

AT405-ALS-A4

DATA SHEET

REV. : 1.0

DATE : 20-Apr.-2005

Ambient Light Sensor, RoHS Compliant, Released for Lead (Pb)-free Solder Process

Description

AT405-ALS-A4 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. AT405-ALS-A4 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, $I_{PCE} = 50 \mu A$ ($E_V = 100 \text{ lx}$)
- Adapted to human eye responsivity
- Wide angle of half sensitivity $\varphi = \pm 60^\circ$
- Surface mount package
- Lead (Pb)-free soldering released
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



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
Collector light current	$E_v = 20\text{ lx}$, CIE illuminant A, $V_{CE} = 5\text{ V}$	I_{PCE}	3.5	10	16	μA
	$E_v = 100\text{ lx}$, CIE illuminant A, $V_{CE} = 5\text{ V}$	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

Typical Characteristics

T_{amb} = 25 °C, unless otherwise specified

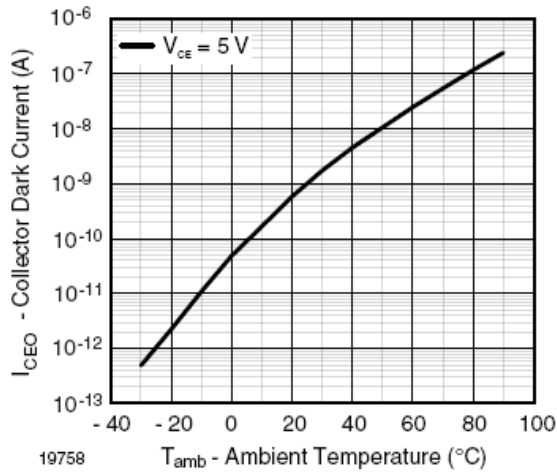


Figure 1. Collector Dark Current vs. Ambient Temperature

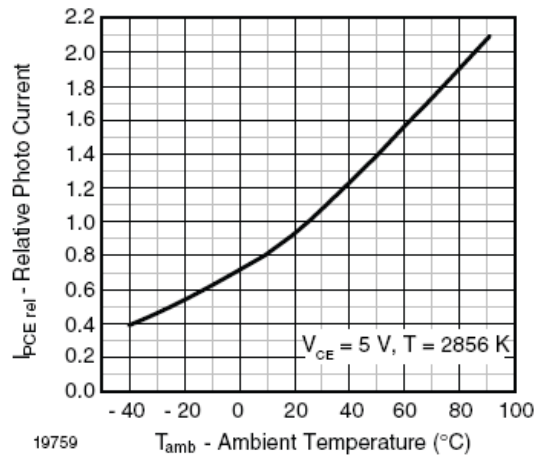


Figure 2. Relative Photo Current vs. Ambient Temperature

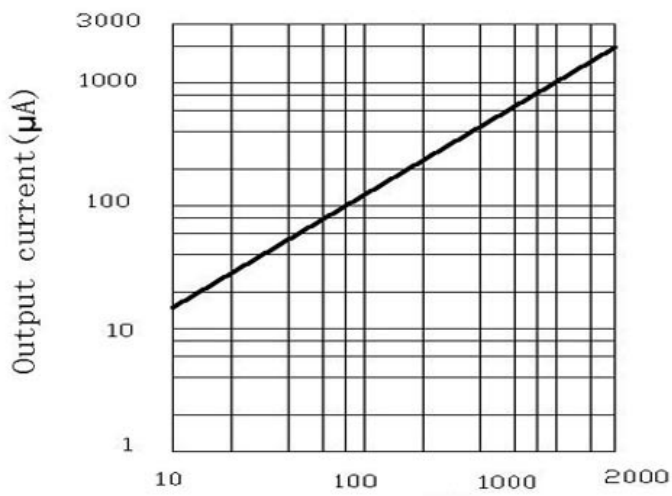


Figure 3 Illuminance (lux)

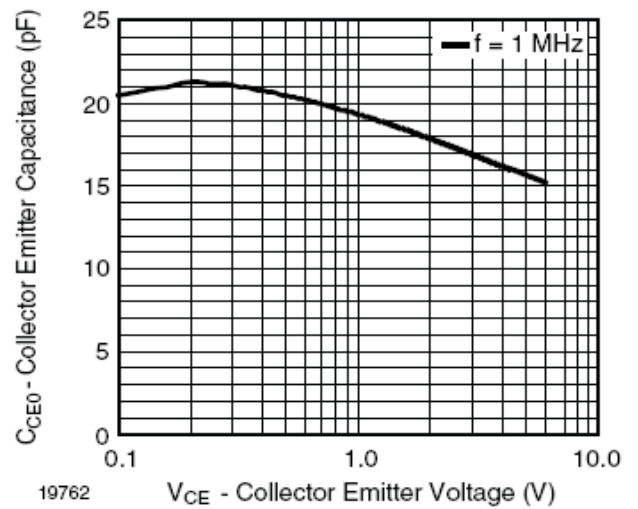


Figure 4. Collector Emitter Capacitance vs. Collector Emitter Voltage

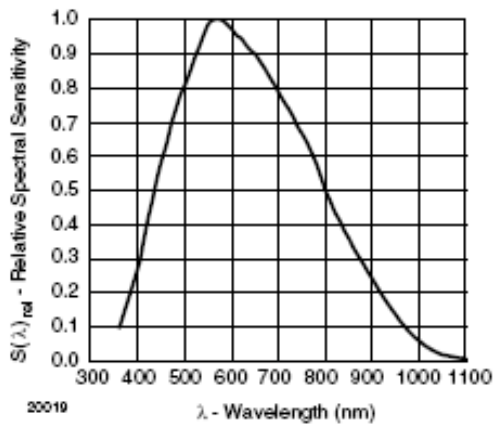


Figure 5. Relative Spectral Sensitivity vs. Wavelength

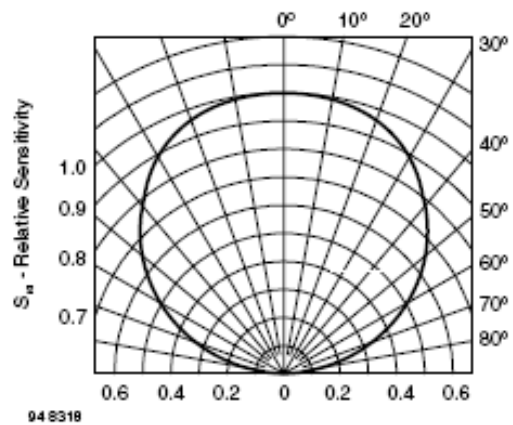


Figure 6. Relative Radiant Sensitivity vs. Angular Displacement

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 AT442-AS-A1 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 $40\text{ }^{\circ}\text{C}$ (+ $5\text{ }^{\circ}\text{C}$), $RH < 5\%$.

Reflow Solder Profiles

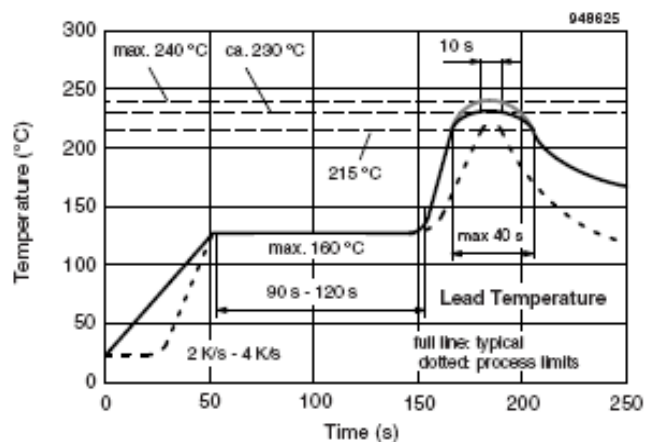


Figure 8. Lead Tin (SnPb) Reflow Solder Profile

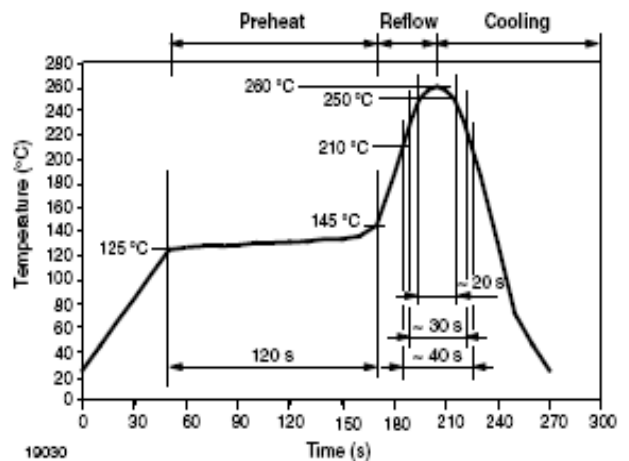
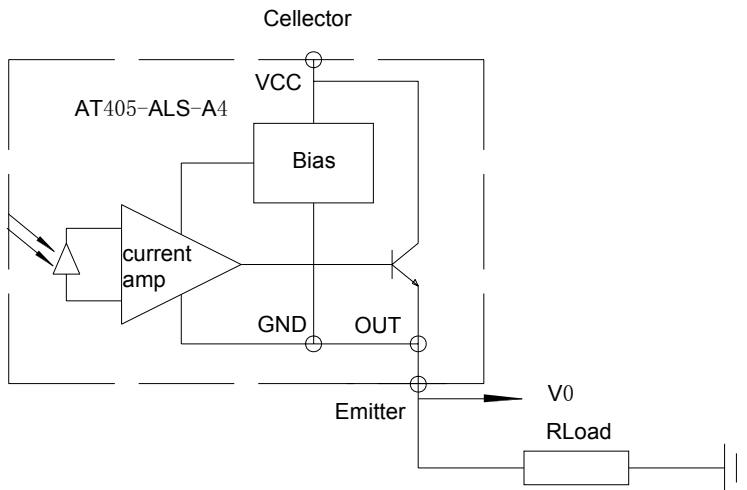


Figure 7. Tin (Sn) Reflow Solder Profile (Pb-free)

Application circuit



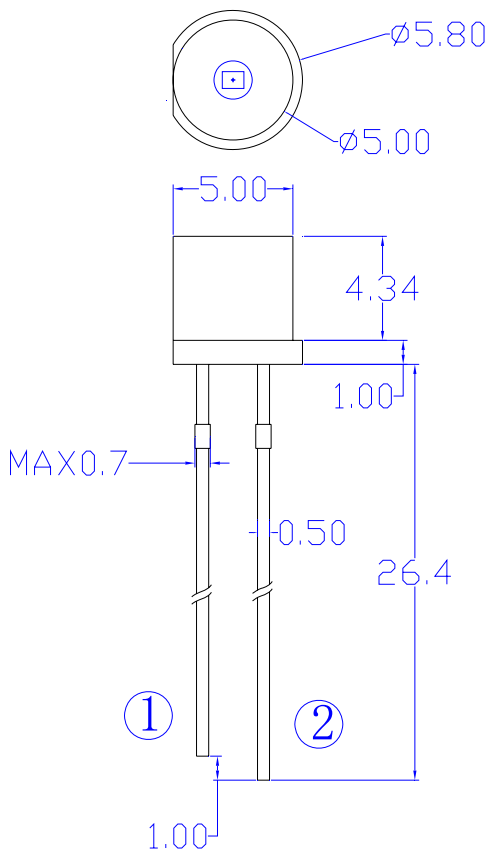
***output Voltage Vs light inputs**

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

***Output Voltage range**

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

Package Dimensions in millimeters



- 1. Unspecified tolerance shall be ± 0.2
- 2. Dimensions in parenthesis are shown for reference
- 3. pin name

- ① $V_{out}(emitter)$
- ② $V_{cc}(Collector)$