

LUXEON Versat 3030 HP 700

Brightest, lambertian flat top emitter

LUXEON Versat 3030 HP 700 is developed to enable maximum hot lumen on standard FR4 boards. It has lower thermal resistance than competitive packages in the market. It comes in an industry standard 3030 SMD package to provide easy handling and optimum protection of the die.

LUXEON Versat 3030 HP 700 is available in the following color wavelengths:

- Red Orange (615 nm)
- Red (623 nm)
- Long Red (630 nm)
- Super Red (635 nm)

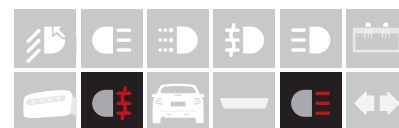
FEATURES AND BENEFITS

Low thermal resistance and power consumption results in simplified thermal management and system cost

Lambertian flat top emitter

High flux output provides flexibility in styling and optical design

Higher drive current capability for increased flux performance



PRIMARY APPLICATIONS

Rear Fog

Stop/Tail

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General Product Information

Product Test Conditions

LUXEON Versat 3030 HP 700 LEDs are tested and binned using a 20 ms monopulse (MP) at 700 mA drive current, case temperature, T_c , of 25 °C.

Part Number Nomenclature

Part numbers for LUXEON Versat 3030 HP 700 follow the convention below:

A 1 V A – **A B C D E F G H J K M N P**

Where:

- A – designates product segment (A = Automotive)
- 1 – designates product level (1 = Level 1)
- V – designates product line/family (V = LUXEON Versat)
- A – designates package size (A = High Performance)
- A B C D** – designates color variant (O612 = 612 nm minimum, R620 = 620 nm minimum, S627 = 627 nm minimum, S632 = 632 nm minimum)
- E** – designates binning current (C = 700 mA)
- F** – designates binning configuration (1 = single binning)
- G** – open space (0 = standard part)
- H** – designates minimum luminous flux (refer to luminous flux bins)
- J** – designates maximum luminous flux (refer to luminous flux bins)
- K** – designates minimum forward voltage (refer to forward voltage bins)
- M** – designates maximum forward voltage (refer to forward voltage bins)
- N P** – reserved for custom part numbers (00 = standard part)

Therefore, the following part number is used for a LUXEON Versat 700 Red-Orange with a luminous flux range of 107 lumens to 187 lumens, and a forward voltage range of 2.00–2.60 volts:

A 1 V A – **O 6 1 2 C 1 0 M P A D 0 0**

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Versat 3030 HP 700 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

Table 1. Product selection for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA, $T_c = 25^\circ\text{C}$

| COLOR | DOMINANT WAVELENGTH ^[1,2] (nm) | PART NUMBER |
|------------|--|--------------|
| Red Orange | 615 | A1VA-O612C10 |
| Red | 623 | A1VA-R620C10 |
| Long Red | 630 | A1VA-S627C10 |
| Super Red | 635 | A1VA-S632C10 |

Notes for Table 1:

1. Dominant wavelength is derived from the CIE 1931 Chromaticity diagram and represents perceived color.
2. Lumileds maintains a tolerance of $\pm 1\text{nm}$ for dominant wavelength measurements.

Optical Characteristics

Table 2. Typical optical characteristics for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA, $T_c = 25^\circ\text{C}$

| PART NUMBER | TYPICAL TOTAL INCLUDED ANGLE ^[1] $\theta_{0.90V}$ | TYPICAL VIEWING ANGLE ^[2] $2\theta_{1/2}$ |
|--------------------|---|---|
| A1VA-xxxxC10xxxxxx | 138° | 120° |

Notes for Table 2:

1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is $\frac{1}{2}$ of the peak value.

Electrical and Thermal Characteristics

Table 3. Typical electrical and thermal characteristics for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA $T_c = 25^\circ\text{C}$

| PART NUMBER | FORWARD VOLTAGE (V_f) | | THERMAL RESISTANCE – JUNCTION TO CASE ($^\circ\text{C}/\text{W}$) | | | |
|--------------------|---------------------------|---------|---|---------|-----------------------------------|---------|
| | | | $R\theta_{jc} \text{ ELEC}^{[1]}$ | | $R\theta_{jc} \text{ REAL}^{[2]}$ | |
| | MINIMUM | MAXIMUM | TYPICAL | MAXIMUM | TYPICAL | MAXIMUM |
| A1VA-xxxxC10xxxxxx | 2.00 | 2.60 | 4.34 | 5.08 | 8.68 | 10.15 |

Notes for Table 3:

1. $R_{\theta j-c \text{ elec}}$: Electrical thermal resistance (junction to case).
2. $R_{\theta j-c \text{ real}}$: Real thermal resistance (junction to case) with wall plug efficiency included. Reference JESD51-51, JESD51-14, 4.1.3.
3. All values are typical unless otherwise stated.
4. The Max Rth values are calculated (3 σ).
5. Typical Temperature Coefficient of V_f , TCV ($I_f = 350\text{mA}$, $10^\circ\text{C} \leq T_c \leq 110^\circ\text{C}$) is $-4.0 \text{ mV}/^\circ\text{C}$

Absolute Ratings

Table 4. Absolute ratings for LUXEON Versat 3030 HP 700

| PARAMETER | PERFORMANCE |
|---|--------------------|
| Minimum DC Forward Current | 20 mA |
| Maximum DC Forward Current | 1 A |
| Maximum Junction Temperature ^[1] | 150 °C |
| Operating Case Temperature at Test Current ^[1] | -40 to 135 °C |
| LED Storage Temperature | -40 to 135 °C |
| Soldering Temperature | JEDEC 020E 260 °C |
| Allowable Reflow Cycles | 3 |
| Minimum ESD Sensitivity ^[2] | 8 kV HBM, 400 V MM |
| Reverse Voltage (V_{reverse}) ^[3] | -15 V |

Notes for Table 4:

1. Proper current derating must be observed to maintain junction temperature below the maximum, so that the LED is maintained below the maximum rated operating case temperature. LUXEON Versat 3030 HP 700 LEDs driven at or above the maximum rated operating case temperature may have shorter lifetime.
2. Measured using human body model (per ANSI/ESDA/JEDEC JS-001-2010) and charged device model (per JESD22-C101F).
3. LUXEON Versat 3030 is not designed to be driven in reverse bias.

JEDEC Moisture Sensitivity

Table 5. Moisture sensitivity levels for LUXEON Versat 3030 HP 700

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

Characteristic Curves

Spectral Power Distribution Characteristics

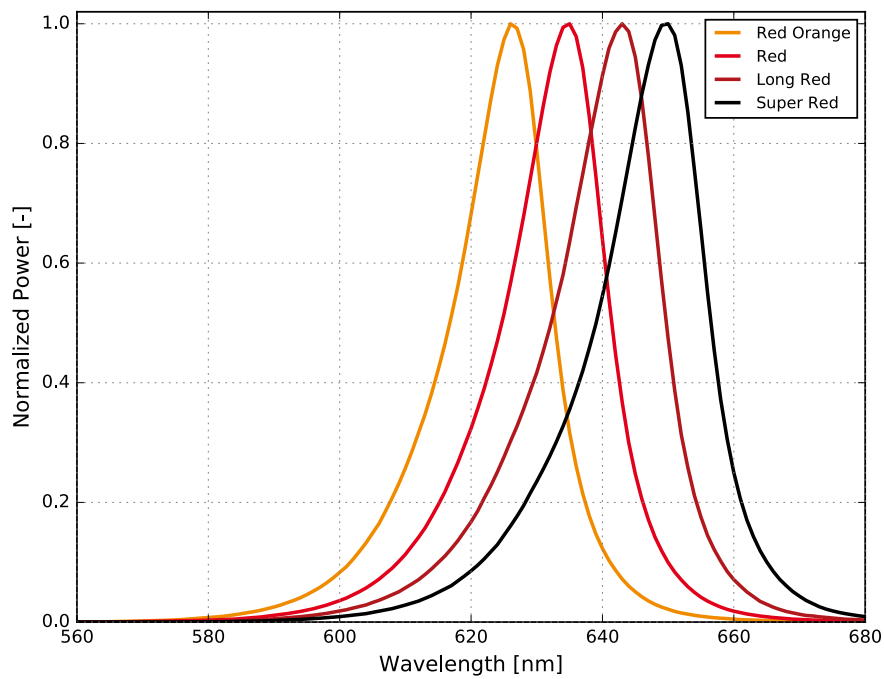


Figure 1. Typical normalized power vs. wavelength for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA, $T_c = 25^\circ\text{C}$

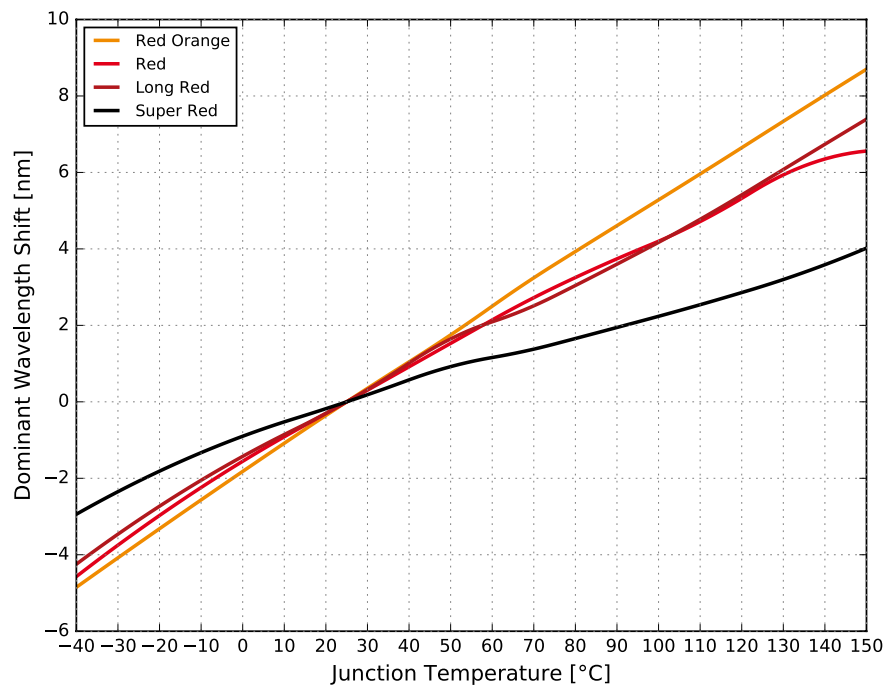


Figure 2. Typical wavelength shift vs. junction temperature for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA

Light Output Characteristics

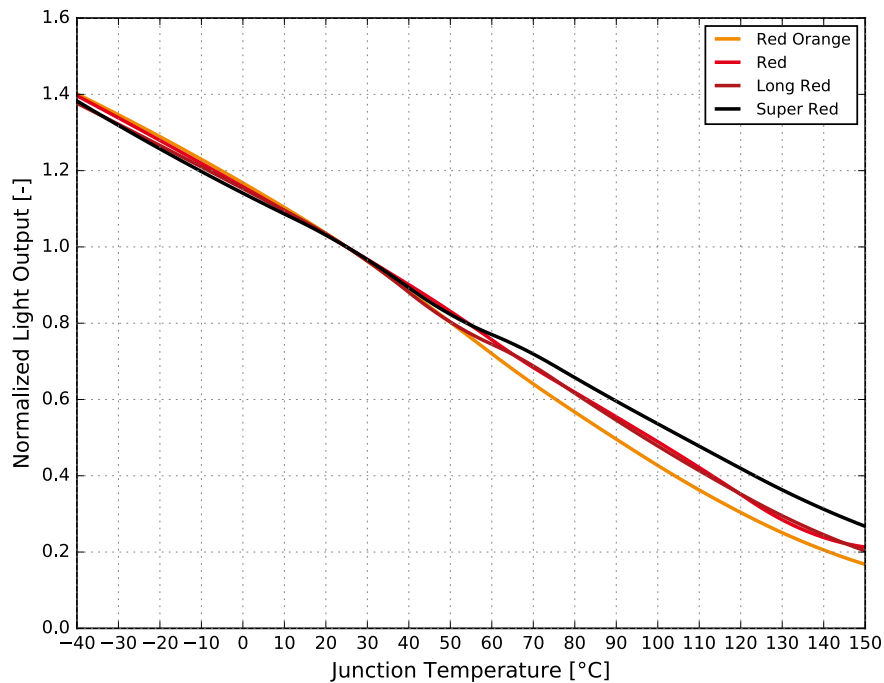


Figure 3. Typical normalized light output vs. junction temperature for LUXEON Versat 3030 HP 700 20 ms MP, 700 mA

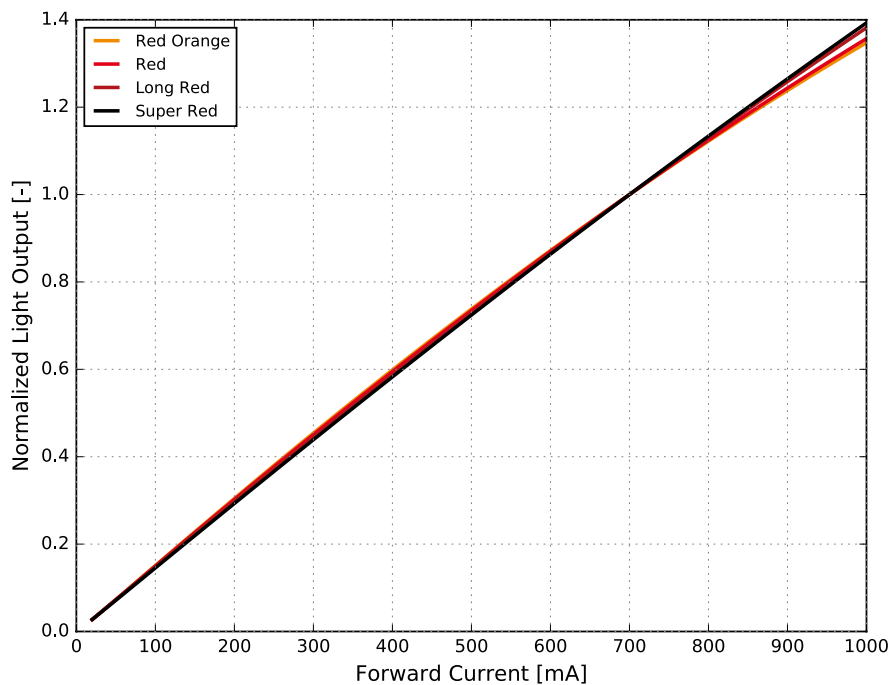


Figure 4. Typical normalized light output vs. forward current for LUXEON Versat 3030 HP 700 at $T_c = 25^\circ\text{C}$

Forward Current and Voltage Characteristics

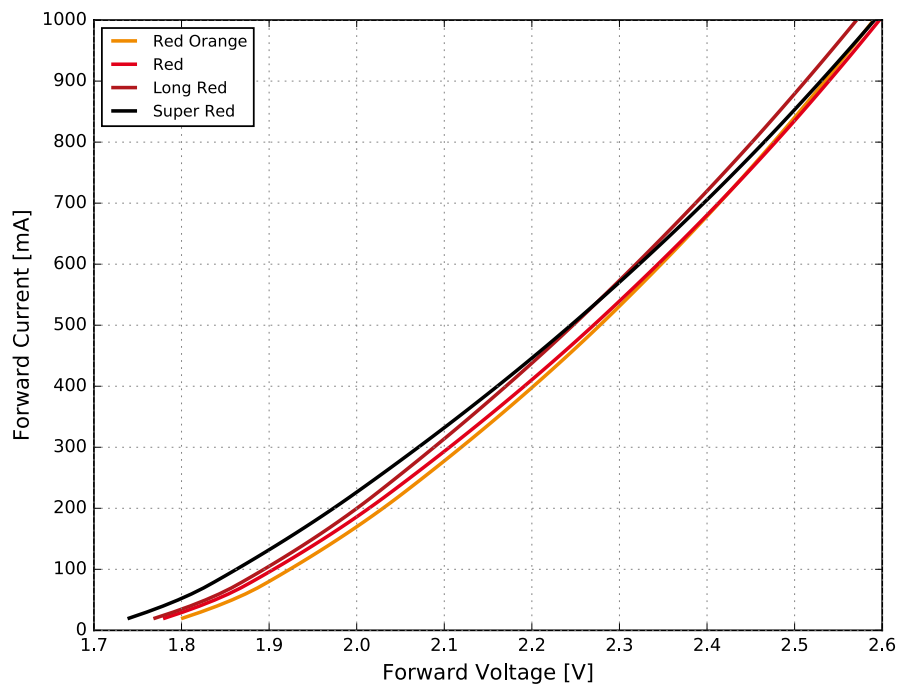


Figure 5. Typical forward current vs. forward voltage for LUXEON Versat 3030 HP 700 at $T_c = 25\text{ }^{\circ}\text{C}$

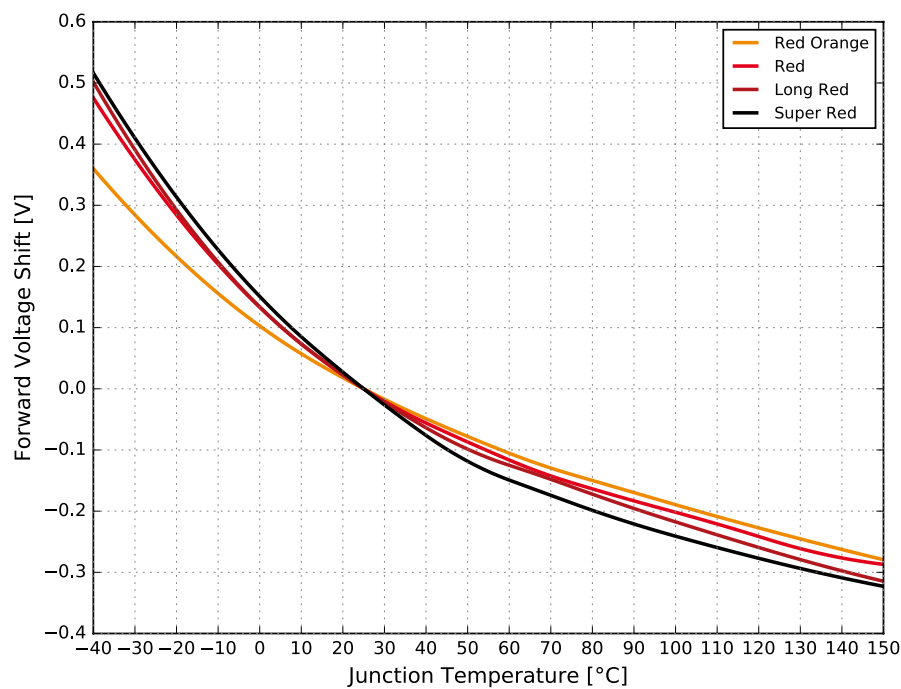


Figure 6. Typical forward voltage shift vs. junction temperature for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA

Radiation Pattern Characteristics

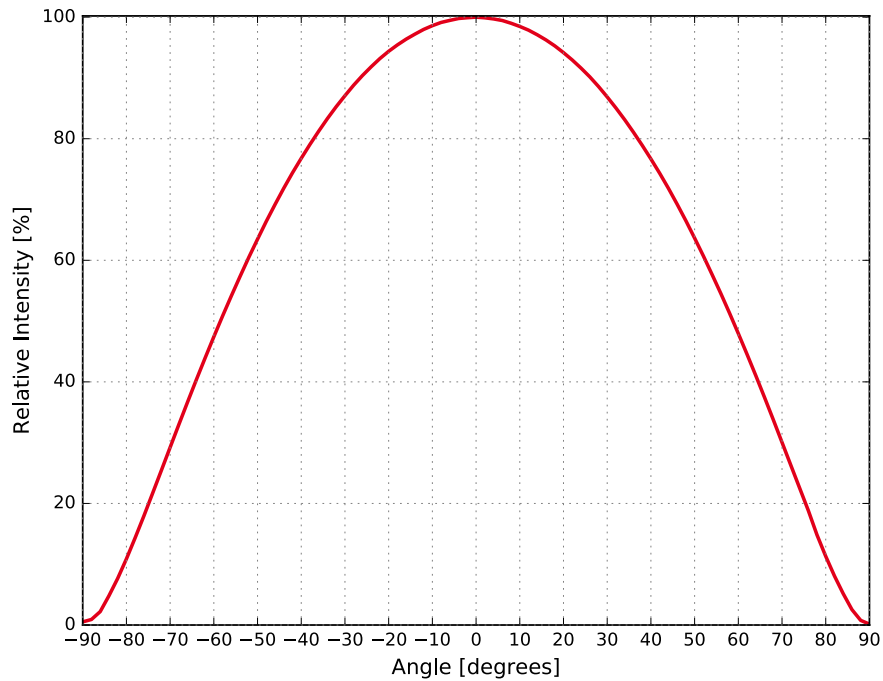


Figure 7. Typical radiation pattern for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA

Operating Limits Characteristics

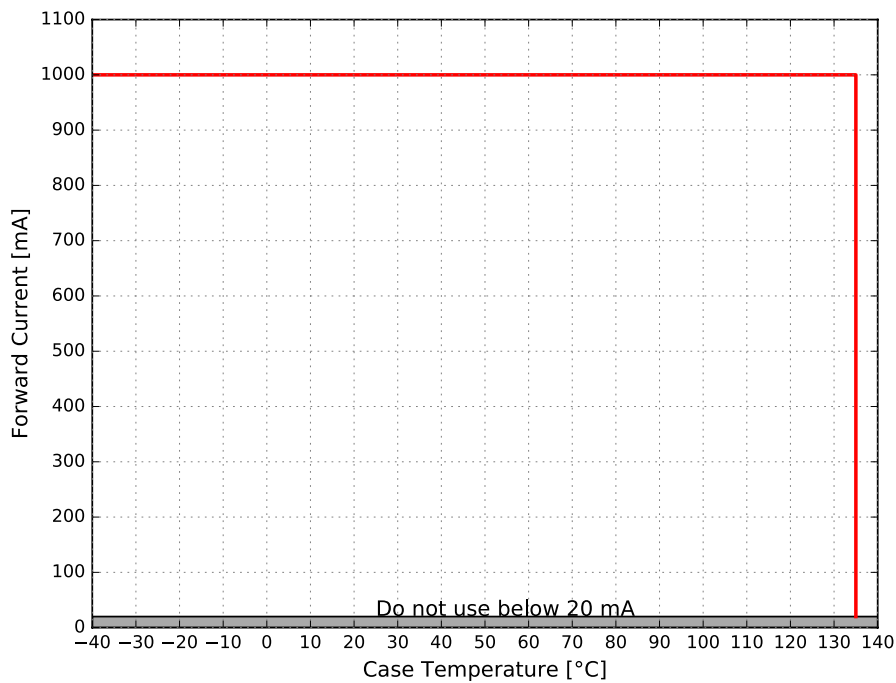


Figure 8: Maximum forward current vs. case temperature for LUXEON Versat 3030 HP 700

Product Bin and Labeling Definitions

Designing with LUXEON Versat 3030 HP 700

Flux bins supportable for car programs depend on product color and program start-of-production and end-of-production dates. Flux roadmaps by year and product color are maintained and available from the sales representative. Please contact a local sales representative to request the flux bin range with best supportability for program timing.

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 HP 700 LEDs are labeled using a 3-digit alphanumeric CAT code following the format below:

A B C

Where:

- A** – designates luminous flux bin (example: N = 130 lumens to 156 lumens)
- B** – designates color code (example: 3 = 612 nm to 620 nm)
- C** – designates forward voltage bin (example: A = 2.00 V to 2.15 V)

Therefore, a LUXEON Versat 3030 HP 700 with a lumen range of 130 to 156, color code of 3 and a forward voltage of 2.00 to 2.15 has the following CAT code:

N 3 A

Luminous Flux Bins

Table 6 lists the standard luminous flux bins for LUXEON Versat 3030 HP 700 emitters. Product availability in a particular bin varies by color and platform start-of-production date. Contact your local sales representative for best supportability of programs.

Table 6. Luminous flux bin definitions for LUXEON Versat 3030 HP 700 at 20 ms MP, $T_c = 25^\circ\text{C}$

| BIN | LUMINOUS FLUX ^[1] (lm) | |
|-----|-----------------------------------|---------|
| | MINIMUM | MAXIMUM |
| G | 43 | 52 |
| H | 52 | 62 |
| J | 62 | 75 |
| K | 75 | 90 |
| L | 90 | 107 |
| M | 107 | 130 |
| N | 130 | 156 |
| P | 156 | 187 |

Notes for Table 6:

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

Color Codes

Table 7. Color code definitions for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA, $T_c = 25\text{ }^{\circ}\text{C}$

| CODE | DOMINANT WAVELENGTH ^[1] (nm) | |
|------|---|---------|
| | MINIMUM | MAXIMUM |
| 3 | 612 | 620 |
| 6 | 620 | 627 |
| 4 | 627 | 632 |
| 5 | 632 | 638 |

Notes for Table 7:

1. Lumileds maintains a tolerance of $\pm 0.5\text{ nm}$ on dominant wavelength measurements.

Forward Voltage Bins

Table 8. Forward voltage bin definitions for LUXEON Versat 3030 HP 700 at 20 ms MP, 700 mA, $T_c = 25\text{ }^{\circ}\text{C}$

| BIN | FORWARD VOLTAGE ^[1] (V_f) | |
|-----|--|---------|
| | MINIMUM | MAXIMUM |
| A | 2.00 | 2.15 |
| B | 2.15 | 2.30 |
| C | 2.30 | 2.45 |
| D | 2.45 | 2.60 |

Notes for Table 8:

1. Lumileds maintains a tolerance of $\pm 0.06\text{ V}$ on forward voltage measurements.

Mechanical Dimensions

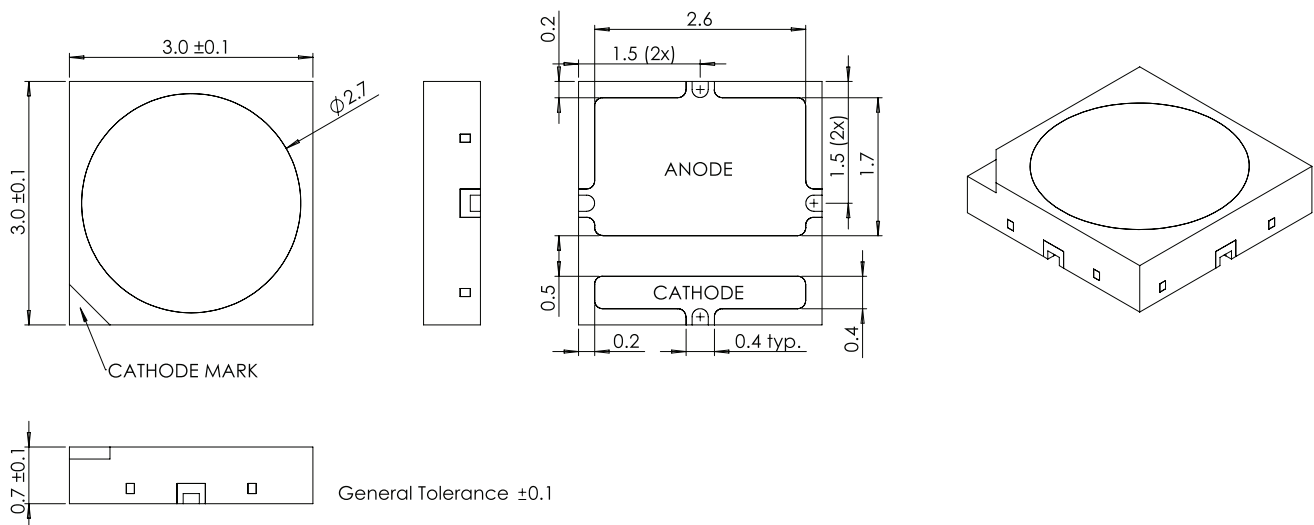


Figure 9. Mechanical dimensions for LUXEON Versat 3030 HP 700

Notes for Figure 9:

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

Reflow Soldering Guidelines

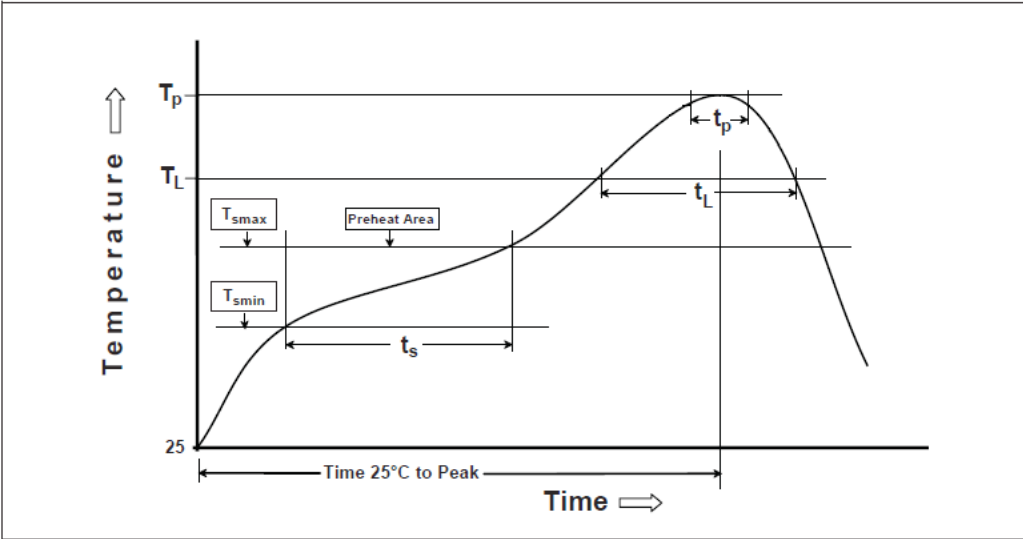


Figure 10. Visualization of the acceptable reflow temperature profile as specified in Table 9

Table 9. Reflow profile characteristics for LUXEON Versat 3030 HP 700

| PROFILE FEATURE | LEAD FREE ASSEMBLY |
|---|-----------------------|
| Preheat Minimum Temperature (T_{smin}) | 150 °C |
| Preheat Maximum Temperature (T_{smax}) | 200 °C |
| Preheat Time (t_{smin} to t_{smax}) | 60 to 180 seconds |
| Ramp-Up Rate (T_L to T_p) | 3 °C / second maximum |
| Liquidus Temperature (T_L) | 217 °C |
| Time Maintained Above Temperature T_L (t_L) | 60 to 150 seconds |
| Peak / Classification Temperature (T_p) | 260 °C |
| Time Within 5 °C of Actual Temperature (t_p) | 20 to 40 seconds |
| Ramp-Down Rate (T_p to T_L) | 6 °C / second maximum |
| Time 25 °C to Peak Temperature | 8 minutes maximum |

Notes for Table 9:

1. All temperatures refer to the application Printed Circuit Board (PCB), measured on the surface adjacent to the package body.

Packaging Information

Pocket Tape Dimensions

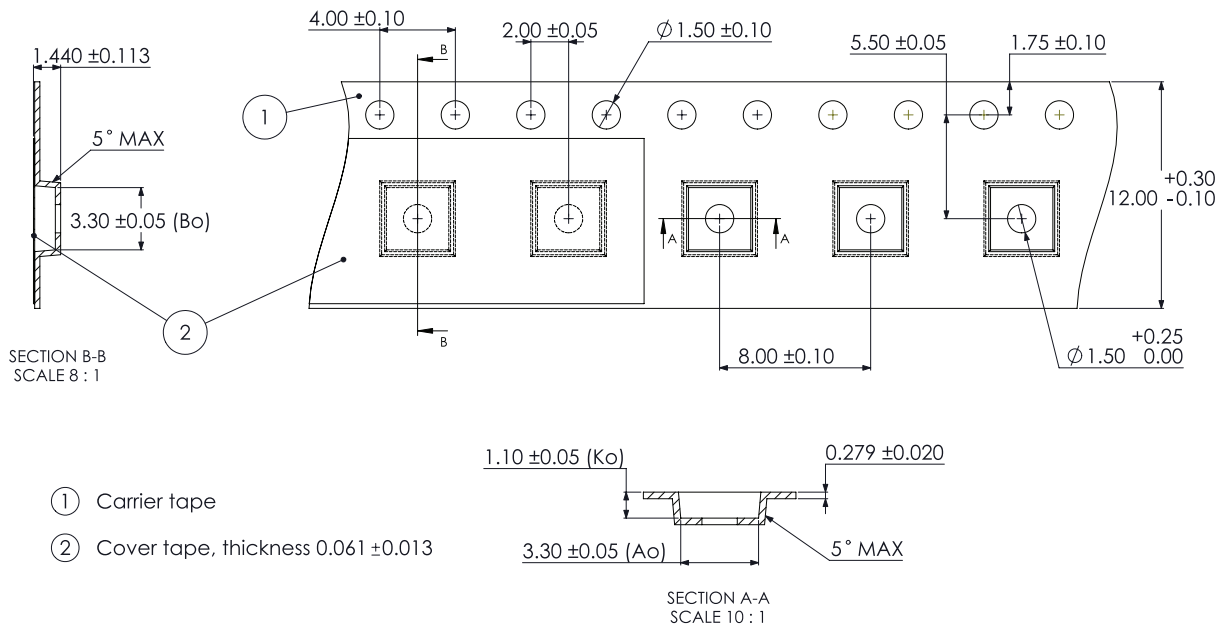


Figure 11. Pocket tape dimensions for LUXEON Versat 3030 HP 700

Notes for Figure 11:

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

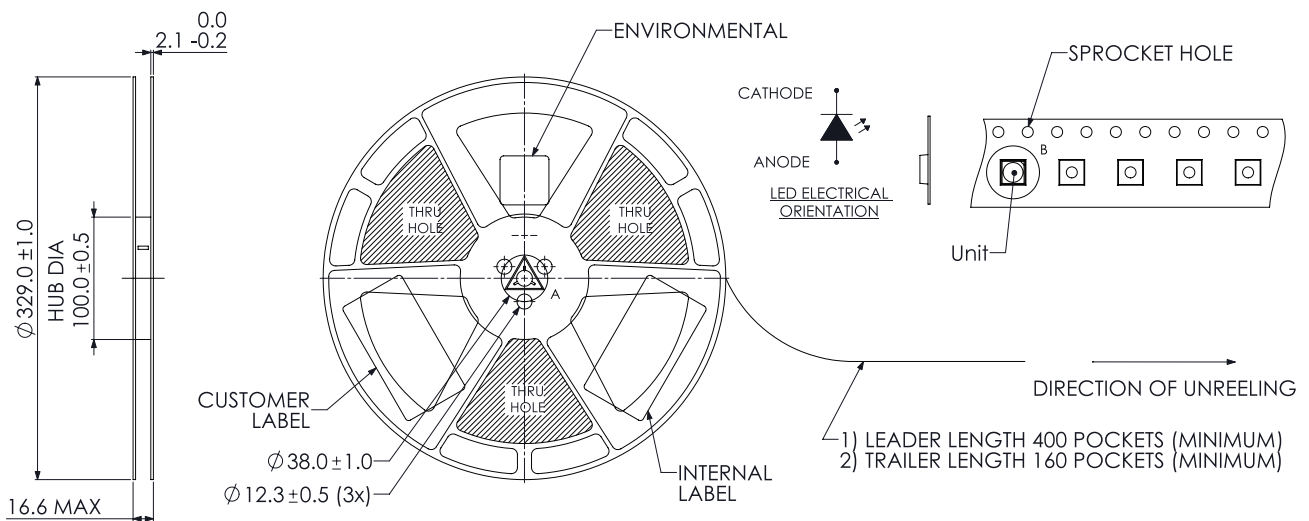


Figure 12. Reel dimensions for LUXEON Versat 3030 HP 700

Notes for Figure 12:

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

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.



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