Po188 Ambient Light Sensor

■ Description

    The Po188 is a photoelectrical integrated optical sensor designed at λp=520nm, with double sensitive receiver. It is highly sensitive to visible light, and varies linearly with illumination changing. It is used in saving energy, automatic sensitivity to light, and self-adaptive control in TV, LCD back light, Digital code product, instrument, industry device etc.

■ Electric Characteristic

- Small dark current, low illumination response, high sensibility, output current in proportion to illumination;
- Built in double sensitive receiver and Optical filter-less, attenuate near infrared automatically. Spectral response close to human eye sensitivity;
- Embedded micro signal CMOS amplifier, high precision voltage source, and correct circuit; Output current is high;
- Two Optics material packages to choose, to permeate visible light, cut off ultraviolet, relative damp infrared ray, and improve optical-filter effect;
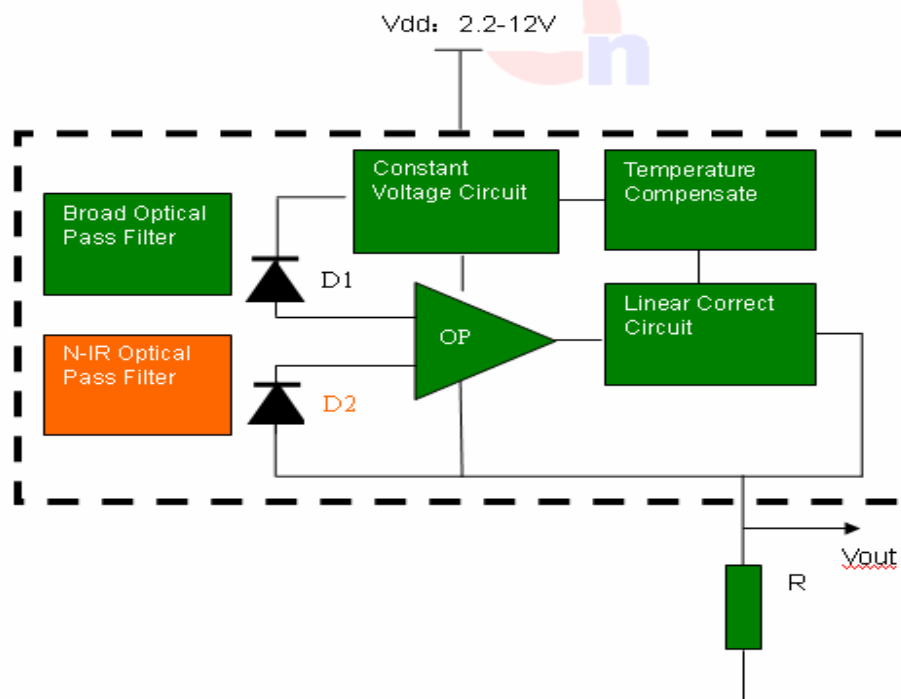- Accord with RoHS standard. Pb free, CdS free.

Fig.1 Visible light illumination Sensor Simplified Schematic

■ Typical Application

- Back light source illuminations adjust: TV, Computer display, LCD Backlight, Data code camera, MP3/MP4, PDA, and GPS;

- Energy saving: Outdoor advertisement machine, inductive lightening utensil, and toy;

- Instrument: Illuminometer and industrial control.

- Environment protection substitute: Substitute for light sensitive resistor, photosensitive diode, photosensitive triode;

■ Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage	Vdd	2.4-12	V
Operating Temperature	Topr.	-20 to +75	℃
Storage Temperature	Tstg.	-40 to +120	℃
Soldering Temperature	Tsol.	260	℃
Static current	I	<5uA@<1Lux	uA

■ Optic-electric characteristics

Parameter	Symbol	Test Conditions Vcc=5V,R=1KΩ,Ta=25℃	Min.	Typ.	Max.	Unit
Typical incident wave	λp	-	-	520	-	nm
Quiescent Current	I_D	Ev=0Lux,	0	0.03	4	µA
Light Current of Common Epoxy Resin Package Sample	I_L	Ev=5Lux	-	58	-	µA
		Ev=10Lux	-	113	-	
		Ev=100Lux	-	758	-	
		Ev=200Lux	-	1318	-	
		Ev=500Lux	-	2620	-	
		Ev=1000Lux	-	4060	-	
Light Current of Nano-epoxy resin	I_L	Ev=5Lux	-	36	-	
		Ev=10Lux	-	69	-	
		Ev=100Lux	-	394	-	

Package Sample		Ev=200Lux	-	643	-	
		Ev=500Lux	-	1192	-	
		Ev=1000Lux	-	1905	-	
Response time	Tr	-	-	2	-	µs
	Tf	-	-	2	-	µs

■ Spectral Sensitivity Curves

Human eye function, Si photo device spectrum, versus. Ambient light sensor spectrum curve

— Ambient light sensor spectrum
— Si photodevice spectrum
— Human eye function
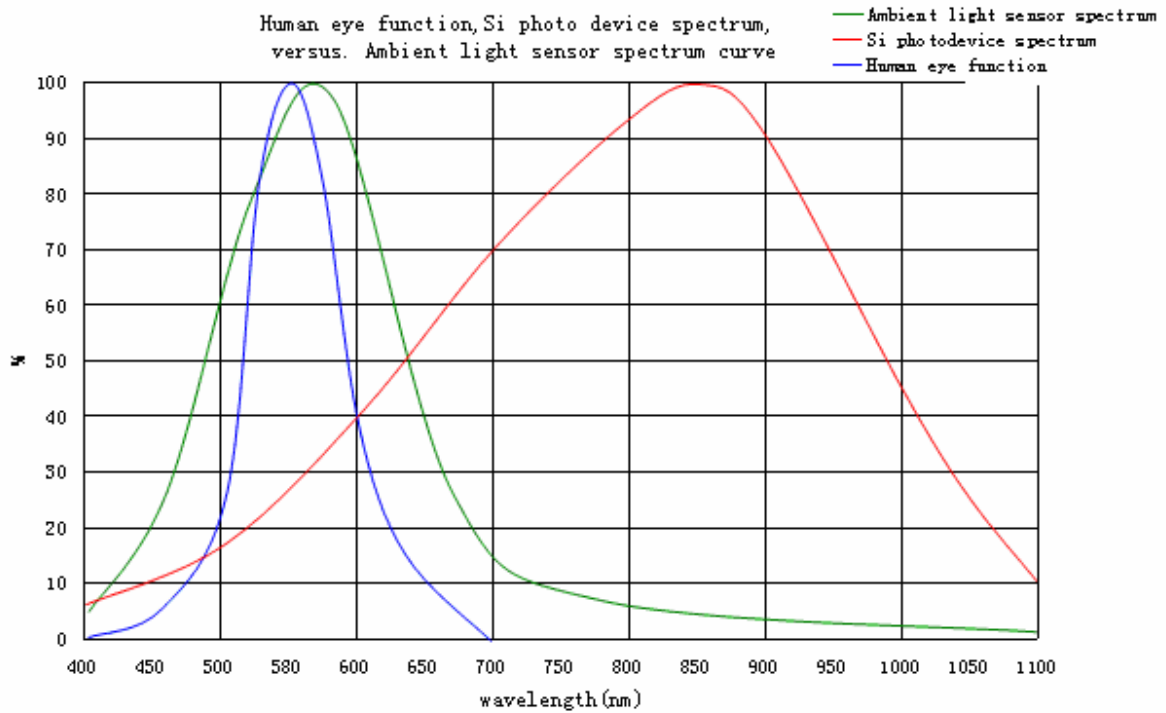
Fig.2 Spectral Sensitivity of Different Detectors Compared to the Human eye
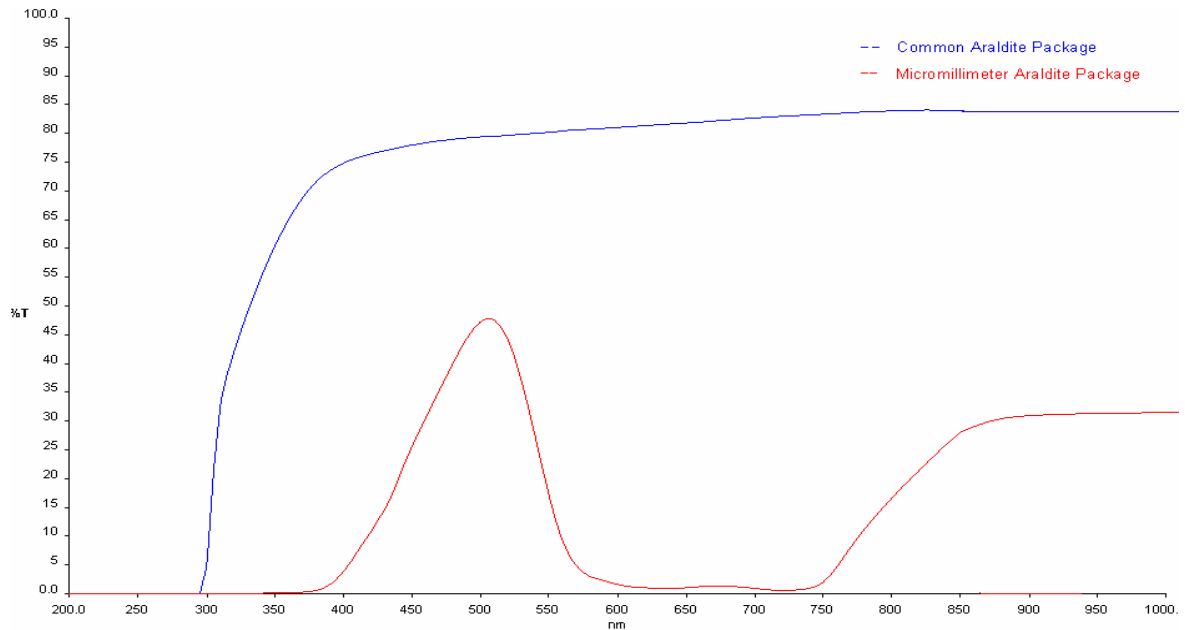
Fig.3 Different Package Material Spectrum Contrast

Noted: Different deepness of incidence interface to CMOS chip, different package material and lapse of light source may affect the test data.

■ Test Circuit
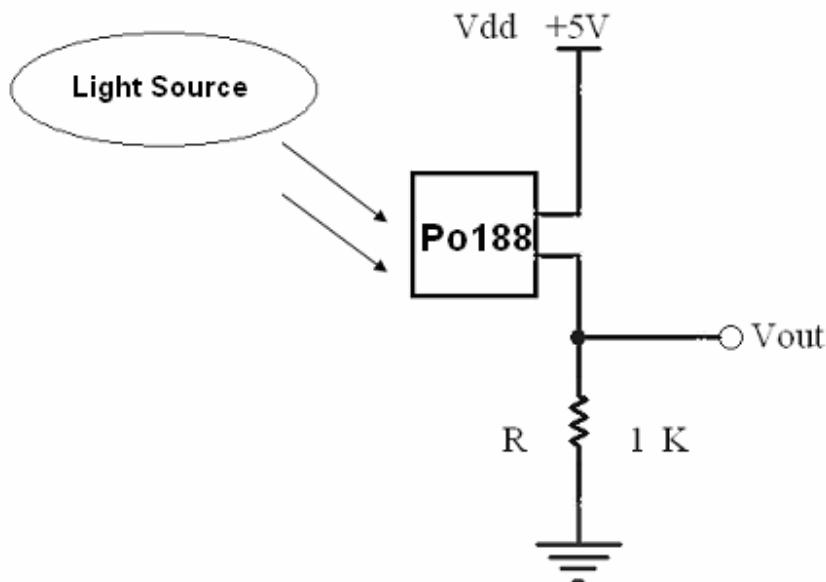
Fig.4 Light Current Test Circuit
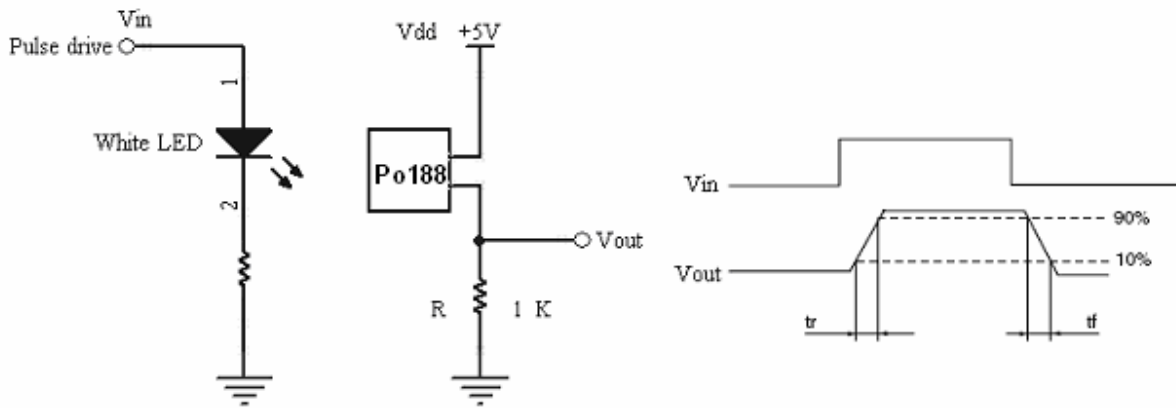
Fig.5 ON/OFF Time Test Circuit

Test condition：ambient temprature25ºC±3，pull down resistor R=1KΩ,supply voltage Vdd=5V, light source is common incandescence light. All indexes in the specification are tested under this condition.

■ **Characteristic Curve**

Incandescence light response
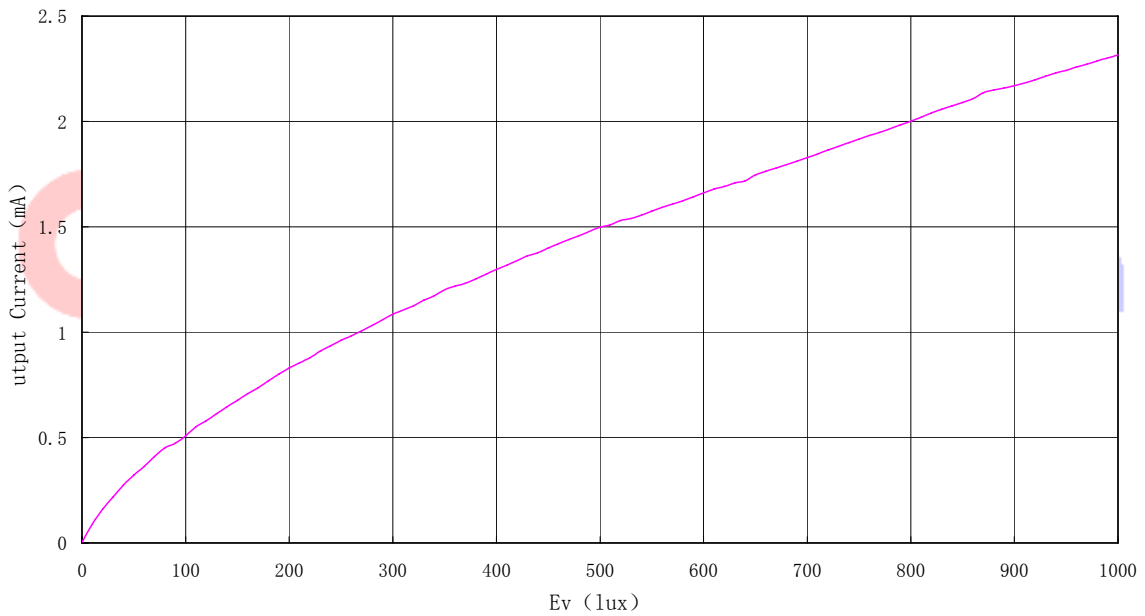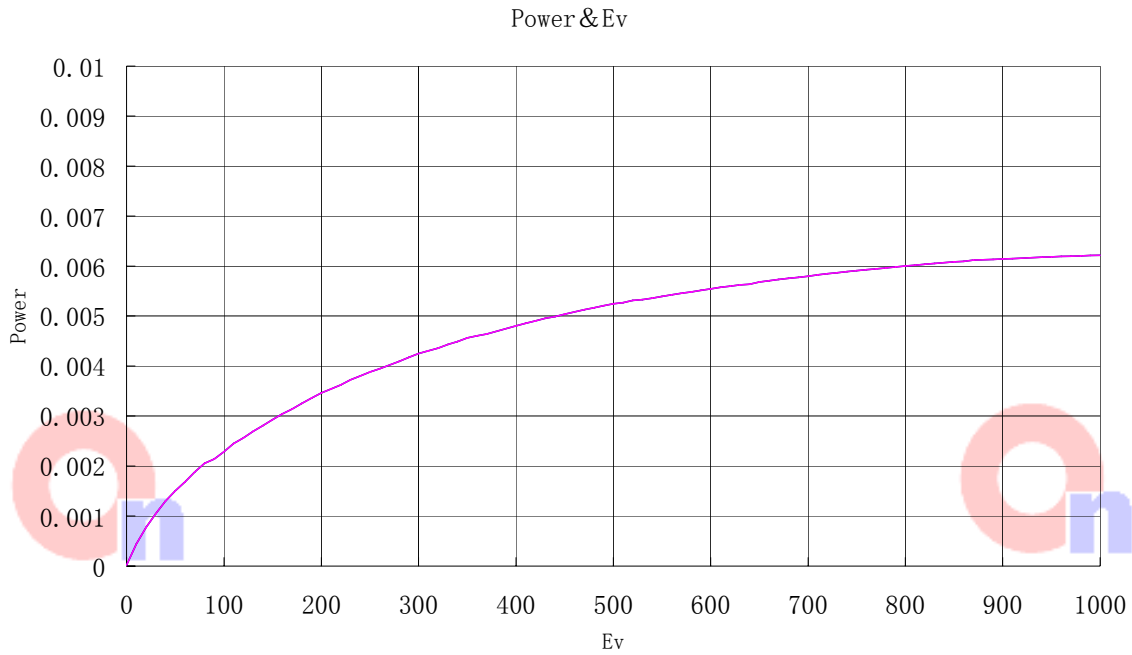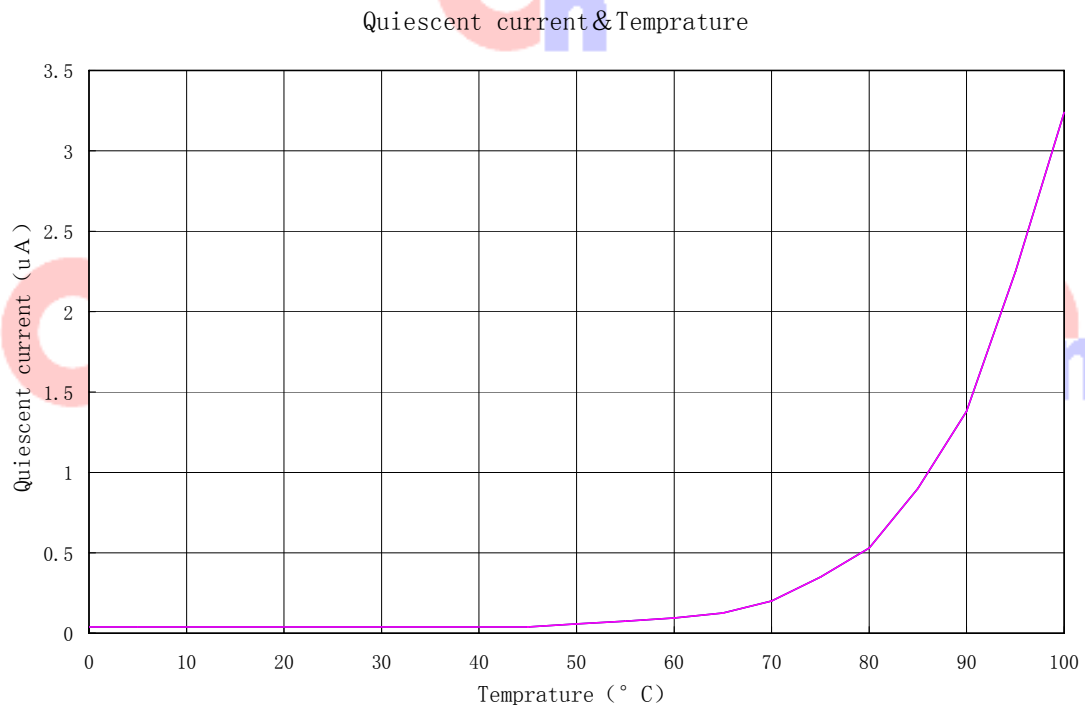

Fig.6 Incandescent Light Response

Power&Ev

Fig.7   Power vs. Vdd

Quiescent current&Temprature

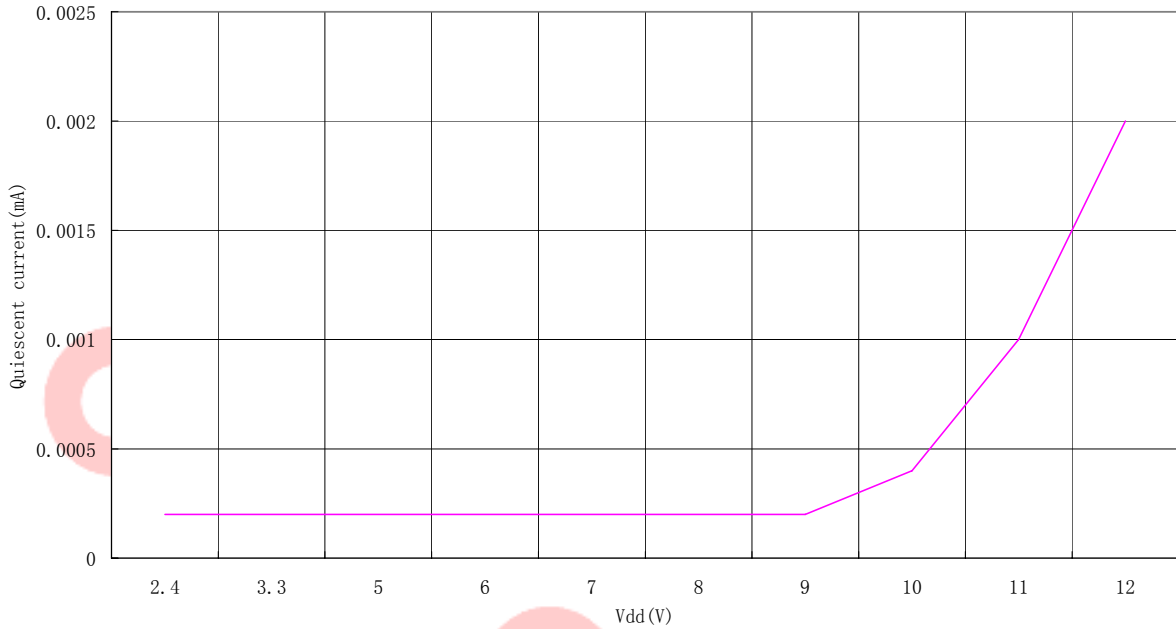Fig.8 Quiescent current vs. Temperature

Quiescent current&Vdd

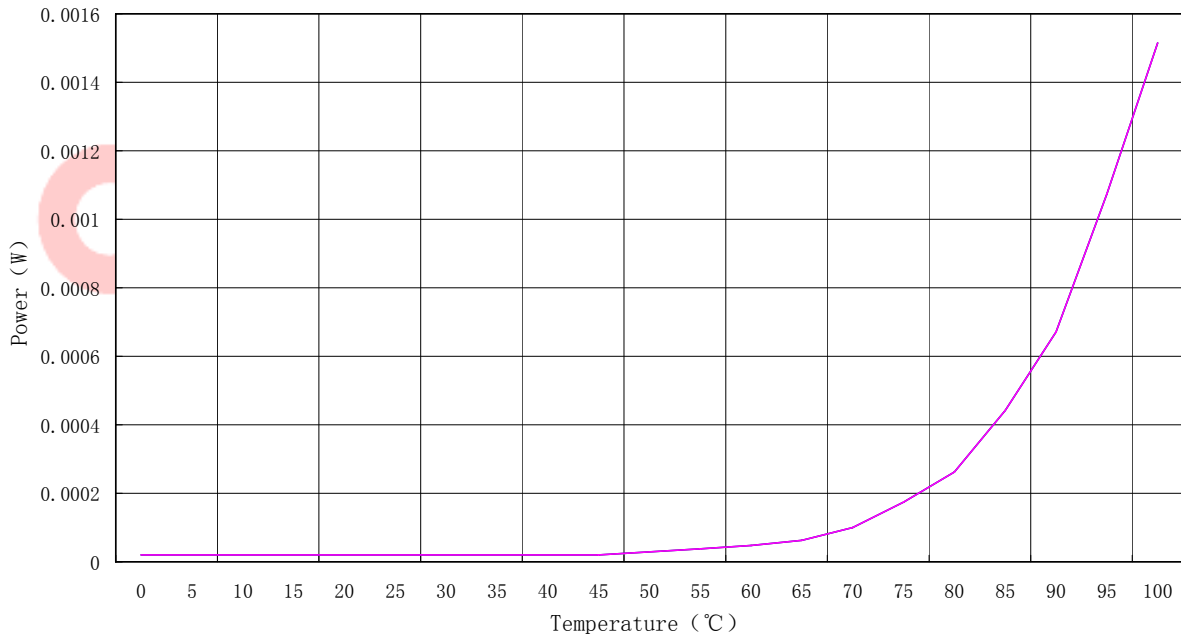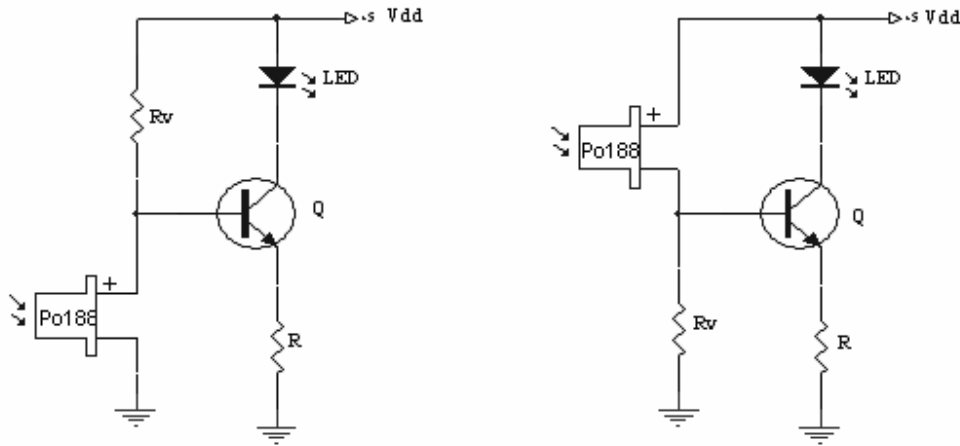

Fig.9 Quiescent current vs. Vdd

Power&Temperature

Fig.10   Power vs. Temperature

■ Typical Application Circuit

Left chart: Shut down LED by regulating Rv, i.e. to regulate Ev to a fixed value;

Right chart: Turn on LED by regulating Rv, i.e. to regulate Ev to a fixed value.
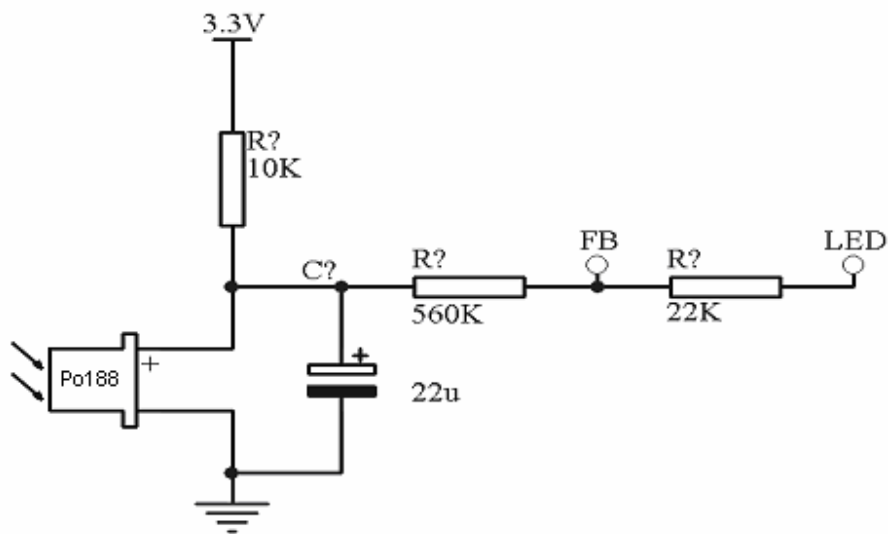
Fig.11 Two Typical Light Control Circuit of Po188

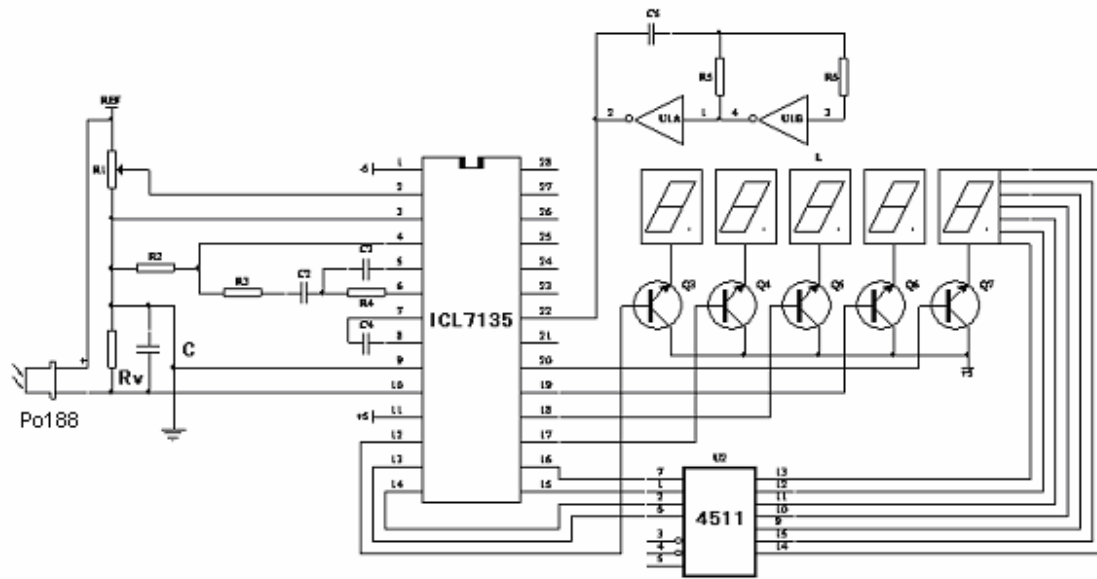Fig.12 Typical LED Luminance Control Circuit of LCD Display Back Light

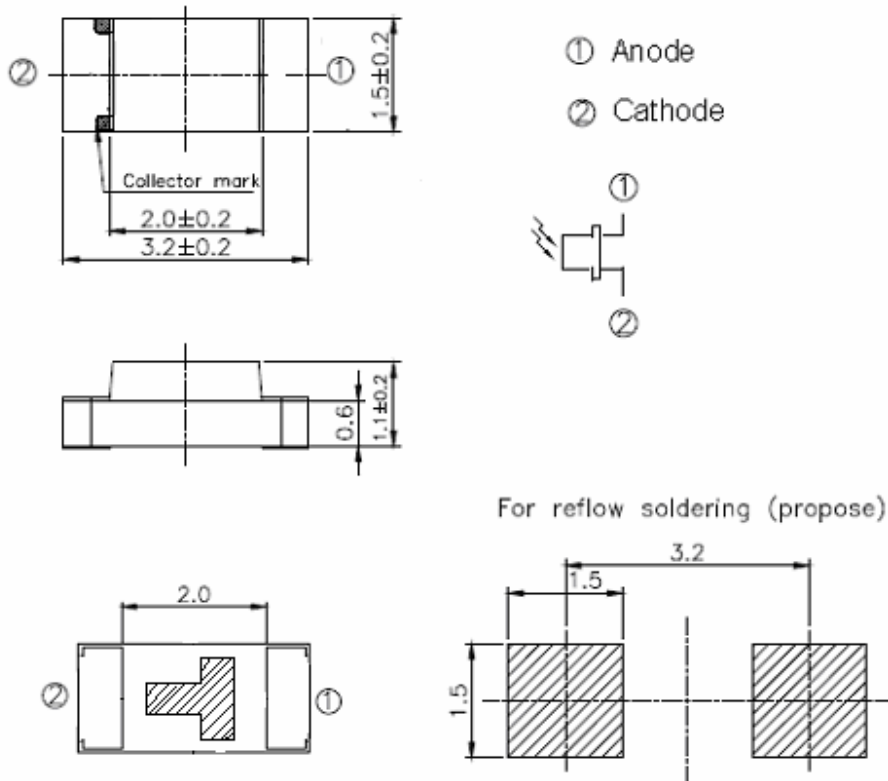Fig.13 LCD Digital Illuminometer Typical Circuit

■ Package Dimensions

① Anode

② Cathode

For reflow soldering (propose)

Fig.14 SMD 1206 Package Dimensions   unit: mm

■ SMT Reflow Soldering Instructions

Number of reflow process shall be less than 2 times and cooling process to normal temperature is required between first and second soldering process
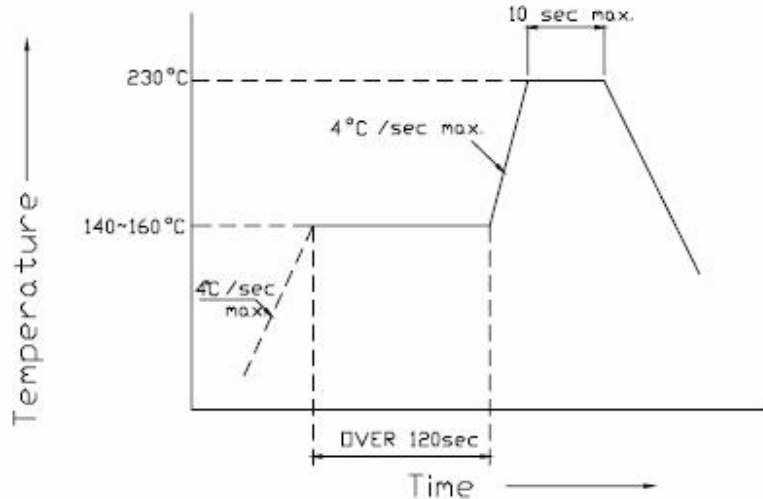

Fig.15 SMT 1206 Reflow Soldering Instructions
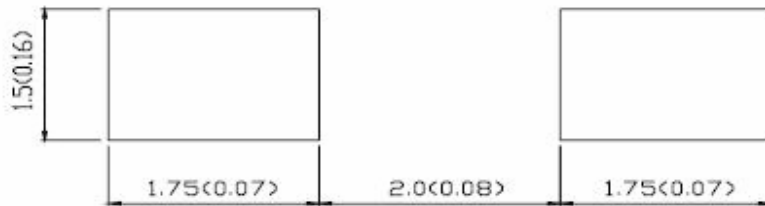
■ Recommended Soldering Pattern

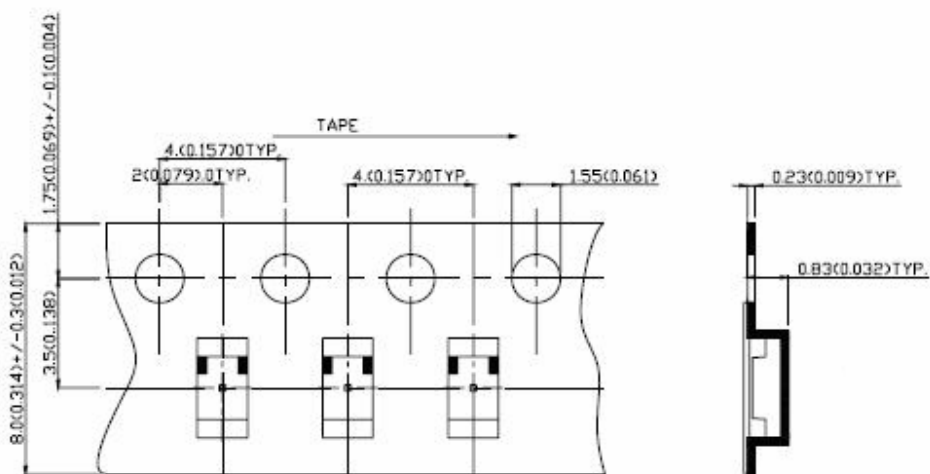Fig.16   SMD 1206 Recommended Soldering Pattern   Unit：mm

■ Tape Specifications

Fig.17 Tape Specifications   Unit：mm

■ Enclosure Material

Component	Material	Color	Characteristic	Environmental protection
Chip	Si	---	---	RoHS
Package Material	Common epoxy	Achromaticity	Light be effected by near infrared light	RoHS
Package Material	Nano-epoxy	Sky blue	Ultraviolet cut off, near infrared light relatively attenuated	RoHS

■ Attention

Don't use the sensor out of the domain of Product Standards;

The application circuit in Product Standards only used for example, please attention the periphery establishment to design circuit and adjust the parameter；

The sensor have CMOS IC in it, please avoid static electrical breakdown;

Please ensure soldering temperature in max rated range. Don't put outside force on the feet in soldering and just soldered. Don't solder repeatedly.

The product accord with European RoHS instruction

Photocurrent may be affected by damnification and pollution on the surface, protection against the tide;

SMD packaged as 3000 pcs per tray；

■ Declaration

The product has obtain patent right from Chinese Knowledge Property Right Bureau. The patent right number is ZL200520060170.5. Any unit or individual can copy, modify, and sale the CMOS chip sample in any form until obtain clear permission in affidavit. For market reason, all mutuality manufacturers must obtain the usufruct to use through justice channel and agreement. Any tortuous action must take in law sequence and amends economy loss for patentee.