




# PRODUCT SPECIFICATION

**Model No : CSHV-NL60xWG4-C2**

Descriptions:	
• LED Type	: High Power VEGA
• LED Package	: Lambertian
• Emitting Color	: CW / NW / WW
• Viewing Angle	: 120°
• Encapsulating	: Silicone LENS



CUSTOMER APPROVED SIGNATURES	APPROVED BY	CHECKED BY	PREPARED BY
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<b>Spec. No.</b>	PS-0905-004
<b>Rev.</b>	A

■ **Features –**

1. High Luminous Output
2. Silicone Encapsulation
3. RoHs Compliant
4. Compatible Lead-Free Reflow Solder
5. ESD>8KV(HBM)
6. Standard Collimator Compatible
7. Low thermal resistance (junction to Case) : 10 °C/W

■ **Device Selection Guide –**

Part No.	Chip		LED Lens
	Material	Emitted Color	
CSHV-NL60CWG4-C2	InGaN/Sapphire	Cool White	Water Transparent
CSHV-NL60NWG4-C2		Neutral White	
CSHV-NL60WWG4-C2		Warm White	

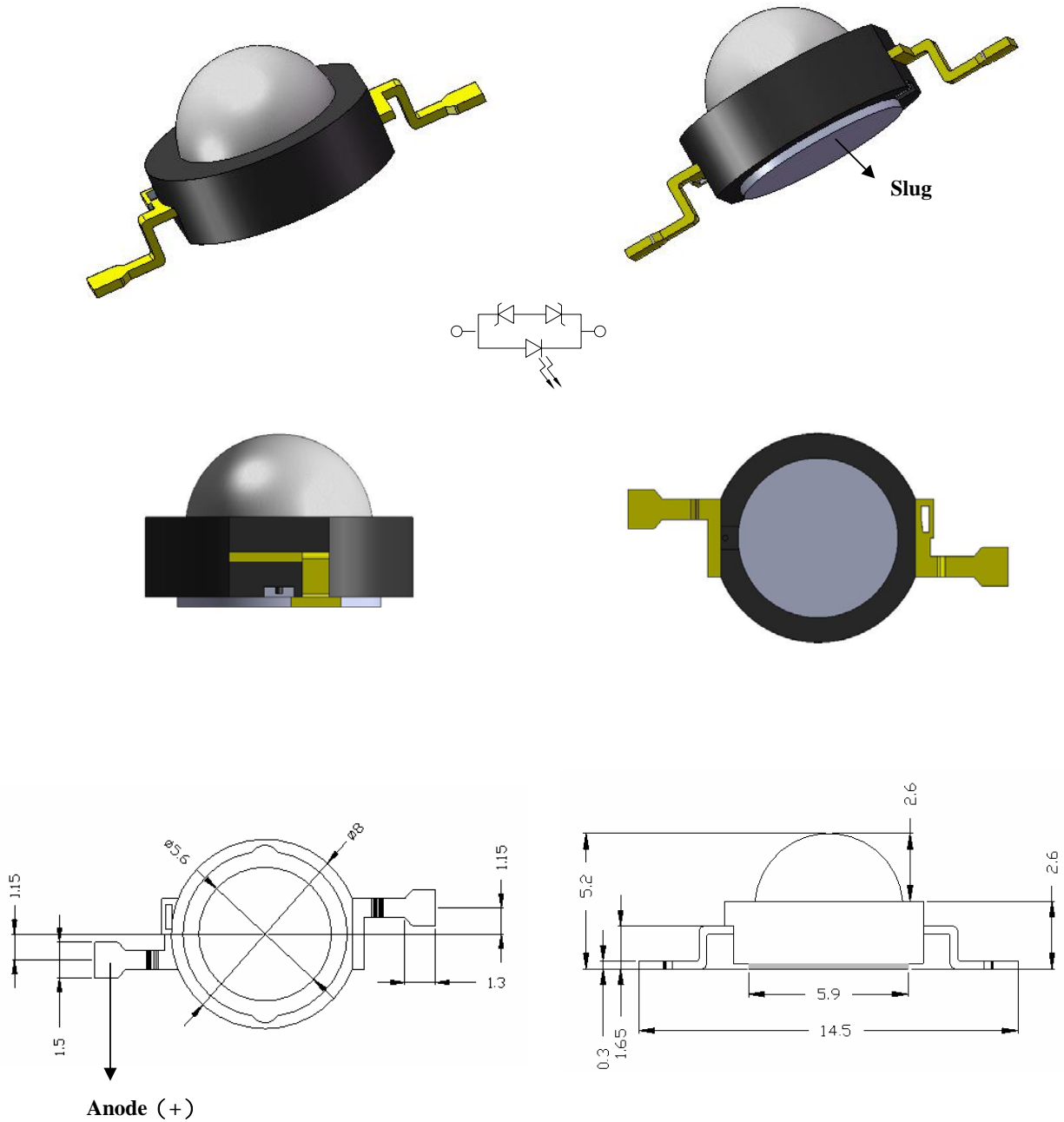
■ **Absolute Maximum Rating –**

(Ta=25°C)

Parameter	Symbol	Rating	Unit
Power Dissipation	<b>Pd</b>	2	W
Forward Current (DC)	<b>IF</b>	500	mA
Peak Forward Current *	<b>IFP</b>	700	mA
Reverse Voltage	<b>VR</b>	5	V
Operating Temp.	<b>Topr</b>	-40 ~ +85	°C
Storage Temp.	<b>Tstg</b>	-40 ~ +100	°C

\* Pulse width  $\leq 0.1$  msec. duty  $\leq 1/10$

■ Package Outline Dimensions –



Notes: Tolerance of measurement of Dimension:  $\pm 0.25\text{mm}$

■ **Electrical / Optical Characteristics –**

(Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	VF		3.4	4	V	IF=350mA
Luminous Flux	Φv	58	75		lm	
Viewing Angle	2θ 1/2		120		deg	
Color Rendering Index	Ra	90			CRI	
Reverse Current	IR			50	μA	VR=5V

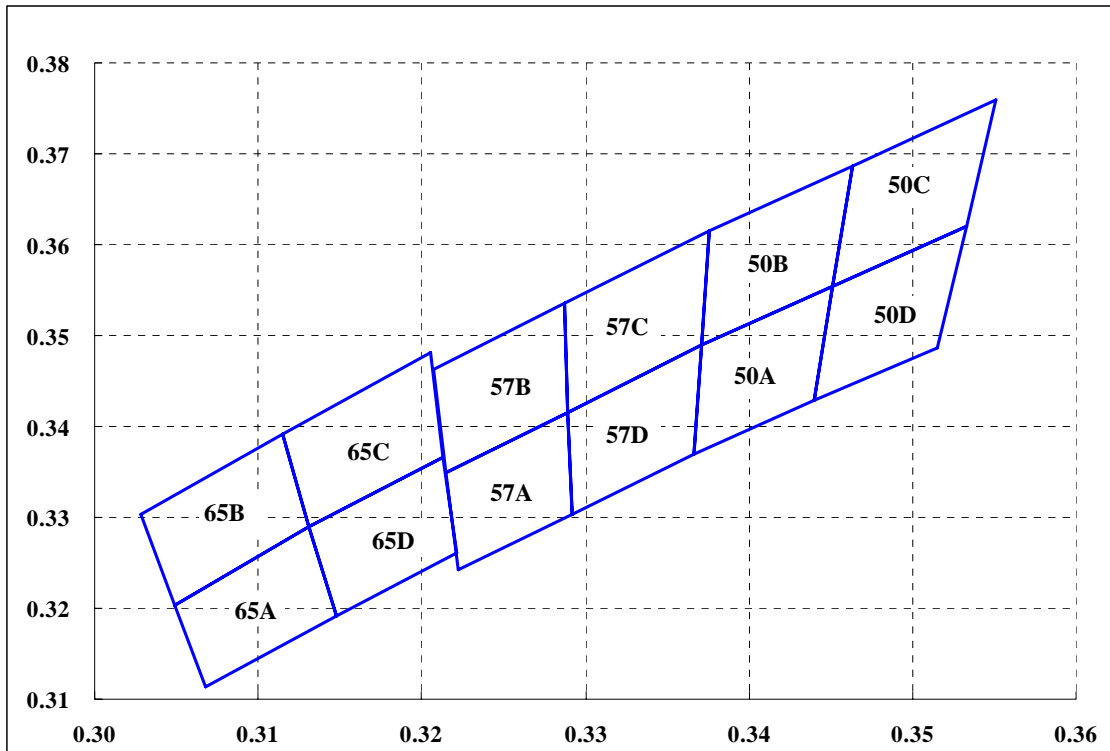
■ **Luminous Flux Rank Limits ( IF = 350mA )**

unit : lm

Luminous Flux Part No.	58-70	70-80	80-90	90-100
	CSHV-NL60CWG4-C2	K	L	M
CSHV-NL60NWG4-C2	K	L	M	N
CSHV-NL60WWG4-C2	K	L	M	N

■ **Color Rank Limits ( IF = 350mA )**

**CSHV-NL60CWG4-C2**



<b>Rank 65 Color Temperature:6500K (6530 ± 510)</b>									
<b>65A</b>					<b>65C</b>				
<b>X</b>	0.3049	0.3131	0.3148	0.3068	<b>X</b>	0.3115	0.3205	0.3213	0.3131
<b>Y</b>	0.3204	0.3289	0.3191	0.3113	<b>Y</b>	0.3392	0.3481	0.3366	0.3289
<b>65B</b>					<b>65D</b>				
<b>X</b>	0.3028	0.3115	0.3131	0.3049	<b>X</b>	0.3131	0.3213	0.3221	0.3148
<b>Y</b>	0.3304	0.3392	0.3289	0.3204	<b>Y</b>	0.3289	0.3366	0.3261	0.3191

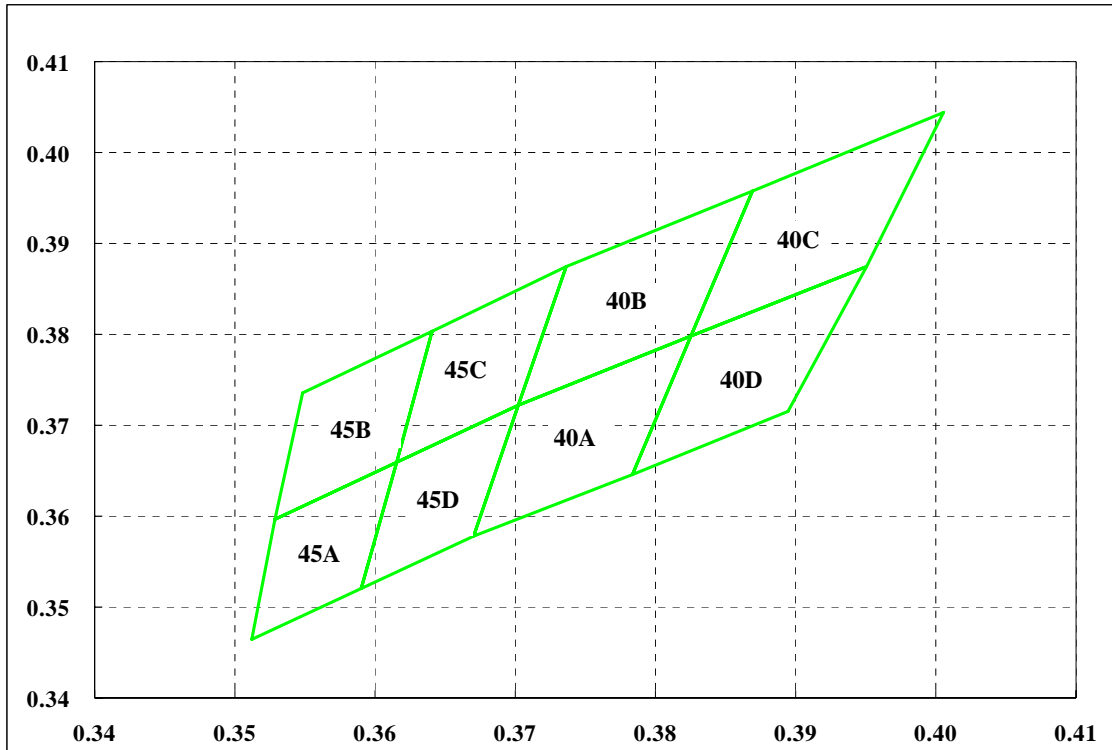
<b>Rank 57 Color Temperature:5700K (5665 ± 355)</b>									
<b>57A</b>					<b>57C</b>				
<b>X</b>	0.3215	0.3289	0.3292	0.3222	<b>X</b>	0.3287	0.3376	0.3371	0.3289
<b>Y</b>	0.3349	0.3415	0.3303	0.3243	<b>Y</b>	0.3535	0.3616	0.3490	0.3415
<b>57B</b>					<b>57D</b>				
<b>X</b>	0.3207	0.3287	0.3289	0.3215	<b>X</b>	0.3289	0.3371	0.3366	0.3292
<b>Y</b>	0.3462	0.3535	0.3415	0.3349	<b>Y</b>	0.3415	0.3490	0.3369	0.3303



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<b>Rank 50 Color Temperature:5000K (5028 ± 283)</b>									
<b>50A</b>					<b>50C</b>				
<b>X</b>	0.3371	0.3451	0.3440	0.3366	<b>X</b>	0.3463	0.3551	0.3533	0.3451
<b>Y</b>	0.3490	0.3554	0.3428	0.3369	<b>Y</b>	0.3687	0.3760	0.3620	0.3554
<b>50B</b>					<b>50D</b>				
<b>X</b>	0.3376	0.3463	0.3451	0.3371	<b>X</b>	0.3451	0.3533	0.3515	0.3440
<b>Y</b>	0.3616	0.3687	0.3554	0.3490	<b>Y</b>	0.3554	0.3620	0.3487	0.3428

**CSHV-NL60NWG4-C2**



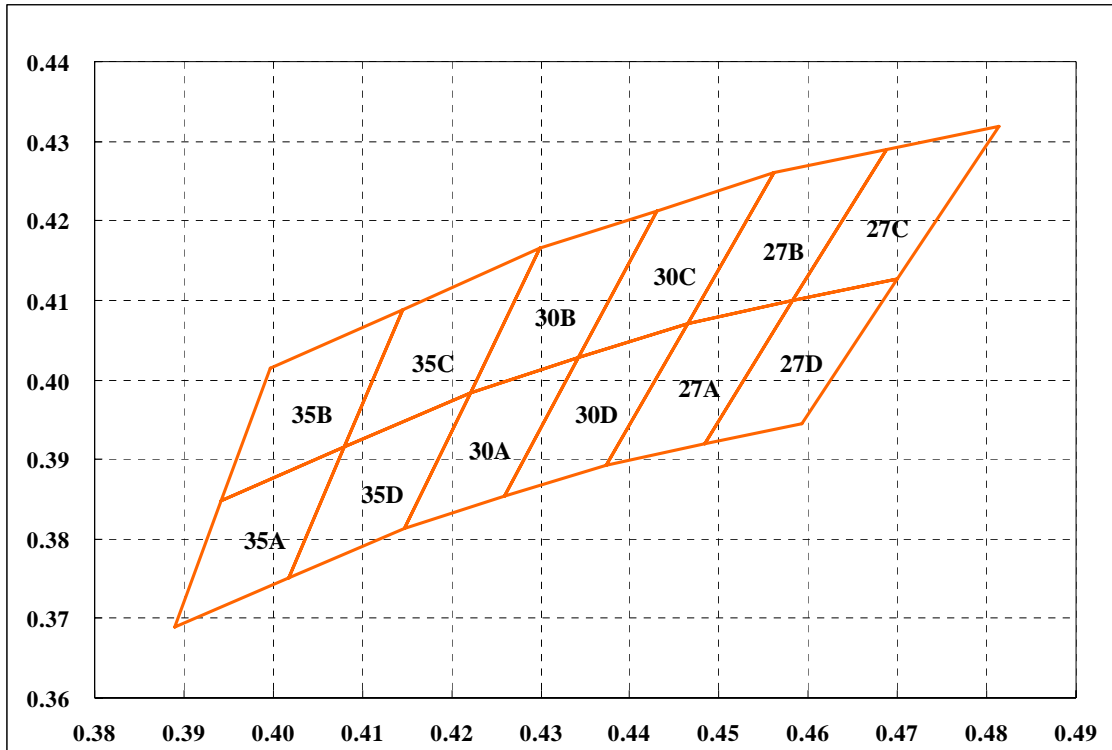
<b>Rank 45 Color Temperature:4500K (4503 ± 243)</b>									
<b>45A</b>					<b>45C</b>				
<b>X</b>	0.3512	0.3529	0.3615	0.3590	<b>X</b>	0.3615	0.3641	0.3736	0.3702
<b>Y</b>	0.3465	0.3597	0.3659	0.3521	<b>Y</b>	0.3659	0.3804	0.3874	0.3722
<b>45B</b>					<b>45D</b>				
<b>X</b>	0.3529	0.3548	0.3641	0.3615	<b>X</b>	0.3590	0.3615	0.3702	0.3670
<b>Y</b>	0.3597	0.3736	0.3804	0.3659	<b>Y</b>	0.3521	0.3659	0.3722	0.3578



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<b>Rank 40 Color Temperature:4000K (3985 ± 275)</b>									
<b>40A</b>					<b>40C</b>				
<b>X</b>	0.3670	0.3702	0.3825	0.3783	<b>X</b>	0.3825	0.3869	0.4006	0.3950
<b>Y</b>	0.3578	0.3722	0.3798	0.3646	<b>Y</b>	0.3798	0.3958	0.4044	0.3875
<b>40B</b>					<b>40D</b>				
<b>X</b>	0.3702	0.3736	0.3869	0.3825	<b>X</b>	0.3783	0.3825	0.3950	0.3895
<b>Y</b>	0.3722	0.3874	0.3958	0.3798	<b>Y</b>	0.3646	0.3798	0.3875	0.3716

**CSHV-NL60WWG4-C2**



<b>Rank 35 Color Temperature:3500K (3465 ± 245)</b>									
<b>35A</b>					<b>35C</b>				
<b>X</b>	0.3889	0.3941	0.4080	0.4017	<b>X</b>	0.4080	0.4146	0.4299	0.4221
<b>Y</b>	0.3690	0.3848	0.3916	0.3751	<b>Y</b>	0.3916	0.4089	0.4165	0.3984
<b>35B</b>					<b>35D</b>				
<b>X</b>	0.3941	0.3996	0.4146	0.4080	<b>X</b>	0.4017	0.4080	0.4221	0.4147
<b>Y</b>	0.3848	0.4015	0.4089	0.3916	<b>Y</b>	0.3751	0.3916	0.3984	0.3814

<b>Rank 30 Color Temperature:3000K (3045 ± 175)</b>									
<b>30A</b>					<b>30C</b>				
<b>X</b>	0.4147	0.4221	0.4342	0.4259	<b>X</b>	0.4342	0.4430	0.4562	0.4465
<b>Y</b>	0.3814	0.3984	0.4028	0.3853	<b>Y</b>	0.4028	0.4212	0.4260	0.4071
<b>30B</b>					<b>30D</b>				
<b>X</b>	0.4221	0.4299	0.4430	0.4342	<b>X</b>	0.4259	0.4342	0.4465	0.4373
<b>Y</b>	0.3984	0.4165	0.4212	0.4028	<b>Y</b>	0.3853	0.4028	0.4071	0.3893

<b>Rank 27 Color Temperature:2700K (2725 ± 145)</b>									
<b>27A</b>					<b>27C</b>				
<b>X</b>	0.4373	0.4465	0.4582	0.4483	<b>X</b>	0.4582	0.4687	0.4813	0.4700
<b>Y</b>	0.3893	0.4071	0.4099	0.3919	<b>Y</b>	0.4099	0.4289	0.4319	0.4126
<b>27B</b>					<b>27D</b>				
<b>X</b>	0.4465	0.4562	0.4687	0.4582	<b>X</b>	0.4483	0.4582	0.4700	0.4593
<b>Y</b>	0.4071	0.4260	0.4289	0.4099	<b>Y</b>	0.3919	0.4099	0.4126	0.3944

**Notes :**

1. Tolerance of measurement of luminous Flux : ±10%
2. Tolerance of measurement of Color Coordinates : ±0.01
3. All data are measured by CSC's test equipment.
4. Please confirm with CSC sales , if your request different from standard specification.





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■ Typical Electrical / Optical Characteristics Curves –  
(Ta = 25°C Unless Otherwise Noted)

Figure 1. Relative Luminous FLux  
vs. Forward Current

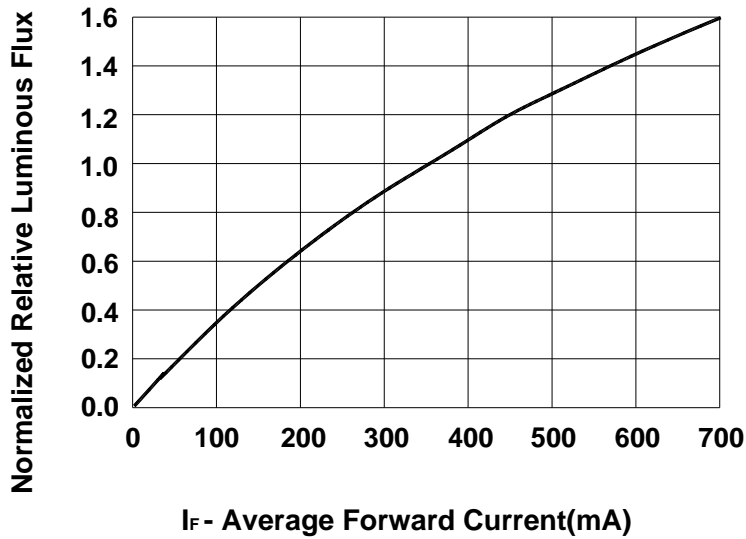
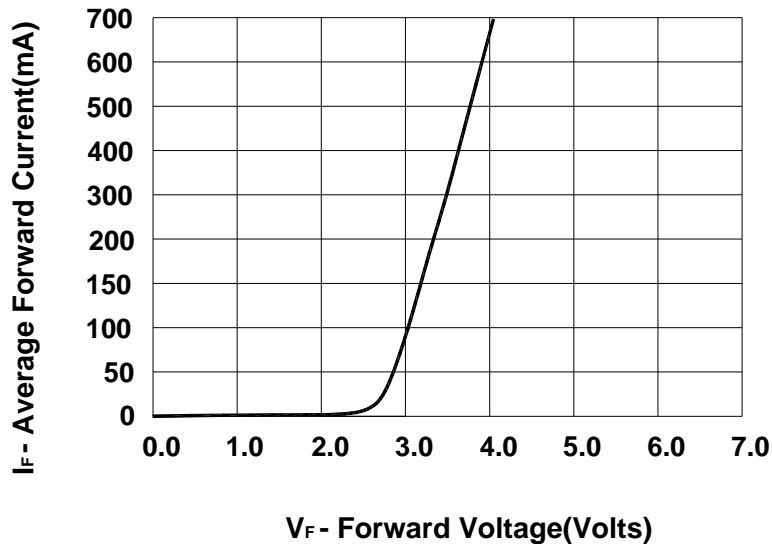


Figure 2. Forward Current  
vs. Forward Voltage





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Figure 3. Maximum Forward Current vs. Ambient Temperature.  
Derating based on  $T_{JMAX}=120^{\circ}C$

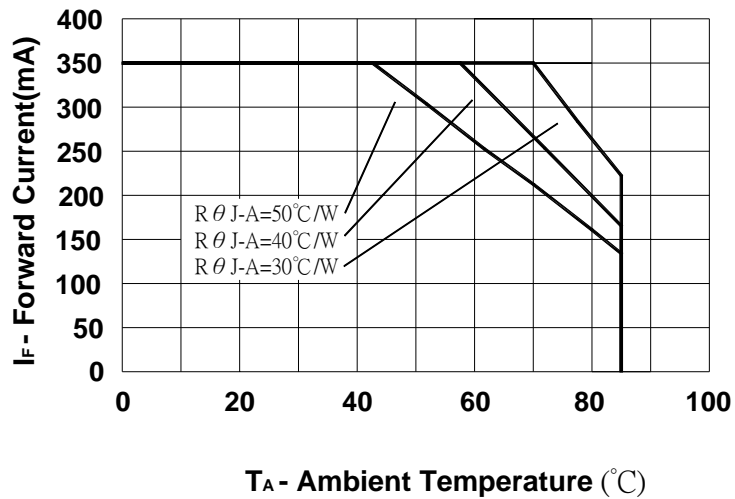
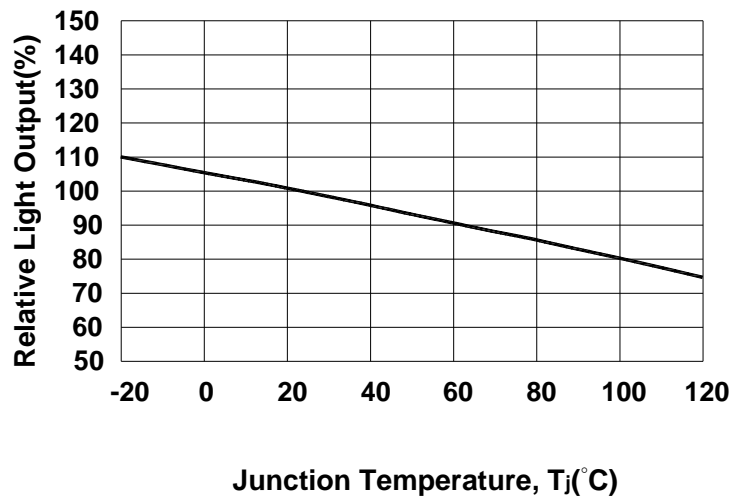
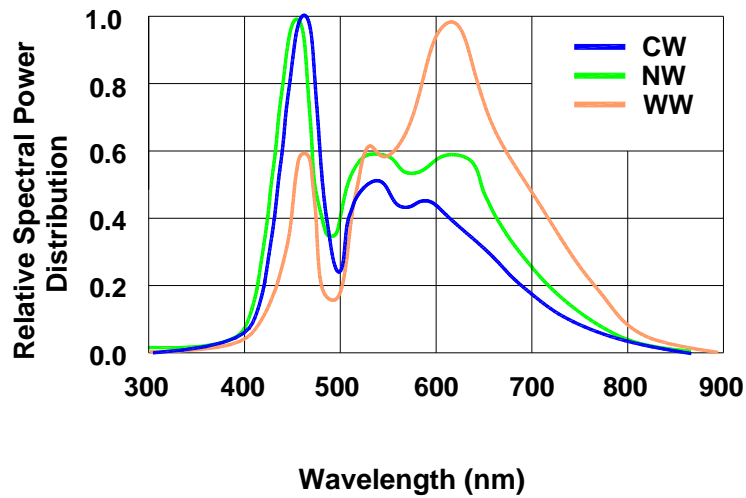


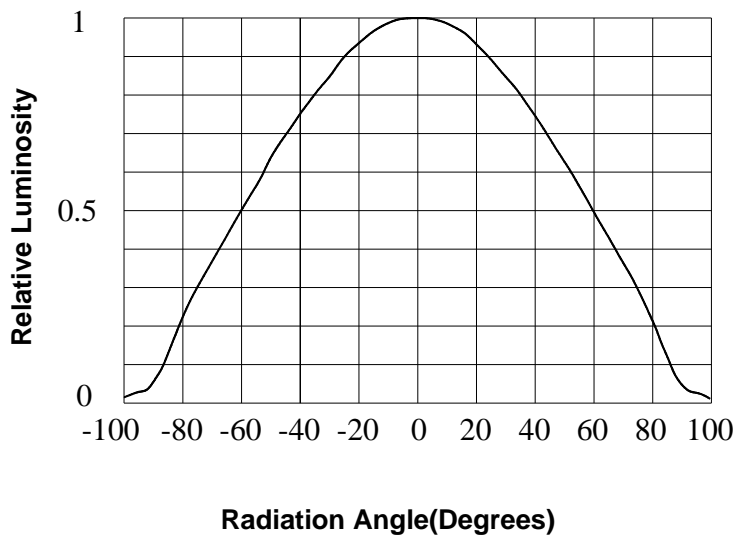
Figure 4. Relative Light Output vs. Junction Temperature



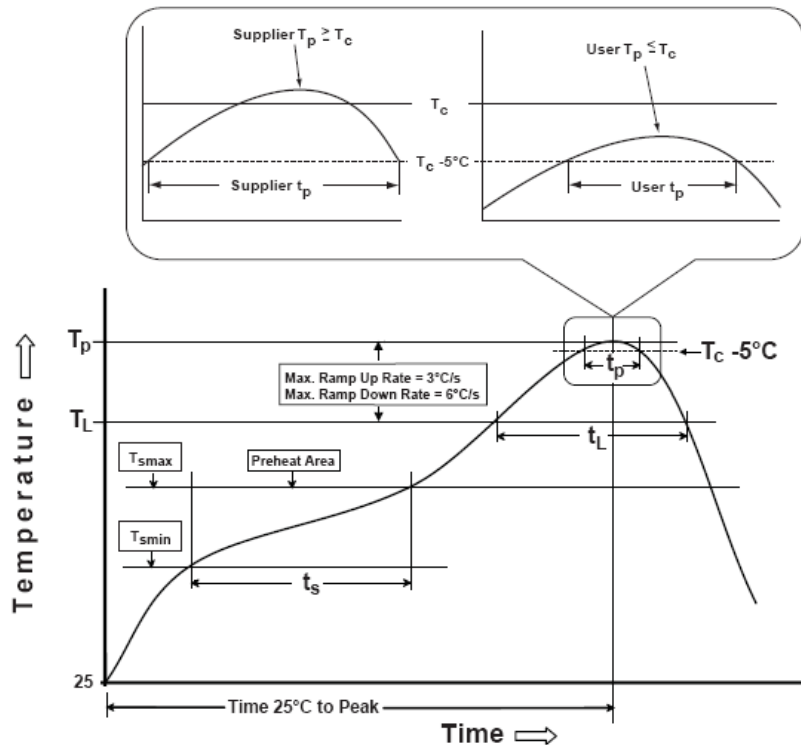
**Figure 5. Relative Spectral Power Distribution vs. Wavelength**



**Figure 6. Relative Luminosity vs. Radiation Angle**



## Reflow Soldering Characteristics –



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
Temperature Min ( $T_{smin}$ )	100°C	150°C
Temperature Max ( $T_{smax}$ )	150°C	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds	60-120 seconds
Ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.	3°C/second max.
Liquidous temperature ( $T_L$ )	183°C	217°C
Time ( $t_L$ ) maintained above $T_L$	60-150 seconds	60-150 seconds
Peak package body temperature ( $T_p$ )	For users $T_p$ must not exceed the Classification temp in Table 4-1. For suppliers $T_p$ must equal or exceed the Classification temp in Table 4-1.	For users $T_p$ must not exceed the Classification temp in Table 4-2. For suppliers $T_p$ must equal or exceed the Classification temp in Table 4-2.
Time ( $t_p$ )* within 5°C of the specified classification temperature ( $T_c$ ), see Figure 5-1.	20* seconds	30* seconds
Ramp-down rate ( $T_p$ to $T_L$ )	6°C/second max.	6°C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum		

## Hand Soldering Characteristics –

<b>Soldering temperature</b>	<b>260°C</b>
<b>Soldering time</b>	<b>5 sec</b>

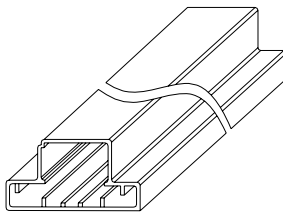
**Notes : All temperatures refer to solder Pad**


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■ **Package –**

**1. Tube : 50pcs/tube**

CSC P/N : CSC Production number  
 Flux : Intensity grade  
 Color : Color grade  
 Q'ty : Quantity

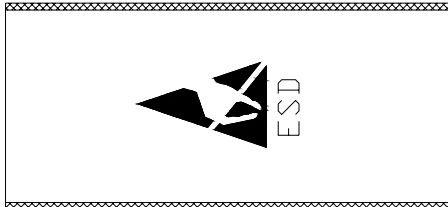



Part No :
Flux : Color: VF: Q'ty: pcs


**on tube**

**2. Anti-electrostatic bag : 10 tubes/bag**

Product type : Vega Power  
 CSC P/N : CSC Production number  
 Flux : Intensity grade  
 Color : Color grade  
 Lot No : Lot Number  
 Date code : Production time  
 Q'ty : Quantity

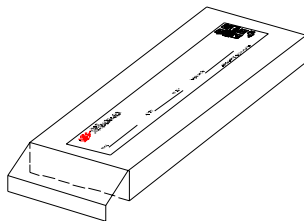




Product Type :	Part No :
Flux : Color: VF: Q'ty: PCS	RoHS
Lot No : Date code :	QC :
	

**on anti-electrostatic bag**

**3. Carton: 2 anti-electrostatic bags/carton**

CSC P/N : CSC Production number  
 Q'ty : Quantity  
 Date code : Production time



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	P / N _____ Q'TY _____ PCS _____	Data code _____
SIZE:49.5X9.5X4.5cm		

**on carton**

■ **Precautions for use –**

1 . Please use LEDES refer to JEDEC 2a(Industry Best Moisture Sensitivity Level) as below

Floor life		Standard		Accelerated Environment	
time	conditions	time	conditions	time	conditions
4	≤ 30°C/60%RH	(hours)	30°C/60%RH	(hours)	60°C/60%RH
weeks		696 <sup>2</sup> +5/-0		120+1/-0	

**Notes** : The standard soak time includes a default value of 24 hours for semiconductor exposure time between bake and bag and includes the maximum time allowed out of bag at the distributor's facility.

- 2 . Please confirm the moisture card in the anti-electrostatic bag after opening package.  
If it shows 50%RH, LEDs should be performed baking treatment before used.  
( bake condition: At 125°C +5/-0 for 24 hours )
- 3 . Any mechanical force or any excess vibration on LENS should be avoid during operating.
- 4 . LED should be stored below 60%RH after opening package.
- 5 . Please refer to Fig.3 of Page 10 to choose current drive to use. Ambient temperature will affect current.

**Notes** : The specifications are subject to change without notice. Please contact us for updated information.