

# **SST-20V-WE (CRI > 70)**

The V-Line High Power White LEDs



### Features

- High CRI, high-efficacy white LEDs for high-performance directional lighting applications.
- The vertical chip features high lumen density and small emitting angle, ideal for maximizing the light intensity and reducing the optics size in optical beam shaping.
- The phosphor-on-chip technology delivers high color uniformity over radiation angle, enabling superior light quality for beam spots.
- Maximum Drive Current: 3.0 A
- Color Temperature: 4000K, 5700K
- Color Rendering Index: >70
- Low thermal resistance: 1.6 °C/W
- ANSI-compatible chromaticity bins
- Electrically isolated thermal path
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001



# **Applications**

- Roadway and Street Lighting
- Sports Field Lighting
- Outdoor Area Lighting
- Landscape Lighting
- Garage and Canopy Lights
- High / Low Bay Industrial Lighting
- Automotive Auxiliary Lights

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- LED Work Lights
- Portable Lights



# **Ordering Information**

### Ordering Part Numbers<sup>1</sup>

	сст	Luminous Flux		Ordering Part Number		
CRI		Minimum Flux Bin¹	Minimum Flux <sup>2</sup>	Chromaticity Bin Kit ANSI Centers	Chromaticity Bin Kit 5-Step Ellipse	
> 70	4000K	D6	340 lm	SST-20V-WE40-A2-D6402	SST-20V-WE40-A2-D640E5	
		D7	355 lm	SST-20V-WE40-A2-D7402	SST-20V-WE40-A2-D740E5	
	5700K	D6	340 lm	SST-20V-WE57-A2-D6572	SST-20V-WE57-A2-D657E5	
		D7	355 lm	SST-20V-WE57-A2-D7572	SST-20V-WE57-A2-D757E5	

#### Part Number Nomenclature

SST	20V	W <xyy></xyy>	A<#>	<ffcccc></ffcccc>
Product Family	Chip Area	Color	Package Configuration	Bin Kit
S: Surface Mount S: Dome Lensed T: Single Emitter	<b>20</b> : 2.0 mm <sup>2</sup> <b>V</b> : V-Line	<ul> <li>W: White</li> <li><x> CRI Category Code</x></li> <li>E: CRI&gt;70</li> <li><yy> Color Temperature</yy></li> <li>40: 4000K</li> <li>57: 5700K</li> </ul>	A: 3535 Package, Type A Solder Pad < <b>#</b> > Chip Generation <b>2</b> : Gen 2	< <b>ff</b> > Minimum Flux Bin, see 'Luminus Flux Binning' table for details < <b>cccc</b> > Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details

#### Notes:

1. The Ordering Part Number specifies the Minimum Flux Bin in shipment; higher flux bins may be shipped without advance notice. Please refer to 'Luminous Flux Binning' table for details of all flux bins.

2. Product test condition:  $I_f = 700 \text{ mA}, T_i = 85^{\circ}\text{C}.$ 

3. Shipments always adhere to the color bins specified in each Chromaticity Bin Kit. See 'Chromaticity Bin Kit Codes' table for the color bins included in each bin kit.



#### Luminous Flux Bins<sup>1,2</sup>

Binning @ 700 mA			$\Omega_{\rm correlated}$ Minimum Flux (lar) $\Omega = 0.5^{\circ}\Omega^{2}$				<b>D</b> <sup>2</sup>		
Flux Bin	T <sub>i</sub> = 85°C		T <sub>j</sub> = 25°C		Correlated Minimum Flux (Im) @ T <sub>j</sub> =85°C <sup>2</sup>				
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)	350 mA	1000 mA	1500 mA	2000 mA	3000 mA	
D5	325	340	358	176	442	618	770	1030	
D6	340	355	374	184	462	646	806	1078	
D7	355	375	391	192	483	675	841	1125	
D8	375	395	413	203	510	713	889	1189	

#### Forward Voltage Bins<sup>3</sup>

	Binning @ 700 mA, T <sub>j</sub> = 85°C				
voltage Bin	Minimum Voltage (V)	Maximum Voltage (V)			
VH	2.5	2.7			
VJ	2.7	2.9			
VK	2.9	3.1			

#### Notes:

- 1. LEDs are measured at 25°C ambient temperature with 700 mA 20 ms single pulse. The measured values are correlated to values at 85°C junction temperature (T<sub>i</sub>). Luminus maintains a ±6% tolerance on flux measurement.
- 2. Flux values at other junction temperature  $(T_i)$  and/or forward current conditions are calculated and for reference only.

3. Individual voltage bins are not orderable.



### **Chromaticity Binning Coordinates (ANSI Centers)**

ССТ	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy
		0.3744	0.3685		0.3763	0.3760		0.3825	0.3798		0.3804	0.3721
400014	540	0.3763	0.3760		0.3782	0.3837	F01	0.3847	0.3877	]	0.3825	0.3798
4000K	FA3	0.3825	0.3798	FB4	0.3847	0.3877	FCT	0.3912	0.3917	1 FD2	0.3887	0.3836
		0.3804	0.3721		0.3825	0.3798		0.3887	0.3836		0.3863	0.3758
		0.3215	0.3350		0.3207	0.3462		0.3290	0.3538		0.3290	0.3417
F700K		0.3290	0.3417		0.3290	0.3538		0.3376	0.3616		0.3371	0.3490
5700K	CA	0.3290	0.3300	CB	0.3290	0.3417		0.3371	0.3490		0.3366	0.3369
		0.3222	0.3243		0.3215	0.3350		0.3290	0.3417		0.3290	0.3300

### Chromaticity Binning Coordinates (Ellipse)

0.07	Center Point		3-Step Ellipse		5-Step	Annala		
CCT	CIEx	CIEy	а	b	а	b	Angle	
4000K	0.3818	0.3797	0.0094	0.0040	0.0157	0.0067	53.70°	
5700K	0.3287	0.3417	0.0072	0.0032	0.0119	0.0052	59.09°	



### Chromaticity Binning Diagram (Warm White) 1,2



### **Chromaticity Bin Kit Codes**

ССТ	Bin Kit	Chromaticity Bins		
400.01/	402	FA3, FB4, FC1, FD2		
4000K	40E5	40E3, 40E5A, 40E5B, 40E5C, 40E5D		

#### Notes:

1. LED chromaticity is measured and binned at 25°C ambient temperature with 700 mA 20 ms single pulse.

2. Luminus maintains a tolerance of  $\pm 0.005$  on Chromaticity (CIEx, CIEy) measurement.



### Chromaticity Binning Diagram (Cool White) 1,2



### **Chromaticity Bin Kit Codes**

ССТ	Bin Kit	Chromaticity Bins
57004	572	CA, CB, CC, CD
5700K	57E5	57E3, 57E5A, 57E5B, 57E5C, 57E5D

#### Notes:

1. LED chromaticity is measured and binned at 25°C ambient temperature with 700 mA 20 ms single pulse.

2. Luminus maintains a tolerance of  $\pm 0.005$  on Chromaticity (CIEx, CIEy) measurement.



# Absolute Maximum Ratings

	Quark d	Val	ues			
Parameter	Parameter			T <sub>j</sub> =150°C	Unit	
Forward Querent	Minimum	l <sub>f min</sub>	0.	.1		
	Maximum	I <sub>f max</sub>	3.0	2.0	А	
Surge Current (t<10 ms, Duty Cycle < 10%)	۱ <sub>s</sub>	4.0	3.0			
Power Dissipation	P <sub>D</sub>	11	7	W		
Reverse Voltage (@ I <sub>f</sub> = 10 mA)	V <sub>r</sub>	5		V		
Junction Temperature		Т <sub>ј</sub>	150			
Operating Temperature Range	T <sub>opr</sub>	-40 to 100		°C		
Storage Temperature Range	T <sub>stg</sub>	-40 to 100				
ESD withstand Voltage ANSI/ESDA/JEDEC JS-001	V <sub>ESD</sub>	8				
ESD withstand Voltage ANSI/ESDA/JEDEC JS-002	V <sub>CDM</sub>	-		КV		

# **Characteristics**

Parameter (I <sub>f</sub> =700 mA, T <sub>j</sub> =85°C)	Symbol	Value	Unit	
Color Rendering Index <sup>1</sup>		CRI <sub>min</sub>	> 70	
	Minimum	$V_{fmin}$	2.5	
Forward Voltage	Typical	V <sub>f typ</sub>	2.9	V
	Maximum	V <sub>f max</sub>	3.1	
Viewing Angle	20 <sub>1/2</sub>	118	o	
Temperature Coefficient of Voltage	$\partial_{\rm Vf}/\partial_{\rm T}$	-1.2	mV/°C	
Electrical Thermal Resistance (Junction to Solder F	R <sub>th JS elec</sub>	1.6	°C/W	

#### Notes:

1. Luminus maintains a tolerance of ±2 on Color Rendering Index (CRI) measurement.

2. Thermal measurements are in accordance with JEDEC 51-14.



#### **Relative Luminous Flux vs Forward Current**



### Forward Voltage vs Forward Current

T<sub>i</sub>=85°C



### **Relative Chromaticity vs Forward Current**



### **Relative Luminous Flux vs Temperature**



### Forward Voltage vs Temperature

I<sub>f</sub> = 0.7 A



### **Relative Chromaticity vs Temperature**





# Angular Distribution and Typical Spectrum





### **Relative Spectral Power Distribution**





# Mechanical Dimensions<sup>1</sup>



#### RECOMMENDED STENCIL PATTERN DESIGN

#### Note:

1. All dimensions are in millimeter  $\pm$  0.13 mm.



# **Soldering Profile**



Time

#### SMT Solder Rework Temperature Guidelines

Parameter	Manual Hotplate Reflow	Hot Air Gun Reflow		
Heating Time	< 60 sec			
Hotplate Temperature	< 245°C	< 150°C		

#### Notes:

- 1. Product complies to Moisture Sensitivity Level 3 (MSL 3).
- 2. The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
- 3. During the pick and place process, axial forces on the dome (or window) should not exceed 0.5 Newtons (N).
- 4. Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
- 5. Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. Temperature is referenced to the center of the PCB.
- 6. Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
- 7. These are general guidelines. Consult the solder paste manufacturer's datasheet for guidelines specific to the alloy and flux combination used in your application. For more information, please refer to:

https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-

8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.



# **Tape and Reel Outline**



#### Notes:

1. Each Reel contains 1,000 units of LEDs.

2. Leave minimum 160 mm with empty compartments sealed by cover tape for lead in.

3. Leave minimum 480 mm with empty compartments sealed by cover tape for trailer.

4. All dimensions must comply to EIA-481-D

5. Final tape and reel packaging must meet the requirements of JEDEC-STD-033, LEVEL 2A.

PDS-003518 Rev 01



# **Shipping Label**





#### Label Fields:

CPN: Luminus ordering part number
CID: Customer's part number
QTY: Quantity of parts per reel
Flux: Bin as defined on page 3
Voltage: Bin as defined on page 3
Color: Bin as defined on page 4
CRI: NA
Lot ID & Reel ID: For Luminus internal use

### Label on Reel



### Label Fields:

CPN: Luminus ordering part number
MPN: For Luminus internal use
QTY: Quantity of parts per reel
Flux: Bin as defined on page 3
Voltage: Bin as defined on page 3
Color: Bin as defined on page 4
CRI: NA

Lot ID & Reel ID: For Luminus internal use



Packaging



- 1,000 units per reel
- Each reel is enclosed in anti-static bag
- Shipping label is placed on top of each reel
- Multiple labels are attached to the box (one label per reel inside the box)



# Notes

#### **Environmental Compliance**

Luminus complies with RoHS and REACH. Luminus is committed to selling environmentally friendly and sustainable products. We do not use harmful or hazardous substances in our composites and products. Luminus will not intentionally add the following restricted materials to our products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), or polybrominated diphenyl ethers (PBDE).

### **Static Electricity**

- 1. The products are sensitive to static electricity, and care should be taken when handling them.
- 2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear anti-electrostatic gloves or wristband when handling the LEDs.
- 3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

Reference: <u>APN-002815</u> Electrical Stress Damage to LEDs and How to Prevent It

#### Storage

Please follow J-STD-033D guidance on safe storage and bake treatment.

1. Before opening the package

The LEDs should be kept at a temperature lower than 40°C and relative humidity lower than 90%. The LEDs should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.

2. After opening the package

The LEDs should be kept at a temperature lower than 30°C and relative humidity lower than 60%. The LEDs should be soldered within 168 hours (7 days) after opening the moisture proof package.

If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with moisture absorbent material (silica gel). It is also recommended to return the unused LEDs to the original moisture proof package and to seal it again.

If the moisture absorbent material (silica gel) vaporizes or passes the expiration date, baking treatment should be performed by using the following conditions : 60°C for 20 hours.

The LED's electrode and lead frame comprise a silver plated copper alloy. The silver surface may be affected by environments. Please avoid conditions which may cause the LEDs to corrode or discolor. The corrosion or discoloration might lower solderability or affect optical characteristics.

Please avoid rapid transition in ambient temperature, especially in high humidity environments where condensation can occur.