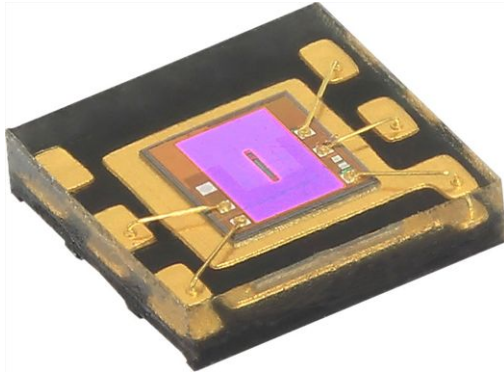


Low Power, High Sensitivity, I²C Ambient Light Sensor



DESCRIPTION

VEML6035 is a 16-bit low power, high sensitivity CMOS ambient light sensor operated via a simple I²C command. The sensor offers an active interruption feature that is triggered outside of the threshold window settings eliminating loading on the host. Active average power consumption is around 300 μ W.

VEML6035 incorporates a photodiode, amplifiers, and analog / digital circuits in a single chip. Vishay's patented Filtron™ technology, a wafer level optical filter, provides the best spectral sensitivity to match human eye responses. The sensor has excellent temperature compensation to maintain output stability under changing temperature and its refresh rate setting does not need an external RC low pass filter. There is a programmable shutdown mode which reduces current consumption to 0.5 μ A. Operating voltage ranges from 1.7 V to 3.6 V.

FEATURES

- Package type: surface-mount
- Dimensions (L x W x H in mm): 2.0 x 2.0 x 0.4
- Integrated modules: ambient light sensor (ALS)
- Supply voltage range V_{DD}: 1.7 V to 3.6 V
- Communication via I²C interface
- I²C bus H-level range: 1.7 V to 3.6 V
- Floor life: 168 h, MSL 3, according to J-STD-020
- Low stand by current consumption: typ. 0.5 μ A
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Ambient light sensor for mobile devices (e.g. smart phones, touch phones, PDA, GPS) for backlight dimming even under tinted glass
- Ambient light sensor for industrial on- / off-lighting operation
- Optical switch for consumer, computing, and industrial devices and displays

AMBIENT LIGHT FUNCTION

- ALS output tolerance \leq 10 %
- High ALS sensitivity with minimum detectable intensity of 0.0004 lux/bit supports low transmittance lens design
- 100 Hz and 120 Hz flicker noise rejection
- Excellent temperature compensation
- High dynamic detection resolution

INTERRUPT FEATURE (INT) SUPPORT

Programmable interrupt function with upper and lower thresholds. Adjustable persistence to prevent false triggers.

PRODUCT SUMMARY						
PART NUMBER	OPERATING VOLTAGE RANGE (V)	I ² C BUS VOLTAGE RANGE (V)	AMBIENT LIGHT RANGE (lx)	AMBIENT LIGHT RESOLUTION (lx)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VEML6035	1.7 to 3.6	1.7 to 3.6	6710	0.0004	16 bit, I ² C	- / 0.0004

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
VEML6035	Tape and reel	MOQ: 2500	2.0 mm x 2.0 mm x 0.4 mm

Note

⁽¹⁾ MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Supply voltage		V_{DD}	0	4	V
Operation temperature range		T_{amb}	-25	+85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-25	+85	$^{\circ}\text{C}$
Total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	P_{tot}	-	50	mW
Junction temperature		T_j	-	85	$^{\circ}\text{C}$

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		V_{DD}	1.7	1.8	3.6	V
Shut down current ⁽²⁾	$V_{DD} = 1.8\text{ V}$	I_{sd}	-	0.5	-	μA
Operation mode current ⁽¹⁾	$V_{DD} = 1.8\text{ V}$, CHANNEL_EN = 0 (ALS only)	I_{DD}	-	170	-	μA
	$V_{DD} = 1.8\text{ V}$, CHANNEL_EN = 1 (ALS and WHITE)	I_{DD}	-	225	-	μA
I ² C clock rate range		f_{SCL}	10	-	400	kHz
I ² C bus input H-level range	$V_{DD} = 1.8\text{ V}$	V_{ih}	1.2	-	V_{DD}	V
I ² C bus input L-level range	$V_{DD} = 1.8\text{ V}$	V_{il}	0	-	0.4	V
Output low voltage SDA	3 mA sink current	V_{ol}	0	-	0.4	V
Digital resolution (LSB count)	With GAIN = 1, DG = 1, SENS = 0		-	0.0004	-	lx/step
Detectable minimum illuminance ⁽³⁾	With GAIN = 1, DG = 1, SENS = 0	$E_{V\ min.}$	-	0.004	-	lx
Detectable maximum illuminance	With GAIN = 0, DG = 0, SENS = 1	$E_{V\ max.}$	-	6710	-	lx
Dark offset ⁽⁴⁾	With GAIN = 1, DG = 1, SENS = 0		-	-	5	step

Notes

- (1) Light source: white LED
- (2) Light conditions: dark
- (3) The part has a typical zero offset of 10 counts at the set max. resolution of 0.0004lx/step, so the first valid measurement will be at an illuminance of 0.004lx (typ.)
- (4) The dark offset can be above or below 0

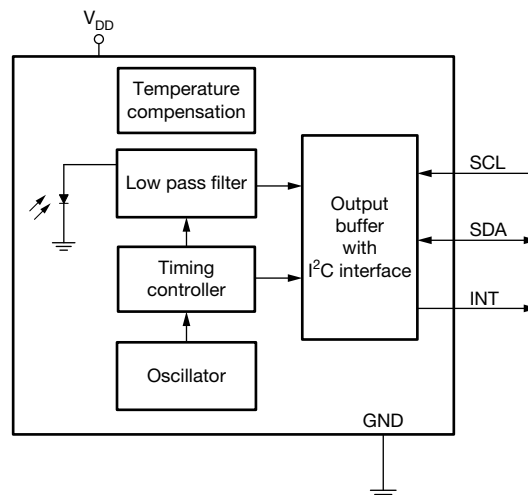
CIRCUIT BLOCK DIAGRAM


Fig. 1 - Block Diagram