SEMILEDS

PRODUCT DATASHEET

N5050U-UNx2

High Power UV LED

Introduction

The N5050U-UNx2 product series is a compact, high quality and reliable 4-chip UV LED. Featuring high radiometric power density and design flexibility – the N5050U-UNx2 spectrum can be tailored to your application.

Table of Contents

RoHS Compliant

Characteristics

Absolute Maximum Ratings (T_j=25°C)

Parameter	Rating
	N5050U-UNx2 Series
DC Forward Current (mA)	700 mA
LED Junction Temperature	150°C
LED Operating Temperature	-40°C~85°C
Storage Temperature	-40°C~125°C
Soldering Temperature	Max. 260°C / Max. 10sec. (JEDEC 020c)
ESD Sensitivity	2,000 V HBM (JESD-22A-114-B)
Reverse Voltage	Not designed to be driven in reverse bias (VR≦5V)
Preconditioning	Acc. to JEDEC Level 1

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.

General Characteristics at 350mA

Part number	Color	Peak Wavelength λp		$2\theta_{1/2}$	Thermal Resistance Junction to Pad (°C/W)
		Min	Max		$R\Theta_{J-L}$
N5050U-UNL2-A1G41H	U40	380	390	135	1.5
	U50	390	400	135	1.5
	U60	400	410	135	1.5
	U70	410	420	135	1.5
N5050U-UNF2-A1G41H	U40	380	390	65	1.5
	U50	390	400	65	1.5
	U60	400	410	65	1.5
	U70	410	420	65	1.5

Notes:The peak wavelength is measured with an accuracy of ±1nm

Radiometric Power and Forward Voltage (T_j=25˚C)

Part number	Color	Performance at Test Current (350mA)					Performance at 700mA
		Group	Radiometric Power (mW)		VF		Calculated Minimum Radiometric Power* (mW)
			Min	Max	Min	Max	
N5050U-UNL2-A1G41H (beam angle 135°)	U40 (380-390nm)	NHP	1000	1200	11	15	1800
		NHQ	1200	1400	11	15	2200
		NHR	1400	1600	11	15	2500
	U50 (390-400nm)	NHQ	1200	1400	11	15	2200
		NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
	U60 (400-410nm)	NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
		NI2	2000	2200	11	15	3600
	U70 (410-420nm)	NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
		NI2	2000	2200	11	15	3600

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.

Part number	Color	Performance at Test Current (350mA)					Performance at 700mA
		Group	Radiometric Power (mW)		VF		Calculated Minimum Radiometric Power* (mW)
			Min	Max	Min	Max	
N5050U-UNF2-A1G41H (beam angle 65°)	U40 (380-390nm)	NHP	1000	1200	11	15	1800
		NHQ	1200	1400	11	15	2200
		NHR	1400	1600	11	15	2500
	U50 (390-400nm)	NHQ	1200	1400	11	15	2200
		NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
	U60 (400-410nm)	NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
		NI2	2000	2200	11	15	3600
	U70 (410-420nm)	NHR	1400	1600	11	15	2500
		NHS	1600	1800	11	15	2900
		NI1	1800	2000	11	15	3200
		NI2	2000	2200	11	15	3600

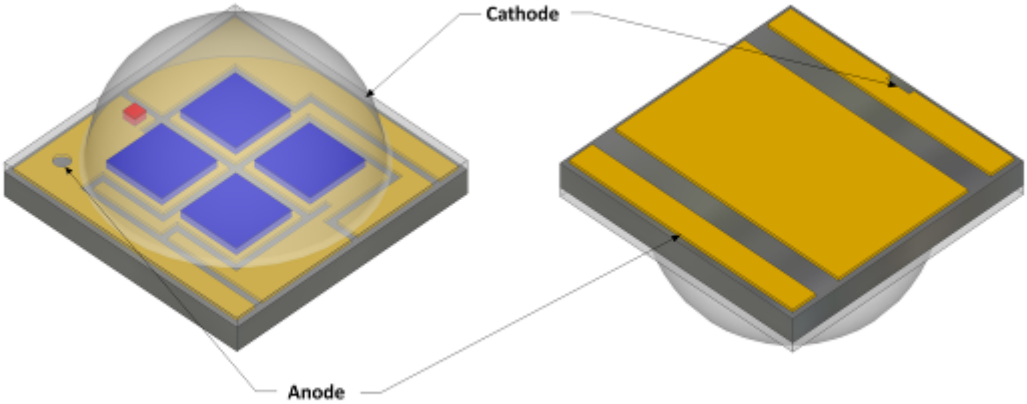
Note: 1. Radiometric power is measured with an accuracy of ±10%

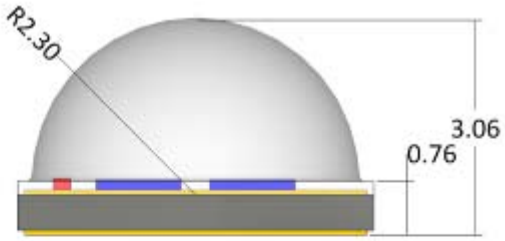
2. The forward voltage is measured with an accuracy of ±0.2V

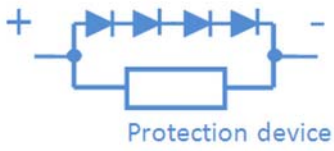
* Calculated values are for reference only.

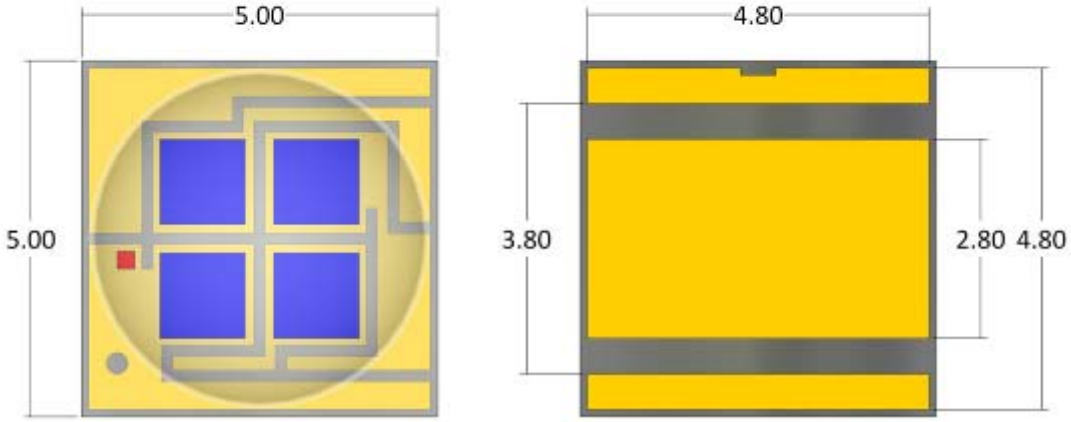
Mechanical Dimensions

N5050U-UNL2-A1G41H (beam angle 135°)





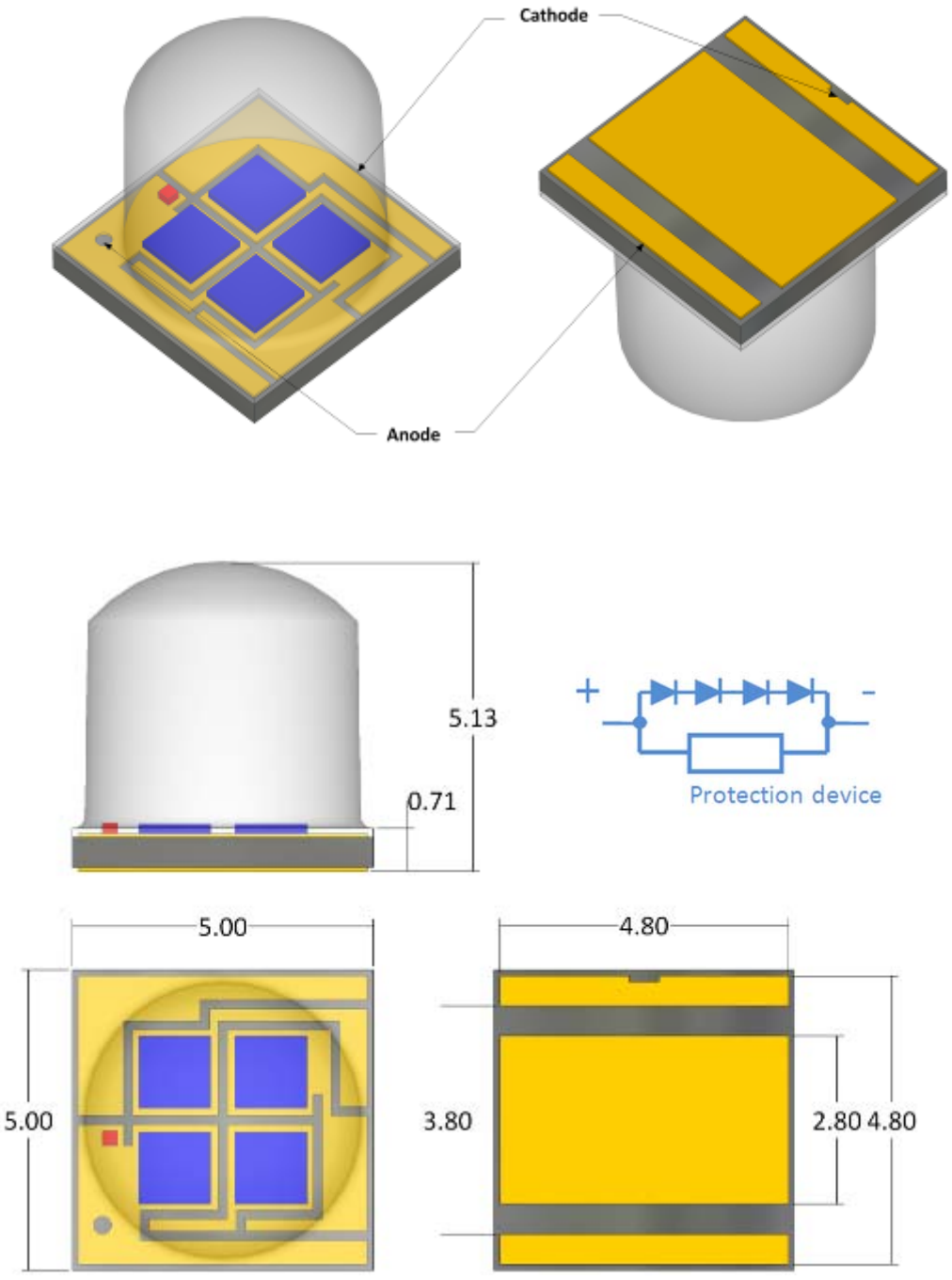




Notes :

1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are ±0.13mm unless otherwise indicated

N5050U-UNF2-A1G41H (beam angle 65°)

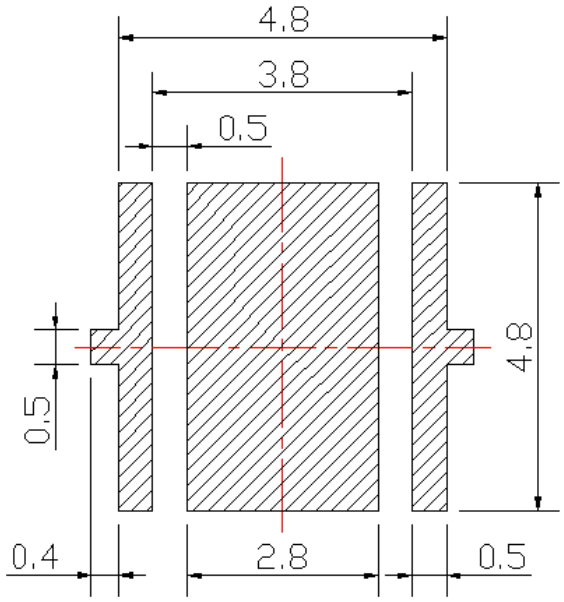


Notes :

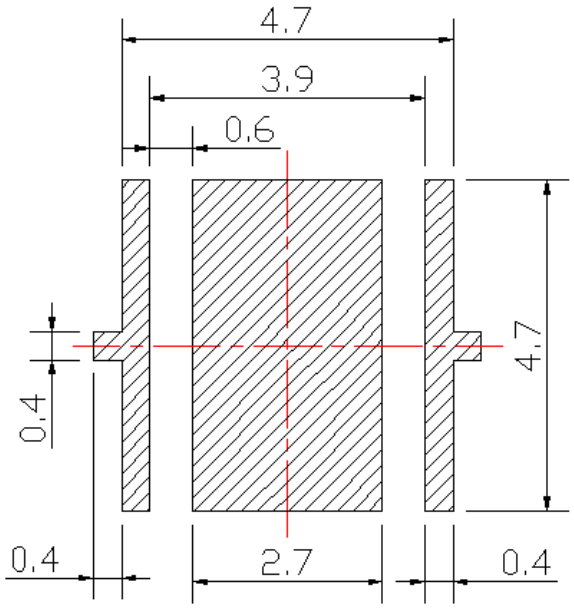
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are ±0.13mm unless otherwise indicated

Recommended Solder Pad Design

Recommended Soldering Pad Design



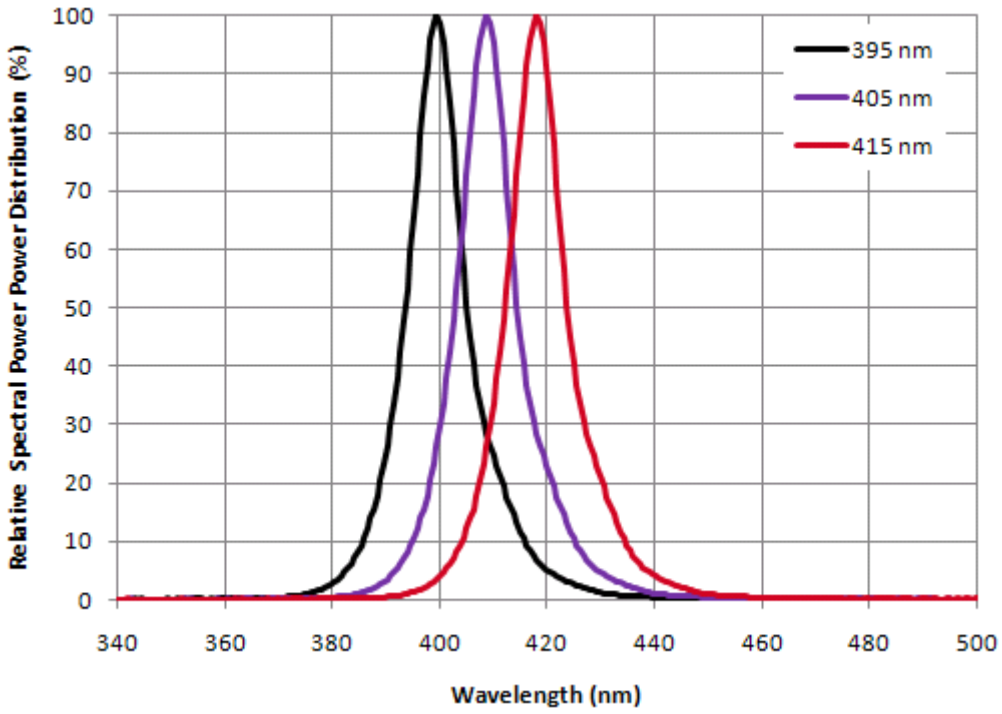
Recommended Stencil Pattern Design (Marked Area is Opening)



Notes :

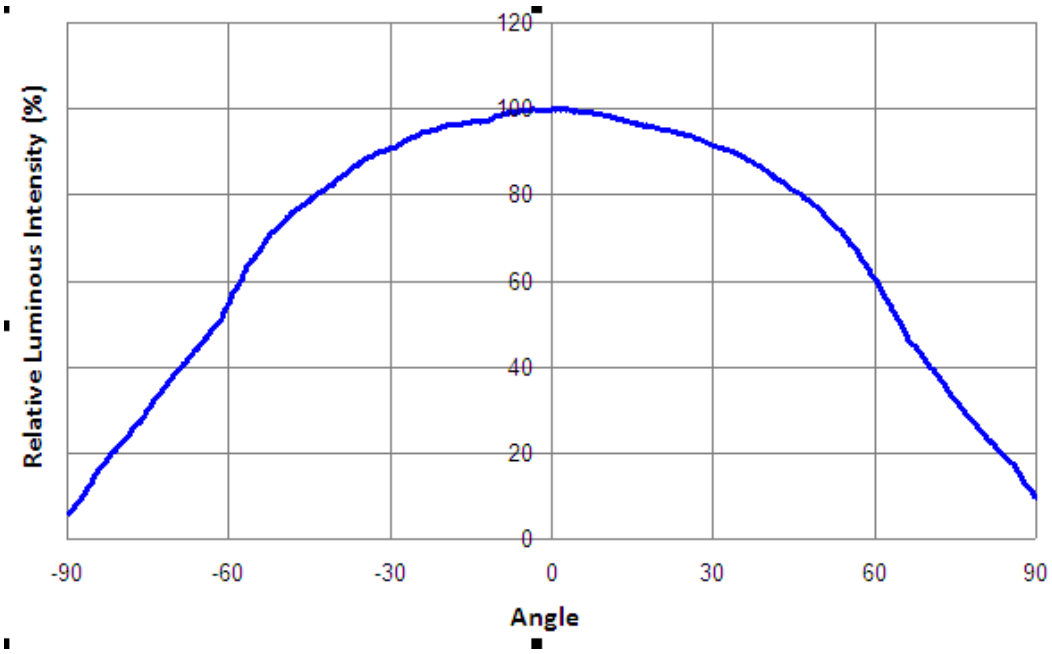
1. Drawing is not to scale
2. All dimensions are in millimeter

Relative Spectral Power Distribution, T_j=25°C

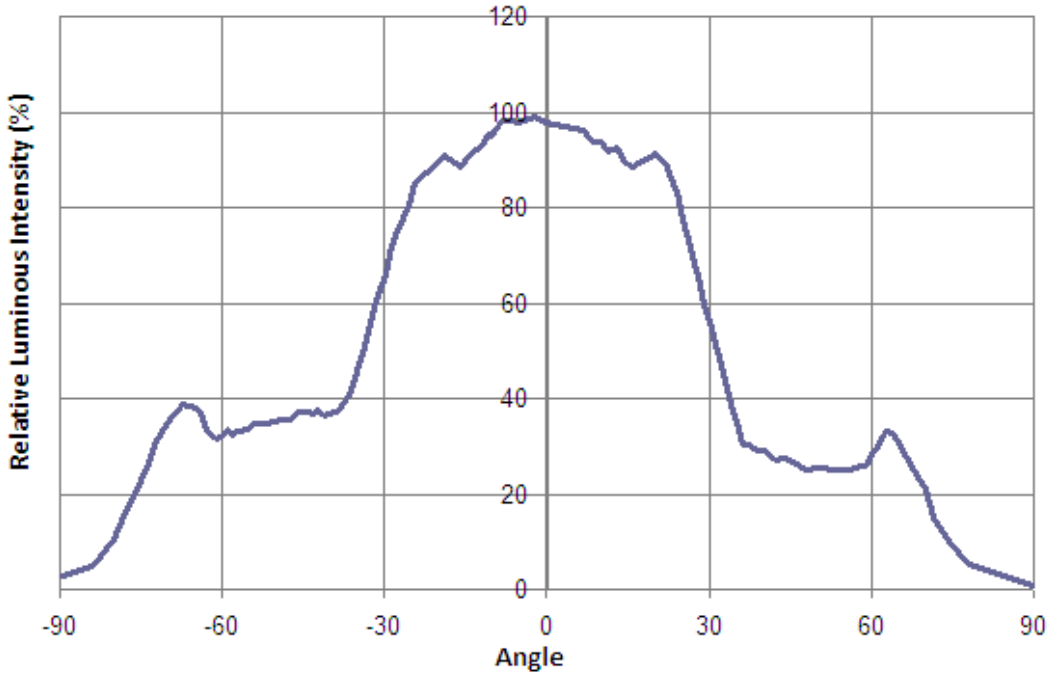


Typical Spatial Radiation Pattern

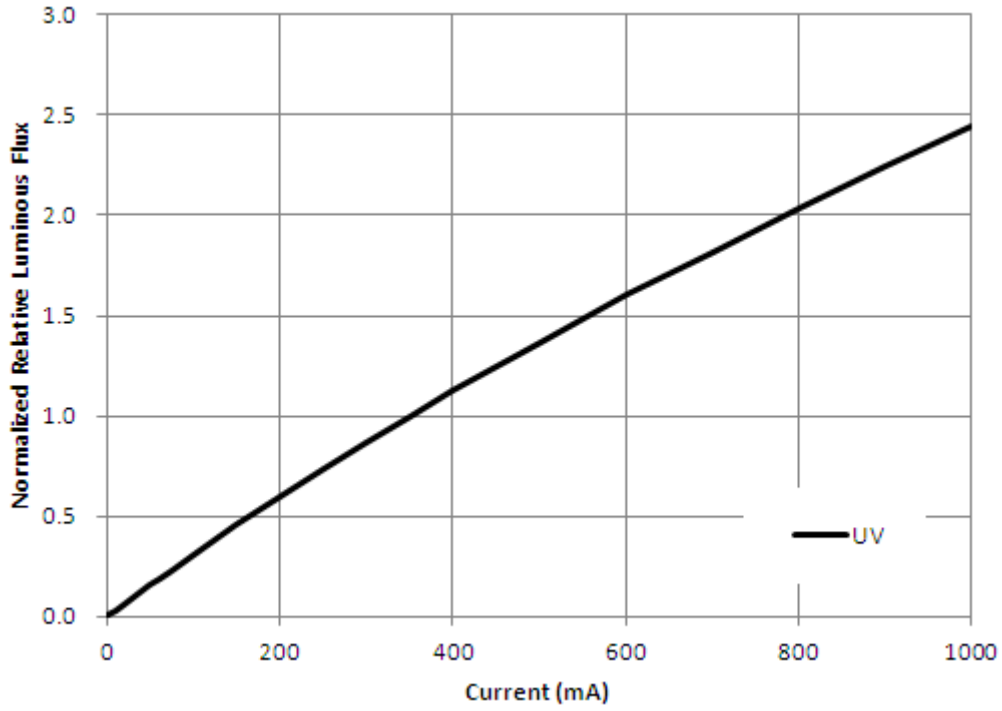
N5050U-UNL2-A1G41H (beam angle 135°)



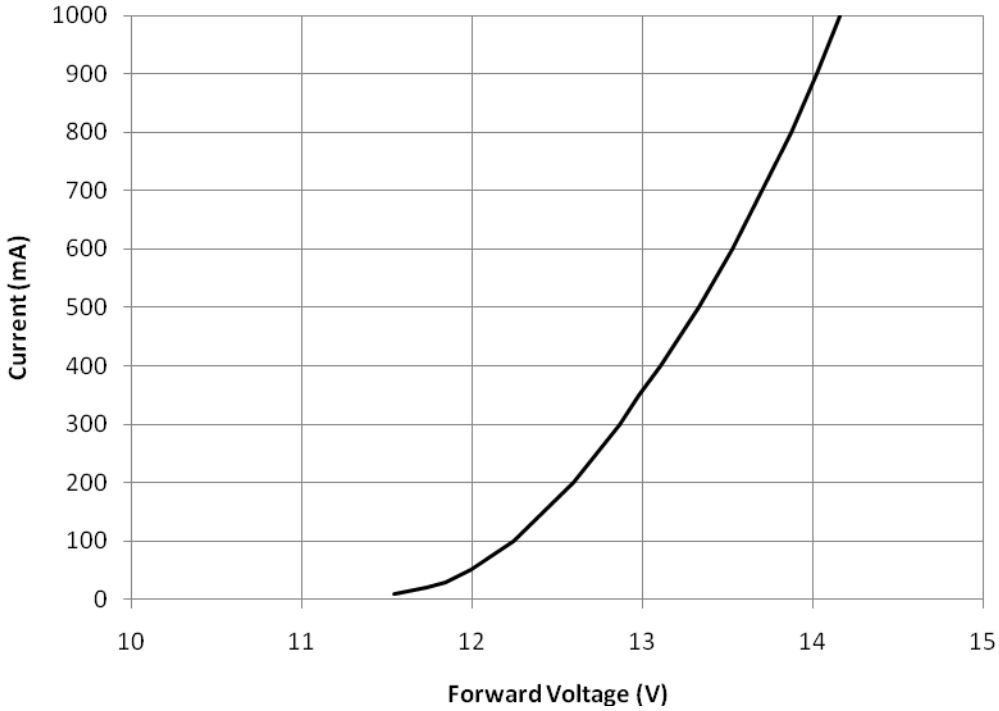
N5050U-UNF2-A1G41H (beam angle 65°)



Typical Forward L-I Characteristics, T_j=25°C

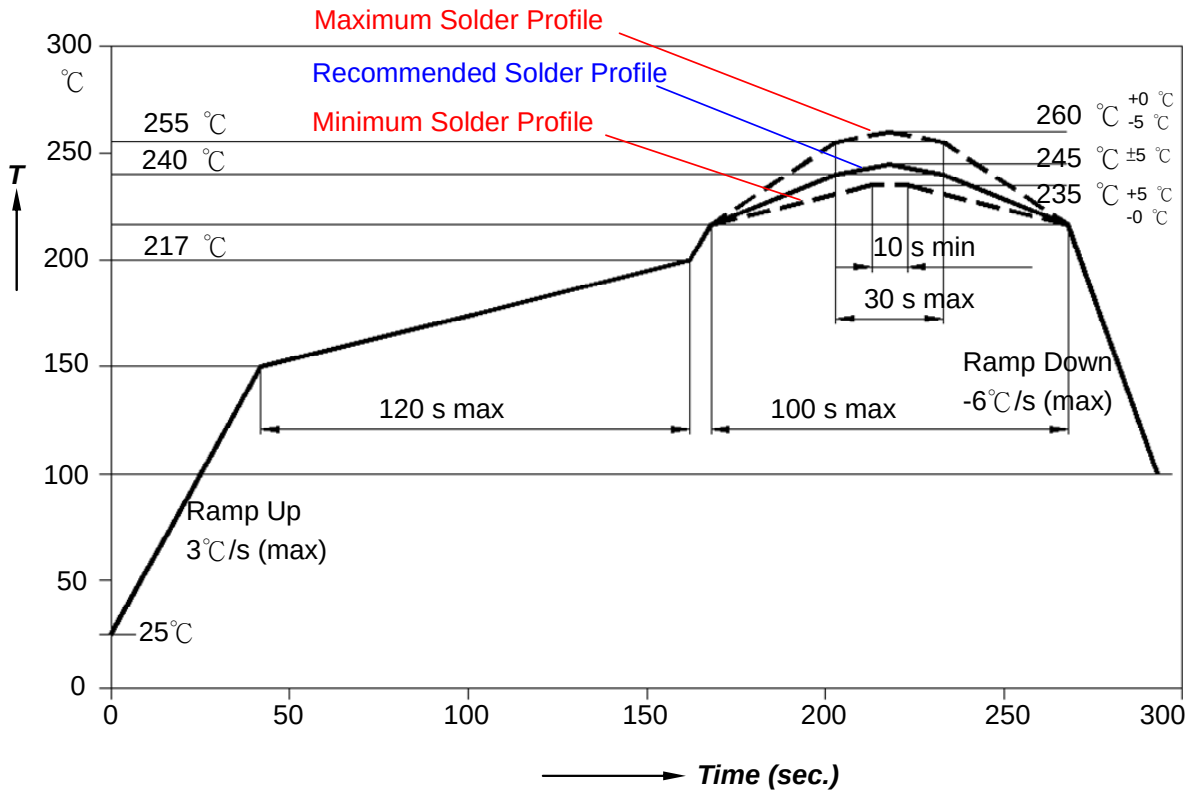


Typical Forward I-V Characteristics, T_j=25°C



Recommended Soldering Profile

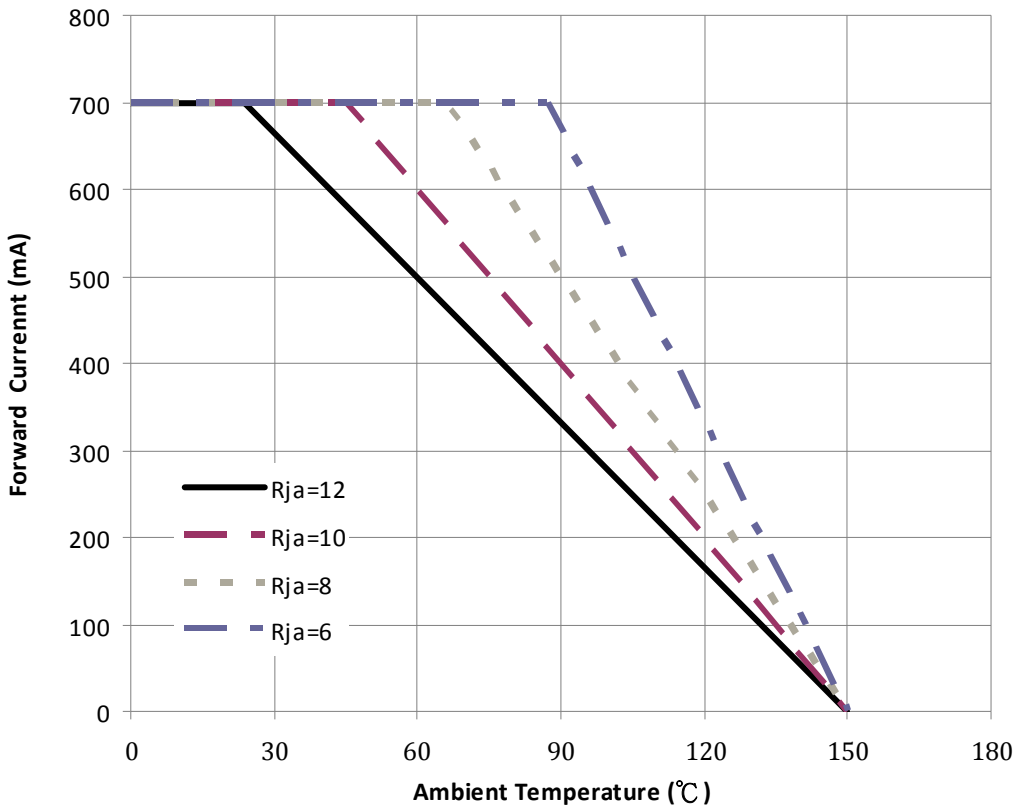
The LEDs can be soldered using the parameters listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (Ts_{max} to Tp)	3°C/second max.	3°C/second max.
Preheat - Temperature Min(Ts_{min}) - Temperature Max(Ts_{max}) - Time(ts_{min} to ts_{max})	 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/classification Temperature(Tp)	215°C	260°C
Time within 5℃ of actual Peak Temperature(tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6°C/second max.	6°C/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point ($R\Theta_{J-P}$) 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

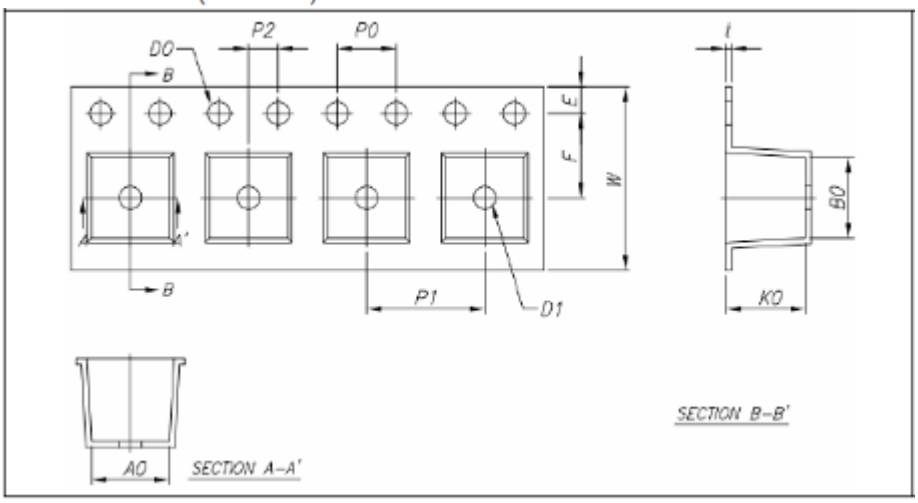
Ta: Ambient temperature

Rja: Thermal resistance between the junction and ambient

W: Input power (I_F*V_F)

Packing Information

Dimensions. (Unit: mm)



Common dimensions

Item	Specification	Tol. (+/-)
W	12.00	±0.20
E	1.75	±0.10
F	5.50	±0.10
D0	1.50	±0.10
D1	1.50	±0.10
P0	4.00	±0.10
P1	8.00	±0.10
P2	2.00	±0.10
P0x10	40.00	±0.20

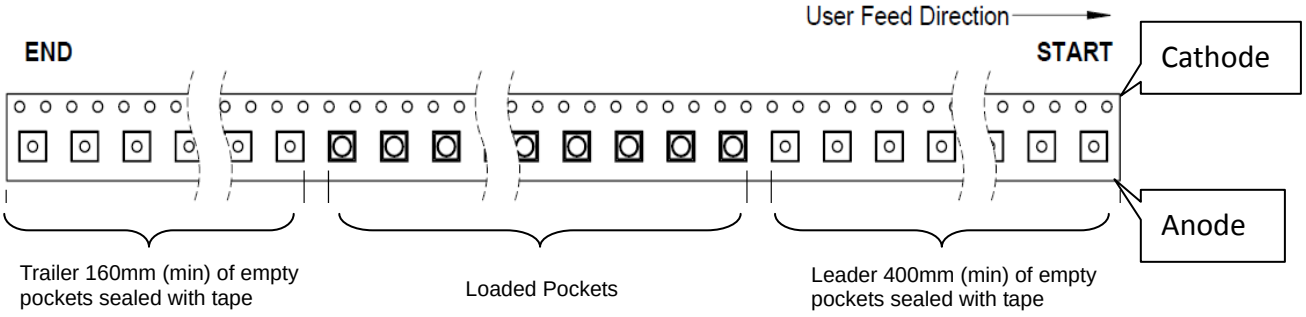
Pocket & other dimensions

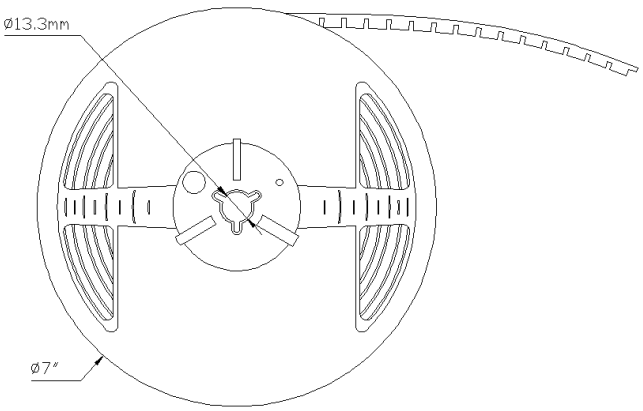
N5050U-UNL2 series

Item	Specification	Tol. (+/-)
t	0.28	±0.05
A0	5.35	±0.10
B0	5.35	±0.10
K0	3.40	±0.10

N5050U-UNF2 series

Item	Specification	Tol. (+/-)
t	0.40	±0.05
A0	5.30	±0.10
B0	5.30	±0.10
K0	5.40	±0.10





About Us

SemiLEDs is an innovative manufacturer of chip-level and packaged LEDs that enable today's advanced solid state lighting solutions. Fully ISO9001 certified, with state of the art fabrication facilities in Hsinchu Science Park, Taiwan, the company employs patented and proprietary technologies that deliver high performance with increased color stability and lumen maintenance. SemiLEDs visible- and ultraviolet-LEDs are found in a wide variety of general lighting applications, including street lights and commercial, industrial and residential architectural lighting, along with specialty industrial applications such as UV curing, medical/cosmetic, counterfeit detection, and horticulture.

SemiLEDs is a publicly traded company on NASDAQ Global Select Market (stock symbol "LEDS"). For investor information, please contact us at **investors@semileds.com.**

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