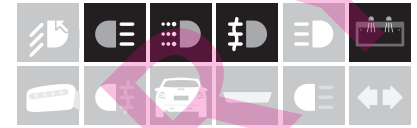


# LUXEON Versat 3030 ST CW 150

Industry-leading solutions for exterior automotive lighting

LUXEON Versat is perfect for high-volume assembly where consistency is never compromised. This family of products provides design flexibility, automotive reliability and ease of integration/manufacturing to facilitate simplified system integration for high volume automotive designs. The LUXEON Versat 3030 ST CW 150 LED is designed to meet the needs of exterior automotive front lighting applications. All LUXEON Versat 3030 ST LEDs are AEC-Q102 qualified and cold binned at 25 °C.



## FEATURES AND BENEFITS

- Optimized package drives efficient light extraction
- Industry standard footprint for simple integration
- Low Z profile simplifies optical design and minimizes design space

## PRIMARY APPLICATIONS

- Back-Up/Reverse
- Daytime Running Lights
- Front Fog
- License Plate

# Table of Contents

<b>General Product Information</b> .....	<b>2</b>
Product Test Conditions .....	2
Part Number Nomenclature .....	2
Environmental Compliance .....	3
<b>Performance Characteristics</b> .....	<b>3</b>
Product Selection Guide .....	3
Optical Characteristics .....	3
Electrical and Thermal Characteristics .....	3
Characteristic Curves .....	4
Spectral Power Distribution Characteristics .....	4
<b>Light Output Characteristics</b> .....	<b>5</b>
Forward Current and Forward Voltage Characteristics .....	6
Color Shift Characteristics .....	7
Radiation Pattern Characteristics .....	8
Operating Limits Characteristics .....	9
Permissible Pulse Handling Characteristics .....	9
<b>Product Bin and Labeling Definitions</b> .....	<b>10</b>
Decoding Product Bin Labeling .....	10
Luminous Flux Bins .....	11
Color Codes .....	12
Color Bin Definitions .....	13
Forward Voltage Bins .....	14
<b>Mechanical Dimensions</b> .....	<b>15</b>
Package Weight .....	15
JEDEC Moisture Sensitivity .....	15
<b>Packaging Information</b> .....	<b>16</b>
Pocket Tape Dimensions .....	16
Reel Dimensions .....	16
Product Labelling .....	17

# General Product Information

LUXEON Versat 3030 ST CW 150 emitters are mid-power phosphor converted cool white emitters in an EMC leadframe pack-age. All LUXEON Versat 3030 ST emitters contain a TVS chip for ESD protection.

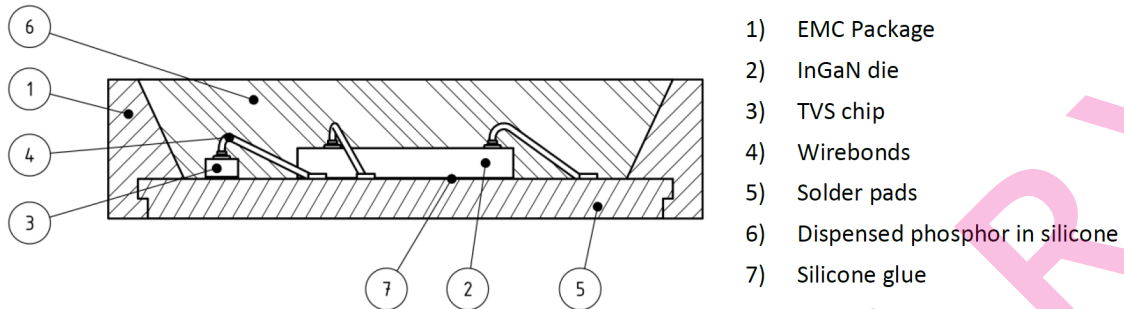


Figure 1. Schematic cross section LUXEON Versat 3030 ST CoolWhite

## Product Test Conditions

LUXEON Versat ST CW 150 is binned using a 20 ms monopulse (MP) of 150 mA drive current. The case temperature is set to  $T_c = 25\text{ }^\circ\text{C}$  at the beginning of the pulse.

## Part Number Nomenclature

Part numbers for LUXEON Versat 3030 ST CW 150 follow the convention below: - 5 8 5 0 A 0 1 0 J K M N 0

A 1 V C – **5 8 5 0 A 0 1 0 J K M N 0**

Where:

- A – Designates product segment (A = Automotive)
- 1 – Designates product level (1 = Level 1)
- V – Designates product line/family (V = LUXEON Versat)
- C – Designates package type (C = 3030 ST)
- 5 8 5 0** – Designates correlated color temperature (5850 = White)
- A** – Designates binning current (A = 150 mA)
- 0** – Reserved for future customization
- 1** – Designates generation (1 = first generation)
- 0** – Reserved for future customization
- J K M N** – Designates minimum luminous flux (0058 = 58 lumens, 0064 = 64 lumens, etc.)
- 0** – Reserved for future customization

Therefore, the following part number is used for a LUXEON Versat 3030 ST CW 150 with a minimum luminous flux of 58 lumens:

A 1 V C – **5 8 5 0 A 0 1 0 0 0 5 8 0**

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Versat 3030 ST CW 150 is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

## Performance Characteristics

### Product Selection Guide

LUXEON Versat 3030 ST CW 150 emitters are tested and binned using a 20 ms monopulse (MP) at 150 mA drive current, case temperature,  $T_c$ , of 25 °C.

Table 1. Product selection for LUXEON Versat 3030 ST CW 150 at 150 mA,  $T_c = 25\text{ °C}$

COLOR	MINIMUM LUMINOUS FLUX <sup>[1]</sup> (lm)	TEST CURRENT (mA)	PART NUMBER
Cool White	53	150	A1VC-5850A01000530
	58	150	A1VC-5850A01000580
	64	150	A1VC-5850A01000640

Notes for Table 1:

- Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux measurements.

## Optical Characteristics

Table 2. Typical optical characteristics for LUXEON Versat 3030 ST CW 150 at 150 mA,  $T_c = 25\text{ °C}$

PART NUMBER	CORRELATED COLOR TEMPERATURE (K)		TOTAL INCLUDED ANGLE <sup>[1]</sup> $\theta_{0.90V}$	VIEWING ANGLE <sup>[2]</sup> $2\theta_{1/2}$
	MINIMUM	MAXIMUM		
A1VC-5850A010xxxx0	5500	6250	138°	120°

Notes for Table 2:

- Total angle at which 90% of total luminous flux is captured.
- $2\theta_{1/2}$  denotes the viewing angle, with  $\theta_{1/2}$  being the off-axis angle from the LED centerline where the luminous intensity is  $1/2$  of the peak value.

## Electrical and Thermal Characteristics

Table 3. Typical electrical and thermal characteristics for LUXEON Versat 3030 ST CW 150 at 150 mA,  $T_c = 25\text{ °C}$

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ )		THERMAL RESISTANCE— JUNCTION TO CASE (°C/W)			
			$R\theta_{j-c,el}$ <sup>[2]</sup>		$R\theta_{j-c,real}$ <sup>[3]</sup>	
	MINIMUM	MAXIMUM	TYPICAL	MAXIMUM	TYPICAL	MAXIMUM
A1VC-5850A010xxxx0	2.70	3.49	13.00	20.00	22.00	34.00

Notes for Table 3:

- Lumileds maintains a tolerance of  $\pm 0.06\text{ V}$  on forward voltage measurements.
- Ratio between temperature difference (junction $\leftrightarrow$ case) and electrical input power (references JESD51-51, JESD51-14).
- Ratio between temperature difference (junction $\leftrightarrow$ case) and dissipated heat, i.e. emitted light taken into account (references JESD51-51, JESD51-14)

# Absolute Ratings

Table 4. Absolute ratings for LUXEON Versat 3030 ST CW 150

PARAMETER	PERFORMANCE
Minimum DC Forward Current	20 mA
Maximum DC Forward Current	250 mA
Maximum Peak Pulsed Forward Current <sup>[1]</sup>	750 mA
Maximum Emitter Junction Temperature <sup>[1]</sup> (DC & Pulse)	150 °C
Operating Case Temperature at Test Current <sup>[1]</sup>	-40 °C to 135 °C
LED Storage Temperature	-40 °C to 135 °C
Soldering Temperature	260 °C per JEDEC J-STD-020E
Allowable Reflow Cycles	3
ESD Sensitivity <sup>[2]</sup>	±8 kV HBM, ±2 kV CDM
Reverse Voltage ( $V_{reverse}$ )	LUXEON LEDs are not designed to be driven in reverse bias
Autoclave Conditions	121°C at 2 ATM 100% Relative Humidity for 96 Hours Maximum

**Notes for Table 4:**

1. Proper current derating must be used to maintain junction temperature below the maximum. LUXEON Versat LEDs driven at or above maximum LED case temperature may have shorter lifetime.
2. Measured using human body model (per JESD22 A114), machine model (per JESD22 A115) and charged device model (per JESD22 C101).

## Characteristic Curves

### Spectral Power Distribution Characteristics

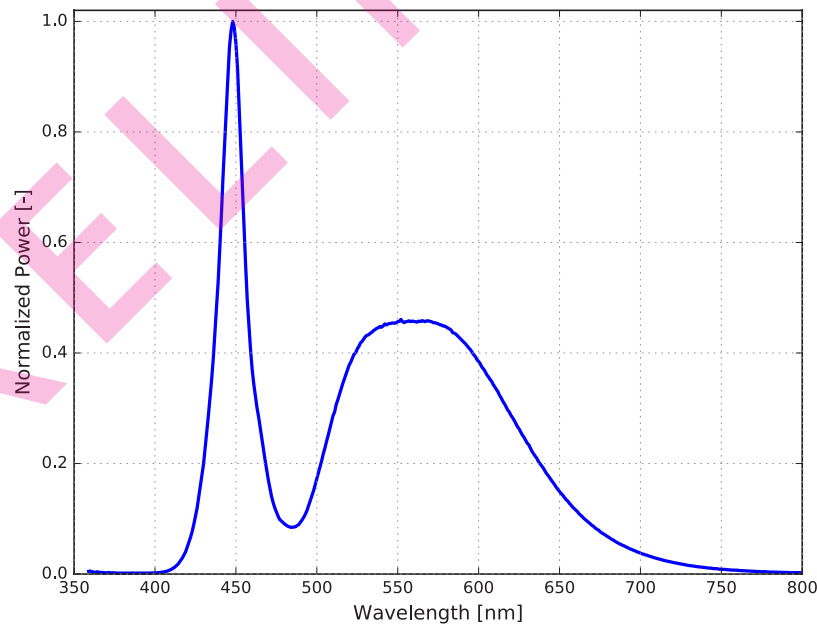


Figure 2. Typical normalized power vs. wavelength for LUXEON Versat 3030 ST CW 150 at 150 mA,  $T_c = 25\text{ °C}$

# Light Output Characteristics

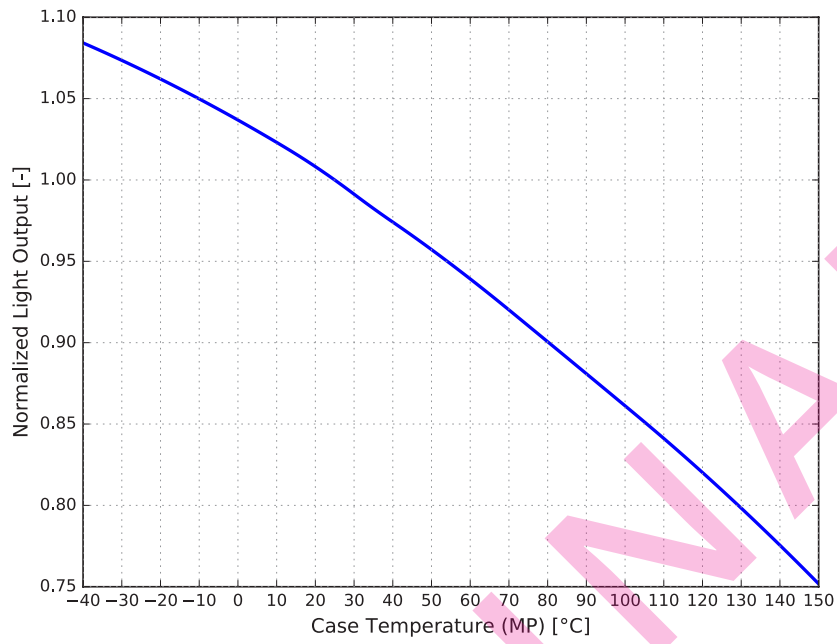


Figure 3. Typical normalized light output vs. case temperature for LUXEON Versat 3030 ST CW 150 at 150 mA

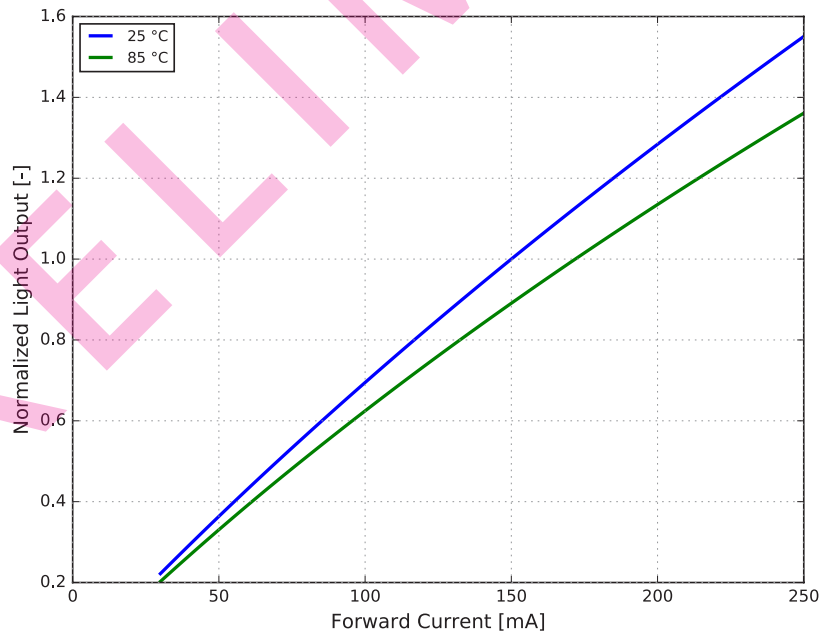


Figure 4. Typical normalized light output vs. forward current for LUXEON Versat 3030 ST CW 150 at  $T_c = 25\text{ °C}$

# Forward Current and Forward Voltage Characteristics

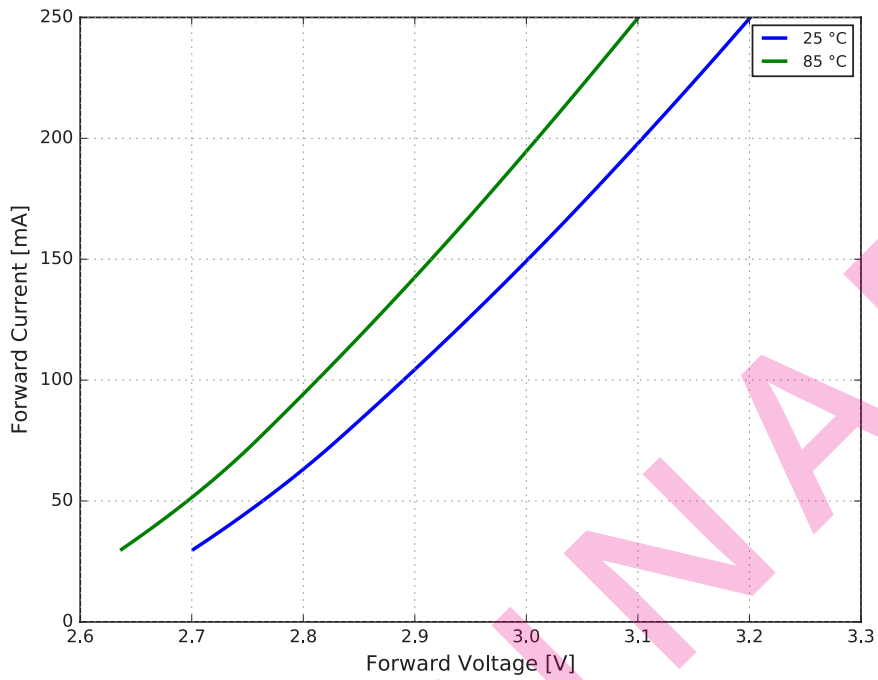


Figure 5. Typical forward current vs. forward voltage for LUXEON Versat 3030 ST CW 150 at  $T_c = 25\text{ °C}$

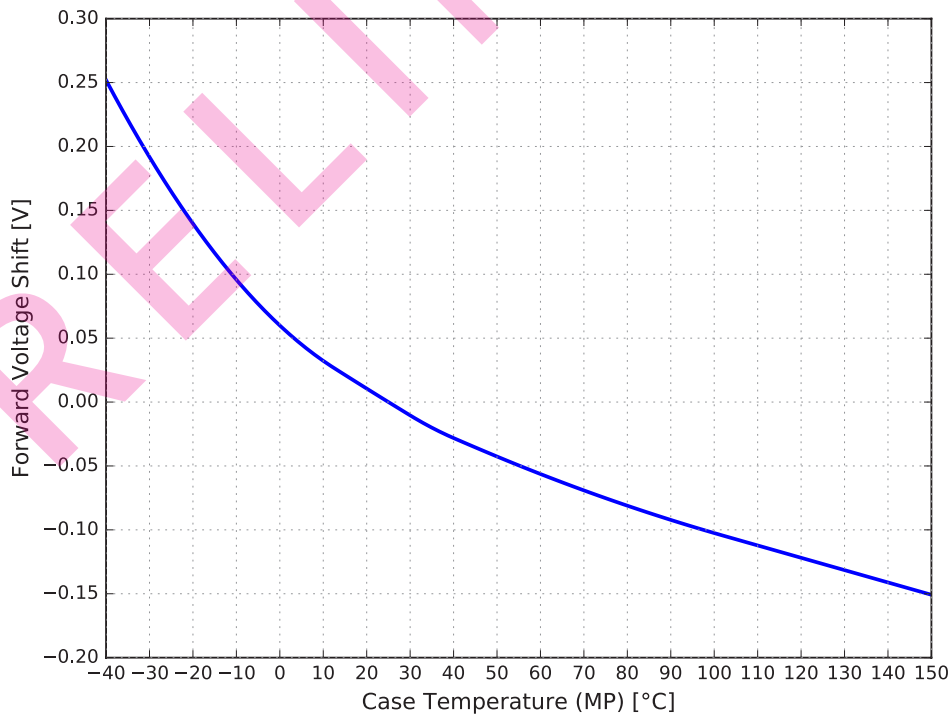


Figure 6. Typical forward voltage shift vs. case temperature for LUXEON Versat 3030 ST CW 150 at 20 ms MP, 150 mA

# Color Shift Characteristics

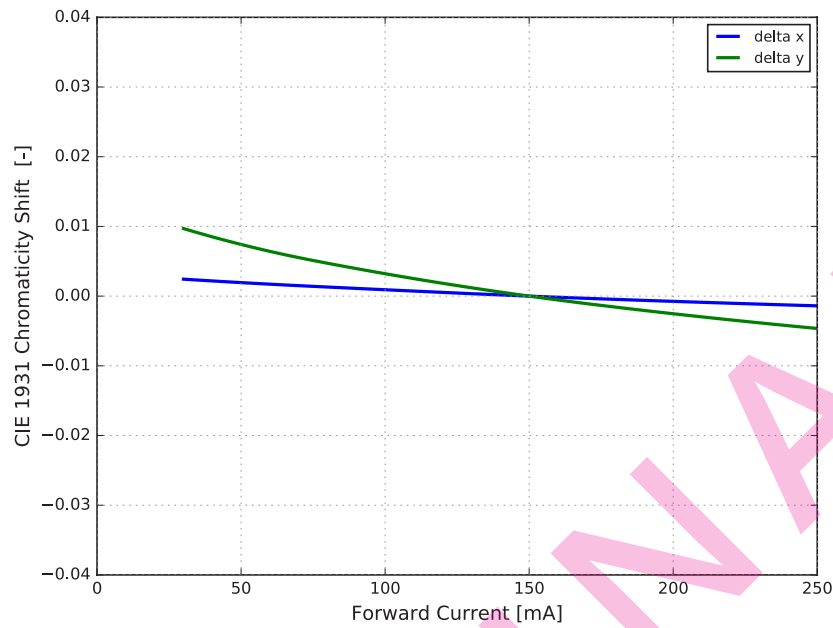


Figure 7. Typical color shift in CIE 1931 x and y coordinates for LUXEON Versat 3030 ST CW 150 at 20 ms MP, 150 mA

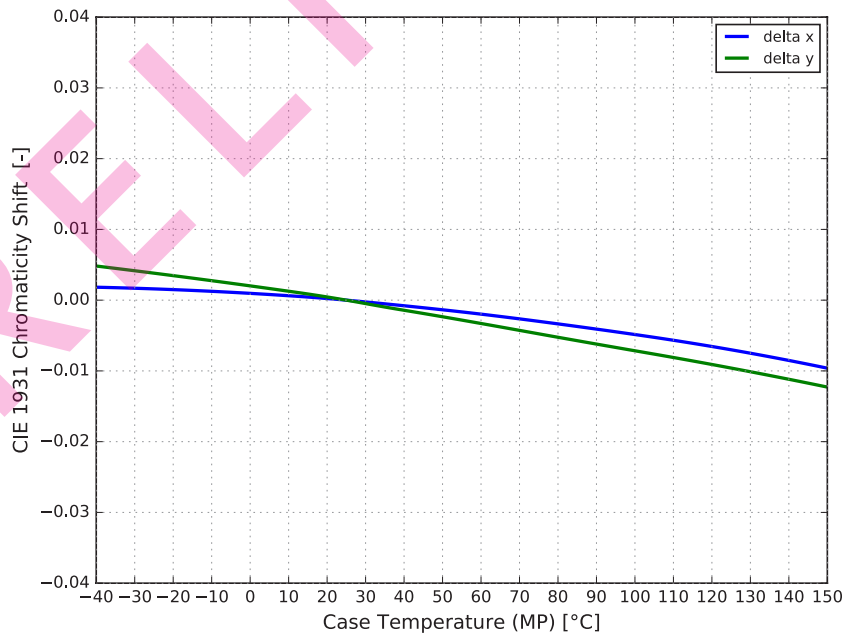


Figure 8. Typical color shift in CIE 1931 x and y coordinates over angle for LUXEON Versat 3030 ST CW 150 at 20 ms MP, 150 mA

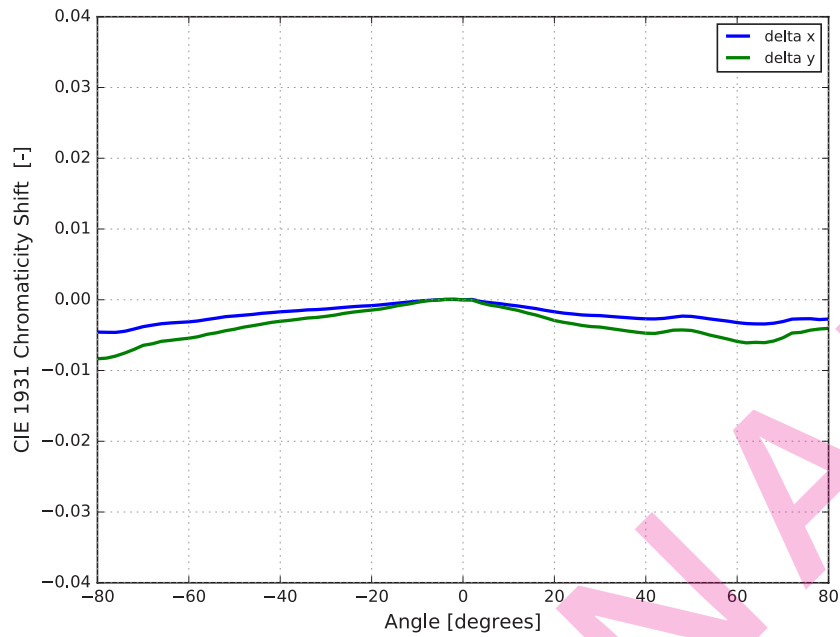


Figure 9. Typical color shift over angle for LUXEON Versat 3030 ST CW 150 at 20ms MP, 150 mA

## Radiation Pattern Characteristics

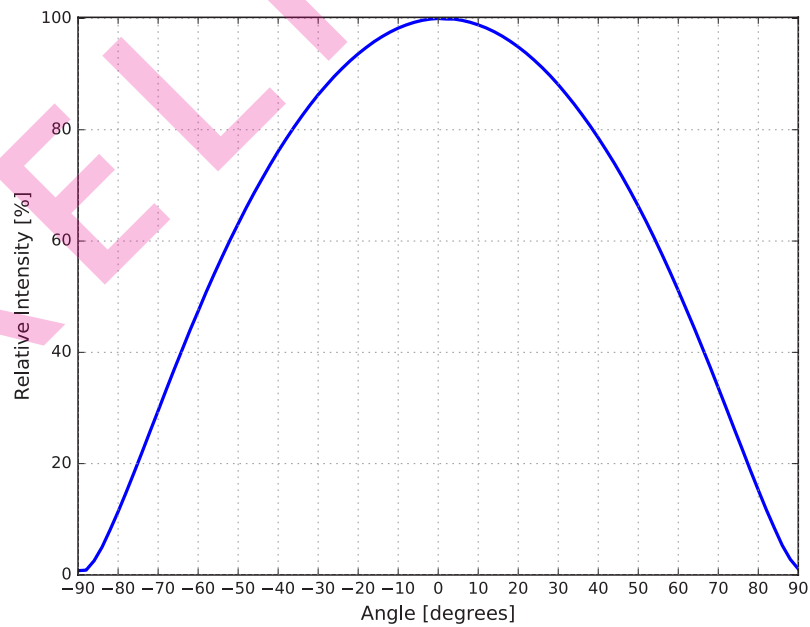


Figure 10. Typical radiation pattern for LUXEON Versat 3030 ST CW 150 at 20 ms MP, 150 mA,  $T_c = 25\text{ }^\circ\text{C}$

# Operating Limits Characteristics

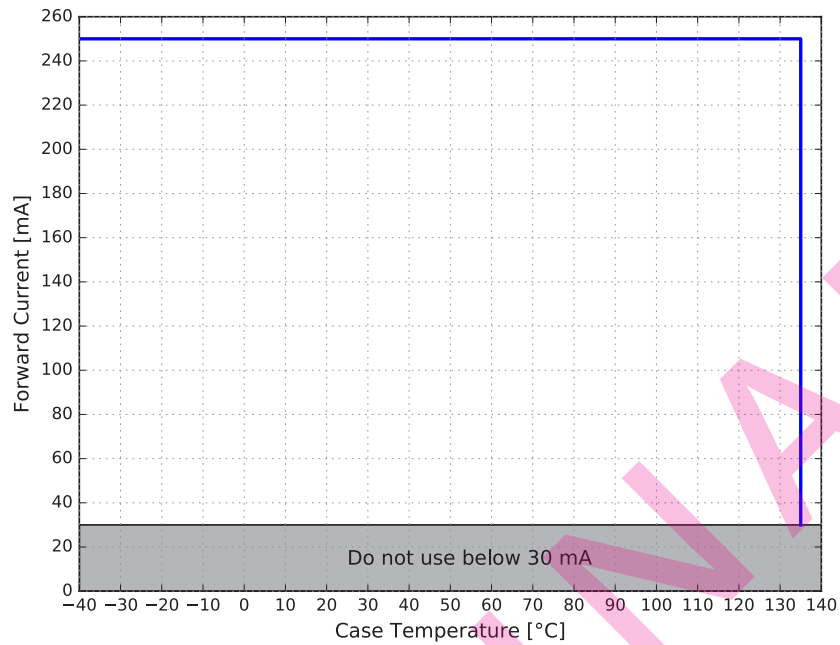


Figure 11. Maximum forward current vs. case temperature for LUXEON Versat 3030 ST CW 150

### Notes for Figure 11:

- 1. Proper current derating must be used to maintain junction temperature below the maximum. LUXEON Versat LEDs driven at or above maximum LED case temperature may have shorter lifetime. Lumileds does not guarantee reliability of the board interconnect e.g. solder joint cracks caused by thermal mismatch.

# Permissible Pulse Handling Characteristics

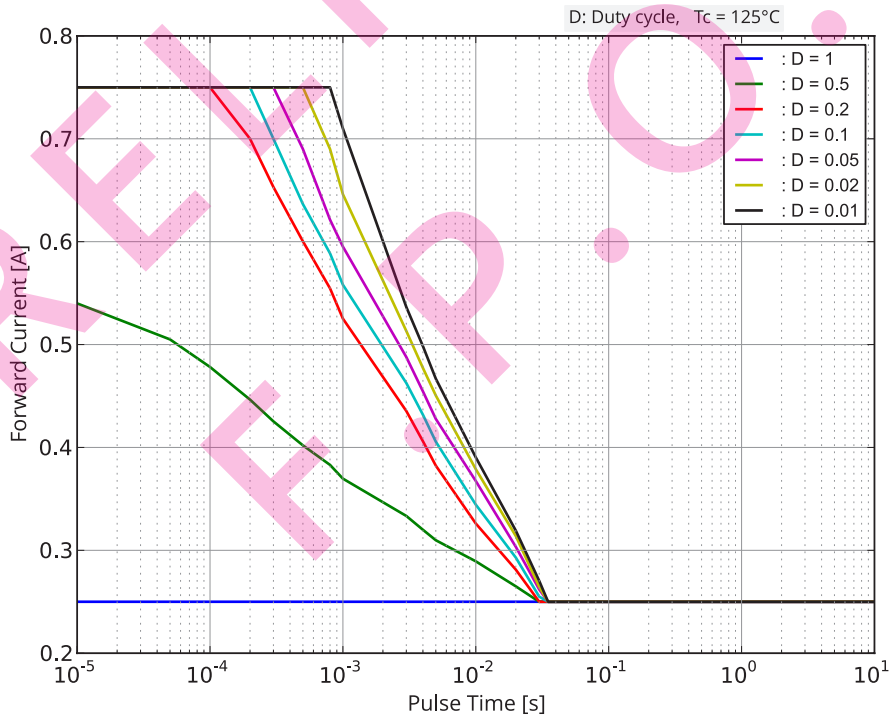


Figure 12. Permissible pulse handling capability for LUXEON Versat 3030 ST CW 150

# Product Bin and Labeling Definitions

## Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheets. For this reason, Lumileds bins the LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON Versat 3030 ST CW 150 LEDs are labeled using a 4-digit alphanumeric CAT code following the format below:

**A B C D**

Where:

- A** - designates luminous flux bin (example: H = 58 lumens to 64 lumens)
- B C** - designates color code
- D** - designates forward voltage bin (example: B = 2.94 V to 3.20 V)

Therefore, a LUXEON Versat 3030 ST CW 150 with a lumen range of 58 to 64, color code of 3B and a forward voltage of 2.94 to 3.20 has the following CAT code:

**H 3 B B**

## Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON Versat 3030 ST CW 150 emitters. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Table 5a. Luminous flux bin definitions for LUXEON Versat 3030 ST CW 150,  $T_c = 25\text{ }^\circ\text{C}$

BIN	LUMINOUS FLUX <sup>[1]</sup> (lm)	
	MINIMUM	MAXIMUM
G	53	58
H	58	64
J	64	70
K	70	76
L	76	82

Notes for Table 5a:

1. Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux measurements.

Table 5b. Luminous flux bin definitions for LUXEON Versat 3030 ST CW 150,  $T_c = 25\text{ }^\circ\text{C}$

BIN	LUMINOUS FLUX <sup>[1]</sup> (lm)	
	MINIMUM	MAXIMUM
G1	53.0	55.5
G2	55.5	58.0
H1	58.0	61.0
H2	61.0	64.0
J1	64.0	67.0
J2	67.0	70.0
K1	70.0	73.0
K2	73.0	76.0
L1	76.0	79.0
L2	79.0	82.0

# Color Codes

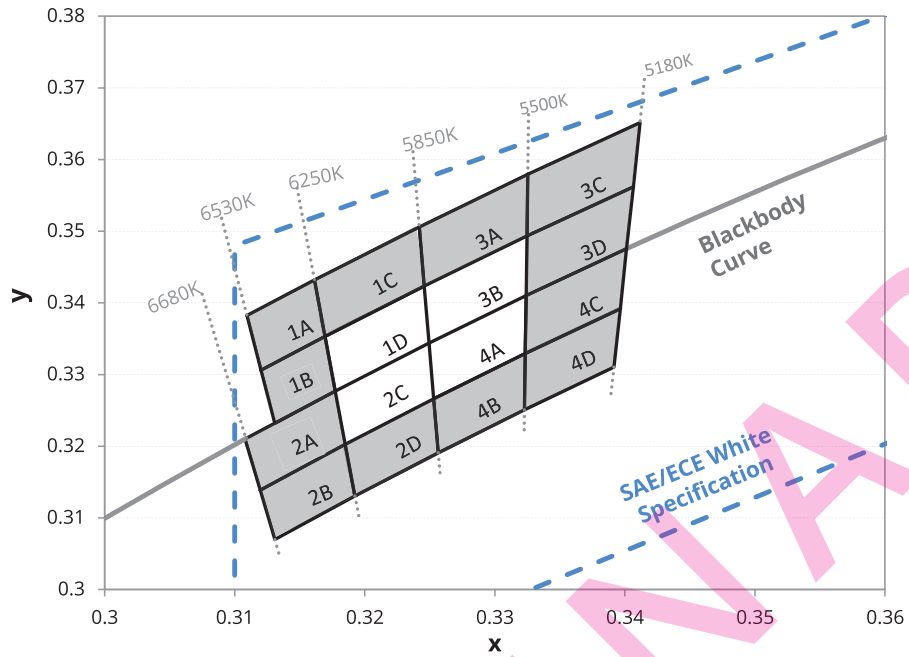


Figure 13a. Color bin structure for LUXEON Versat 3030 ST CW 150

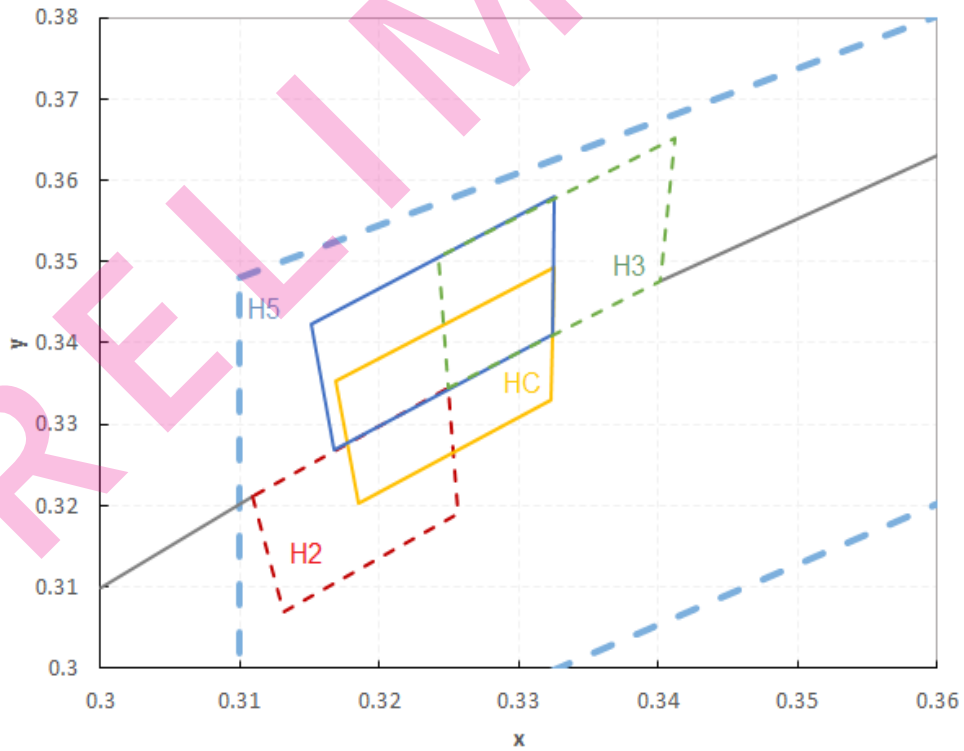


Figure 13b. Color bin structure for LUXEON Versat 3030 ST CW 150

# Color Bin Definitions

Table 6a. Color bin definitions for LUXEON Versat 3030 ST CW 150

COLOR BIN	x	y	6-DIGIT IEC CODE	TYPICAL CCT (K)	COLOR BIN	x	y	6-DIGIT IEC CODE	TYPICAL CCT (K)
2B	0.3120	0.3139	ebvG33	6460	1B	0.3120	0.3306	fbwA23	6390
	0.3185	0.3203				0.3169	0.3353		
	0.3192	0.3131				0.3177	0.3277		
	0.3131	0.3070				0.3131	0.3232		
2D	0.3185	0.3203	ebyG33	6050	1D	0.3169	0.3353	fbyA33	6050
	0.3253	0.3266				0.3246	0.3424		
	0.3256	0.3191				0.3249	0.3344		
	0.3192	0.3131				0.3177	0.3277		
4B	0.3253	0.3266	ecbG33	5680	3B	0.3246	0.3424	fcbA33	5680
	0.3323	0.3329				0.3325	0.3493		
	0.3323	0.3251				0.3324	0.3410		
	0.3256	0.3191				0.3249	0.3344		
4D	0.3323	0.3329	eceG33	5350	3D	0.3325	0.3493	fceA33	5350
	0.3396	0.3392				0.3406	0.3562		
	0.3392	0.3310				0.3401	0.3476		
	0.3323	0.3251				0.3324	0.3410		
2A	0.3109	0.3211	ebvD33	6460	1A	0.3109	0.3382	fbwD23	6390
	0.3177	0.3277				0.3161	0.3432		
	0.3185	0.3203				0.3169	0.3353		
	0.3120	0.3139				0.3120	0.3306		
2C	0.3177	0.3277	ebyD33	6050	1C	0.3161	0.3432	fbyD33	6050
	0.3249	0.3344				0.3242	0.3506		
	0.3253	0.3266				0.3246	0.3424		
	0.3185	0.3203				0.3169	0.3353		
4A	0.3249	0.3344	ecbD33	5680	3A	0.3242	0.3506	fcbD33	5680
	0.3324	0.3410				0.3325	0.3579		
	0.3323	0.3329				0.3325	0.3493		
	0.3253	0.3266				0.3246	0.3424		
4C	0.3324	0.3410	eceD33	5350	3C	0.3325	0.3579	fceD33	5350
	0.3401	0.3476				0.3412	0.3652		
	0.3396	0.3392				0.3406	0.3562		
	0.3323	0.3329				0.3325	0.3493		

**Notes for Table 6a:**

1. Lumileds maintains a tester tolerance of  $\pm 0.005$  on x and y color coordinates.
2. CIE 1931 x and y coordinate frame.

Table 6b. Color bin definitions for LUXEON Versat 3030 ST CW 150 at 150 mA, TC = 25 °C

COLOR BIN	x	y
HC	0.3325	0.3493
	0.3169	0.3353
	0.3185	0.3203
	0.3323	0.3329
	0.3325	0.3493
H5	0.3325	0.3579
	0.3151	0.3423
	0.3168	0.3268
	0.3324	0.341
	0.3325	0.3579
H2	0.3109	0.3211
	0.3131	0.307
	0.3256	0.3191
	0.3249	0.3344
	0.3109	0.3211
H3	0.3249	0.3344
	0.3401	0.3476
	0.3412	0.3652
	0.3242	0.3506
	0.3249	0.3344

## Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON Versat 3030 ST CW 150

BIN	FORWARD VOLTAGE <sup>(1)</sup> (V <sub>f</sub> )	
	MINIMUM	MAXIMUM
A	2.70	2.94
B	2.94	3.20
C	3.20	3.49

**Notes for Table 7:**

1. Lumileds maintains a tolerance of ±0.06 V on forward voltage measurements.

# Mechanical Dimensions

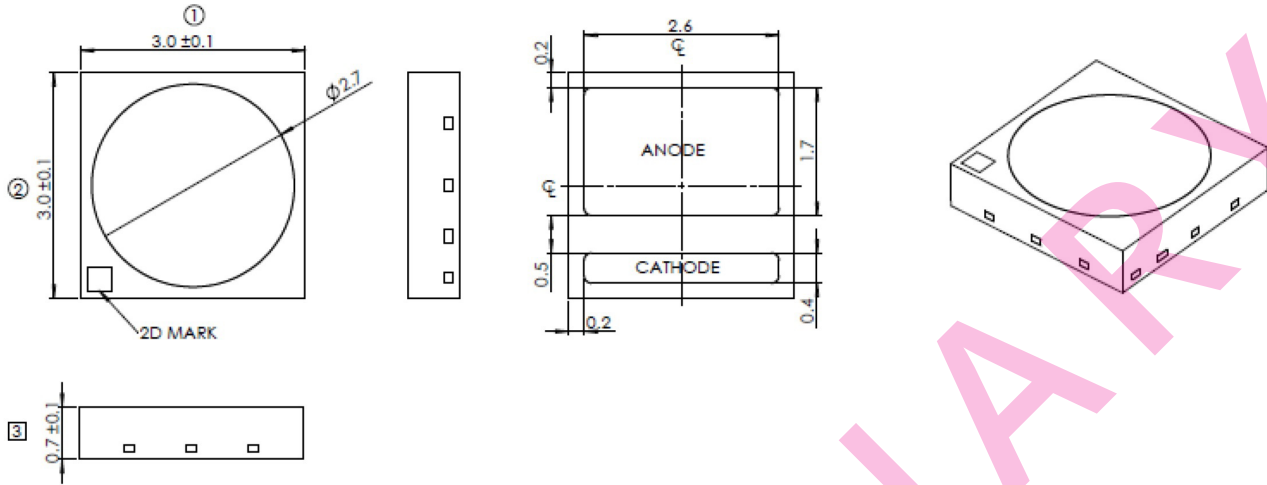


Figure 14. Mechanical dimensions for LUXEON Versat 3030 ST CW 150

Notes for Figure 14:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

## Package Weight

Table 8. Approximate weight of LUXEON Versat 3030 ST CW 150

PART NUMBER	PACKAGE WEIGHT [MG]
A1VC-5850A010xxxx0	17.5

## JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON Versat 3030 ST CW 150

LEVEL	FLOOR LIFE		STANDARD SOAK REQUIREMENTS	
	TIME	CONDITIONS	TIME	CONDITIONS
2	1 year	≤ 30 °C / 60 % RH	168 Hours +5 / -0	85 °C / 60 % RH

# Packaging Information

## Pocket Tape Dimensions

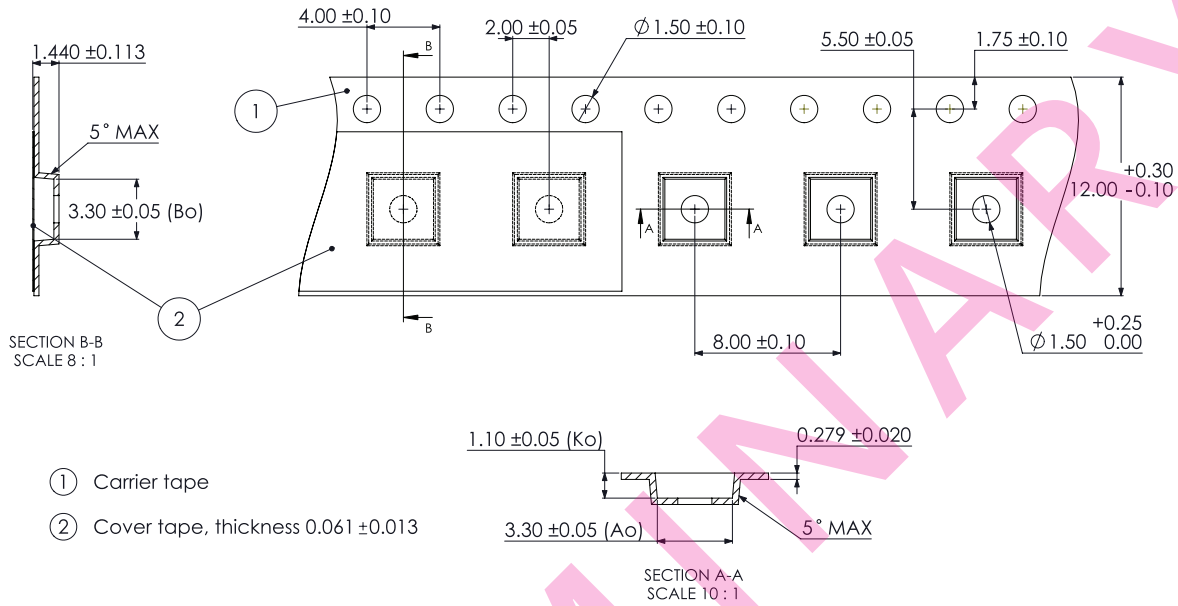


Figure 15. Pocket tape dimensions for LUXEON Versat 3030 ST CW 150

### Notes for Figure 15:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Ao is the width of pocket, Ko is the depth of pocket, and Bo is the height of pocket.

## Reel Dimensions

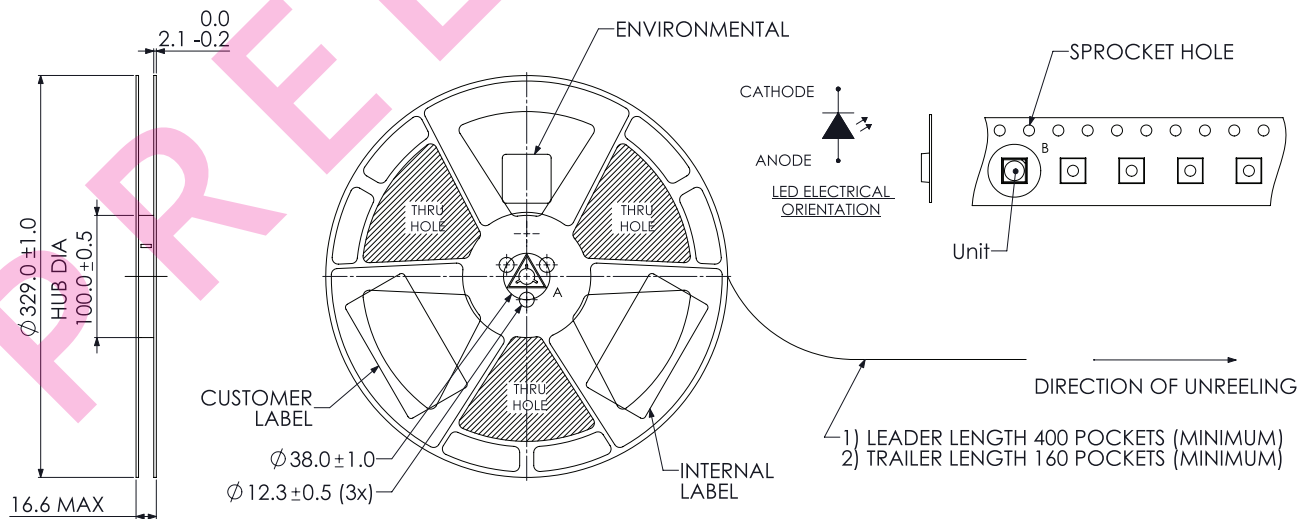


Figure 16. Reel dimensions for LUXEON Versat 3030 ST CW 150

### Notes for Figure 16:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

# Product Labelling

LUXEON Versat 3030 LEDs are packaged in moisture barrier bags on reels. Both moisture barrier bag and reels have printed information providing part numbers with CAT codes that indicate luminous flux bin, color bins and forward voltage bins.



Figure 17. Example of a reel label LUXEON Versat 3030 ST CW 150

**Notes for Figure 17– Reel label descriptions for customer use:**

Field labels not described are for Lumileds internal use only.

1. Total number of LED emitters in a shipment box.
2. Lumileds part number
3. Customer part number for custom requests only.
4. LED test date in YYWW format.
5. Unique product lot identification number. This number is required for traceability purposes.
6. Country code of origin of manufacturing of part (e.g. MY for Malaysia, CN for China) according to ISO 3166-1 alpha-2 document.
7. Product bin 4-digit alphanumeric CAT code.

## About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world safer, better and more beautiful—with light.

To learn more about our lighting solutions, visit [lumileds.com](http://lumileds.com).



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