

Version:  
November 30, 2018



**(PT-A6)**  
**Visible Light Detector  
for Security Lighting**

**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 Visible Light Detector for Security Lighting with Near Human Eye Photopic Response.

#### Features :

- Simulate the human eye, peak wavelength 520nm.
- Using super 82 layer coating process on the Chip. 100% Filter infrared interference
- Good batch consistency, completely solve the infrared light start too early.
- Fast response, stable performance, aging at +85°C/65% humidity for 1000 Hr.
- The starting point does not drift. Nice appearance.

#### Applications :

- Replace the traditional CDS photoresistor.
- Cadmium and lead free with RoHS compliant.
- Dedicated to infrared monitoring products.
- When control the infrared light, it is no need to add extra casing and filter on low illumination.

#### Customization :

- For the convenience of installation in all kinds of products in any position, different sizes are available upon request.
- Token offers various option of the bright current/dark current (bright resistance/dark resistance) to costume the most products.

Photodiodes do not react to light in the same manner as human eyes do. A persons eye is insensitive to infra-red (a wave length more than 780nm) and also to ultra-violet light (a wave length under 380nm). A typical plastic photodiode, however, senses light at any wave length between 300nm and 1100nm. This means that the designer's first challenge is to remove the IR and UV components from the sensor's output.

The (PT-A6) Visible Light Detector family using high quality chip packaging and processing super-plated infrared filter membrane on chip surface, so this sensor can fully filter infrared interference. It is no need to add the casing and extra filter and effective filtering out the effect of light reflection due to infrared emission on security products.



By selecting the accuracy of chips, under strict management of production process, (PT-A6) visible light sensors finished batch consistency uniform. The consistency is 3 to 5 times higher on comparison of similar photosensitive devices. The precision can be controlled as narrow as 10%. Fully meet the customer requirements for starting the LUX value. Token taking the advantage of temperature compensation internal process on the chip, (PT-A6) features one times higher temperature resistance than other similar products while working on high temperature environment. Please contact our sales or link to Token official website "[Visible Light Sensors](http://www.token.com.tw)" for more information.



► Dimensions

**Dimensions & Configurations (Unit: mm) (PT-A6-BC-3-PE-520) Plate Edge**

Part NO.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
PT-A6-BC-3-PE-520	4.05 ± 0.20	3.00 ± 0.20	1.50 Max.	1.50 ± 0.50	2.54 ± 0.20	3.85 ± 0.20	0.75 ± 0.20	25.4 Min.	0.50 ± 0.20

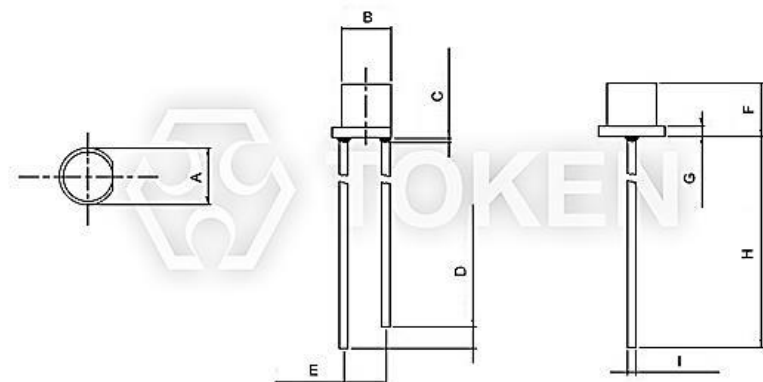



Plate Edge Visible Light Detector (PT-A6-BC-3-PE-520) Dimensions



www.token.com.tw

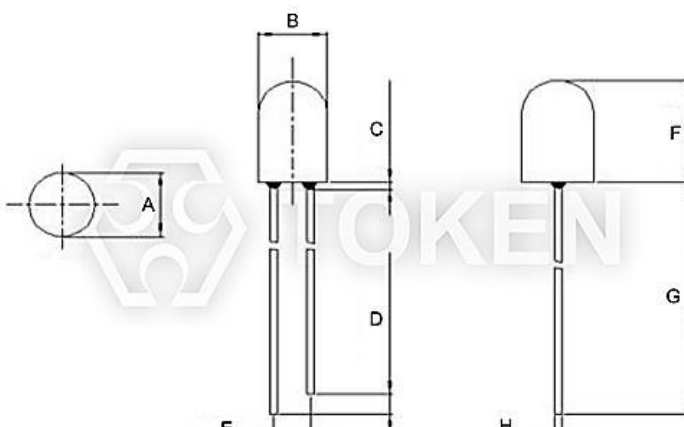
Plate Edge Visible Light Detector  
(PT-A6-BC-3-PE-520)

Remark:


- The epoxy resin highest: 1.5mm max.
- Product images, plastic color of appearance, and all other information is for reference only, goods in-kind prevail.
- Short Lead—Collector    Long Lead—Emitter.

**Dimensions & Configurations (Unit: mm) (PT-A6-AC-5-BN-520) Bullet None**

Part NO.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
PT-A6-AC-5-BN-520	5.00 ± 0.20	5.00 ± 0.20	1.50 Max.	2.00 ± 0.5	2.54 ± 0.20	7.00 ± 0.20	14.00 Min.	0.50 ± 0.20



Visible Light Sensor / Phototransistor (PT-A6-AC-5-BN-520) Bullet None Dimensions



www.token.com.tw

Phototransistor Plate None  
(PT-A6-AC-5-BN-520)

Remark:

- The epoxy resin highest: 1.5mm max.
- Product images, plastic color of appearance, and all other information is for reference only, goods in-kind prevail.
- Short Lead—Collector    Long Lead—Emitter.

## ▶ Electro-Optical Characteristics

### Electro-Optical Characteristics (Ta=25 ° C) PT-A6-BC-3-PE-520

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak Wavelength	$\lambda_p$	\	-	520	-	nm
Spectral Response Bandwidth	$\lambda$	\	400	-	700	nm
Collector-Emitter Breakdown Voltage	$B_{vceo}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	60	-	-	V
Emitter-Base Breakdown Voltage	$B_{veco}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	7	-	-	V
Collector-Emitter Saturation Voltage	$V_{ce}$ (sat)	$I_{ce}=2mA$ $E_e=1m^W/cm^2$	-	-	1.0	V
Photo Current	$I_{L(1)}$	$V_{ce}=5V$ $E_v=10Lux$	3	7	12	$\mu A$
	$I_{L(2)}$	$V_{ce}=5V$ $E_v=30Lux$	9	21	36	$\mu A$
	$I_{L(3)}$	$V_{ce}=5V$ $E_v=100Lux$	30	70	120	$\mu A$
Collector Dark Current	$I_{ceo}$	$V_{ce}=5V$ $E_v=0Lux$	-	-	0.2	$\mu A$
IR Receiving Current	$I_{L(4)}$	$V_{ce}=5V/850\text{ nm IR LED}$ $E_e=1m^W/cm^2$	-	-	0.3	$\mu A$
Rise Time	$t_r$	$V_{ce}=5V$ $I_{ce}=1mA$	40			$\mu s$
Fall Time	$t_f$	$RL=1000\Omega$	60			

### Electro-Optical Characteristics (Ta=25 ° C) PT-A6-AC-5-BN-520

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak Wavelength	$\lambda_p$	\	-	520	-	nm
Spectral Response Bandwidth	$\lambda$	\	400	-	700	nm
Collector-Emitter Breakdown Voltage	$B_{vceo}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	60	-	-	V
Emitter-Base Breakdown Voltage	$B_{veco}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	7	-	-	V
Collector-Emitter Saturation Voltage	$V_{ce}$ (sat)	$I_{ce}=2mA$ $E_e=1m^W/cm^2$	-	-	1.0	V
Photo Current	$I_{L(1)}$	$V_{cc}=5V$ $E_v=10Lux$	5	14	22	$\mu A$
	$I_{L(2)}$	$V_{cc}=5V$ $E_v=30Lux$	15	42	66	$\mu A$
	$I_{L(3)}$	$V_{cc}=5V$ $E_v=100Lux$	50	140	220	$\mu A$
Collector Dark Current	$I_{ceo}$	$V_{ce}=5V$ $E_v=0Lux$	-	-	0.2	$\mu A$
IR Receiving Current	$I_{L(4)}$	$V_{ce}=5V/850nm\text{ IR LED}$ $E_e=1m^W/cm^2$	-	-	0.5	$\mu A$
Rise Time	$t_r$	$V_{cc}=5V$ $I_{ce}=1mA$	40			$\mu s$
Fall Time	$t_f$	$RL=1000\Omega$	60			

**Electro-Optical Characteristics (Ta=25 ° C) PT-A6-AC-5-PN-580**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak Wavelength	$\lambda_p$	\	-	580	-	nm
Spectral Response Bandwidth	$\lambda$	\	400	-	700	nm
Collector-Emitter Breakdown Voltage	$B_{vceo}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	60	-	-	V
Emitter-Base Breakdown Voltage	$B_{veco}$	$I_{ce}=100\mu A$ $E_e=0m^W/cm^2$	7	-	-	V
Collector-Emitter Saturation Voltage	$V_{ce}$ (sat)	$I_{ce}=2mA$ $E_e=1m^W/cm^2$	-	-	1.0	V
Photo Current	$I_{L(1)}$	$V_{cc}=5V$ $E_v=10Lux$	2.5	6	10	$\mu A$
	$I_{L(2)}$	$V_{cc}=5V$ $E_v=30Lux$	7.5	18	30	$\mu A$
	$I_{L(3)}$	$V_{cc}=5V$ $E_v=100Lux$	25	60	100	$\mu A$
Collector Dark Current	$I_{ceo}$	$V_{cc}=5V$ $E_v=0Lux$	-	-	0.2	$\mu A$
IR Receiving Current	$I_{L(4)}$	$V_{cc}=5V/850nm$ IR LED $E_e=1m^W/cm^2$	-	-	0.3	$\mu A$
Rise Time	$t_r$	$V_{cc}=5V$ $I_{ce}=1mA$	40			$\mu s$
Fall Time	$t_f$	$RL=1000\Omega$	60			

**Absolute maximum ratings (Ta=25 ° C) PT-A6**

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	V
Emitter-Collector-Voltage	$V_{ECO}$	7	V
Power Dissipation	$P_C$	50	$m^W$
Operating Temperature Range	$T_{opr}$	-25 ~ +85	$^{\circ}C$
Storage Temperature	$T_{stg}$	-40 ~ +100	$^{\circ}C$

► Curve PTA6BC3PE520

Relative Spectral Sensitivity vs. Wavelength PT-A6-BC-3-PE-520

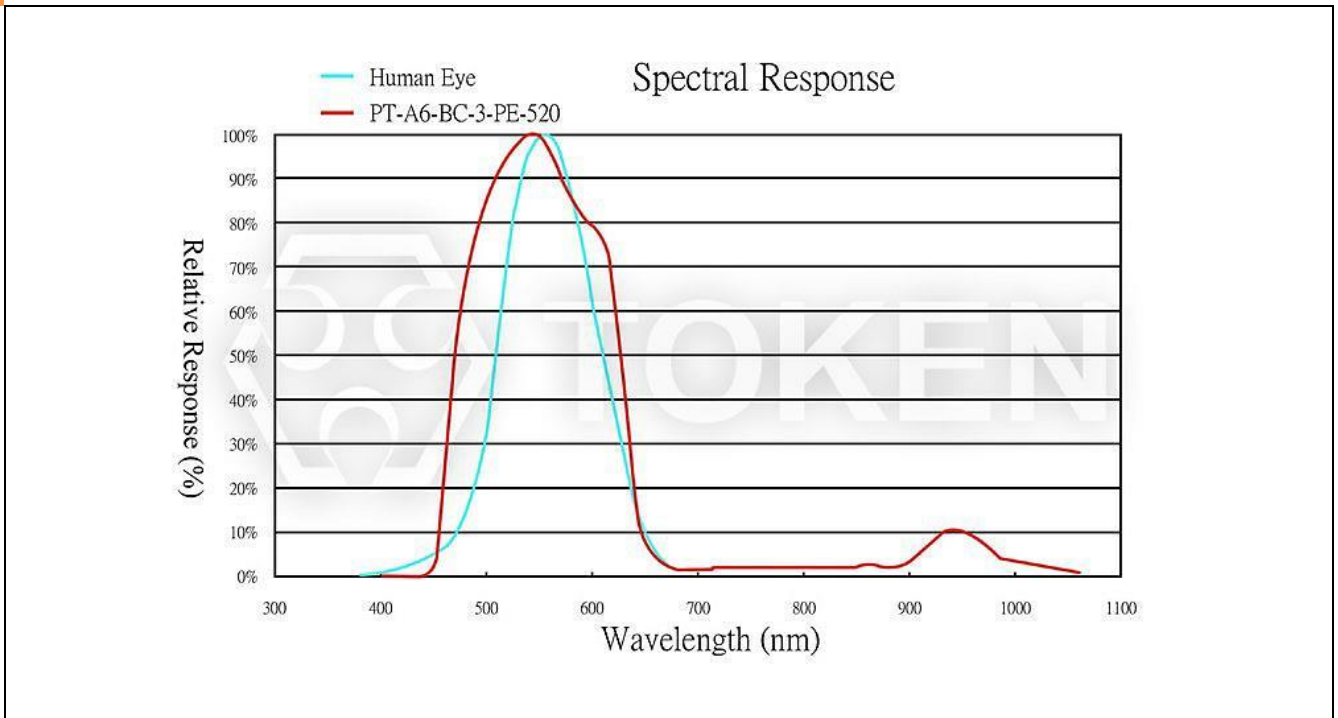
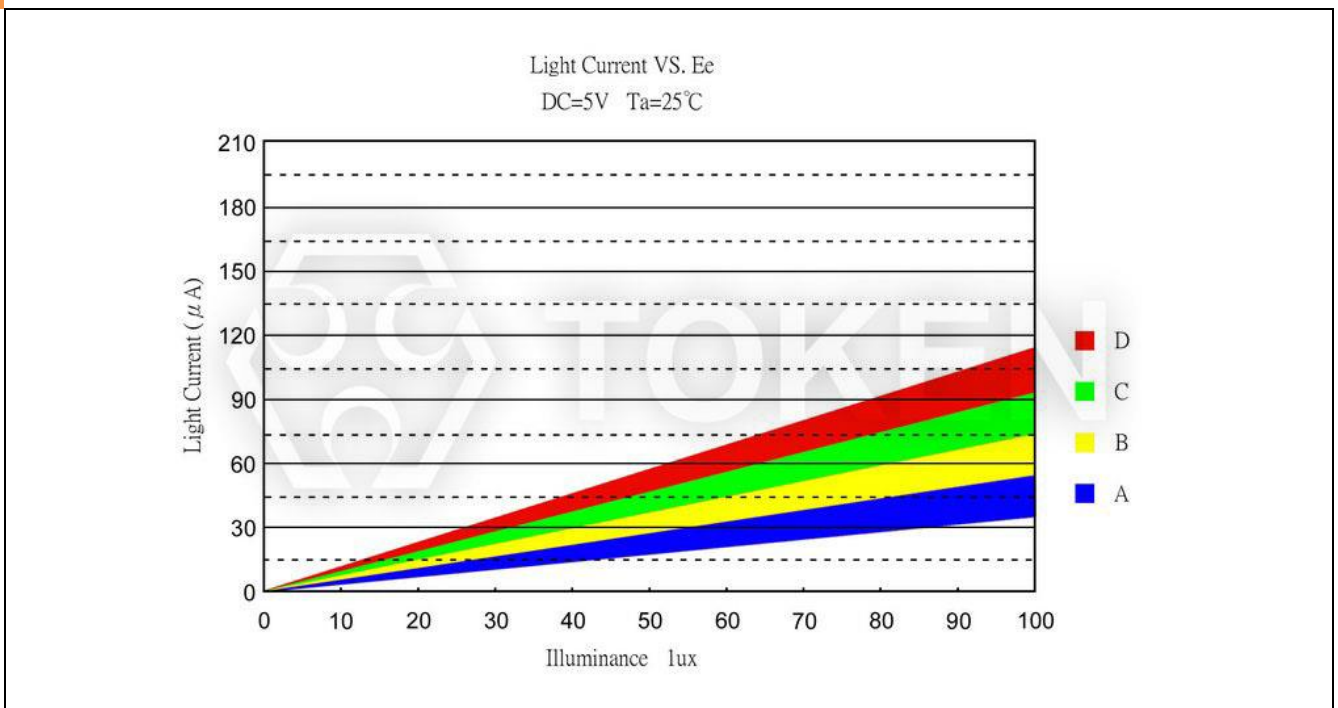
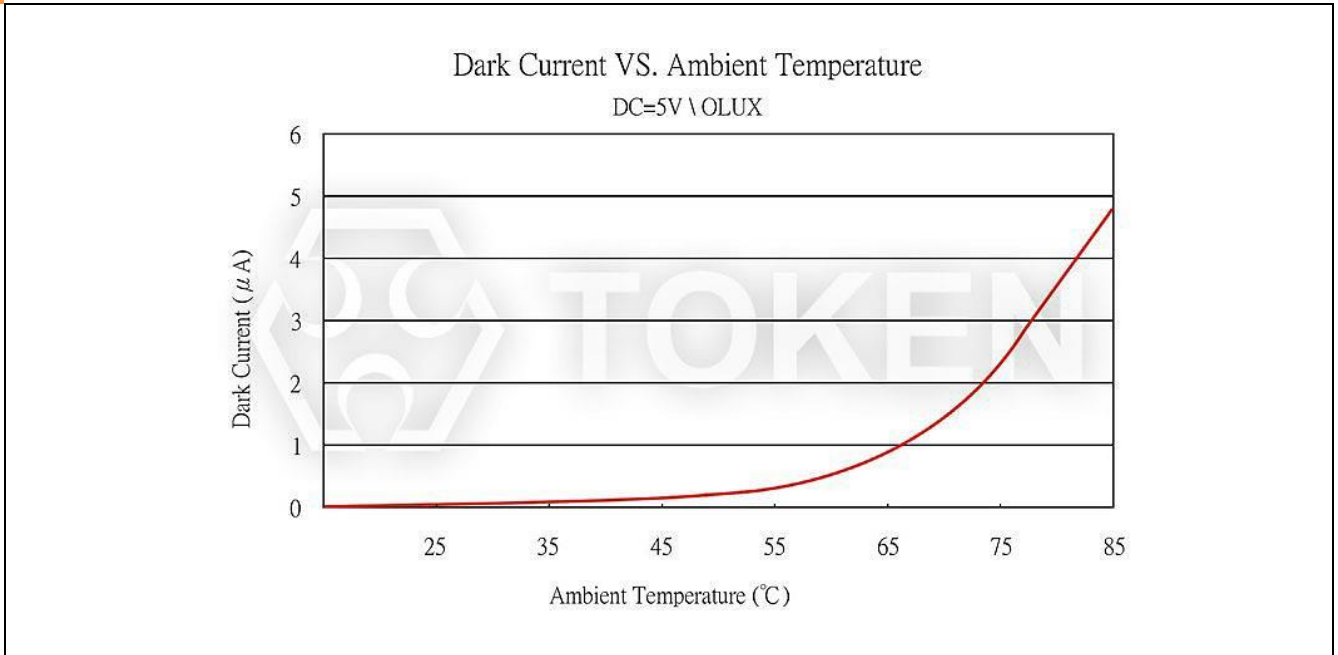


Photo Current vs. Illuminance PT-A6-BC-3-PE-520





Dark Current vs. Ambient Temperature PT-A6-BC-3-PE-520



► Curve PTA6AC5BN520

Relative Spectral Sensitivity vs. Wavelength (PT-A6-AC-5-BN-520) Bullet None

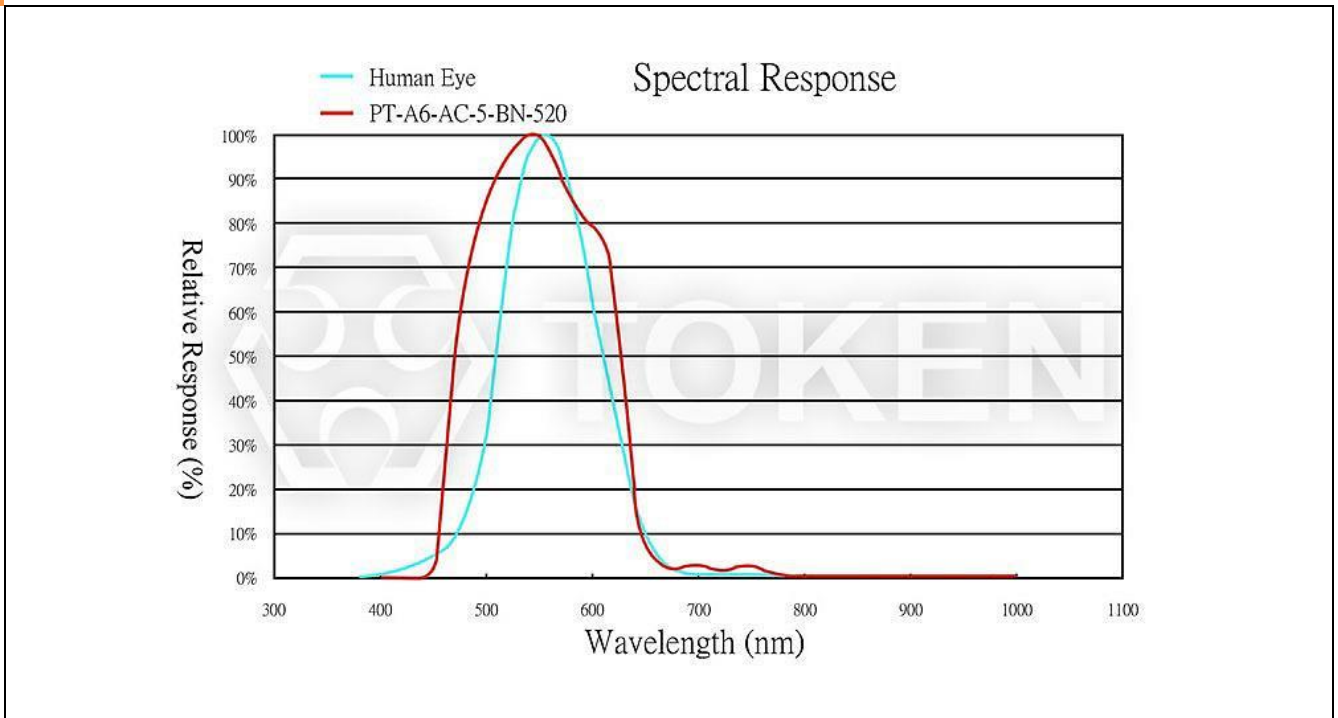
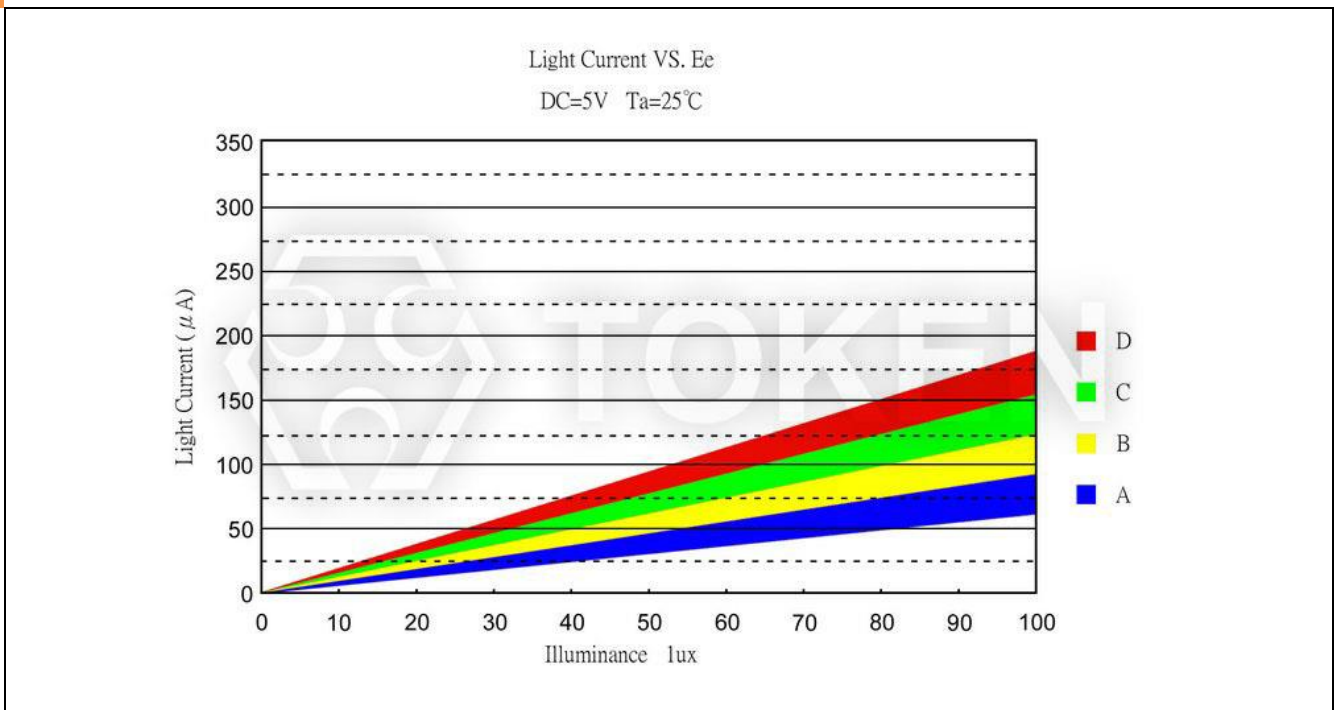
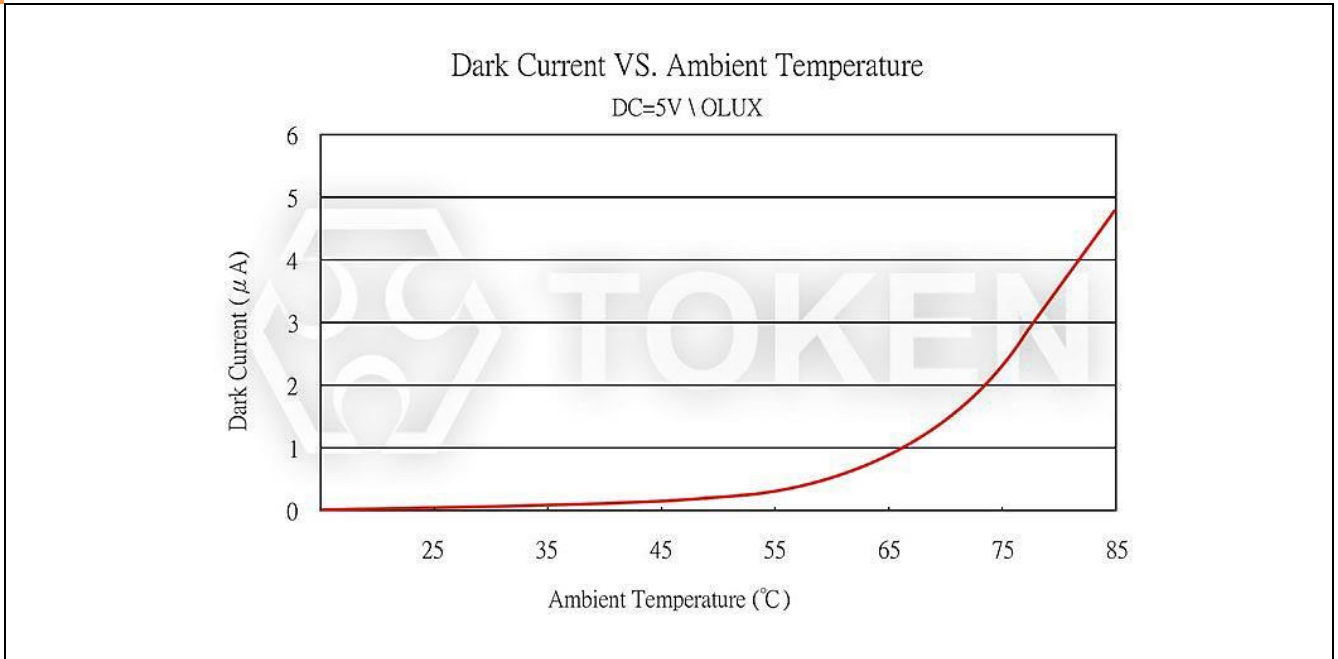


Photo Current vs. Illuminance (PT-A6-AC-5-BN-520) Bullet None



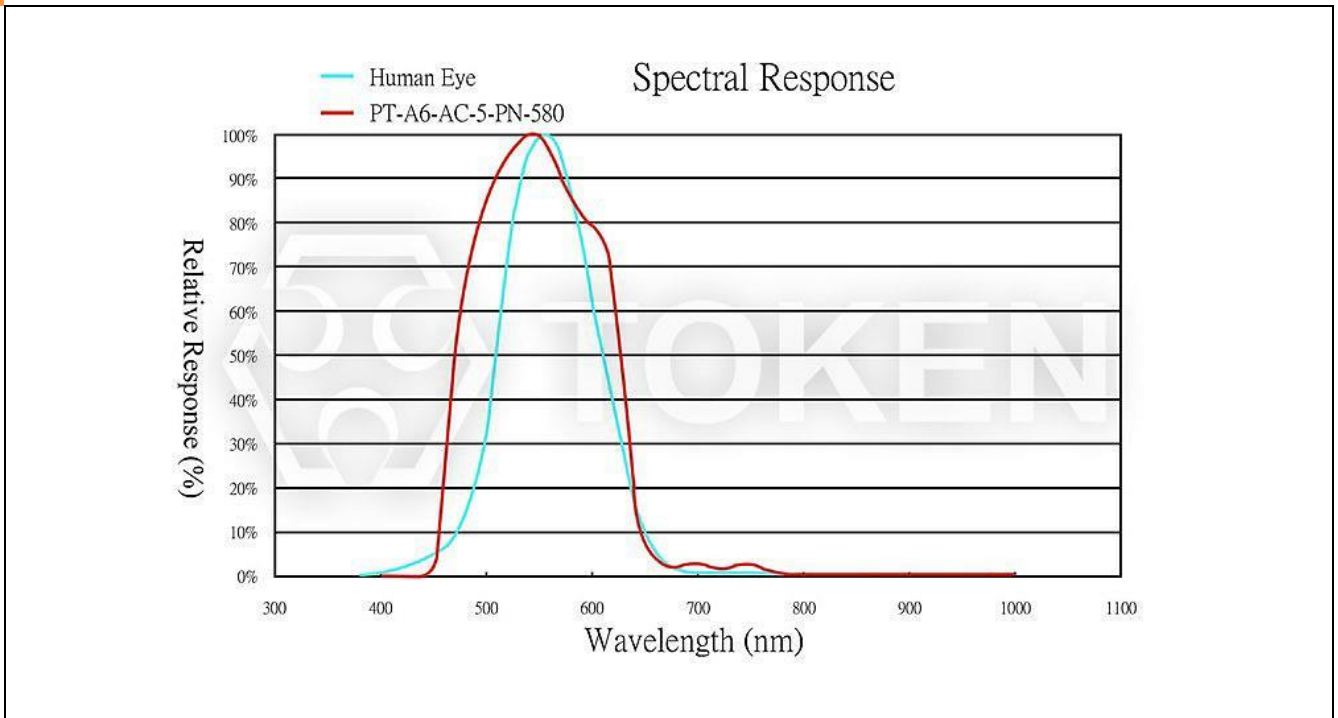


Dark Current vs. Ambient Temperature (PT-A6-AC-5-BN-520) Bullet None

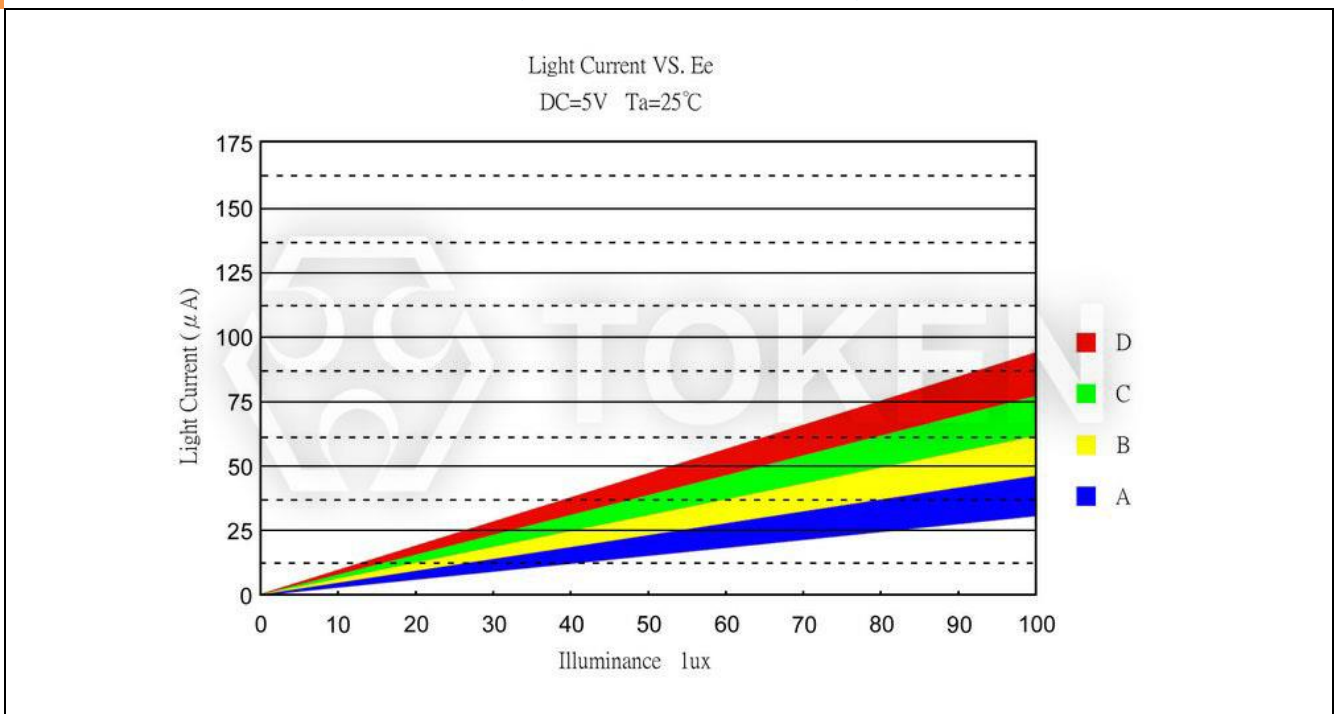


▶ **Curve PTA6AC5PN580**

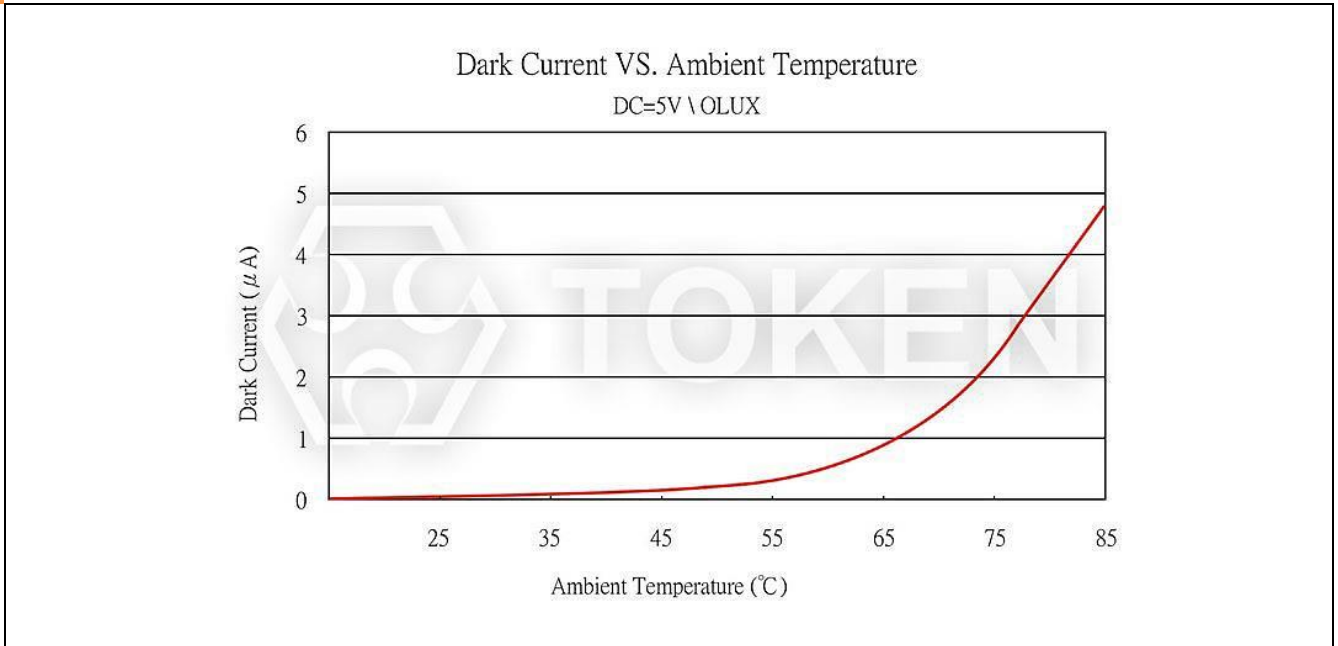
**Relative Spectral Sensitivity vs. Wavelength (PT-A6-AC-5-PN-580) Plate None**



**Photo Current vs. Illuminance (PT-A6-AC-5-PN-580) Plate None**



Dark Current vs. Ambient Temperature (PT-A6-AC-5-PN-580) Plate None



## ► Note

### Visible Light Detector (TPT3PE) Precaution Usage :

- The light source : Select 590nm LED Surface light source.

### Mounting :

- While packages are on one circuit board, avoid mismatching in the thermal expansion of each component, generate cracks in the package and break the bonding wire.

### Soldering :

- Do not immerse plastic parts in tin tank.
- During soldering, when adding thermal stress in a moisture absorbing state, moisture evaporates, swells and generates stress to the internal package.
- To avoid swellings and cracks in the surface of the package, followsoldering conditions below.
- Wave soldering method:  $120^{\circ}\text{C} < 60\text{s}$  、  $260^{\circ}\text{C} < 5\text{s}$ .
- Manual soldering:  $260^{\circ}\text{C} < 5\text{s}$  、  $340^{\circ}\text{C} < 3\text{s}$ .

### Lead-forming and cuttings :

- Before soldering, perform lead forming at normal temperature.
- While forming or cutting the lead, stay the area at a distance of 5 mm or greater from the root of the lead.
- Avoid mounting which may cause force on the root of the lead.

### Storage :

The sensor is incorporated in the transparent resin package. Because of its sensitivity to humidity, the package is moisture-proof. When storing the sensor, do as instructed below.

- Quickly use after opening. (within 2 days, below  $30^{\circ}\text{C}/60\%$  R.H.).
- Once unpacked, use within three months, or keeping within a moisture-proof method, which include maintaining within a moisture-proof container with silica gels, is suggested for longterm safe-keeping.
- Very bad storage conditions may deteriorate solderability or characteristics, and defect the appearance. Recommended conditions of the storage place, temperature  $0^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ , humidity below 60% R.H. (Avoid freezing and dew condensation).

### Cleaning :

- Do not wash with water to avoid corrosion.
- Under any circumstance, the cleaning time should be within 1 minute of normal temperature.
- Alcohol is recommended as a cleaning agent when cleaning products.
- If you use other cleaning agents, you need to confirm whether the cleaning agent will corrode the epoxy body.
- Freon can not be used as a cleaning agent.
- When cleaning products with ultrasonic cleaning, ultrasonic power and time should be less than 300W and 30 seconds, respectively.
- PCB and product can not touch the oscillator. Can not make the product on the PCB resonance.
- This model is static sensitive devices, so static electricity and surges can damage the product.
- To all the equipment, machines, tables, and the ground must be anti-static ground.
- Requires the use of anti-static wrist strap wear.

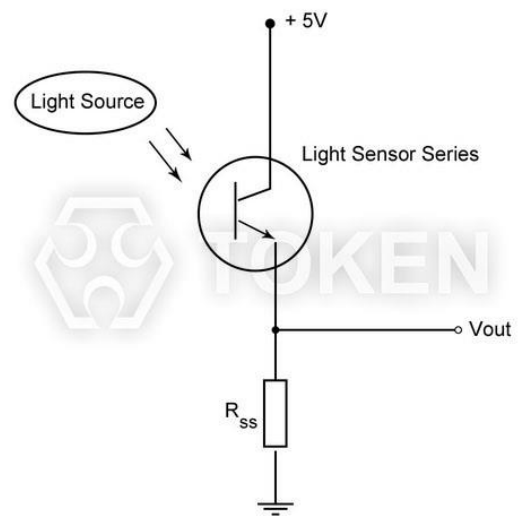


Photo Current Measurement Method -  
3PE520BCA6



▶ **Order Codes**

**Order Codes (PT-A6)**

<b>PT</b>	<b>-</b>	<b>A6</b>	<b>-</b>	<b>BC</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>PE</b>	<b>-</b>	<b>560</b>	
Part Number		Chip Type		Lens Color		Size		Shape		Spectral Bandwidth	
PT		A6		BC	Dark Blue	3	3 mm	PE	Plate Edge	560	560 nm
				AC	Water Clear	5	5 mm	PN	Plate None	580	580 nm
								BN	Bullet None		