

ML8511A

UV Sensor with Voltage Output

GENERAL DESCRIPTION

The ML8511A is a UV sensor, which is suitable for acquiring UV intensity indoors or outdoors. The ML8511A is equipped with an internal amplifier, which converts photo-current to voltage depending on the UV intensity. This unique feature offers an easy interface to external circuits such as ADC. In the power down mode, typical standby current is 0.1 μ A, thus enabling a longer battery life.

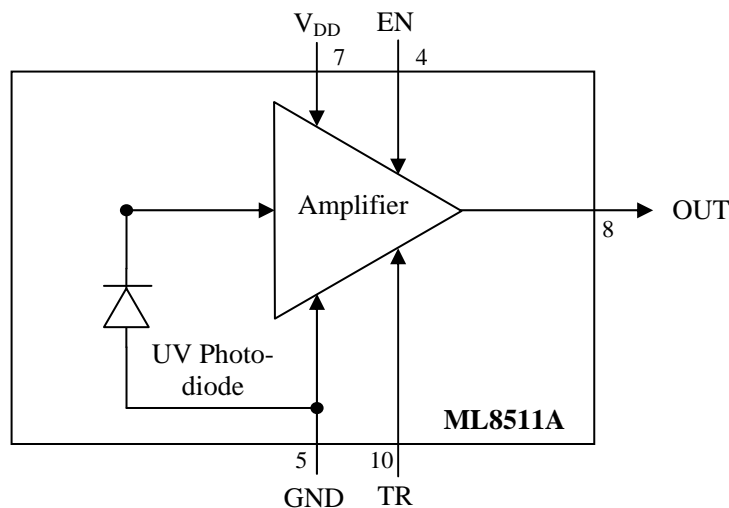
FEATURES

- Photodiode sensitive to UV-A and UV-B
- Embedded operational amplifier
- Analog voltage output
- Low supply current (300 μ A typ.) and low standby current (0.1 μ A typ.)
- Small and thin surface mount package (4.0mm x 3.7mm x 0.73mm, 12-pin ceramic QFN)

APPLICATIONS

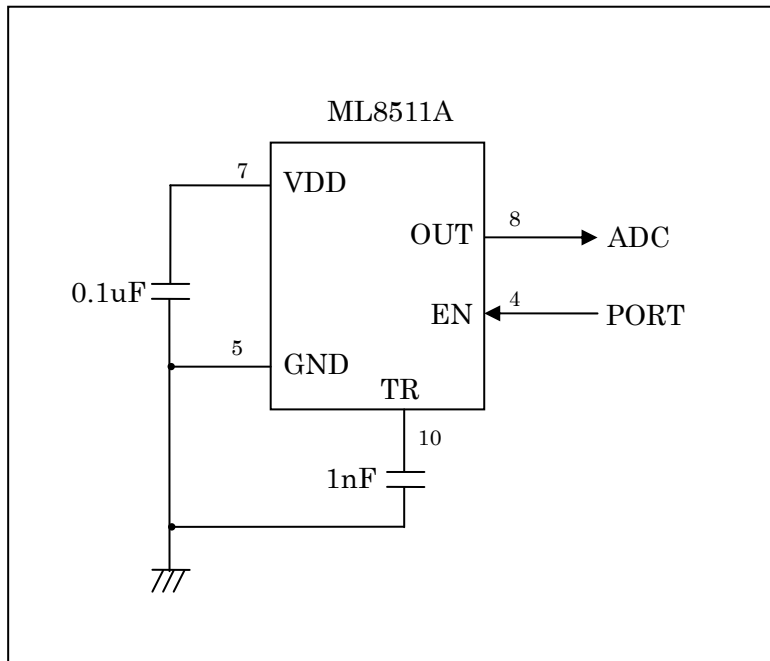
- Smart phone, Smart watch, Wearable healthcare device, Weather station, Bicycle navigation, Accessory

BLOCK DIAGRAM



PIN CONFIGURATIONS

Pin	Symbol	I/O	Function
7	VDD	PW	Supply voltage. Decouple this pin to ground with 0.1 μ F capacitor.
5	GND	PW	Ground
4	EN	I	Active high enable pin. (High: Active mode, Low: Standby mode)
8	OUT	O	Output (Low in power down or standby mode)
10	TR	I/O	Internal reference voltage. Decouple this pin to ground with 1 nF capacitor.
1,2,3,6,9,11,12	NC	-	No Connection. Do not connect.

EXAMPLE OF CONNECTING DIAGRAM

* Load resistance of OUT port is recommended more than 100 k Ω .

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Rating	unit
Supply Voltage	V_{DD}	$T_a=25\text{ }^\circ\text{C}$	-0.3 to +4.6	V
Input Voltage	V_I	$T_a=25\text{ }^\circ\text{C}$	-0.3 to +4.6	V
Output Short Current	I_{OS}	$T_a=25\text{ }^\circ\text{C}$	5	mA
Power Dissipation	P_D	$T_a=25\text{ }^\circ\text{C}$	30	mW
Storage Temperature	T_{stg}	-	-30 to +85	$^\circ\text{C}$

RECOMMENDED OPERATION CONDITIONS

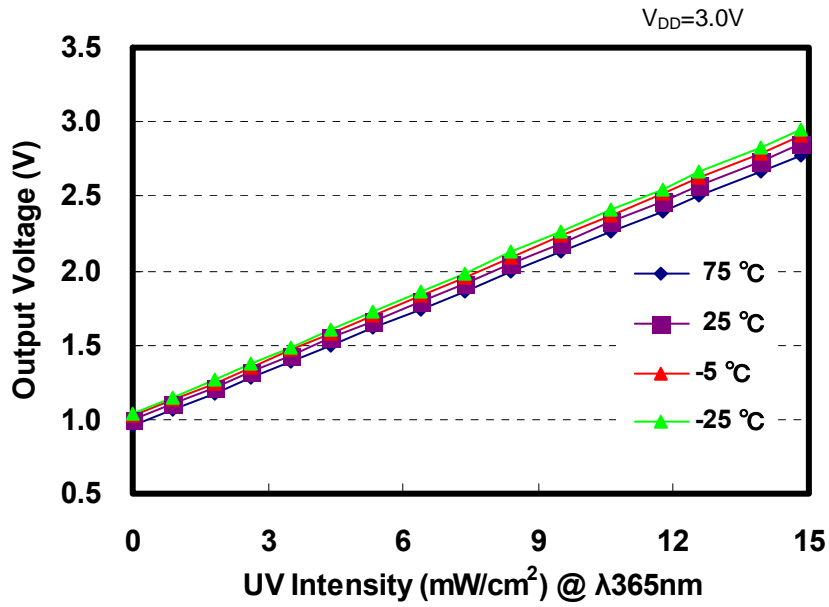
Parameter	Symbol	Min.	Typ.	Max.	unit
Operating Voltage	V_{DD}	2.7	3.3	3.6	V
Operating Temperature	T_a	-20	-	70	$^\circ\text{C}$

ELECTRO-OPTICAL CHARACTERISTICS(V_{DD}=+2.7V to +3.6V, T_a= -20 $^\circ\text{C}$ to +70 $^\circ\text{C}$)

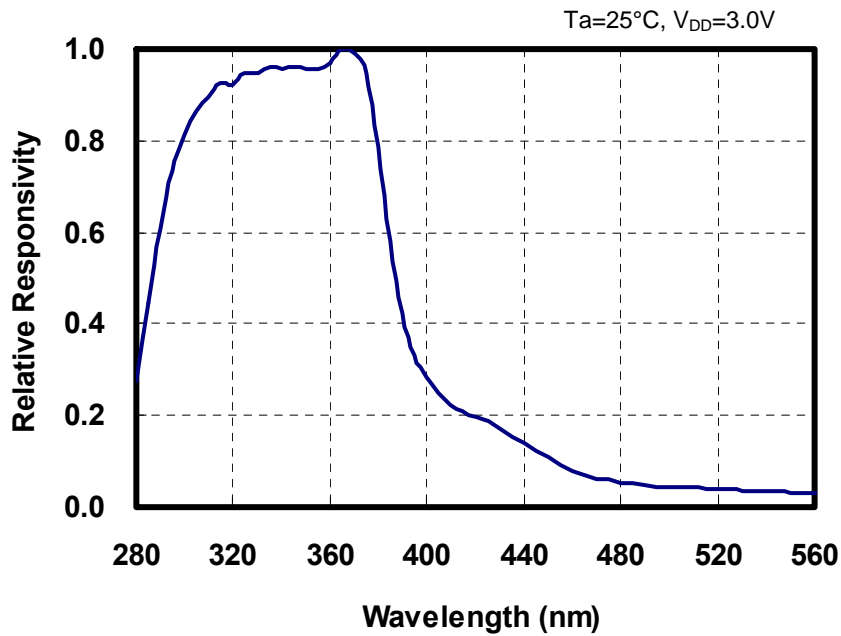
Parameter	Symbol	Condition	Min.	Typ.	Max.	unit
Supply Current (active mode)	I_{DDA}	$V_{EN}=V_{DD}$	-	300	500	μA
Supply Current (standby mode)	I_{DDs}	$V_{EN}=0$	-	0.1	1	μA
Input Voltage (High level)	V_{IH}	-	$V_{DD} \times 0.8$	-	$V_{DD} + 0.3$	V
Input Voltage (Low level)	V_{IL}	-	-0.2	-	0.72	V
High level input current	I_{IH}	$V_{EN}=V_{DD}$	-	-	1	μA
Low level input current	I_{IL}	$V_{EN}=0$	-1	-	-	μA
Wavelength of maximum sensitivity	λ_p	$T_a=25\text{ }^\circ\text{C}$	-	365	-	nm
Output Setup Time	T_{SU}	$V_{EN}=V_{DD}$	-	-	1	ms
Output Voltage (Shading) *	V_{REF}	$T_a=25\text{ }^\circ\text{C}$, $V_{EN}=V_{DD}$	0.95	1.0	1.05	V
Output Voltage (10mW/cm ² at λ_p) *	V_O	$T_a=25\text{ }^\circ\text{C}$, $V_{EN}=V_{DD}$	2.08	2.2	2.32	V

* Load resistance of OUT port is recommended more than 100 k Ω .

OUTPUT VOLTAGE- UV INTENSITY CHARACTERISTICS



SPECTRAL RESPONSIBILITY CHARACTERISTICS

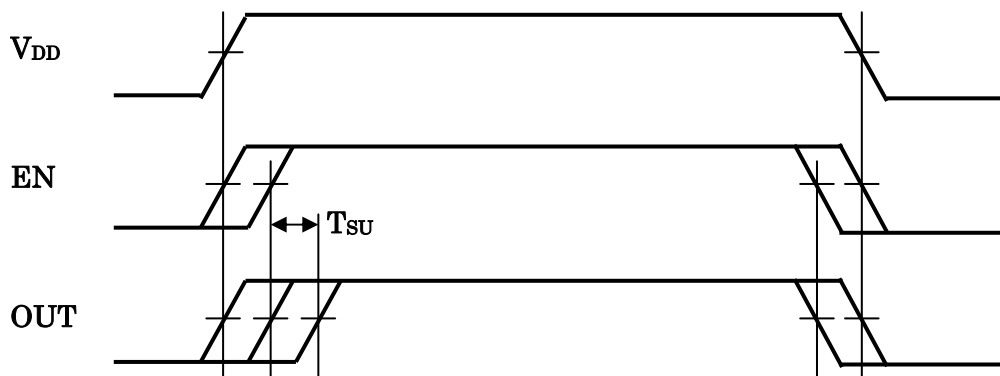


TIMING CHART

Supply voltage and EN signal state should take one of the following procedures:

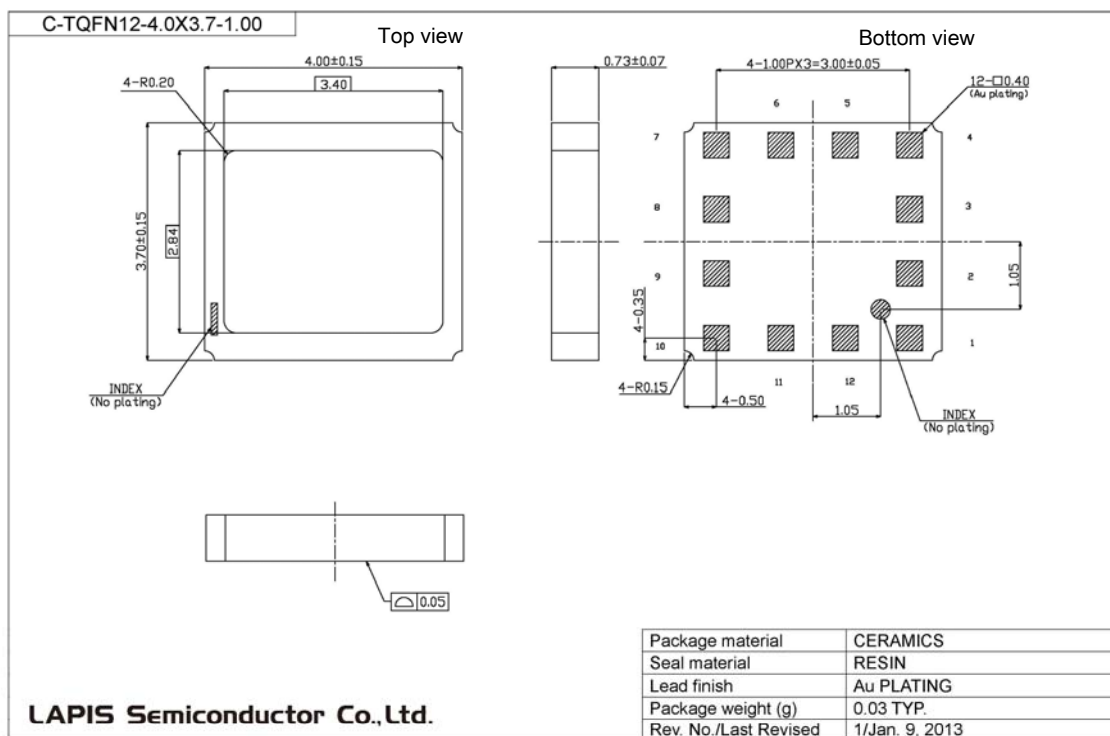
1. EN should be HIGH or LOW at the same time when V_{DD} is applied.
2. EN should be HIGH or LOW while V_{DD} is applied.

Output should be read after output voltage level becomes stable. Maximum time required until stable output voltage reaches is 1 millisecond after EN goes HIGH.



PACKAGE DIMENSIONS

(Unit: mm)



Prohibitions

Do not touch the surface of the resin that cover the bonding wires and sensor chip at the time of the sensor pick-up and handling. Touching the resin surface may cause bonding wire damage or breakage. As the result, fatal damage of sensor or abnormal sensor operation may be caused.

Cautions

Specifications are defined without considering the UV absorption by an external cover material. If a cover is used over the sensor, please consider the UV transparency of the cover.

REVISION History

Document No.	Date	Page		Description
		Previous Edition	Current Edition	
FEDL8511A-01	April. 1, 2015	-		Initial release
FEDL8511A-02	October 6, 2015	1	1	Block diagram and pin configurations are modified with removal of internal bonding wires.
		6	6	Added "Top view" and "Bottom view".
FEDL8511A-03	May 12, 2016	-	6	"Cautions" are changed to "Cautions" and "Prohibitions"..

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