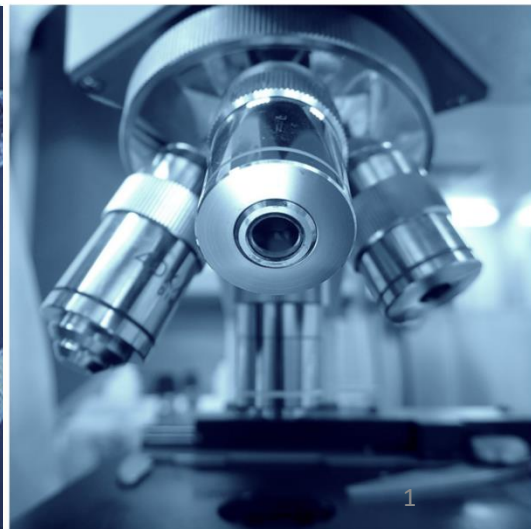
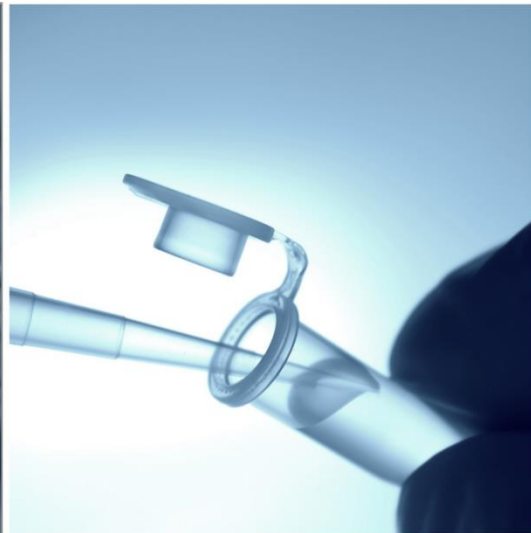
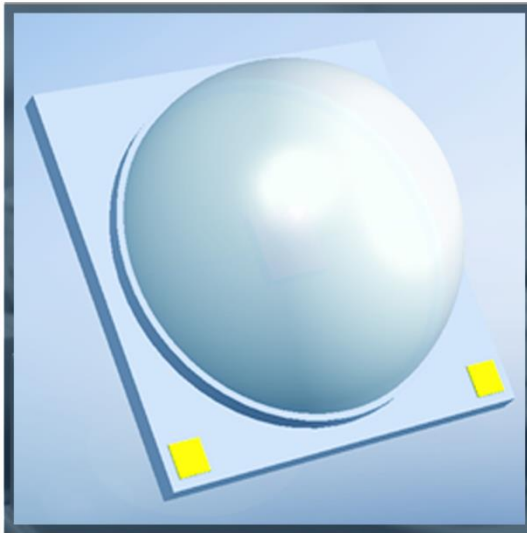


UV-C LED

Product Specifications

3535 Packaged LED

BOLB Inc.
Livermore, California
V1.7 March 2018



SMD type package



S3535--**W**avelength--**P**ower--**V**oltage



Emission Peak
+/- 5 nm



mW @ 20mA
+/- 10%



Voltage @ 20mA
+/- 0.5 V

Example:

S3535-W265-P5.0-V7.0

Interpretation:

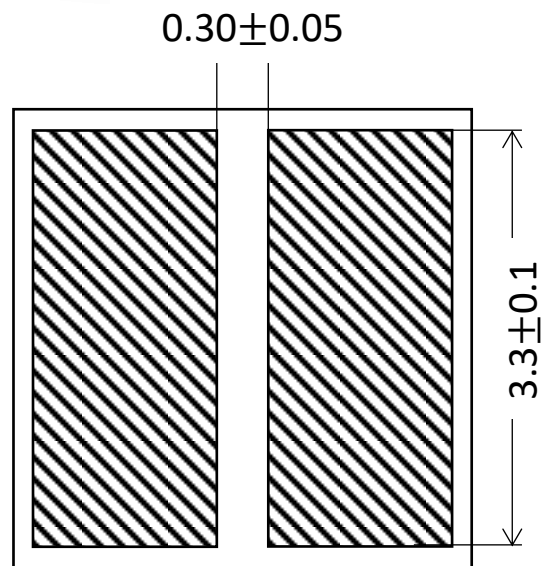
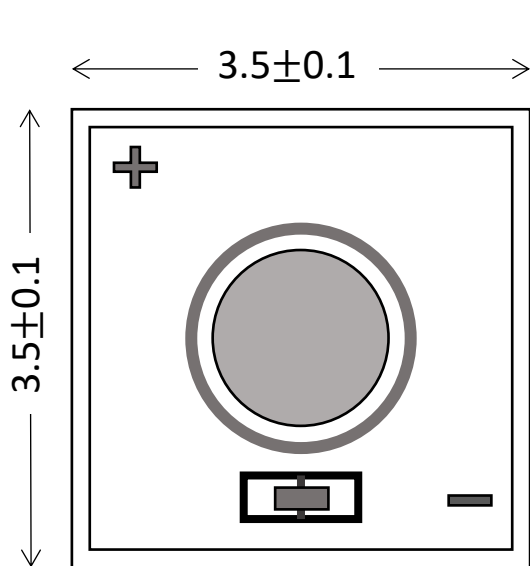
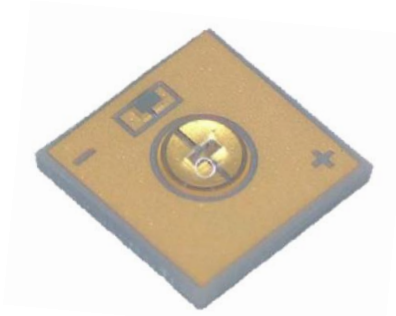
Surface Mount type 3.5x3.5mm packaged LED

Peak wavelength = 265 +/- 5nm

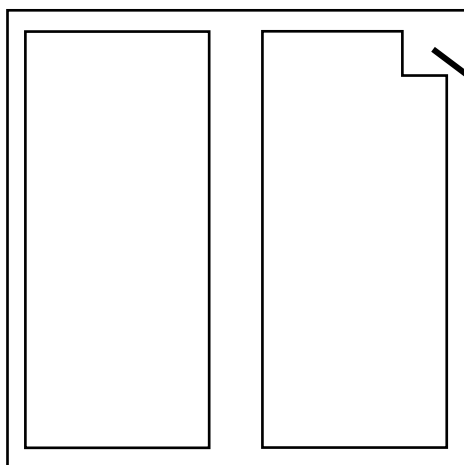
Power output @ 20mA = 5 mW (+/-10%)

Forward voltage @20mA = 7.0V (+/- 0.5V)

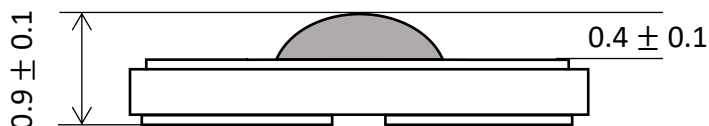
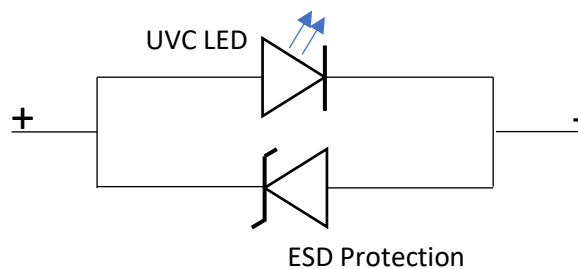
3535 Packaged LED Diagram



Recommended Solder Pattern on PCB



Cathode Mark



All Units = mm

TABLE 1. Performance @ 20mA forward current (25°C ambient, packaged)

Parameter	Symbol	Unit	Min.	Typ.	Max
Peak Wavelength	λ_p	nm	260	270	275
Radiant Flux	ϕ_e	mW	3.8	4.5	5.2
			6.0*	9.0*	11.0*
Forward Voltage	VF	V	6.5	7.5	8.5
			5.0*	5.6*	6.5*
Spectrum Half Width	$\Delta\lambda$	nm		9.5	
View Angle	2 $\theta_{1/2}$	°		150	
Thermal Resistance	RJ-b	°C/W		<10 (TBD)	

*G2 type LEDs: Sampling stage with very limited availability

FIG 1. Forward Current vs. Forward Voltage

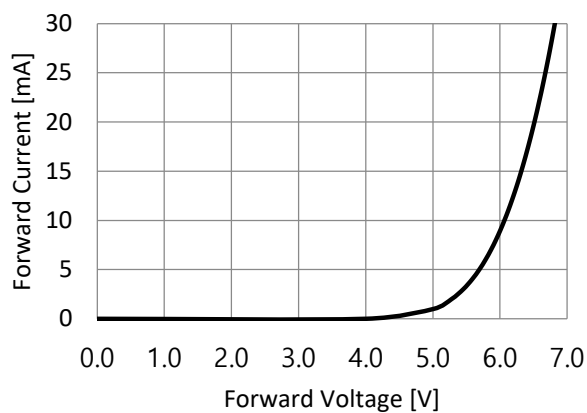


FIG 2. Relative Radiant Flux vs. Forward Current

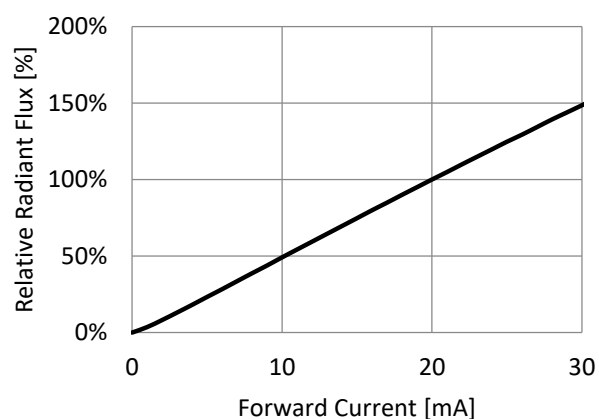


FIG 3. Peak Wavelength vs. Forward Current

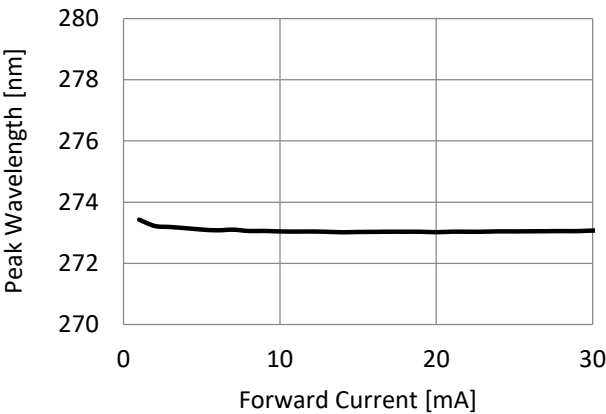


FIG 4. Spectrum

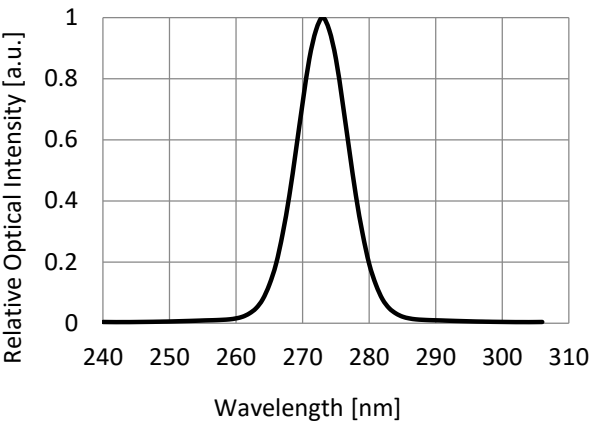


Fig 5. Forward Voltage vs Ambient Temperature

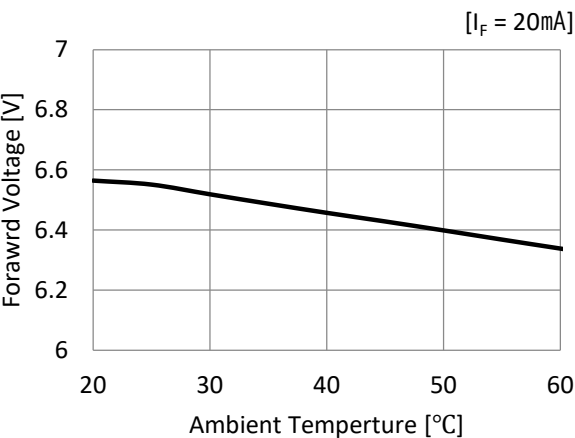


Fig 6. Relative Radiant Flux vs Ambient Temperature

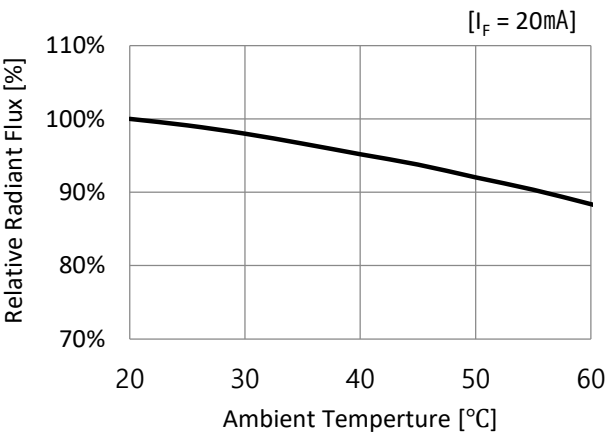


Fig 7. Far-field Emission Pattern

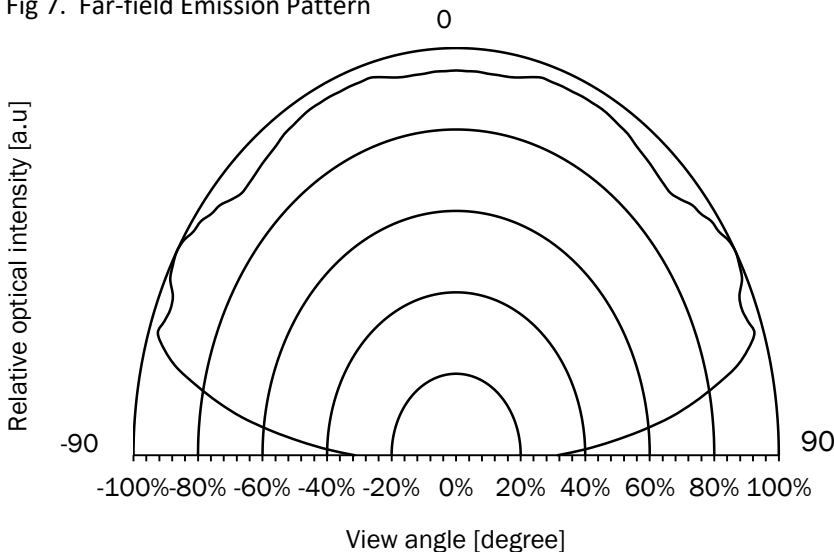


TABLE 2. Device lifetime (forward current =20mA, T = 25°C)

Parameter	Symbol	Unit	Min.	Typ.	Max
70% Power Lifetime	L70	hours	850	1000	2000
50% Power Lifetime	L50	hours	1200	2000	5000



TABLE 3. Bin Structures

[Ta =25°C, I_F = 20mA]

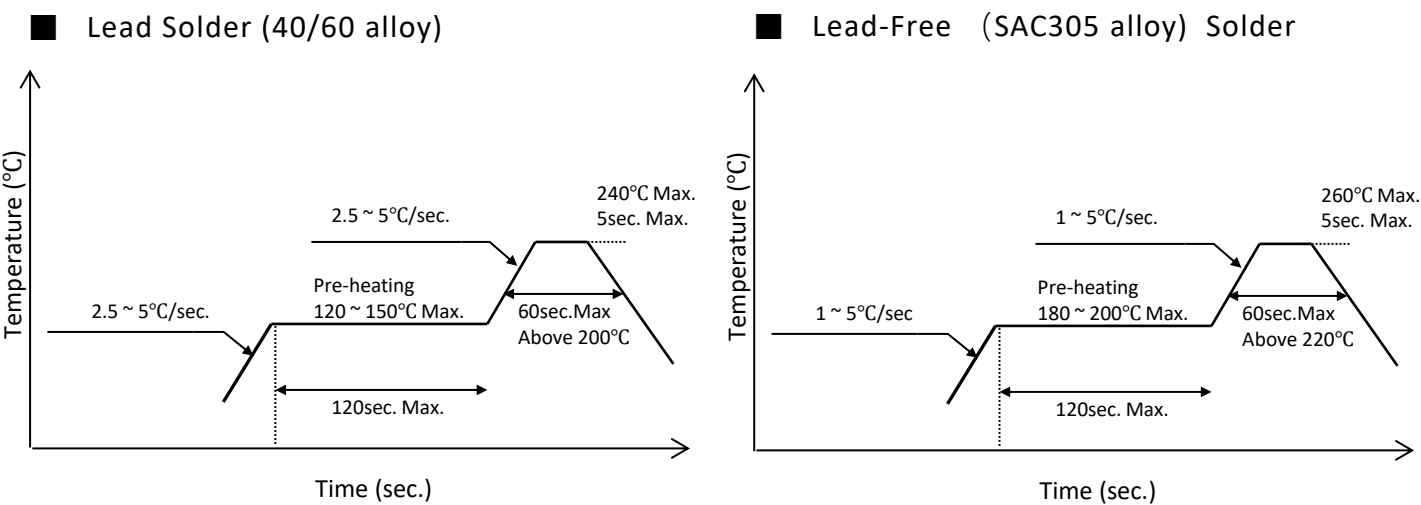
Designate	Information	Code	Min	Typ.	Max.
W	Peak Wavelength	265	260	265	270
		275	270	275	280
P	Radiant Flux (Φ _e)	1.5	1.0	1.5	2.0
		2.5	2.0	2.5	3.0
		3.5	3.0	3.5	4.0
		4.5	4.0	4.5	5.0
		5.5	5.0	5.5	6.0
		G2*	6.0	-	11.0
V	Forward Voltage (V)	5.5	5.0	5.5	6.0
		6.0	6.0	6.5	7.0
		6.5	7.0	7.5	8.0
		7.0	8.0	8.5	9.0
		H	9.0	9.5	10.0

***G2:** Sampling stage with very limited availability

Note: Bin Code method

Bin Code (W-P-V): Peak Wavelength = W ; Radiant Flux = P ; Forward Voltage = V

FIG 8. Solder reflow temperature profile



Reflow Soldering		
	Lead Solder (40/60 alloy)	Lead-Free Solder (SAC305 alloy)
Pre-Heating	120 ~ 150°C	180 ~ 200°C
Pre-Heat Time	120sec. Max.	120sec. Max.
Peak Temperature	240°C Max.	260°C Max.
Soldering Time	5sec. Max.	5sec. Max.

- Recommended solder composition: 305 alloy (SnAgCu)
- Recommended stencil thickness is 60~80um
- Recommended stencil solder paste area is 60~80%
- Forming gas (5%-7%H₂ in N₂) ambient recommended for best results
- After reflow soldering, Rapid cooling should be avoided
- When soldering, do not use a hot plate. A convection type reflow oven is preferred. (Fig 9.)



Fig 9. Do not use a hot plate to mount led-package onto PCB. A reflow oven is recommended.

ESD Protection

Workplace setup should follow the recommendations given in JEDEC standard document JESD625B “Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices” or IEC 61340-5-1,2 and 3. The operators should be properly trained to handle UVC flipchips according the guidelines listed below:

- Always wear conductive wrist straps that is continuously monitored when working or handling assembled boards containing unprotected chips.
- Use an ion blower to neutralize the static discharge that may build up on the surface of the UVC flipchips during storage and handling.
- Always keep unused UVC flipchips in the protective ESD storage bag. Depending on the final application, it may be necessary to include additional ESD protection, such as a TVS protection diode on the substrate on which UVC flip chip is reflowed. Bolb Inc. includes a TVS chip inside each LED package.
- Use tweezers to pick up UVC LEDs, teflon coated tweezers would be recommended to avoid scratching UVC LEDs.
- Recommend holding the sidewalls of the LEDs (See Fig 10.)

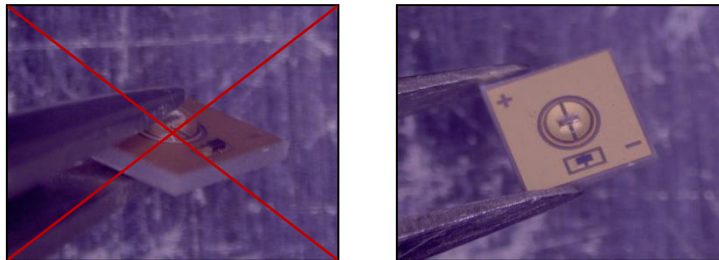


Fig 10. incorrect handling (left) and correct handling (right) of UVC LED Package



UVC flipchip emits deep ultraviolet radiation, with extremely high intensity near its surface. This allows rapid disinfection but safety precautions must be observed during assembly and testing.

By purchasing the UVC LEDs from the manufacturer, the customer hereby agrees to absolve the manufacturer's responsibility of any bodily harm as a result of failure to observe the precautions, warnings and guidelines contained within this Specifications.

All assembly workers, observers and bystanders must wear eye and skin protection when the UVC LEDs are energized. Bare eye observation (including through microscopes) and bare-hand handling of a UVC LED in operation is **PROHIBITED**.

UVC light can be easily absorbed, so any oil or other absorbent liquid or solid substance must **NOT** be allowed to touch the sapphire side of the UVC chip, or the dome lens on a packaged LED.

Do not apply pressure to the dome lens on packaged LED.