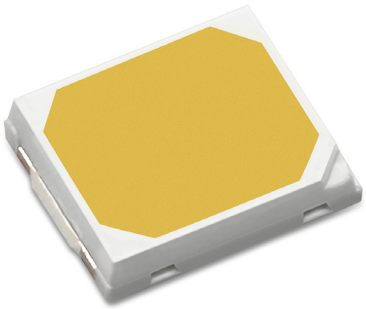
LUMILEDS

ILLUMINATION

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 1/5th 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

c UL us No. E507562 RoHS COMPLIANT

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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	PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	2700K	80	30.0	33.2	185.1	65	L128-2780SA35A00A1
		3000K	80	32.0	34.4	192.0	65	L128-3080SA35A00A1
		3500K	80	32.5	35.1	196.0	65	L128-3580SA35A00A1
		4000K	80	33.0	35.8	200.0	65	L128-4080SA35A00A1
		5000K	80	33.0	35.8	200.0	65	L128-5080SA35A00A1
		5700K	80	33.0	35.8	200.0	65	L128-5780SA35A00A1
		6500K	80	32.5	35.4	197.3	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_j=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T_j=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	PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	2700K	80	31.6	34.0	190.9	65	L128-2780SA35A00D1
		3000K	80	32.4	34.8	195.4	65	L128-3080SA35A00D1
		3500K	80	33.1	35.5	199.3	65	L128-3580SA35A00D1
		4000K	80	33.8	36.3	203.8	65	L128-4080SA35A00D1
		5000K	80	34.2	36.7	206.1	65	L128-5080SA35A00D1
		5700K	80	34.2	36.7	206.1	65	L128-5780SA35A00D1
		6500K	80	33.8	36.3	203.8	65	L128-6580SA35A00D1
		2700K	90	27.2	29.3	164.5	65	L128-2790SA35A00D1
		3000K	90	28.4	30.6	171.8	65	L128-3090SA35A00D1
		3500K	90	29.4	31.6	177.4	65	L128-3590SA35A00D1
		4000K	90	29.7	32.0	179.7	65	L128-4090SA35A00D1
		5000K	90	29.7	32.0	179.7	65	L128-5090SA35A00D1
		5700K	90	29.6	31.8	178.6	65	L128-5790SA35A00D1
		6500K	90	29.4	31.6	177.4	65	L128-6590SA35A00D1
		2500K	95	23.3	24.1	135.3	65	L128-2595SA35A00D1
		2700K	95	24.1	24.8	139.2	65	L128-2795SA35A00D1
		3000K	95	25.1	25.8	144.9	65	L128-3095SA35A00D1
		3500K	95	26.0	26.7	149.9	65	L128-3595SA35A00D1
		4500K	95	27.5	28.3	158.9	65	L128-4595SA35A00D1
		5000K	95	27.5	28.3	158.9	65	L128-5095SA35A00D1
		2700K	90	33.1	34.2	192.0	65	L128-2790SA35A0KD1
		3000K	90	33.9	35.0	196.4	65	L128-3090SA35A0KD1
		3500K	90	34.3	35.4	199.0	65	L128-3590SA35A0KD1
		4000K	90	34.6	35.8	201.0	65	L128-4090SA35A0KD1
		5000K	90	34.4	35.6	200.0	65	L128-5090SA35A0KD1
		5700K	90	34.3	35.4	199.0	65	L128-5790SA35A0KD1
		6500K	90	34.3	35.4	199.0	65	L128-6590SA35A0KD1
		2700K	90	30.7	31.7	178.2	65	L128-2790SA35A1KD1
		3000K	90	31.8	32.9	184.9	65	L128-3090SA35A1KD1
		3500K	90	32.2	33.3	187.1	65	L128-3590SA35A1KD1
		4000K	90	32.9	34.1	191.6	65	L128-4090SA35A1KD1
		5000K	90	32.9	34.1	191.6	65	L128-5090SA35A1KD1
		5700K	90	32.9	34.1	191.6	65	L128-5790SA35A1KD1
		6500K	90	32.9	34.1	191.6	65	L128-6590SA35A1KD1
		2700K	70	34.7	36.4	207.4	65	L128-2770SA35A00E1
		3000K	70	35.7	37.4	213.1	65	L128-3070SA35A00E1
		3500K	70	36.1	37.8	215.4	65	L128-3570SA35A00E1
		4000K	70	37.2	39.0	222.2	65	L128-4070SA35A00E1
		5000K	70	36.8	38.5	219.4	65	L128-5070SA35A00E1
		5700K	70	36.8	38.5	219.4	65	L128-5770SA35A00E1
		6500K	70	36.5	38.2	217.7	65	L128-6570SA35A00E1
		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

Table 1 continued on next page:

1. Correlated color temperature is cold-targeted at T_j=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T_j=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	PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	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	70	35.8	37.4	213.1	65	L128-2770SA35A00F1
		3000K	70	36.9	38.6	219.9	65	L128-3070SA35A00F1
		3500K	70	37.3	39.1	222.8	65	L128-3570SA35A00F1
		4000K	70	38.8	40.6	231.3	65	L128-4070SA35A00F1
		5000K	70	38.3	40.1	228.5	65	L128-5070SA35A00F1
		5700K	70	38.3	40.1	228.5	65	L128-5770SA35A00F1
		6500K	70	37.8	39.6	225.6	65	L128-6570SA35A00F1
		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	31.2	177.7	65	L128-2790SA35A00F1
		3000K	90	30.8	32.4	184.5	65	L128-3090SA35A00F1
		3500K	90	31.8	32.6	185.6	65	L128-3590SA35A00F1
		4000K	90	32.3	33.0	187.8	65	L128-4090SA35A00F1
		5000K	90	32.3	33.0	187.8	65	L128-5090SA35A00F1
		5700K	90	32.3	33.0	187.8	65	L128-5790SA35A00F1
		6500K	90	32.3	33.0	187.8	65	L128-6590SA35A00F1
		2700K	90	31.6	32.7	186.3	65	L128-2790SA35A1KF1
		3000K	90	32.8	33.9	193.1	65	L128-3090SA35A1KF1
		3500K	90	33.2	34.4	195.9	65	L128-3590SA35A1KF1
		4000K	90	34.1	35.3	201.0	65	L128-4090SA35A1KF1
		5000K	90	34.1	35.3	201.0	65	L128-5090SA35A1KF1
		5700K	90	34.1	35.3	201.0	65	L128-5790SA35A1KF1
		6500K	90	34.1	35.3	201.0	65	L128-6590SA35A1KF1
		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
		2700K	90	25.0	26.1	144.4	65	L128-2790SA35A00G1
		3000K	90	26.0	27.1	150.0	65	L128-3090SA35A00G1
		3500K	90	27.0	28.1	155.5	65	L128-3590SA35A00G1
		4000K	90	28.3	29.5	163.3	65	L128-4090SA35A00G1
		5000K	90	28.0	29.2	161.6	65	L128-5090SA35A00G1
		5700K	90	28.0	29.2	161.6	65	L128-5790SA35A00G1
		6500K	90	27.6	28.8	159.4	65	L128-6590SA35A00G1

Table 1 continued on next page:

1. Correlated color temperature is cold-targeted at T_j=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T_j=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	PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
				MINIMUM	TYPICAL			
3V	LUXEON 2835 S	2700K	80	28.2	29.2	155.0	65	L128-2780SA35A00H1
		3000K	80	29.0	30.0	159.2	65	L128-3080SA35A00H1
		3500K	80	30.2	31.2	166.0	65	L128-3580SA35A00H1
		4000K	80	30.6	31.6	168.0	65	L128-4080SA35A00H1
		5000K	80	30.6	31.6	168.0	65	L128-5080SA35A00H1
		5700K	80	30.2	31.2	166.0	65	L128-5780SA35A00H1
		6500K	80	30.0	31.0	165.0	65	L128-6580SA35A00H1
6V	LUXEON 2835 S	2700K	80	102.3	110.1	151.7	120	L128-2780SB35B00A1
		3000K	80	105.1	113.2	155.9	120	L128-3080SB35B00A1
		3500K	80	107.9	116.1	159.9	120	L128-3580SB35B00A1
		4000K	80	110.9	119.4	164.5	120	L128-4080SB35B00A1
		5000K	80	110.9	119.4	164.5	120	L128-5080SB35B00A1
		5700K	80	110.9	119.4	164.5	120	L128-5780SB35B00A1
		6500K	80	109.8	118.3	162.9	120	L128-6580SB35B00A1
		2700K	90	85.6	92.3	127.1	120	L128-2790SB35B00A1
		3000K	90	89.4	96.4	132.8	120	L128-3090SB35B00A1
		3500K	90	93.3	100.6	138.6	120	L128-3590SB35B00A1
		4000K	90	96.8	104.3	143.7	120	L128-4090SB35B00A1
		5000K	90	96.8	104.3	143.7	120	L128-5090SB35B00A1
		5700K	90	96.8	104.3	143.7	120	L128-5790SB35B00A1
		6500K	90	96.4	103.9	143.1	120	L128-6590SB35B00A1

Notes for Table 1:
1. Correlated color temperature is cold-targeted at T_j=25°C.
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at T_j=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.

Optical Characteristics

Table 2. Optical characteristics for LUXEON 2835 Commercial at specified test current, T_j=25°C

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L128-xxxxSx35xxxxx	160°	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 ½ 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°C

PART NUMBER	FORWARD VOLTAGE [1] (V_f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (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-xxxxSA35AxxDx	2.65	2.74	2.85	-1.0 to -2.0	11.9
L128-xxxxSA35A00Ex	2.60	2.70	2.80	-1.0 to -2.0	17.5
L128-xxxxSA35AxxFx	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-xxxxSA35A00Hx	2.70	2.90	3.10	-1.0 to -2.0	36.0
L128-xxxxSB35B00Ax	5.80	6.05	6.30	-2.0 to -4.0	18.0

Notes for Table 3:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 2835 Commercial

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	300mA for L128-xxxxSA35A00Ax 300mA for L128-xxxxSA35A00Bx 300mA for L128-xxxxSA35A00Cx 300mA for L128-xxxxSA35AxxDx 350mA for L128-xxxxSA35A00Ex 350mA for L128-xxxxSA35AxxFx 300mA for L128-xxxxSA35A00Gx 150mA for L128-xxxxSA35A00Hx 150mA for L128-xxxxSB35B00Ax
Peak Pulsed Forward Current [1, 3]	450mA for L128-xxxxSA35A00Ax 480mA for L128-xxxxSA35A00Bx 360mA for L128-xxxxSA35A00Cx 480mA for L128-xxxxSA35AxxDx 480mA for L128-xxxxSA35A00Ex 480mA for L128-xxxxSA35AxxFx 450mA for L128-xxxxSA35A00Gx 225mA for L128-xxxxSA35A00Hx 225mA for L128-xxxxSB35B00Ax
LED Junction Temperature [1] (DC & Pulse)	125°C for L128-xxxxSx35xxxxx
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2
Operating Case Temperature [1]	-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

70CRI

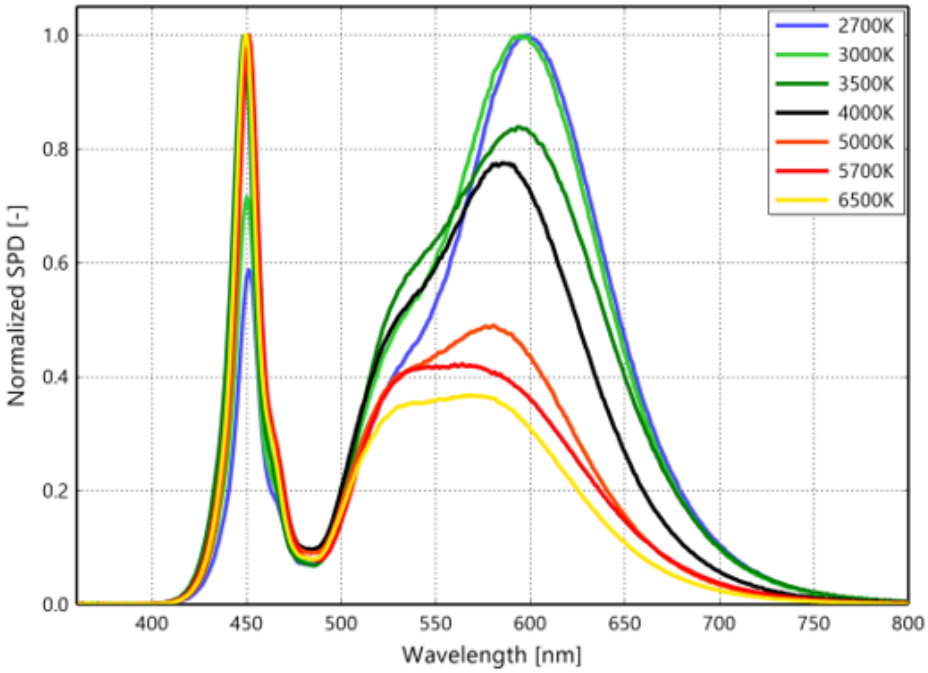


Figure 1a. Typical normalized power vs. wavelength for 70CRI LUXEON 2835 Commercial at specified test current, T_j=25°C

80CRI

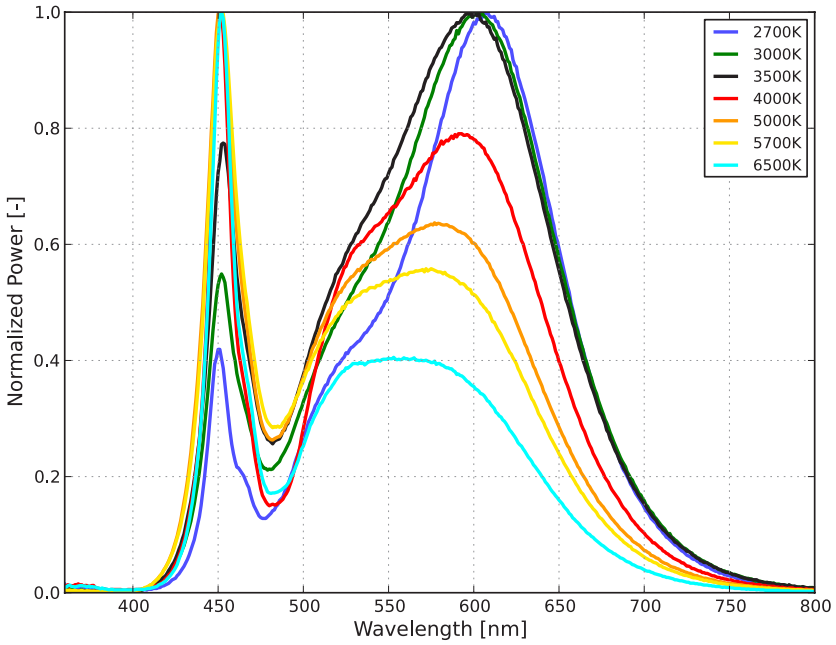


Figure 1b. Typical normalized power vs. wavelength for 80CRI LUXEON 2835 Commercial at specified test current, T_j=25°C

90CRI

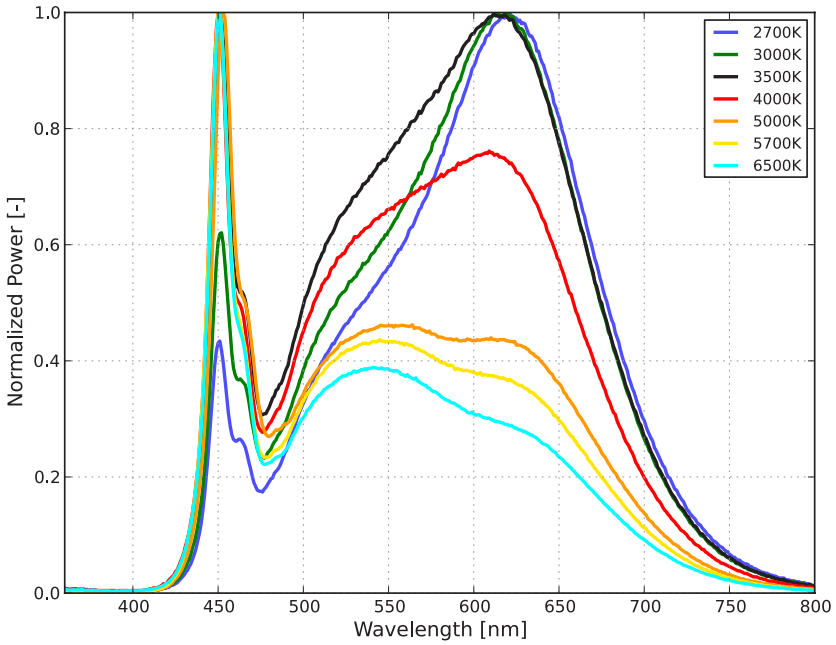


Figure 1c. Typical normalized power vs. wavelength for 90CRI LUXEON 2835 Commercial at specified test current, T_j=25°C

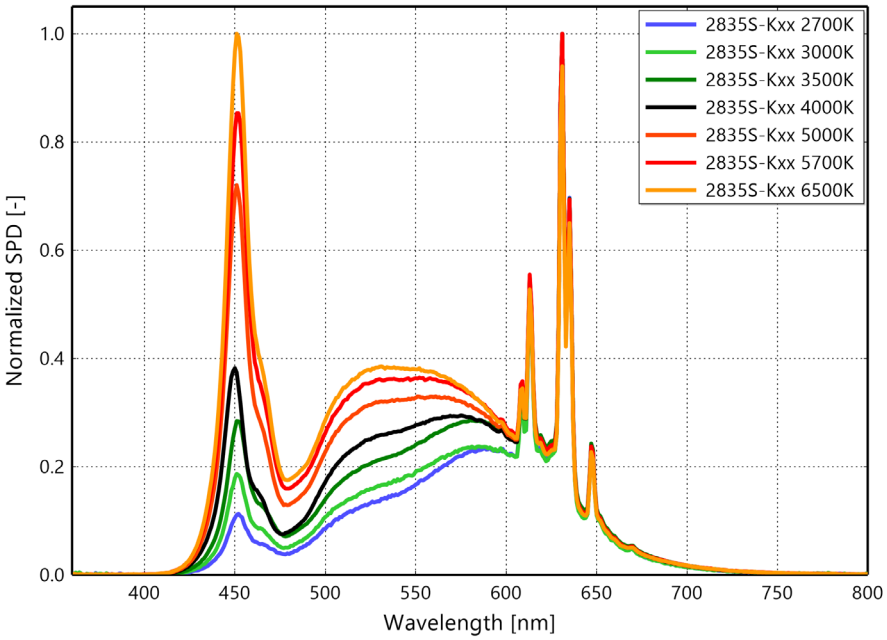


Figure 1d. Typical normalized power vs. wavelength for 90CRI LUXEON 2835 Commercial ended with Kxx and associated parts at specified test current, T_j=25°C

95CRI

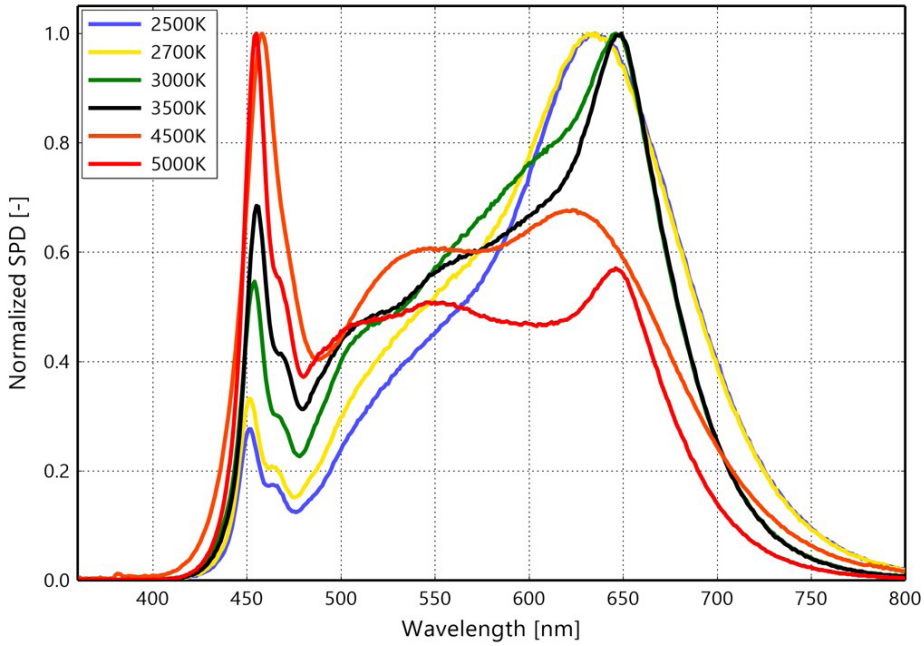


Figure 1e. Typical normalized power vs. wavelength for 95CRI LUXEON 2835 Commercial at specified test current, T_j=25°C

Light Output Characteristics

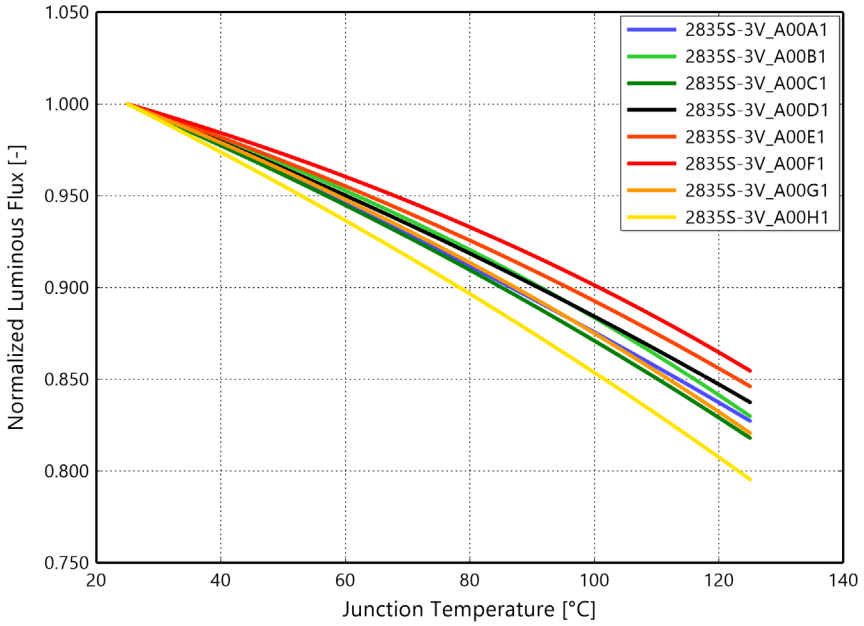


Figure 2a. Typical normalized luminous flux vs. junction temperature for LUXEON 2835S 3V Line at specified test current

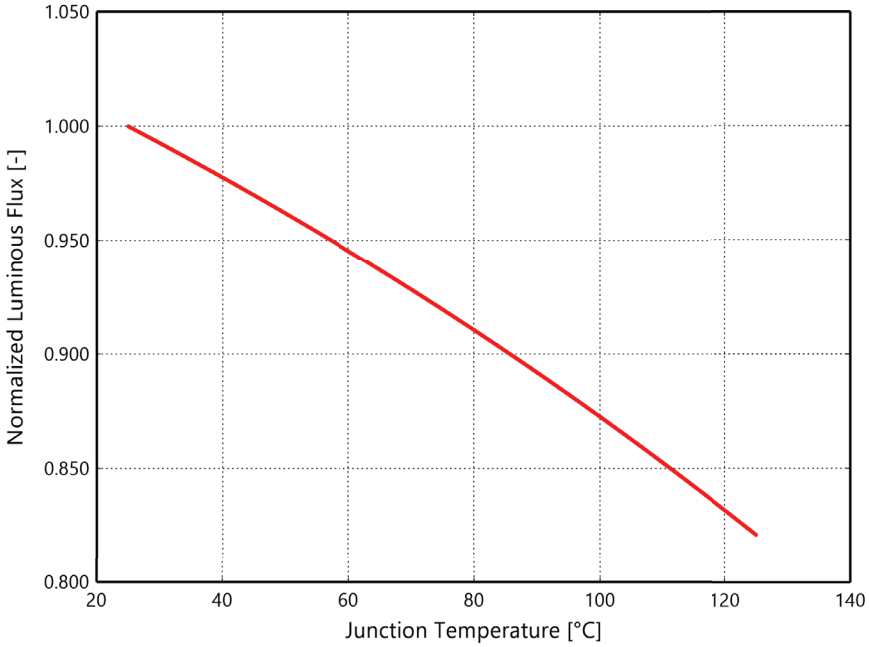


Figure 2b. Typical normalized luminous flux vs. junction temperature for LUXEON 2835S 6V Line at specified test current

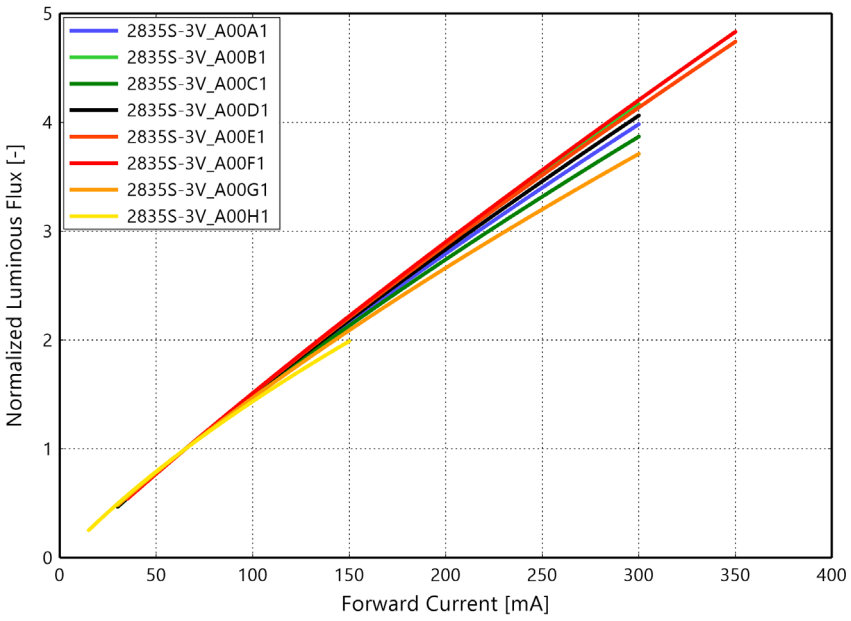


Figure 3a. Typical normalized luminous flux vs. forward current for LUXEON 2835S 3V Line at T_j=25°C

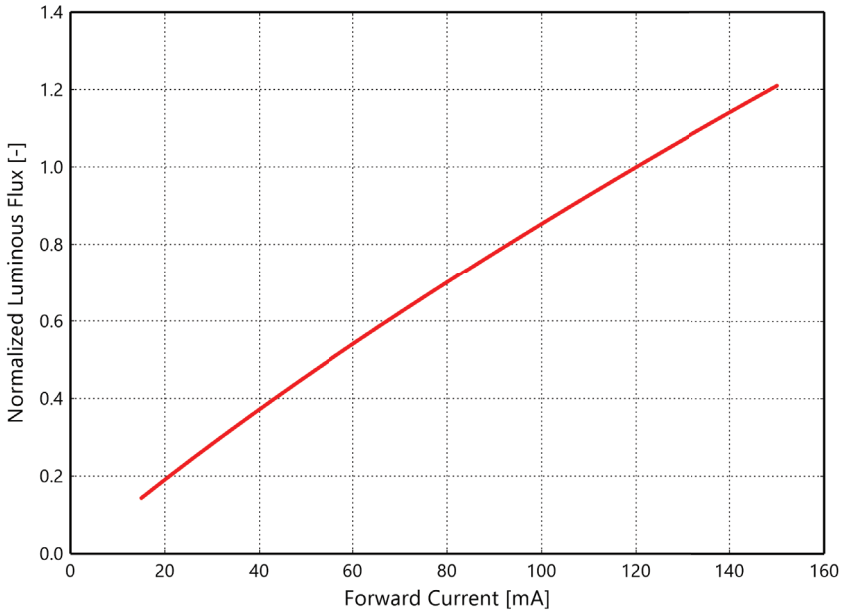


Figure 3b. Typical normalized luminous flux vs. forward current for LUXEON 2835S 6V Line at T_j=25°C

Forward Current Characteristics

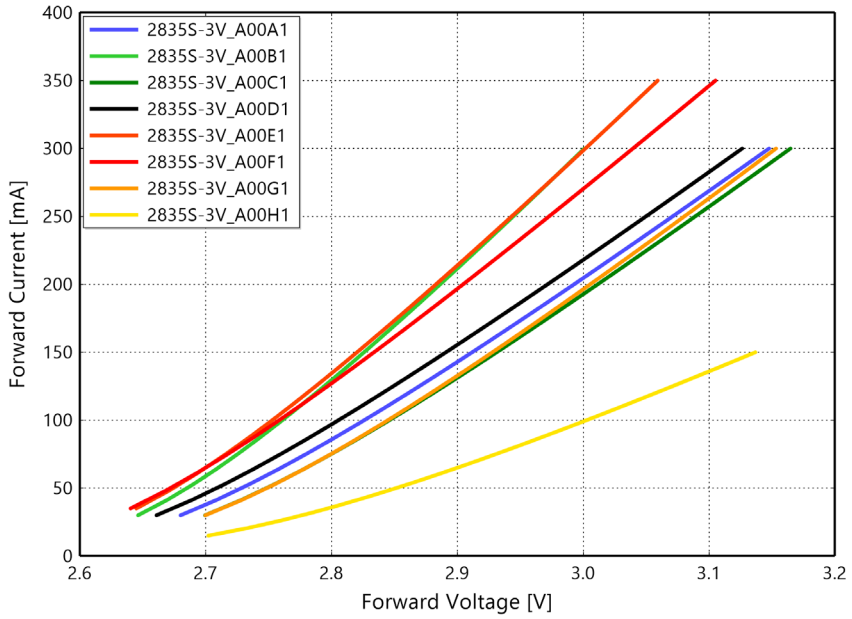


Figure 4a. Typical forward current vs. forward voltage for LUXEON 2835S 3V at T_j=25°C

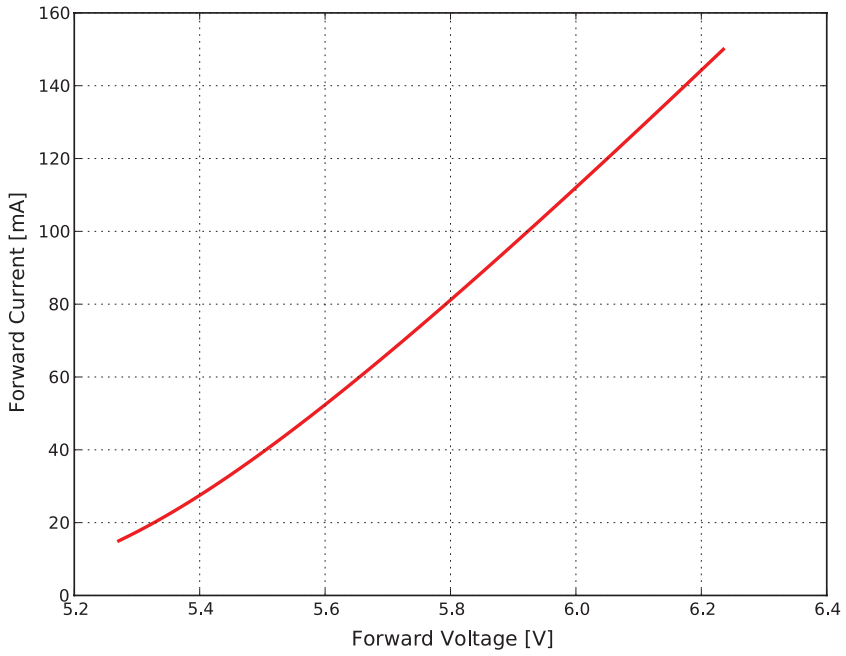


Figure 4b. Typical forward current vs. forward voltage for LUXEON 2835S 6V at T_j=25°C

Radiation Pattern Characteristics

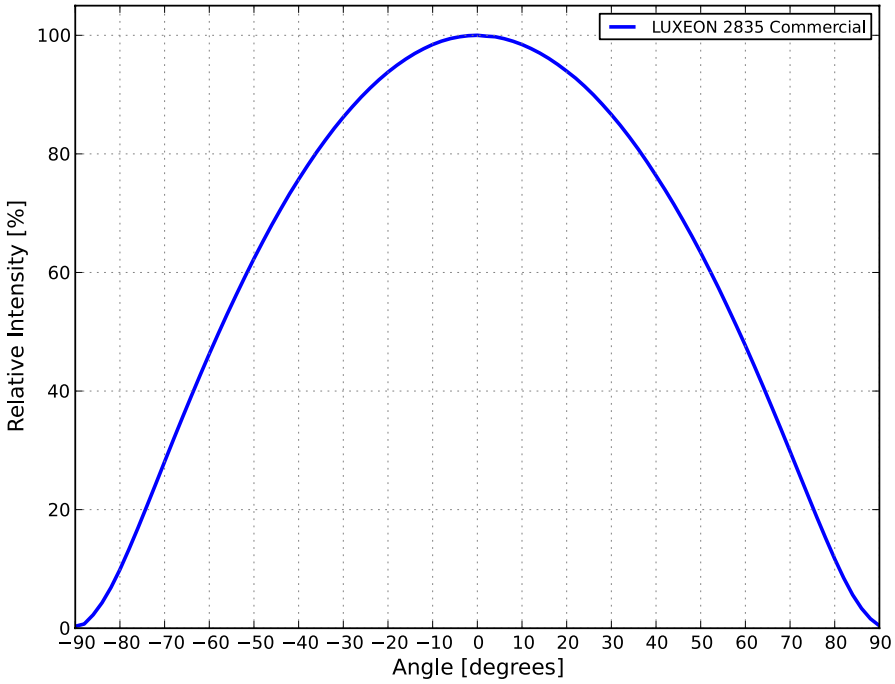


Figure 5. Typical radiation pattern for LUXEON 2835 Commercial at test current, T_j=25°C

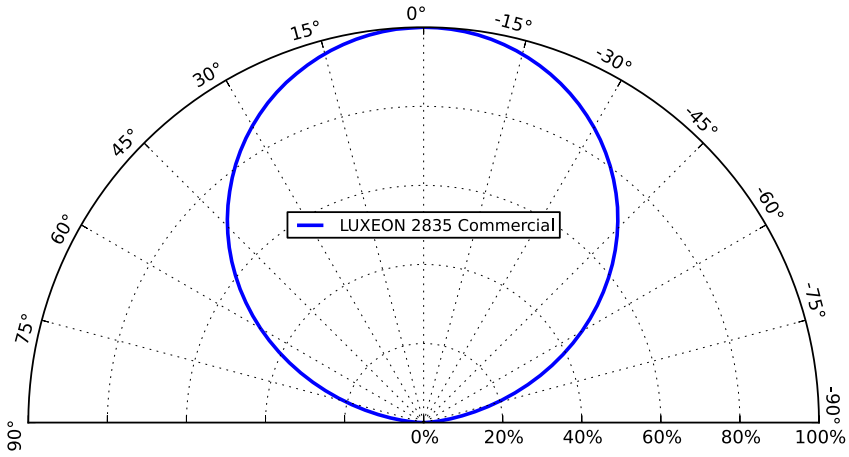


Figure 6. Typical polar radiation pattern for LUXEON 2835 Commercial at test current, T_j=25°C

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 datasheet. For this reason, Lumileds bins LED components for luminous flux, radiometric power, color point, peak wavelength, dominant wavelength and forward voltage.

LUXEON 2835 Commercial LEDs are labeled using a 4- or 5-digit alphanumeric CAT code following the format below:

A or Ax B C D

Where:

A or Ax	–	designates luminous flux bin (example: L=29 to 31 lm, M=31 to 33 lm)
B C	–	designates correlated color bin (example: 7D, 7E, 7F, 7G, 7H for 3000K parts)
D	–	designates forward voltage bin (example: C=2.6 to 2.7V, D=2.7 to 2.8V)

Therefore, a LUXEON 2835S 3V LED with a lumen range of 29 to 31 lm, color bin of 7D and a forward voltage range of 2.7 to 2.8V has the following CAT code:

L 7 D D

Luminous Flux Bins

Table 5. Luminous flux bin definitions for LUXEON 2835 Commercial, T_j=25°C

PART	BIN	LUMINOUS FLUX [1] (lm)	
		MINIMUM	MAXIMUM
LUXEON 2835S 3V	G	21.0	23.0
	H	23.0	25.0
	J	25.0	27.0
	K	27.0	29.0
	L	29.0	31.0
	M	31.0	33.0
	N	33.0	35.0
	P	35.0	37.0
	Q	37.0	39.0
	R	39.0	41.0
	S	41.0	43.0
	T	43.0	45.0
	U	45.0	47.0
LUXEON 2835S 6V	Z	50.0	55.0
	A	55.0	60.0
	B	60.0	65.0
	C	65.0	70.0
	D	70.0	75.0
	E	75.0	80.0
	F	80.0	85.0
	G	85.0	90.0
	H	90.0	95.0
	J	95.0	100.0
	K	100.0	105.0
	L	105.0	110.0
	M	110.0	115.0
	N	115.0	120.0
	P	120.0	125.0
	Q	125.0	130.0
	R	130.0	135.0
	S	135.0	140.0
	T	140.0	145.0
	U	145.0	150.0

Notes for Table 5:
1. Lumileds maintains a tolerance of ±7.5% on luminous flux measurements.

Color Bin Definition

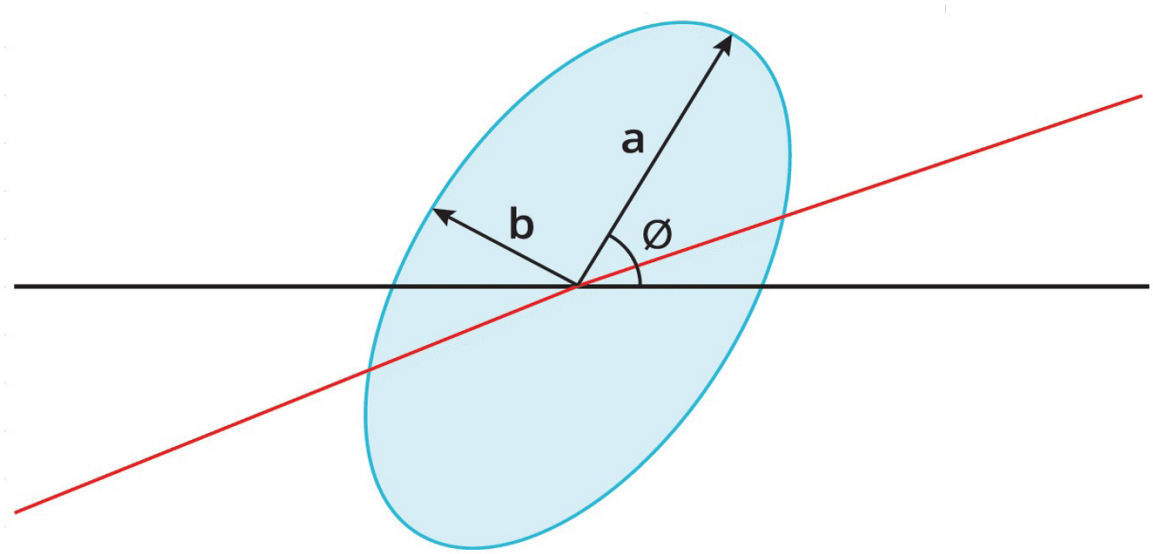


Figure 7a. 3- and 5-step MacAdam ellipse illustration for Tables 6a–6g

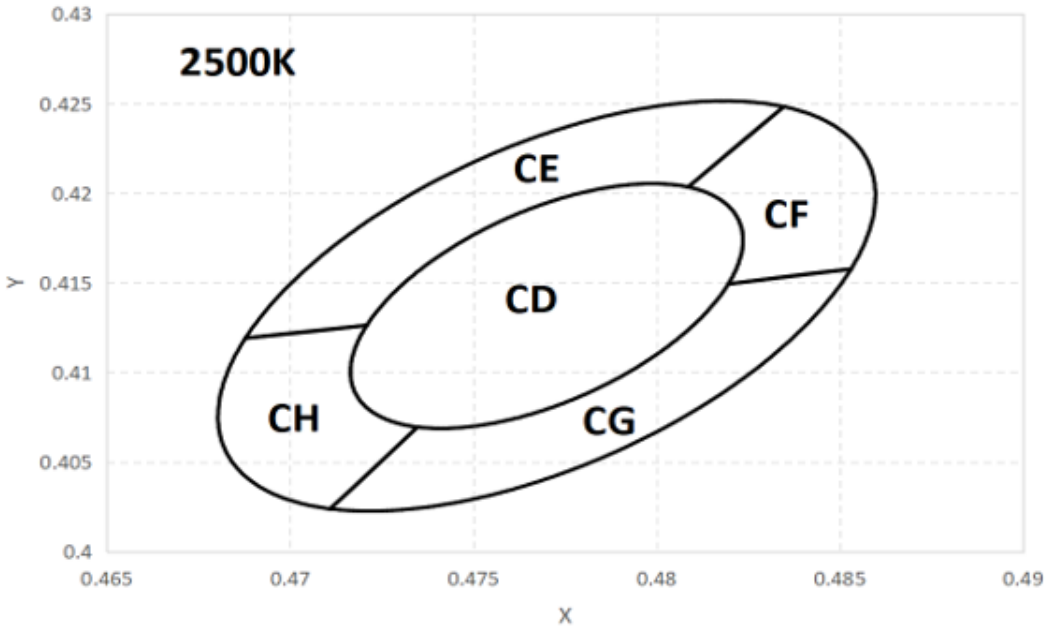


Figure 7b. 1/5th color bin structure for LUXEON 2835 Commercial 2500K at specified test current and binning temperature of T_j=25°C

Table 6a-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 2500K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
2500K	Single 3-step MacAdam ellipse	(0.4770, 0.4137)	0.00770	0.00400	57.28°
2500K	Single 5-step MacAdam ellipse	(0.4770, 0.4137)	0.01290	0.00670	57.28°

Table 6a-2. 4 quadrants definition for LUXEON 2835 Commercial 2700K, at specified test and binning conditions

POINT	x	y
1	0.4880	0.4326
2	0.4660	0.4113
3	0.4675	0.3955
4	0.4895	0.4168
Center	0.4770	0.4137

Notes for Table 6a:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

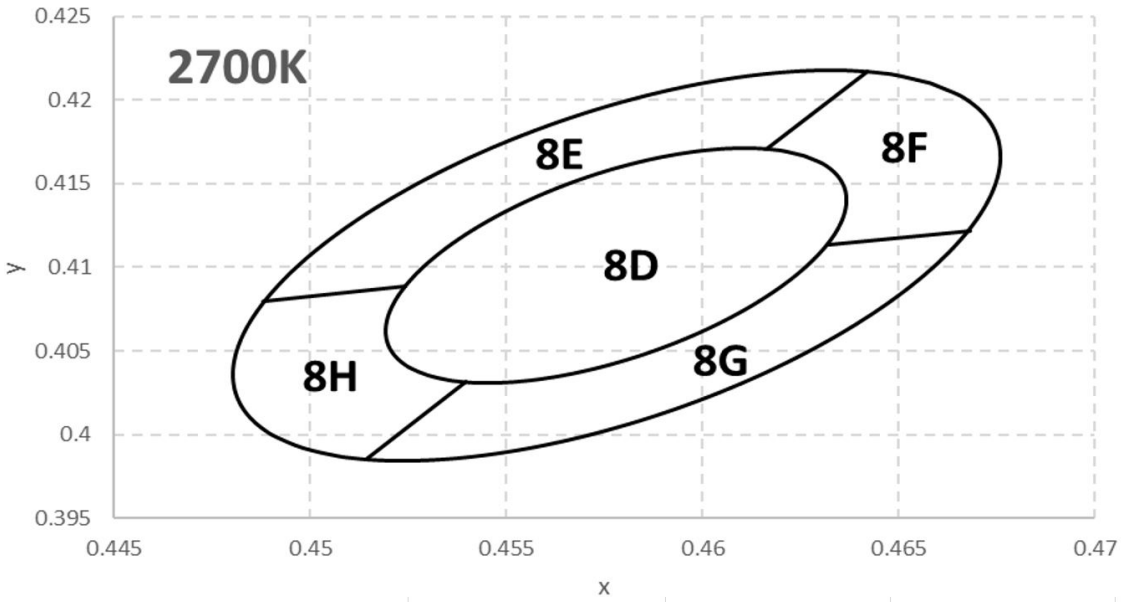


Figure 7c. 1/5th color bin structure for LUXEON 2835 Commercial 2700K at specified test current and binning temperature of T_j=25°C

Table 6b-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 2700K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
2700K	Single 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00810	0.00420	53.70°
2700K	Single 5-step MacAdam ellipse	(0.4578, 0.4101)	0.01350	0.00700	53.70°

Table 6b-2. 4 quadrants definition for LUXEON 2835 Commercial 2700K, at specified test and binning conditions

POINT	x	y
1	0.4642	0.4217
2	0.4488	0.4080
3	0.4514	0.3985
4	0.4668	0.4122
Center	0.4578	0.4101

Notes for Table 6b:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

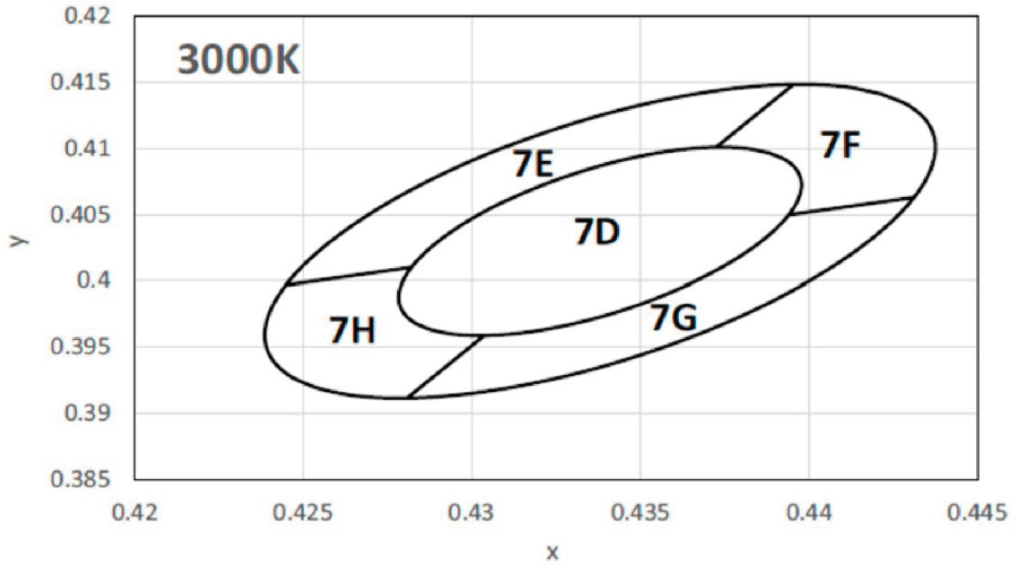


Figure 7d. 1/5th color bin structure for LUXEON 2835 Commercial 3000K at specified test current and binning temperature of T_j=25°C

Table 6c-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 3000K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
3000K	Single 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00834	0.00408	53.22°
3000K	Single 5-step MacAdam ellipse	(0.4338, 0.4030)	0.01390	0.00680	53.22°

Table 6c-2. 4 quadrants definition for LUXEON 2835 Commercial 3000K, at specified test and binning conditions

POINT	x	y
1	0.4395	0.4148
2	0.4245	0.3997
3	0.4282	0.3912
4	0.4431	0.4062
Center	0.4338	0.4030

Notes for Table 6c:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

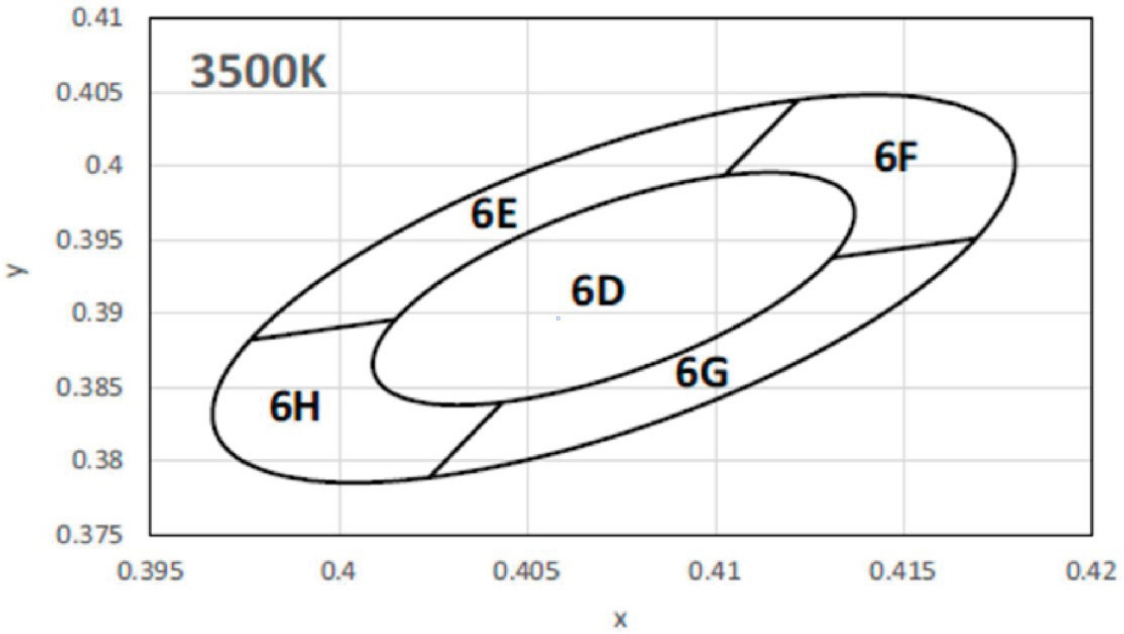


Figure 7e. 1/5th color bin structure for LUXEON 2835 Commercial 3500K at specified test current and binning temperature of T_j=25°C

Table 6d-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 3500K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
3500K	Single 3-step MacAdam ellipse	(0.4073, 0.3917)	0.00927	0.00414	54.00°
3500K	Single 5-step MacAdam ellipse	(0.4073, 0.3917)	0.01545	0.00690	54.00°

Table 6d-2. 4 quadrants definition for LUXEON 2835 Commercial 3500K, at specified test and binning conditions

POINT	x	y
1	0.4122	0.4045
2	0.3976	0.3882
3	0.4024	0.3789
4	0.4169	0.3951
Center	0.4073	0.3917

Notes for Table 6d:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

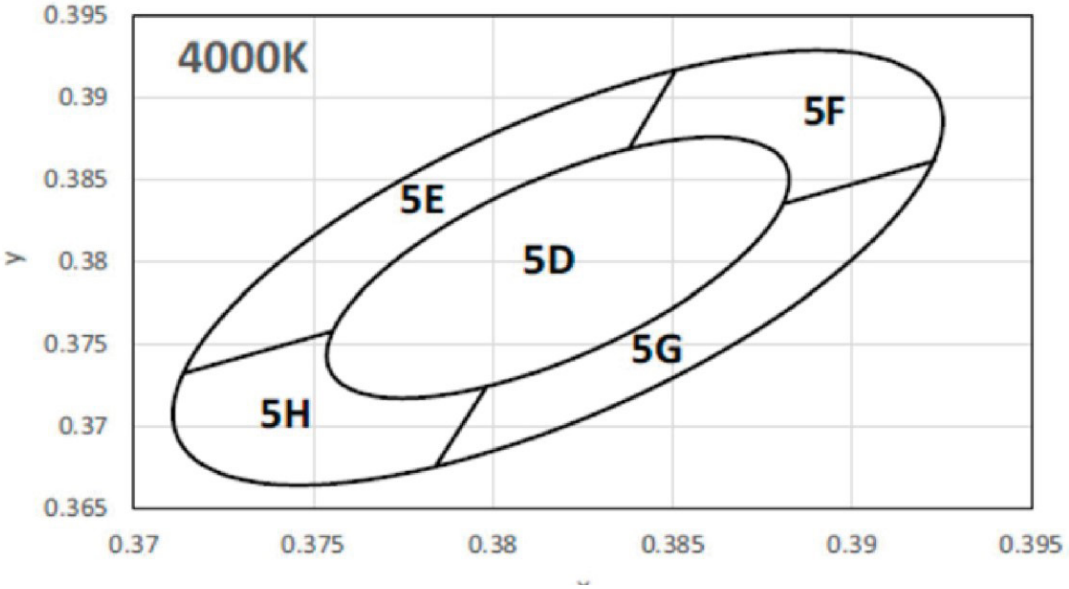


Figure 7f. 1/5th color bin structure for LUXEON 2835 Commercial 4000K at specified test current and binning temperature of T_j=25°C

Table 6e-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 4000K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
4000K	Single 3-step MacAdam ellipse	(0.3818, 0.3797)	0.00939	0.00402	53.72°
4000K	Single 5-step MacAdam ellipse	(0.3818, 0.3797)	0.01565	0.00670	53.72°

Table 6e-2. 4 quadrants definition for LUXEON 2835 Commercial 4000K, at specified test and binning conditions

POINT	x	y
1	0.3851	0.3918
2	0.3714	0.3733
3	0.3784	0.3676
4	0.3923	0.3862
Center	0.3818	0.3797

Notes for Table 6e:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

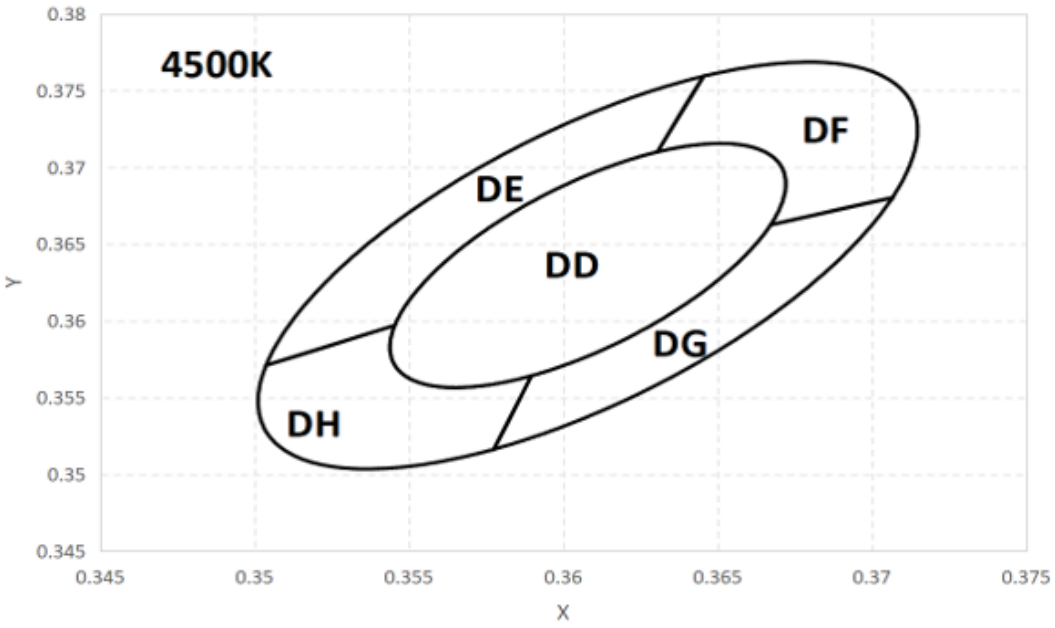


Figure 7g. 1/5th color bin structure for 2835 Commercial 4500K at specified test current and binning temperature of T_j=25°C

Table 6f-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 4500K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
4500K	Single 3-step MacAdam ellipse	(0.3608, 0.3636)	0.00939	0.00404	54.00°
4500K	Single 5-step MacAdam ellipse	(0.3608, 0.3636)	0.01564	0.00673	54.00°

Table 6f-2. 4 quadrants definition for LUXEON 2835 Commercial 4500K, at specified test and binning conditions

POINT	x	y
1	0.3656	0.3794
2	0.3483	0.3558
3	0.3569	0.3483
4	0.3733	0.3692
Center	0.3608	0.3636

Notes for Table 6f:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

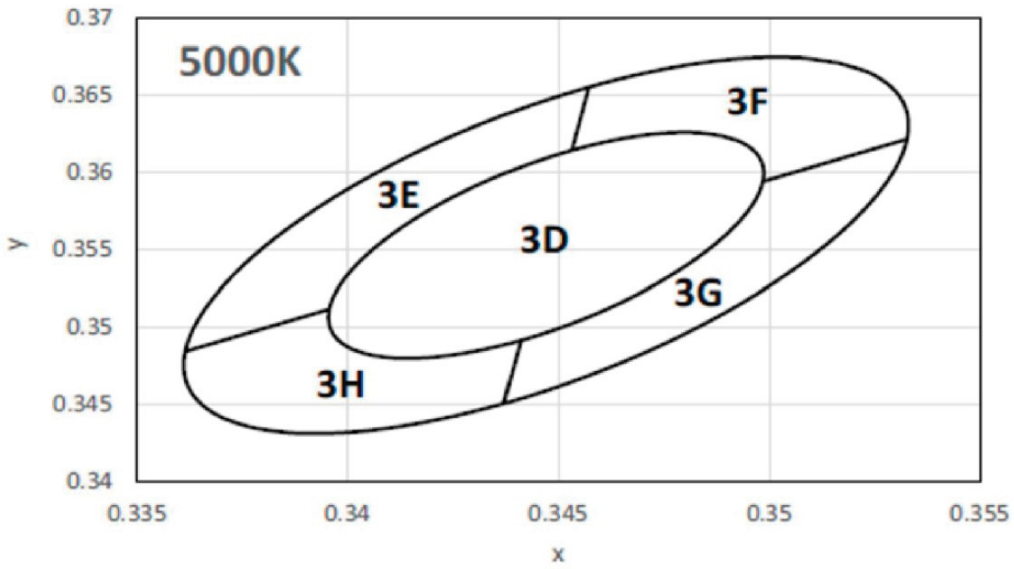


Figure 7h. 1/5th color bin structure for LUXEON 2835 Commercial 5000K at specified test current and binning temperature of T_j=25°C

Table 6g-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 5000K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
5000K	Single 3-step MacAdam ellipse	(0.3447, 0.3553)	0.00822	0.00354	59.62°
5000K	Single 5-step MacAdam ellipse	(0.3447, 0.3553)	0.01370	0.00590	59.62°

Table 6g-2. 4 quadrants definition for LUXEON 2835 Commercial 5000K, at specified test and binning conditions

POINT	x	y
1	0.3457	0.3655
2	0.3361	0.3484
3	0.3439	0.3452
4	0.3533	0.3623
Center	0.3447	0.3553

Notes for Table 6g:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

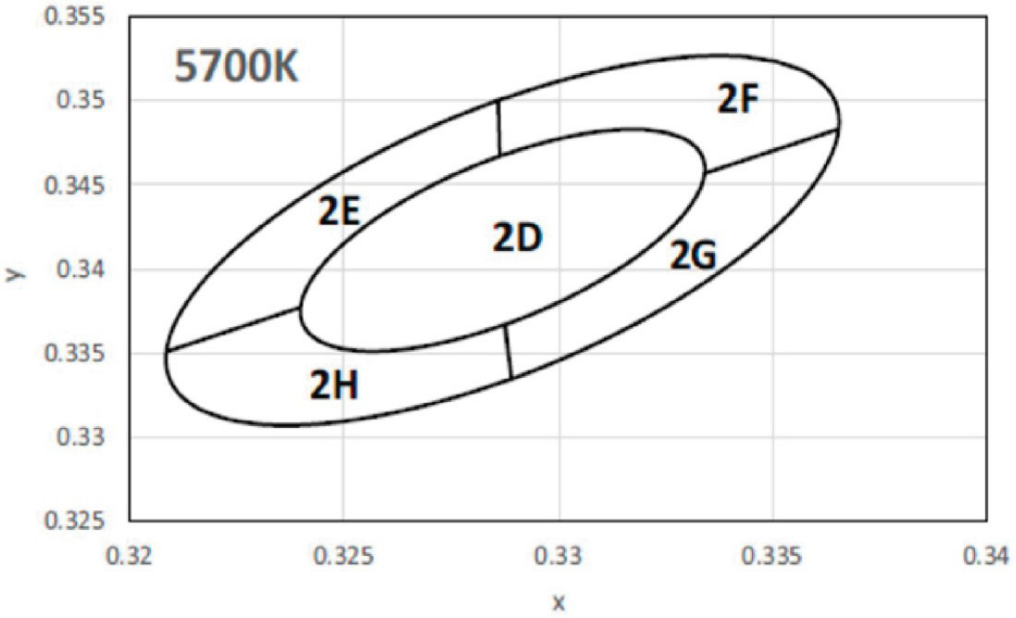


Figure 7i. 1/5th color bin structure for LUXEON 2835 Commercial 5700K at specified test current and binning temperature of T_j=25°C

Table 6h-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 5700K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
5700K	Single 3-step MacAdam ellipse	(0.3287, 0.3417)	0.00746	0.00320	59.09°
5700K	Single 5-step MacAdam ellipse	(0.3287, 0.3417)	0.01243	0.00533	59.09°

Table 6h-2. 4 quadrants definition for LUXEON 2835 Commercial 5700K, at specified test and binning conditions

POINT	x	y
1	0.3286	0.3501
2	0.3209	0.3351
3	0.3289	0.3334
4	0.3365	0.3483
Center	0.3287	0.3417

Notes for Table 6h:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

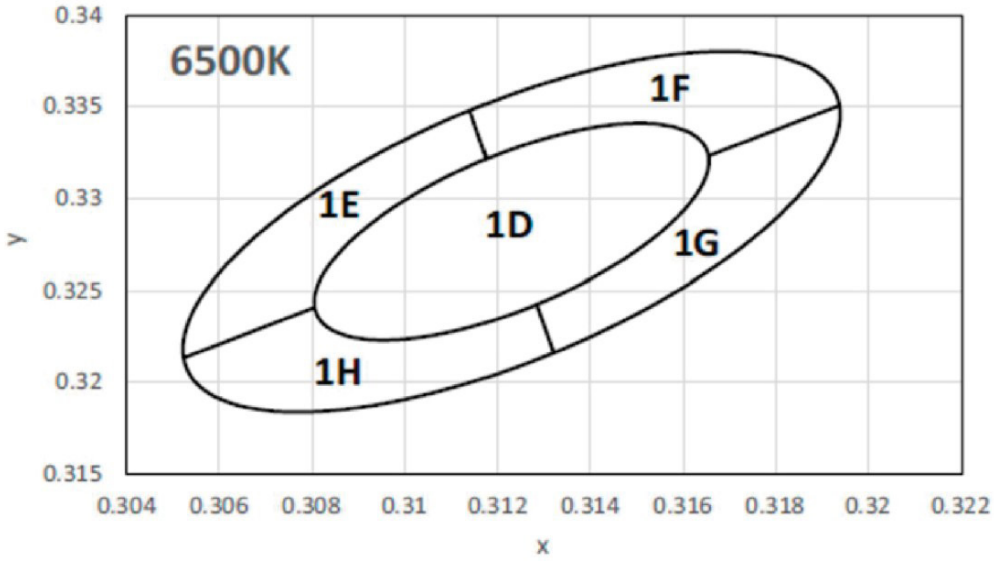


Figure 7i. 1/5th color bin structure for LUXEON 2835 Commercial 6500K at specified test current and binning temperature of T_j=25°C

Table 6i-1. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 2835 Commercial 6500K, at specified test and binning conditions

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
6500K	Single 3-step MacAdam ellipse	(0.3123, 0.3282)	0.00669	0.00285	58.57°
6500K	Single 5-step MacAdam ellipse	(0.3123, 0.3282)	0.01115	0.00475	58.57°

Table 6i-2. 4 quadrants definition for LUXEON 2835 Commercial 6500K, at specified test and binning conditions

POINT	x	y
1	0.3114	0.3348
2	0.3052	0.3213
3	0.3132	0.3216
4	0.3194	0.3352
Center	0.3123	0.3282

Notes for Table 6i:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 2835 Commercial at specified test current, T_j=25°C

PRODUCT	BIN	FORWARD VOLTAGE [1] (V_f)	
		MINIMUM	MAXIMUM
LUXEON 2835S 3V	C	2.60	2.70
	D	2.70	2.80
	E	2.80	2.90
	F	2.90	3.00
	G	3.00	3.10
LUXEON 2835S 6V	G	5.80	6.00
	H	6.00	6.20
	J	6.20	6.40
	K	6.40	6.60

Notes for Table 7:
1. Lumileds maintains a tolerance of ±0.05V on forward voltage measurements.

Mechanical Dimensions

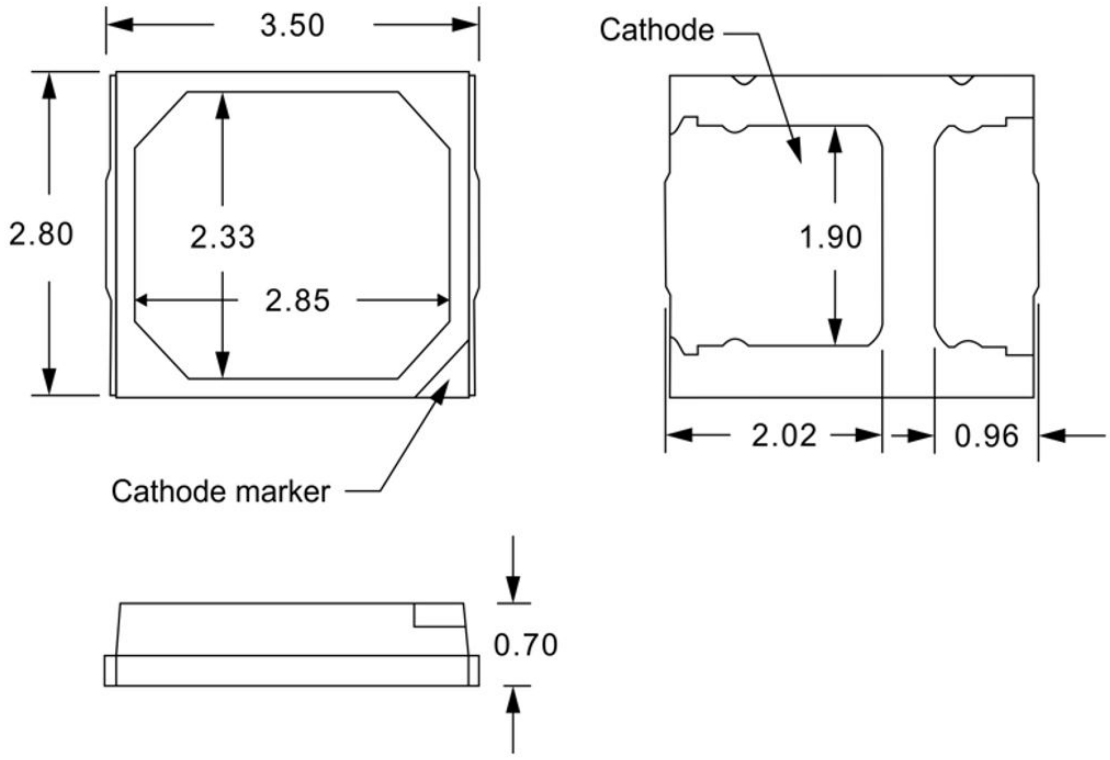


Figure 8. Mechanical dimensions for LUXEON 2835 Commercial

Notes for Figure 8:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Tolerance: ±0.1mm.

Reflow Soldering Guidelines

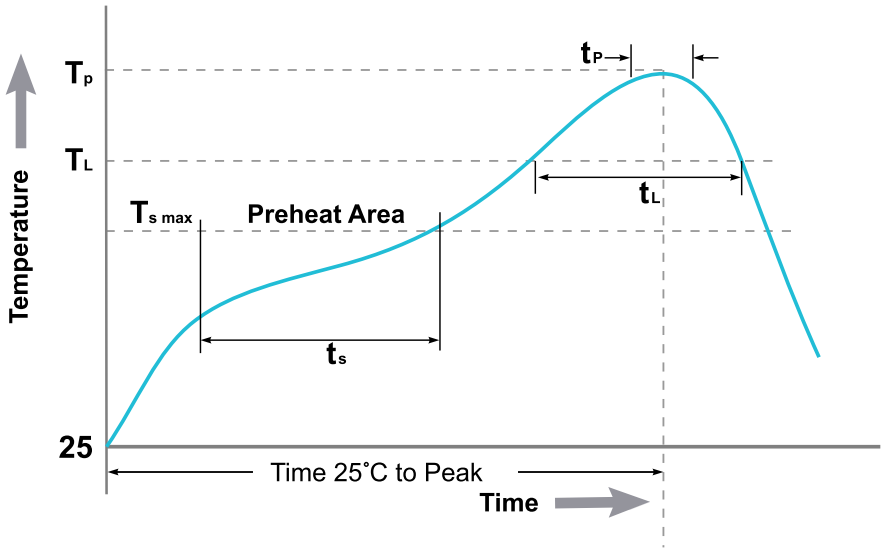


Figure 9. Visualization of the acceptable reflow temperature profile as specified in Table 5

Note for Figure 9:
1. This general guideline may not apply to all designs and configurations of reflow soldering equipment.

Table 8. Reflow profile characteristics for LUXEON 2835 Commercial

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Maximum Temperature (T_{smax})	180°C
Preheat Time (t_s)	120 seconds maximum
Ramp-Up Rate (T_{smax} 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 9. Moisture sensitivity levels for LUXEON 2835 Commercial

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
3	168 Hours	≤30°C / 60% RH	192 Hours +5 / -0	30°C / 60% RH

Solder Pad Design

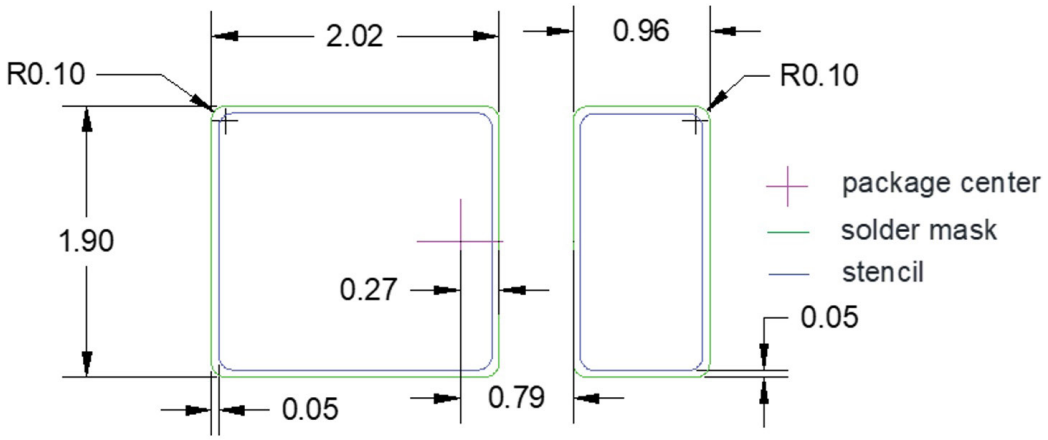


Figure 10. Recommended PCB solder pad layout for LUXEON 2835 Commercial.

Notes for Figure 10:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Packaging Information

Pocket Tape Dimensions

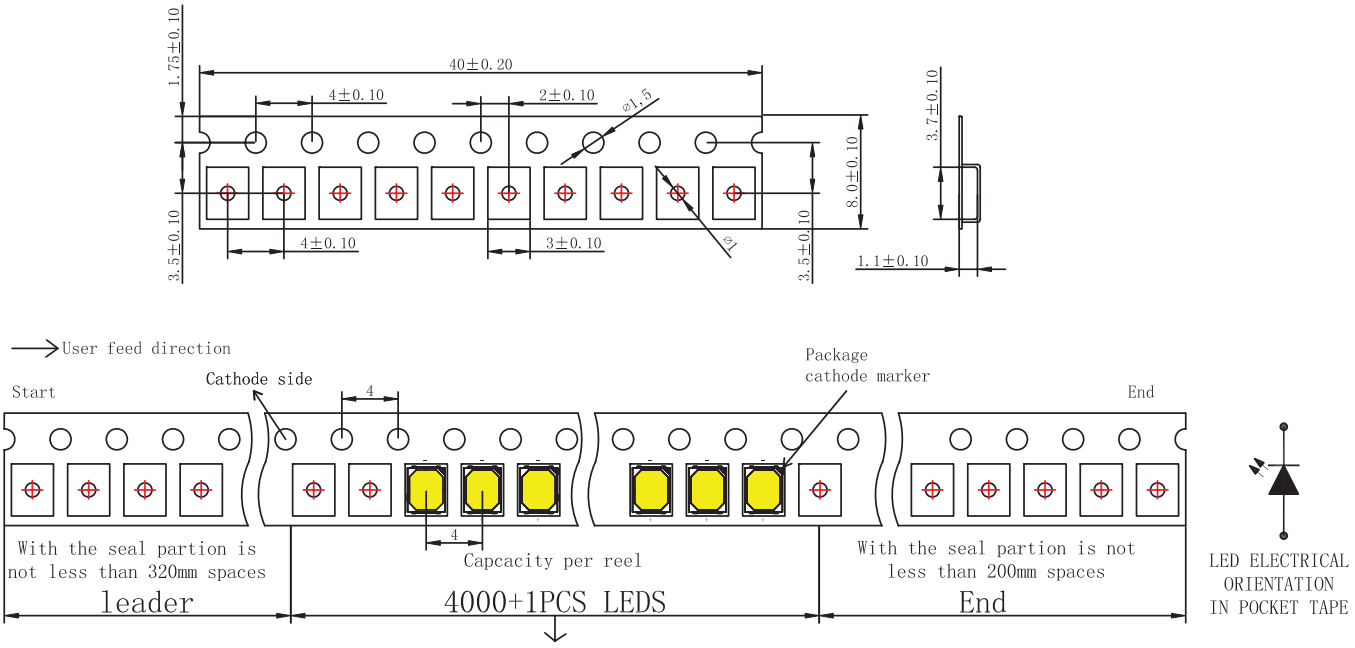


Figure 11a. Pocket tape dimensions for LUXEON 2835 Commercial

Notes for Figure 11a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

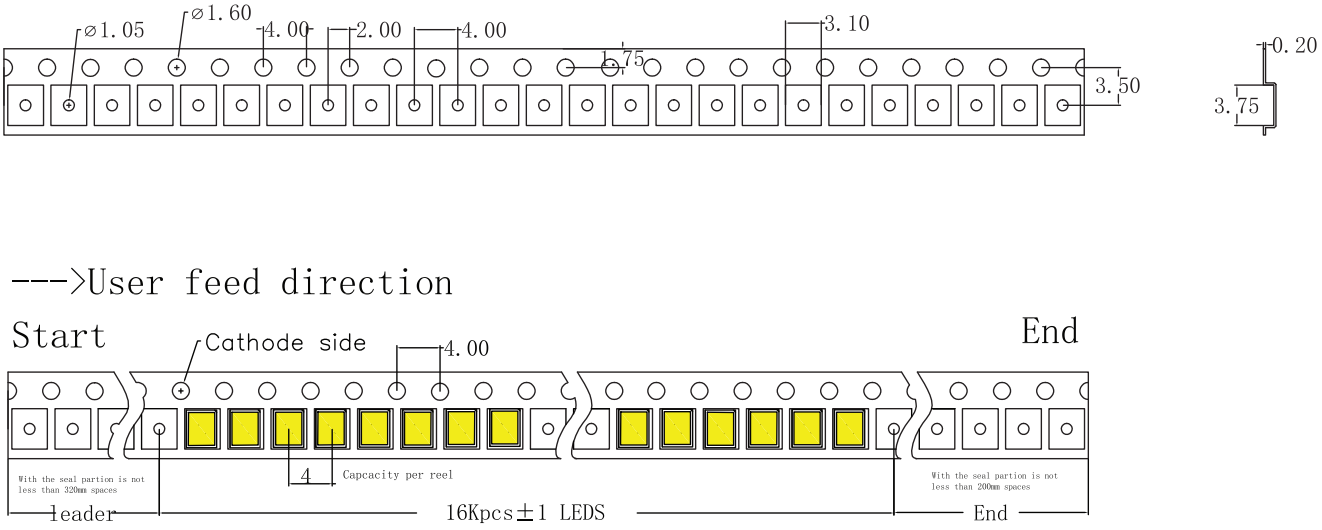


Figure 11b. Pocket tape dimensions for LUXEON 2835 Commercial (L128-xxxxSA35A00Gx & L128-xxxxSA35A00Hx)

Notes for Figure 11b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reel Dimensions

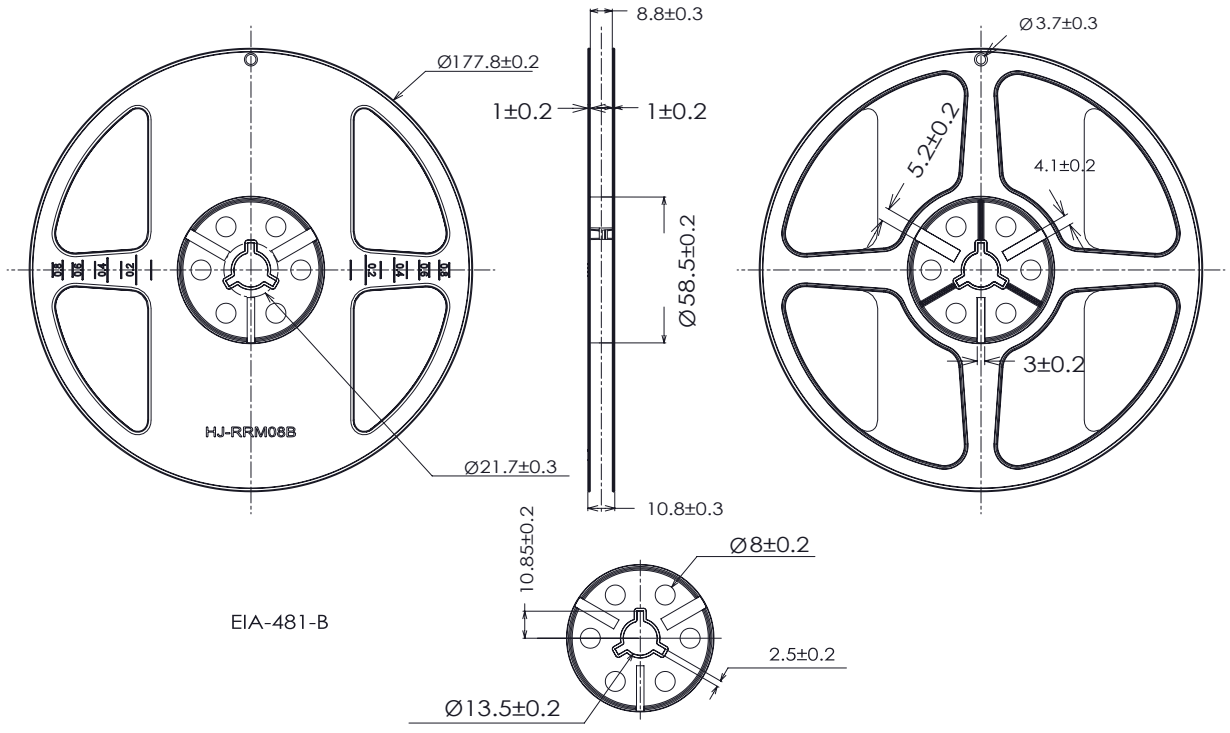
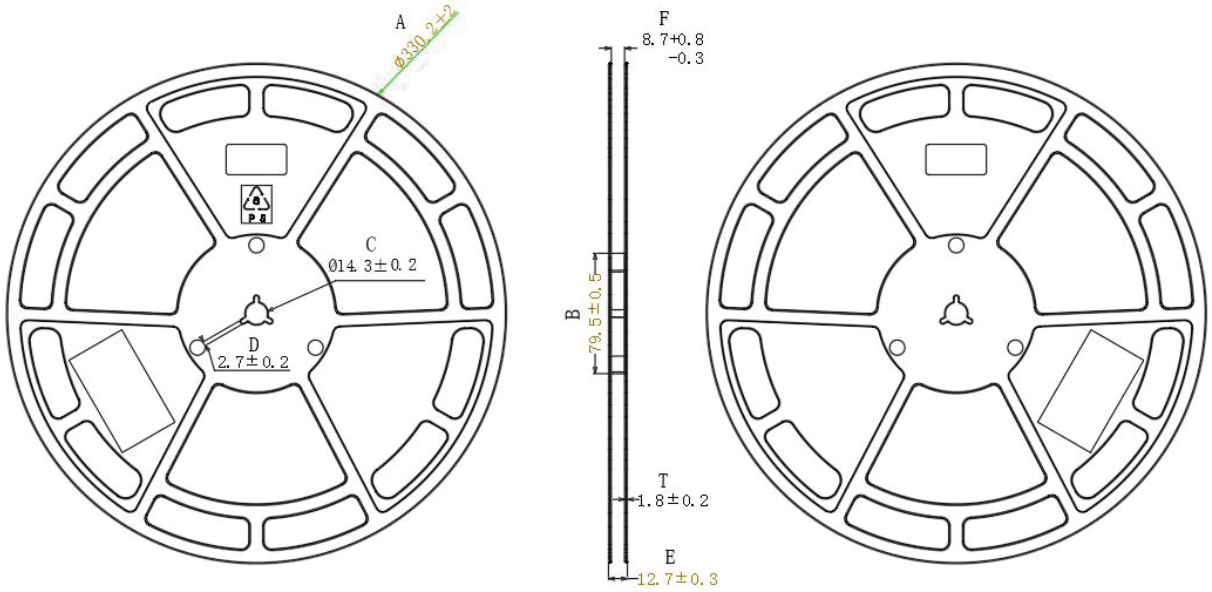


Figure 12a. Reel dimensions for LUXEON 2835 Commercial

Notes for Figure 12a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.



A±2	B±0.5	C±0.2	D±0.2	E±0.3	$F^{+0.8}_{-0.3}$	T±0.2
Ø330.2	Ø79.5	Ø14.3	2.7	12.7	8.7	1.8

Figure 12b. Reel dimensions for LUXEON 2835 Commercial (L128-xxxxSA35A00Gx & L128-xxxxSA35A00Hx)

Notes for Figure 12b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

About Lumileds

Lumileds is a global leader in LED and microLED technology, innovation, and solutions for the automotive, display, illumination, mobile, and other markets where light sources are essential. Our approximately 3,500 employees operate in over 15 countries and partner with our customers to deliver never before possible solutions for lighting, safety, and well-being.

To learn more about our lighting solutions, visit lumileds.com.

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