

LUXEON Altilon SMD-A 1x3

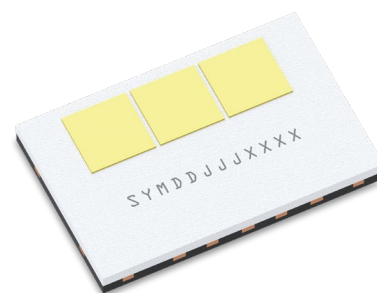
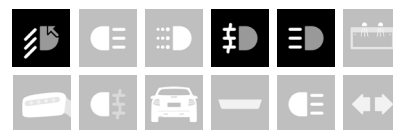
Unmatched robustness and utility for next-generation headlighting

LUXEON Altilon SMD-A 1x3 LEDs are designed for advanced front lighting applications like ADB, low beam, high beam, and front fog. Its exceptional hot-cold stability, high contrast, and single-die addressability augment integrated versatility without compromise. LUXEON Altilon SMD-A 1x3 is hot-binned at 85°C, consistent with automotive operating environments for ease-of-use.

LUXEON Altilon SMD-A 1x3 is AEC-Q102 qualified and tested according to USCAR-33.

FEATURES AND BENEFITS

- Compact design and AI-IMS PCB compatibility lowers system costs
- Best-in-class MSL1 per JEDEC J-STD-020E
- Single-die activation capability enables core ADB functionality and utility
- Hot-binned at 85°C to better match with actual operating conditions
- IEC / PAS 62707-1 White LED



PRIMARY APPLICATIONS

- Headlighting
 - Low Beam
 - High Beam
- Adaptive Forward Lighting Systems
- Adaptive Driving Beam
- Front Fog

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General Product Information

LUXEON Altilon SMD-A 1x3 emitters are high-power Lumiramic™ Phosphor converted InGaN emitters mounted on an EMC leadframe. All LUXEON Altilon SMD-A 1x3 emitters contain a TVS chip per InGaN die for ESD protection.

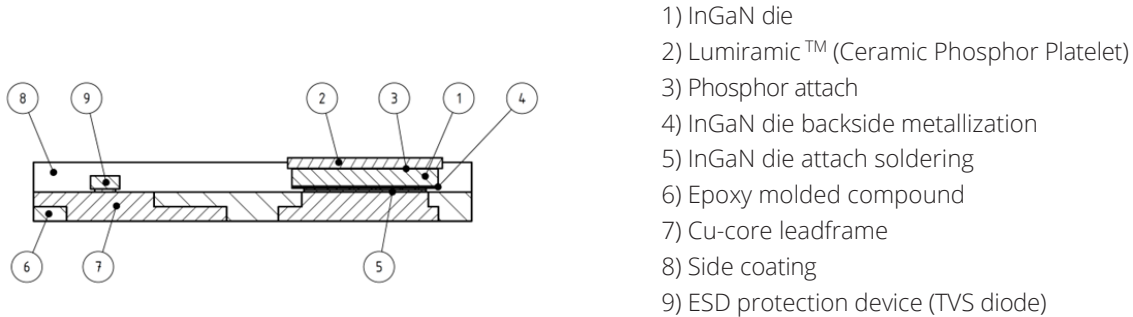


Figure 1. Schematic cross section LUXEON Altilon SMD-A 1x3

Product Test and Binning Conditions

Monopulse (MP) testing for LUXEON Altilon SMD-A 1x3 is done with a pulse of 1 ms. The binning condition for LUXEON Altilon SMD-A 1x3 is MP testing at 1000 mA at a temperature of 85 °C.

Part Number Nomenclature

Part numbers for LUXEON Altilon SMD-A 1x3 follow the convention below:

A 1 S D – 5 8 5 0 **B C D E F F F F G**

Where:

- B** - designates the number of die / chip (2 = 2 die)
- C** - designates binning current (D = 1000 mA)
- D** - designates binning temperature (H = 85 °C)
- E** - designates product generation (0 = Generation 1)
- F F F F** - designates minimum total luminous flux (example: 1050 = 1050 lumens)
- G** - designates options code for distribution (default = 0)

Therefore, the following part number is used for a LUXEON Altilon SMD-A 1x3 with a minimum total luminous flux of 1050 lumens:

A 1 S D – 5 8 5 0 **3 D H 0 1 0 5 0 0**

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Altilon SMD-A 1x3 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 performance and optical characteristics of LUXEON Altilon SMD-A 1x3 at MP binning condition

MINIMUM TOTAL LUMINOUS FLUX ^[1] (lm)	PART NUMBER
1050	A1SD-58503DH010500
1080	A1SD-58503DH010800
1110	A1SD-58503DH011100
1140	A1SD-58503DH011400
1170	A1SD-58503DH011700
1200	A1SD-58503DH012000

Notes for Table 1:

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

Optical Characteristics

Table 2. Optical characteristics for LUXEON Altilon SMD-A 1x3 at MP binning condition and far-field optical characteristics

PART NUMBER	CORRELATETD COLOR TEMPERATURE		TYPICAL TOTAL INCLUDED ANGLE ^[1] $2\theta_{0.90V}$	TYPICAL VIEWING ANGLE ^[2] $2\theta_{1/2}$
	MINIMUM	MAXIMUM		
A1SD-58503DHxxxxxx	5180K	6680K	140°	120°

Notes for Table 2:

- $2\theta_{0.90V}$ denotes the total angle at which 90% of total luminous flux is captured, i.e., the cone defined by the off-axis angle $\theta_{0.90V}$ from the LED centerline includes 90% of the total flux.
- $2\theta_{1/2}$ denotes the viewing angle, with $\theta_{1/2}$ being the off-axis angle from the LED centerline where the luminous intensity is $\frac{1}{2}$ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON Altilon SMD-A 1x3. Electrical characteristics at MP binning condition, thermal characteristics at binning current and 25°C stage temperature

PART NUMBER	FORWARD VOLTAGE (V_f) ^[1] [V]			THERMAL RESISTANCE JUNCTION TO CASE (K/W)			
	MIN.	TYP.	MAX.	$R\theta_{j-c}$ electrical ^[2]		$R\theta_{j-c}$ real ^[3]	
				TYPICAL	MAXIMUM	TYPICAL	MAXIMUM
A1SD-58503DHxxxxxx	8.70	9.33	10.05	0.74	0.83	1.20	1.35

Notes for Table 3:

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

Absolute Ratings

Table 4. Absolute ratings for LUXEON Altilon SMD-A 1x3

PARAMETER	PERFORMANCE
Minimum DC Forward Current	50 mA
Maximum DC Forward Current ^[1]	1500 mA
Maximum Peak Pulsed Forward Current ^[1]	3000 mA
Maximum Emitter Junction Temperature ^[1] (DC & Pulse)	150 °C
Maximum Emitter Junction Temperature ^[1,2] (DC & Pulse), short term	180 °C
ESD Sensitivity ^[3]	HBM ±8 kV CDM ±2 kV
Operating Case Temperature ^[1]	-40 °C to 125 °C
Emitter Storage Temperature	-40 °C to 125 °C
SMD Process Classification Temperature	260 °C
Allowable Reflow Cycles	3
Reverse Voltage (V_{reverse})	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. Short time operations of less than 200 hours
3. Measured using human body model (per ANSI/ANSI/ESDA/JEDEC JS-001-2010), charged device model (AEC Q101-005 rev A).

Characteristic Curves

Spectral Power Distribution Characteristics

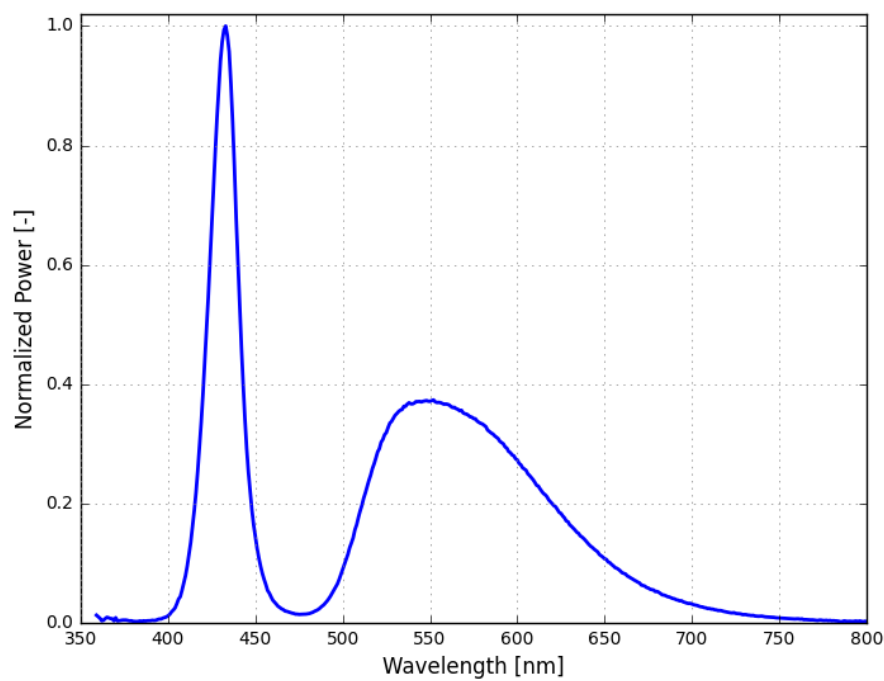


Figure 2. Typical normalized power vs. wavelength for LUXEON Altilon SMD-A 1x3 at MP binning condition

Light Output Characteristics

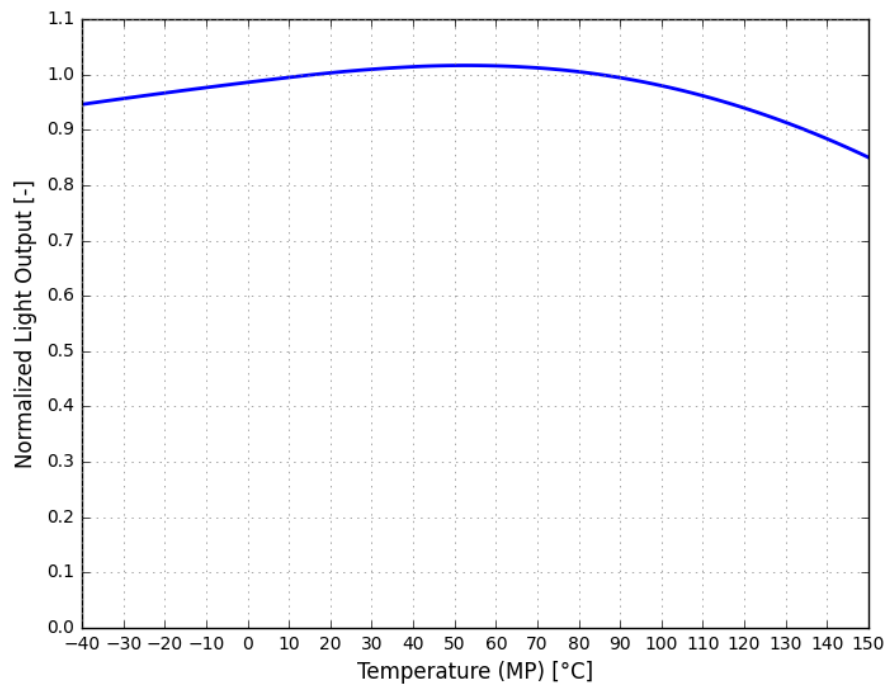


Figure 3. Typical normalized light output vs. temperature for LUXEON Altilon SMD-A 1x3 at MP binning current

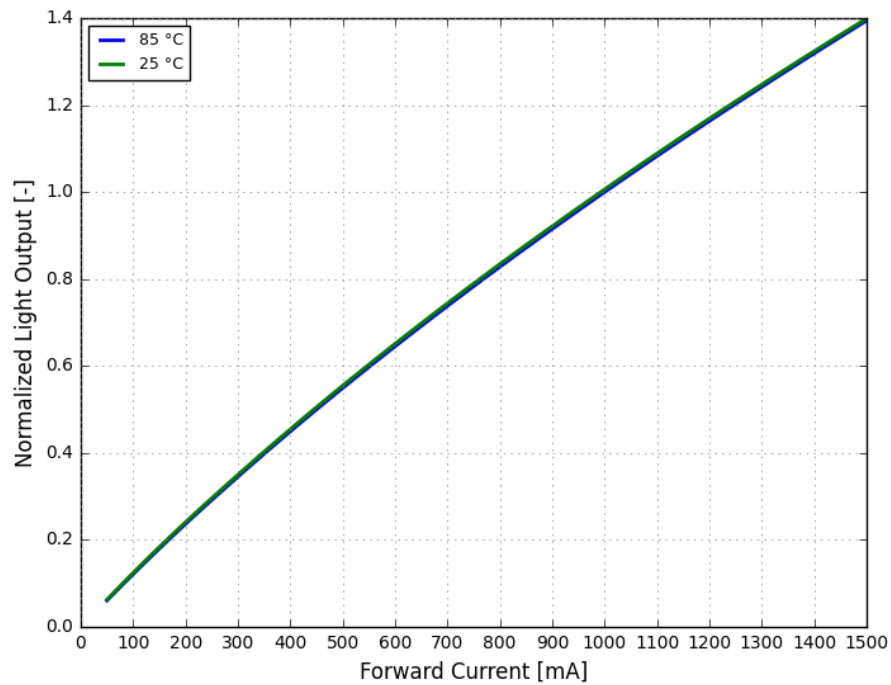


Figure 4. Typical normalized light output vs. forward current for LUXEON Altilon SMD-A 1x3 at MP binning temperature and at room temperature

Forward Current and Forward Voltage Characteristics

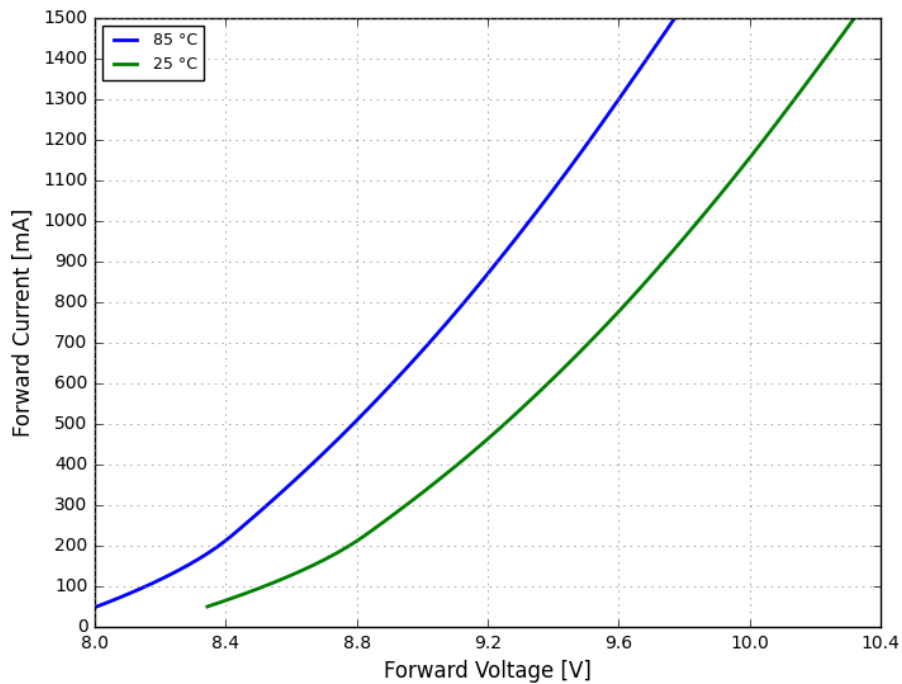


Figure 5. Typical forward current vs. forward voltage for LUXEON Altilon SMD-A 1x3 at MP binning temperature and at room temperature

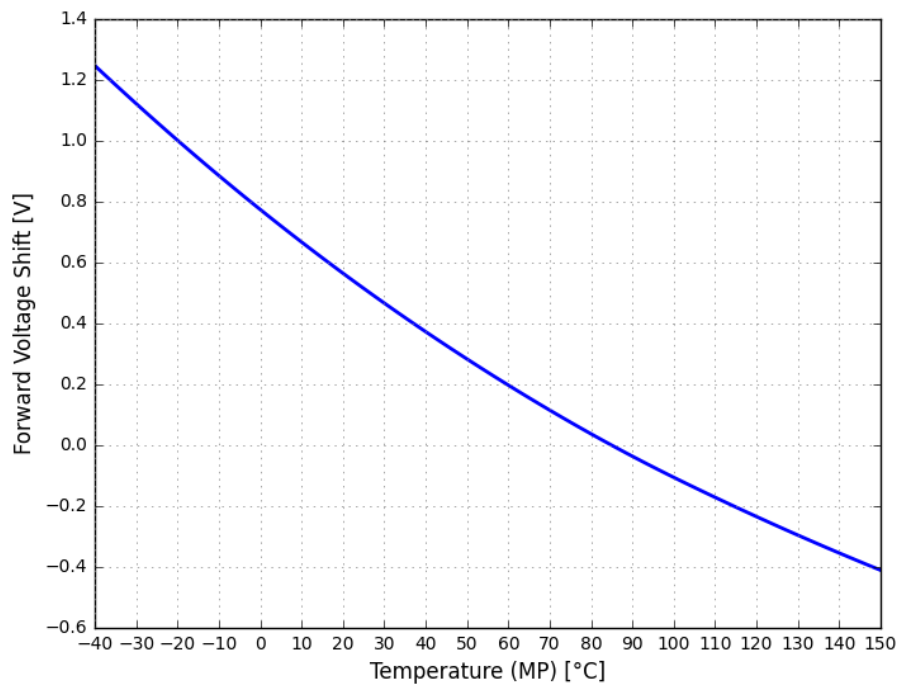


Figure 6. Typical forward voltage shift vs. temperature for LUXEON Altilon SMD-A 1x3 at MP binning current

Color Shift Characteristics

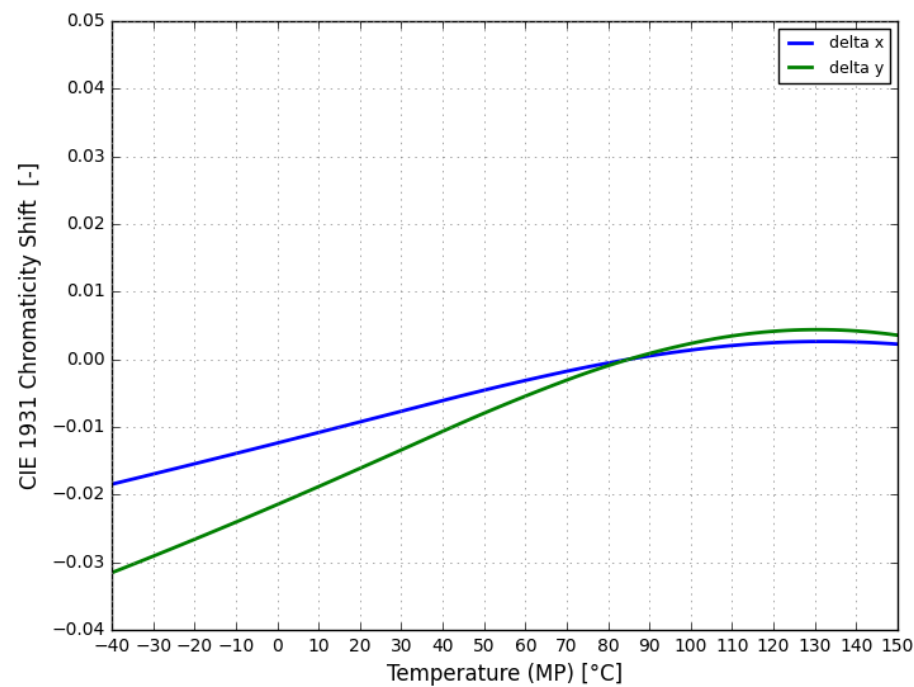


Figure 7. Typical color shift in CIE1931 x, y coordinates vs. temperature for LUXEON Altilon SMD-A 1x3 at MP binning current

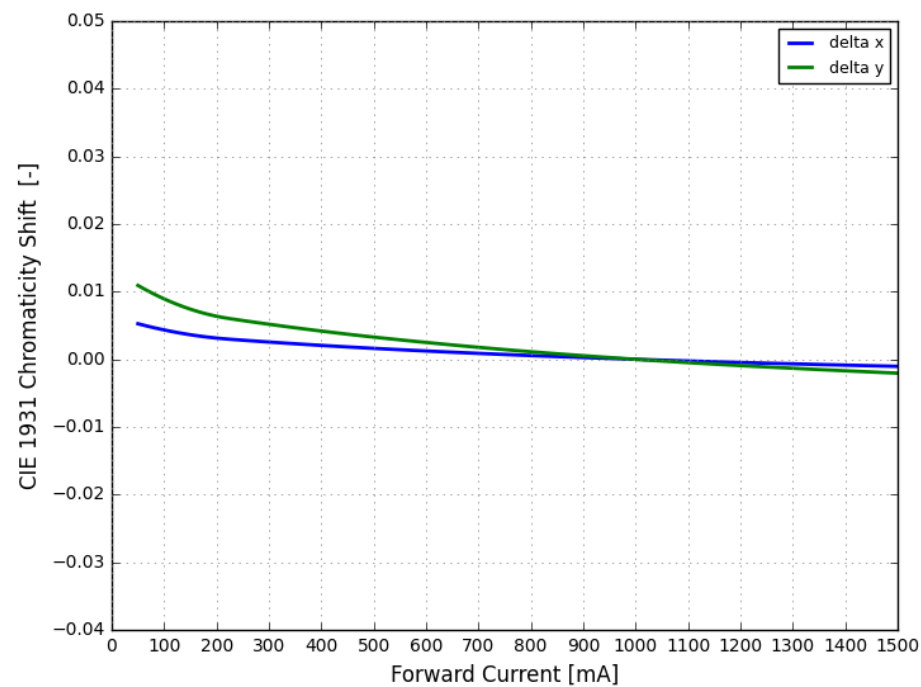


Figure 8. Typical color shift in CIE1931 x, y coordinates vs. forward current for LUXEON Altilon SMD-A 1x3 at MP binning temperature

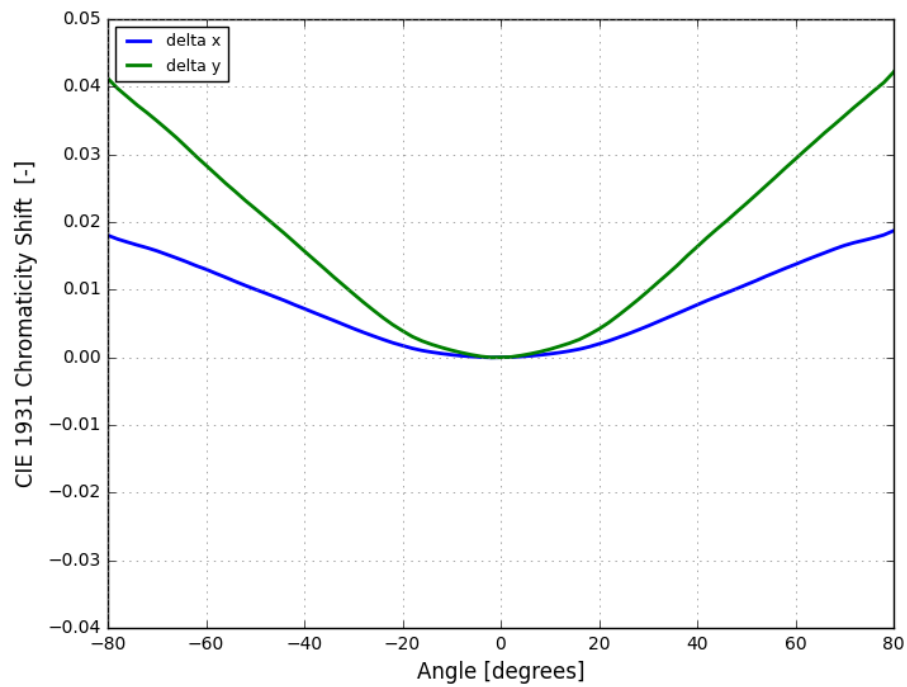


Figure 9. Typical color shift over angle for LUXEON Altilon SMD-A 1x3

Radiation Pattern Characteristics

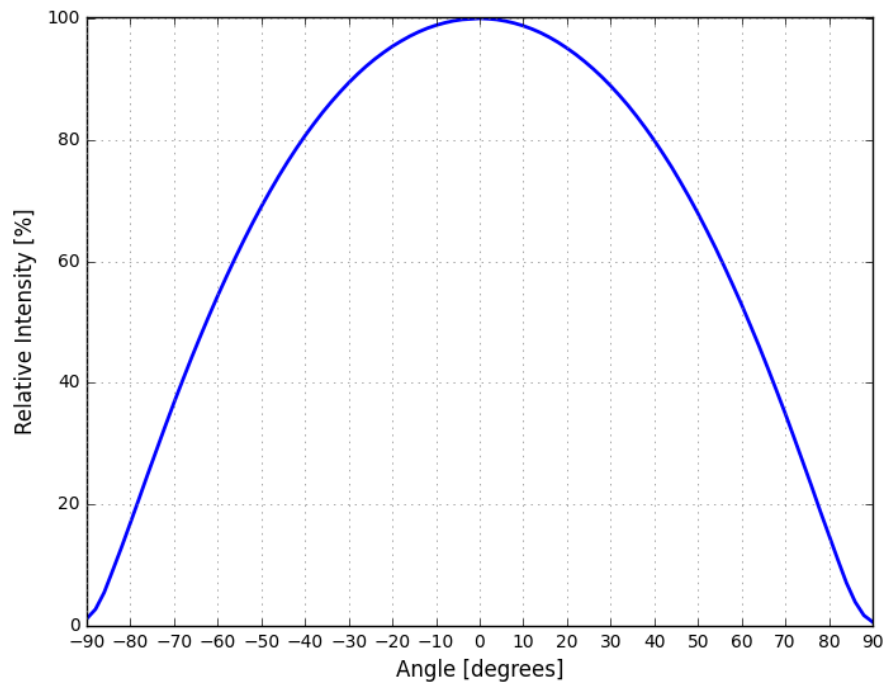


Figure 10. Typical radiation pattern for LUXEON Altilon SMD-A 1x3

Operating Limits Characteristics

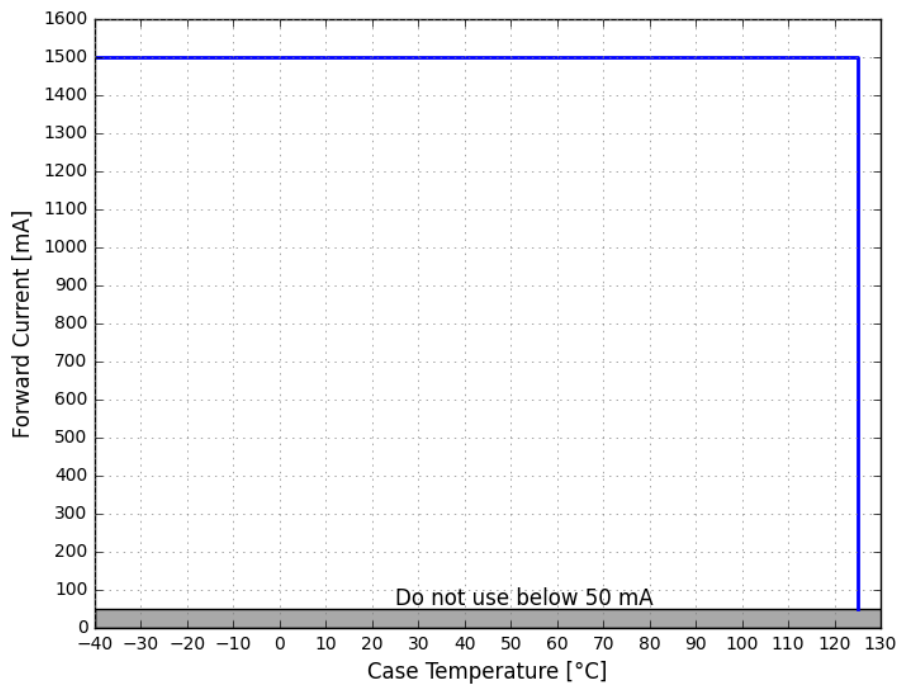


Figure 11. Maximum forward current vs. case temperature for LUXEON Altilon SMD-A 1x3

Permissible Pulse Handling Characteristics

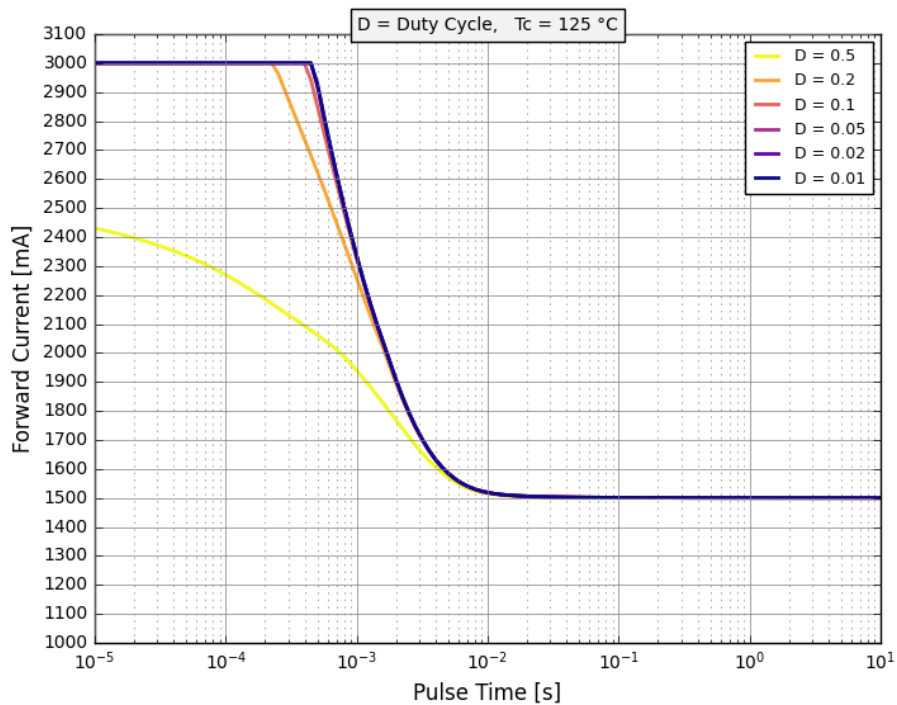


Figure 12. Pulse handling capability for LUXEON Altilon SMD-A 1x3 at maximum case temperature

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 components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON Altilon SMD-A 1x3 emitters are labeled using a 4-digit alphanumeric CAT code following the format below:

A B C D

Where:

- A** - designates luminous flux bin (P = 360 to 370 lumens)
- B C** - designates color bin (H5 = color bin H5)
- D** - designates forward voltage bin (B = 8.70 V to 9.60 V)

Therefore, a LUXEON Altilon SMD-A 1x3 with a lumen range of 1080 to 1110 lumens, color code H5, and a forward voltage of 8.70 V to 9.60 V has the following CAT code:

P H 5 B

Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON Altilon SMD-A 1x3 emitters. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Table 5. Luminous flux bin definitions for LUXEON Altilon SMD-A 1x3 at MP binning condition

BIN	LUMINOUS FLUX ⁽¹⁾ (lm)		TOTAL LUMINOUS FLUX ⁽¹⁾ (lm)	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
N	350	360	1050	1080
P	360	370	1080	1110
Q	370	380	1110	1140
R	380	390	1140	1170
S	390	400	1170	1200
T	400	410	1200	1230

Notes for Table 5:

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

Color Codes

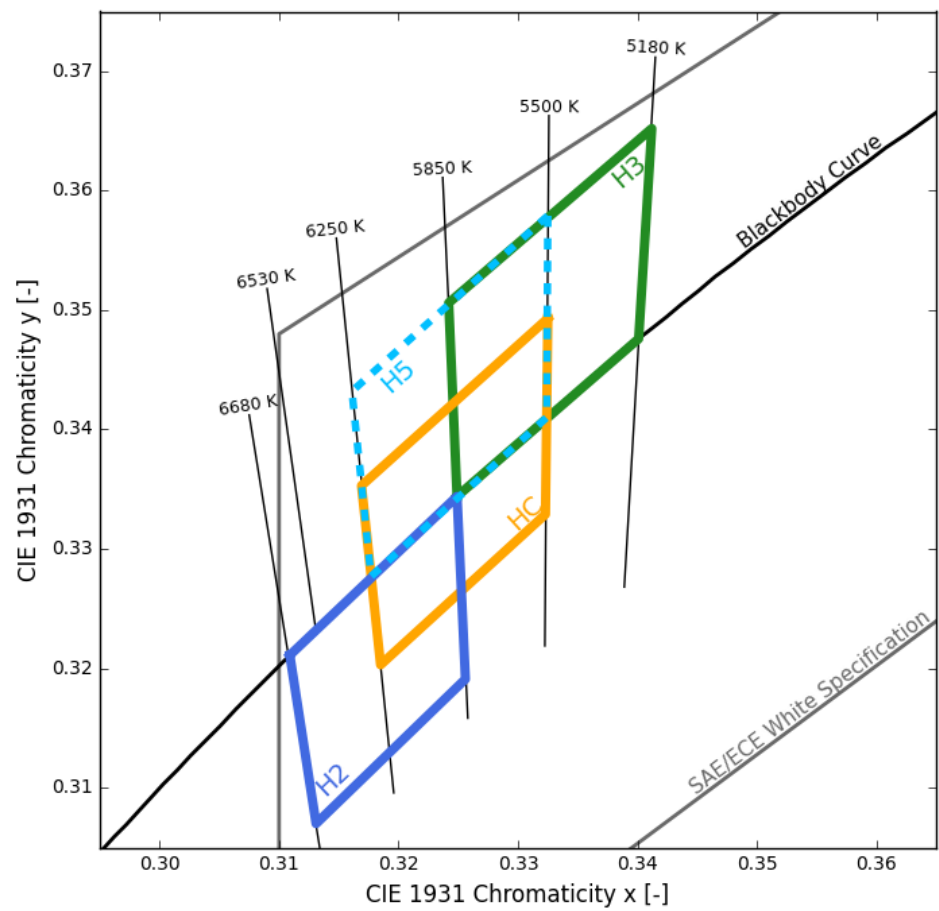


Figure 13. Color bin structure for LUXEON Altilon SMD-A 1x3

Color Bin Definitions

Table 6. Color bin definitions for LUXEON Altilon SMD-A 1x3^[1]

BIN	<i>x</i>	<i>y</i>	6-digit IEC CODE	TYPICAL CCT
HC	0.3325	0.3493	ebyD66	5860k
	0.3169	0.3353		
	0.3185	0.3203		
	0.3323	0.3329		
H5	0.3325	0.3579	fbyA66	5850K
	0.3161	0.3432		
	0.3177	0.3277		
	0.3324	0.3410		
H2	0.3109	0.3211	ebvG66	6250K
	0.3131	0.3070		
	0.3256	0.3191		
	0.3249	0.3344		
H3	0.3249	0.3344	fcbA66	5500K
	0.3401	0.3476		
	0.3412	0.3652		
	0.3242	0.3506		

Notes for Table 6:

1. Lumileds maintains a tester tolerance of ± 0.005 on CIE1931 *x*, *y* color coordinates.

Forward Voltage Bins

Forward voltage distribution of Lumileds LEDs is very narrow, nevertheless for some applications the restriction of forward voltage is beneficial. On request individual bins are available according to Table 7.

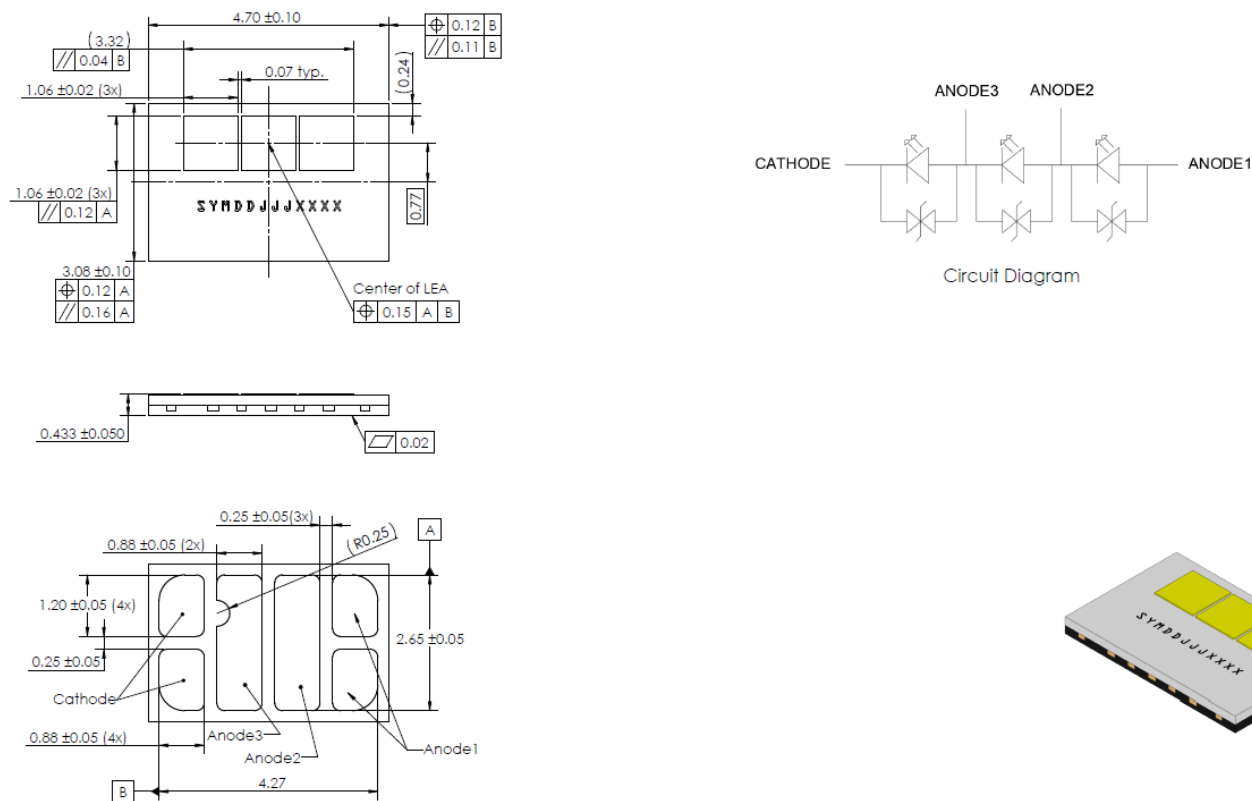
Table 7. Forward voltage bin definitions for LUXEON Altilon SMD-A 1x3 at MP binning condition

BIN	FORWARD VOLTAGE ^[1] (V _f)	
	MINIMUM	MAXIMUM
B	8.70	9.60
C	9.60	10.05

Notes for Table 7:

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

Mechanical Dimensions



Notes for Figure 14:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Package Weight

Table 8. Approximate weight of LUXEON Altilon SMD-A 1x3

PART NUMBER	PACKAGE WEIGHT [mg]
A1SD-58503DHxxxxx	24.6

JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON Altilon SMD-A 1x3

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

Packaging Information

Pocket Tape Dimensions

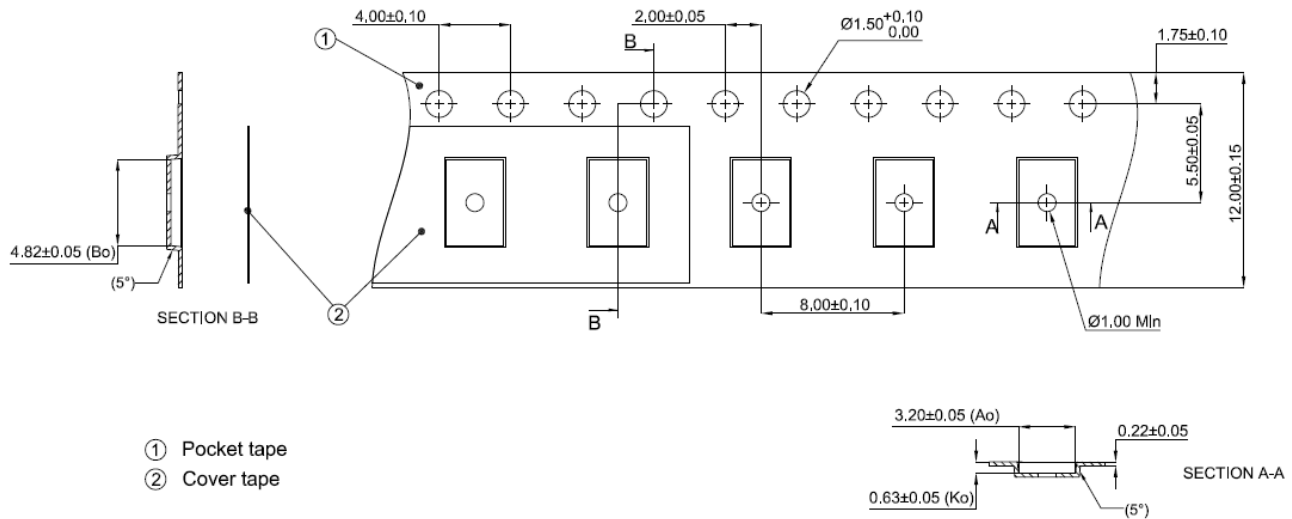


Figure 15. Pocket tape dimensions for LUXEON Altilon SMD-A 1x3

Notes for Figure 15:

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

Reel Dimensions

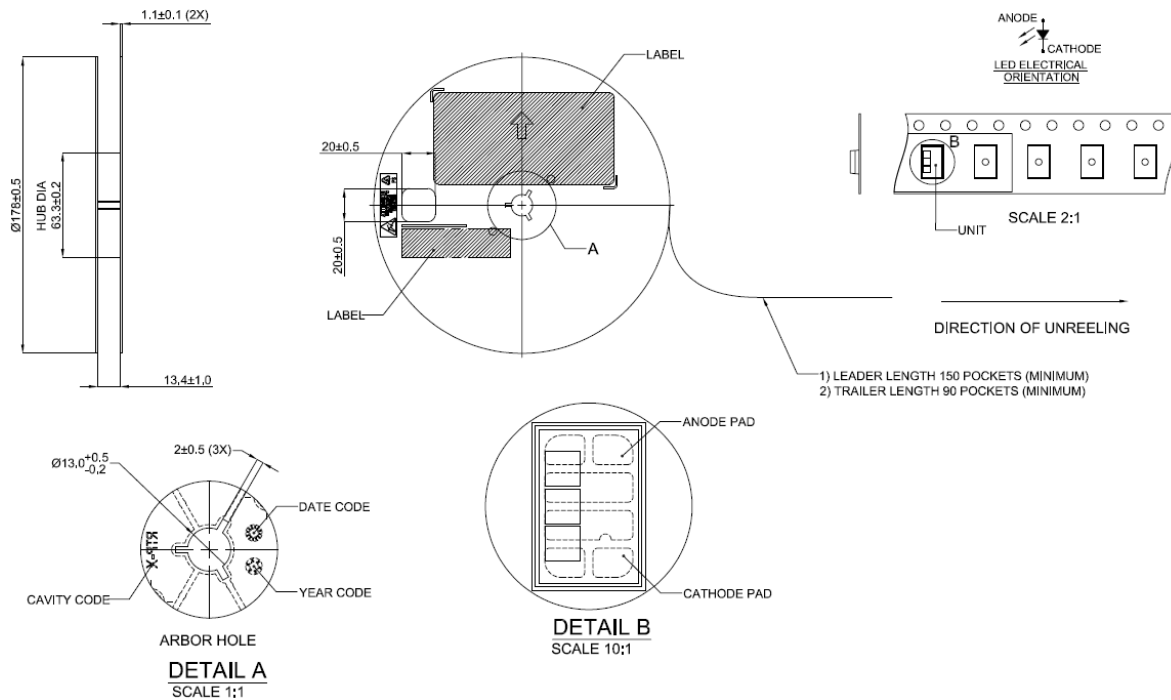


Figure 16. Reel dimensions for LUXEON Altilon SMD-A 1x3

Notes for Figure 16:

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

Product Labeling

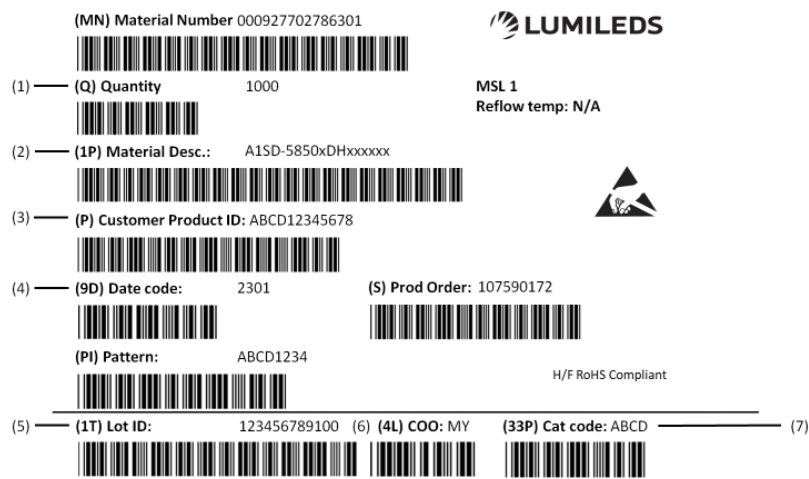


Figure 17. Example of a product label for LUXEON Altilon SMD-A 1x3

Notes for Figure 17 - Reel label descriptions for customer use:
Field labels not described are for Lumileds internal use only.

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

About Lumileds

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

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



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