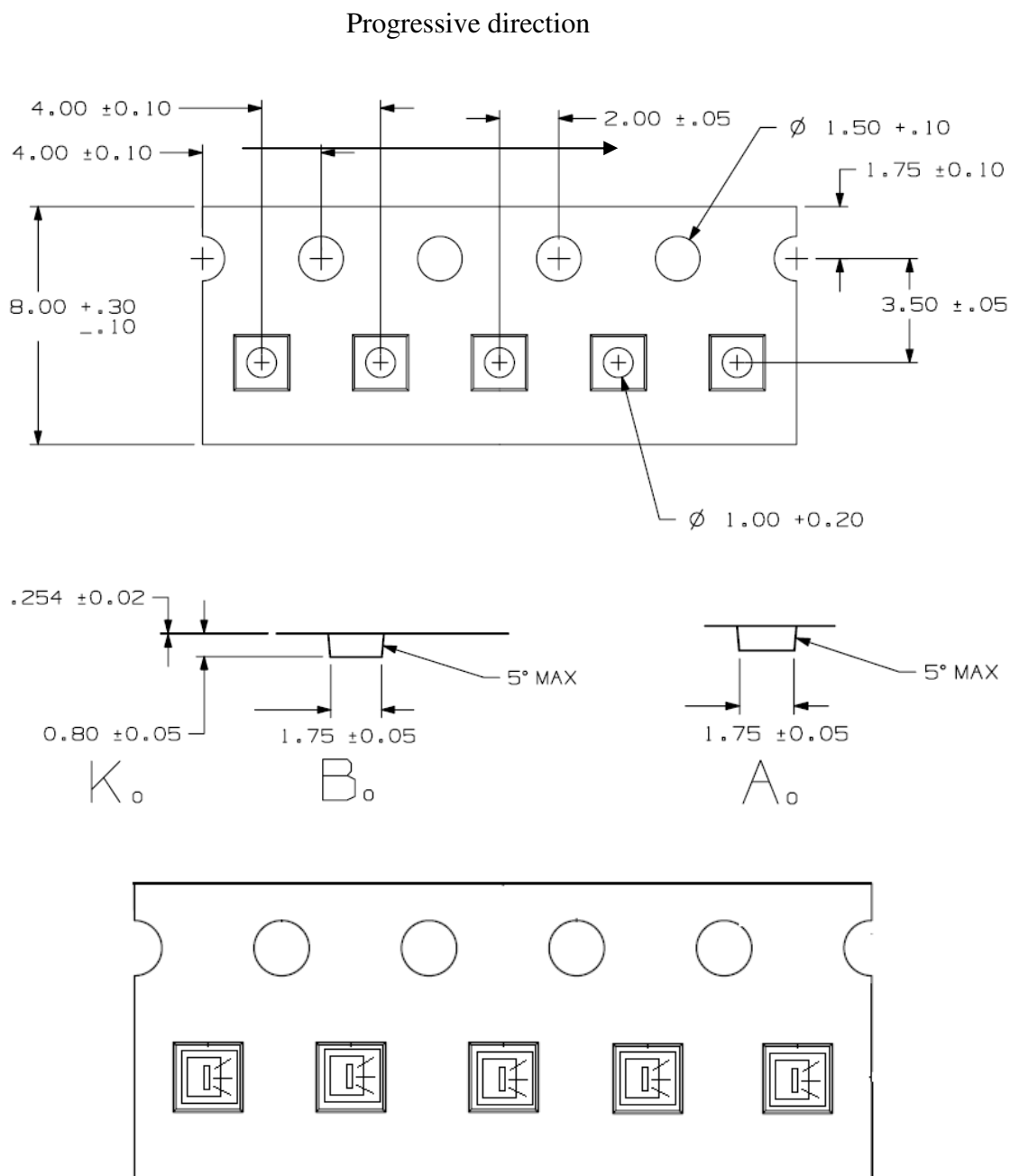
Reel Dimensions



Unit: mm

Tolerance: ±0.1mm

Tape Dimensions



Unit: mm

Tolerances: $\pm 0.1\text{mm}$

Note:

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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