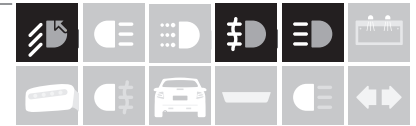


LUXEON Go

Standard LED Module for Mainstream Car Segments

LUXEON Go is an off-the-shelf building block for LED headlighting applications combining compactness, high precision, and superior thermal management. The standardized modules allow for cost-efficient LED headlamps and short development cycles. LUXEON Go is AEC-Q102 qualified.



FEATURES AND BENEFITS

Off-the-shelf solution with integrated heat management enabling fast time to market and low development effort

Three lumen levels and compact size allowing for flexible application in a wide variety of headlamp designs

Easy mechanical referencing and assembly during headlamp manufacturing process

Tight tolerance for increased optical system performance

Master/slave version with/without thermistor and bin-code resistor

Electrical connector with connector-position assurance (CPA) function

Dedicated pin for grounding of the module

Openings for light-shield fixation

PRIMARY APPLICATIONS

Low beam and high beam

Static bending light

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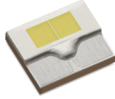
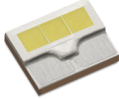





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General Product Information

Product Overview

The LUXEON Go standard portfolio is offering three LED configurations (1x2, 1x3 and 1x4) and four heatsink designs (see table 1). Each module is equipped with a PCBA providing the electrical interface to the driver electronics (see chapter electrical interface). Table 4 contains product variations that are currently released and under development.

Table 1. Product overview

LED CONFIGURATION	1X2	1X3		1X4
				
HEATSINK CONFIGURATION	A	A	C	A
				

Key Features

LUXEON Go is designed as a stand-alone LED headlighting module that facilitates the design of an LED-based low-beam, high-beam reflection headlamp. The portfolio of six standard types enables a broad range of designs and functions.

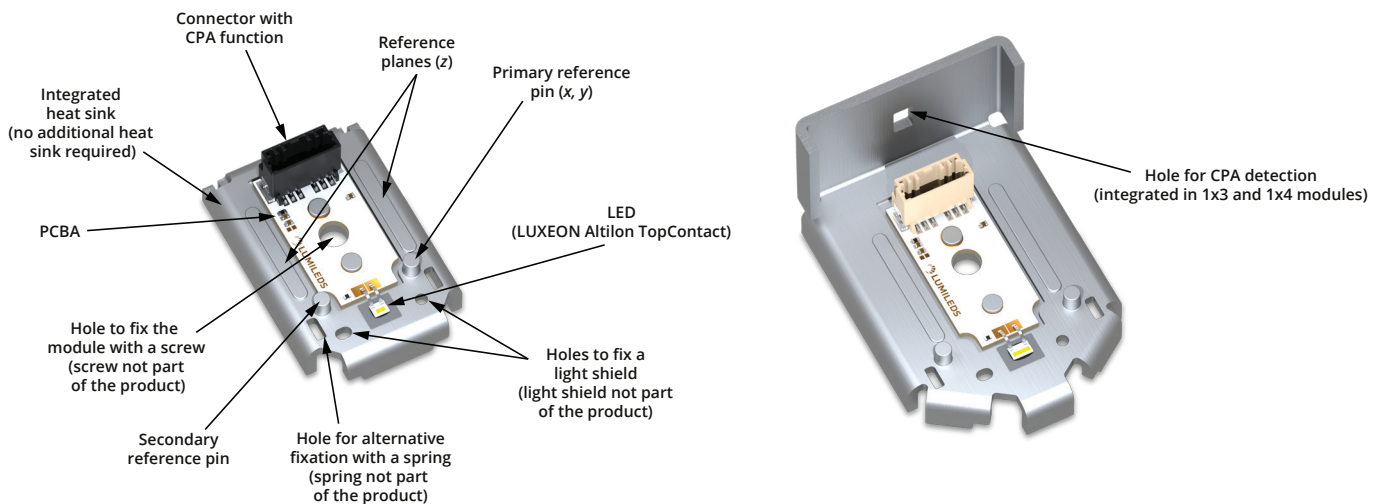


Figure 1. LUXEON Go key product features

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Go 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).

Product Test Conditions

Regardless of the LED configuration (1x2, 1x3, 1x4), all LUXEON Go LEDs are tested using 20 ms monopulse (MP) at 1000 mA drive current, 85 °C temperature.

For the 1x2 and the 1x3 module, Lumileds recommends an operating current of 1000 mA, whereas for the 1x4 module, we recommend 900 mA. Consequently, both the 1000 mA and 900 mA curves are provided in charts relevant to the LUXEON Go 1x4 module.

Table 2. Binning currents and recommended operating currents

LED CONFIGURATION	LED BINNING CURRENT [mA]	RECOMMENDED OPERATING CURRENT FOR MODULE [mA]
1x2	1000	1000
1x3	1000	1000
1x4	1000	900

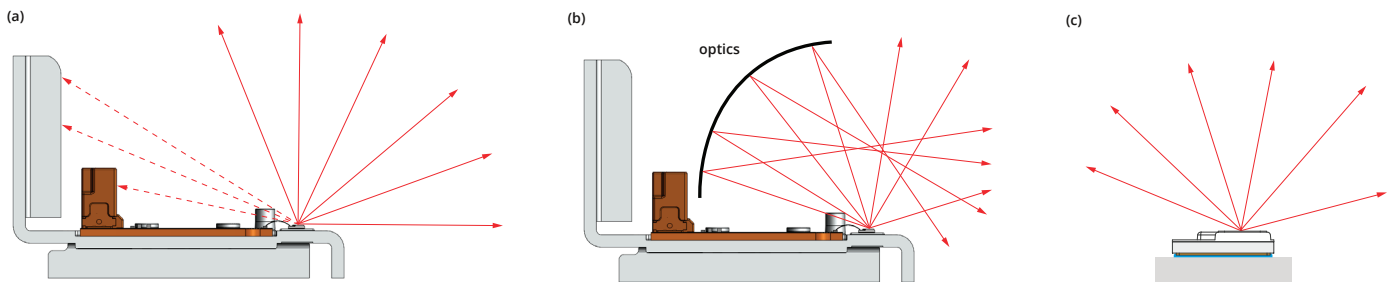


Figure 2. Interception effects and test conditions

When measuring luminous flux of LUXEON Go in an integrating sphere, some elements of the LUXEON Go module (e.g. heat sink, connector) will be exposed to radiation, see Figure 2(a). The intercepted light will be partly absorbed by the structure and partly reflected. This leads to slightly reduced measured luminous flux and changed spectral distribution. With respect to typical application scenarios, where suitable optical elements are employed for collecting the light output in close proximity to the LED light source as shown in Figure 2(b), this light would be fully available for the optical system and not intercepted by the module structure. Therefore, unless stated otherwise, all flux and color-point specifications in this document refer to the complete light emitted from the LED without reduction by self-absorption through the module structure (cf. schematic test setup depicted in Figure 2(c)).

Decoding Product Identifier

Table 3. Product description for LUXEON Go

DIGIT	CONTENT	CODE	EXPLANATION
1	Function	M	Mono function
2	Control	M	Master
		S	Slave
3	LED configuration	2	LUXEON Altilon TopContact 1x2
		3	LUXEON Altilon TopContact 1x3
		4	LUXEON Altilon TopContact 1x4
4	LED flux bin	1	330 - 360 lm per die (L, M, N)
		2	350 - 380 lm per die (N, P, Q) ^[1]
		3	360 - 390 lm per die (P, Q, R) ^[1]
		4	370 - 410 lm per die (Q, R, S, T) ^[2]
5	LED color bin	1	HC
		2	H2
6-7	Connector	AA	UJU 6 pin, CPA, code B (black)
		AB	UJU 3 pin, CPA, code B (black)
		AC	UJU 6 pin, CPA, code C (brown)
		AD	UJU 3 pin, CPA, code C (brown)
		AE	UJU 6 pin, CPA, code A (natural)
		AF	UJU 3 pin, CPA, code A (natural)
		AG	UJU 5 pin, CPA, code B (black)
		AH	UJU 5 pin, CPA, code C (brown)
		AJ	UJU 5 pin, CPA, code A (natural)
		AK	UJU 6 pin, CPA, code D (blue)
8	R_BIN	A	130 kΩ
		C	15 kΩ
		D	1 kΩ
		0	not populated
9	R_NTC	A	100 kΩ
		C	10 kΩ
		D	10 kΩ 20 kΩ
10	PCBA	A	Design 1 / Color White
		B	Design 2 / Color White
11	Heatsink type	A	see Table 1
		C	

Notes for Table 3:

1. On request
2. SOP Q4 2024

Optical Performance

Table 4. Typical and minimum luminous flux for LUXEON Go at different ambient temperatures T_a .

PRODUCT IDENTIFIER	OPERATING CURRENT (mA)	TYP. LUMINOUS FLUX ^[1] (lm)	MINIMUM LUMINOUS FLUX ^[1] (lm)		
		$T_a = 25\text{ °C}$	$T_a = 50\text{ °C}$	$T_a = 80\text{ °C}$	$T_a = 85\text{ °C}$ ^[2]
MM2 11xx xxxx	1000	685	600	85% of $T_a = 50\text{ °C}$ value	80% of $T_a = 50\text{ °C}$ value
MM2 31xx xxxx		750	660		
MM2 41xx xxxx		785	700		
MS2 11xx xxxx		685	600		
MS2 12xx xxxx		685	600		
MS2 31xx xxxx		750	660		
MS2 41xx xxxx		785	700		
MM3 11xx xxxx		1015	880		
MM3 31xx xxxx		1090	968		
MM3 41xx xxxx		1160	1020		
MS3 11xx xxxx	1015	880	85% of $T_a = 50\text{ °C}$ value	80% of $T_a = 50\text{ °C}$ value	
MS3 21xx xxxx	1075	930			
MS3 41xx xxxx	1160	1020			
MM4 11xx xxxx	1250	1100			
MM4 31xx xxxx	1375	1210			
MM4 41xx xxxx	1425	1270			
MS4 11xx xxxx	1250	1100			
MS4 41xx xxxx	1425	1270			

Notes for Table 4:

1. Lumileds maintains a tolerance of $\pm 6.5\%$ on luminous flux measurements. The mentioned luminous flux data is emitted from the light emitting area in DC mode.
2. Reduced operating current (derating current).

Color Code

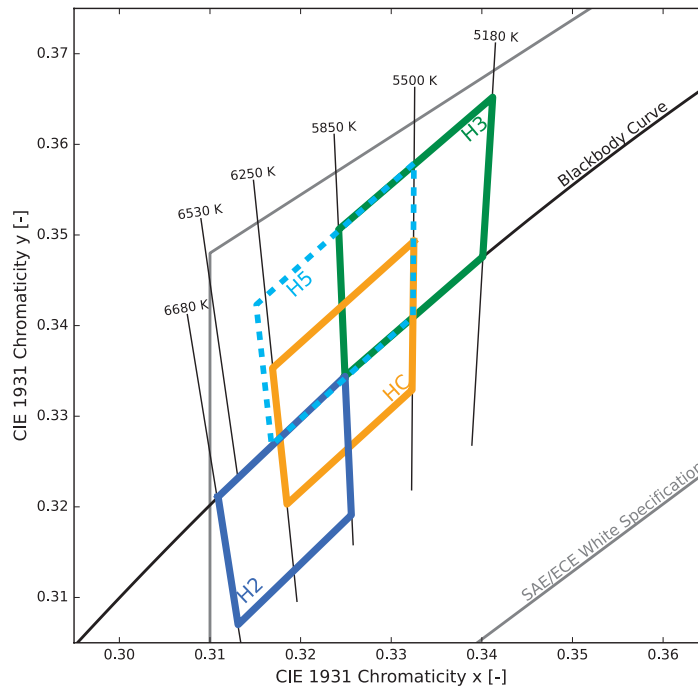


Figure 3. Color bins in CIE 1931 color space for LUXEON Go at 1000 mA, 20 ms MP, $T = 85\text{ }^{\circ}\text{C}$

Color Definition

Table 5. Color bin definitions for LUXEON Go at 1000 mA, 20 ms MP, $T = 85\text{ }^{\circ}\text{C}$

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

Notes for Table 5:

- Lumileds maintains a tester tolerance of ± 0.005 on x and y coordinates.
- CIE 1931 x and y coordinates frame.

Thermal Characteristics

Table 6. Typical thermal resistance $R_{thj-NTC,real}$ for LUXEON Go modules

PARAMETER	CONFIGURATION		
	1x2	1x3	1x4
$R_{thj-NTC,real}$ (K/W)	4.5	4.0	3.5

Electrical Characteristics

Table 7. Electrical characteristics for LUXEON Go at 1000 mA, 20 ms MP, $T = 85\text{ °C}$

PARAMETER		CONFIGURATION		
		1x2	1x3	1x4
Forward voltage $V_f^{[1,2]}$ (V)	min.	5.8	8.7	11.6
	max.	6.4	9.6	12.8

Notes for Table 7:

1. Lumileds maintains a tolerance of $\pm 0.06\text{ V}$ on forward voltage measurement.
2. The forward voltage is measured between pins 3 and 4 of the slave module and between pins 6 and 7 of the master module. For a more detailed visualization see the electrical equivalent circuit.

Absolute Ratings

Table 8. Absolute ratings for LUXEON Go

PARAMETER	CONFIGURATION		
	1x2	1x3	1x4
Minimum DC forward current	50 mA		
Maximum DC forward current	1500 mA		
Maximum junction temperature ^[1, 2, 3]	150 °C		
Maximum junction temperature for short time applications ^[4]	180 °C		
Operating ambient temperature range ^[5]	-40 °C to 105 °C		
ESD sensitivity ^[6]	$\pm 8\text{ kV HBM}$, $\pm 2\text{ kV CDM}$		
Reverse voltage	LUXEON Go modules are not designed to be driven in reverse bias		

Notes for Table 8:

1. Proper current derating must be ensured to maintain junction temperature below the maximum.
2. LUXEON Go driven at or above the maximum rated operating LED junction temperature may have shorter lifetime.
3. Please consult with Lumileds for more information on maximum time durations and forward currents for these temperatures.
4. Short time operations of less than 200 h.
5. Ambient temperature around module in natural convection environment.
6. Measured using human body model (per ANSI/ANSI/ESDA/JEDEC JS-001-2010), charged device model (AEC Q101-005 rev_A)

Validation Characteristics

Table 9. Validation characteristics for LUXEON Go

TEST GROUP	TEST DESCRIPTION	TEST ACCORDING TO	TEST TYPE
Characterization	Visual inspection	Lumileds internal specification	passive
	Photometry	Lumileds internal specification	active
	Geometry LED position	Lumileds internal specification	passive
	Thermal resistance	Lumileds internal specification	active
	Pull force test ribbon bond	Lumileds internal specification	passive
	Shear force test LED	Lumileds internal specification	passive
	Shear force test ribbon bond	Lumileds internal specification	passive
	Cross sections	Lumileds internal specification	passive
	Degassing test	Lumileds internal specification	passive
	Grounding resistance	Lumileds internal specification	passive
Climatic and lifetime tests ⁽¹⁾	X-ray	Lumileds internal specification	passive
	Temperature shock test (TMSK)	LV124 DIN EN 60068-2-14	passive
	Damp heat with frost	LV124 DIN EN 60068-2-38	active
	High/low temperature storage test	LV124	passive
	Incremental temperature test	LV124	active
	Low temperature operation	LV124 DIN EN 60068-2-1	active
	High temperature operating lifetime test (HTOL)	LV124 DIN EN 60068-2-2	active
	Temperature cycle test	LV124 DIN EN 60068-2-14	active
	Wet high temperature operating lifetime test (WHTOL)	Lumileds internal specification	active
	Lifetime test 8000 h	Lumileds internal specification	active
Mechanical tests ⁽¹⁾	Harmful gas test	LV124 DIN EN 60068-2-60	passive
	Wide band vibration test	LV124 DIN EN 60068-2-64	active
	Mechanical shock test	LV124 DIN EN 60068-2-27	active
	Vibration on temp test	LV124 DIN EN 60068-2-6,-64	active
	Sinus sweep vibration	LV124 DIN EN 60068-2-6	active
	JIS Vibration	JIS D1601	active
	SAE test on resistance to shock	SAE J575e	active
	Connector pull force	Lumileds internal specification	passive

Notes for Table 9:

1. Validation report can be requested at Lumileds.

Operating Limits - LUXEON Go 1x2 Module

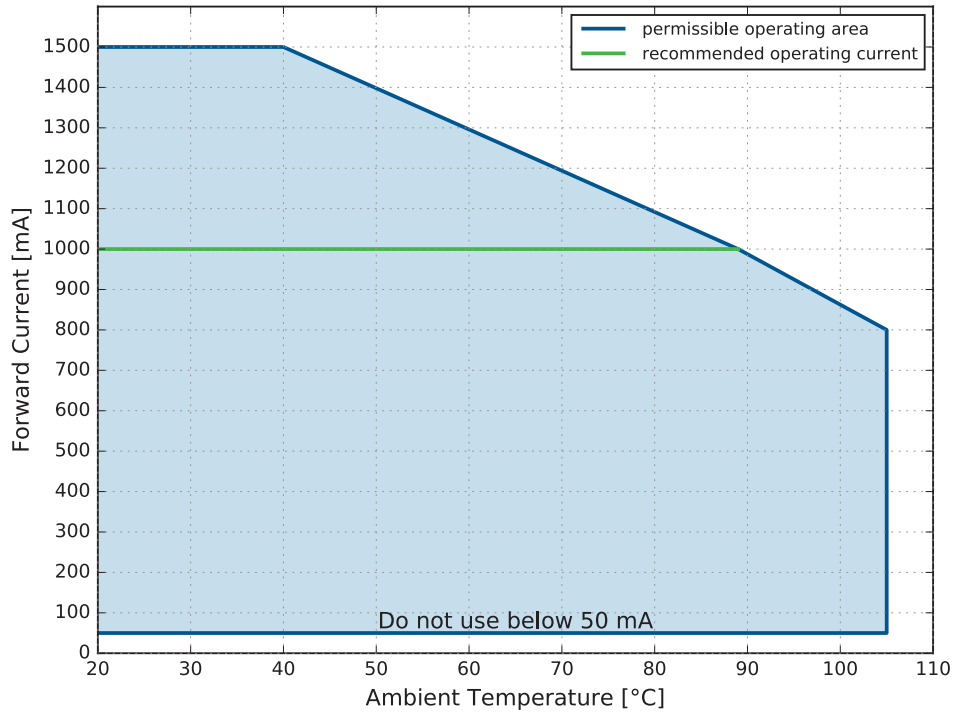


Figure 4. Permissible forward current vs. ambient temperature for a stand-alone LUXEON Go 1x2 module. As a guide to the eye, the green line marks the recommended operating current.

Operating Limits - LUXEON Go 1x3 Module

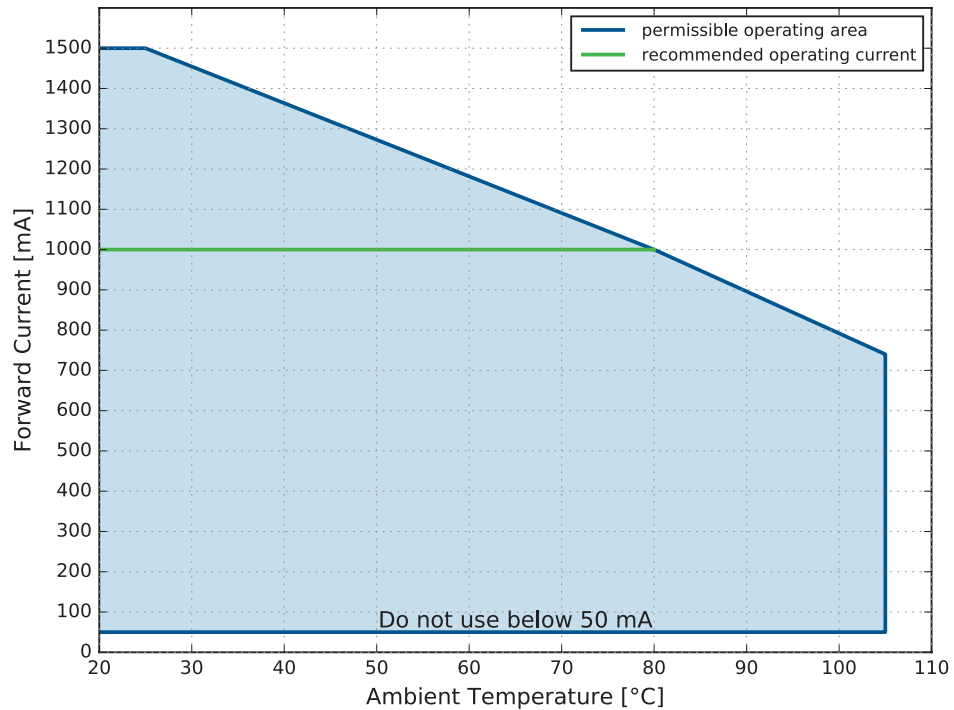


Figure 5. Permissible forward current vs. ambient temperature for a stand-alone LUXEON Go 1x3 module. As a guide to the eye, the green line marks the recommended operating current.

Operating Limits - LUXEON Go 1x4 Module

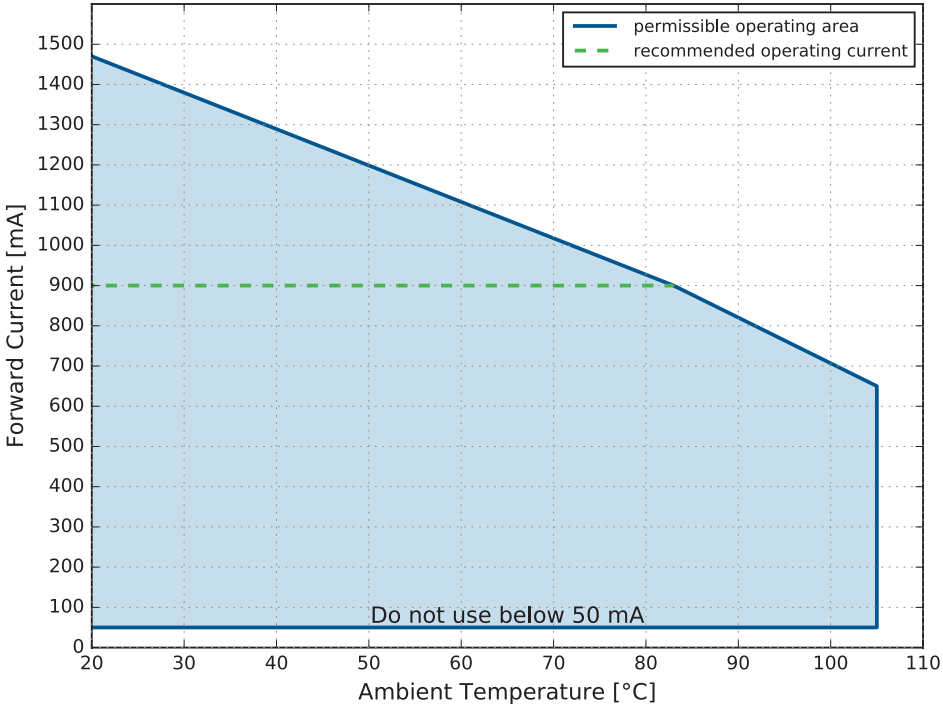


Figure 6. Permissible forward current vs. ambient temperature for a stand-alone LUXEON Go 1x4 module. As a guide to the eye, the green line marks the recommended operating current.

Electrical Interface

LUXEON Go modules are equipped with a PCBA that defines the electrical interface to the driver electronics. It contains a connector and several electrical components depending on the specific version (see Table 10).

Equivalent Electrical Circuit

Pin 5 of the master modules (PCBA Version A) and Pin 1 of the slave modules (PCBA Version A) are dedicated ground pins which are electrically connected via the rivet holes to the metal heat sink. By connecting pin 5 with the electrical ground on the driver side, the module as well as the reflector can be grounded (e.g. for ESD protection). PCBA Version B of the master module does not provide such a dedicated ground pin. Here AGND and GND are merged into one pin to reduce the number of necessary pins and wire connections.

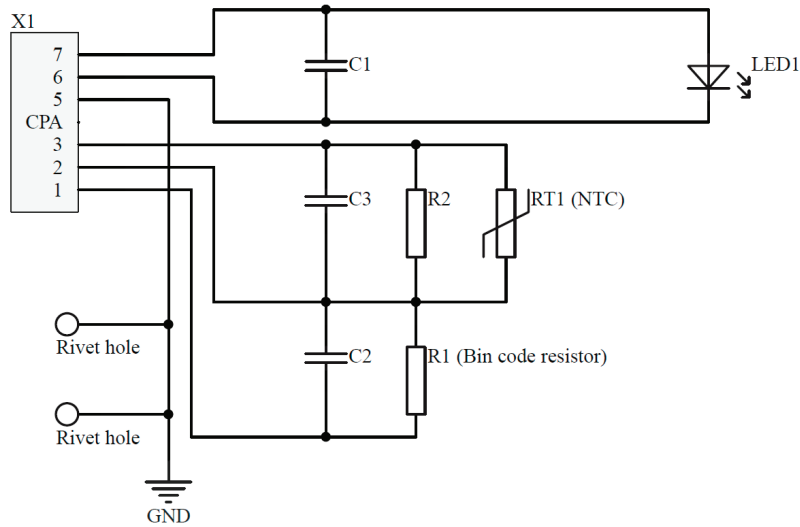


Figure 7. Equivalent electrical circuit of the LUXEON Go master modules - PCBA Version A

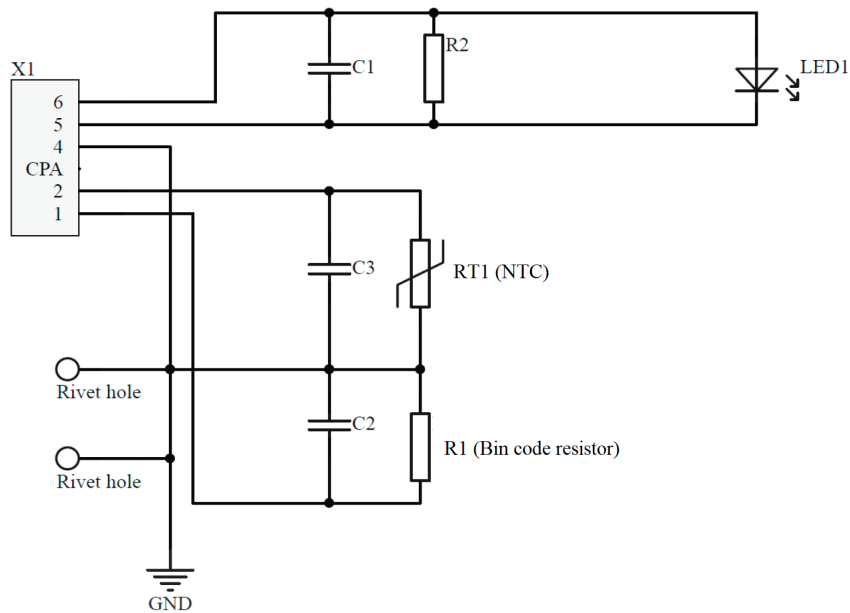


Figure 8. Equivalent electrical circuit of the LUXEON Go master modules - PCBA Version B

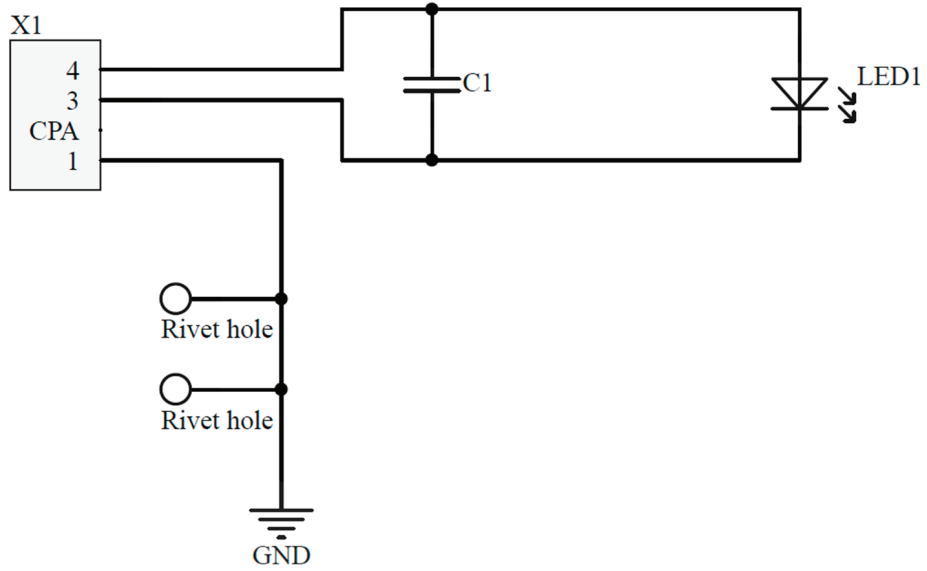


Figure 9. Equivalent electrical circuit of the LUXEON Go slave modules - PCBA Version A

Table 10. Electrical interface

PARAMETER	MASTER		SLAVE
PCBA TYPE	A	B	A
CONNECTOR TYPES	6 PIN	5 PIN	3 PIN
Pins			
LED +	X	X	X
LED -	X	X	X
Coding resistor	X	X	
Thermistor (NTC/PTC)	X	X	
AGND	X	X	
GND	X		X

Mechanical Dimensions

Mechanical Dimensions of 1x2 Module

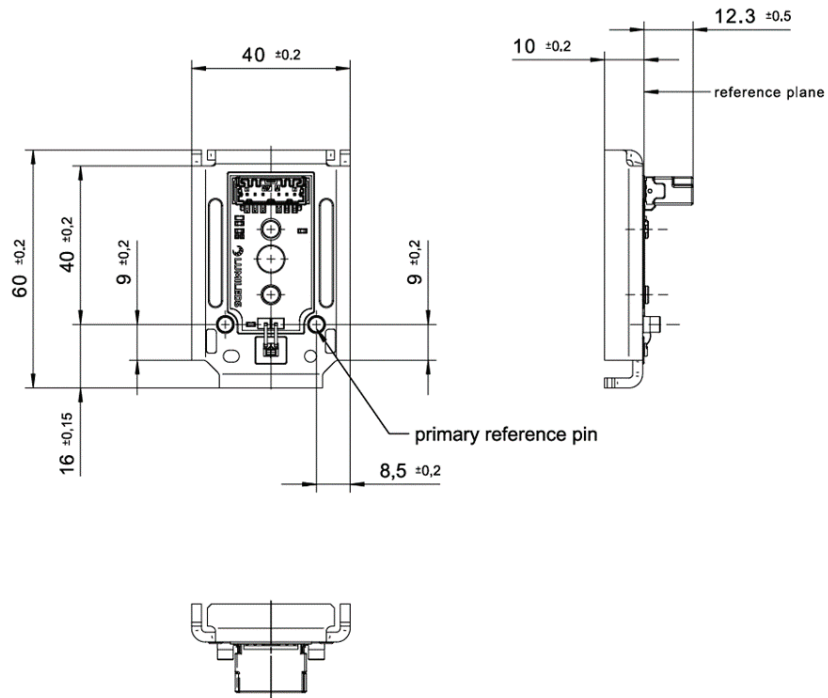


Figure 10. Mechanical dimensions in mm of the LUXEON Go 1x2 master module with heatsink type A

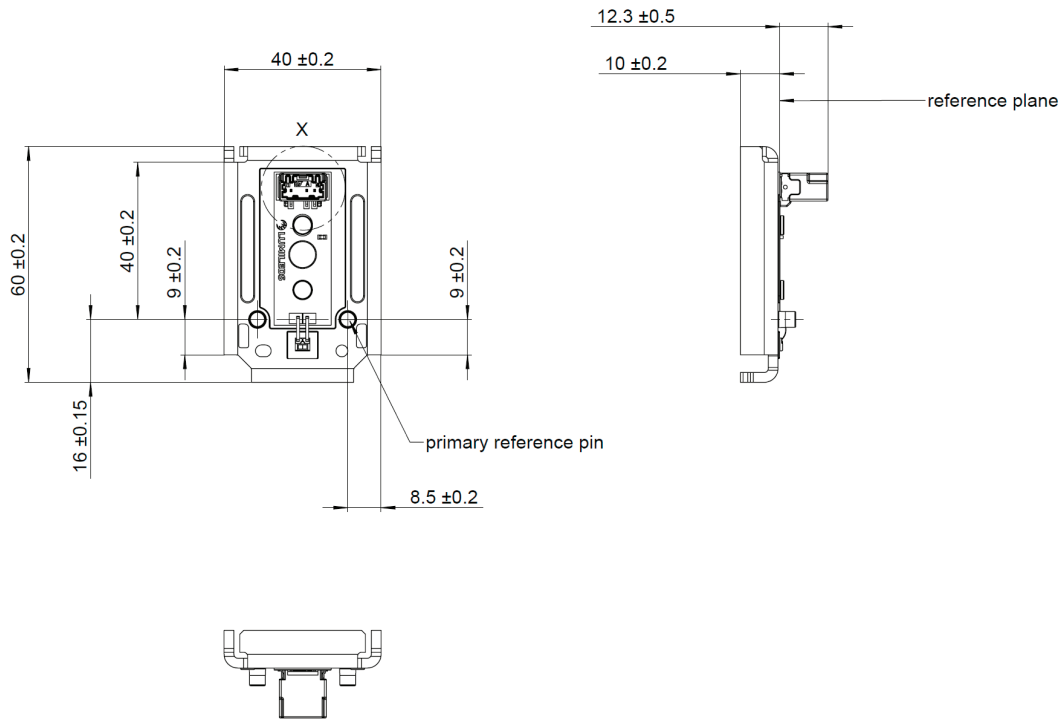


Figure 11. Mechanical dimensions in mm of the LUXEON Go 1x2 slave module with heatsink type A

Mechanical Dimensions of 1x3 Module

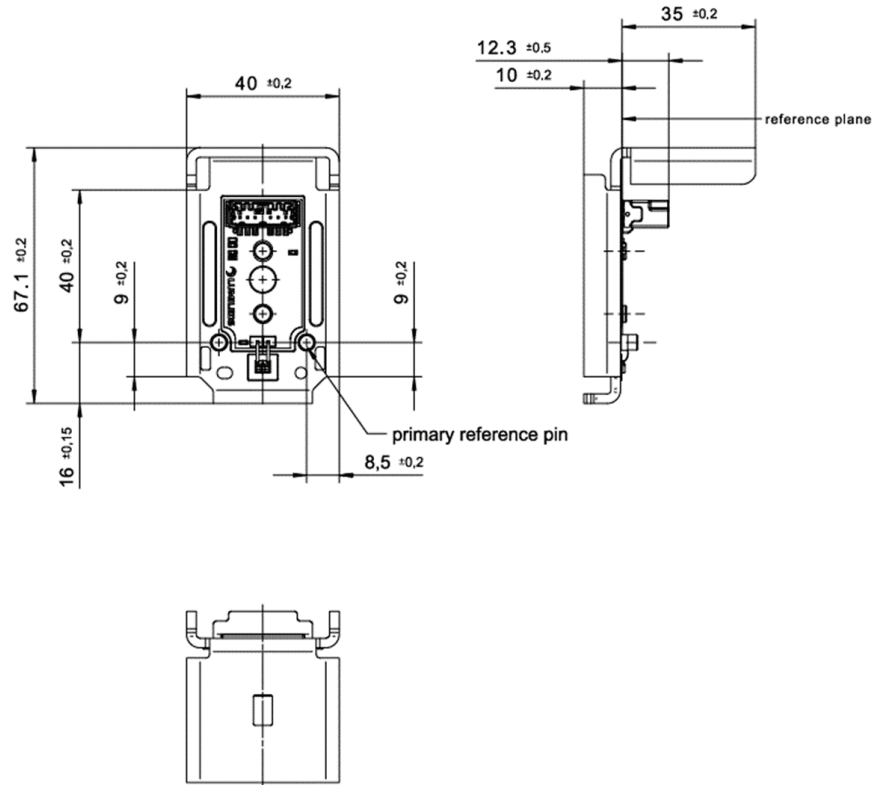


Figure 12. Mechanical dimensions in mm of the LUXEON Go 1x3 master module with heatsink type A

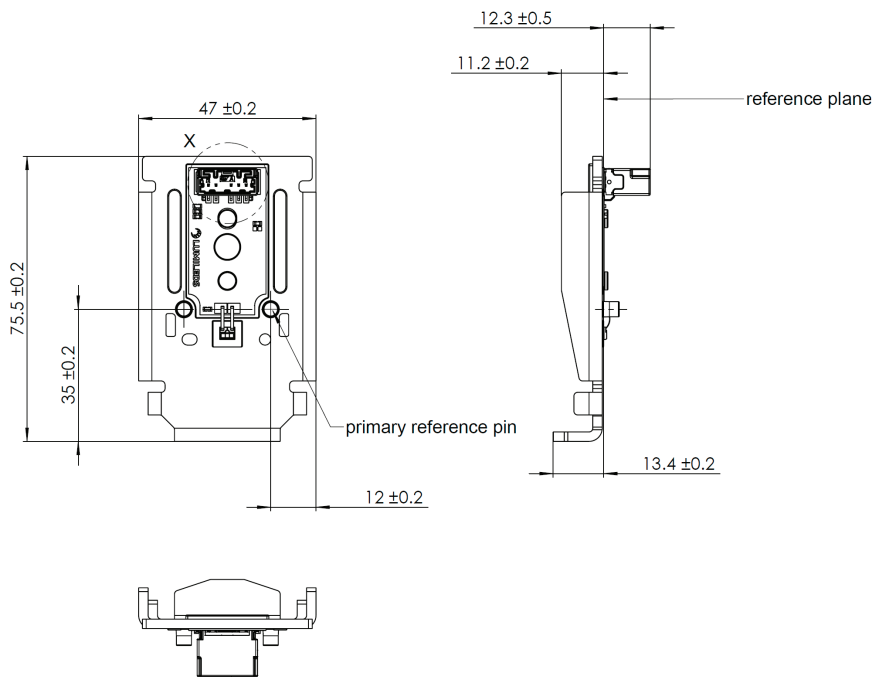


Figure 13. Mechanical dimensions in mm of the LUXEON Go 1x3 master module with heatsink type C

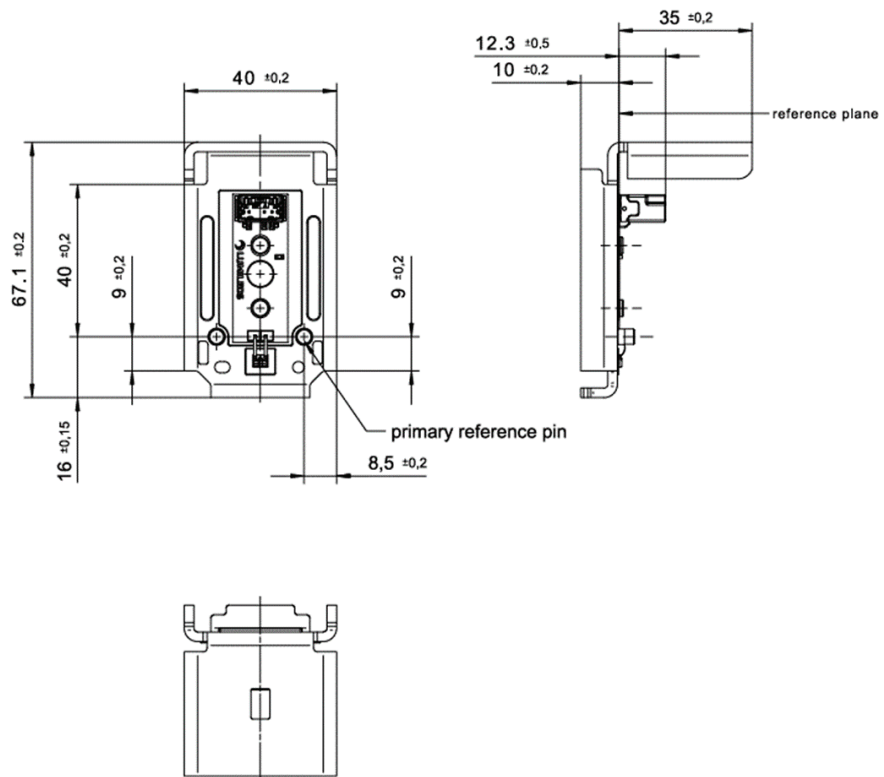


Figure 14. Mechanical dimensions in mm of the LUXEON Go 1x3 slave module with heatsink type A

Mechanical Dimensions of 1x4 Module

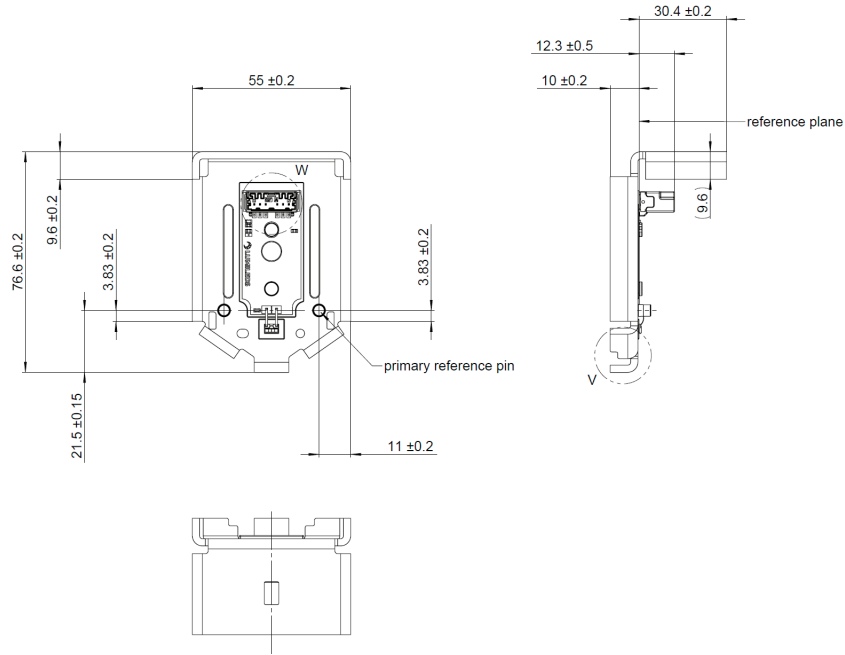


Figure 15. Mechanical dimensions in mm of the LUXEON Go 1x4 master module with heatsink type A

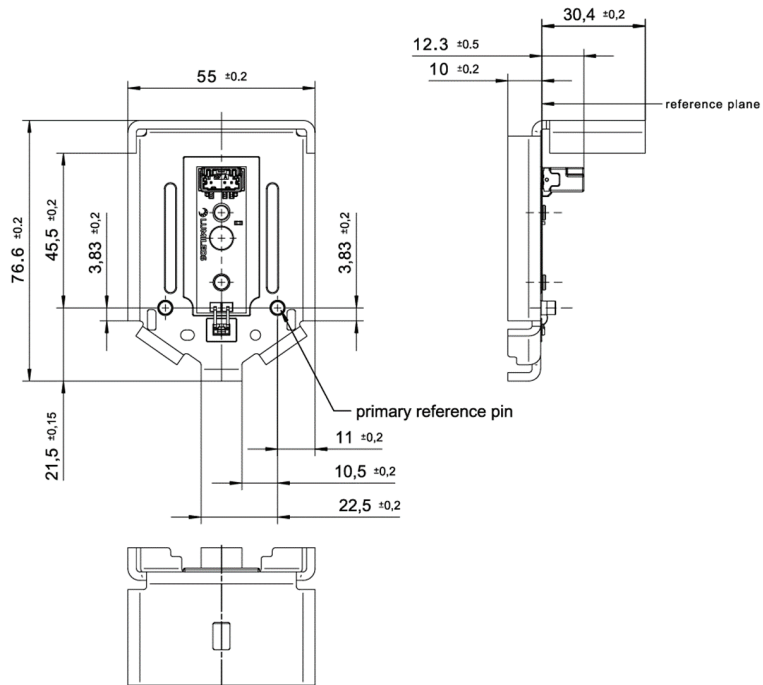


Figure 16. Mechanical dimensions in mm of the LUXEON Go 1x4 slave module with heatsink type A

Plug Dimensions

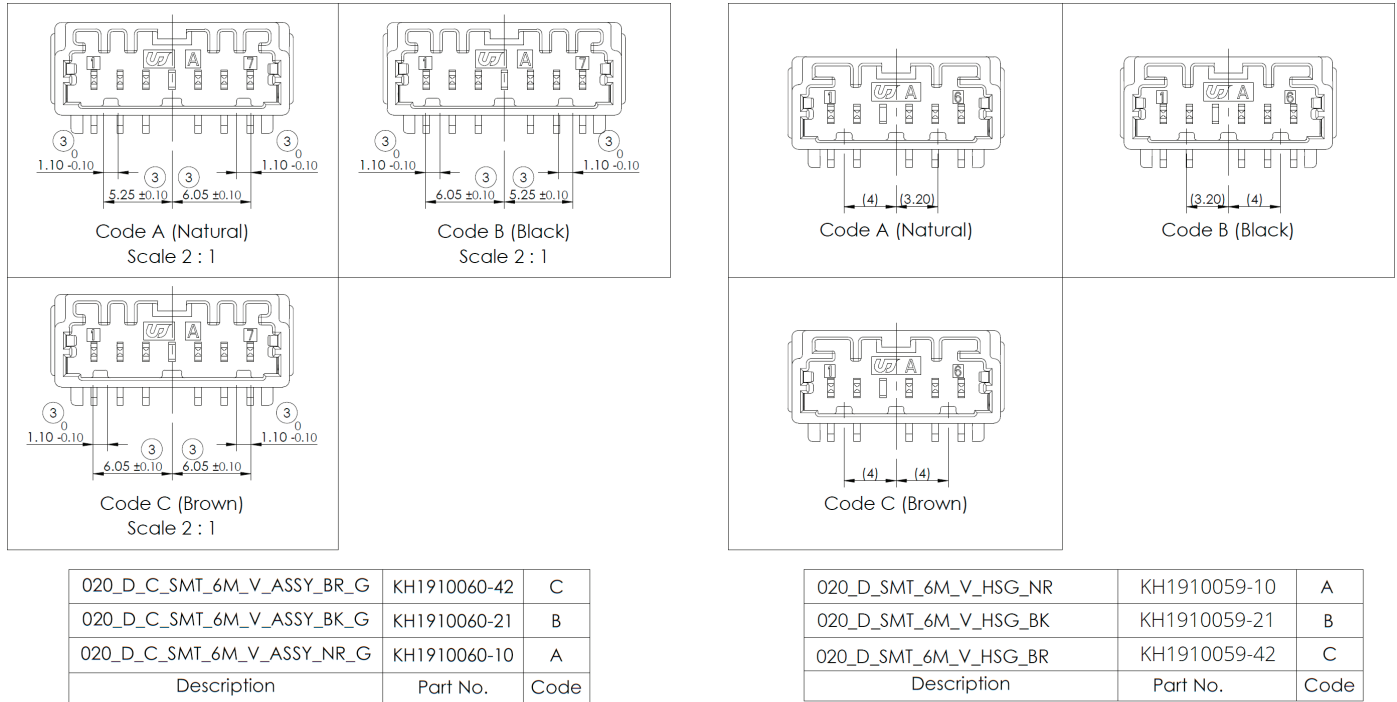


Figure 17. Connector of 020 D series of the company UJU Electronics for the master module

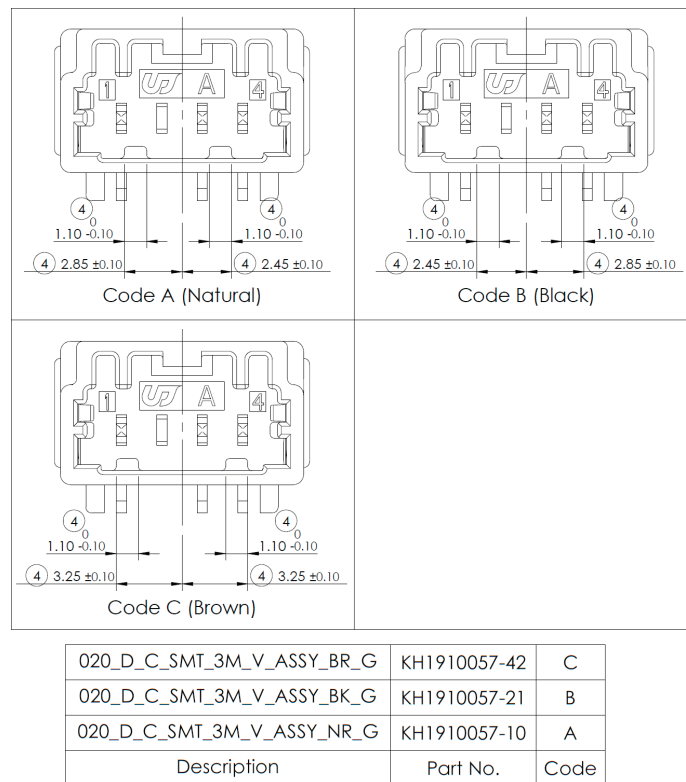


Figure 18. Connector of 020 D series of the company UJU Electronics for the slave module

Referencing

For proper referencing in x - and y -direction all LUXEON Go modules are equipped with two reference pins. The light emitting area of the LED is positioned during manufacturing of the module with respect to the primary reference pin. This pin should be used to primarily define the x - and y - position of the LED module with respect to the optical surface of the reflector by placing it into an adequate counterpart (e.g. V-shaped groove) on the reflector side. The second reference pin should be brought into contact with a well-defined second reference plane on the reflector side without changing position of the primary reference pin, e.g. via rotation around the center of the primary reference pin. By doing so, the module is well placed with respect to rotation around the z -axis (see Figure 19 for further explanation).

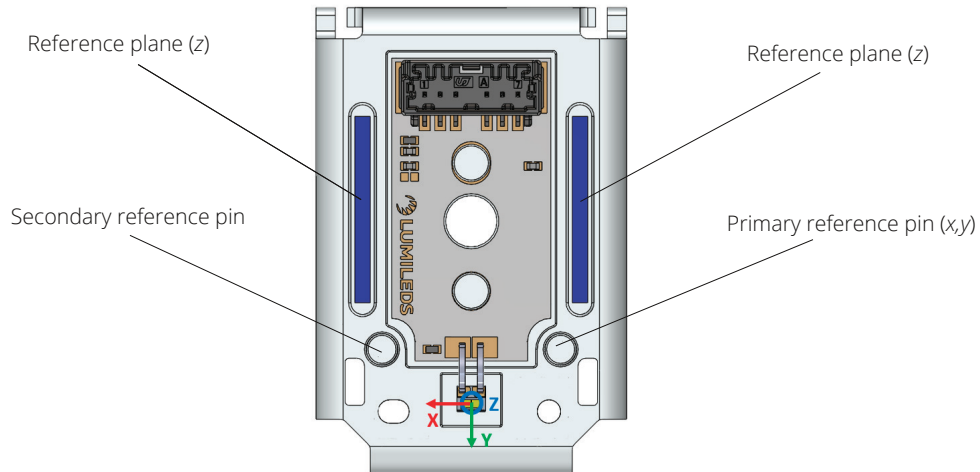


Figure 19. Referencing system of LUXEON Go

Lifetime

The lifetime of the LUXEON Go modules at a current of $I_f = 1000$ mA and a junction of $T_j = 150$ °C is more than 8000 hours for B3 L80 C90.

Handling and Safety Requirements

Recommendations for Correct and Safe Handling of LEDs

LUXEON Altilon LEDs operated at maximum DC current of 1.5 A fall into photobiological hazard risk group 2 (moderate risk) according to IEC62471 (2006-7). Do not stare at exposed LED modules in operation as this may be harmful to your eyes. Appropriate personal protective equipment may be necessary.

Do not touch the LED nor the ribbon bonds directly. Avoid any mechanical stress on the ribbon bonds as they might be distorted, leading to potential failure of the product. We recommend to wear clean gloves when handling LUXEON Go modules. Minimum ESD protection is integrated in the module. We recommend to apply appropriate ESD protection measures during handling and assembling.

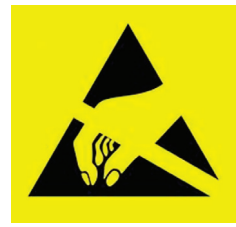


Table 11. Handling and safety requirements for LUXEON Go

PROCESS	RECOMMENDATIONS
Storage	Do not store LUXEON Go outdoors.
	Avoid heat and contact with excessive humidity/water.
	Avoid heavy mechanical impact (drop, shock, vibration).
	Store LUXEON Go only in original packaging and in correct top/bottom position.
Transport	Do not stack pallets of LUXEON Go.
	Avoid mechanical shocks and vibrations.
	Transport of products has to take place in closed boxes only.
	In case of transport outside of boxes e.g. trays in ESD bag or individual trays, special attention is needed. Products not properly stored anymore within the trays can lead to damages of the LED, electrical components or ribbon bonds. Outside ESD bag limited ESD protection has to be taken into account.
Handling	Use original packaging between warehouse and production line.
	Handle LUXEON Go with clean gloves.
	CAUTION. Do not stare at exposed lamp in operation. May be harmful to the eyes.
	Avoid contact with other materials.
	Keep LUXEON Go in their tray of their original packaging until they are finally mounted.
Operation	Avoid all mechanical contact between the surface of the LED and sub-assemblies, e.g. cables, etc.
	LUXEON Go must be operated only in closed lighting systems.
	The manufacturer will not accept any liability for injury or damage caused by wrong use.
	During operation, specific parts of the product might reach elevated temperatures. Therefore, the products must not be touched, during or shortly after operation. Maximum permitted temperatures of adjacent surfaces need to be considered.

Storage Conditions and Shelf Lifetime

Table 12. Storage conditions and shelf lifetime

PRODUCT IDENTIFIER	STORAGE CONDITIONS	SHELF LIFETIME (PASSIVE)
All LUXEON Go	≤ 40 °C / 85% RH (packed in original ESD bag)	≥ 2 years

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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