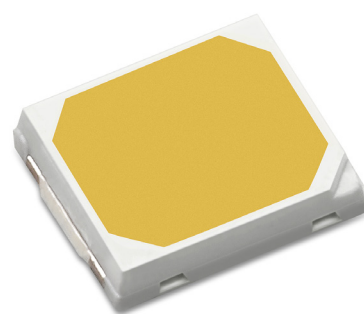


# LUXEON 2835 Commercial



Superior lm/W/\$ choice in LUXEON 2835 portfolio

LUXEON 2835 Commercial mid-power LEDs are the price/performance leader for commercial indoor lighting solutions when lumens per Watt and lumens per dollar are the driving metrics for development. They are available in CCTs from 2700K to 6500K and CRIs of 80 and 90. LUXEON 2835 Commercial has a superior max current rating and features a 1/5<sup>th</sup> color bin structure making it a perfect choice for indoor applications where you want the quality and reliability of LUXEON in a commercial application. LUXEON 2835 Commercial leads its class in flux, color consistency, robustness, and reliability making it the right choice for commercial indoor luminaires.



## FEATURES AND BENEFITS

- 
- Complete CCT/CRI offering for various application

---

  - Industry standard footprint for drop-in replacement

---

  - Reliable package design for commercial applications

---

  - 5 SDCM MacAdam ellipse enable precise color control
- 

## PRIMARY APPLICATIONS

- 
- Panel / Soft Lights

---

  - Linear

---

  - Troffers
-

# Table of Contents

<b>General Product Information</b> .....	<b>2</b>
Product Test Conditions .....	2
Part Number Nomenclature .....	2
Lumen Maintenance .....	2
Environmental Compliance .....	2
<b>Performance Characteristics</b> .....	<b>3</b>
Product Selection Guide .....	3
Optical Characteristics .....	5
Electrical and Thermal Characteristics .....	5
<b>Absolute Maximum Ratings</b> .....	<b>6</b>
<b>Characteristics Curves</b> .....	<b>7</b>
Spectral Power Distribution Characteristics .....	7
Light Output Characteristics .....	8
Forward Current Characteristics .....	10
Radiation Pattern Characteristics .....	11
<b>Mechanical Dimensions</b> .....	<b>12</b>
<b>Reflow Soldering Guidelines</b> .....	<b>13</b>
JEDEC Moisture Sensitivity .....	13
Solder Pad Design .....	14
<b>Packaging Information</b> .....	<b>14</b>
Pocket Tape Dimensions .....	14
Reel Dimensions .....	15
Notes for Figure 11b: .....	16

# General Product Information

## Product Test Conditions

LUXEON 2835 Commercial LEDs are tested and binned with a 20ms monopulse specified below at a junction temperature,  $T_j$ , of 25°C.

65mA – LUXEON 2835S 3V

120mA – LUXEON 2835S 6V

## Part Number Nomenclature

Part numbers for LUXEON 2835 Commercial follow the convention below:

**L 1 2 8 – A A B B S C 3 5 D D E E E**

Where:

**A A** – designates nominal ANSI CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)

**B B** – designates minimum CRI (80=80CRI and 90=90CRI)

**C** – designates voltage of the part (A=3V, B=6V, C=9V)

**D D** – designates options for product specification

**E E E** – designates options for product specification

Therefore, the following part number is used for a LUXEON 2835 Commercial 4000K 80CRI, 3V LED:

**L 1 2 8 – 4 0 8 0 S A 3 5 A 0 0 A 1**

## Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON 2835 Commercial is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the ROHS Directive 2011/65/EU including amendments 2015/863/EU & 2017/2102/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 performance of LUXEON 2835 Commercial LEDs at specified test conditions.

VOLTAGE	PRODUCT	NOMINAL CCT <sup>[1]</sup>	MINIMUM CRI <sup>[2, 3]</sup>	LUMINOUS FLUX <sup>[2, 3]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	2700K	80	30.0	32.5	181.0	65	L128-2780SA35A00A1
		3000K	80	32.0	33.5	186.5	65	L128-3080SA35A00A1
		3500K	80	32.5	34.0	189.0	65	L128-3580SA35A00A1
		4000K	80	33.0	35.0	195.0	65	L128-4080SA35A00A1
		5000K	80	33.0	35.0	195.0	65	L128-5080SA35A00A1
		5700K	80	33.0	35.0	195.0	65	L128-5780SA35A00A1
		6500K	80	32.5	34.5	192.0	65	L128-6580SA35A00A1
		2700K	90	25.5	27.5	153.3	65	L128-2790SA35A00A1
		3000K	90	26.8	28.8	160.5	65	L128-3090SA35A00A1
		3500K	90	28.1	30.2	168.3	65	L128-3590SA35A00A1
		4000K	90	28.6	30.8	171.7	65	L128-4090SA35A00A1
		5000K	90	28.6	30.8	171.7	65	L128-5090SA35A00A1
		5700K	90	28.6	30.8	171.7	65	L128-5790SA35A00A1
		6500K	90	28.3	30.4	169.5	65	L128-6590SA35A00A1
		2700K	80	31.3	34.3	194.7	65	L128-2780SA35A00B1
		3000K	80	32.2	35.4	201.0	65	L128-3080SA35A00B1
		3500K	80	33.2	36.3	206.1	65	L128-3580SA35A00B1
		4000K	80	33.8	36.9	209.5	65	L128-4080SA35A00B1
		5000K	80	33.8	37.1	210.6	65	L128-5080SA35A00B1
		5700K	80	33.8	37.1	210.6	65	L128-5780SA35A00B1
		6500K	80	33.3	36.6	207.8	65	L128-6580SA35A00B1
		2700K	90	26.8	28.8	163.5	65	L128-2790SA35A00B1
		3000K	90	27.4	29.9	169.7	65	L128-3090SA35A00B1
		3500K	90	28.3	30.8	174.9	65	L128-3590SA35A00B1
		4000K	90	29.4	31.8	180.5	65	L128-4090SA35A00B1
		5000K	90	29.4	31.8	180.5	65	L128-5090SA35A00B1
		5700K	90	29.4	31.8	180.5	65	L128-5790SA35A00B1
		6500K	90	29.4	31.8	180.5	65	L128-6590SA35A00B1
		2700K	80	29.2	31.4	173.8	65	L128-2780SA35A00C1
		3000K	80	30.2	32.5	179.9	65	L128-3080SA35A00C1
		3500K	80	31.1	33.5	185.4	65	L128-3580SA35A00C1
		4000K	80	31.6	33.9	187.6	65	L128-4080SA35A00C1
		5000K	80	31.6	34.0	188.2	65	L128-5080SA35A00C1
		5700K	80	31.6	34.0	188.2	65	L128-5780SA35A00C1
		6500K	80	31.4	33.7	186.5	65	L128-6580SA35A00C1
		2700K	90	24.9	26.8	148.3	65	L128-2790SA35A00C1
3000K	90	25.8	27.8	153.8	65	L128-3090SA35A00C1		
3500K	90	26.7	28.8	159.4	65	L128-3590SA35A00C1		
4000K	90	28.2	30.3	167.7	65	L128-4090SA35A00C1		
5000K	90	28.2	30.4	168.2	65	L128-5090SA35A00C1		
5700K	90	28.2	30.4	168.2	65	L128-5790SA35A00C1		
6500K	90	27.9	30.0	166.0	65	L128-6590SA35A00C1		

Table 1 continued on next page:

1. Correlated color temperature is cold-targeted at T<sub>f</sub>=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T<sub>f</sub>=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7.5% on luminous flux measurements.

Table 1. Product performance of LUXEON 2835 Commercial LEDs at specified test conditions, Continued.

VOLTAGE	PRODUCT	NOMINAL CCT <sup>[1]</sup>	MINIMUM CRI <sup>[2, 3]</sup>	LUMINOUS FLUX <sup>[2, 3]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	2700K	80	31.6	34.0	190.7	65	L128-2780SA35A00D1
		3000K	80	32.4	34.8	195.1	65	L128-3080SA35A00D1
		3500K	80	33.1	35.5	199.6	65	L128-3580SA35A00D1
		4000K	80	33.8	36.3	204.1	65	L128-4080SA35A00D1
		5000K	80	34.2	36.7	206.3	65	L128-5080SA35A00D1
		5700K	80	34.2	36.7	206.3	65	L128-5780SA35A00D1
		6500K	80	33.8	36.3	204.1	65	L128-6580SA35A00D1
		2700K	90	27.2	29.3	164.5	65	L128-2790SA35A00D1
		3000K	90	28.4	30.6	171.7	65	L128-3090SA35A00D1
		3500K	90	29.4	31.6	177.3	65	L128-3590SA35A00D1
		4000K	90	29.7	32.0	179.5	65	L128-4090SA35A00D1
		5000K	90	29.7	32.0	179.5	65	L128-5090SA35A00D1
		5700K	90	29.6	31.8	178.4	65	L128-5790SA35A00D1
		6500K	90	29.4	31.6	177.3	65	L128-6590SA35A00D1
		2700K	80	33.8	34.2	195.0	65	L128-2780SA35A00E1
		3000K	80	34.3	35.2	200.6	65	L128-3080SA35A00E1
		3500K	80	35.3	35.9	204.6	65	L128-3580SA35A00E1
		4000K	80	37.2	38.2	218.0	65	L128-4080SA35A00E1
		5000K	80	37.2	38.2	218.0	65	L128-5080SA35A00E1
		5700K	80	36.7	38.2	218.0	65	L128-5780SA35A00E1
		6500K	80	35.7	37.5	214.0	65	L128-6580SA35A00E1
		2700K	90	29.8	31.0	176.6	65	L128-2790SA35A00E1
		3000K	90	30.6	32.2	183.5	65	L128-3090SA35A00E1
		3500K	90	30.8	32.4	184.6	65	L128-3590SA35A00E1
		4000K	90	31.3	32.7	186.3	65	L128-4090SA35A00E1
		5000K	90	31.3	32.7	186.3	65	L128-5090SA35A00E1
		5700K	90	31.3	32.7	186.3	65	L128-5790SA35A00E1
		6500K	90	31.8	32.7	186.3	65	L128-6590SA35A00E1
		2700K	80	34.8	35.2	200.6	65	L128-2780SA35A00F1
		3000K	80	35.7	36.1	205.7	65	L128-3080SA35A00F1
		3500K	80	36.7	37.3	212.5	65	L128-3580SA35A00F1
		4000K	80	37.5	38.6	220.0	65	L128-4080SA35A00F1
		5000K	80	37.7	38.6	220.0	65	L128-5080SA35A00F1
		5700K	80	37.7	38.6	220.0	65	L128-5780SA35A00F1
		6500K	80	37.7	39.5	225.1	65	L128-6580SA35A00F1
		2700K	90	29.8	31.0	176.6	65	L128-2790SA35A00F1
		3000K	90	30.8	32.2	183.5	65	L128-3090SA35A00F1
		3500K	90	31.8	32.4	184.6	65	L128-3590SA35A00F1
		4000K	90	32.3	32.7	186.3	65	L128-4090SA35A00F1
		5000K	90	32.3	32.7	186.3	65	L128-5090SA35A00F1
		5700K	90	32.3	32.7	186.3	65	L128-5790SA35A00F1
		6500K	90	32.3	32.7	186.3	65	L128-6590SA35A00F1
		2700K	80	30.2	31.7	175.4	65	L128-2780SA35A00G1
		3000K	80	30.7	32.3	178.7	65	L128-3080SA35A00G1
		3500K	80	30.9	32.5	179.9	65	L128-3580SA35A00G1
		4000K	80	32.5	34.2	189.3	65	L128-4080SA35A00G1
		5000K	80	32.5	34.2	189.3	65	L128-5080SA35A00G1
		5700K	80	32.5	34.2	189.3	65	L128-5780SA35A00G1
		6500K	80	31.8	33.5	185.4	65	L128-6580SA35A00G1

Table 1 continued on next page:

1. Correlated color temperature is cold-targeted at T<sub>j</sub>=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T<sub>j</sub>=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7.5% on luminous flux measurements.

Table 1. Product performance of LUXEON 2835 Commercial LEDs at specified test conditions, Continued.

VOLTAGE	PRODUCT	NOMINAL CCT <sup>[1]</sup>	MINIMUM CRI <sup>[2, 3]</sup>	LUMINOUS FLUX <sup>[2, 3]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
6V	LUXEON 2835 S	2700K	80	101.4	109.0	150.1	120	L128-2780SB35B00A1
		3000K	80	104.1	112.0	154.3	120	L128-3080SB35B00A1
		3500K	80	106.9	115.0	158.4	120	L128-3580SB35B00A1
		4000K	80	110.0	118.3	162.9	120	L128-4080SB35B00A1
		5000K	80	110.0	118.3	162.9	120	L128-5080SB35B00A1
		5700K	80	110.0	118.3	162.9	120	L128-5780SB35B00A1
		6500K	80	108.6	116.8	160.9	120	L128-6580SB35B00A1
		2700K	90	84.8	91.2	125.6	120	L128-2790SB35B00A1
		3000K	90	88.5	95.2	131.1	120	L128-3090SB35B00A1
		3500K	90	93.1	100.2	138.0	120	L128-3590SB35B00A1
		4000K	90	95.9	103.2	142.1	120	L128-4090SB35B00A1
		5000K	90	95.9	103.2	142.1	120	L128-5090SB35B00A1
		5700K	90	95.9	103.2	142.1	120	L128-5790SB35B00A1
		6500K	90	95.9	103.2	142.1	120	L128-6590SB35B00A1

## Notes for Table 1:

- Correlated color temperature is cold-targeted at  $T_j=25^\circ\text{C}$ .
- Luminous flux and CRI specs are based upon mounted package on highly reflective surface at  $T_j=25^\circ\text{C}$ . Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
- Lumileds maintains a tolerance of  $\pm 2$  on CRI and  $\pm 7.5\%$  on luminous flux measurements.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON 2835 Commercial at specified test current,  $T_j=25^\circ\text{C}$ .

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L128-xxxxSx35xxxx	160°	120°

## Notes for Table 2:

- Total angle at which 90% of total luminous flux is captured.
- 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. Electrical and thermal characteristics for LUXEON 2835 Commercial at specified test current,  $T_j=25^\circ\text{C}$ .

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ )			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L128-xxxxSA35A00Ax	2.60	2.76	2.90	-1.0 to -2.0	18.0
L128-xxxxSA35A00Bx	2.60	2.71	2.80	-1.0 to -2.0	10.0
L128-xxxxSA35A00Cx	2.65	2.78	2.85	-1.0 to -2.0	20.5
L128-xxxxSA35A00Dx	2.65	2.74	2.85	-1.0 to -2.0	14.0
L128-xxxxSA35A00Ex	2.60	2.70	2.80	-1.0 to -2.0	17.5
L128-xxxxSA35A00Fx	2.60	2.70	2.80	-1.0 to -2.0	15.2
L128-xxxxSA35A00Gx	2.60	2.78	2.90	-1.0 to -2.0	23.1
L128-xxxxSB35B00Ax	5.80	6.05	6.30	-2.0 to -4.0	18.0

## Notes for Table 3:

- Lumileds maintains a tolerance of  $\pm 0.1\text{V}$  on forward voltage measurements.
- Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .

# Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 2835 Commercial.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1,2]</sup>	300mA for L128-xxxxSA35A00Ax 300mA for L128-xxxxSA35A00Bx 300mA for L128-xxxxSA35A00Cx 300mA for L128-xxxxSA35A00Dx 300mA for L128-xxxxSA35A00Ex 300mA for L128-xxxxSA35A00Fx 300mA for L128-xxxxSA35A00Gx 150mA for L128-xxxxSB35B00Ax
Peak Pulsed Forward Current <sup>[1,3]</sup>	450mA for L128-xxxxSA35A00Ax 480mA for L128-xxxxSA35A00Bx 360mA for L128-xxxxSA35A00Cx 480mA for L128-xxxxSA35A00Dx 480mA for L128-xxxxSA35A00Ex 480mA for L128-xxxxSA35A00Fx 450mA for L128-xxxxSA35A00Gx 225mA for L128-xxxxSB35B00Ax
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	125°C for L128-xxxxSx35xxxxx
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2
Operating Case Temperature <sup>[1]</sup>	-40°C to 105°C
LED Storage Temperature	-40°C to 105°C
Soldering Temperature	JEDEC 020c 260°C
Allowable Reflow Cycles	3
Reverse Voltage ( $V_{reverse}$ )	LUXEON LEDs are not designed to be driven in reverse bias

**Notes for Table 4:**

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called “ripple,” are acceptable if the following conditions are met:
  - The frequency of the ripple current is 100Hz or higher
  - The average current for each cycle does not exceed the maximum allowable DC forward current
  - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current
3. At ≤50% duty cycle with pulse width of 5ms.

# Characteristics Curves

## Spectral Power Distribution Characteristics

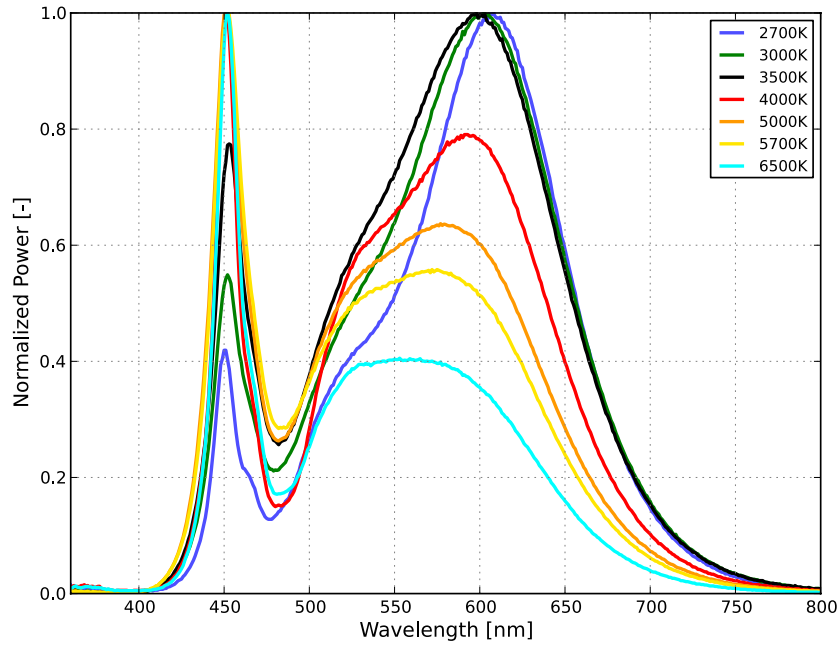


Figure 1a. Typical normalized power vs. wavelength for 80CRI LUXEON 2835 Commercial at specified test current,  $T_j=25^\circ\text{C}$ .

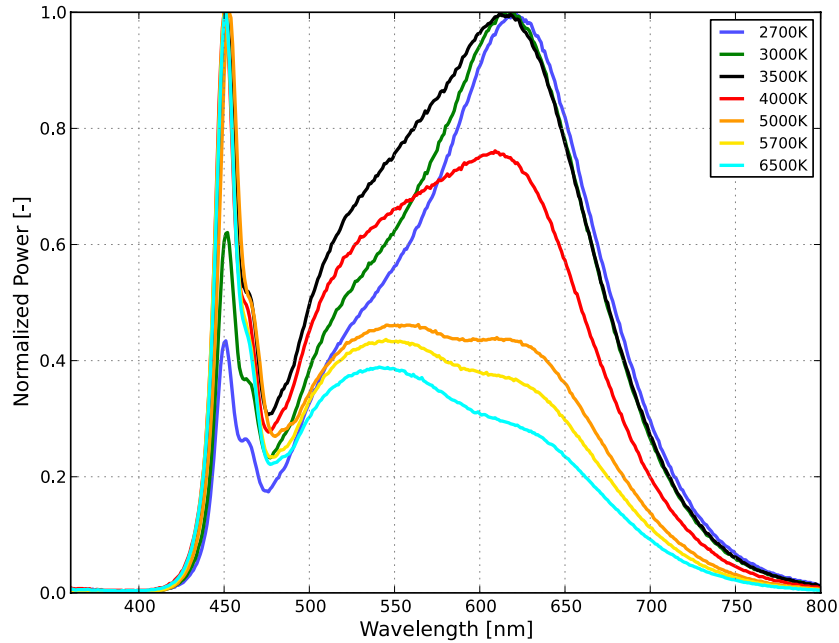


Figure 1b. Typical normalized power vs. wavelength for 90CRI LUXEON 2835 Commercial at specified test current,  $T_j=25^\circ\text{C}$ .



# Light Output Characteristics

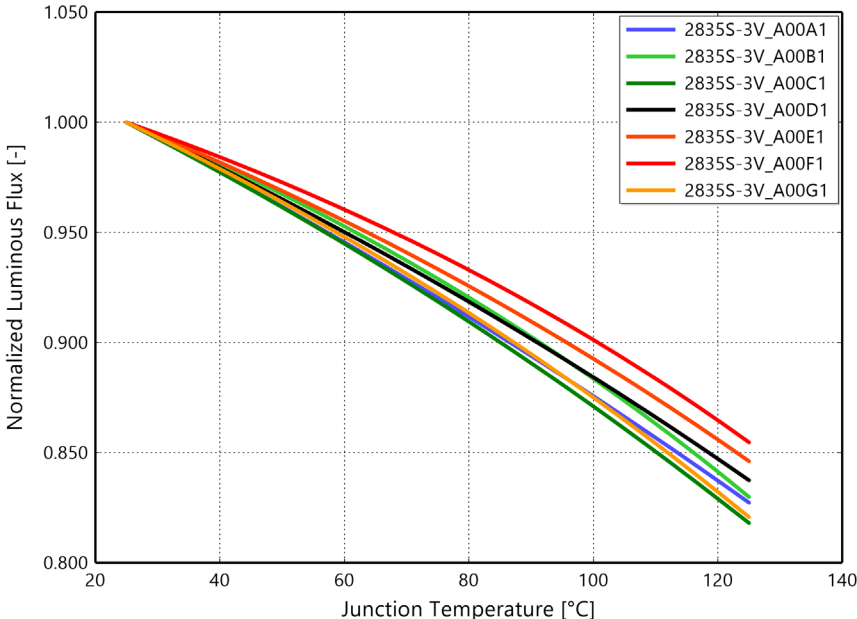


Figure 2a. Typical normalized luminous flux vs. junction temperature for LUXEON 2835S 3V Line at specified test current.

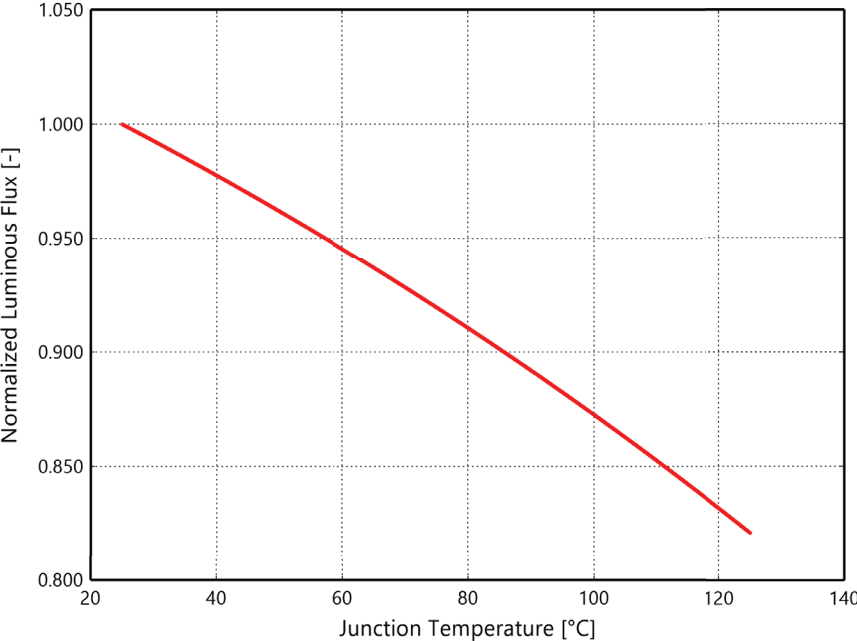


Figure 2b. Typical normalized luminous flux vs. junction temperature for LUXEON 2835S 6V Line at specified test current.

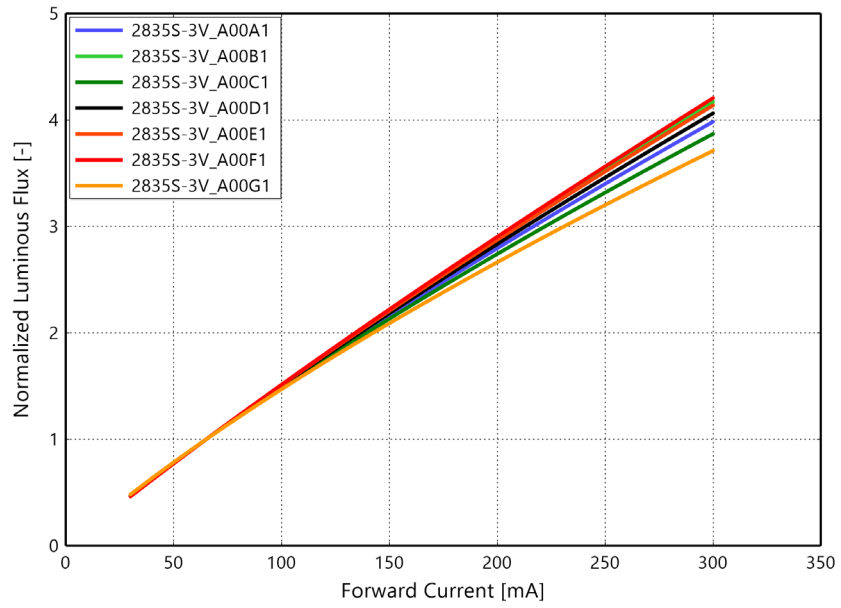


Figure 3a. Typical normalized luminous flux vs. forward current for LUXEON 2835S 3V Line at  $T_j=25^\circ\text{C}$ .

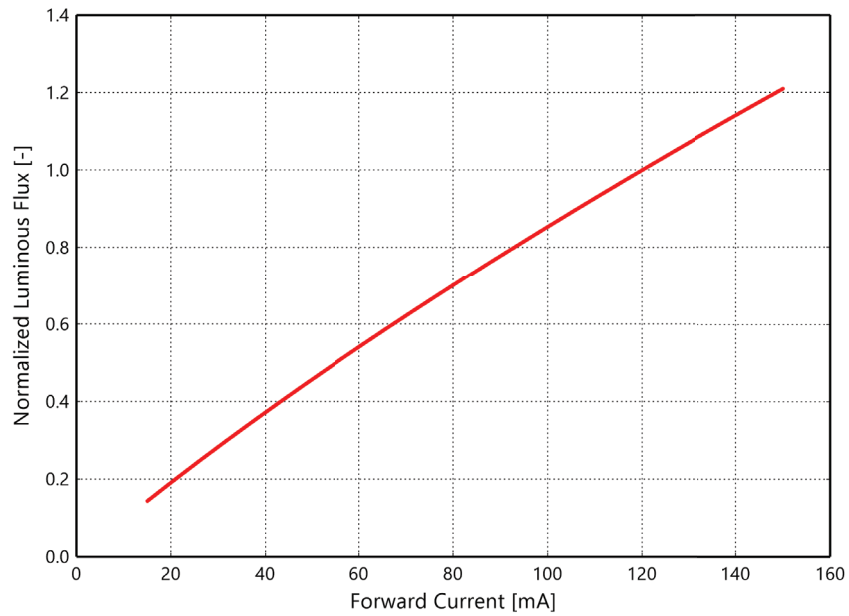


Figure 3b. Typical normalized luminous flux vs. forward current for LUXEON 2835S 6V Line at  $T_j=25^\circ\text{C}$ .

# Forward Current Characteristics

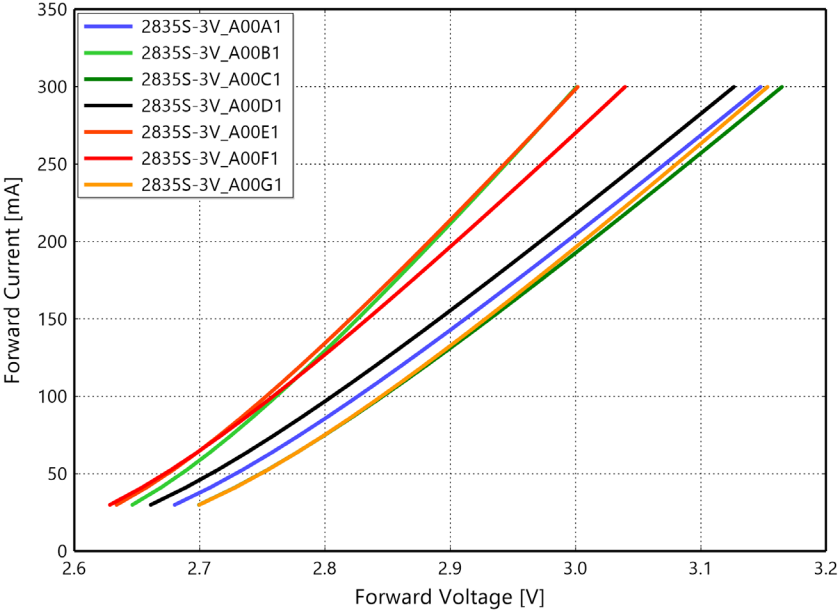


Figure 4a. Typical forward current vs. forward voltage for LUXEON 2835S 3V at  $T_j=25^{\circ}\text{C}$ .

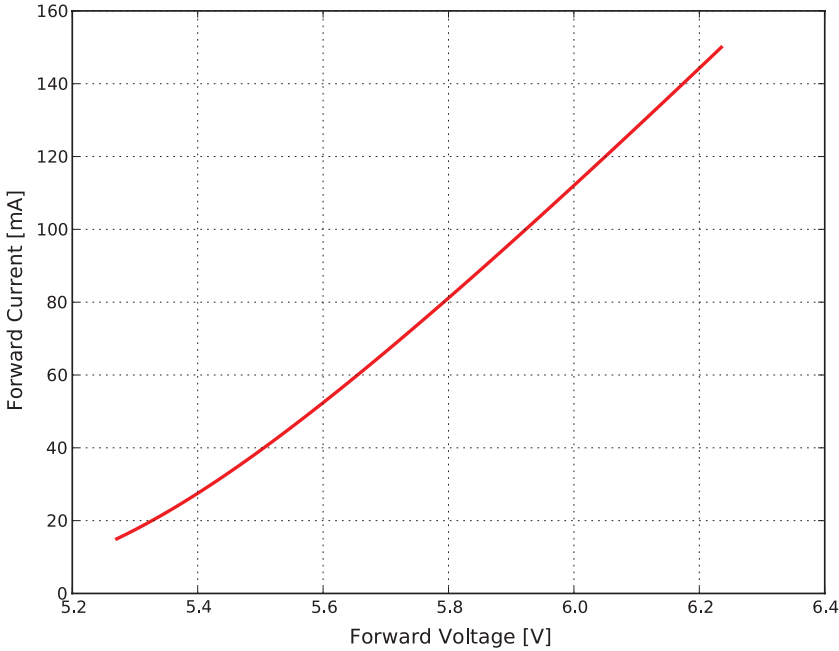


Figure 4b. Typical forward current vs. forward voltage for LUXEON 2835S 6V at  $T_j=25^{\circ}\text{C}$ .

# Radiation Pattern Characteristics

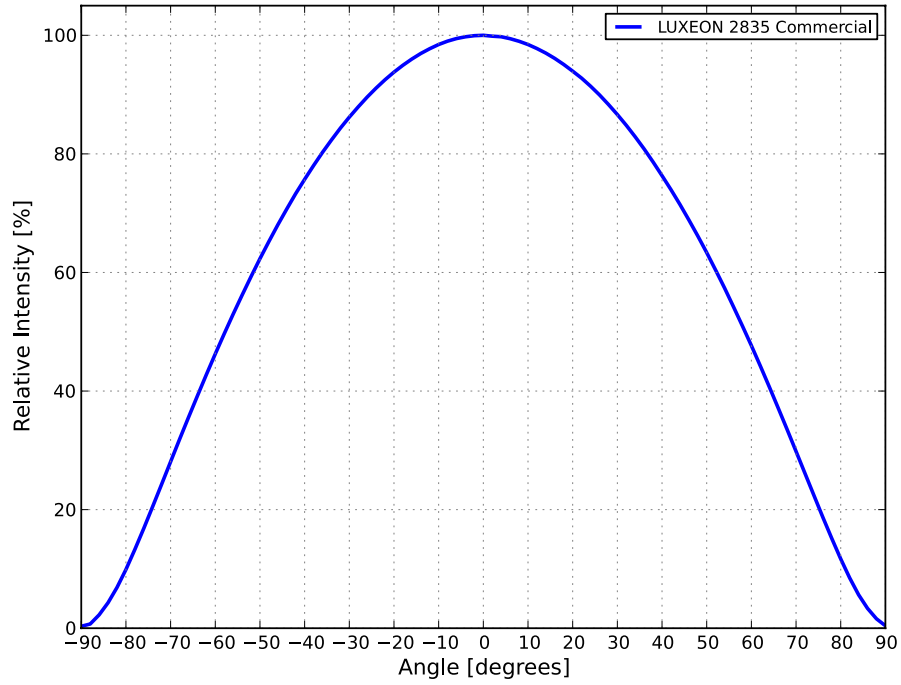


Figure 5. Typical radiation pattern for LUXEON 2835 Commercial at test current,  $T_j=25^{\circ}\text{C}$ .

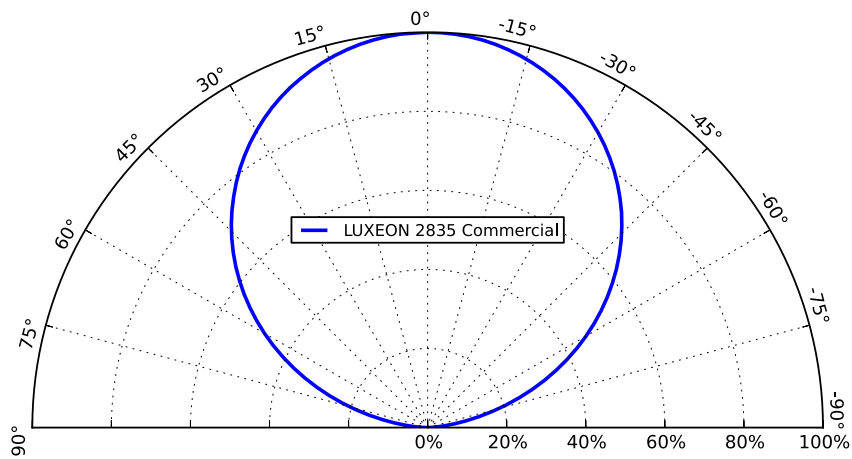


Figure 6. Typical polar radiation pattern for LUXEON 2835 Commercial at test current,  $T_j=25^{\circ}\text{C}$ .

# Mechanical Dimensions

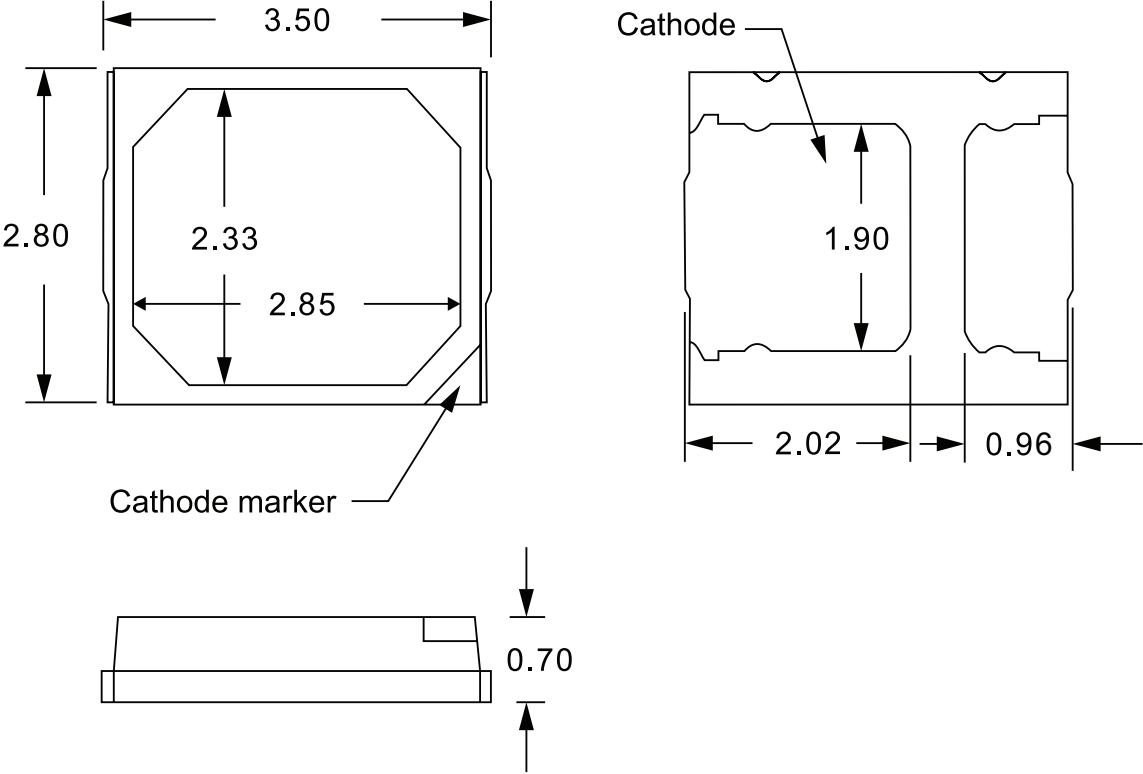


Figure 7. Mechanical dimensions for LUXEON 2835 Commercial.

- Notes for Figure 7:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.
  3. Tolerance:  $\pm 0.1\text{mm}$ .

# Reflow Soldering Guidelines

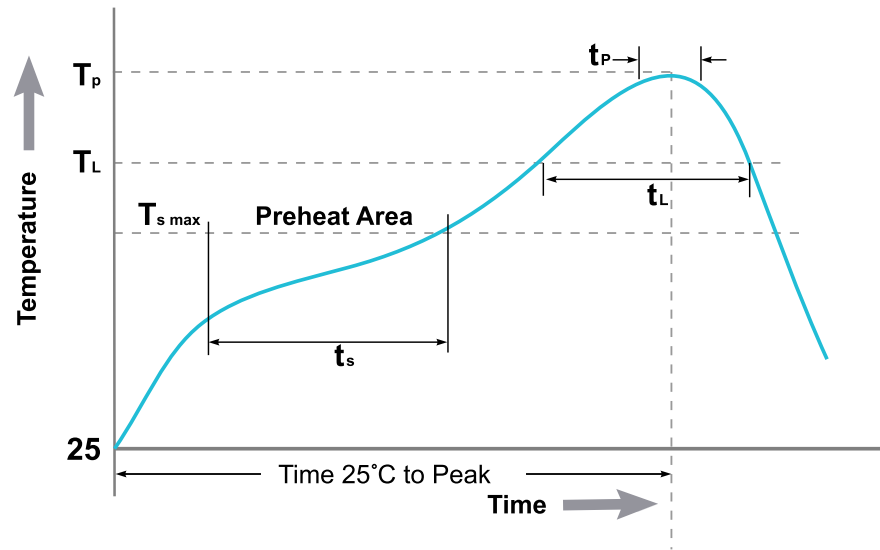


Figure 8. Visualization of the acceptable reflow temperature profile as specified in Table 5.

Note for Figure 8:

1. This general guideline may not apply to all designs and configurations of reflow soldering equipment.

Table 5. Reflow profile characteristics for LUXEON 2835 Commercial.

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Maximum Temperature ( $T_{s\max}$ )	180°C
Preheat Time ( $t_s$ )	120 seconds maximum
Ramp-Up Rate ( $T_{s\max}$ to $T_p$ )	5°C / second maximum
Liquidus Temperature ( $T_L$ )	220°C
Time Maintained Above Temperature $T_L$ ( $t_L$ )	60 seconds maximum
Peak / Classification Temperature ( $T_p$ )	260°C
Time Within 5°C of Actual Peak Temperature ( $t_p$ )	10 seconds maximum
Time 25°C to Peak Temperature	3.5 minutes maximum

## JEDEC Moisture Sensitivity

Table 6. Moisture sensitivity levels for LUXEON 2835 Commercial.

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
4	72 Hours	≤30°C / 60% RH	96 Hours +2 / -0	30°C / 60% RH

# Solder Pad Design

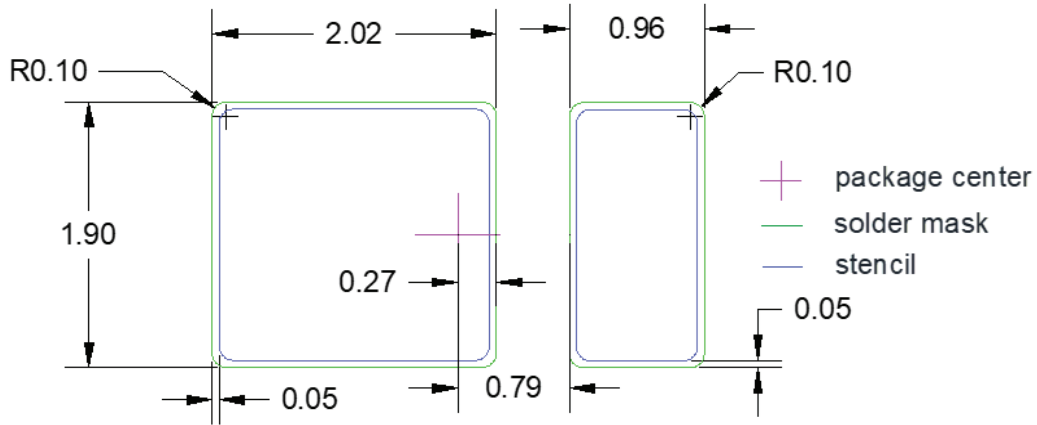


Figure 9. Recommended PCB solder pad layout for LUXEON 2835 Commercial.

**Notes for Figure 9:**

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

# Packaging Information

## Pocket Tape Dimensions

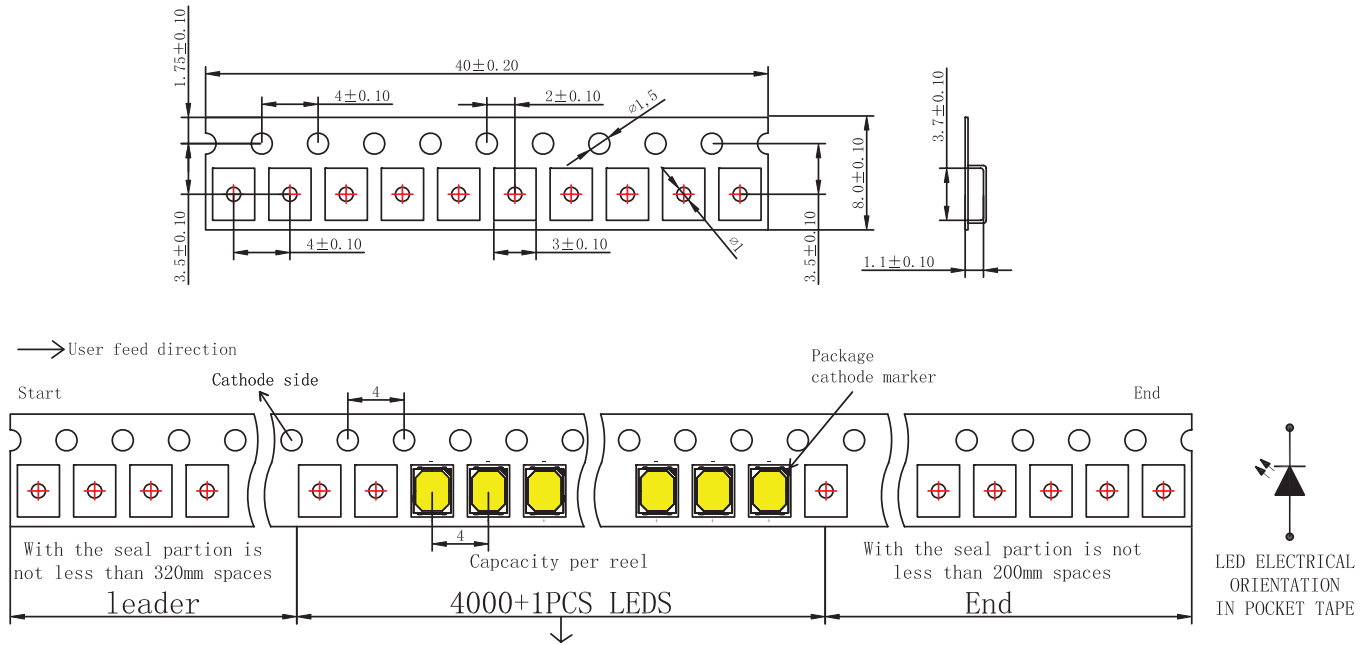
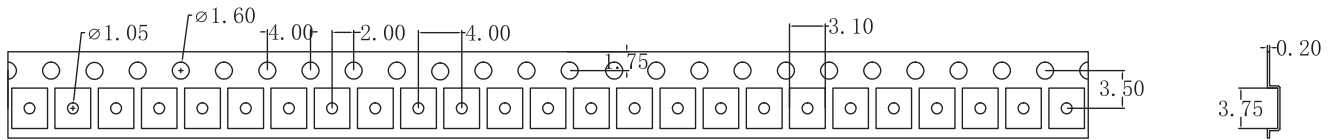


Figure 10a. Pocket tape dimensions for LUXEON 2835 Commercial.

**Notes for Figure 10a:**

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



--->User feed direction

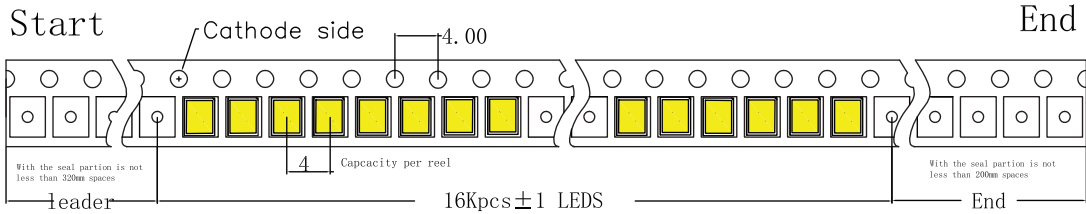


Figure 10b. Pocket tape dimensions for LUXEON 2835 Commercial L128-xxxxSA35A00Gx.

Notes for Figure 10b:

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

## Reel Dimensions

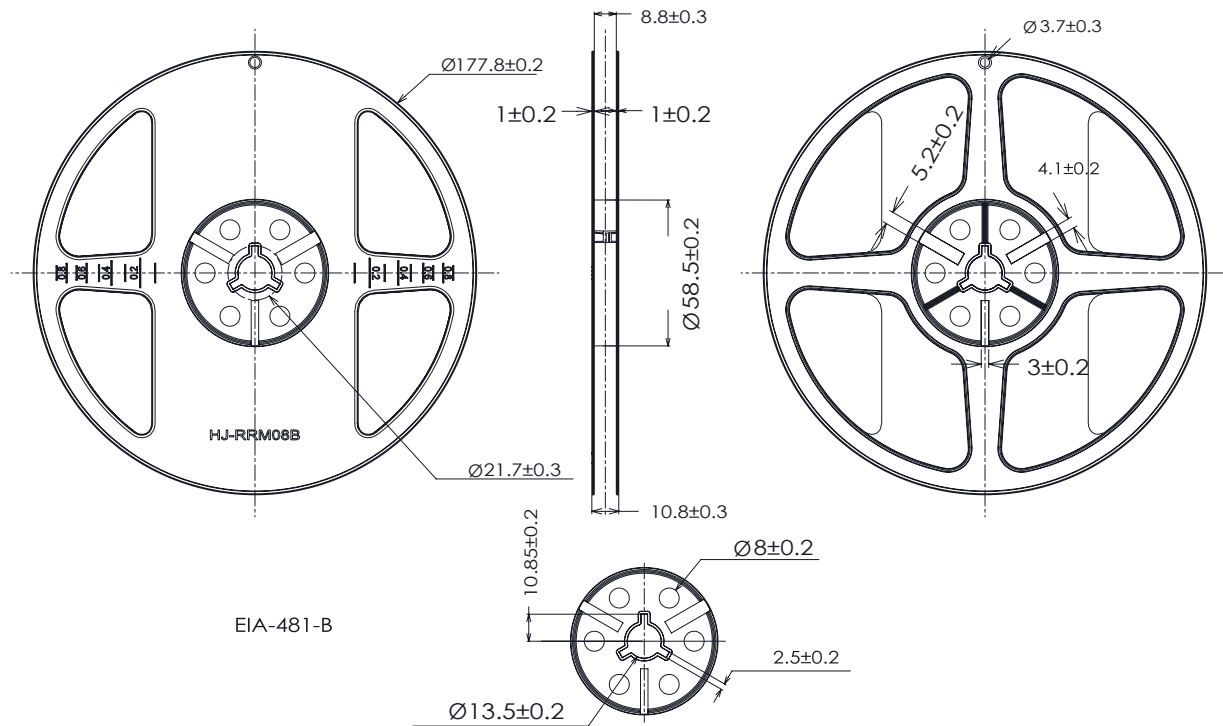


Figure 11a. Reel dimensions for LUXEON 2835 Commercial.

Notes for Figure 11a:

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



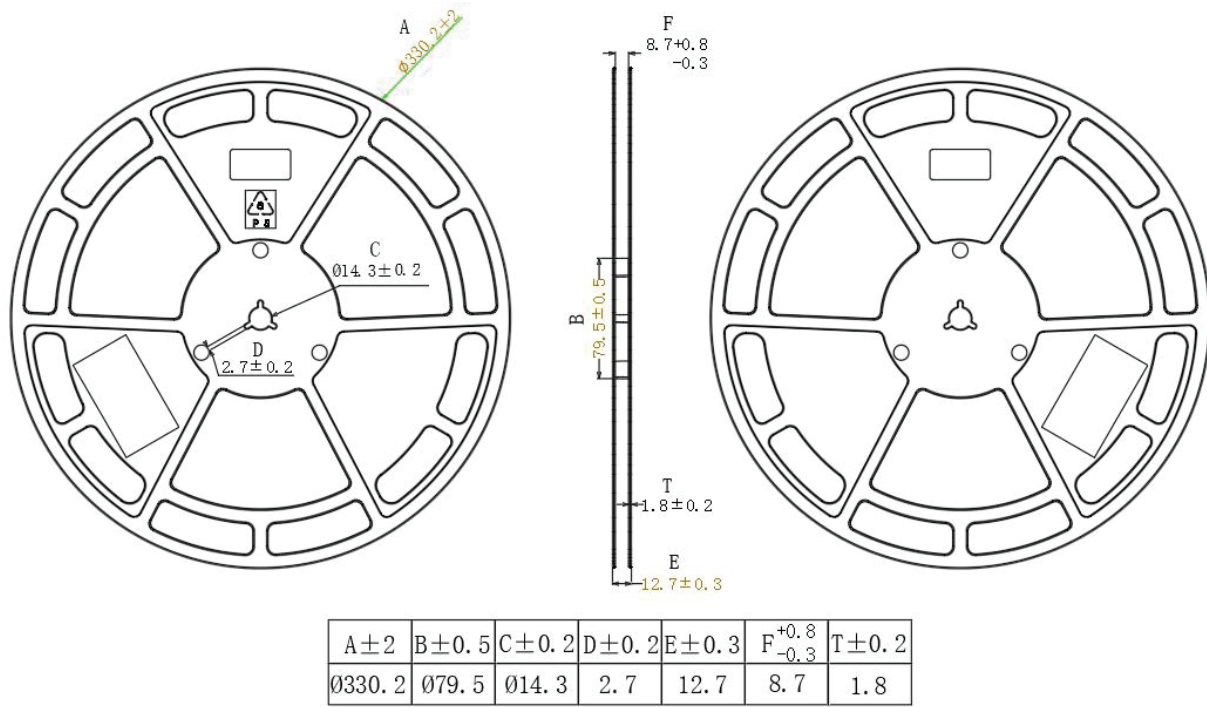


Figure 11b. Reel dimensions for LUXEON 2835 Commercial L128-xxxxSA35A00Gx.

Notes for Figure 11b:

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 better, safer, more beautiful—with light.

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



---

©2024 Lumileds Holding B.V. All rights reserved.  
LUXEON is a registered trademark of the Lumileds  
Holding B.V. in the United States and other countries.  
[lumileds.com](https://lumileds.com)

Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided “as is,” and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the download or use of the provided materials, information and data. A listing of Lumileds product/patent coverage may be accessed at [lumileds.com/patents](https://lumileds.com/patents).