

Version:  
July 27, 2017



**(PT-B1-DC-0603-940)**  
**SMD Light Sensor**

**Token Electronics Industry Co., Ltd.**

**Taiwan:** No.137, Sec. 1, Zhongxing Rd., Wugu District,  
New Taipei City, Taiwan, R.O.C. 24872  
**Tel:** +886 2981 0109   **Fax:** +886 2988 7487

**China:** 12F, Zhong Xing Industry Bld., Chuang Ye Road,  
Nan Shan District, Shen Zhen City,  
Guang Dong, China 518054  
**Tel:** +86 755 26055363; **Fax:** +86 755 26055365

[Web: www.token.com.tw](http://www.token.com.tw)

[Email: rfq@token.com.tw](mailto:rfq@token.com.tw)



## ▶ Product Introduction

**Token SMD phototransistors achieve the second generation of optical axis keyboard.**

### Applications :

- Replace the traditional CDS photoresistor. No Cadmium and lead free with RoHS compliant.
- Suitable for all kinds of light control lighting products, such as security monitoring machine, small night lights, lawn lights, solar lights and so on.
- Auto-adjust background light, such as LCD, mobile phone, camera, digital photo frame, GPS navigation.
- Control all kinds of optical control video products and all kinds of optical control testing equipment.

Optical axis keyboard is a new generation keyboard which join the new optical sensor recognition technology in recent years. By replacing the traditional metal contacts for the optical sensor components, use optical media as a bridge. Because there is no contact, so it will not wear.

Optical axis technology takes advantage of infrared optical induction. There is no abrasion during conduction due to no contact point. The waveform of Optical signal pulse output is clean and noise-free. The keyboard response speed only takes 1ms. Thanks to the new optical sensors - SMD phototransistors (PT-B1-DC-0603-940) is the most critical component in optical axis applications.

The (PT-B1-DC-0603-940) surface mounted infrared receiving light sensor features fast response speed, stable performance, low current loss in static, and anti-strong light interference. The effective control distance is greater than 1.5 meters.

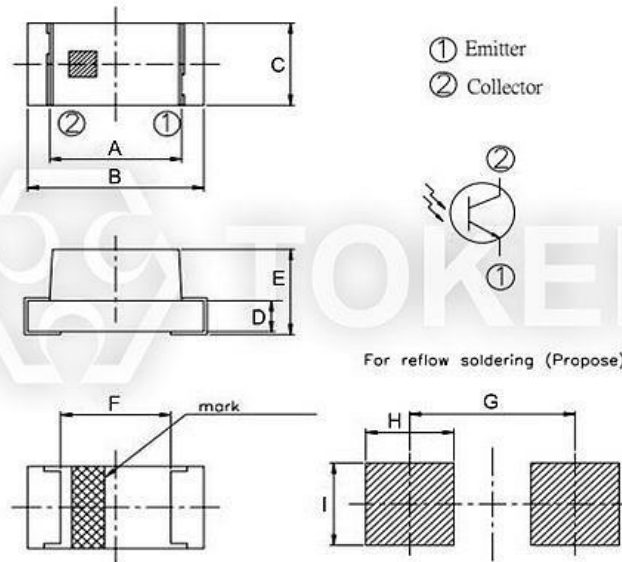
For the convenience of installation in all kinds of products in any position, different sizes are available upon request. So that product consistency is better, more market competitiveness. It is also achievable to provide the bright current / dark current (bright resistance / dark resistance) for the most suitable product. Please contact our sales or link to Token official website "[Ambient-light-sensors](http://www.token.com.tw)" for more information.



► **Dimensions**

**Dimensions & Configurations Chip (PT-B1-DC-0603-940) Unit: mm**

Part NO.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
PT-B1-DC-0603-940	1.2 ± 0.2	1.6 ± 0.2	0.8 ± 0.2	0.3 ± 0.2	0.8 ± 0.2	1.0 ± 0.2	1.5 ± 0.2	0.8 ± 0.2	0.8 ± 0.2



SMD Light Sensor (PT-B1-DC-0603-940) Dimensions

▶ **Electro-Optical Characteristics**

**Electro-Optical Characteristics (Ta=25 ° C) PT-B1-DC-0603-940**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak Wavelength	$\lambda_p$	\	-	940	-	nm
Spectral Response Bandwidth	$\lambda$	\	700	-	1100	nm
Operating Voltage	$V_{cc}$	\	-	5	-	V
Collector-Emitter Breakdown Voltage	$B_{vceo}$	$I_{cc}=100\mu A$ $E_c=0mW/cm^2$	30	-	-	V
Emitter-Base Breakdown Voltage	$B_{veco}$	$I_{cc}=100\mu A$ $E_c=0mW/cm^2$	3	-	-	V
Collector-Emitter Saturation Voltage	$I_{L(3)}$	$V_{cc}=5V$ $E_v=0Lux$	-	-	0.4	V
Collector Emitter Current	$I_L$	$V_{cc}=5V$ $E_c=1mW/cm^2$	0.2	0.3	0.4	$\mu A$
Collector Dark Current	$I_d$	$V_{cc}=5V$ $E_v=0Lux$	-	-	0.1	$\mu A$
Rise Time	$t_r$	$V_{cc}=5V$	15			us
Fall Time	$t_f$	$E_v=30Lux$ $R_L=1000\Omega$	15			

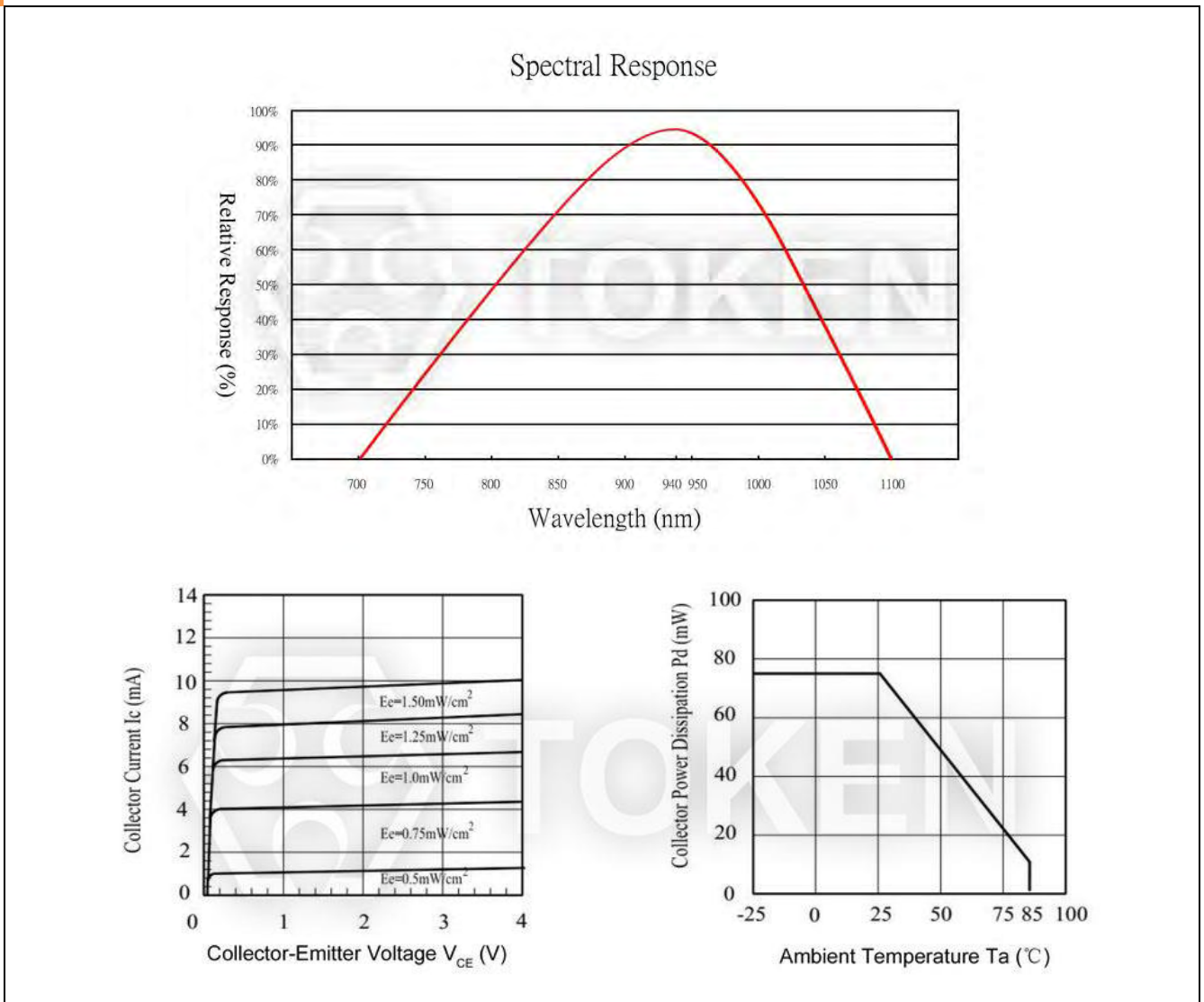
**Electro-Optical Characteristics (Ta=25 ° C) PT-B1-DC-0603-940**

Parameter	Symbol	Rating Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	30	V
Emitter - Collector Voltage	$V_{ECO}$	5	V
Power Dissipation	$P_c$	70	mW
Operating Temperature Range	$T_{opr}$	-25 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +85	°C

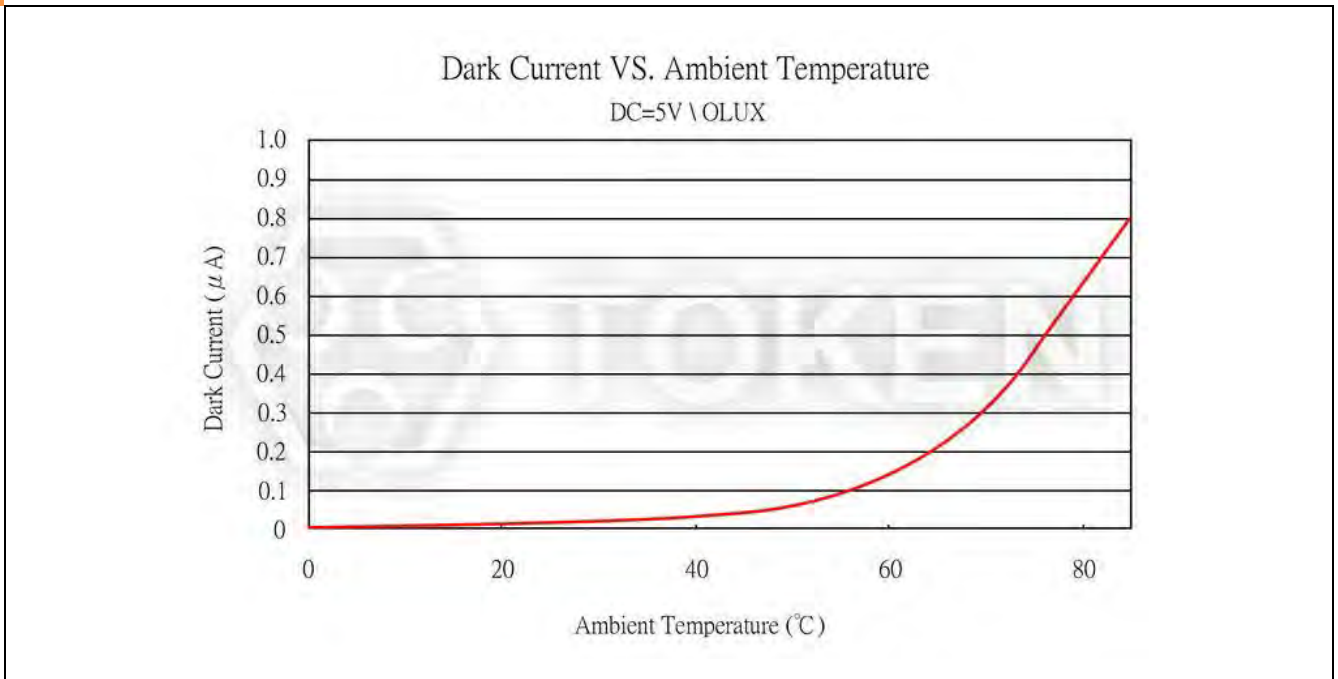


► Curve

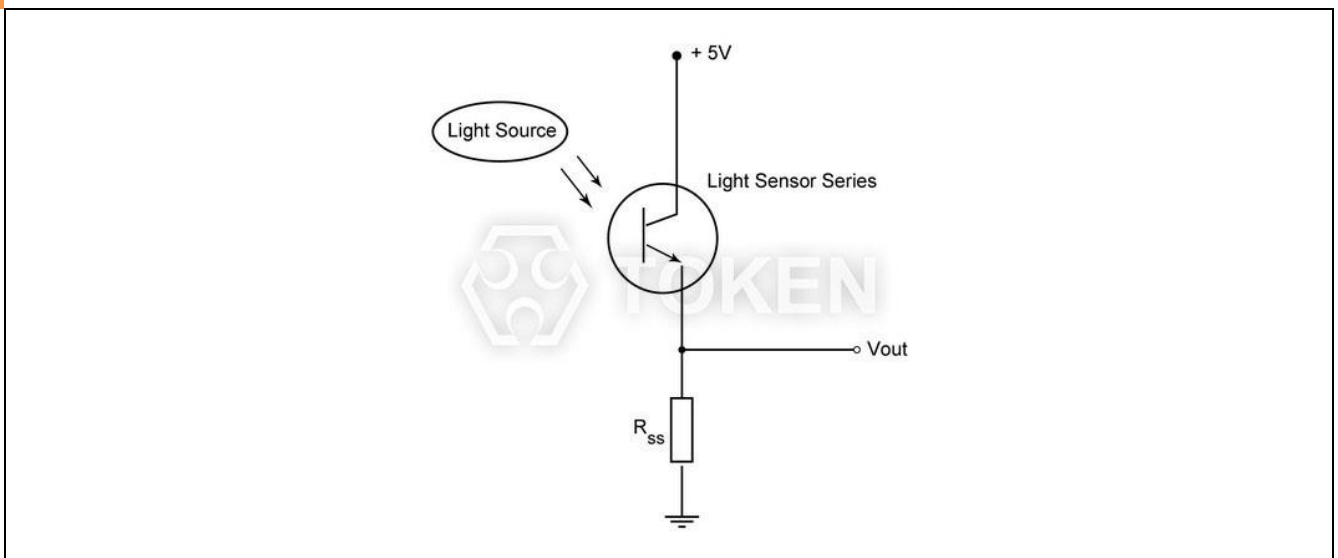
Relative Spectral Sensitivity vs. Wavelength (PT-B1-DC-0603-940)



**Dark Current vs. Ambient Temperature (PT-B1-DC-0603-940)**



**Photo Current Measurement Method (PT-B1-DC-0603-940)**

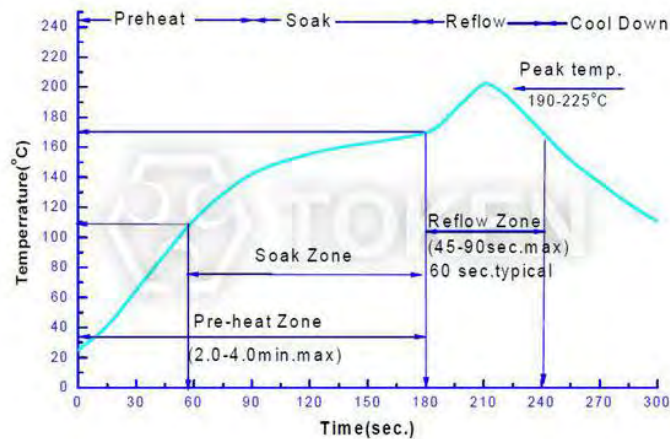




## Recommended Reflow

### Recommended Reflow Chart (PT-B1-DC-0603-940)

Characteristic of Temperature Curve	Reference Settings
Average Heating Speed (T <sub>max</sub> to T <sub>p</sub> )	Max. 3°C / Sec
Preheating: Minimum Temperature	(T <sub>min</sub> )
Preheating: Maximum Temperature (T <sub>max</sub> )	150°C
Preheating: Time (t <sub>min</sub> to t <sub>max</sub> )	60 ~ 120 Sec
Reflow Temperature: Temperature (T <sub>L</sub> )	183°C
Period of Reflow: Time (T <sub>L</sub> )	60 ~ 150 Sec
Peaking Temperature (T <sub>P</sub> )	225°C
Within the Actual Peak Temperature (t <sub>p</sub> ) 5°C	10 ~ 30 Sec
Cooling speed	Max. 6°C / Sec
25°C Time required to rise to peak temperature	Max. 6 minutes



► **Note**

**Storage :**

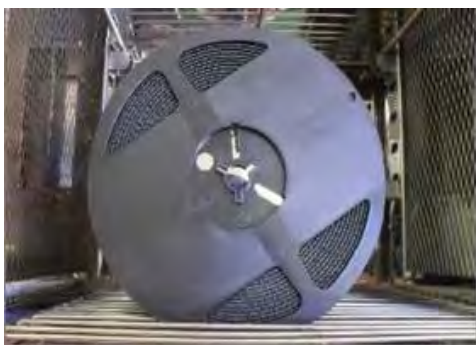
1. Without opening the original wrapper, the recommended storage environment is: 5°C ~ 30°C, Humidity less 85%.
2. After opening the original wrapper, the recommended storage environment is: 5°C ~ 30°C, Humidity less 60%.
3. This product is humidity sensitive device. In order to avoid moisture absorption after unpackage, it is recommended that the opened packaging be stored in an airtight container with desiccant.
4. After opening the package, the original should be used within 12 hours.
5. If the desiccant fails or the device is exposed to air for more than 12 hours. Should be used for dehumidification treatment at 60°C / 24H.

**Baking and dehumidification :**

1. Use instructions before soldering this product. After opening the original wrapper, product exposure and humid environment. Product may be damaged during soldering.
2. Description of the storage: Products with exposure time exceeding the specified time must be baked according to the baking conditions listed below. The following downgrade table determines the maximum amount of time that this product can be exposed to the humidity and temperature conditions listed. (Unit: Day)

Temperature	Maximum Relative Humidity (%)						
	30%	40%	50%	60%	70%	80%	90%
30°C	9	5	4	3	1	1	1
25°C	12	7	5	4	2	1	1
20°C	17	9	7	6	2	2	1

3. Baking conditions: No need to bake all the products. Baking is required only if the following criteria are met:
  - A: Products that have been removed from the original package;
  - B: Exposure to humid environments over time which list in Relative Humidity Table.;
  - C: Products that have not been soldered. Reflow soldering of parts within one hours after baking, or immediately store the part in a container of relative humidity less than 20%. The product should be baked in its original reel under 60°C for 24 hours. The exposure time of the products after this baking process is again determined by the moisture sensitivity table above.



The Right way to bake



Wrong baking style





**Service life :**

It can be used for up to 100,000 hours at rated current and rated voltage.

**Use and description of Humidity Monitor card :**

1. The card with "Humiditor" in the bag is the humidity monitor card.
2. If there is no humidity in the bag, then the color in the black circle of the monitor card is blue as shown in Figure (1).
3. If humidity card "20%" corresponds to the black circle showing the color is pink, then bake and dehumidification the product as shown in Figure (2).
4. Humidity card indicates packaging bag humidity conditions.



Figure (1)



Figure (2)

**Electrostatic Protection :**

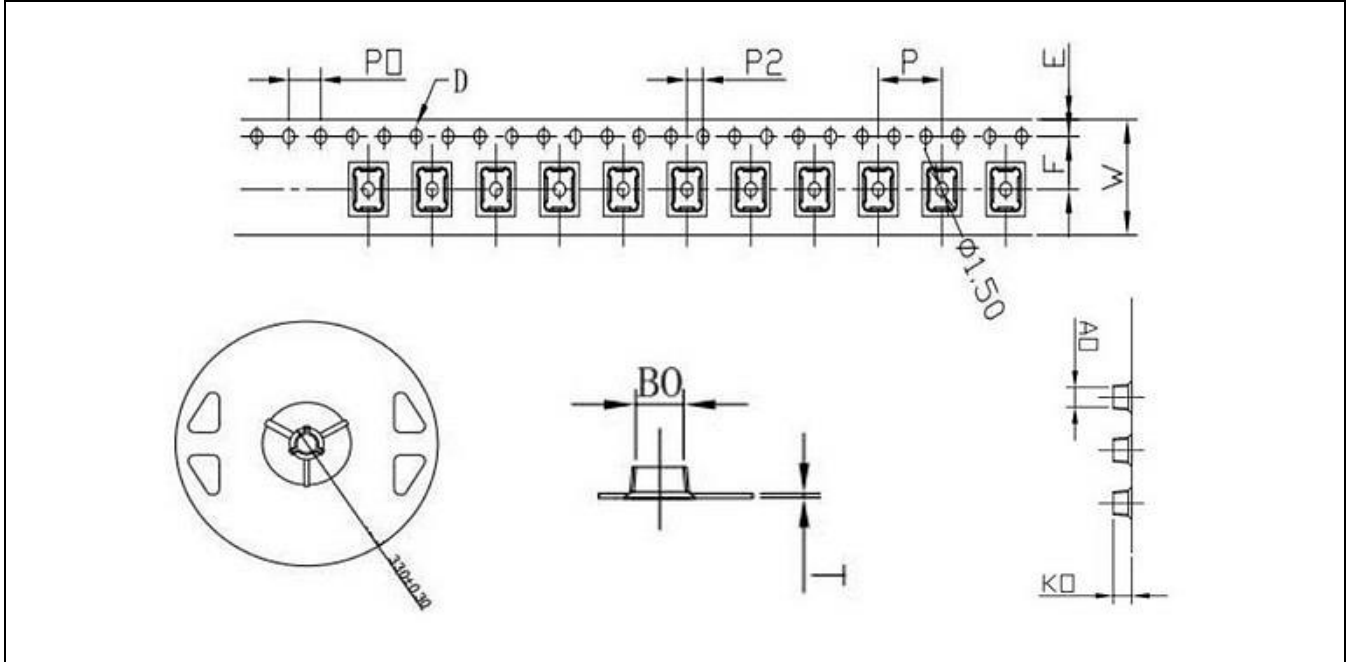
1. Electrostatic and surge will cause changes in product characteristics, such as positive voltage dropping, etc. The situation is serious, even damaging the product.
2. During the whole process (production, testing, packaging, etc.), who might contact with chip phototransistor, do measures to prevent and eliminate static electricity.
3. All relevant equipment and machines should be properly grounded. Grounding AC resistance is less than 1.0  $\Omega$ , the worktable needs to cushion surface resistance 106  $\Omega$  ~ 109  $\Omega$  Table Mat.
4. The ion fan must be installed on the environment and equipment that produce electrostatic easily.
5. Operation process, operators need to use anti-static bracelet, anti-static cushion, anti-static overalls, work shoes, gloves, anti-static capacitors.

**Other Matters :**

1. The resin package of the Chip Light Sensor product is quite fragile. Do not scrape the encapsulated resin part with a hard, sharp object.  
Should also be very careful when using tweezers to clamp the SMD Light Sensor.
2. Do not directly use the hand to take the Chip Light Sensor products.  
The direct use of hand to get the chip phototransistor will not only pollute the surface of the chip packaging resin, but also may be due to static factors such as chip product performance changes.
3. Do not exert excessive pressure on Chip Light Sensor, especially when Chips are in high temperature (for example, during reflow soldering).  
Excessive pressure may directly affect the inner chip and the gold wire.
4. Chip phototransistor working environment and chip adaptation of the material sulfur elements and compounds can not exceed 100PPM.
5. The module material cannot be stacked together and may damage the internal circuitry.
6. Not available in PH<7 acidic sites.

Packing format (Tape and reel) :

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	12	3.0	3.7	1.5	5.5	1.75	2.6	4.0	2.0	8.0	0.35
TOLE	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05



▶ Order Codes

Order Codes (PT-B1-DC-0603-940)

PT	-	B1	-	DC	-	0603	-	940
Part Number		Chip Type		Lens Color		Dimensions		Peak Wavelength
PT		B1		DC		0603		940
				Dark Transparent		1.6mm × 0.8mm		940 nm