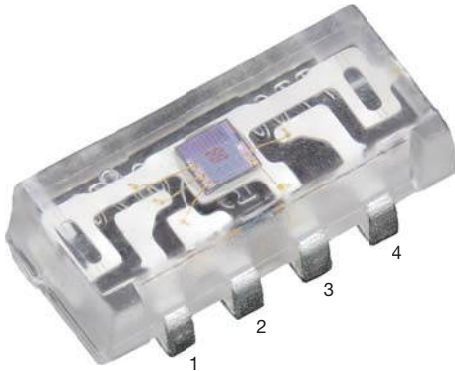


High Accuracy Ambient Light Sensor with I²C Interface


Pinning

- 1: SCL
- 2: V_{DD}
- 3: GND
- 4: SDA

DESCRIPTION

VEML7700 is a high accuracy ambient light digital 16-bit resolution sensor in a miniature transparent 6.8 mm x 2.35 mm x 3.0 mm package. It includes a high sensitive photo diode, a low noise amplifier, a 16-bit A/D converter and supports an easy to use I²C bus communication interface.

The ambient light result is as digital value available.

FEATURES

- Package type: surface mount
- Package form: side view
- Dimensions (L x W x H in mm): 6.8 x 2.35 x 3.0
- Integrated modules: ambient light sensor (ALS)
- Supply voltage range V_{DD}: 2.5 V to 3.6 V
- Communication via I²C interface
- Floor life: 72 h, MSL 4, according to J-STD-020
- Low shut down current consumption: typ. 0.5 μA
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


AMBIENT LIGHT FUNCTION

- Filtron™ technology adaption: close to real human eye response
- O-Trim™ technology adoption: ALS output tolerance ≤ 10 %
- 16-bit dynamic range for ambient light detection from 0 lx to about 167 klx with resolution down to 0.005 lx/ct, supports low transmittance (dark) lens design
- 100 Hz and 120 Hz flicker noise rejection
- Excellent temperature compensation
- High dynamic detection resolution
- Software shutdown mode control

APPLICATIONS

- Ambient light sensor for backlight dimming of e.g. TV displays, smart phones, touch phones, PDA, GPS
- Ambient light sensor for industrial on- / off-lighting operation
- Optical switch for consumer, computing, and industrial devices and displays

PRODUCT SUMMARY							
PART NUMBER	OPERATING RANGE (mm)	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
VEML7700	n/a	2.5 to 3.6	1.7 to 3.6	0 to 167 000	0.005	16 bit, I ² C	- / 0.005

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
VEML7700-TR	Tape and reel	MOQ: 2300 (MOQ is one reel)	Side view
VEML7700-TT	Tape and reel	MOQ: 2200 (MOQ is one reel)	Top view

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	-	100	$^{\circ}\text{C}$

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		V_{DD}	2.5	3.3	3.6	V
Shut down current (rem_2)	V_{DD} is 3.3 V	I_{sd}	-	0.5	-	μA
Operation mode current (rem_2)	V_{DD} is 3.3 V, PSM = 11, refresh time 4100 ms	I_{DD}	-	2	-	μA
	V_{DD} is 3.3 V, PSM = 00, refresh time 600 ms	I_{DD}	-	8	-	μA
	V_{DD} is 3.3 V, PSM_EN = 0, refresh time 100 ms	I_{DD}	-	45	-	μA
I ² C clock rate range		f_{SCL}	10	-	400	kHz
I ² C bus input H-level range	V_{DD} is 3.3 V	V_{ih}	1.3	-	3.6	V
I ² C bus input L-level range	V_{DD} is 3.3 V	V_{il}	-	-	0.4	V
Digital current out (low, current sink)		I_{ol}	3	-	-	mA
Digital resolution (LSB count)	with ALS_SM = "01"		-	0.005	-	lx/step
Detectable minimum illuminance	with ALS_SM = "01"	$E_{V\ min.}$	-	0.01	-	lx
Detectable maximum illuminance	with ALS_SM = "10"	$E_{V\ max.}$	-	167 000	-	lx
Dark offset (rem_2)	with ALS_SM = "01"		-	3	-	step

Note

- rem_1: light source: white LED
- rem_2: light conditions: dark

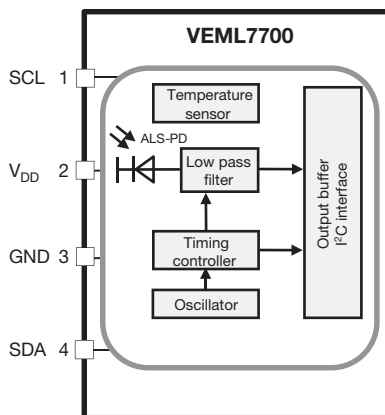
CIRCUIT BLOCK DIAGRAM


Fig. 1 - Block Diagram