

Ambient Light Sensor IC Series

Digital 16bit Serial Output Type Ambient Light Sensor IC


BH1750FVI

No.11046EDT01

●Descriptions

BH1750FVI is an digital Ambient Light Sensor IC for I²C bus interface. This IC is the most suitable to obtain the ambient light data for adjusting LCD and Keypad backlight power of Mobile phone. It is possible to detect wide range at High resolution. (1 - 65535 lx).

●Features

- 1) I²C bus Interface (f / s Mode Support)
- 2) Spectral responsibility is approximately human eye response
- 3) Illuminance to Digital Converter
- 4) Wide range and High resolution. (1 - 65535 lx)
- 5) Low Current by power down function
- 6) 50Hz / 60Hz Light noise reject-function
- 7) 1.8V Logic input interface
- 8) No need any external parts
- 9) Light source dependency is little. (ex. Incandescent Lamp. Fluorescent Lamp. Halogen Lamp. White LED. Sun Light)
- 10) It is possible to select 2 type of I²C slave-address.
- 11) Adjustable measurement result for influence of optical window
(It is possible to detect min. 0.11 lx, max. 100000 lx by using this function.)
- 12) Small measurement variation (+/- 20%)
- 13) The influence of infrared is very small.

●Applications

Mobile phone, LCD TV, NOTE PC, Portable game machine, Digital camera, Digital video camera, PDA, LCD display

●Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Units |
|-----------------------|------------------|---------|-------|
| Supply Voltage | Vmax | 4.5 | V |
| Operating Temperature | Topr | -40~85 | °C |
| Storage Temperature | Tstg | -40~100 | °C |
| SDA Sink Current | I _{max} | 7 | mA |
| Power Dissipation | Pd | 260* | mW |

* 70mm × 70mm × 1.6mm glass epoxy board. Derating is done at 3.47mW/°C for operating above Ta=25°C.

●Operating Conditions

| Parameter | Symbol | Ratings | | | Units |
|------------------------------------|------------------|---------|------|------|-------|
| | | Min. | Typ. | Max. | |
| Vcc Voltage | Vcc | 2.4 | 3.0 | 3.6 | V |
| I ² C Reference Voltage | V _{DVI} | 1.65 | - | Vcc | V |

●Electrical Characteristics (Vcc = 3.0V, DVI = 3.0V, Ta = 25°C, unless otherwise noted)

| Parameter | Symbol | Limits | | | Units | Conditions |
|---|--------|-----------|------|------------|-------|--|
| | | Min. | Typ. | Max. | | |
| Supply Current | Icc1 | — | 120 | 190 | μA | Ev = 100 lx ※ ¹ |
| Powerdown Current | Icc2 | — | 0.01 | 1.0 | μA | No input Light |
| Peak Wave Length | λp | — | 560 | — | nm | |
| Measurement Accuracy | S/A | 0.96 | 1.2 | 1.44 | times | Sensor out / Actual lx EV = 1000 lx ※ ¹ , ※ ² |
| Dark (0 lx) Sensor out | S0 | 0 | 0 | 3 | count | H-Resolution Mode ※ ³ |
| H-Resolution Mode Resolution | rHR | — | 1 | — | lx | |
| L-Resolution Mode Resolution | rLR | — | 4 | — | lx | |
| H-Resolution Mode Measurement Time | tHR | — | 120 | 180 | ms | |
| L-Resolution Mode Measurement Time | tLR | — | 16 | 24 | ms | |
| Incandescent / Fluorescent Sensor out ratio | rIF | — | 1 | — | times | EV = 1000 lx |
| ADDR Input 'H' Voltage | VAH | 0.7 * VCC | — | — | V | |
| ADDR Input 'L' Voltage | VAL | — | — | 0.3 * VCC | V | |
| DVI Input 'L' Voltage | VDVL | — | — | 0.4 | V | |
| SCL, SDA Input 'H' Voltage 1 | VIH1 | 0.7 * DVI | — | — | V | DVI ≥ 1.8V |
| SCL, SDA Input 'H' Voltage 2 | VIH2 | 1.26 | — | — | V | 1.65V ≤ DVI < 1.8V |
| SCL, SDA Input 'L' Voltage 1 | VIL1 | — | — | 0.3 * DVI | V | DVI ≥ 1.8V |
| SCL, SDA Input 'L' Voltage 2 | VIL2 | — | — | DVI - 1.26 | V | 1.65V ≤ DVI < 1.8V |
| SCL, SDA, ADDR Input 'H' Current | IiH | — | — | 10 | μA | |
| SCL, SDA, ADDR Input 'L' Current | IiL | — | — | 10 | μA | |
| I ² C SCL Clock Frequency | fSCL | — | — | 400 | kHz | |
| I ² C Bus Free Time | tBUF | 1.3 | — | — | μs | |
| I ² C Hold Time (repeated) START Condition | tHDSTA | 0.6 | — | — | μs | |
| I ² C Set up time for a Repeated START Condition | tsUSTA | 0.6 | — | — | μs | |
| I ² C Set up time for a Repeated STOP Condition | tsUSTD | 0.6 | — | — | μs | |
| I ² C Data Hold Time | tHDDAT | 0 | — | 0.9 | μs | |
| I ² C Data Setup Time | tsUDAT | 100 | — | — | ns | |
| I ² C 'L' Period of the SCL Clock | tLOW | 1.3 | — | — | μs | |
| I ² C 'H' Period of the SCL Clock | tHIGH | 0.6 | — | — | μs | |
| I ² C SDA Output 'L' Voltage | VOL | 0 | — | 0.4 | V | IOL = 3 mA |

※¹ White LED is used as optical source.

※² Measurement Accuracy typical value is possible to change '1' by "Measurement result adjustment function".

※³ Use H-resolution mode or H-resolution mode2 if dark data (less than 10 lx) is need.