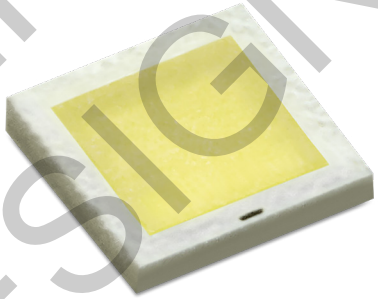
LUMILEDS

AUTOMOTIVE

LUXEON Neo CW 1 mm²

Industry-leading solutions for matrix headlighting

LUXEON Neo LEDs, with their miniaturized form factor and low mechanical tolerances, are the ideal LED components for matrix headlighting. All LUXEON Neo LEDs are hot binned at 85°C and AEC-Q 102 qualified.



FEATURES AND BENEFITS

- Higher drive current capability for increased flux performance
- Low thermal resistance for better hot lumen performance
- Miniaturized package for dense population of boards
- Hot binned at 85°C monopulse (MP) to match closer to operating conditions
- IEC/PAS 62707-1 White LED

PRIMARY APPLICATIONS

- Adaptive Lighting
  - AFS
- Headlight
  - Low Beam
  - High Beam

RoHS COMPLIANT

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General Information

Product Test Conditions

LUXEON Neo CW 1 mm² LEDs are tested and binned using a <20ms monopulse (MP) at 1000mA drive current, case temperature, T_C, of 85°C.

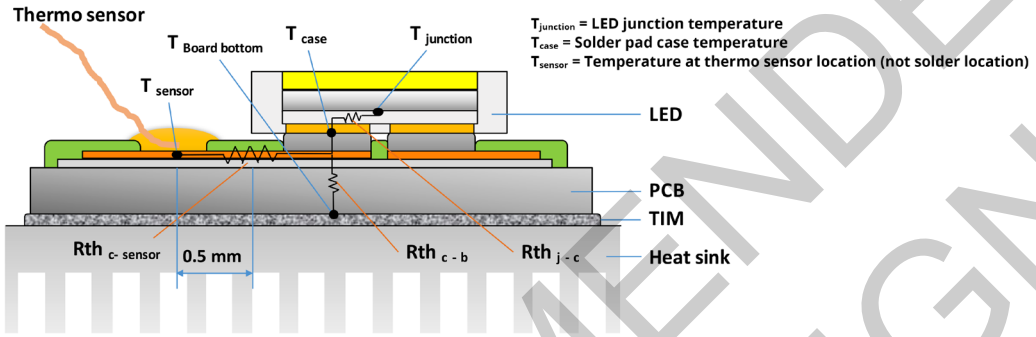

Figure 1. Example of case temperature location on sample board for LUXEON Neo CW 1 mm².

Part Number Nomenclature

Part numbers for LUXEON Neo CW 1 mm² follow the convention below:

A 1 N 1 – **C C C C** D E **F G H H H H J**

Where:

A 1	–	designates Automotive LED
N 1	–	designates LUXEON Neo product family
C C C C	–	designates color temperature
D	–	designates die size (1=1.0mm²)
E	–	designates binning current (D=1000mA)
F	–	designates binning condition (H=85°C)
G	–	designates options for detailed product specification (default 0)
H H H H	–	designates product generation
J	–	designates options for detailed product specification (default 0)

Therefore, the following part number is used for a LUXEON Neo CW 1 mm² with a minimum luminous flux of 290 lumens, hot binned at 1000mA:

A 1 N 1 – **5 8 5 0** 1 D **H 0 0 2 9 0 0**

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Neo 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 Neo CW 1 mm² at <20ms MP, 1000mA, T_C=85°C.

MINIMUM LUMINOUS FLUX [1] (lm)	TEST CURRENT (mA)	PART NUMBER
290	1000	A1N1-58501DH002900
300	1000	A1N1-58501DH003000
310	1000	A1N1-58501DH003100
320	1000	A1N1-58501DH003200
330	1000	A1N1-58501DH003300
340	1000	A1N1-58501DH003400

Notes for Table 1:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.

Optical Characteristics

Table 2. Optical characteristics for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA, T_C=85°C.

PART NUMBER	CORRELATED COLOR TEMPERATURE (CCT)		TOTAL INCLUDED ANGLE [1] $\theta_{0.90V}$	TYPICAL VIEWING ANGLE [2] $2\theta_{1/2}$
	MINIMUM	MAXIMUM		
A1N1-58501DHxxxxxx	5180K	6680K	148°	128°

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 Characteristics for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA, T_C=85°C.

PART NUMBER	THERMAL RESISTANCE— JUNCTION TO CASE (K/W)			
	$R\theta_{j-c}$ el [3, 5]		$R\theta_{j-c}$ real [4, 5]	
	TYPICAL	MAXIMUM [5]	TYPICAL	MAXIMUM [5]
A1N1-58501DHxxxxxx	2.7	3.2	4.1	4.9

Notes for Table 3:
1. $R\theta_{j-c}$ el: Electrical thermal resistance (junction to case).
2. $R\theta_{j-c}$ real: Real thermal resistance (junction to case) with wall plug efficiency included. Reference JESD51-51, JESD51-14, 4.1.3..

Absolute Ratings

Table 4. Absolute ratings for LUXEON Neo CW 1 mm².

PARAMETER	PERFORMANCE
Minimum DC Forward Current	50mA
Maximum DC Forward Current	1500mA
Maximum Junction Temperature [1][2]	150°C
Case Temperature Range [1]	-40°C to 135°C
LED Storage Temperature	-40°C to 130°C
Maximum Junction Temperature for <200 Hours (1500 mA)[3]	180°C
ESD Sensitivity [4]	HBM class 0, CDM class C0a
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 junction temperature below the maximum allowable temperature. LEDs driven at or above maximum LED case temperature may have shorter lifetime.
2. Please consult with Lumileds for more information on maximum time durations and forward currents for these temperatures.
3. Short time operations of less than 200 hours.
4. Measured using human body model (per ANSI/ANSI/ESDA/JEDEC JS-001-2010), charged device model (AEC Q101-005 rev A).

JEDEC Moisture Sensitivity

Table 5. Moisture sensitivity levels for LUXEON Neo CW 1 mm².

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

Characteristic Curves

Spectral Power Distribution Characteristics

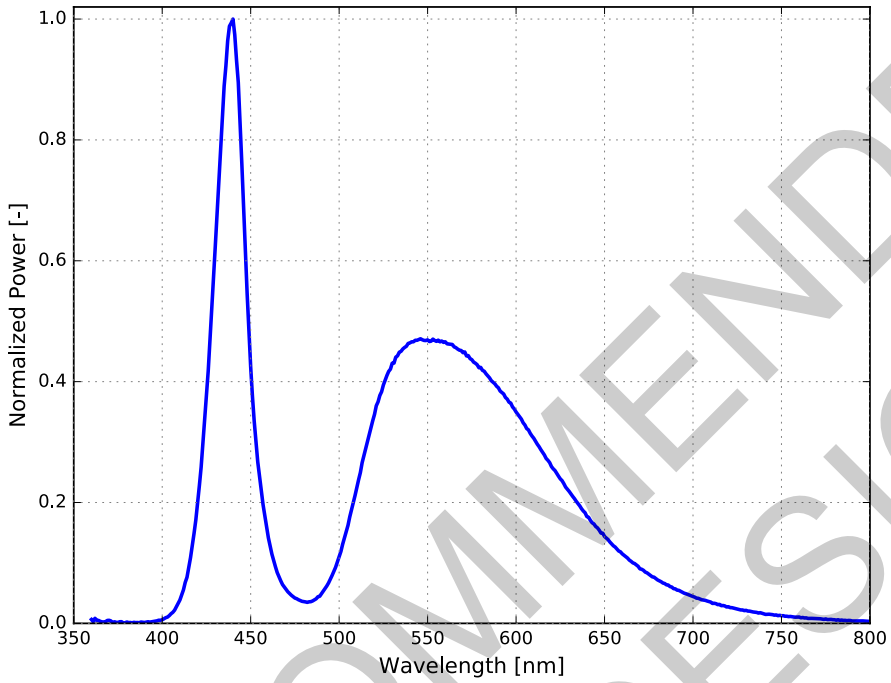

Figure 2. Typical normalized power vs. wavelength for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA, T_c=85°C.

Light Output Characteristics

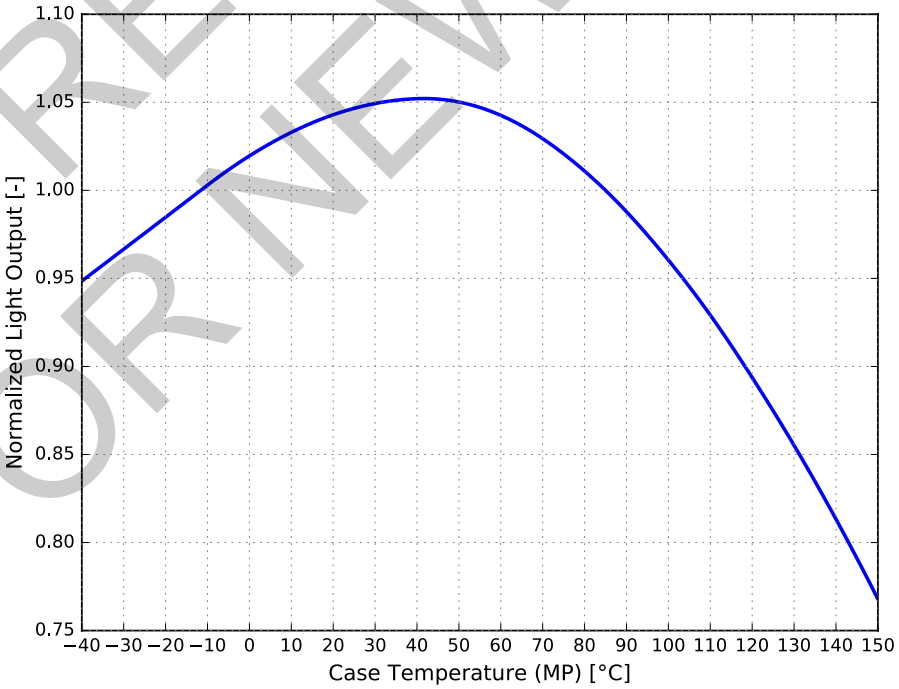

Figure 3a. Typical normalized light output vs. case temperature for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA.

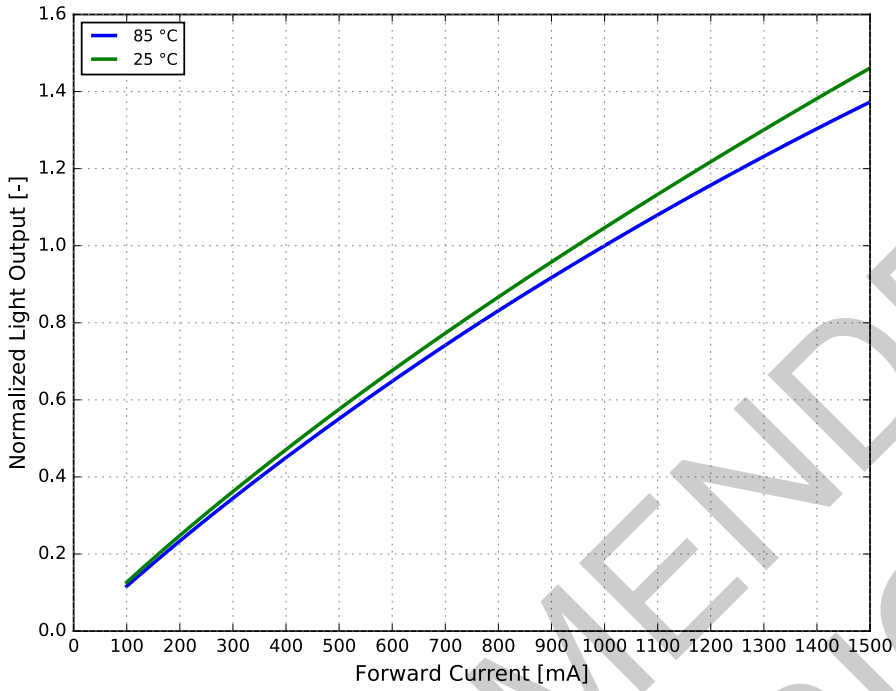

Figure 3b. Typical normalized light output vs. forward current for LUXEON Neo CW 1 mm².

Forward Current and Forward Voltage Characteristics

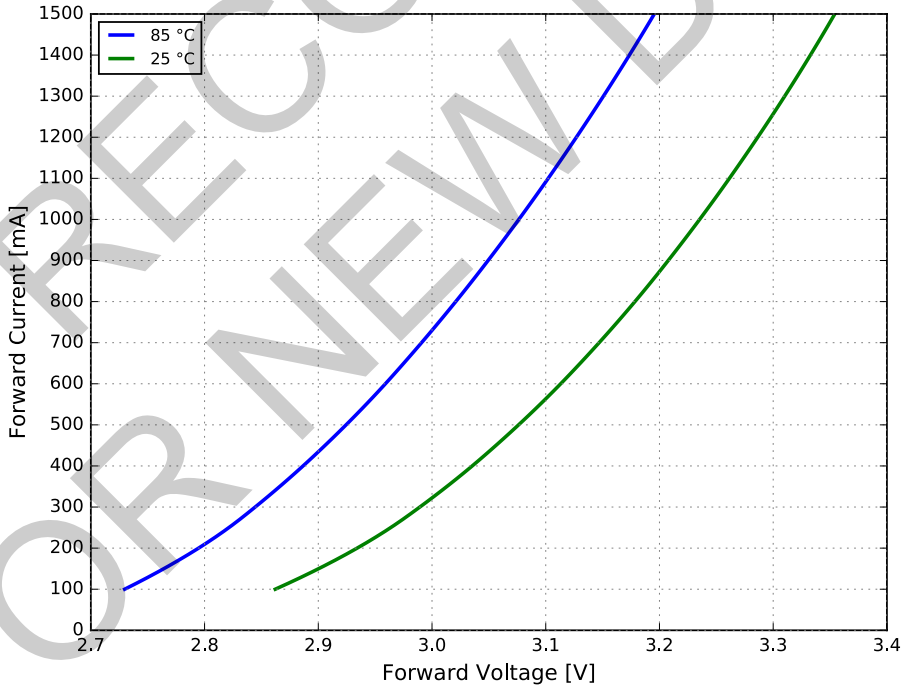

Figure 4a. Typical forward current vs. forward voltage for LUXEON Neo CW 1 mm² at T_c=85°C.

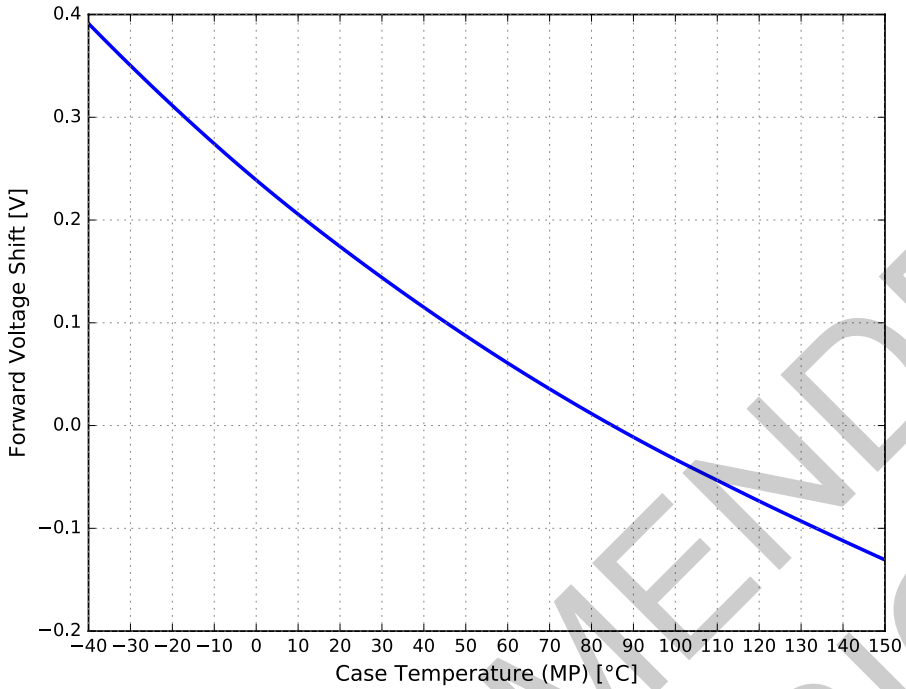

Figure 4b. Typical forward voltage shift vs. case temperature for LUXEON Neo CW 1 mm².

Color Shift Characteristics

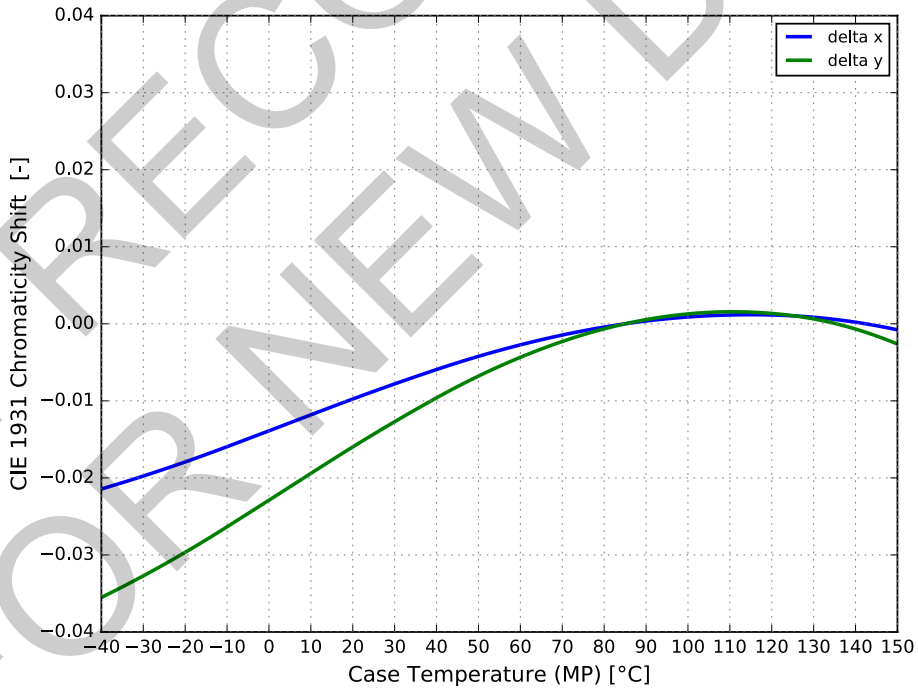

Figure 5a. Typical color shift in CIE 1931 x and y coordinates vs. case temperature for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA.

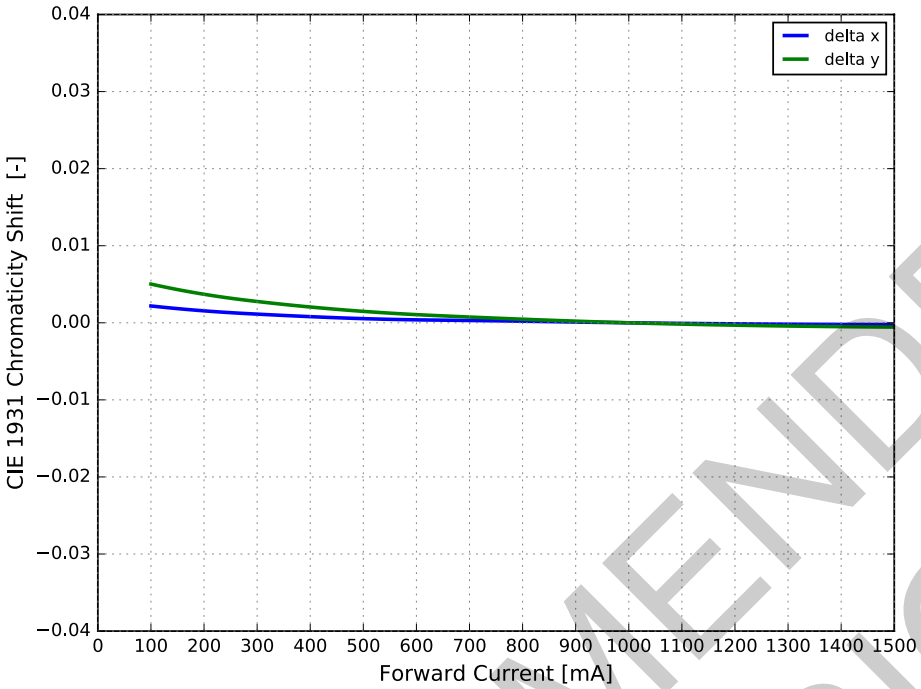

Figure 5b. Typical color shift in CIE 1931 x and y coordinates vs. forward current for LUXEON Neo CW 1 mm² at <20ms MP, T_c=85°C.

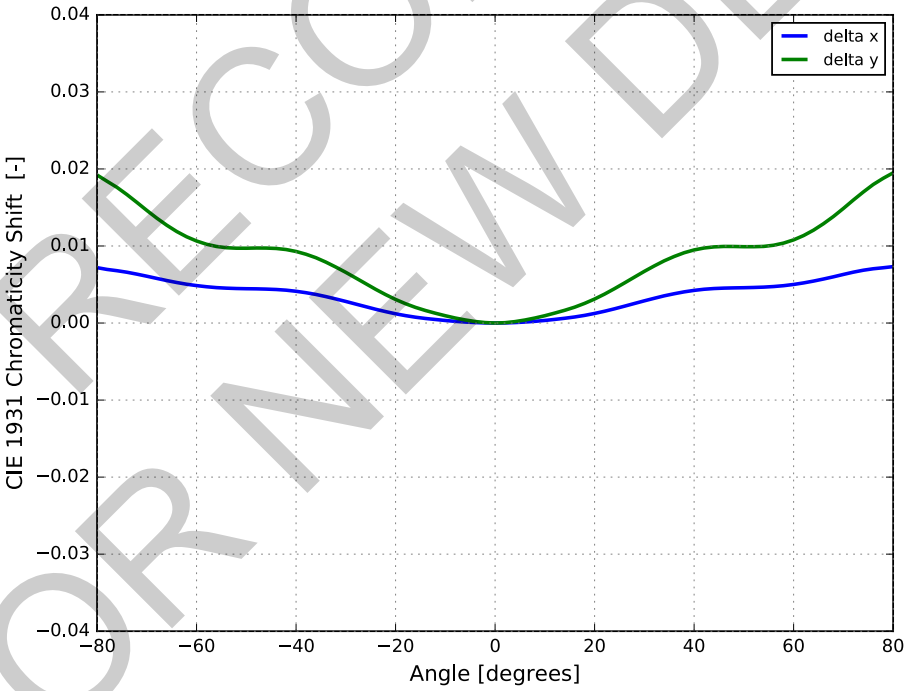

Figure 5c. Typical color shift in CIE 1931 x and y coordinates vs. angle for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA.

Radiation Pattern Characteristics

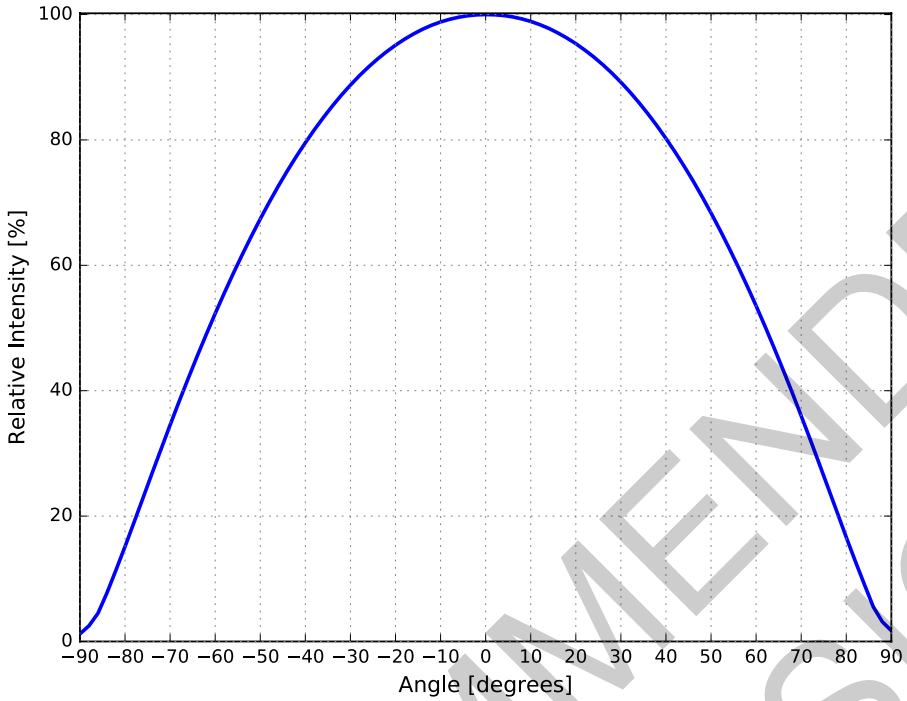

Figure 6. Typical radiation pattern for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA, T_C=85°C.

Operating Limits Characteristics

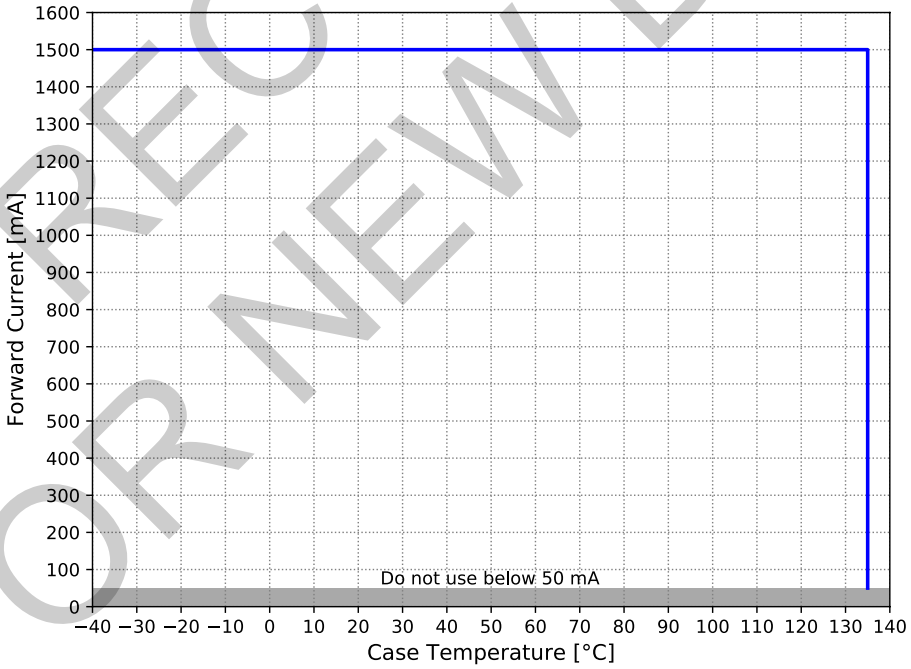

Figure 7. Maximum forward current vs. case temperature for LUXEON Neo CW 1 mm².

Permissible Pulse Handling Characteristics

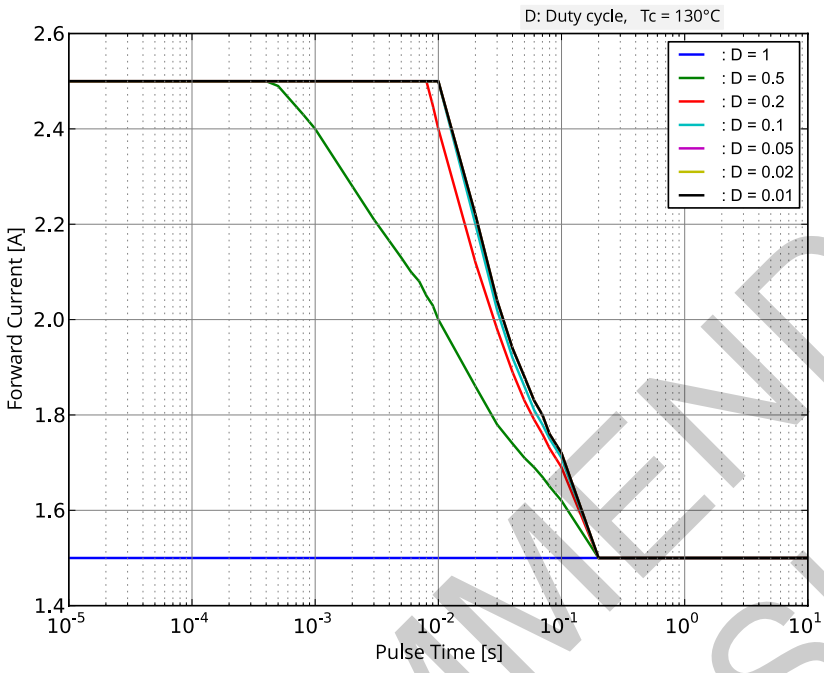

Figure 8. Permissible pulse handling capability for LUXEON Neo CW 1 mm².

Product Bin and Labeling Definitions

Designing with LUXEON Neo CW 1 mm²

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 datasheet. For this reason, Lumileds bins LED components for luminous flux, color and forward voltage.

LUXEON Neo CW 1 mm² 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=300 to 310 lumens)

B C – designates color bin (example: HC, H2, H3, H5)

D – designates forward voltage bin (example: B=2.55 to 2.79V)

Therefore, a LUXEON Neo CW 1 mm² with a lumen range of 300 to 310 lumens, color bin of HC and a forward voltage range of 2.55 to 2.79V has the following CAT code:

H H C B

Luminous Flux Bins

Table 6. Luminous flux bins for LUXEON Neo CW 1 mm² at <20ms MP, 1000mA, T_C=85°C.

BIN	LUMINOUS FLUX [1] (lm)	
	MINIMUM	MAXIMUM
G	290	300
H	300	310
J	310	320
K	320	330
L	330	340
M	340	350
N	350	360
P	360	370
Q	370	380

Notes for Table 6:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.

Color Codes

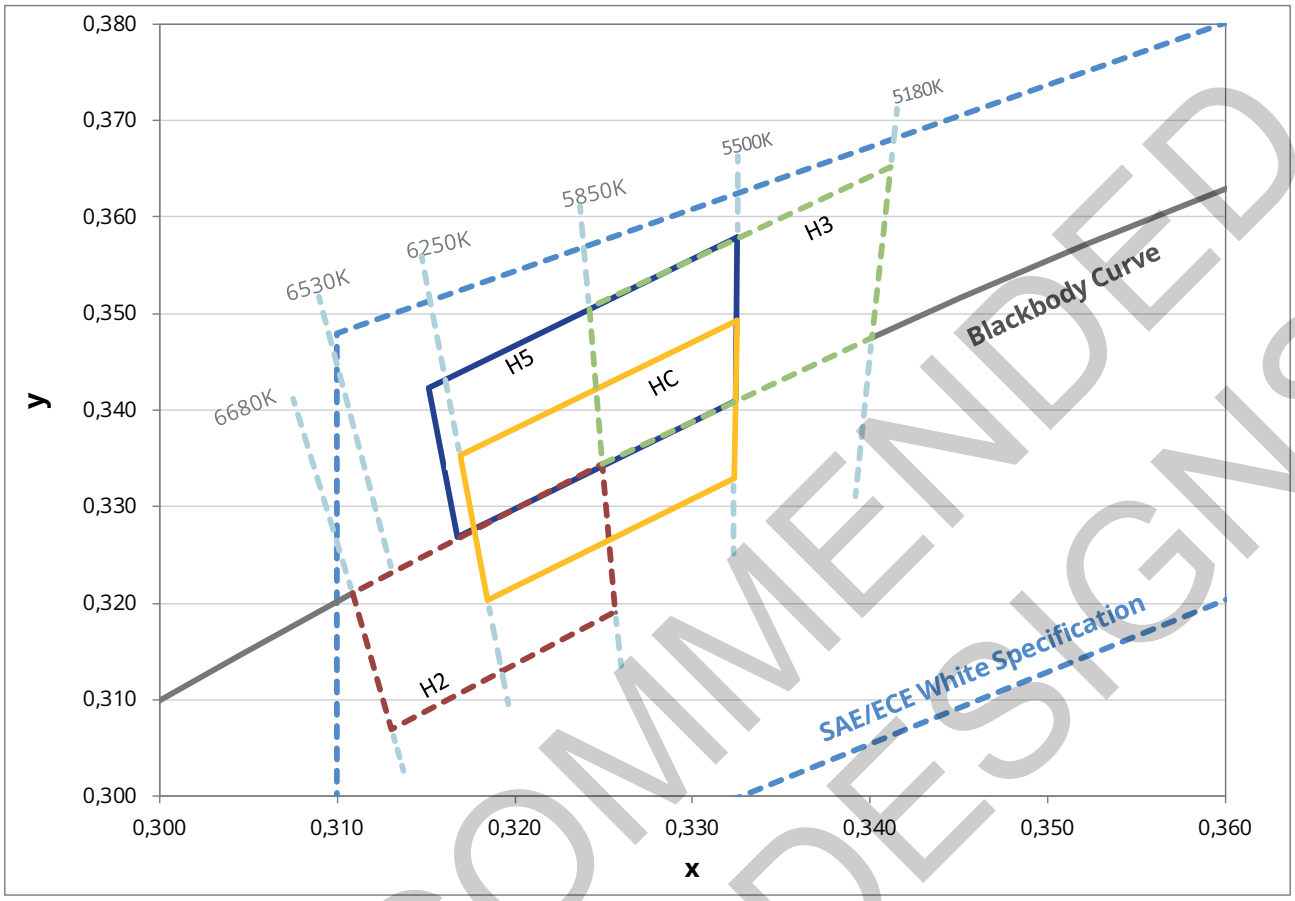

Figure 9. Color bin structure in CIE 1931 color space for LUXEON Neo CW 1 mm².

Notes for Figure 9:
1. Lumileds supports the following bins for LUXEON Neo CW 1 mm² 1x1: H2, H3, HC, H5

Color Bin Definitions

Table 7. Color bin definitions for LUXEON Neo CW 1 mm²

BIN	x [1, 2]	y [1, 2]	6-DIGIT IEC CODE	TYPICAL CCT
HC	0.3325	0.3493		5850K
	0.3169	0.3353		
	0.3185	0.3203		
	0.3323	0.3329		
H5	0.3325	0.3579		5900K
	0.3151	0.3423		
	0.3168	0.3268		
	0.3324	0.3410		
H2	0.3109	0.3211		6250K
	0.3131	0.3070		
	0.3256	0.3191		
	0.3249	0.3344		
H3	0.3249	0.3344		5500K
	0.3401	0.3476		
	0.3412	0.3652		
	0.3242	0.3506		

Notes for Table 7:
1. Lumileds maintains a tester tolerance of ±0.005 on x and y color coordinates.
2. CIE 1931 x and y coordinate frame.

Forward Voltage Bins

Table 8. Forward voltage bin definitions for LUXEON Neo CW 1 mm².

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
B	2.55	2.79
C	2.79	3.03
D	3.03	3.27
E	3.27	3.51

Notes for Table 8:
1. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.
2. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Mechanical Dimensions

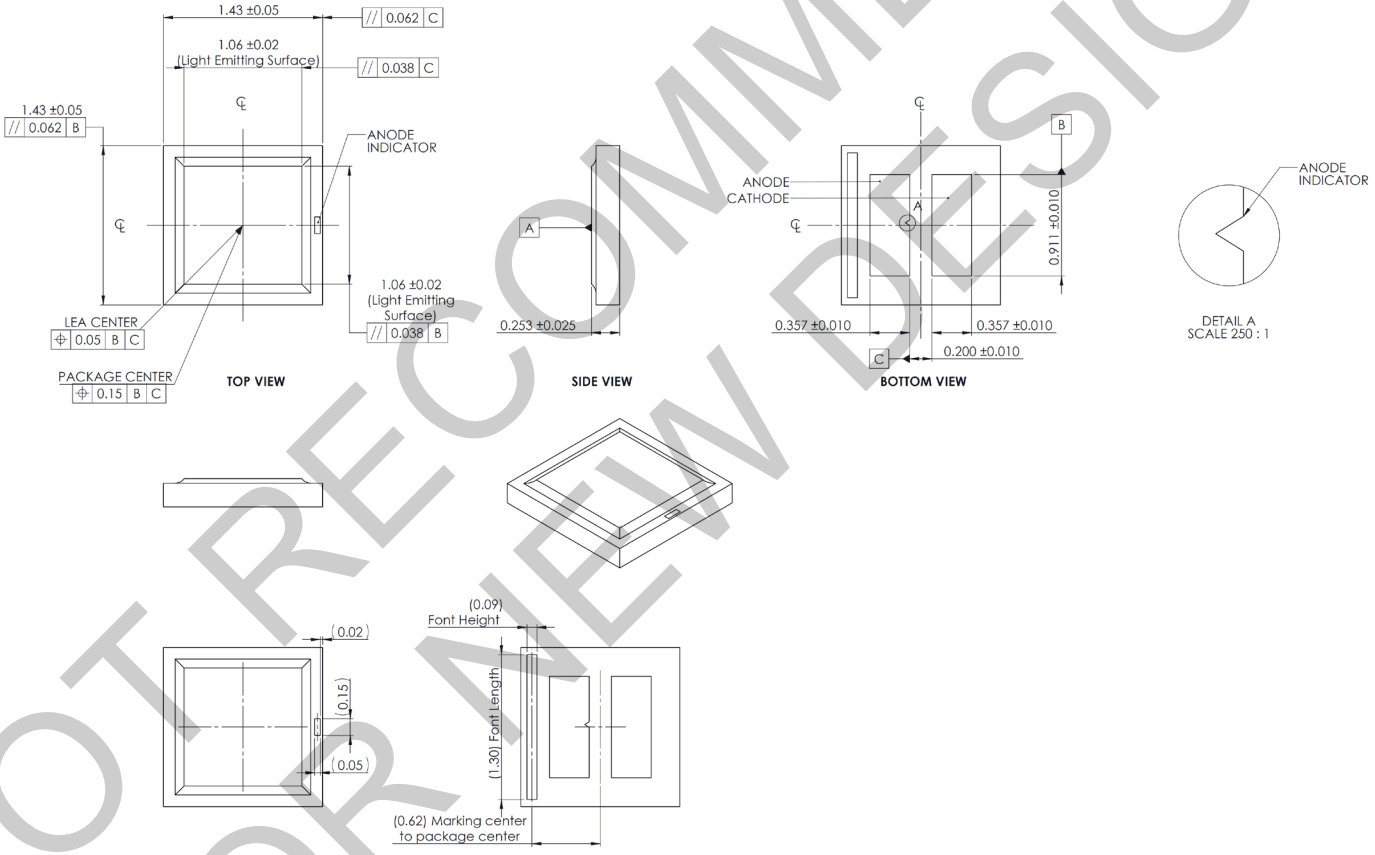

Figure 10. Mechanical dimensions for LUXEON Neo CW 1 mm².

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

Packaging and Labeling Information

Pocket Tape Dimensions

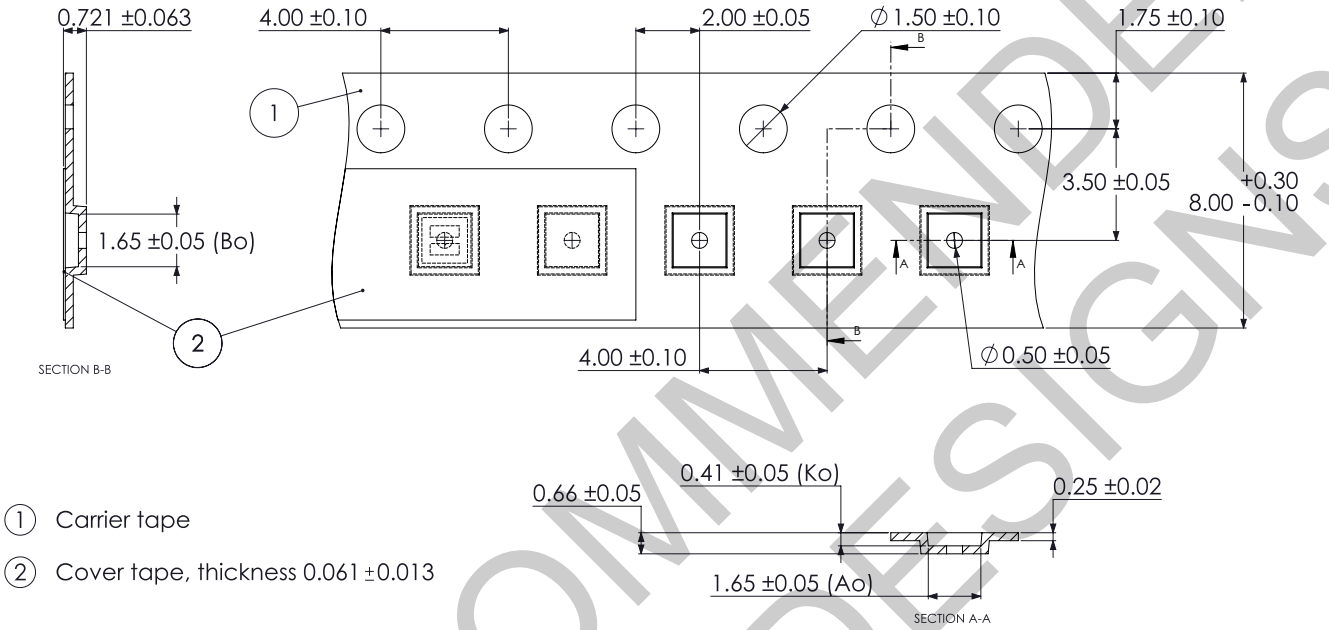

Figure 11. Pocket tape dimensions for LUXEON Neo CW 1 mm².

Notes for Figure 11:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Ao is the length of pocket, Bo is the width of pocket and Ko is the depth of pocket.

Reel Dimensions

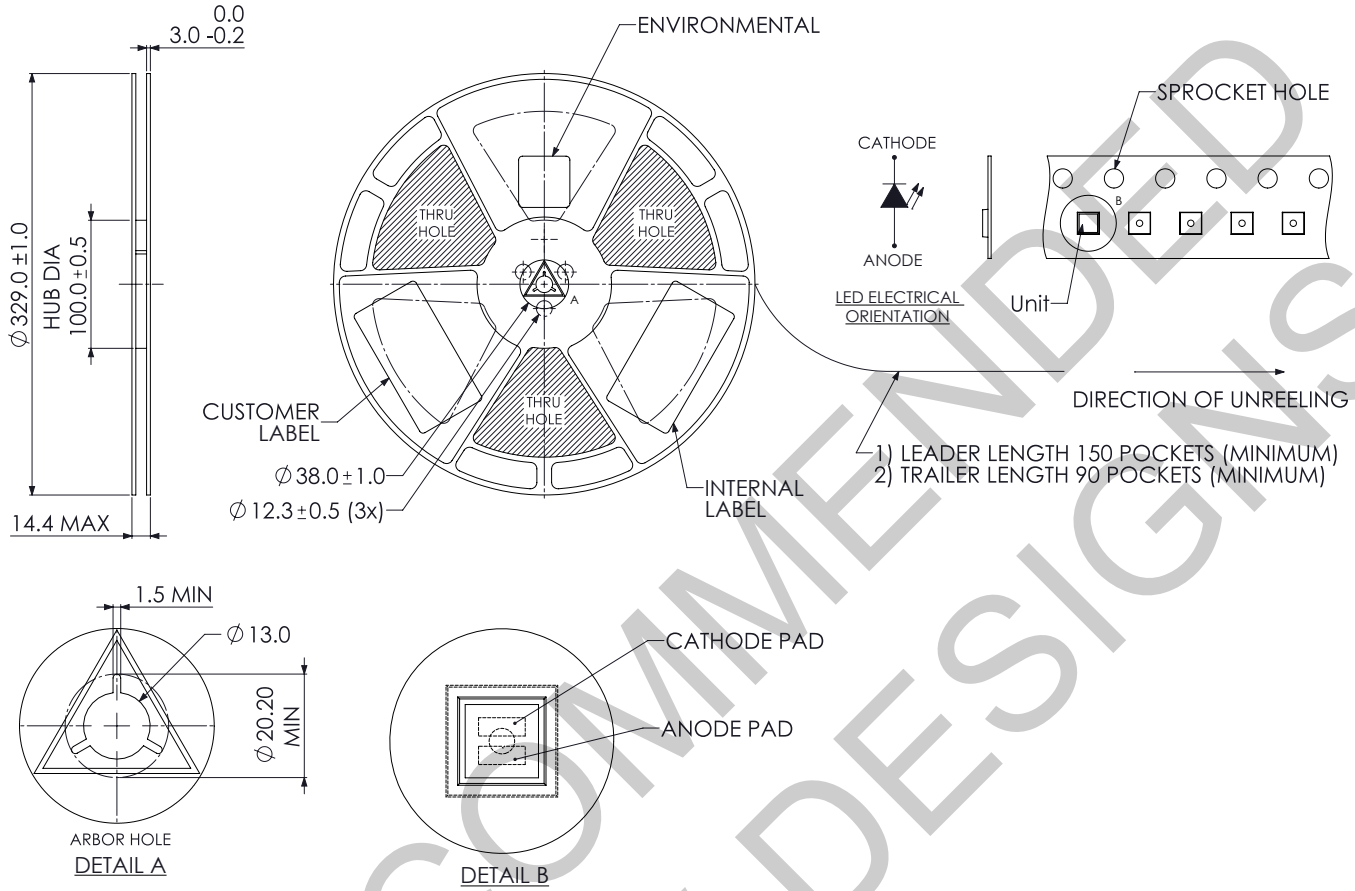

Figure 12. Reel dimensions for LUXEON Neo CW 1 mm².

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

Product Labeling

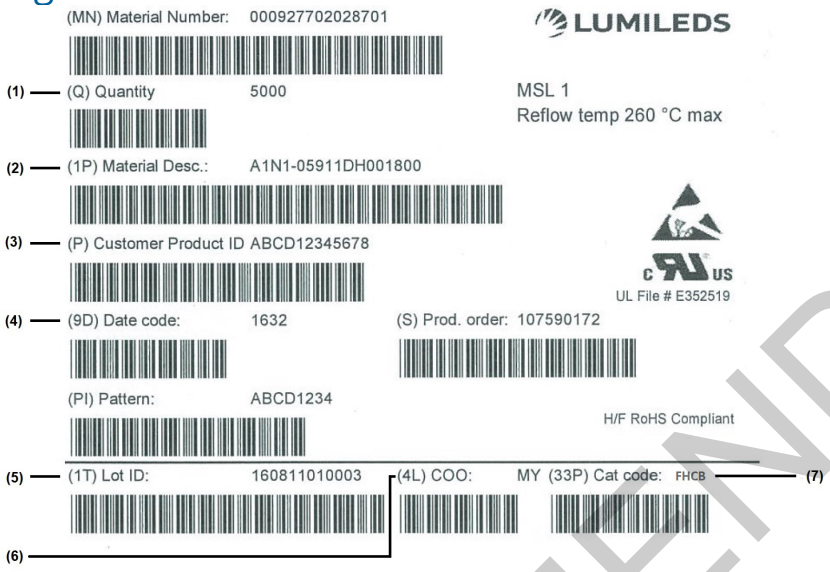

Figure 13. Example of a reel label for LUXEON Neo CW 1 mm².

Notes for Figure 13 – 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 better, safer, more beautiful—with light.

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

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