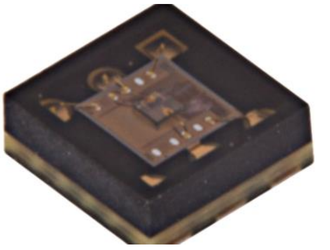
SUViSEN 320

Digital UV Index sensor

SUVB-CS-S2424 – *M [A ~ Z]*



RoHS

Product Brief

Description

The *SUViSEN 320* is a PKG of digital UV Index sensor with IC (Integrated Circuits) . It is displayed an accurate measurement values by first decimal number from the Sunlight. The UV sensor material is AlGaN.

The AlGaN material has excellent properties for UV sensing application which is adjusted the cut-off UV wavelength without any other filter due to controlled Al contents.

The AlGaN material based UV sensor has been developed to achieve the best accuracy for UV wavelength sensing such as UV Index real monitoring.

The *SUViSEN 320* is provided the Digital data through I2C interface (400 KHz).

The *SUViSEN 320* is Black mold type's packages which is 2.4 mm x 2.4 mm x 0.9 mm.

Features and Benefits

- UV sensor Driver IC

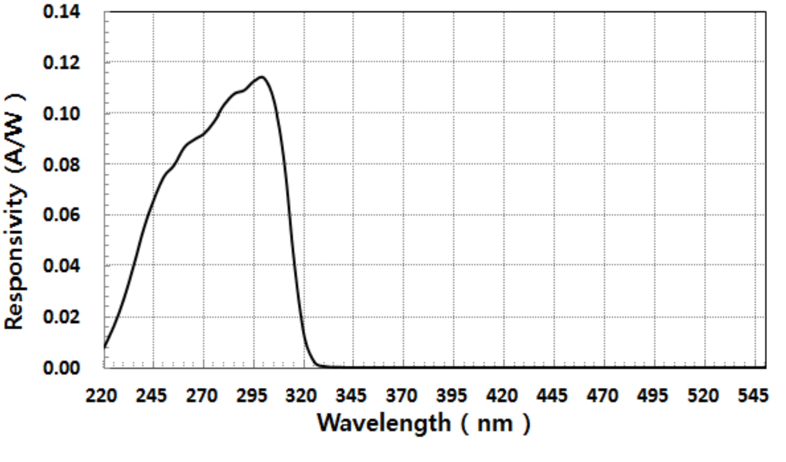
  Calibrated with optical signal
- 0.0 – 15.0 UV Index output range
- I2C interfaces (400 KHz)
- Operation (300 *u*A) / sleep mode (<1 *u*A)
- Supply voltage : 3 to 3.6 V
- Black mold DFN PKG

  (2.4 mm x 2.4 mm x 0.9 mm)

Key Applications

- UV Index Monitor
- Smartphone and tablet / Wearable devices
- Real Time Monitoring of UV Index

Spectral Responsivity (A/W) of UV sensor



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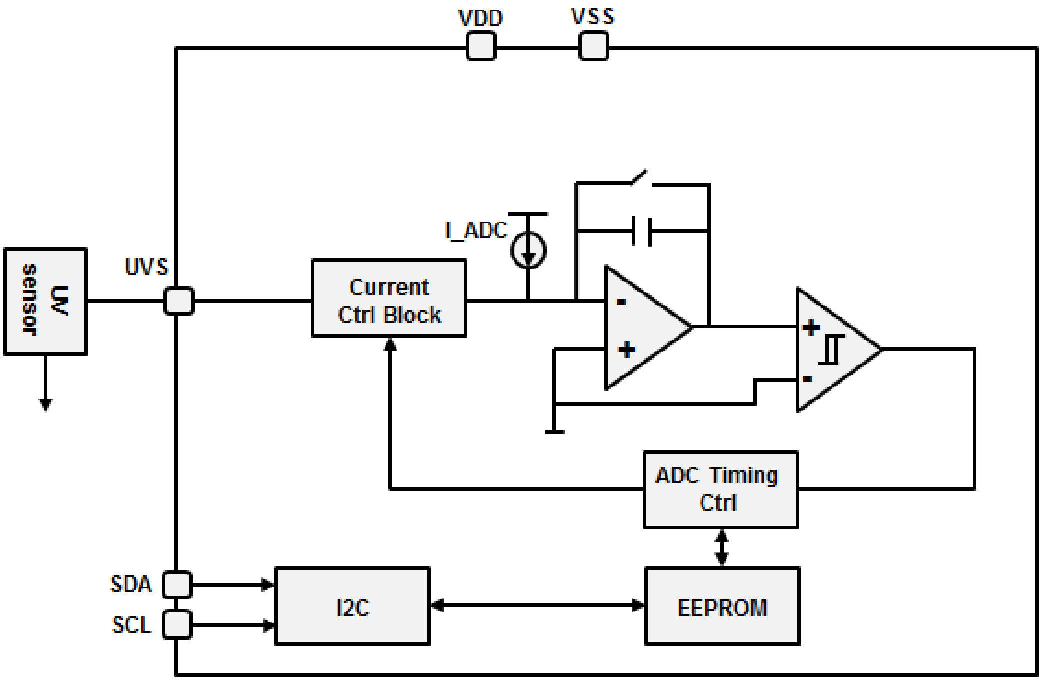
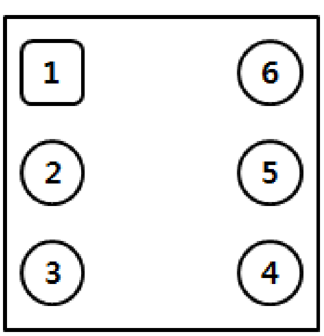
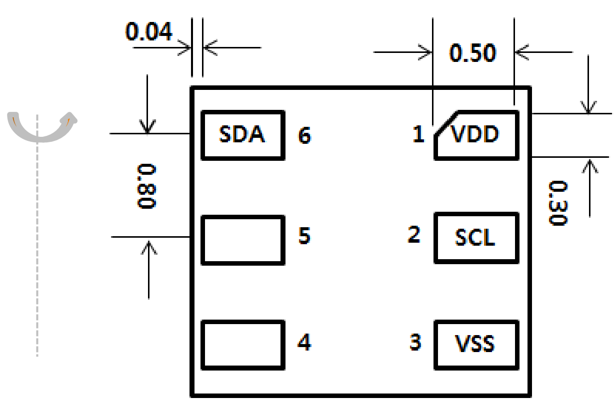
1. Block Diagram



Front side



Back side



Performance Characteristics

2. Pin Configuration

PIN No	PIN NAME	I/O	DESCRIPTIOIN
1	VDD	Power	Analog, Digital Power
2	SCL	Input	I2C clock
3	VSS	Ground	Analog, Digital GND
4	NC	-	No connect
5	NC	-	No connect
6	SDA	Input / Output	I2C data

3. Absolute Maximum Ratings (VDD = 2.8 V, Ta = 25 ℃)

Symbol	PARAMETER (NOTE 1)	MIN	MAX	UNITS
Vin	Input Voltage	- 0.5	VDD+0.5	V
Vout	Output Voltage	- 0.5	VDD+0.5	V
Vhbm	Static Discharge (HBM)		2	kV
Vmm	Static Discharge (MM)		200	V
Tj	Junction Temperature	- 40	85	℃
Ts	Soldering reflow temperature (Note 2)		260	℃

+ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. Theses are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Note 1 : All voltage values are with respect to VSS.

Note2 : The device should be soldered using the recommended solder reflow profile.

Performance Characteristics

4. Recommended Operating Conditions

Symbol	PARAMETER	MIN	TYP	MAX	UNITS
VDD	Supply Voltage	3	3.3	3.6	V
Vin	Input Voltage	0		VDD	V
Vout	Output Voltage	0		VDD	V
TA	Operating ambient temperature	- 40		85	℃

5. Electrical Specification

(VDD = 3.3 V, Ta = 25 ℃)

5.1. Supply Current

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Icc	Operation current	No load, Standby mode	-	300	350	*u*A
Icc_s	Sleep current	Sleep mode	-	-	1	*u*A

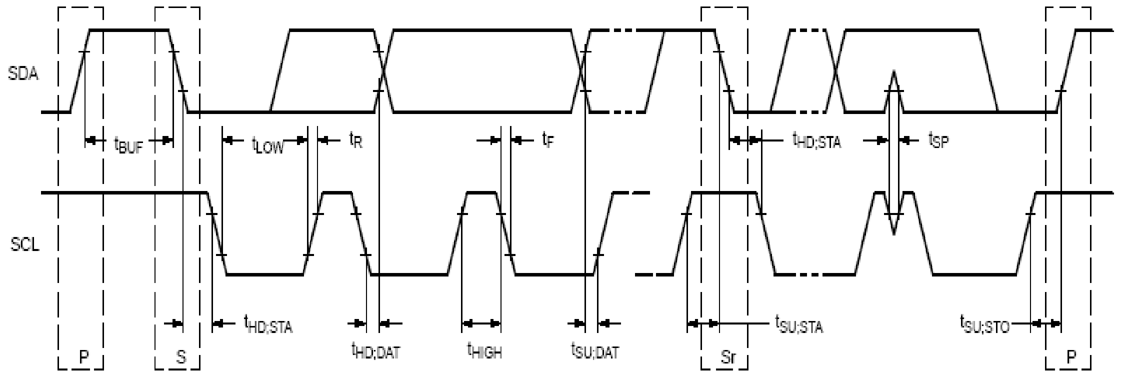
5.2. Operation Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Vuvs	UV sensor applied voltage	Operation Mode	1.6	1.8	2	V
F_adc	Full scale ADC counts	Operation Mode			1,024	
D-adc	Dark ADC count value	Operation Mode		2	10	counts

Performance Characteristics

5.3. I2C Interface

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{IH}	Input High level		1.8			V
V_{IL}	Input low level				0.8	V
V_{OL}	Output Low level (SDA)	IOL = 4mA			0.5	V
f_{SCLK}	SCLK Operating Frequency				400	kHz
t_{BUF}	Bus Free Time Between STOP and START Condition		1.3			us
$t_{HD;STA}$	Hole Time After Repeated START Conditions After this period, the first clock is generated		0.6			us
t_{LOW}	SCLK Clock Low Period		1.3			us
t_{HIGH}	SCLK Clock High Period		0.6			us
$t_{SU;STA}$	Repeated START Condition Setup Time		0.6			us
$t_{HD;DAT}$	Data Hold Time		0		0.9	us
$t_{SU;DAT}$	Data Setup Time		100			ns
t_F	Clock/Data Fall Time				300	ns
t_R	Clock/Data Rise Time				300	ns
$t_{SU;STO}$	Stop Condition Setup time		0.6			us



Performance Characteristics

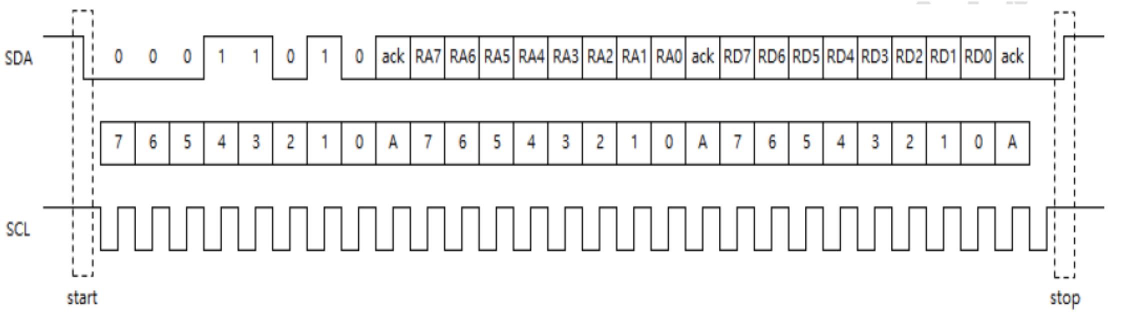
6. I2C Interface

6.1. Register Write

A register is written by first sending the command byte, with the device address and read/write set to “L”(write). Then a register address byte is sent, which selects which register is to be written (RA7-RA0 below).

Finally, the data byte is sent, which is latched into the addressed register when complete.

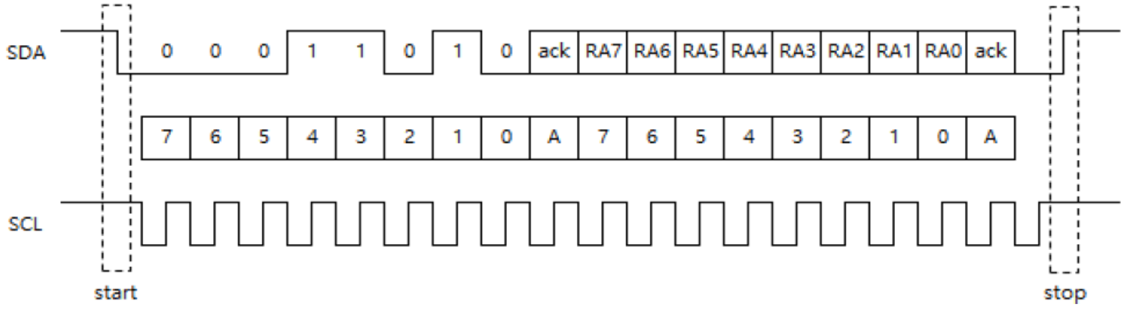
Note that additional writes may be performed without sending a stop; in this case the register address will automatically increment and the following 8-bit register will be written.



6-2. Register Read

A register is read by first sending the command byte, with the device address and read/write set to “0”(write).

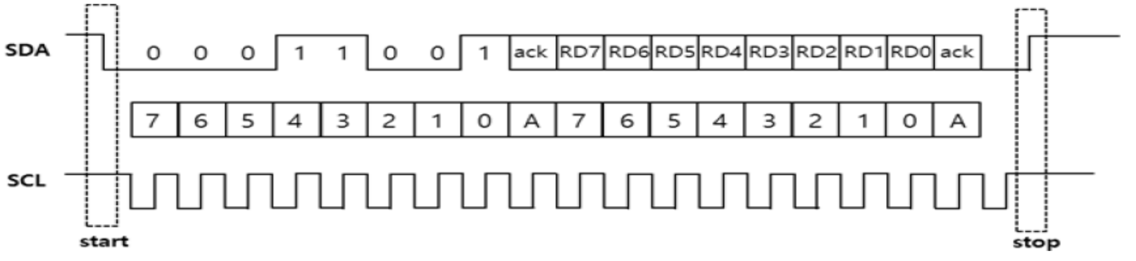
Then a register address byte is sent (RA7-RA0 below), which selects which register is to be read.



Performance Characteristics

Following the register selection, another command byte is sent, again addressing the device, but with the read/write bit set to “1”(read). Then the data from the addressed register is read.

Note that additional reads may be performed without sending a stop; in this case the register address will automatically increment and the following 8-bit register will be read.

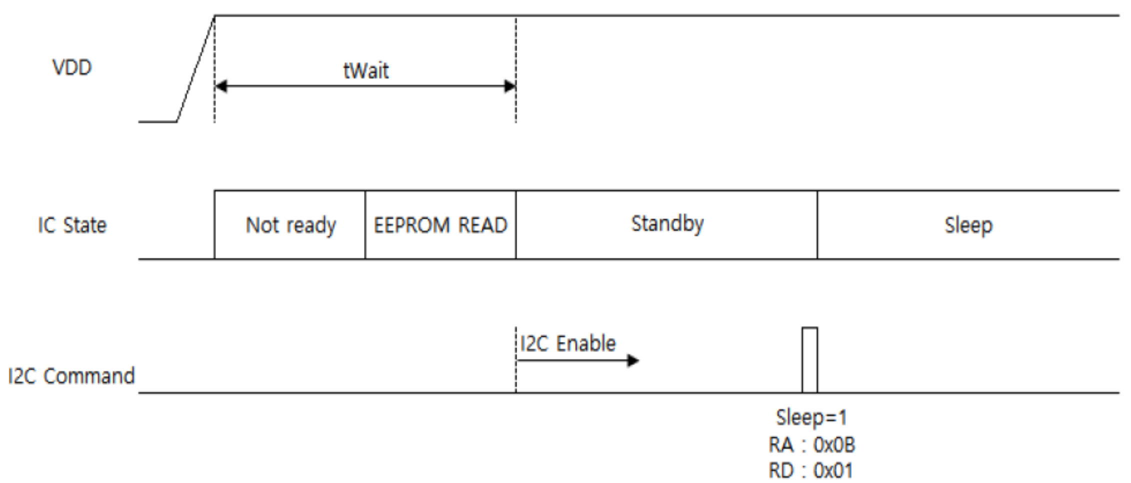


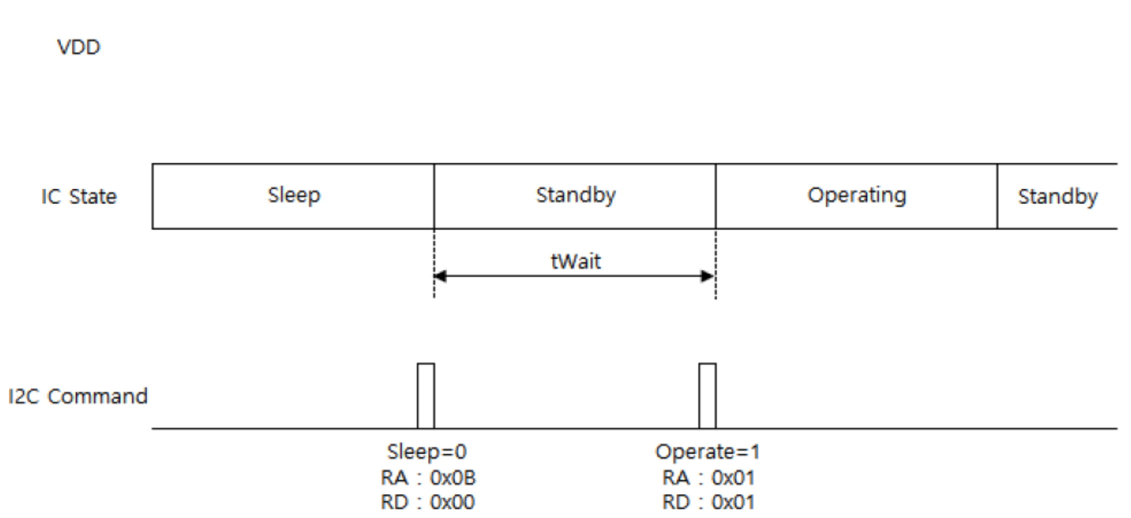
Performance Characteristics

7. Application Examples

7.1. Power Sequence

Symbol	Parameter	Min	Typ	Max	Unit
tWait	Power on time	10			ms





tWait = 10ms (minimum)

Performance Characteristics

8. Register Map

8.1. Device Address

Symbol		D7	D6	D5	D4	D3	D2	D1	D0
Device Address	Write	0	0	0	1	1	0	1	0
	Read	0	0	0	1	1	0	1	1

8.2. Register Map

RA	RD7	RD6	RD5	RD4	RD3	RD2	RD1	RD0	Def	Type
01H	-	-	-	-	-	-	-	OPERATE [0]	00H	RW
02H	-	-	ChTime [13]	ChTime [12]	ChTime [11]	ChTime [10]	ChTime [9]	ChTime [8]	EEP	EEP
03H	ChTime [7]	ChTime [6]	ChTime [5]	ChTime [4]	ChTime [3]	ChTime [2]	ChTime [1]	ChTime [0]	EEP	EEP
04H	-	-	-	GainSel [4]	GainSe l[3]	GainSel [2]	GainSel [1]	GainSel [0]	EEP	EEP
05H	-	-	DisData [13]	DisData [12]	DisData [11]	DisData [10]	DisData [9]	DisData [8]	-	R
06H	DisData [7]	DisData [6]	DisData [5]	DisData [4]	DisData [3]	DisData [2]	DisData [1]	DisData [0]	-	R
07H	-	-	-	-	-	-	UVout [9]	UVout [8]	-	R
08H	UVout [7]	UVout [6]	UVout [5]	UVout [4]	UVout [3]	UVout [2]	UVout [1]	UVout [0]	-	R
09H	-	-	OffData [13]	OffData [12]	OffData [11]	OffData [10]	OffData [9]	OffData [8]	EEP	EEP
0AH	OffData [7]	OffData [6]	OffData [5]	OffData [4]	OffData [3]	OffData [2]	OffData [1]	OffData [0]	EEP	EEP
0BH	-	-	-	-	-	-	-	SLEEP	00H	RW
0CH	UserData0 [7]	UserData0 [6]	UserData0[5]	UserData0 [4]	UserData0 [3]	UserData0 [2]	UserData0 [1]	UserData0 [0]	EEP	EEP
0DH	-	-	-	-	-	-	-	EEPWP	01H	RW
0EH	-	-	-	-	-	Test [2]	Test [1]	Test [0]	00H	RW
0FH	-	Cal_vco [6]	Cal_vco [5]	Cal_vco [4]	Cal_vco [3]	Cal_vco [2]	Cal_vco [1]	Cal_vco [0]	EEP	EEP
10H	Eeprom [7]	Eeprom [6]	Eeprom [5]	Eeprom [4]	Eeprom [3]	Eeprom [2]	Eeprom [1]	Eeprom [0]	00H	RW
11H	UserData1 [7]	UserData1 [6]	UserData1 [5]	UserData1 [4]	UserData1 [3]	UserData1 [2]	UserData1 [1]	UserData1 [0]	EEP	EEP
12H	UserData2 [7]	UserData2 [6]	UserData2 [5]	UserData2 [4]	UserData2 [3]	UserData2 [2]	UserData2 [1]	UserData2 [0]	EEP	EEP

* EEP : EEPROM (storage) Write / Read

Performance Characteristics

9. Register Description

9.1. OPERATION

a) 0x00 : Reserved   b) 0x01 : Operation (1 Time)

Address : 01h				
Bit	**Name**	**Description**	**Default**	**Type**
RD0	OPERATE[0]	1bit Operation Data	00H	RW

9.2. Charge Time 1 : Charge Time Count Data

Address : 02h				
Bit	**Name**	**Description**	**Default**	**Type**
RD5	ChTime[13]	14 bits Charge Time Count Data (MSB)	EEP	EEP
RD4	ChTime[12]	14 bits Charge Time Count Data	EEP	
RD3	ChTime[11]	14 bits Charge Time Count Data	EEP	
RD2	ChTime[10]	14 bits Charge Time Count Data	EEP	
RD1	ChTime[9]	14 bits Charge Time Count Data	EEP	
RD0	ChTime[8]	14 bits Charge Time Count Data	EEP	
Address : 03h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	ChTime[7]	14 bits Charge Time Count Data	EEP	EEP
RD6	ChTime[6]	14 bits Charge Time Count Data	EEP	
RD5	ChTime[5]	14 bits Charge Time Count Data	EEP	
RD4	ChTime[4]	14 bits Charge Time Count Data	EEP	
RD3	ChTime[3]	14 bits Charge Time Count Data	EEP	
RD2	ChTime[2]	14 bits Charge Time Count Data	EEP	
RD1	ChTime[1]	14 bits Charge Time Count Data	EEP	
RD0	ChTime[0]	14 bits Charge Time Count Data (LSB)	EEP	

Performance Characteristics

9.3. Gain Select : Gain select

1) x0.01 : 0x10 2) x0.1 : 0x08 3) x0.2 : 0x04 4) x0.3 : 0x0C 5) x0.4 : 0x02
6) x0.5 : 0x0A 7) x0.6 : 0x06 8) x0.7 : 0x0E 9) x0.8 : 0x01 10) x0.9 : 0x09
11) x1.0 : 0x05 12) x1.1 : 0x0D 13) x1.2 : 0x03 14) x1.3 : 0x0B 15) x1.4 : 0x07 16) x1.5 : 0x0F

Address : 04h				
Bit	**Name**	**Description**	**Default**	**Type**
RD4	Gainsel[4]	5bits Gainsel Data (MSB)	EEP	EEP
RD3	Gainsel[3]	5bits Gainsel Data	EEP	
RD2	Gainsel[2]	5bits Gainsel Data	EEP	
RD1	Gainsel[1]	5bits Gainsel Data	EEP	
RD0	Gainsel[0]	5bits Gainsel Data (LSB)	EEP	

9.4. Discharge Data : Discharge output Data

Address : 05h				
Bit	**Name**	**Description**	**Default**	**Type**
RD5	DisDate [13]	14 bits Discharge Output Data (MSB)	-	R
RD4	DisDate [12]	14 bits Discharge Output Data	-	
RD3	DisDate [11]	14 bits Discharge Output Data	-	
RD2	DisDate [10]	14 bits Discharge Output Data	-	
RD1	DisDate [9]	14 bits Discharge Output Data	-	
RD0	DisDate [8]	14 bits Discharge Output Data (LSB)	-	
Address : 06h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	DisDate [7]	14 bits Discharge Output Data (MSB)	-	R
RD6	DisDate[6]	14 bits Discharge Output Data	-	
RD5	DisDate [5]	14 bits Discharge Output Data	-	
RD4	DisDate [4]	14 bits Discharge Output Data	-	
RD3	DisDate[3]	14 bits Discharge Output Data	-	
RD2	DisDate [2]	14 bits Discharge Output Data	-	
RD1	DisDate [1]	14 bits Discharge Output Data	-	
RD0	DisDate [0]	14 bits Discharge Output Data (LSB)	-	

Performance Characteristics

9.5. UV out : UV out Data

Address : 07h				
Bit	**Name**	**Description**	**Default**	**Type**
RD1	UVout[9]	10 bits UV output Data (MSB)	-	R
RD0	UVout[8]	10 bits UV output Data	-	

Address : 08h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	UVout[7]	10 bits UV output Data	-	R
RD6	UVout[6]	10 bits UV output Data	-	
RD5	UVout[5]	10 bits UV output Data	-	
RD4	UVout[4]	10 bits UV output Data	-	
RD3	UVout[3]	10 bits UV output Data	-	
RD2	UVout[2]	10 bits UV output Data	-	
RD1	UVout[1]	10 bits UV output Data	-	
RD0	UVout[0]	10 bits UV output Data (LSB)	-	

Performance Characteristics

9.6. Offset Data : Offset Data in Dark State

Address : 09h				
Bit	**Name**	**Description**	**Default**	**Type**
RD5	OffData[13]	14 bits Offset Compare Data (MSB)	EEP	EEP
RD4	OffData[12]	14 bits Offset Compare Data	EEP	
RD3	OffData[11]	14 bits Offset Compare Data	EEP	
RD2	OffData[10]	14 bits Offset Compare Data	EEP	
RD1	OffData[9]	14 bits Offset Compare Data	EEP	
RD0	OffData[8]	14 bits Offset Compare Data	EEP	
Address : 0Ah				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	OffData[7]	14 bits Offset Compare Data	EEP	EEP
RD6	OffData[6]	14 bits Offset Compare Data	EEP	
RD5	OffData[5]	14 bits Offset Compare Data	EEP	
RD4	OffData[4]	14 bits Offset Compare Data	EEP	
RD3	OffData[3]	14 bits Offset Compare Data	EEP	
RD2	OffData[2]	14 bits Offset Compare Data	EEP	
RD1	OffData[1]	14 bits Offset Compare Data	EEP	
RD0	OffData[0]	14 bits Offset Compare Data (LSB)	EEP	

Performance Characteristics

9.7. SLEEP : Sleep mode select

a) 0x00 : Standby   b) 0x01 : Sleep

Address : 0Bh				
Bit	**Name**	**Description**	**Default**	**Type**
RD0	SLEEP[0]	1bit Sleep mode Select Data	00H	RW

9.8. User Data 0 : Memory0 for user data

Address : 0Ch				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	UserData0[7]	8bits User Data (MSB)	EEP	EEP
RD6	UserData0[6]	8bits User Data	EEP	
RD5	UserData0[5]	8bits User Data	EEP	
RD4	UserData0[4]	8bits User Data	EEP	
RD3	UserData0[3]	8bits User Data	EEP	
RD2	UserData0[2]	8bits User Data	EEP	
RD1	UserData0[1]	8bits User Data	EEP	
RD0	UserData0[0]	8bits User Data (LSB)	EEP	

9.9. EEPWP : EEPROM Write Protection

a) 0x00 : no protected   b) 0x01 : protected

Address : 0Dh				
Bit	**Name**	**Description**	**Default**	**Type**
RD0	EEPWP[0]	1bit EEPROM Write Protection Select Data	00H	RW

Performance Characteristics

9.10. Test : Reserved

Address : 0Eh				
Bit	**Name**	**Description**	**Default**	**Type**
RD2	Test[2]	3bit Test Data (MSB)	00H	RW
RD1	Test[1]	3bit Test Data	00H	
RD0	Test[0]	3bit Test Data (LSB)	00H	

9.11. Calibrate VCO : Reserved

Address : 0Fh				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	Cal_vco[7]	8bits Cal_vco Data (MSB)	EEP	EEP
RD6	Cal_vco[6]	8bits Cal_vco Data	EEP	
RD5	Cal_vco[5]	8bits Cal_vco Data	EEP	
RD4	Cal_vco[4]	8bits Cal_vco Data	EEP	
RD3	Cal_vco[3]	8bits Cal_vco Data	EEP	
RD2	Cal_vco[2]	8bits Cal_vco Data	EEP	
RD1	Cal_vco[1]	8bits Cal_vco Data	EEP	
RD0	Cal_vco[0]	8bits Cal_vco Data (LSB)	EEP	

Performance Characteristics

9.12. EEPROM EXECUTE : 8bit EEPROM EXECUTE data

a) 0xAA : EEPROM Write b) 0x55 : EEPROM Read

Address : 10h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	Eeprom[7]	8bits EEPROM EXECUTE Data (MSB)	00H	RW
RD6	Eeprom[6]	8bits EEPROM EXECUTE Data	00H	
RD5	Eeprom[5]	8bits EEPROM EXECUTE Data	00H	
RD4	Eeprom[4]	8bits EEPROM EXECUTE Data	00H	
RD3	Eeprom[3]	8bits EEPROM EXECUTE Data	00H	
RD2	Eeprom[2]	8bits EEPROM EXECUTE Data	00H	
RD1	Eeprom[1]	8bits EEPROM EXECUTE Data	00H	
RD0	Eeprom[0]	8bits EEPROM EXECUTE Data (LSB)	00H	

9.13. UserData1 : Memory 1 for user

Address : 11h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	UserData1[7]	8bits UserData (MSB)	EEP	EEP
RD6	UserData1[6]	8bits UserData	EEP	
RD5	UserData1[5]	8bits UserData	EEP	
RD4	UserData1[4]	8bits UserData	EEP	
RD3	UserData1[3]	8bits UserData	EEP	
RD2	UserData1[2]	8bits UserData	EEP	
RD1	UserData1[1]	8bits UserData	EEP	
RD0	UserData1[0]	8bits UserData (LSB)	EEP	

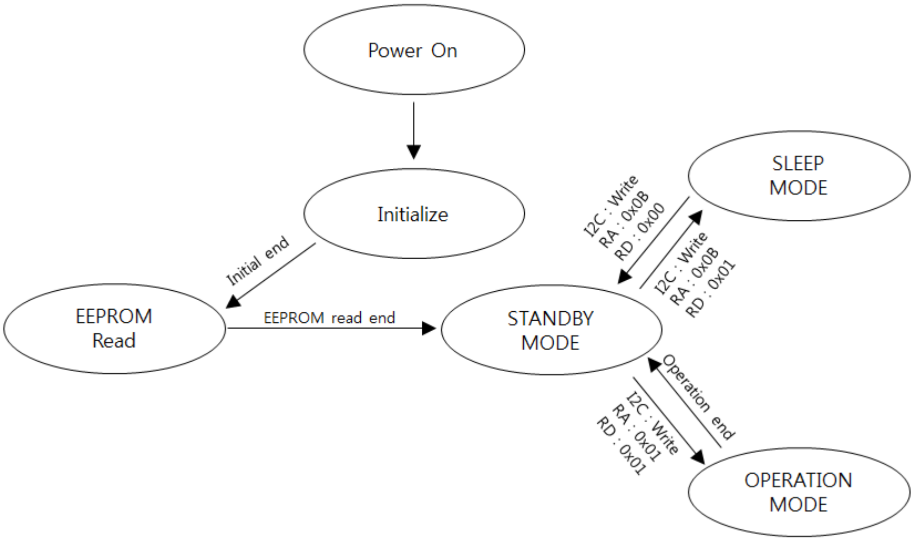
Performance Characteristics

9.14. UserData2: Memory 1 for user

Address : 12h				
Bit	**Name**	**Description**	**Default**	**Type**
RD7	UserData2[7]	8bits UserData (MSB)	EEP	EEP
RD6	UserData2[6]	8bits UserData	EEP	
RD5	UserData2[5]	8bits UserData	EEP	
RD4	UserData2[4]	8bits UserData	EEP	
RD3	UserData2[3]	8bits UserData	EEP	
RD2	UserData2[2]	8bits UserData	EEP	
RD1	UserData2[1]	8bits UserData	EEP	
RD0	UserData2[0]	8bits UserData (LSB)	EEP	

10. Mode Condition

After VDD is supplied, IC is set as STANDBY mode as default.
The sequence of STANDBY / OPERATION / SLEEP mode is as Fig :



UVI Calculation

$$UVI = \frac{\text{UV out Data - Offset Data}}{\text{UVI coefficient}}$$

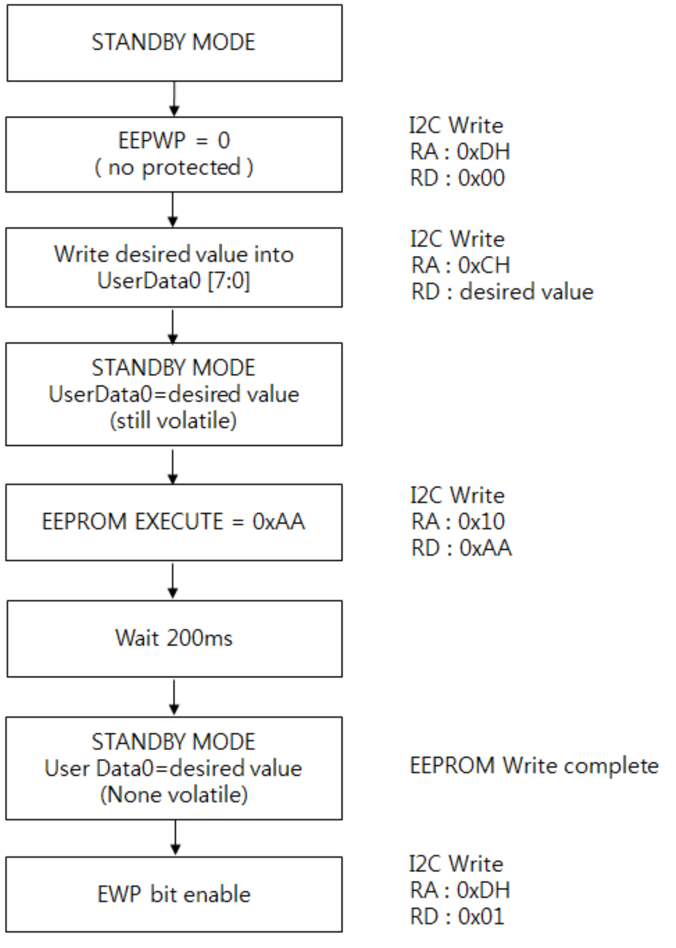
Performance Characteristics

11. EEPROM Write

To save data in the non-volatile registers, a special "EEPROM Write" sequence must be performed. The sequence is as follows.

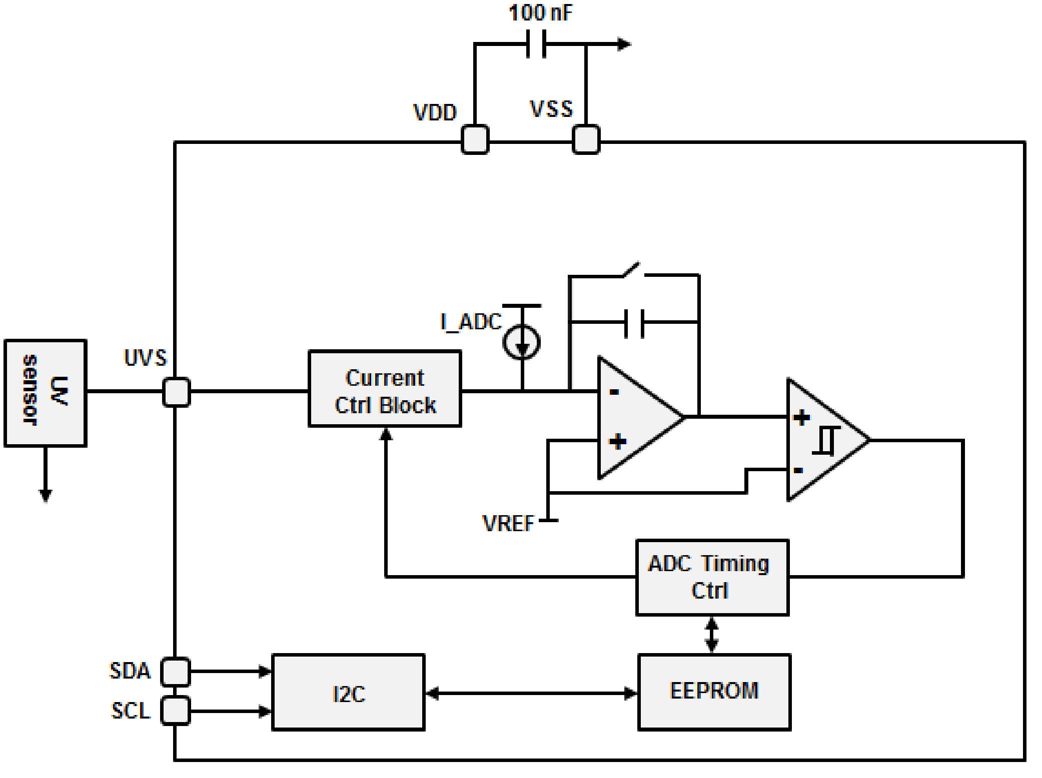
1. Write the desired values into the non-volatile registers
   (Ex : User Data[7:0])
2. Write Protect Register disable.
3. Send EEPROM EXECUTE command.
4. Wait 200ms
5. EEPROM write completed

EEPROM is performed in STANDBY Mode.



Performance Characteristics

12. Typical Application Circuit

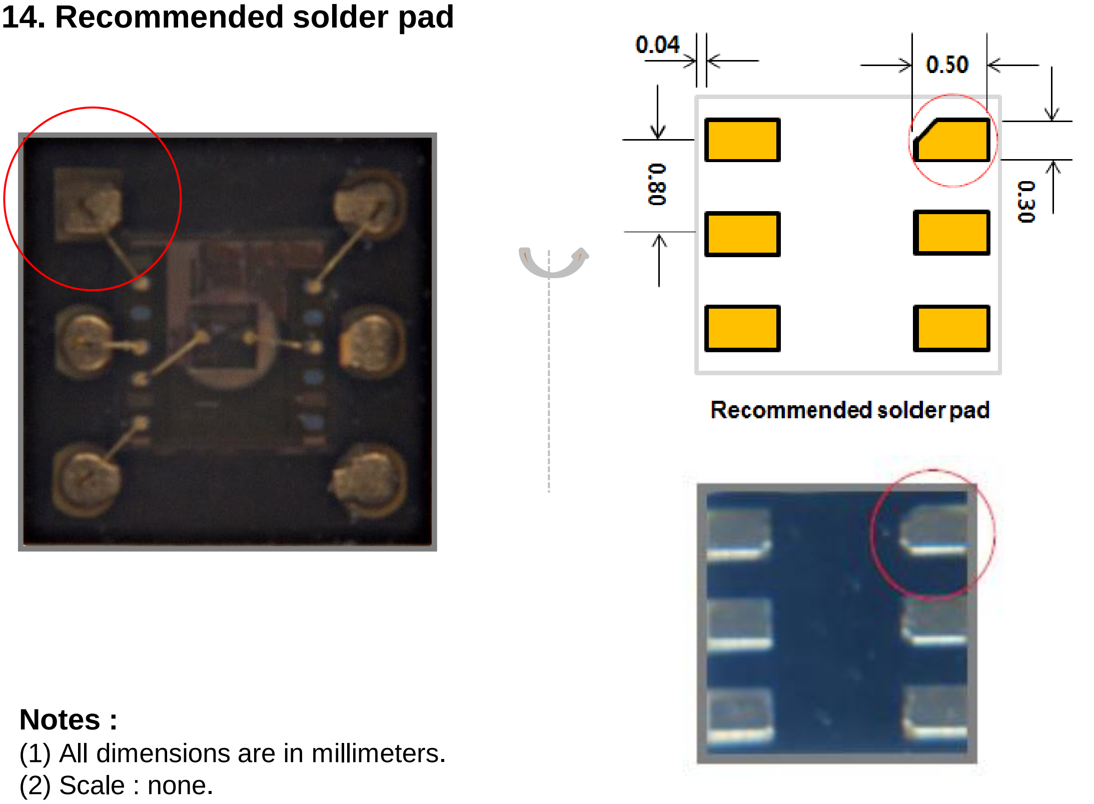


Performance Characteristics

13. Labeling

Product : UV Index sensor
Product Name : SUViSEN320
Quantity : 1,000
Part No. : SUVB-CS-S2424-A
SVC Part No. : 16I28UVBS24001
seoulviosys

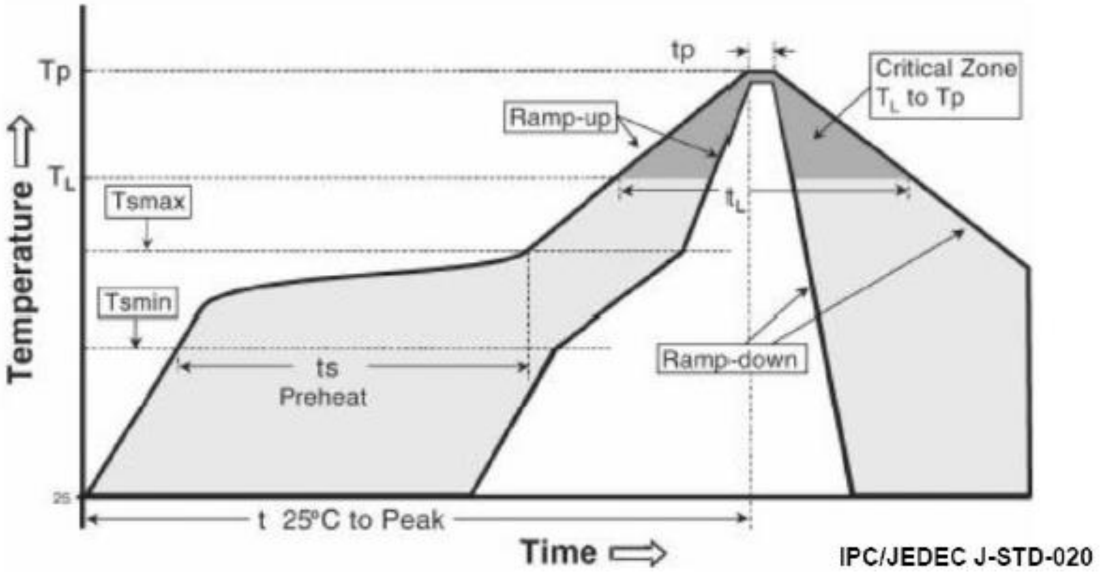
14. Recommended solder pad



Notes :
(1) All dimensions are in millimeters.
(2) Scale : none.
(3) Undefined tolerance is ± 0.1 mm.
(4) The appearance and specifications of the product may be changed for improvement without notice.

Performance Characteristics

15. Reflow Soldering Characteristics



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_{s_max} to T_p)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (T_{s_min}) - Temperature Max (T_{s_max}) - Time (T_{s_min} to T_{s_max}) (t_s)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (T_L) - Time (t_L)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (T_p)	215℃	260℃
Time within 5°C of actual Peak Temperature (t_p)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 °C/second max.	6 °C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Caution :

(1) Reflow soldering is recommended not to be done more than two times
In the case of more than 24 hours passed soldering after first, UV sensors will be damaged.

(2) Repairs should not be done after the UV sensors have been soldered
When repair is unavoidable, suitable tools must be used.

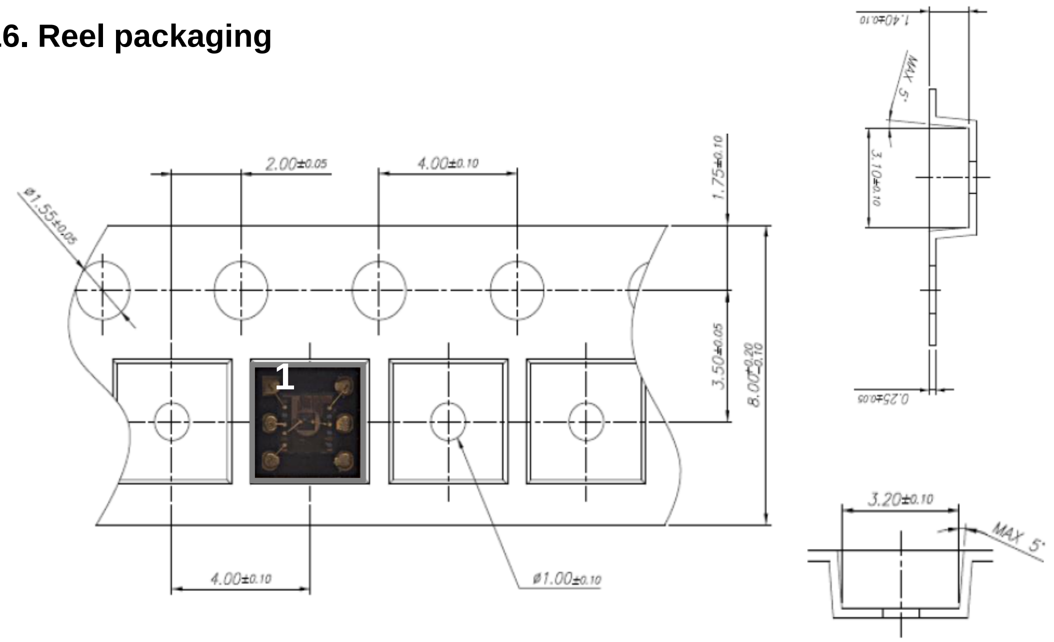
(3) Die slug is to be soldered.

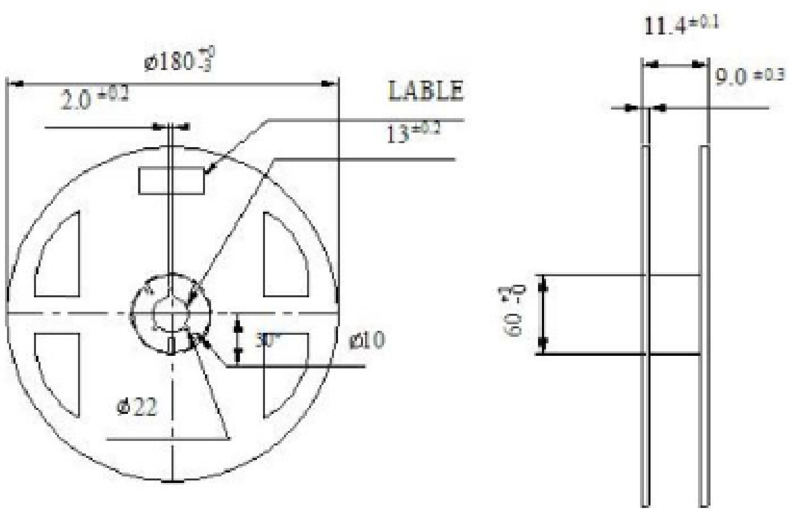
(4) When soldering, do not put stress in the UV sensors during heating.

(5) After soldering, do not wrap the circuit board.

Performance Characteristics

16. Reel packaging





(Tolerance: ±0.2, Unit: mm)

Notes :

(1) Quantity : Max. about 4,000pcs/real

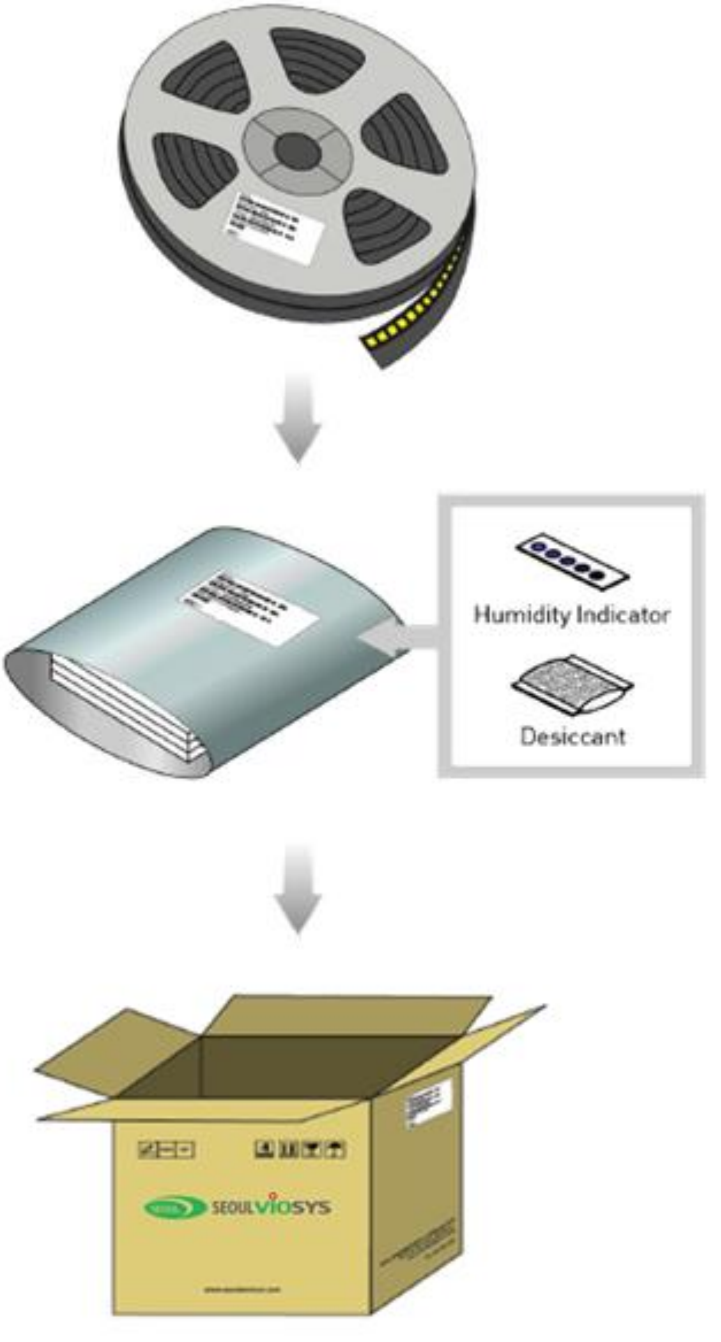
(2) Cumulative tolerance : cumulative tolerance / 10 pitches to be ±0.2mm.

(3) Adhesion strength of cover tape : Adhesion strength to be 0.1 ~ 0.7N when the cover tape is turned off from the carrier tape at the angle of 10˚ to the carrier tape

(4) Package : P/N, manufacturing data code No. and Quantity to be indicated on a damp proof package.

Performance Characteristics

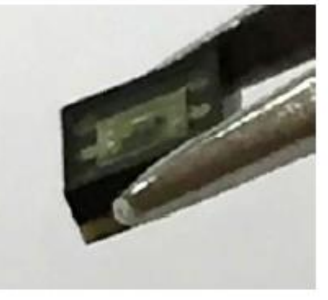
Reel packaging



Performance Characteristics

17. Handling of silicone Resin for UV sensors

(1) During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.



(2) In general, UV sensors should only be handled from the side, By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

(3) Silicone differs from materials conventionally used for the manufacturing of UV sensors. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust.

As mentioned previously, the increased sensitivity to dust requires special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

(4) SVC suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the UV sensor.

(5) Please do not mold this product into another resin (epoxy, urethane, etc) and do not handle this. Product with acid or sulfur material in sealed space.

Performance Characteristics

18. Precaution

1) Storage conditions.

Keep the product in a dry box or a desiccator with a desiccant in order to prevent moisture absorption.

a. Keep it at a temperature in the range from 5 ℃ to 30 ℃ and at a humidity of less than 50 % RH. The product should be kept within a year.

2) After opening the package.

When soldering, this could result in a decrease of the leakage current or sensing intensity.

a. Soldering should be done right after mounting the product.
b. Keep the temperature in the range from 5 ℃ to 30 ℃ and the humidity at less than 60%.

Soldering should be done within 7 days after opening the desiccant package.
If the product has been exposed for more than 7 days after opening the package or the indicating color of the desiccator changes, the product must be baked at a temperature between 65 ±5 ℃ for less than 24 hours. An unused and unsealed product should be repacked in a desiccant package and kept sealed in a dry atmosphere. Stored at a humidity of less than 10 %RH.

3) Precautions for use.

The PKGs are sensitive to Electric Static Discharge (ESD) and Electrical Over Stress(EOS), users are required to handle with care.
If the applied current and/or voltage exceed the maximum rating, the overflow in energy may cause damage to, or possibly result in electrical destruction of the products. Accordingly, customer should take absolutely secure countermeasure against static electricity and surge when dandling products.

Any external mechanical force or excessive vibration should not be applied to the product during cooling after soldering, and it is preferable to avoid rapid cooling.
The product should not be mounted on a distorted part of PCB.
Gloves or wrist bands for ESD should be wore in order to prevent ESD and surge damage, and all devices and equipment must be grounded to the earth.

4) General precaution for use

PKGs should be stored in a clean environment.
PKGs should keep away from high humidity environment. The PKGs surrounded by the environment with high moisture can be damaged, which can cause degradation of optical and electrical performance as well as delamination between the interfaces.
This PKG should not be used directly in any type of fluid such as water, oil, organic solvent, etc. When washing is required, Diluted IPA is recommended to use.

Performance Characteristics

5) Sensors are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress(EOS).
Below is a list of suggestions that Seoul Viosys purposes to minimize these effects.

a. ESD (Electro Static Discharge)
ESD is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to a sensor may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current / decrease in photo current

The following recommendations are suggested to help minimize the potential for an ESD event. One or more recommended work area suggestions:
- Ionizing fan setup , ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
- Antistatic wrist-strap / shoes / clothes

Environmental controls:
- Humidity control (ESD gets worse in a dry environment)

b. EOS (Electrical Over Stress)
EOS is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device.
The effects from an EOS event can be noticed through product performance like:
- Changes to the performance of the sensor package
- Changes to the photocurrent of the absorption light from component failure
- Damaged may be noticed to the bond wires (appearing similar to a blown fuse)
- Damage to the bond pads located on the absorption surface of the Sensor package (shadowing can be noticed around the bond pads while viewing through a microscope)
- This damage usually appears due to the thermal stress produced during the EOS event.

c. To help minimize the damage from an EOS event Seoulviosys recommends utilizing:
- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device

Do not press the PKG surface.

The above specifications are subject to change with prior notice.

SEOUL VIOSYS Co., Ltd
June, 09, 2017