

# 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 $\mu$ A, thus enabling a longer battery life.

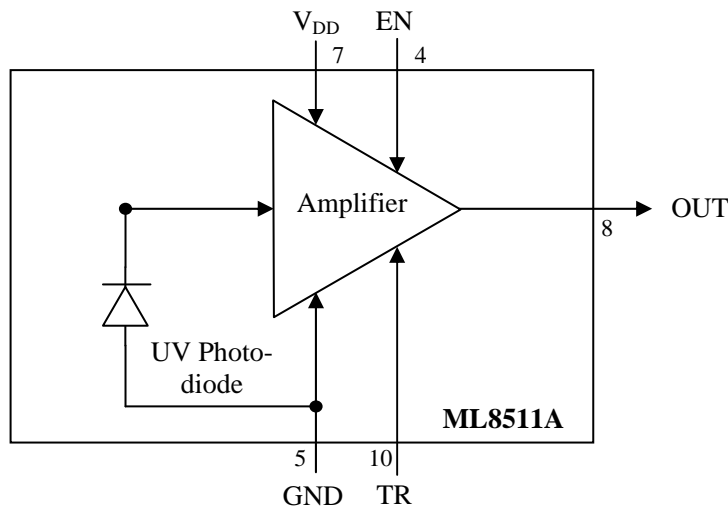
### FEATURES

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

### APPLICATIONS

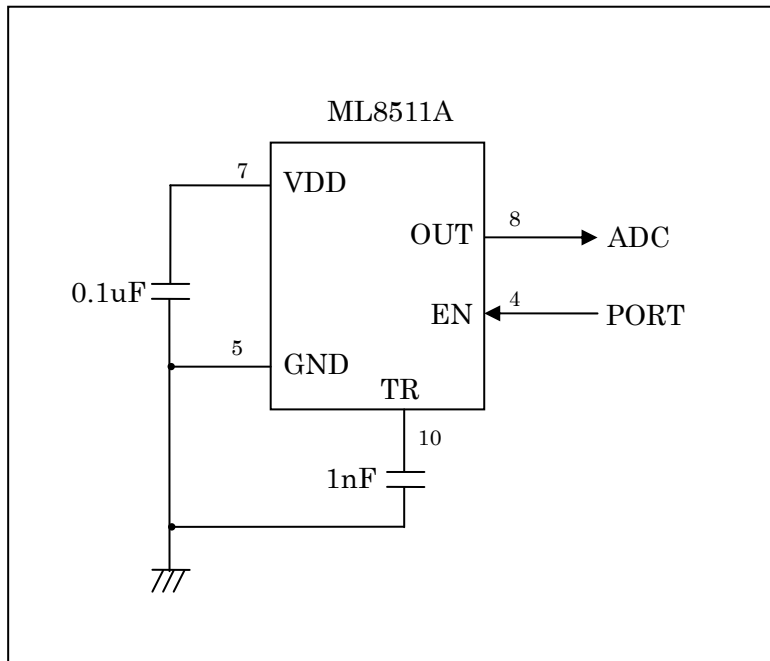
- Smart phone, Smart watch, Wearable healthcare device, Weather station, Bicycle navigation, Accessory

### BLOCK DIAGRAM



### PIN CONFIGURATIONS

Pin	Symbol	I/O	Function
7	VDD	PW	Supply voltage. Decouple this pin to ground with 0.1 $\mu$ 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 $\Omega$ .

**ABSOLUTE MAXIMUM RATINGS**

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

**RECOMMENDED OPERATION CONDITIONS**

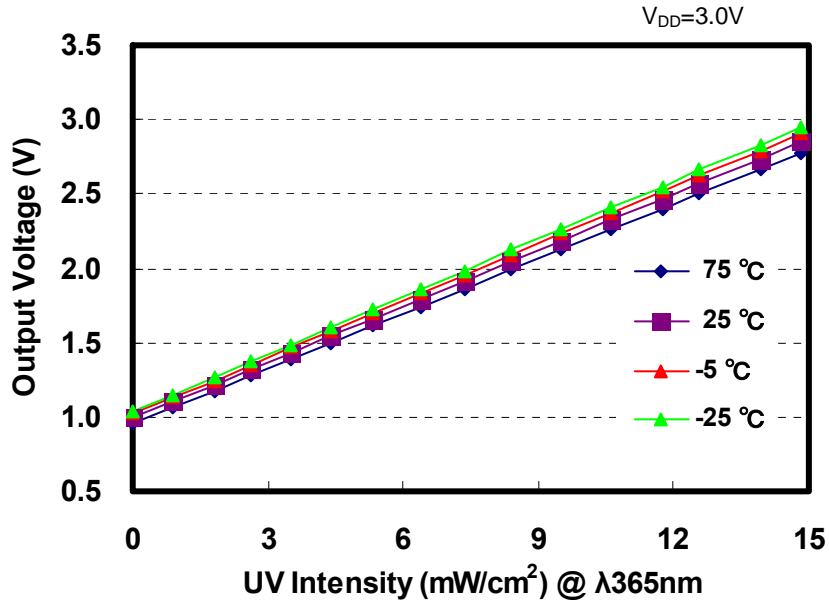
Parameter	Symbol	Min.	Typ.	Max.	unit
Operating Voltage	$V_{DD}$	2.7	3.3	3.6	V
Operating Temperature	Ta	-20	-	70	°C

**ELECTRO-OPTICAL CHARACTERISTICS**(V<sub>DD</sub>=+2.7V to +3.6V, Ta= -20°C to +70°C)

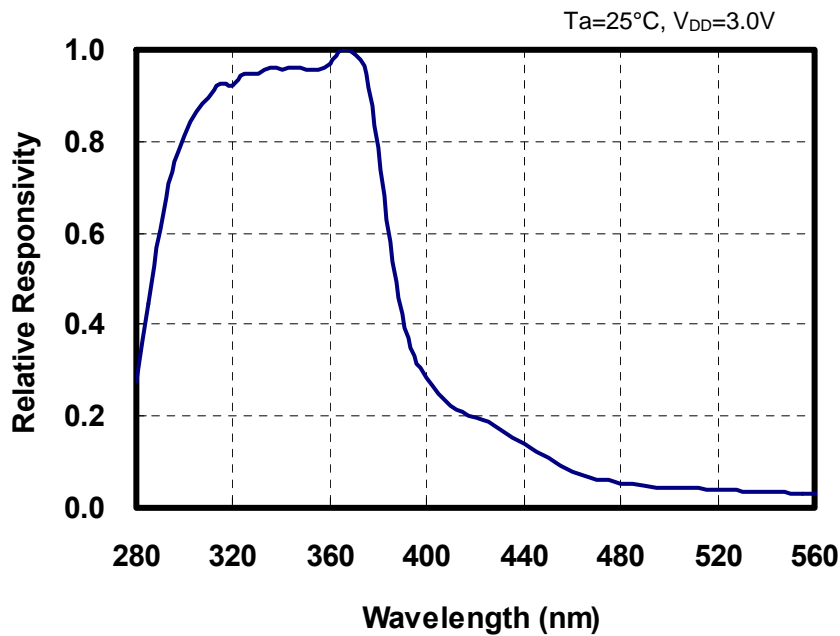
Parameter	Symbol	Condition	Min.	Typ.	Max.	unit
Supply Current (active mode)	$I_{DDA}$	$V_{EN}=V_{DD}$	-	300	500	μA
Supply Current (standby mode)	$I_{DDs}$	$V_{EN}=0$	-	0.1	1	μA
Input Voltage (High level)	$V_{IH}$	-	$V_{DD} \times 0.8$	-	$V_{DD} + 0.3$	V
Input Voltage (Low level)	$V_{IL}$	-	-0.2	-	0.72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

\* Load resistance of OUT port is recommended more than 100 kΩ.

**OUTPUT VOLTAGE- UV INTENSITY CHARACTERISTICS**



**SPECTRAL RESPONSIBILITY CHARACTERISTICS**

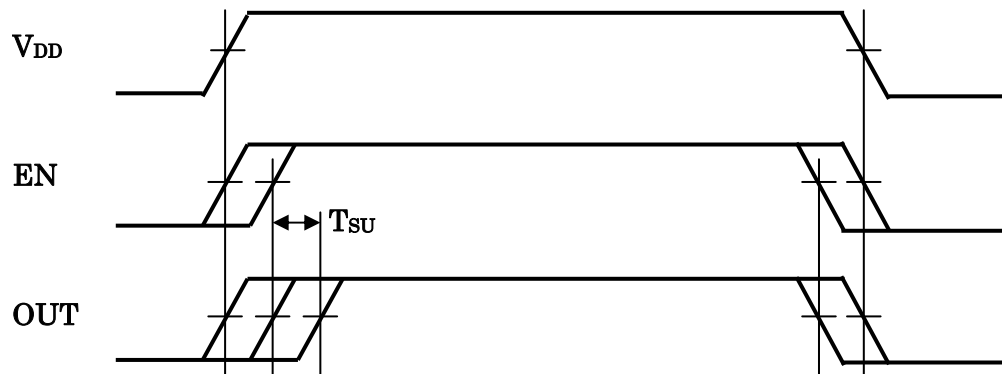


## TIMING CHART

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

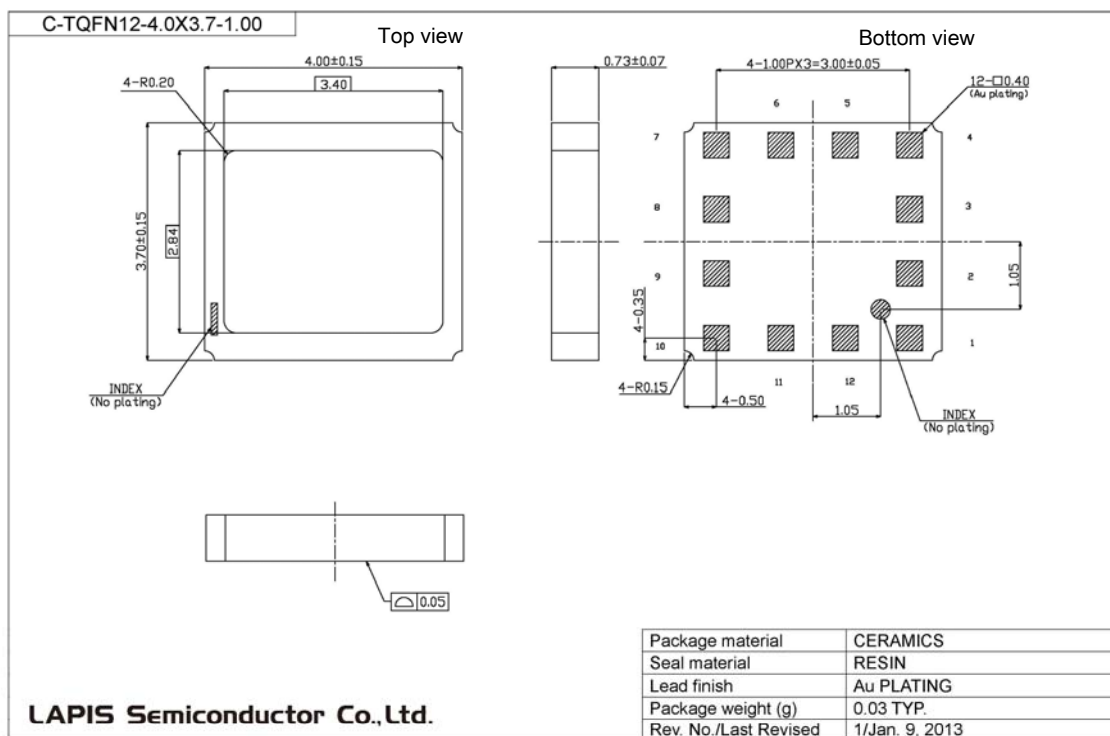
1. EN should be HIGH or LOW at the same time when  $V_{DD}$  is applied.
2. EN should be HIGH or LOW while  $V_{DD}$  is applied.

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)



**Cautions**

Do not touch the surface of the resin covering the top of the package as the resin is scratched easily and bonding wires under the resin may be damaged.  
 Specifications are defined without considering the UV absorption by an external cover material. If a cover is used over the sensor, take the UV transparency of the cover into consideration.

**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".

Notes

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