



Module LLE G4 24x1120 / 24x1400 mm ADV

Modules LLE ADVANCED

Product description

- Ideal for linear lights 4 and 5 feet
- Length available in 1,120 mm (4 feet) and 1,400 mm (5 feet)
- Typ. luminous flux 650, 1,250 and 2,000 lm
- Efficacy of the module up to 181 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3^o
- Colour temperatures 3,000 K and 4,000 K
- Significant saving in production time due to little wiring effort
- Simple installation (e.g. screws)
- Long life-time: 50,000 hours
- 5-year guarantee



Standards, page 10

Colour temperatures and tolerances, page 15



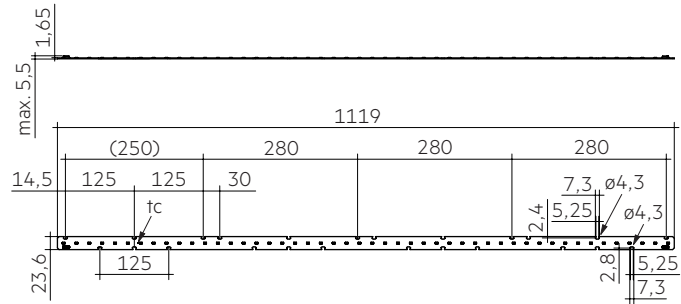


Module LLE G4 24x1120 / 24x1400 mm ADV

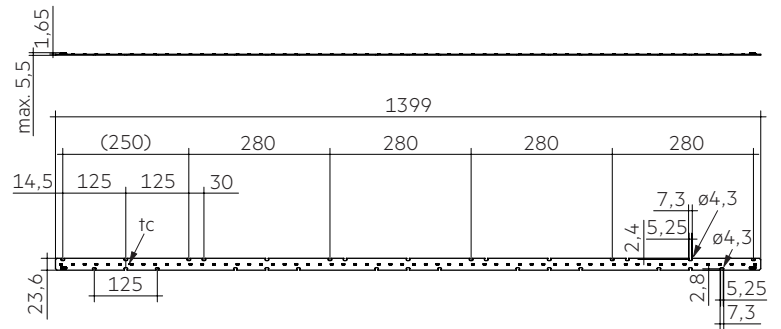
Modules LLE ADVANCED

Technical data

Beam characteristic	120°
Ambient temperature range	-25 ... +65 °C
tp rated	65 °C
tc	95 °C
Irrated for 650 lm and 1250 lm per feet	325 mA
Irrated for 2000 lm per feet	350 mA
I _{max}	540 mA
Max. permissible LF current ripple	660 mA
Max. permissible peak current	780 mA / max. 10 ms
Max. working voltage for insulation [®]	335 V
Insulation test voltage	1.67 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 4
Risk group (IEC 62471:2008) [®]	RG1
Classification acc. to IEC 62031	Built-in
Type of protection	IPO0



LLE G4 24x1120mm ADV



LLE G4 24x1400mm ADV

Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
650 lm per feet				
LLE G4 24x1120mm 2600lm 830 ADV	89602968	3,000 K	20 pc(s).	0.090 kg
LLE G4 24x1120mm 2600lm 840 ADV	89602969	4,000 K	20 pc(s).	0.090 kg
LLE G4 24x1400mm 3250lm 830 ADV	89602970	3,000 K	20 pc(s).	0.110 kg
LLE G4 24x1400mm 3250lm 840 ADV	89602971	4,000 K	20 pc(s).	0.110 kg
1250 lm per feet				
LLE G4 24x1120mm 4800lm 830 ADV	89602972	3,000 K	20 pc(s).	0.092 kg
LLE G4 24x1120mm 4800lm 840 ADV	89602973	4,000 K	20 pc(s).	0.092 kg
LLE G4 24x1400mm 6000lm 830 ADV	89602974	3,000 K	20 pc(s).	0.114 kg
LLE G4 24x1400mm 6000lm 840 ADV	89602975	4,000 K	20 pc(s).	0.114 kg
2000 lm per feet				
LLE G4 24x1120mm 8000lm 840 ADV	89602977	4,000 K	20 pc(s).	0.095 kg
LLE G4 24x1400mm 10000lm 840 ADV	89602979	4,000 K	20 pc(s).	0.118 kg

Specific technical data

Type [ⓐ]	Photo-metric code	Typ. luminous flux at tp = 25 °C [ⓑ]	Typ. luminous flux at tp = 65 °C [ⓑ]	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C [ⓑ]	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
650lm per foot – Operating mode HE at 225 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	1,770 lm	1,690 lm	225 mA	42.5 V	48.3 V	10.0 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	1,850 lm	1,770 lm	225 mA	42.5 V	48.3 V	10.0 W	181 lm/W	177 lm/W	163 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	2,210 lm	2,110 lm	225 mA	53.1 V	60.4 V	12.5 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	840/359	2,310 lm	2,210 lm	225 mA	53.1 V	60.4 V	12.5 W	181 lm/W	177 lm/W	163 lm/W	> 80
650lm per foot – Operating mode NM at 300 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	2,330 lm	2,220 lm	300 mA	43.3 V	49.2 V	13.6 W	168 lm/W	164 lm/W	151 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	2,440 lm	2,330 lm	300 mA	43.3 V	49.2 V	13.6 W	176 lm/W	172 lm/W	158 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	2,910 lm	2,780 lm	300 mA	54.2 V	61.5 V	17.0 W	168 lm/W	164 lm/W	151 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	840/359	3,050 lm	2,910 lm	300 mA	54.2 V	61.5 V	17.0 W	176 lm/W	172 lm/W	158 lm/W	> 80
650lm per foot – Operating mode NM at 325 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	2,500 lm	2,380 lm	325 mA	43.6 V	49.5 V	14.8 W	165 lm/W	161 lm/W	148 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	2,610 lm	2,500 lm	325 mA	43.6 V	49.5 V	14.8 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	3,120 lm	2,980 lm	325 mA	54.5 V	61.8 V	18.5 W	165 lm/W	161 lm/W	148 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	840/359	3,270 lm	3,120 lm	325 mA	54.5 V	61.8 V	18.5 W	173 lm/W	169 lm/W	155 lm/W	> 80
650lm per foot – Operating mode NM at 350 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	2,680 lm	2,550 lm	350 mA	43.9 V	49.7 V	16.0 W	163 lm/W	160 lm/W	147 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	2,800 lm	2,680 lm	350 mA	43.9 V	49.7 V	16.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	3,340 lm	3,190 lm	350 mA	54.8 V	62.2 V	20.0 W	163 lm/W	160 lm/W	147 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	840/359	3,500 lm	3,340 lm	350 mA	54.8 V	62.2 V	20.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
650lm per foot – Operating mode HO at 400 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	3,020 lm	2,890 lm	400 mA	44.4 V	50.3 V	18.5 W	159 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	3,170 lm	3,020 lm	400 mA	44.4 V	50.3 V	18.5 W	167 lm/W	163 lm/W	150 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	3,780 lm	3,610 lm	400 mA	55.5 V	62.8 V	23.1 W	159 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	827/359	3,960 lm	3,780 lm	400 mA	55.5 V	62.8 V	23.1 W	167 lm/W	163 lm/W	150 lm/W	> 80
650lm per foot – Operating mode HO at 500 mA											
LLE G4 24x1120mm 2600lm 830 ADV	830/359	3,690 lm	3,520 lm	500 mA	45.4 V	51.3 V	23.6 W	152 lm/W	149 lm/W	137 lm/W	> 80
LLE G4 24x1120mm 2600lm 840 ADV	840/359	3,860 lm	3,690 lm	500 mA	45.4 V	51.3 V	23.6 W	160 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1400mm 3250lm 830 ADV	830/359	4,610 lm	4,400 lm	500 mA	56.7 V	64.1 V	29.5 W	152 lm/W	149 lm/W	137 lm/W	> 80
LLE G4 24x1400mm 3250lm 840 ADV	840/359	4,830 lm	4,610 lm	500 mA	56.7 V	64.1 V	29.5 W	160 lm/W	156 lm/W	144 lm/W	> 80

[ⓐ] Integral measurement over the complete module.

[ⓑ] If mounted with M4 screws and plastic washers.

[ⓐ] Measured at operating mode HO.

[ⓐ] HE ... high efficiency. NM ... nominal mode. HO ... high output.

[ⓐ] Tolerance range for optical and electrical data: ±10 %.

Spezifische technische Daten

Type [Ⓢ]	Photo-metric code	Typ. luminous flux at tp = 25 °C [Ⓢ]	Typ. luminous flux at tp = 65 °C [Ⓢ]	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C [Ⓢ]	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
1250lm per foot – Operating mode HE at 225 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	3,530 lm	3,370 lm	225 mA	85.0 V	96.7 V	20.0 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	3,700 lm	3,530 lm	225 mA	85.0 V	96.7 V	20.0 W	181 lm/W	177 lm/W	163 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	4,420 lm	4,220 lm	225 mA	106.2 V	120.8 V	25.0 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	4,630 lm	4,420 lm	225 mA	106.2 V	120.8 V	25.0 W	181 lm/W	177 lm/W	163 lm/W	> 80
1250lm per foot – Operating mode NM at 300 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	4,660 lm	4,450 lm	300 mA	86.7 V	98.4 V	27.1 W	168 lm/W	164 lm/W	151 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	4,880 lm	4,660 lm	300 mA	86.7 V	98.4 V	27.1 W	176 lm/W	172 lm/W	158 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	5,820 lm	5,560 lm	300 mA	108.3 V	123.0 V	33.9 W	168 lm/W	164 lm/W	151 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	6,100 lm	5,820 lm	300 mA	108.3 V	123.0 V	33.9 W	176 lm/W	172 lm/W	158 lm/W	> 80
1250lm per foot – Operating mode NM at 325 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	4,990 lm	4,760 lm	325 mA	87.2 V	98.9 V	29.6 W	165 lm/W	161 lm/W	148 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	5,230 lm	4,990 lm	325 mA	87.2 V	98.9 V	29.6 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	6,240 lm	5,960 lm	325 mA	109.0 V	123.7 V	36.9 W	165 lm/W	161 lm/W	148 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	6,530 lm	6,240 lm	325 mA	109.0 V	123.7 V	36.9 W	173 lm/W	169 lm/W	155 lm/W	> 80
1250lm per foot – Operating mode NM at 350 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	5,350 lm	5,110 lm	350 mA	87.7 V	99.5 V	32.0 W	163 lm/W	160 lm/W	147 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	5,600 lm	5,350 lm	350 mA	87.7 V	99.5 V	32.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	6,690 lm	6,390 lm	350 mA	109.6 V	124.3 V	40.0 W	163 lm/W	160 lm/W	147 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	7,010 lm	6,690 lm	350 mA	109.6 V	124.3 V	40.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
1250lm per foot – Operating mode HO at 400 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	6,040 lm	5,770 lm	400 mA	88.8 V	100.5 V	37.0 W	159 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	6,330 lm	6,050 lm	400 mA	88.8 V	100.5 V	37.0 W	167 lm/W	163 lm/W	150 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	7,550 lm	7,210 lm	400 mA	111.0 V	125.7 V	46.3 W	159 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	7,910 lm	7,560 lm	400 mA	111.0 V	125.7 V	46.3 W	167 lm/W	163 lm/W	150 lm/W	> 80
1250lm per foot – Operating mode HO at 500 mA											
LLE G4 24x1120mm 4800lm 830 ADV	830/359	7,380 lm	7,040 lm	500 mA	90.8 V	102.6 V	47.3 W	152 lm/W	149 lm/W	137 lm/W	> 80
LLE G4 24x1120mm 4800lm 840 ADV	840/359	7,730 lm	7,380 lm	500 mA	90.8 V	102.6 V	47.3 W	160 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1400mm 6000lm 830 ADV	830/359	9,220 lm	8,800 lm	500 mA	113.4 V	128.2 V	59.1 W	152 lm/W	149 lm/W	137 lm/W	> 80
LLE G4 24x1400mm 6000lm 840 ADV	840/359	9,660 lm	9,220 lm	500 mA	113.4 V	128.2 V	59.1 W	160 lm/W	156 lm/W	144 lm/W	> 80

[Ⓢ] Integral measurement over the complete module.

[Ⓢ] If mounted with M4 screws and plastic washers.

[Ⓢ] Measured at operating mode HO.

[Ⓢ] HE ... high efficiency. NM ... nominal mode. HO ... high output.

[Ⓢ] Tolerance range for optical and electrical data: ±10 %.

Spezifische technische Daten

Type [Ⓢ]	Photo-metric code	Typ. luminous flux at tp = 25 °C [Ⓢ]	Typ. luminous flux at tp = 65 °C [Ⓢ]	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C [Ⓢ]	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
2000lm per foot – Operating mode HE at 225 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	5,550 lm	5,300 lm	225 mA	127.5 V	145.0 V	299 W	181 lm/W	177 lm/W	163 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	6,940 lm	6,630 lm	225 mA	159.4 V	181.3 V	37.4 W	181 lm/W	177 lm/W	163 lm/W	> 80
2000lm per foot – Operating mode NM at 300 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	7,320 lm	6,990 lm	300 mA	130.0 V	147.6 V	40.7 W	176 lm/W	172 lm/W	158 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	9,150 lm	8,730 lm	300 mA	162.5 V	184.5 V	50.9 W	176 lm/W	172 lm/W	158 lm/W	> 80
2000lm per foot – Operating mode NM at 325 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	7,840 lm	7,490 lm	325 mA	130.8 V	148.4 V	44.3 W	173 lm/W	169 lm/W	155 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	9,800 lm	9,360 lm	325 mA	163.5 V	185.5 V	55.4 W	173 lm/W	169 lm/W	155 lm/W	> 80
2000lm per foot – Operating mode NM at 350 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	8,410 lm	8,030 lm	350 mA	131.6 V	149.2 V	48.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	10,510 lm	10,030 lm	350 mA	164.5 V	186.5 V	60.0 W	171 lm/W	167 lm/W	154 lm/W	> 80
2000lm per foot – Operating mode HO at 400 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	9,500 lm	9,070 lm	400 mA	133.2 V	150.8 V	55.5 W	167 lm/W	163 lm/W	150 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	11,870 lm	11,330 lm	400 mA	166.4 V	188.5 V	69.4 W	167 lm/W	163 lm/W	150 lm/W	> 80
2000lm per foot – Operating mode HO at 500 mA											
LLE G4 24x1120mm 8000lm 840 ADV	840/359	11,590 lm	11,070 lm	500 mA	136.1 V	153.9 V	70.9 W	160 lm/W	156 lm/W	144 lm/W	> 80
LLE G4 24x1400mm 10000lm 840 ADV	840/359	14,490 lm	13,830 lm	500 mA	170.2 V	192.4 V	88.6 W	160 lm/W	156 lm/W	144 lm/W	> 80

[Ⓢ] Integral measurement over the complete module.

[Ⓢ] If mounted with M4 screws and plastic washers.

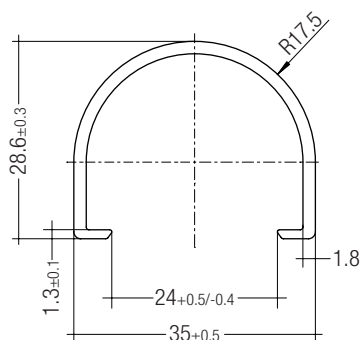
[Ⓢ] Measured at operating mode HO.

[Ⓢ] HE ... high efficiency. NM ... nominal mode. HO ... high output.

[Ⓢ] Tolerance range for optical and electrical data: ±10 %.

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: ± 1 mm for 597 mm length (ends finished),
+ 20 mm for 1,200 / 1,500 / 1,600 / 1,800 mm length (ends raw)

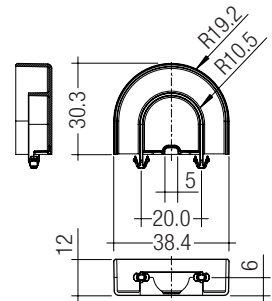
**Ordering data**

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



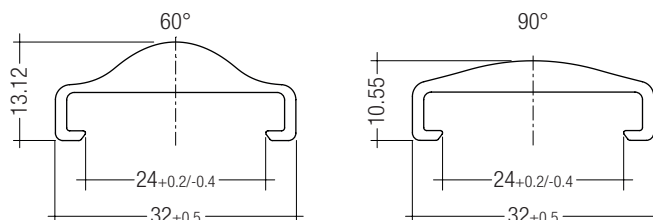
Ordering data

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)



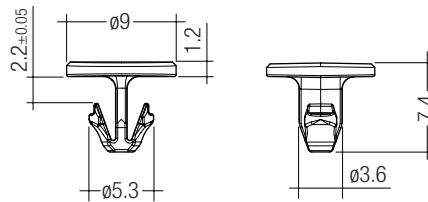
Ordering data

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

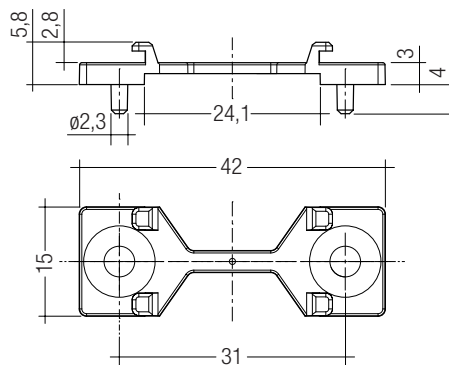
Type	Article number	Colour	Packaging bag [®]	Weight per pc.
ACL CLIP 4.3mm PUSH-FIX	28001036	White	500 pc(s).	0.001 kg

[®] 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[®]
- 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 [®]	Weight per pc.
ACL BRIDGE LLE24/40 SCREW-FIX	28001205	White	600 Stk.	0.001 kg

[®] Minimum sales quantity 600 pcs.

[®] Beam characteristics will change due to the elevated fixation (see photometric files for details).

1. Standards

IEC 62031
IEC 62471
IEC 61000-4-2
IEC 62778

1.1 Photometric code

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

1 st digit	2 nd + 3 rd digit	4 th digit	5 th digit	6 th digit		
Code	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)		
				Code	Luminous flux	
7				70 – 79	7	≥ 70 %
8				80 – 89	8	≥ 80 %
9	≥90	9	≥ 90 %			

1.2 Energy classification

Typ	Energieklassifizierung
LLE G4 24mm ADV	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	-40...+100 °C
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Operation only in non condensing environment.

Humidity during processing of the module should be between 0 to 60 %.

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 G4 24x1120mm 2600lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	65 °C	225 mA	7.66 K/W	87 cm ²
25 °C	65 °C	325 mA	4.90 K/W	136 cm ²
25 °C	65 °C	500 mA	2.80 K/W	238 cm ²
35 °C	65 °C	225 mA	5.75 K/W	116 cm ²
35 °C	65 °C	325 mA	3.68 K/W	181 cm ²
35 °C	65 °C	500 mA	2.10 K/W	318 cm ²
40 °C	65 °C	225 mA	4.79 K/W	139 cm ²
40 °C	65 °C	325 mA	3.06 K/W	218 cm ²
40 °C	65 °C	500 mA	1.75 K/W	382 cm ²
45 °C	65 °C	225 mA	3.83 K/W	174 cm ²
45 °C	65 °C	325 mA	2.45 K/W	272 cm ²
45 °C	65 °C	500 mA	1.40 K/W	477 cm ²
50 °C	65 °C	225 mA	2.87 K/W	232 cm ²
50 °C	65 °C	325 mA	1.84 K/W	363 cm ²
50 °C	65 °C	500 mA	1.05 K/W	636 cm ²
55 °C	65 °C	225 mA	1.91 K/W	348 cm ²
55 °C	65 °C	325 mA	1.22 K/W	545 cm ²
55 °C	65 °C	500 mA	0.70 K/W	955 cm ²
60 °C	65 °C	225 mA	0.96 K/W	697 cm ²
60 °C	65 °C	325 mA	0.61 K/W	1,091 cm ²
60 °C	65 °C	500 mA	0.35 K/W	1,915 cm ²

LLE G4 24x1400mm 3250lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	65 °C	225 mA	6.32 K/W	105 cm ²
25 °C	65 °C	325 mA	3.97 K/W	168 cm ²
25 °C	65 °C	500 mA	2.27 K/W	293 cm ²
35 °C	65 °C	225 mA	4.74 K/W	141 cm ²
35 °C	65 °C	325 mA	2.97 K/W	224 cm ²
35 °C	65 °C	500 mA	1.70 K/W	391 cm ²
40 °C	65 °C	225 mA	3.95 K/W	169 cm ²
40 °C	65 °C	325 mA	2.48 K/W	269 cm ²
40 °C	65 °C	500 mA	1.42 K/W	469 cm ²
45 °C	65 °C	225 mA	3.16 K/W	211 cm ²
45 °C	65 °C	325 mA	1.98 K/W	336 cm ²
45 °C	65 °C	500 mA	1.14 K/W	587 cm ²
50 °C	65 °C	225 mA	2.37 K/W	281 cm ²
50 °C	65 °C	325 mA	1.49 K/W	449 cm ²
50 °C	65 °C	500 mA	0.85 K/W	783 cm ²
55 °C	65 °C	225 mA	1.58 K/W	422 cm ²
55 °C	65 °C	325 mA	0.99 K/W	673 cm ²
55 °C	65 °C	500 mA	0.57 K/W	1,175 cm ²
60 °C	65 °C	225 mA	0.79 K/W	845 cm ²
60 °C	65 °C	325 mA	0.49 K/W	1,348 cm ²
60 °C	65 °C	500 mA	0.28 K/W	2,356 cm ²

LLE G4 24x1120mm 4800lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25°C	65°C	225 mA	3.92 K/W	170 cm ²
25°C	65°C	325 mA	2.46 K/W	271 cm ²
25°C	65°C	500 mA	1.41 K/W	472 cm ²
35°C	65°C	225 mA	2.94 K/W	227 cm ²
35°C	65°C	325 mA	1.85 K/W	361 cm ²
35°C	65°C	500 mA	1.06 K/W	630 cm ²
40°C	65°C	225 mA	2.45 K/W	272 cm ²
40°C	65°C	325 mA	1.54 K/W	433 cm ²
40°C	65°C	500 mA	0.88 K/W	756 cm ²
45°C	65°C	225 mA	1.96 K/W	341 cm ²
45°C	65°C	325 mA	1.23 K/W	542 cm ²
45°C	65°C	500 mA	0.71 K/W	945 cm ²
50°C	65°C	225 mA	1.47 K/W	454 cm ²
50°C	65°C	325 mA	0.92 K/W	723 cm ²
50°C	65°C	500 mA	0.53 K/W	1,261 cm ²
55°C	65°C	225 mA	0.98 K/W	682 cm ²
55°C	65°C	325 mA	0.61 K/W	1,085 cm ²
55°C	65°C	500 mA	0.35 K/W	1,895 cm ²
60°C	65°C	225 mA	0.49 K/W	1,366 cm ²
60°C	65°C	325 mA	0.31 K/W	2,176 cm ²
60°C	65°C	500 mA	0.18 K/W	3,808 cm ²

LLE G4 24x1120mm 8000lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25°C	65°C	225 mA	2.51 K/W	265 cm ²
25°C	65°C	325 mA	1.46 K/W	455 cm ²
25°C	65°C	500 mA	0.93 K/W	721 cm ²
35°C	65°C	225 mA	1.88 K/W	354 cm ²
35°C	65°C	325 mA	1.10 K/W	607 cm ²
35°C	65°C	500 mA	0.69 K/W	961 cm ²
40°C	65°C	225 mA	1.57 K/W	425 cm ²
40°C	65°C	325 mA	0.91 K/W	729 cm ²
40°C	65°C	500 mA	0.58 K/W	1,154 cm ²
45°C	65°C	225 mA	1.26 K/W	531 cm ²
45°C	65°C	325 mA	0.73 K/W	912 cm ²
45°C	65°C	500 mA	0.46 K/W	1,444 cm ²
50°C	65°C	225 mA	0.94 K/W	708 cm ²
50°C	65°C	325 mA	0.55 K/W	1,217 cm ²
50°C	65°C	500 mA	0.35 K/W	1,927 cm ²
55°C	65°C	225 mA	0.63 K/W	1,063 cm ²
55°C	65°C	325 mA	0.36 K/W	1,828 cm ²
55°C	65°C	500 mA	0.23 K/W	2,898 cm ²
60°C	65°C	225 mA	0.31 K/W	2,133 cm ²
60°C	65°C	325 mA	0.18 K/W	3,673 cm ²
60°C	65°C	500 mA	0.11 K/W	5,840 cm ²

LLE G4 24x1400mm 6000lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25°C	65°C	225 mA	3.13 K/W	213 cm ²
25°C	65°C	325 mA	1.98 K/W	337 cm ²
25°C	65°C	500 mA	1.13 K/W	589 cm ²
35°C	65°C	225 mA	2.35 K/W	284 cm ²
35°C	65°C	325 mA	1.48 K/W	449 cm ²
35°C	65°C	500 mA	0.85 K/W	786 cm ²
40°C	65°C	225 mA	1.96 K/W	340 cm ²
40°C	65°C	325 mA	1.24 K/W	539 cm ²
40°C	65°C	500 mA	0.71 K/W	943 cm ²
45°C	65°C	225 mA	1.57 K/W	426 cm ²
45°C	65°C	325 mA	0.99 K/W	674 cm ²
45°C	65°C	500 mA	0.57 K/W	1,180 cm ²
50°C	65°C	225 mA	1.17 K/W	568 cm ²
50°C	65°C	325 mA	0.74 K/W	889 cm ²
50°C	65°C	500 mA	0.42 K/W	1,574 cm ²
55°C	65°C	225 mA	0.78 K/W	852 cm ²
55°C	65°C	325 mA	0.49 K/W	1,350 cm ²
55°C	65°C	500 mA	0.28 K/W	2,365 cm ²
60°C	65°C	225 mA	0.39 K/W	1,707 cm ²
60°C	65°C	325 mA	0.25 K/W	2,707 cm ²
60°C	65°C	500 mA	0.14 K/W	4,753 cm ²

LLE G4 24x1400mm 10000lm 8x0 ADV

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25°C	65°C	225 mA	2.08 K/W	320 cm ²
25°C	65°C	325 mA	1.20 K/W	554 cm ²
25°C	65°C	500 mA	0.76 K/W	879 cm ²
35°C	65°C	225 mA	1.56 K/W	427 cm ²
35°C	65°C	325 mA	0.90 K/W	739 cm ²
35°C	65°C	500 mA	0.57 K/W	1,173 cm ²
40°C	65°C	225 mA	1.30 K/W	513 cm ²
40°C	65°C	325 mA	0.75 K/W	887 cm ²
40°C	65°C	500 mA	0.47 K/W	1,408 cm ²
45°C	65°C	225 mA	1.04 K/W	641 cm ²
45°C	65°C	325 mA	0.60 K/W	1,109 cm ²
45°C	65°C	500 mA	0.38 K/W	1,761 cm ²
50°C	65°C	225 mA	0.78 K/W	855 cm ²
50°C	65°C	325 mA	0.45 K/W	1,480 cm ²
50°C	65°C	500 mA	0.28 K/W	2,351 cm ²
55°C	65°C	225 mA	0.52 K/W	1,283 cm ²
55°C	65°C	325 mA	0.30 K/W	2,223 cm ²
55°C	65°C	500 mA	0.19 K/W	3,535 cm ²
60°C	65°C	225 mA	0.26 K/W	2,574 cm ²
60°C	65°C	325 mA	0.15 K/W	4,467 cm ²
60°C	65°C	500 mA	0.09 K/W	7,121 cm ²

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.

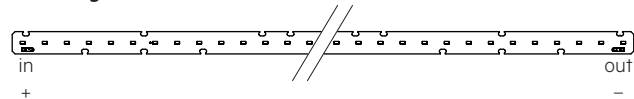
LLE can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.



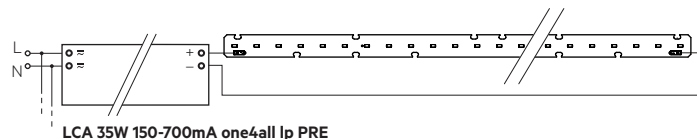
LLE are basic isolated up to 335 V (if mounted with M4 screws with head diameter 7 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 335 V, an additional 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

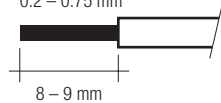


3.3 Wiring type and cross section

The wiring can be in stranded wires or solid with a cross section of 0.2 to 0.75 mm².

For the push-wire connection you have to strip the insulation (8–9 mm).

wire preparation:
0.2 – 0.75 mm²



To remove the wires use a suitable tool (e.g. Microcon release pin) or through twist and pull.

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. 9 screws per 1,120 mm module and min. 11 screws per 1,400 mm module or ACL CLIP 4.3mm.

Always use the most outside mounting holes.

Extensive bending of the module during mounting must be avoided.



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.

4.2 Lumen maintenance for LLE G4 24mm ADV

Forward current	tp tempera- ture	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
		38,000 h	43,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
100 mA	45 °C	38,000 h	43,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	35,000 h	40,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	30,000 h	34,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
150 mA	45 °C	26,000 h	29,000 h	54,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	43,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	34,000 h	38,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
200 mA	45 °C	29,000 h	32,000 h	58,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	42,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	29,000 h	32,000 h	58,000 h	>60,000 h	>60,000 h	>60,000 h
225 mA	45 °C	25,000 h	28,000 h	51,000 h	57,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	42,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	33,000 h	37,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
275 mA	45 °C	28,000 h	31,000 h	55,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	42,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	28,000 h	31,000 h	55,000 h	>60,000 h	>60,000 h	>60,000 h
325 mA	45 °C	23,000 h	26,000 h	48,000 h	54,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	42,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	23,000 h	26,000 h	48,000 h	54,000 h	>60,000 h	>60,000 h
400 mA	45 °C	23,000 h	25,000 h	46,000 h	52,000 h	>60,000 h	>60,000 h
	55 °C	37,000 h	42,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	23,000 h	25,000 h	46,000 h	52,000 h	>60,000 h	>60,000 h
450 mA	45 °C	36,000 h	41,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	31,000 h	36,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	26,000 h	29,000 h	51,000 h	59,000 h	>60,000 h	>60,000 h
500 mA	45 °C	21,000 h	24,000 h	43,000 h	48,000 h	>60,000 h	>60,000 h
	55 °C	36,000 h	41,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	21,000 h	24,000 h	43,000 h	48,000 h	>60,000 h	>60,000 h
500 mA	45 °C	30,000 h	34,000 h	58,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	30,000 h	34,000 h	58,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	25,000 h	27,000 h	48,000 h	56,000 h	>60,000 h	>60,000 h
500 mA	45 °C	20,000 h	22,000 h	40,000 h	45,000 h	>60,000 h	>60,000 h
	55 °C	36,000 h	40,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	20,000 h	22,000 h	40,000 h	45,000 h	>60,000 h	>60,000 h
500 mA	45 °C	29,000 h	33,000 h	55,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	29,000 h	33,000 h	55,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	23,000 h	25,000 h	44,000 h	51,000 h	>60,000 h	>60,000 h
500 mA	45 °C	18,000 h	19,000 h	35,000 h	40,000 h	59,000 h	>60,000 h
	55 °C	35,000 h	40,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	18,000 h	19,000 h	35,000 h	40,000 h	59,000 h	>60,000 h
500 mA	45 °C	16,000 h	18,000 h	32,000 h	36,000 h	54,000 h	>60,000 h
	55 °C	35,000 h	39,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	16,000 h	18,000 h	32,000 h	36,000 h	54,000 h	>60,000 h
500 mA	45 °C	27,000 h	30,000 h	51,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	27,000 h	30,000 h	51,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	20,000 h	22,000 h	38,000 h	44,000 h	>60,000 h	>60,000 h
500 mA	45 °C	15,000 h	16,000 h	29,000 h	32,000 h	49,000 h	56,000 h
	55 °C	15,000 h	16,000 h	29,000 h	32,000 h	49,000 h	56,000 h
	65 °C	15,000 h	16,000 h	29,000 h	32,000 h	49,000 h	56,000 h

5. Electrical values

5.1 Declaration of electrical parameters

Irated ... Nominal operating current the module is designed for.

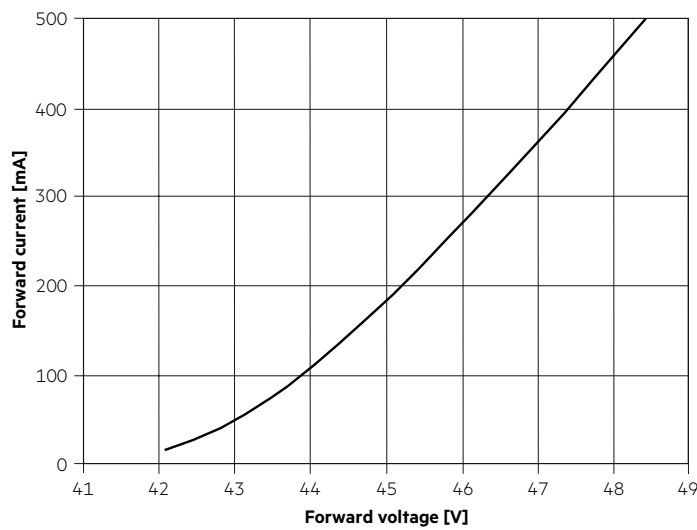
I_{max} ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

Max. permissible LF current ripple ... Max. output current of the LED driver incl. Tolerances and LF current ripple must not exceed this value.

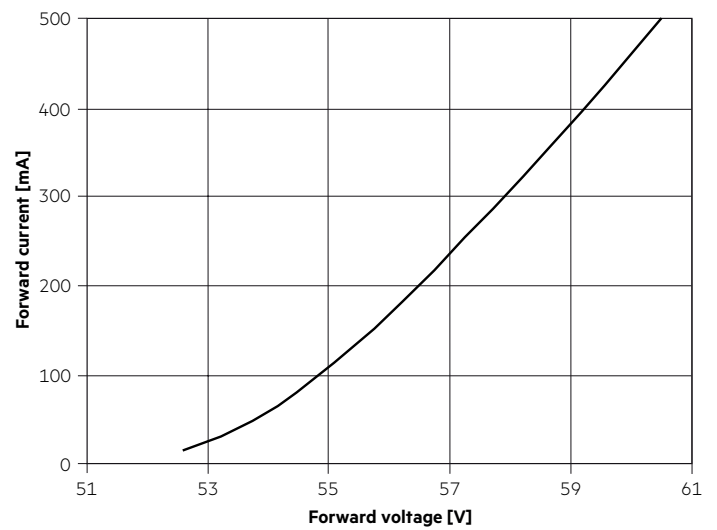
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

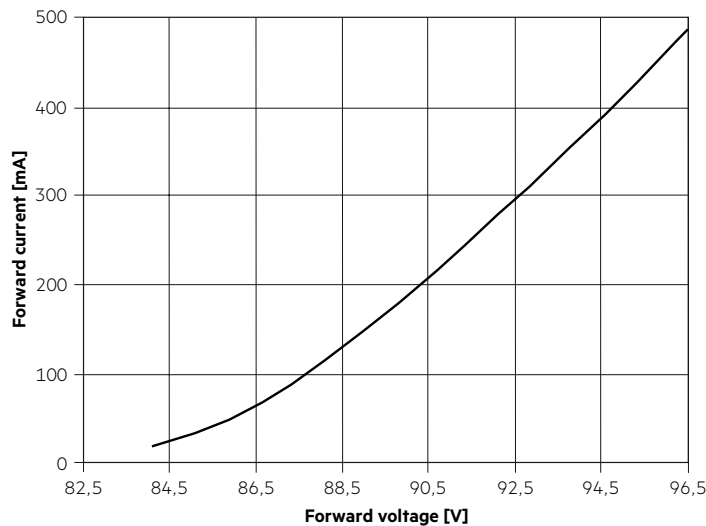
LLE G4 24x1120mm 2600lm 8x0 ADV



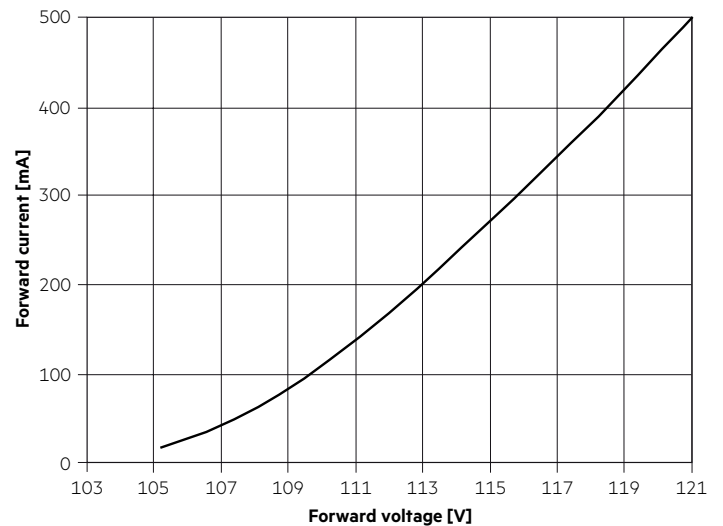
LLE G4 24x1400mm 3250lm 8x0 ADV



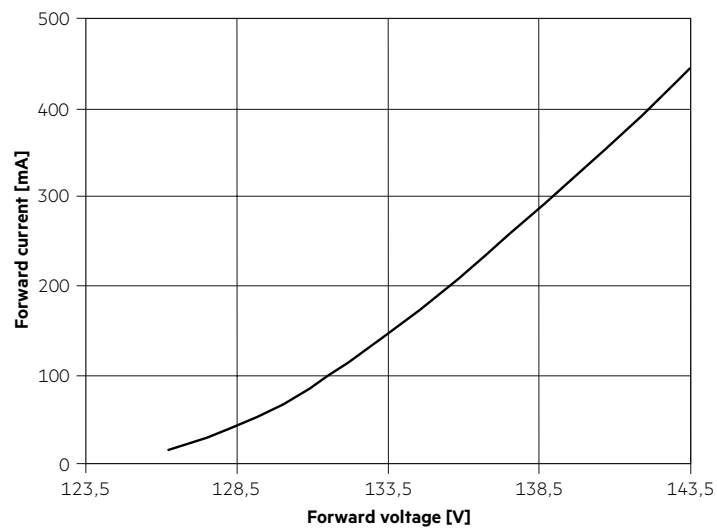
LLE G4 24x1120mm 4800lm 8x0 ADV



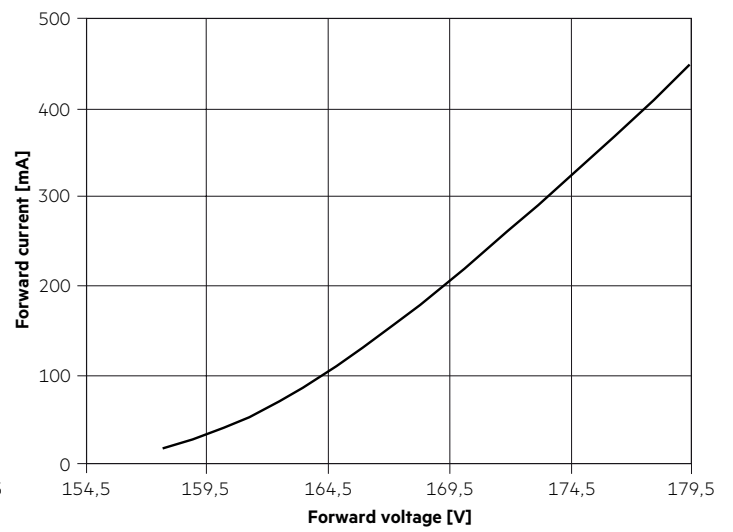
LLE G4 24x1400mm 6000lm 8x0 ADV



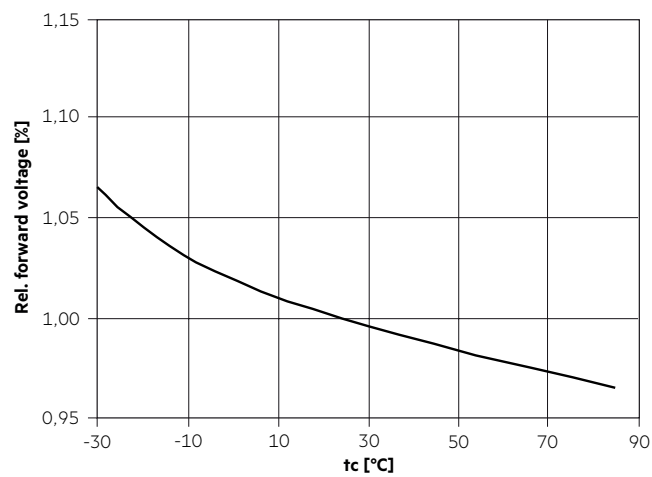
LLE G4 24x1120mm 8000lm 8x0 ADV



LLE G4 24x1400mm 10000lm 8x0 ADV



5.3 Forward voltage vs. tc temperature



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

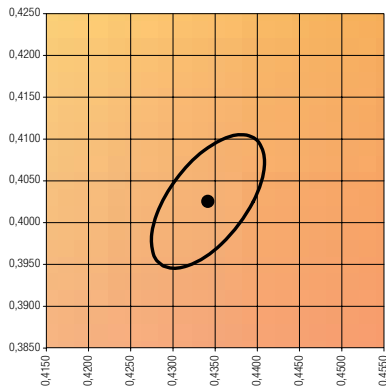
The specified colour coordinates are integral measured by current impulse of 325 mA and a duration of 100 ms.

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

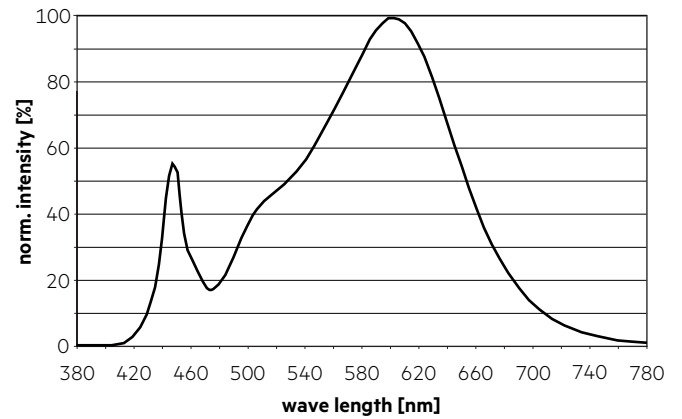
The measurement tolerance of the colour coordinates are ± 0.01 .

3,000 K

	x0	y0
Centre	0.4340	0.4026

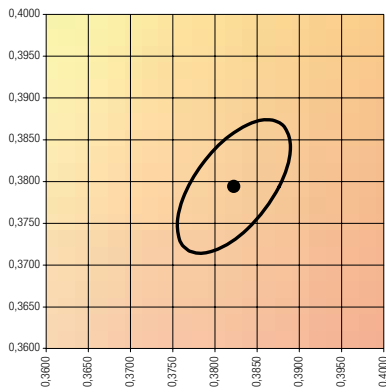


— MacAdam Ellipse: 3SDCM

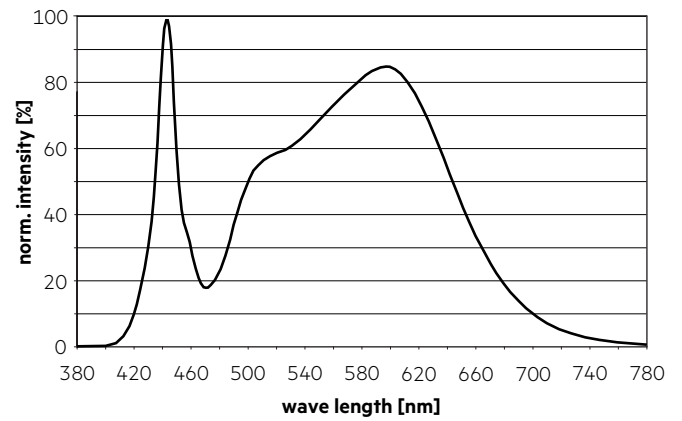


4,000 K

	x0	y0
Center	0.3822	0.3794

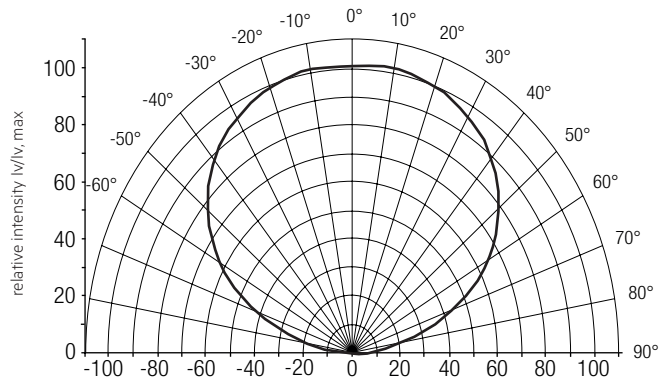


— MacAdam Ellipse: 3SDCM



6.2 Light distribution

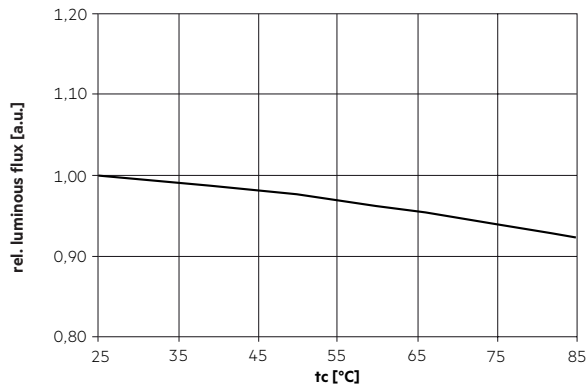
The optical design of the LLE product line ensures optimum homogeneity for the light distribution.



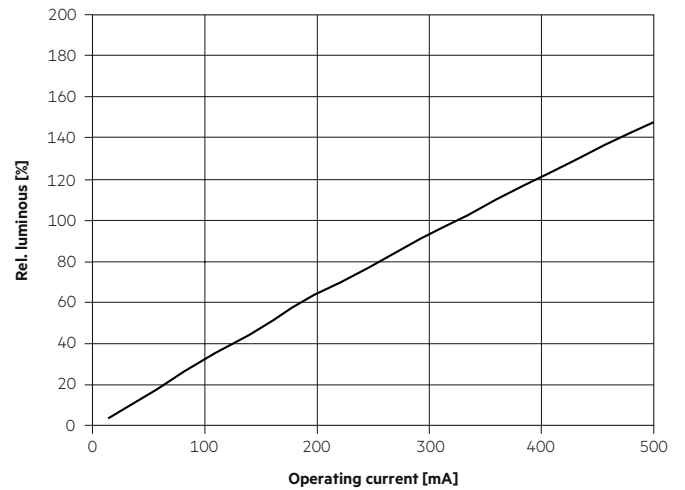
The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3.

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.

6.3 Relative luminous flux vs. tc temperature



6.4 Relative luminous flux vs. operating current



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

7. Miscellaneous

7.1 Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

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