

AT443-ALS-A3

DATA SHEET

REV. : 1.0

DATE : 20-Apr.-2005

Ambient Light Sensor, RoHS Compliant, Released for Lead

(Pb)-free Solder Process

Description

AT443-ALS-A3 ambient light sensor plays a key role in power savings strategies by controlling LCD display intensity and keypad backlighting of mobile devices and in industrial on/off-lighting operation. It is sensitive to visible light much like the human eye and has peak sensitivity at 580 nm. AT443-ALS-A3 has analog output and is packaged in a small surface mount package.



Features

- Product designed and qualified acc. AEC-Q101 for the automotive market
- High sensitivity, $I_{PCE} = 40 \mu A$ ($E_V = 100 \text{ lx}$)
- Adapted to human eye responsivity
- Wide angle of half sensitivity $\varphi = \pm 60^\circ$
- Surface mount package
- Dimensions: L 22 mm x W 3.28 mm x H 1.80 mm
- Lead (Pb)-free soldering released
- Lead (Pb)-free component in accordance with

Applications

Ambient light sensor for control of display backlight dimming in LCD displays and keypad backlighting of mobile devices and in industrial on/off-lighting operation.

- Automotive sensors
- Mobile phones
- Notebook computers
- PDA's
- Cameras
- Dashboards

Absolute Maximum Ratings

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

| Parameter | Test condition Symbol | Symbol | Value | Unit |
|-------------------------------------|---|------------|--------------|--------------------|
| Supply voltage | | V_{CC} | 0~7 | V |
| Supply current | | I_C | 20 | mA |
| Total power dissipation | $T_{amb} \leq 55\text{ }^{\circ}\text{C}$ | P_{tot} | 100 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | - 25 to + 85 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to + 100 | $^{\circ}\text{C}$ |
| Soldering temperature | Reflow Profile Figure 7 | T_{sd} | 260 | $^{\circ}\text{C}$ |
| Thermal resistance junction/ambient | | R_{thJA} | 450 | K/W |

Basic Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

| Parameter | Test condition | Symbol | Min | Typ | Max | Unit |
|--------------------------------|--|-----------------|----------|---------------|-----|---------------|
| Operating supply voltage | $I_C = 0.1\text{ mA}$ | V_{CC} | 2.2 | | 5.5 | V |
| Output dark current | $V_{CC} = 3\text{ V}, E = 0\text{ Lux}$ | I_{LEAK} | | | 0.2 | μA |
| Supply Current | $V_{CC} = 3\text{ V}, E_v = 1000\text{ Lux}$ $R_L = 1\text{ K}$ | I_{cc} | | 425 | | μA |
| output light current | $E_v = 20\text{ lx}$, CIE illuminant A, $V_{CE} = 3\text{ V}$ | I_{PCE} | 3.5 | 10 | 16 | μA |
| | $E_v = 100\text{ lx}$, CIE illuminant A, $V_{CE} = 3\text{ V}$ | I_{PCE} | | 40 | | μA |
| Angle of half sensitivity | | φ | ± 60 | | | deg |
| Wavelength of peak sensitivity | | λ_p | | 580 | | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | | 360 to 970 | | nm |

Tamb = 25 °C, unless otherwise specified

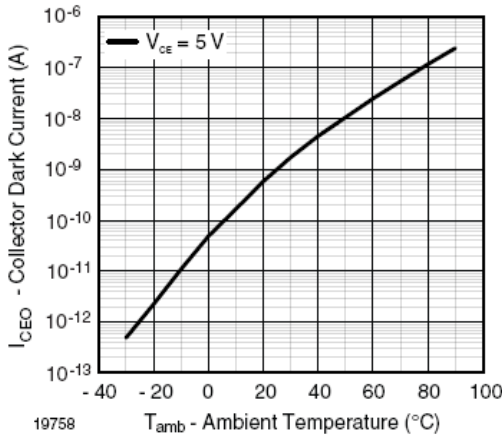


Figure 1. Collector Dark Current vs. Ambient Temperature

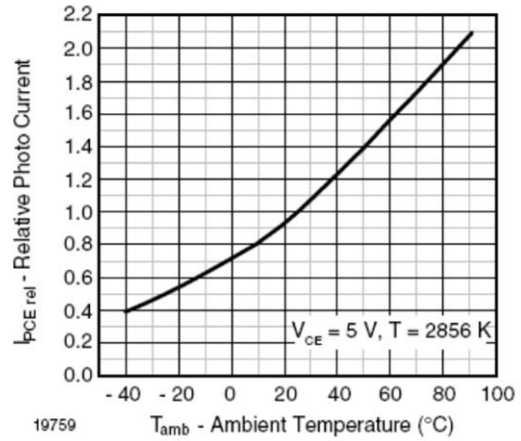


Figure 2. Relative Photo Current vs. Ambient Temperature

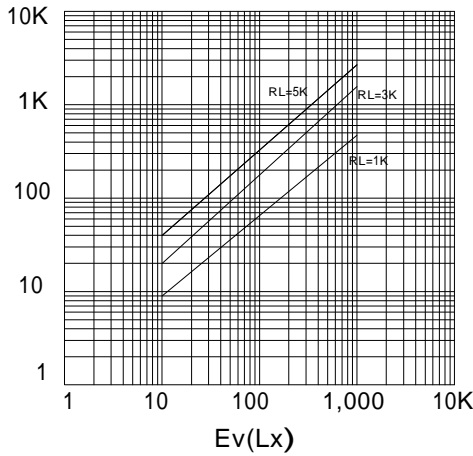


Figure3: Output Voltage Vs illuminance

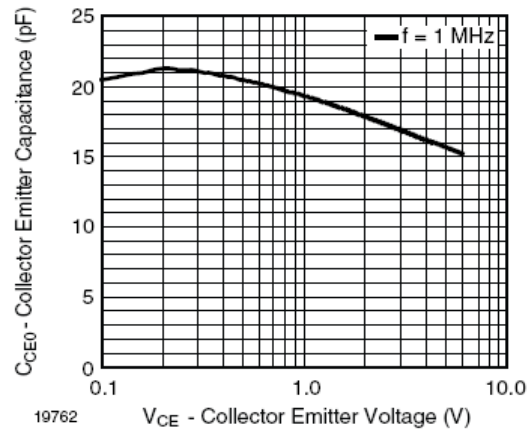


Figure 4. Collector Emitter Capacitance vs. Collector Emitter Voltage

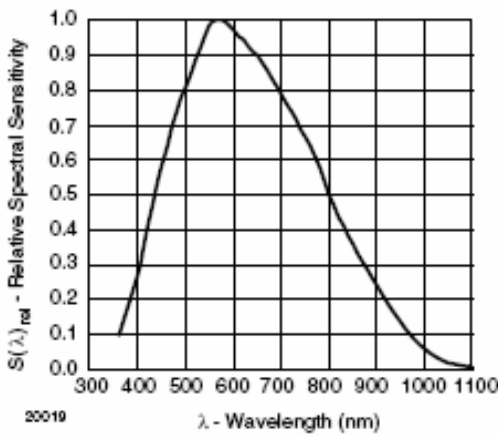


Figure 5. Relative Spectral Sensitivity vs. Wavelength

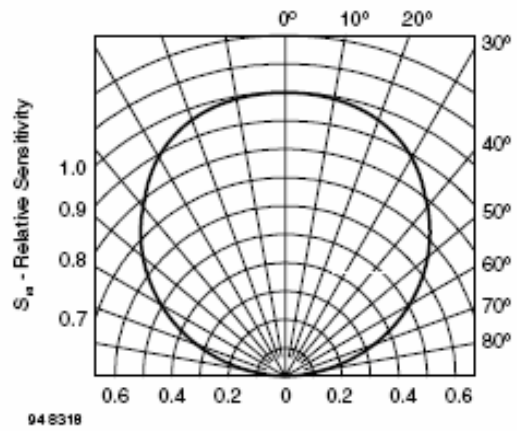


Figure 6. Relative Radiant Sensitivity vs. Angular Displacement

Drypack

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

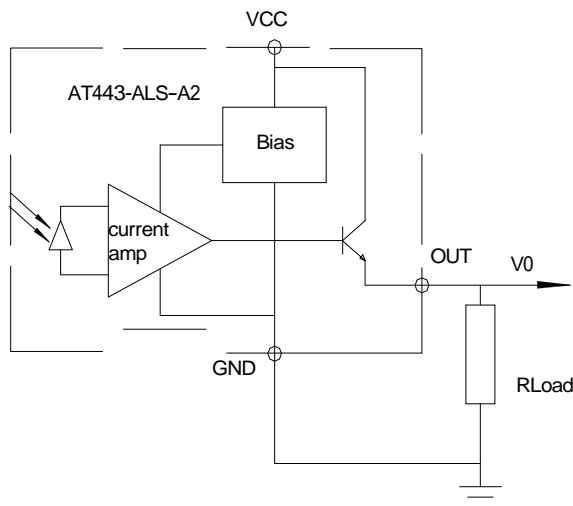
Floor Life

Floor life (time between soldering and removing from MBB) must not exceed the time indicated in J-STD-020 AT443-ALS-A3 is released for: Moisture Sensitivity Level 4, according to JEDEC, J-STD-020
 Floor Life: 72 h
 Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, $RH < 60\%$

Drying

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or Label. Devices taped on reel dry using recommended conditions 192 h at $40\text{ }^{\circ}\text{C}$ (+ $5\text{ }^{\circ}\text{C}$), $RH < 5\%$.

Application circuit



*output Voltage Vs light inputs

$V_0 = I_{input} \times R_{load}$ output Voltage V_0 is increased light input is increased

*Output Voltage range

$$0 \leq V_0 \leq V_{dc} - 1.3v$$

Reflow Solder Profiles

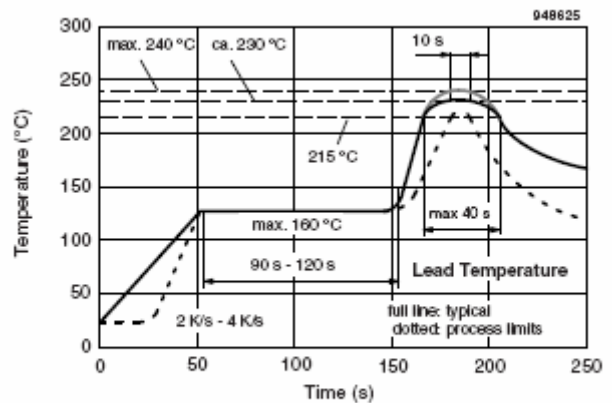


Figure 7. Lead Tin (SnPb) Reflow Solder Profile

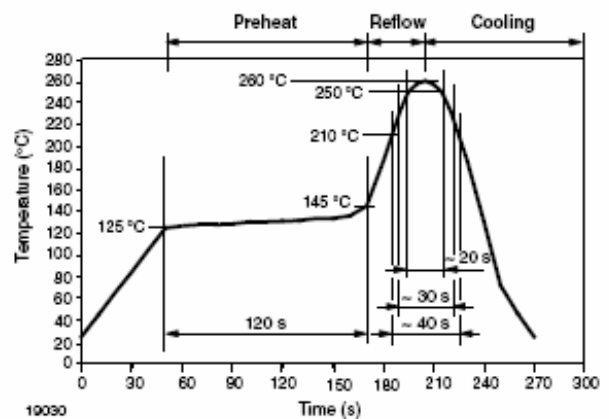
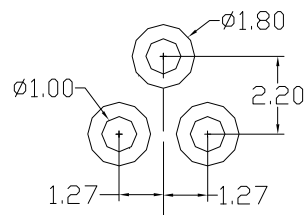
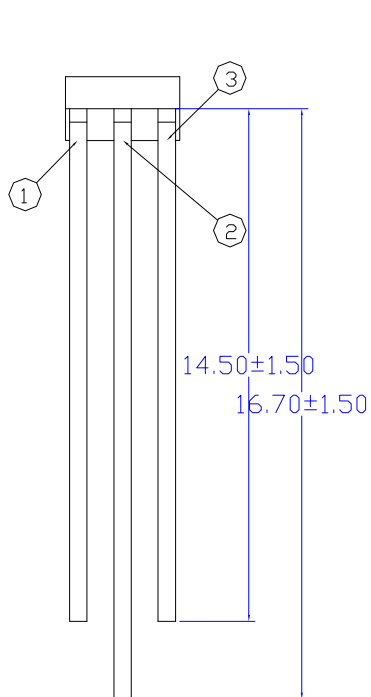
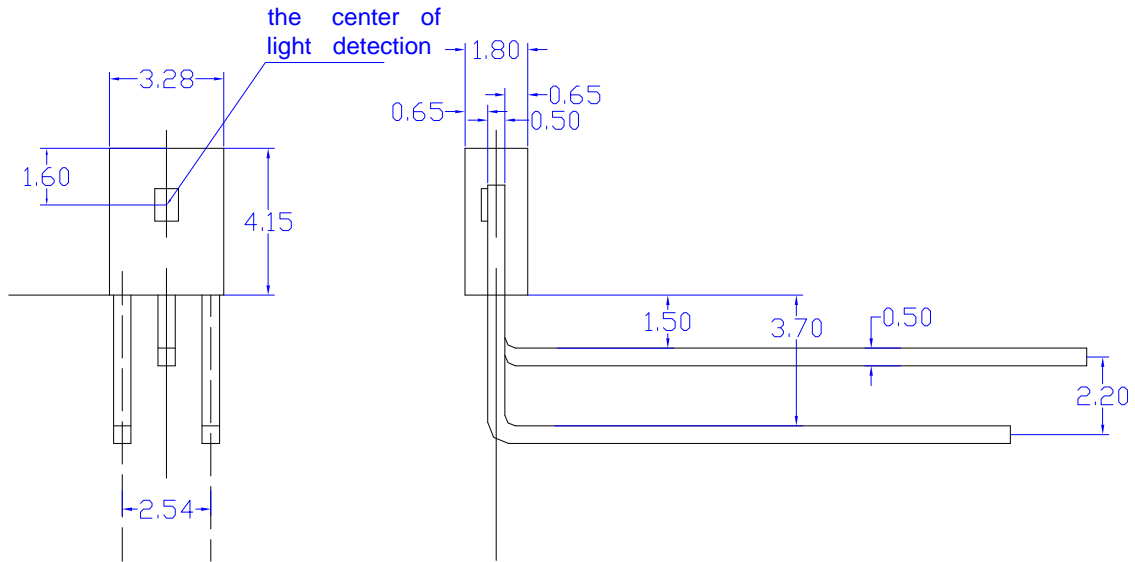


Figure 8. Tin (Sn) Reflow Solder Profile (Pb-free)

Package Dimensions in millimeters



the potten exomple from
the view point of PCB

1.Unspecified tollerence shall be ± 0.2

2.Dimensions in parenthesis are shown for reference

3.pin name

- ① Vcc
- ② GND
- ③ IO