Inolux Surface Mount High Power Ultraviolet LED
IN-3531ACUV

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.

2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Label Specifications

INOLUX P/N:

I N - 3 5 3 1 A C U V -X X X X

Series Name	Substrate / Emitting Color	Customer Code
IN-3531 **Inolux 3531 package**	**Aluminum Nitride substrate** **UV@380-420nm**	**XXXX** **Customer Product Code**

Lot No.:

1	2	3	4	5	6	7	8	9	10
E	1	A	1	A	2	2	L	1	2
Code 1 2		Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10
		Mfg. Year	Mfg. Month	Mfg. Date	Consecutive number		Special code		
Internal Tracing Code		2010-A 2011-B 2012-C 2013-D . .	1:Jan. 2:Feb. .... A:Oct. B:Nov. C:Dec.	1:A 2:B 3:C ... 26:Z 27:7 28:8 29:9 30:3 31:4	01~ZZ		000~ZZZ		

Radiometric Power and Forward Voltage

(Tj =25 °C)

Part Number	Color	Performance at Test Current 500mA				Performance at 1000mA
		Group	Min. Radiometric Power (mW)	Vf		Typical Radiometric Power (mW)
				Min	Max	
IN-3531ACUV	U40 (380~390nm)	NE1	400	3.2	4.2	750
		NE2	440	3.2	4.2	820
		NE3	480	3.2	4.2	890
		NE4	520	3.2	4.2	960
		NE5	560	3.2	4.2	1030
	U50 (390~400nm)	NE4	520	3.2	4.2	960
		NE5	560	3.2	4.2	1030
		NF1	600	3.2	4.2	1100
		NF2	650	3.2	4.2	1200
		NF3	700	3.2	4.2	1300
		NF4	750	3.2	4.2	1400
	U60 (400~410nm)	NE4	520	3.2	4.2	960
		NE5	560	3.2	4.2	1030
		NF1	600	3.2	4.2	1100
		NF2	650	3.2	4.2	1200
		NF3	700	3.2	4.2	1300
		NF4	750	3.2	4.2	1400
	U70 (410~420nm)	NE4	520	3.2	4.2	960
		NE5	560	3.2	4.2	1030
		NF1	600	3.2	4.2	1100
		NF2	650	3.2	4.2	1200
		NF3	700	3.2	4.2	1300
		NF4	750	3.2	4.2	1400

Note:
1. Radiometric Power is measured with an accuracy of ±10%
2. The forward voltage is measured with an accuracy of ±0.2V
* Calculated values are for reference only.

Forward Voltage Binning

Part Number	Performance at Test Current (500mA)		
	V_f Group	Minimum (V)	Maximum (V)
IN-3531ACUV	V30	3.0	3.2
	V32	3.2	3.4
	V34	3.4	3.6
	V36	3.6	3.8
	V38	3.8	4.0
	V40	4.0	4.2

Product Characteristics

Absolute Maximum Ratings

(Tj =25 °C)

Parameter	Rating
DC Forward Current (mA)	1000mA
LED Junction Temperature	150°C
LED Operating Temperature	-40°C ~ 125°C
Storage Temperature	-40°C ~ 125°C
Soldering Temperature	Max. 260°C / Max. 10 sec. (JEDEC 020c)
ESD Sensitivity	2,000V HBM (JESD-22A-114-B)
Preconditioning	Acc. to JEDEC Level 2

Notes:

1. Never operate the LEDs in reverse bias.
2. Do not drive at rated current for more than 5 seconds without proper thermal management.
3. When the LEDs are illuminating, operating current should be decided after considering the packages maximum temperature.
4. Caution: These devices emit high intensity UV/NUV light. Necessary precautions must be taken during operation. Do not look directly into the light or look through the optical system when in operation. Protective eyewear should be worn at all times during operation.
5. Lens discoloration may occur with prolonged exposure to UV/NUV light. Lens material will need to be tested for UV/NUV light compatibility and durability.

Electro-Optical Characteristics

(T_j 25 °C)

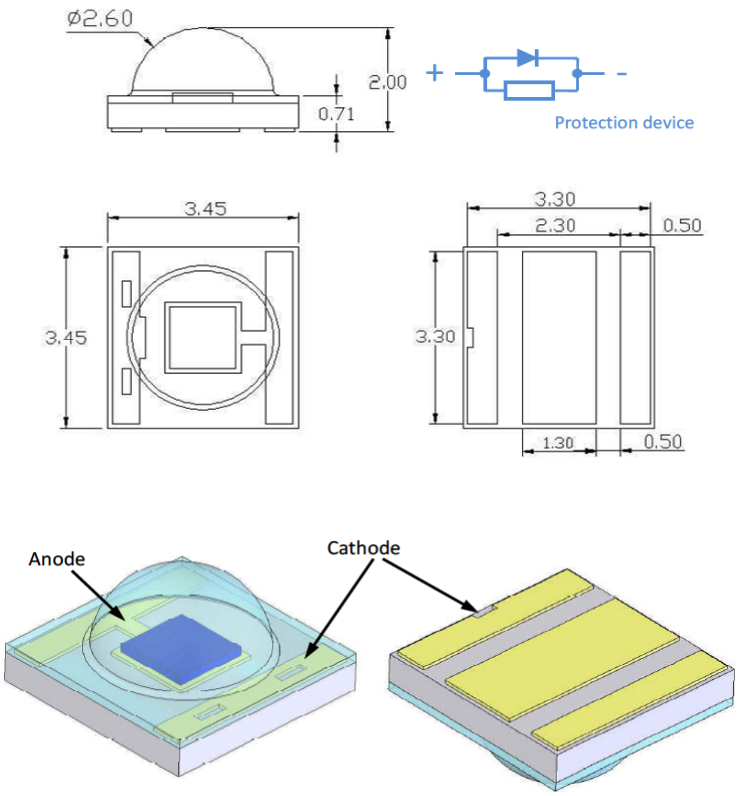
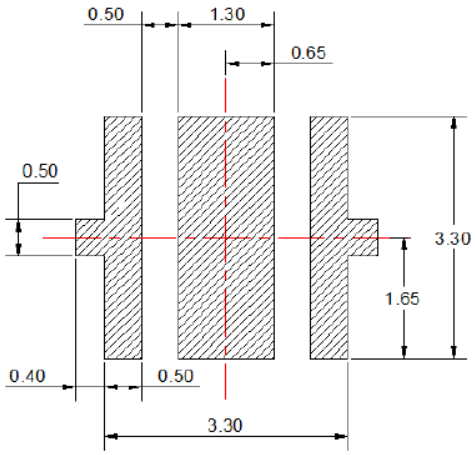
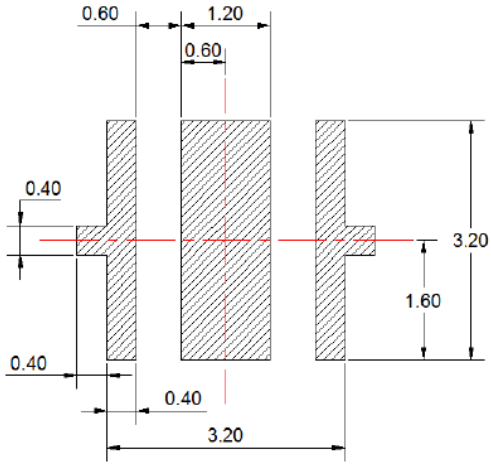
Part Number	Color	Peak Wavelength (λp)		2Θ1/2	Temperature Coefficient of Vf (mV/°C)	Thermal Resistance Junction to Pad
		Min	Max		ΔVF /ΔTJ	(℃/W) $RΘ_{J-L}$
IN-3531ACUV	U40	380	390	125	-2~-4	4.4
	U50	390	400	125	-2~-4	4.4
	U60	400	410	125	-2~-4	4.4
	U70	410	420	125	-2~-4	4.4

Notes:

1. The peak/dominant wavelength is measured with an accuracy of ±1nm.

Package Outline Dimension
Recommended Soldering Pattern for Reflow Soldering

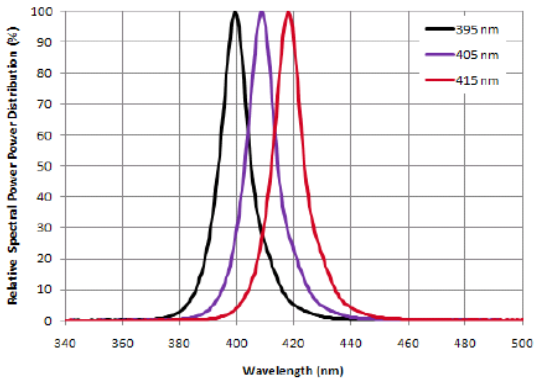
Unit: mm Tolerance: +/-0.13

Outline Dimension	Solder Pattern
	 Recommended soldering Pad Design  Recommend Stencil Pattern Design (Marked Area is Opening)
Soldering terminals may shift in the x, y direction.	Unit: mm

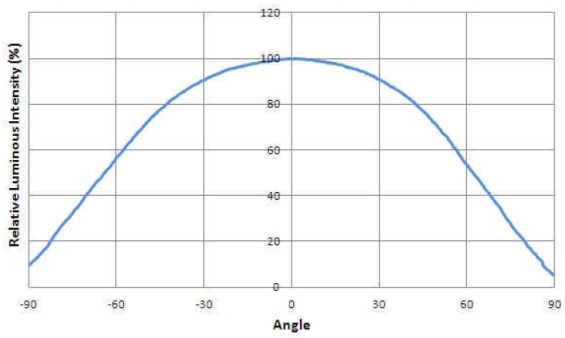
Characteristic Curves

Relative Spectral Power Distribution, Ta=25 ℃

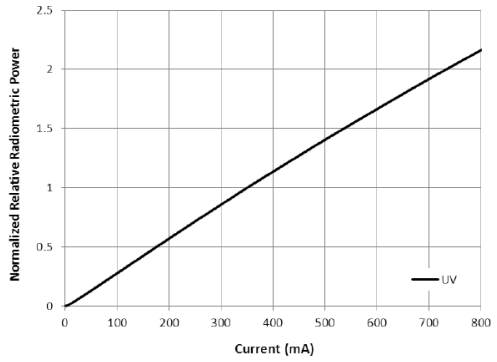
UV



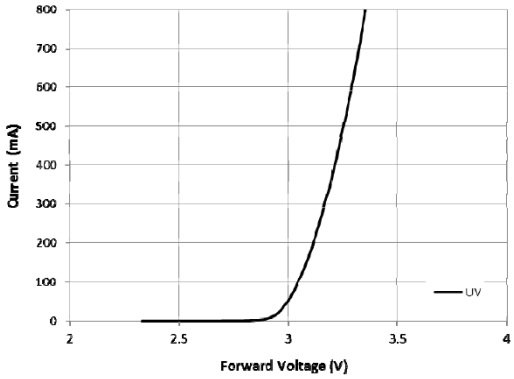
Typical Spatial Radiation Pattern



Typical Forward L-I Characteristics

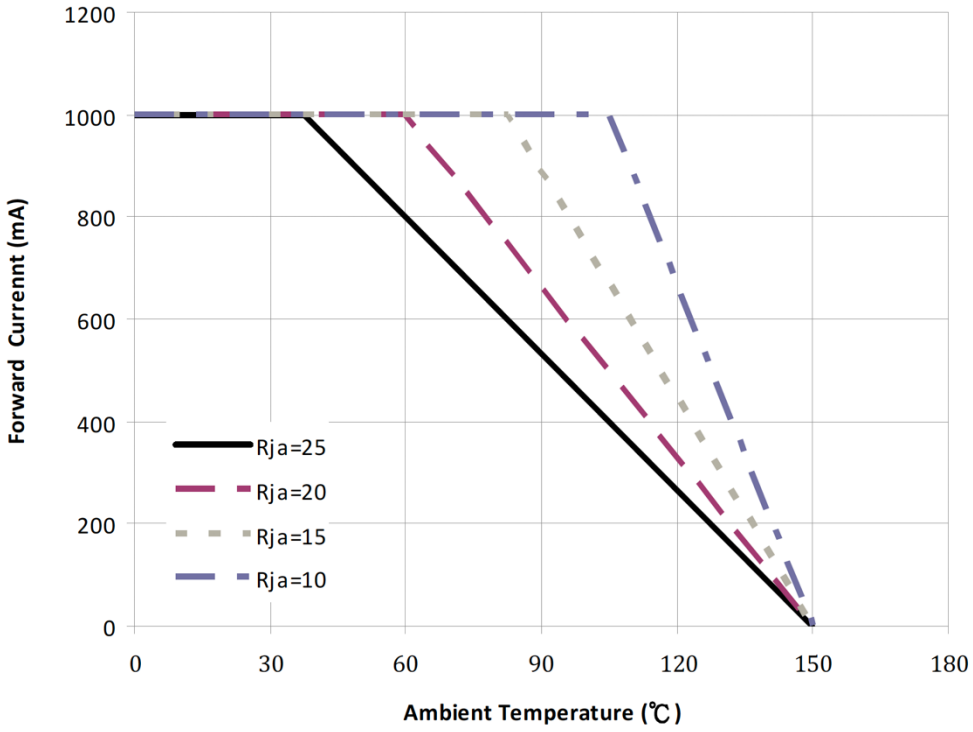


Typical Forward I-V Characteristics



Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point (RΘJ-S) and the end product should be designed to minimize the thermal resistance from the solder point to ambient in order to optimize the emitter life and optical characteristics. The maximum operation current is determined by the plot of Allowable Forward Current vs. Ambient Temperature.



The junction temperature can be correlated to the thermal resistance between the junction and ambient (Rja) by the following equation.

Tj=Ta + Rja*W

Tj: LED junction temperature

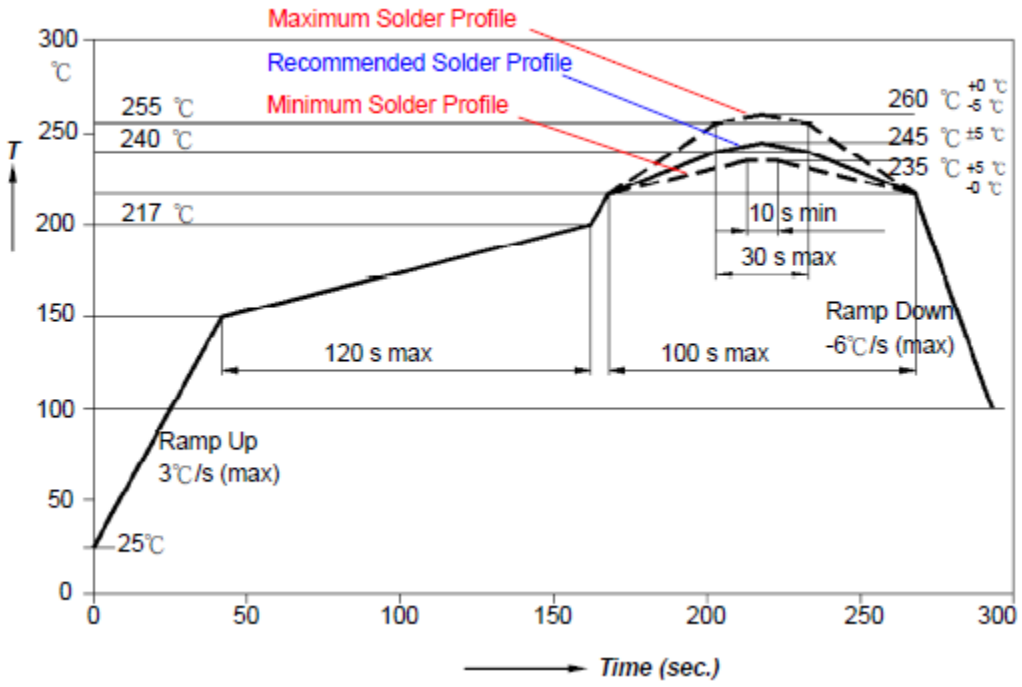
Ta: Ambient temperature

Rja: Thermal resistance between the junction and ambient

W: Input power (I_F*V_F)

Reflow Soldering

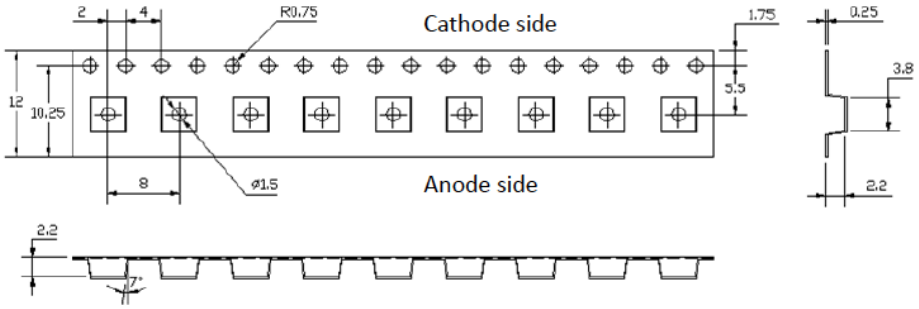
The LEDs can be soldered using the parameter listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest possible temperature is preferred for the LEDs.

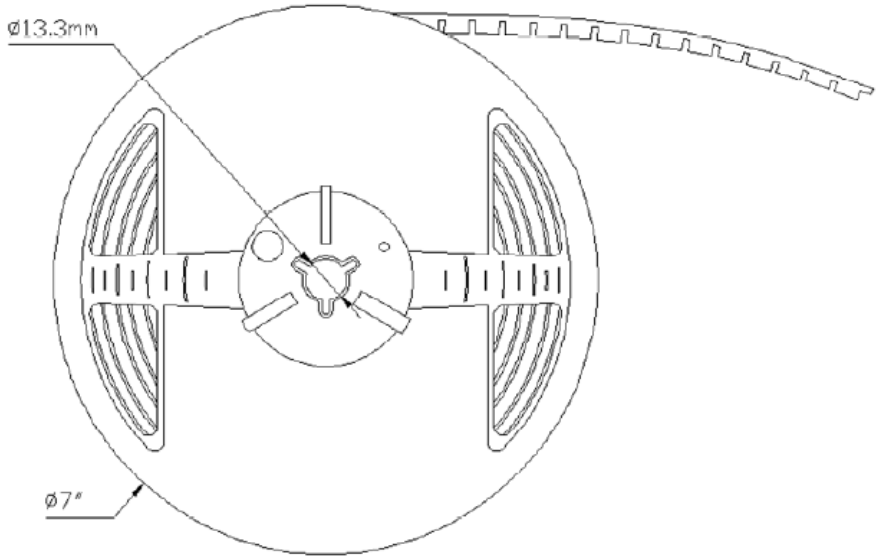


Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (Tsmax to Tp)	3℃/second max.	3℃/second max.
Preheat - Temperature Min(Tsmin) - Temperature Max(Tsmax) - Time(tsmin to tsmax)	 100℃ 150℃ 60-120 seconds	 150℃ 200℃ 60-180 seconds
Time maintained above: - Temperature(TL) - Time(tL)	 183℃ 60-150 seconds	 217℃ 60-150 seconds
Peak/classification Temperature(Tp)	215℃	260℃
Time within 5℃ of actual Peak Temperature(tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6℃/second max.	6℃/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

Packing Information

The carrier tape is conformal to EIA-481D





Note : All Dimensions are in millimeter

Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial release		1.0	01-17-2013
Format update		1.1	08-21-2015