



#### Module LLE G1 24mm SNC

Modules LLE ESSENCE

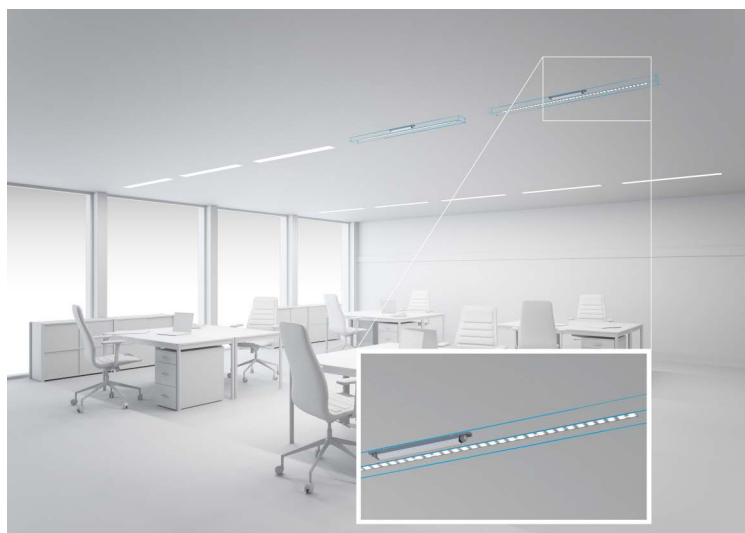
#### Product description

- Ideal for linear and panel lights
- Optimal solution for linear and panel lights where cost is main priority, together with the new LCI TEC Ip LED Driver provides best system efficiency
- Ideal for T8 refurbishment 650 lm module can be driven to output 800 lm
- Luminous flux range from 490 up to 2,950 lm
- Efficiency of the module up to 142 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 4<sup>®</sup>
- Small luminous flux tolerances
- Colour temperatures 3,000, 4,000 and 6,500 K
- Perfectly uniform light, even if several LED modules are used together in a line
- Perfect homogenous light with ACL linear diffuse cover
- Push terminals for quick and simple wiring of LED module to LED module
- Simple installation (e.g. ACL push fix)
- Long life-time up to 50,000 hours<sup>®</sup>
- 5-year guarantee<sup>®</sup>



**Standards**, page 8

**Colour temperatures and tolerances**, page 11





## Ordering data

Type	Article number	Colour temperature	Packaging tray	Weight per pc.
<b>650 lm per 280 mm</b>				
LLE G1 24x280mm 650lm 830 SNC	89602089	3,000 K	30 pc(s).	0.018 kg
LLE G1 24x280mm 650lm 840 SNC	89602090	4,000 K	30 pc(s).	0.021 kg
LLE G1 24x280mm 650lm 865 SNC	89602125	6,500 K	30 pc(s).	0.018 kg
LLE G1 24x560mm 1300lm 830 SNC	89602093	3,000 K	30 pc(s).	0.042 kg
LLE G1 24x560mm 1300lm 840 SNC	89602094	4,000 K	30 pc(s).	0.042 kg
LLE G1 24x560mm 1300lm 865 SNC	89602115	6,500 K	30 pc(s).	0.042 kg
<b>1,250 lm per 280 mm</b>				
LLE G1 24x280mm 1250lm 830 SNC	89602091	3,000 K	30 pc(s).	0.018 kg
LLE G1 24x280mm 1250lm 840 SNC	89602092	4,000 K	30 pc(s).	0.017 kg
LLE G1 24x280mm 1250lm 865 SNC	89602126	6,500 K	30 pc(s).	0.018 kg
LLE G1 24x560mm 2400lm 830 SNC	89602095	3,000 K	30 pc(s).	0.035 kg
LLE G1 24x560mm 2400lm 840 SNC	89602096	4,000 K	30 pc(s).	0.042 kg
LLE G1 24x560mm 2400lm 865 SNC	89602127	6,500 K	30 pc(s).	0.042 kg

## Specific technical data

Type <sup>®</sup>	Photometric code	Typ. luminous flux at tp = 25 °C <sup>®</sup>	Typ. luminous flux at tp = 65 °C <sup>®</sup>	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C <sup>®</sup>	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 65 °C	Efficacy of the system at tp = 65 °C	Colour rendering index CRI
<b>650 lm per 280 mm – Operating mode HE</b>											
LLE G1 24x280mm 650lm 830 SNC	830/449	520 lm	490 lm	200 mA	18.5 V	219 V	4.1 W	122 lm/W	118 lm/W	104 lm/W	> 80
LLE G1 24x280mm 650lm 840 SNC	840/449	560 lm	530 lm	200 mA	18.5 V	219 V	4.1 W	133 lm/W	129 lm/W	114 lm/W	> 80
LLE G1 24x280mm 650lm 865 SNC	865/449	570 lm	540 lm	200 mA	18.5 V	219 V	4.1 W	134 lm/W	131 lm/W	115 lm/W	> 80
LLE G1 24x560mm 1300lm 830 SNC	830/449	1,040 lm	980 lm	200 mA	37.1 V	43.9 V	8.3 W	122 lm/W	118 lm/W	104 lm/W	> 80
LLE G1 24x560mm 1300lm 840 SNC	840/449	1,130 lm	1,070 lm	200 mA	37.1 V	43.9 V	8.3 W	133 lm/W	129 lm/W	114 lm/W	> 80
LLE G1 24x560mm 1300lm 865 SNC	865/449	1,140 lm	1,090 lm	200 mA	37.1 V	43.9 V	8.3 W	134 lm/W	131 lm/W	115 lm/W	> 80
<b>650 lm per 280 mm – Operating mode BLO</b>											
LLE G1 24x280mm 650lm 830 SNC	830/449	640 lm	600 lm	250 mA	18.7 V	22.2 V	5.3 W	119 lm/W	113 lm/W	100 lm/W	> 80
LLE G1 24x280mm 650lm 840 SNC	840/449	700 lm	660 lm	250 mA	18.7 V	22.2 V	5.3 W	130 lm/W	125 lm/W	110 lm/W	> 80
LLE G1 24x280mm 650lm 865 SNC	865/449	700 lm	670 lm	250 mA	18.7 V	22.2 V	5.3 W	130 lm/W	126 lm/W	111 lm/W	> 80
LLE G1 24x560mm 1300lm 830 SNC	830/449	1,280 lm	1,210 lm	250 mA	37.5 V	44.4 V	10.5 W	117 lm/W	115 lm/W	101 lm/W	> 80
LLE G1 24x560mm 1300lm 840 SNC	840/449	1,390 lm	1,310 lm	250 mA	37.5 V	44.4 V	10.5 W	128 lm/W	125 lm/W	110 lm/W	> 80
LLE G1 24x560mm 1300lm 865 SNC	865/449	1,400 lm	1,330 lm	250 mA	37.5 V	44.4 V	10.5 W	128 lm/W	127 lm/W	111 lm/W	> 80
<b>650 lm per 280 mm – Operating mode HO</b>											
LLE G1 24x280mm 650lm 830 SNC	830/449	750 lm	710 lm	300 mA	19.1 V	22.6 V	6.5 W	114 lm/W	109 lm/W	96 lm/W	> 80
LLE G1 24x280mm 650lm 840 SNC	840/449	820 lm	780 lm	300 mA	19.1 V	22.6 V	6.5 W	124 lm/W	120 lm/W	106 lm/W	> 80
LLE G1 24x280mm 650lm 865 SNC	865/449	840 lm	790 lm	300 mA	19.1 V	22.6 V	6.5 W	127 lm/W	122 lm/W	107 lm/W	> 80
LLE G1 24x560mm 1300lm 830 SNC	830/449	1,500 lm	1,420 lm	300 mA	38.2 V	45.3 V	12.9 W	113 lm/W	110 lm/W	97 lm/W	> 80
LLE G1 24x560mm 1300lm 840 SNC	840/449	1,640 lm	1,550 lm	300 mA	38.2 V	45.3 V	12.9 W	123 lm/W	120 lm/W	106 lm/W	> 80
LLE G1 24x560mm 1300lm 865 SNC	865/449	1,650 lm	1,560 lm	300 mA	38.2 V	45.3 V	12.9 W	124 lm/W	121 lm/W	106 lm/W	> 80
<b>1,250 lm per 280 mm – Operating mode HE</b>											
LLE G1 24x280mm 1250lm 830 SNC	830/449	1,000 lm	950 lm	250 mA	28.5 V	31.9 V	7.5 W	130 lm/W	127 lm/W	111 lm/W	> 80
LLE G1 24x280mm 1250lm 840 SNC	840/449	1,090 lm	1,030 lm	250 mA	28.5 V	31.9 V	7.5 W	142 lm/W	137 lm/W	121 lm/W	> 80
LLE G1 24x280mm 1250lm 865 SNC	865/449	1,090 lm	1,030 lm	250 mA	28.5 V	31.9 V	7.5 W	142 lm/W	137 lm/W	121 lm/W	> 80
LLE G1 24x560mm 2400lm 830 SNC	830/449	1,990 lm	1,890 lm	250 mA	57.1 V	63.8 V	14.9 W	130 lm/W	127 lm/W	112 lm/W	> 80
LLE G1 24x560mm 2400lm 840 SNC	840/449	2,170 lm	2,060 lm	250 mA	57.1 V	63.8 V	14.9 W	142 lm/W	138 lm/W	122 lm/W	> 80
LLE G1 24x560mm 2400lm 865 SNC	865/449	2,170 lm	2,060 lm	250 mA	57.1 V	63.8 V	14.9 W	142 lm/W	138 lm/W	122 lm/W	> 80
<b>1,250 lm per 280 mm – Operating mode BLO</b>											
LLE G1 24x280mm 1250lm 830 SNC	830/449	1,180 lm	1,120 lm	300 mA	29.3 V	32.7 V	9.2 W	126 lm/W	122 lm/W	107 lm/W	> 80
LLE G1 24x280mm 1250lm 840 SNC	840/449	1,280 lm	1,220 lm	300 mA	29.3 V	32.7 V	9.2 W	136 lm/W	133 lm/W	117 lm/W	> 80
LLE G1 24x280mm 1250lm 865 SNC	865/449	1,280 lm	1,220 lm	300 mA	29.3 V	32.7 V	9.2 W	136 lm/W	133 lm/W	117 lm/W	> 80
LLE G1 24x560mm 2400lm 830 SNC	830/449	2,350 lm	2,230 lm	300 mA	58.5 V	65.4 V	18.3 W	125 lm/W	122 lm/W	110 lm/W	> 80
LLE G1 24x560mm 2400lm 840 SNC	840/449	2,560 lm	2,430 lm	300 mA	58.5 V	65.4 V	18.3 W	136 lm/W	133 lm/W	117 lm/W	> 80
LLE G1 24x560mm 2400lm 865 SNC	865/449	2,560 lm	2,430 lm	300 mA	58.5 V	65.4 V	18.3 W	136 lm/W	133 lm/W	117 lm/W	> 80
<b>1,250 lm per 280 mm – Operating mode HO</b>											
LLE G1 24x280mm 1250lm 830 SNC	830/449	1,350 lm	1,280 lm	350 mA	29.9 V	33.5 V	10.9 W	119 lm/W	117 lm/W	103 lm/W	> 80
LLE G1 24x280mm 1250lm 840 SNC	840/449	1,470 lm	1,400 lm	350 mA	29.9 V	33.5 V	10.9 W	130 lm/W	128 lm/W	113 lm/W	> 80
LLE G1 24x280mm 1250lm 865 SNC	865/449	1,470 lm	1,400 lm	350 mA	29.9 V	33.5 V	10.9 W	130 lm/W	128 lm/W	113 lm/W	> 80
LLE G1 24x560mm 2400lm 830 SNC	830/449	2,700 lm	2,560 lm	350 mA	59.9 V	66.9 V	21.8 W	120 lm/W	117 lm/W	103 lm/W	> 80
LLE G1 24x560mm 2400lm 840 SNC	840/449	2,950 lm	2,790 lm	350 mA	59.9 V	66.9 V	21.8 W	131 lm/W	128 lm/W	113 lm/W	> 80
LLE G1 24x560mm 2400lm 865 SNC	840/449	2,950 lm	2,790 lm	350 mA	59.9 V	66.9 V	21.8 W	131 lm/W	128 lm/W	113 lm/W	> 80

<sup>®</sup> Tolerance range for optical and electrical data: ±10 %.

<sup>®</sup> If mounted with M4 screws and plastic washers.

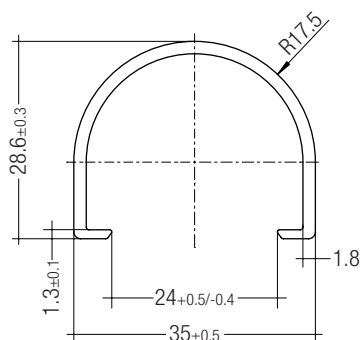
<sup>®</sup> Integral measurement over the complete module.

<sup>®</sup> HE ... high efficiency, BLO ... best LED operation, HO ... high output.

<sup>®</sup> Valid for modules marked with „V2“.

**Product description**

- LINEAR COVER for LLE 24
- Protection against direct touch for non-SELV applications
- Fast snap on mounting on to LLE 24 with clips or plastic washers
- High transmission: transparent 94 %, semi-transparent 87 %, diffuse 76 %
- Made of PMMA
- Tolerances:  $\pm 1$  mm for 597 mm length (ends finished),  
+ 20 mm for 1,200 / 1,500 / 1,600 / 1,800 mm length (ends raw)

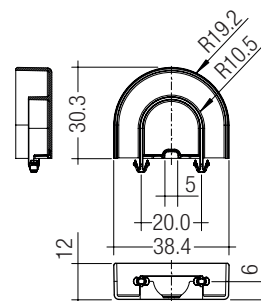
**Ordering data**

Type	Article number	Colour	Length	Packaging carton	Weight per pc.
LINEAR COVER SY Transparent 1600mm	28000338	Transparent	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1800mm	28000437	Semi-transparent	1,800 mm	12 pc(s).	0.308 kg
LINEAR COVER SY Frosted 1600mm	28000339	Semi-transparent	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1500mm	28000435	Semi-transparent	1,500 mm	12 pc(s).	0.244 kg
LINEAR COVER SY Frosted 1200mm	28000422	Semi-transparent	1,200 mm	12 pc(s).	0.205 kg
LINEAR COVER SY Frosted 597mm	28000340	Semi-transparent	597 mm	12 pc(s).	0.102 kg
LINEAR COVER SY Diffuse 1800mm	28000438	Diffuse	1,800 mm	12 pc(s).	0.308 kg
LINEAR COVER SY Diffuse 1600mm	28000341	Diffuse	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Diffuse 1500mm	28000436	Diffuse	1,500 mm	12 pc(s).	0.257 kg
LINEAR COVER SY Diffuse 1200mm	28000434	Diffuse	1,200 mm	12 pc(s).	0.205 kg
LINEAR COVER SY Diffuse 597mm	28000342	Diffuse	597 mm	12 pc(s).	0.102 kg

## ACL ENDCAP LLE24 PUSH-FIX

## Product description

- ENDCAP for LLE 24
- Fast snap on mounting (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- Made of Polycarbonat



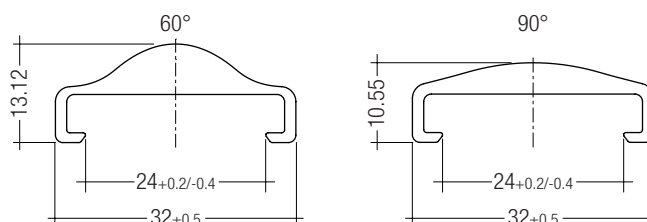
## Ordering data

Type	Article number	Colour	Packaging carton	Weight per pc.
ACL ENDCAP LLE24 PUSH-FIX	28001037	White	480 pc(s).	0.003 kg

## LINEAR LENS

## Product description

- Linear lens for LLE 24
- Available in 60° and 90° light distribution
- Protection against direct touch for non-SELV applications
- Fast snap on mounting on to LLE 24 with clips or plastic washers
- High transmission: semi-transparent 97 %
- Linear lense made of PMMA
- Tolerances: ± 20 mm for 1,600 mm length (ends raw)



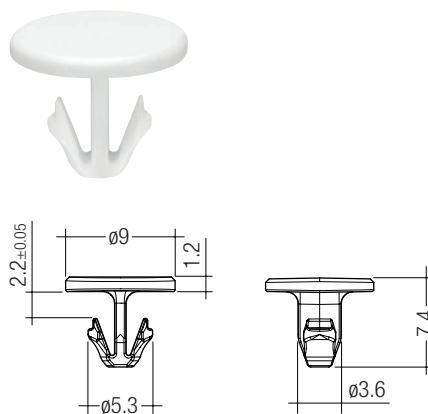
## Ordering data

Type	Article number	Colour	Length	Packaging carton	Weight per pc.
ACL LINEAR LENS 24x1200mm 60°	28001428	Semi-transparent	1,200 mm	21 pc(s).	0.196 kg
ACL LINEAR LENS 24x1200mm 90°	28001429	Semi-transparent	1,200 mm	21 pc(s).	0.165 kg
ACL LINEAR LENS 24x1600mm 60°	28000953	Semi-transparent	1,600 mm	21 pc(s).	0.261 kg
ACL LINEAR LENS 24x1600mm 90°	28000955	Semi-transparent	1,600 mm	21 pc(s).	0.221 kg

## CLIP 4.3mm

## Product description

- Clip for fixation of LED modules with 4.3 mm holes
- Fast snap on mounting (sheet thickness 0.5 – 1.0 mm)
- For drilling hole 4 mm
- Clip made of Polycarbonat



## Ordering data

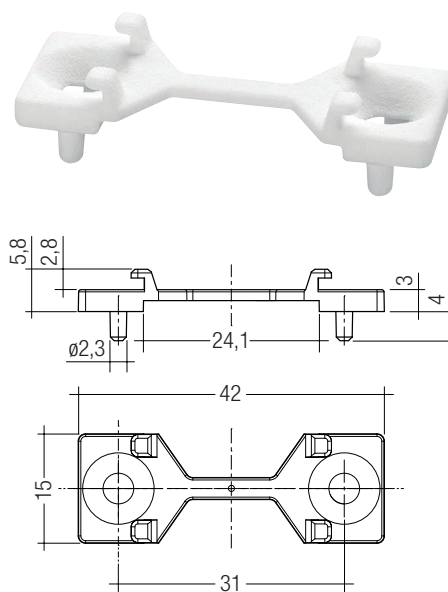
Type	Article number	Colour	Packaging bag <sup>®</sup>	Weight per pc.
ACL CLIP 4.3mm PUSH-FIX	28001036	White	500 pc(s).	0.001 kg

<sup>®</sup> Minimum sales quantity 500 pcs.

## BRIDGE LLE24/40

## Product description

- Enables the fixation of 24 mm wide Tridonic LED modules to fixtures made for 40 mm wide modules
- Ideal for extruded aluminium gear trays made for 40 mm modules with pre-alignment knobs
- Clip-on for LINEAR COVER and LINEAR LENS<sup>®</sup>
- For LLE 24 with 280 mm module minimum 2 bridges required
- For LLE 24 with 560 mm module minimum 3 bridges required
- Fixation via M3 or M4 countersunk screw, max. tightening torque 0.5 Nm
- BRIDGE made of white polycarbonate



## Ordering data

Type	Article number	Colour	Packaging carton <sup>®</sup>	Weight per pc.
ACL BRIDGE LLE24/40 SCREW-FIX	28001205	White	600 Stk.	0.001 kg

<sup>®</sup> Minimum sales quantity 600 pcs.

<sup>®</sup> Beam characteristics will change due to the elevated fixation (see photometric files for details).

## 1. Standards

IEC 62031  
IEC 62471  
IEC 62717  
IEC 61000-4-2

### 1.1 Photometric code

Key for photometric code, e. g. 830 / 349

1 <sup>st</sup> digit	2 <sup>nd</sup> + 3 <sup>rd</sup> digit	4 <sup>th</sup> digit	5 <sup>th</sup> digit	6 <sup>th</sup> digit	
Code CRI	Colour temperature in Kelvin x 100	McAdam initial	McAdam after 25% of the life-time (max.6000h)	Luminous flux after 25% of the life-time (max.6000h)	
7 70 – 79				Code	Luminous flux
8 80 – 89				7	≥ 70 %
9 ≥90				8	≥ 80 %
				9	≥ 90 %

### 1.2 Energy classification

Type	Forward current	Energy classification
LLE G1 24x280mm 650lm 830 SNC	250 mA	A+
	300 mA	A+
LLE G1 24x280mm 650lm 840 SNC	250 mA	A+
	300 mA	A+
LLE G1 24x280mm 650lm 865 SNC	250 mA	A++
	300 mA	A+
LLE G1 24x560mm 1300lm 830 SNC	250 mA	A+
	300 mA	A+
LLE G1 24x560mm 1300lm 840 SNC	250 mA	A+
	300 mA	A+
LLE G1 24x560mm 1300lm 865 SNC	250 mA	A+
	300 mA	A+
LLE G1 24x280mm 1250lm 830 SNC	250 mA	A+
	300 mA	A+
	350 mA	A+
	250 mA	A++
LLE G1 24x280mm 1250lm 840 SNC	300 mA	A+
	350 mA	A+
	250 mA	A++
	300 mA	A+
LLE G1 24x280mm 1250lm 865 SNC	300 mA	A+
	350 mA	A+
	250 mA	A+
	300 mA	A+
LLE G1 24x560mm 2400lm 830 SNC	300 mA	A+
	350 mA	A+
	250 mA	A++
	300 mA	A+
LLE G1 24x560mm 2400lm 840 SNC	300 mA	A+
	350 mA	A+
	250 mA	A++
	300 mA	A+
LLE G1 24x560mm 2400lm 865 SNC	300 mA	A+
	350 mA	A+

## 2. Thermal details

### 2.1 tc point, ambient temperature and life-time

The temperature at tp reference point is crucial for the light output and life-time of a LED product.

For LLE a tp temperature of 65 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and life-time.

Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

The tc and tp temperature of LED modules from Tridonic are measured at the same reference point.

### 2.2 Storage and humidity

Storage temperature	-30...+90 °C
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Operation only in non condensing environment.

Humidity during processing of the module should be between 30 to 70 %.

### 2.3 Thermal design and heat sink

The rated life of LED products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the LLE will be greatly reduced or the LLE may be destroyed.

### 2.4 Heat sink values

#### LLE G1 24x280mm 650lm 8x0 SNC

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	65 °C	250 mA	10.89 K/W	61 cm <sup>2</sup>
35 °C	65 °C	250 mA	8.17 K/W	82 cm <sup>2</sup>
45 °C	65 °C	250 mA	5.44 K/W	122 cm <sup>2</sup>
25 °C	65 °C	300 mA	8.65 K/W	77 cm <sup>2</sup>
35 °C	65 °C	300 mA	8.17 K/W	82 cm <sup>2</sup>
45 °C	65 °C	300 mA	5.44 K/W	122 cm <sup>2</sup>

#### LLE G1 24x280mm 1250lm 8x0 SNC

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	65 °C	250 mA	8.13 K/W	82 cm <sup>2</sup>
35 °C	65 °C	250 mA	6.10 K/W	109 cm <sup>2</sup>
45 °C	65 °C	250 mA	4.06 K/W	164 cm <sup>2</sup>
25 °C	65 °C	300 mA	6.45 K/W	103 cm <sup>2</sup>
35 °C	65 °C	300 mA	4.83 K/W	138 cm <sup>2</sup>
45 °C	65 °C	300 mA	3.22 K/W	207 cm <sup>2</sup>
25 °C	65 °C	350 mA	5.27 K/W	126 cm <sup>2</sup>
35 °C	65 °C	350 mA	3.95 K/W	169 cm <sup>2</sup>
45 °C	65 °C	350 mA	2.63 K/W	253 cm <sup>2</sup>

#### LLE G1 24x560mm 1300lm 8x0 SNC

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	65 °C	250 mA	5.44 K/W	123 cm <sup>2</sup>
35 °C	65 °C	250 mA	4.08 K/W	163 cm <sup>2</sup>
45 °C	65 °C	250 mA	2.72 K/W	245 cm <sup>2</sup>
25 °C	65 °C	300 mA	4.32 K/W	154 cm <sup>2</sup>
35 °C	65 °C	300 mA	4.08 K/W	163 cm <sup>2</sup>
45 °C	65 °C	300 mA	2.72 K/W	245 cm <sup>2</sup>

#### LLE G1 24x560mm 2400lm 8x0 SNC

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	65 °C	250 mA	8.13 K/W	82 cm <sup>2</sup>
35 °C	65 °C	250 mA	6.10 K/W	109 cm <sup>2</sup>
45 °C	65 °C	250 mA	4.06 K/W	164 cm <sup>2</sup>
25 °C	65 °C	300 mA	3.24 K/W	206 cm <sup>2</sup>
35 °C	65 °C	300 mA	2.43 K/W	275 cm <sup>2</sup>
45 °C	65 °C	300 mA	1.62 K/W	412 cm <sup>2</sup>
25 °C	65 °C	350 mA	2.71 K/W	246 cm <sup>2</sup>
35 °C	65 °C	350 mA	2.03 K/W	328 cm <sup>2</sup>
45 °C	65 °C	350 mA	1.35 K/W	492 cm <sup>2</sup>

### Notes

The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation. Depending on the heat sink a heat conducting paste or heat conducting film might be necessary to keep the specified tp temperature.



### 3. Installation / wiring

#### 3.1 Electrical supply/choice of LED Driver

LLE modules from Tridonic are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED Driver which complies with the relevant standards. The use of LED Driver from Tridonic in combination with LLE modules guarantees the necessary protection for safe and reliable operation.

If a LED Driver other than Tridonic is used, it must provide the following protection:

- Short-circuit protection
- Overload protection
- Overtemperature protection



LLE modules must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.

Wrong polarity can damage the LLE.

If LLE modules are wired in parallel and a wire breaks or a complete module fails then the current passing through the other module increases. This may reduce its life considerably. In addition there can be slight differences in light output caused by tolerances.

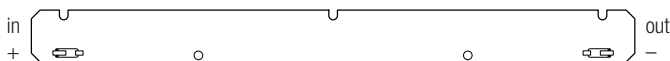
LLE modules can be operated either from LED Drivers or from LED Drivers with LV output voltage.



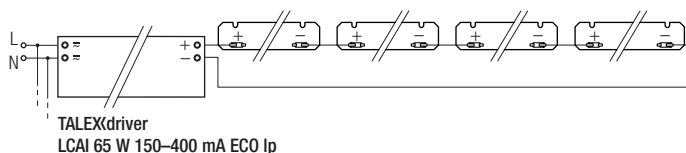
LLE are basic isolated up to 320 V against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 320 V, an additional isolation between LED module and heat sink is required (for example by isolated thermal pads) or by a suitable luminaire construction.

At voltages > 60 V an additional protection against direct touch (test finger) to the light emitting side of the module has to be guaranteed. This is typically achieved by means of a non removable light distributor over the module.

#### 3.2 Wiring



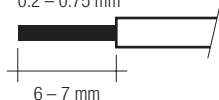
#### Wiring examples



#### 3.3 Wiring type and cross section

The wiring can be solid cable with a cross section of 0.2 to 0.75 mm<sup>2</sup>. For the push-wire connection you have to strip the insulation (6-7 mm).

wire preparation:  
0.2 – 0.75 mm<sup>2</sup>



Inserting stranded wires / removing wires by lightly pressing on the push button.

#### 3.4 Mounting instruction



None of the components of the LLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.5 Nm.

The LED modules are mounted onto a heat sink with min. 5 screws per module. In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.



Chemical substance may harm the LED module. Chemical reactions could lead to colour shift, reduced luminous flux or a total failure of the module caused by corrosion of electrical connections.

Materials which are used in LED applications (e.g. sealings, adhesives) must not produce dissolver gas. They must not be condensation curing based, acetate curing based or contain sulfur, chlorine or phthalate.

Avoid corrosive atmosphere during usage and storage.

#### 3.5 EOS/ESD safety guidelines



The device / module contains components that are sensitive to electrostatic discharge and may only be installed in the factory and on site if appropriate EOS/ESD protection measures have been taken. No special measures need be taken for devices/modules with enclosed casings (contact with the pc board not possible), just normal installation practice. Please note the requirements set out in the document EOS / ESD guidelines (Guideline\_EOS\_ESD.pdf) at: <http://www.tridonic.com/esd-protection>

### 4. Life-time

#### 4.1 Life-time, lumen maintenance and failure rate

The light output of an LED Module decreases over the life-time, this is characterized with the L value.

L70 means that the LED module will give 70 % of its initial luminous flux. This value is always related to the number of operation hours and therefore defines the life-time of an LED module.

As the L value is a statistical value and the lumen maintenance may vary over the delivered LED modules.

The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value. In addition the percentage of failed modules (fatal failure) is characterized by the C value.

The F value is the combination of the B and C value. That means for F degradation and complete failures are considered, e.g. L70F10 means 10 % of the LED modules may fail or be below 70 % of the initial luminous flux.

Life-time declarations are informative and represent no warranty claim.

4.2 Lumen maintenance

Life-time declarations are informative and represent no warranty claim.

LLE 24x280mm 650lm und LLE 24x560mm 1300lm

Forward current	tp						
	tempera- ture	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	55 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	26,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	75 °C	14,000 h	32,000 h	27,000 h	>50,000 h	42,000 h	>50,000 h
300 mA	55 °C	49,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	25,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	75 °C	13,000 h	31,000 h	25,000 h	>50,000 h	40,000 h	>50,000 h

LLE 24x280mm 1250lm und LLE 24x560mm 2400lm

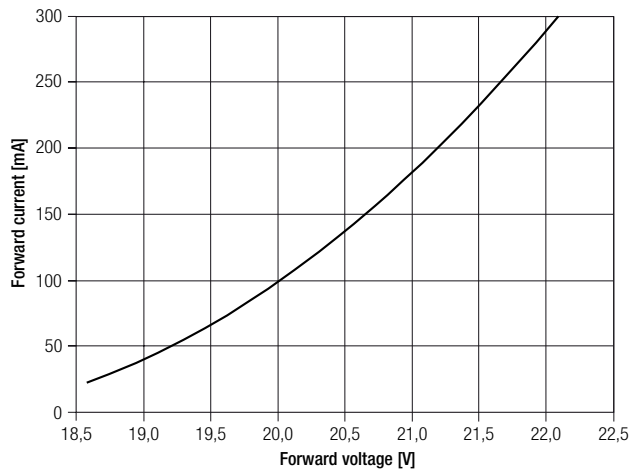
Forward current	tp						
	tempera- ture	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	55 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	28,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	75 °C	15,000 h	35,000 h	29,000 h	>50,000 h	44,000 h	>50,000 h
300 mA	55 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	27,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	75 °C	13,500 h	31,000 h	27,500 h	>50,000 h	42,000 h	>50,000 h

Values are valid for modules marked with „√2“ on the label.

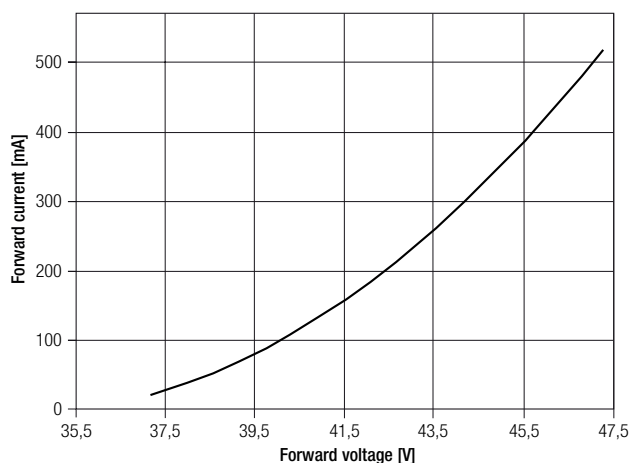
5. Electrical values

5.1 Typ. forward voltage vs. forward current

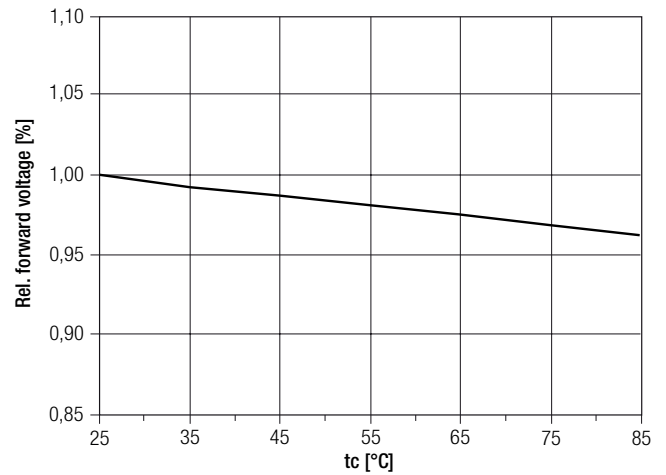
LLE G1 24x280mm 650lm



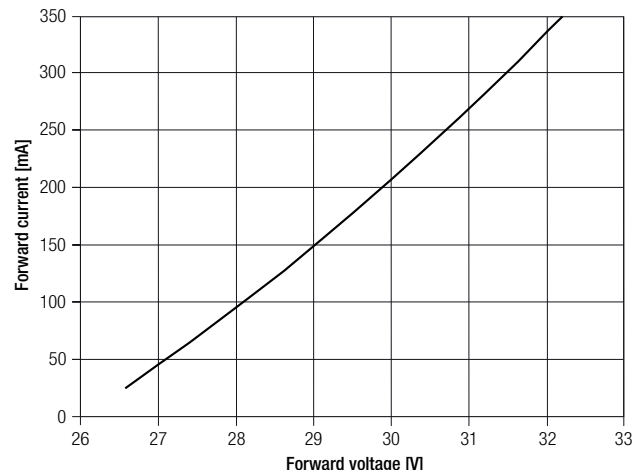
LLE G1 24x560mm 1300lm



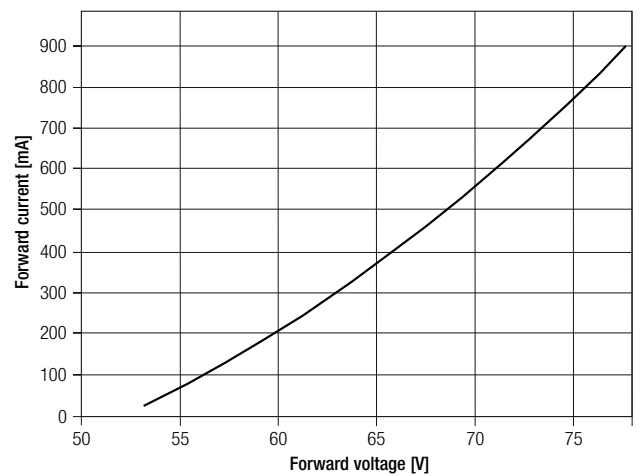
5.2 Forward voltage vs. tc temperature



LLE G1 24x280mm 1250lm



LLE G1 24x560mm 2400lm



The diagrams are based on statistic values.  
The real values can be different.

## 6. Photometric characteristics

### 6.1 Coordinates and tolerances according to CIE 1931

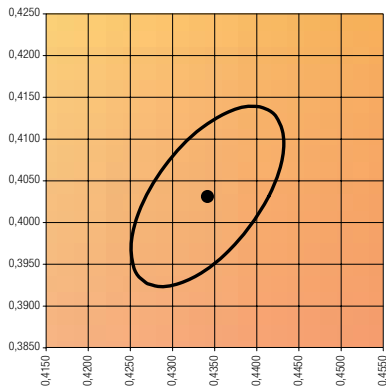
The specified colour coordinates are integral measured by a current impulse with typical values of module and a duration of 100 ms.

The ambient temperature of the measurement is  $t_a = 25^\circ\text{C}$ .

The measurement tolerance of the colour coordinates are  $\pm 0.01$ .

#### 3,000 K

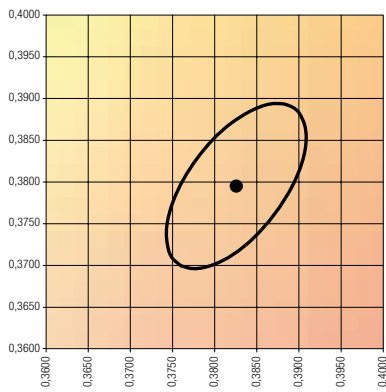
	x0	y0
Centre	0.4344	0.4032



— MacAdam Ellipse: 4SDCM

#### 4,000 K

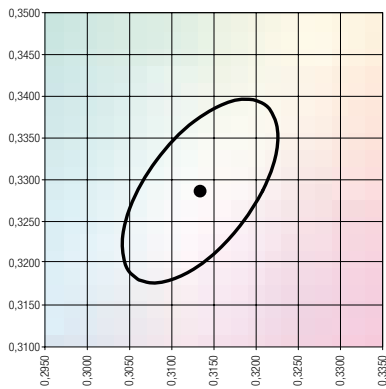
	x0	y0
Centre	0.3825	0.3796



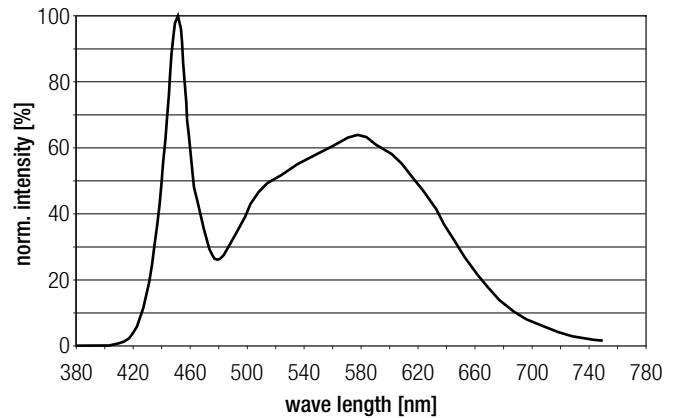
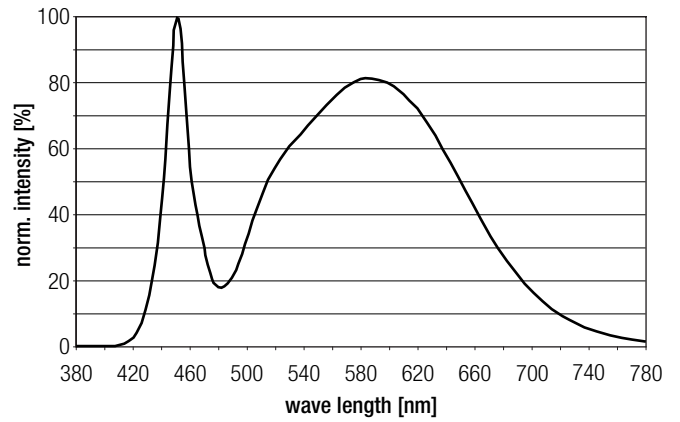
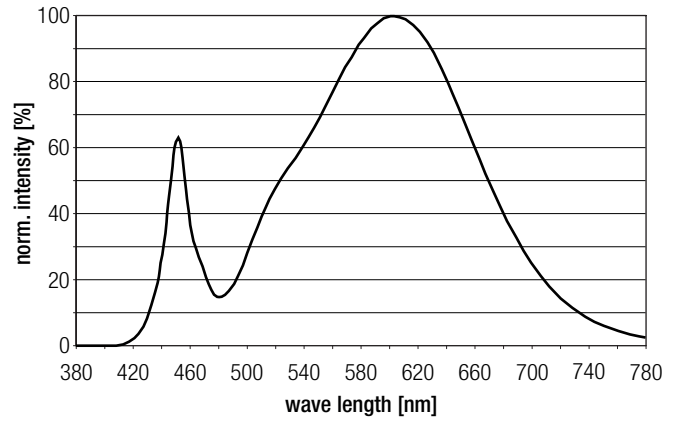
— MacAdam Ellipse: 4SDCM

#### 6,500 K

	x0	y0
Centre	0.3135	0.3284

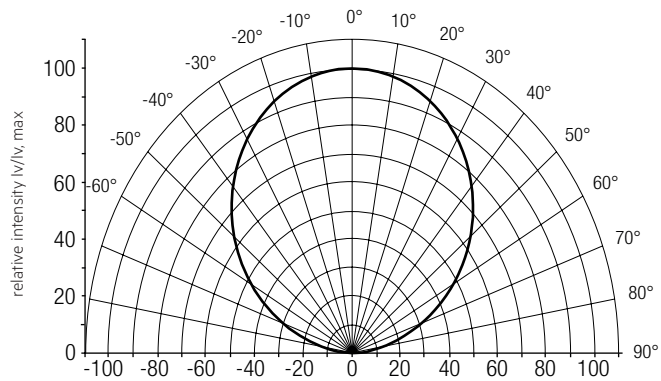


— MacAdam Ellipse: 4SDCM



### 6.2 Light distribution

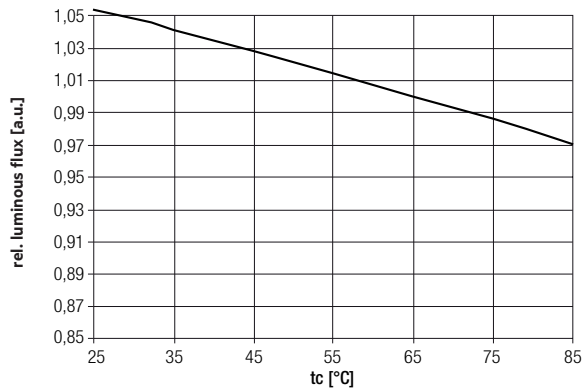
The optical design of the LLE product line ensures optimum homogeneity for the light distribution.



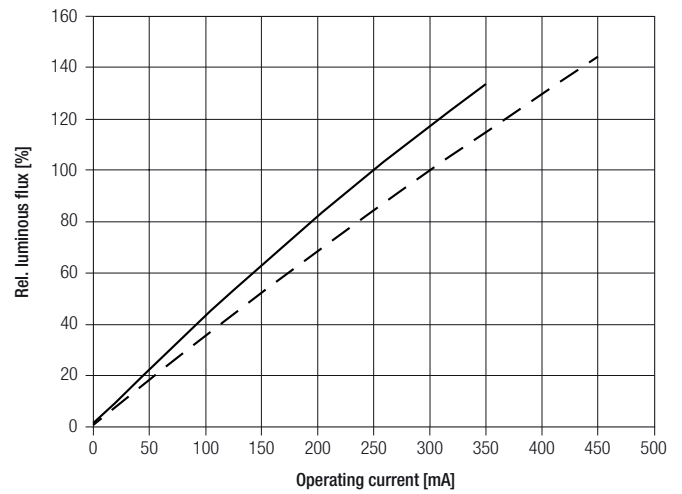
The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 7. To ensure an ideal mixture of colours and a homogenous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 4 cm) should be used.

For further information see Design-in Guide, 3D data and photometric data on [www.tridonic.com](http://www.tridonic.com) or on request.

### 6.3 Relative luminous flux vs. tc temperature



### 6.4 Relative luminous flux vs. operating current



— LLE 24x280mm 650lm + LLE 24x560mm 1300lm  
 - - - LLE 24x280mm 1250lm + LLE 24x560mm 2400lm

The diagrams are based on statistic values.  
 The real values can be different.