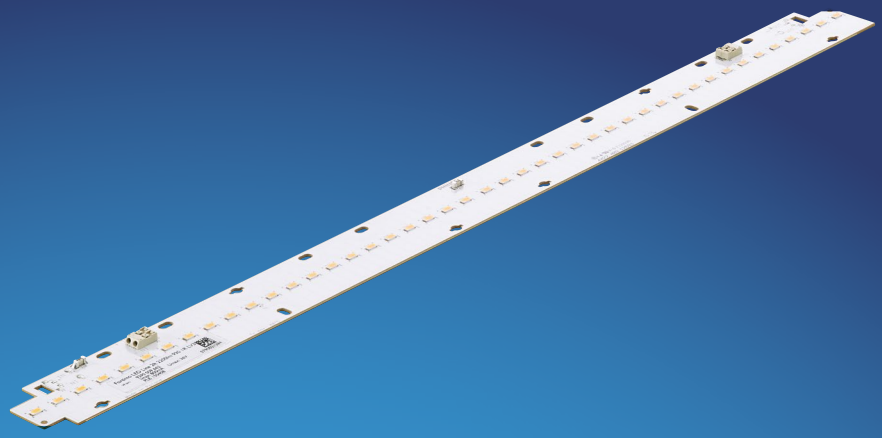
PHILIPS

Fortimo

LED system

LED Line 2 ft
2200 lm 9xx 1R LV3



Datasheet

Fortimo **LED Line Gen3**

Fortimo LED Line systems are designed to produce pure white light for general lighting applications with high efficiency levels. The Fortimo LED Line portfolio consists of 3 main ranges of products, which have been differentiated by the number of rows of LEDs contained on the module. Fortimo LED Linear encompasses a wide range, offering solutions for all the different types of linear luminaires.

Key features and benefits

- State-of-the-art LED module efficiency of up to 165 lm/W
- Long life-time: >50,000 hours
- High color rendering (CRI >80 and >90)
- Excellent color consistency of 3 SDCM
- Choice of color temperatures (3000 K, 4000 K and 5000 K)
- Two lumen packages: 650 lm and 1100 lm per foot/280 mm
- LED module range with 1, 2 or 3 rows of LEDs
- Tunable lumen output, efficacy and lifetime
- Push-in connectors enabling automated wiring
- Five year system warranty

Suitable for:

Retail Office Industry

June 2015

Zhaga

Ordering data

Commercial product name	EOC	12NC
Fortimo LED Line 2ft 2200lm 930 1R LV3	8718696 481103 00	9290 009 66206
Fortimo LED Line 2ft 2200lm 940 1R LV3	8718696 481127 00	9290 009 66306

Drive currents and case temperatures

Parameter	Nominal*	Life**	Max***	Unit
I (current through the LED module)	550	800	800	mA
Tc (case temperature at Tc point)	50	80	85	˚C

* Nominal value at which typical performance is specified.
** Value at which lifetime L70B50 ≥ 50,000 hour is specified.
*** Maximum value for safe operation; do not operate above this value.

Optical characteristics - table per color (CCT)

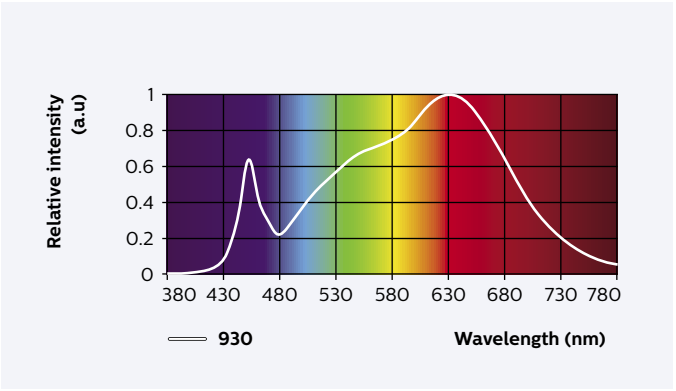
Fortimo LED line 2 ft 2200 lm 930 1R LV3

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		3000		K
Color coordinates (CIEx, CIEy)		(0.431 , 0.396)		-
CRI*	90			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	3000K	lm	lm/W
80% I-nom 440 mA	Tc 25 °C	1692	120
	Tc-nom 50 °C	1635	118
	Tc-life 80 °C	1552	113
I-nom 550 mA	Tc 25 °C	2070	116
	Tc-nom 50 °C	**2000**	**113**
	Tc-life 80 °C	1898	109
I-life 800 mA	Tc 25 °C	2884	106
	Tc-nom 50 °C	2786	104
	Tc-life 80 °C	2644	100

Tolerance for flux data is ±7.5%.
Tolerance for efficacy data is ±10%.



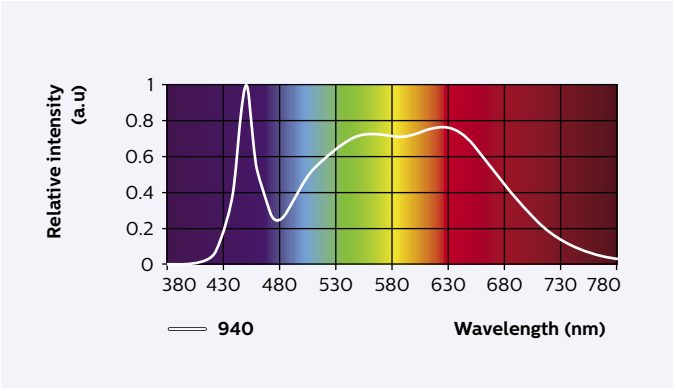
Fortimo LED line 2 ft 2200 lm 940 1R LV3

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		4000		K
Color coordinates (CIEx, CIEy)		(0.379 , 0.373)		-
CRI*	90			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	4000K	lm	lm/W
80% I-nom 440 mA	Tc 25 °C	1861	132
	Tc-nom 50 °C	1799	129
	Tc-life 80 °C	1707	125
I-nom 550 mA	Tc 25 °C	2277	127
	Tc-nom 50 °C	**2200**	**124**
	Tc-life 80 °C	2088	120
I-life 800 mA	Tc 25 °C	3173	117
	Tc-nom 50 °C	3065	115
	Tc-life 80 °C	2908	110

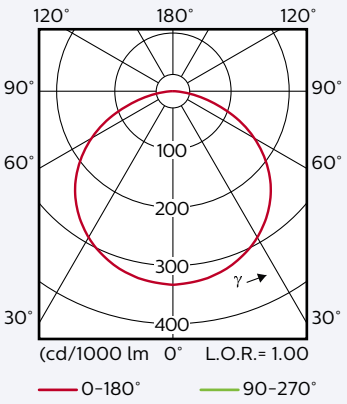
Tolerance for flux data is ±7.5%.
Tolerance for efficacy data is ±10%.



Measurement tolerance is ±2.5% for the flux data and 5% for the efficacy data.
* Measurement tolerance is ± 1.

Beam shape

The Philips LED module generates a Lambertian beam shape, which is a pragmatic starting point for OEMs wishing to design secondary optics.



Electrical characteristics

Parameter	Min	Typ	Max	Unit
Nominal current		550		mA
Forward voltage	30.7	32.2	33.6	V
Power consumption	16.9	17.7	18.5	W
Energy efficiency label		A+		
Minimum dimming for performance	10			%
Number of parallel modules per chain			2	
Bins		2 (C and D)		

Specifications stated at Tc-nom and I-nom.

Performance over life

Lumen maintenance

Operation point	Time x 1000 hours	L70			L80			L90		
		B50	B20	B10	B50	B20	B10	B50	B20	B10
80% I-nom 440 mA	Tc 25 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
	Tc-nom 50 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
	Tc-life 80 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
I-nom 550 mA	Tc 25 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
	Tc-nom 50 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
	Tc-life 80 °C	>50	>50	>50	>50	>50	>50	45	44	43
I-life 800 mA	Tc 25 °C	>50	>50	>50	>50	>50	>50	>50	>50	>50
	Tc-nom 50 °C	>50	>50	>50	>50	>50	>50	30	29	28
	Tc-life 80 °C	>50	>50	>50	43	42	41	20	20	19

Values in the table are based on available LM80 LED data (8000h). Lumen maintenance will be updated once additional measurement data becomes available.
50k hours claim is based on extrapolating raw LM80-data to lower temperatures and currents by using statistical techniques.

Parameter	Min	Typ	Max	Unit
Δu'v' at 6000 hours			0.007	-

Specifications stated while Tc < Tc-life and I < I-life.

Absolute maximum ratings

Parameter	Min	Typ	Max	Unit
Current through the LED module (I-max)			800	mA
Case temperature (Tc-max)			85	°C
Power rated at U-max and I-max			29	W
ESD (direct contact)			8	kV
ESD (air)			15	kV
Working voltage (between input to metal mounting plate)			420	Vdc
Voltage strength (Input to metal mounting plate)			1840	Vac
Ambient temperature	-40			°C

Wiring

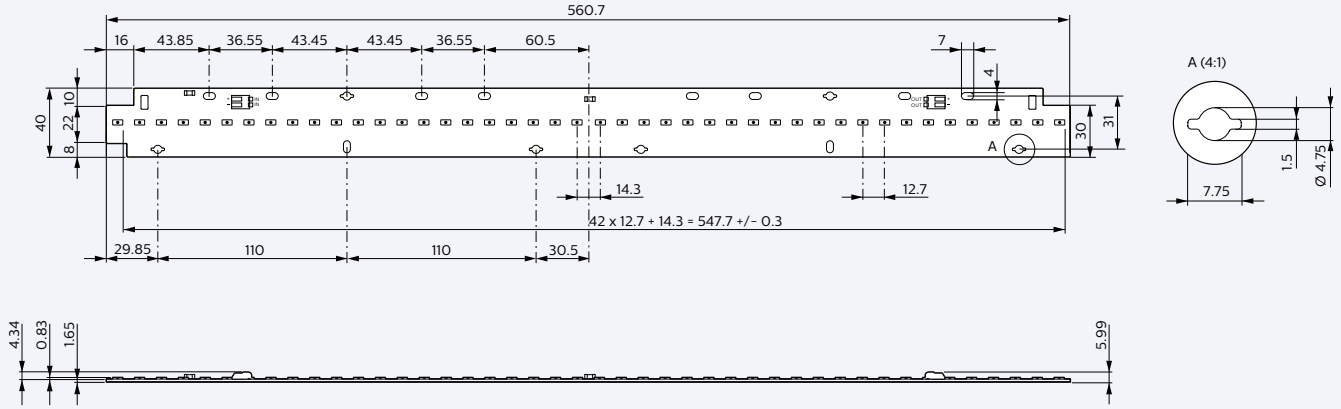
Specification item	Value	Unit	Condition
Input wire cross-section	0.2...0.75	mm^2	Solid
	18...24	AWG	
	0.3..0.5	mm^2	Stranded
	20..22	AWG	
Input wire strip length	7.5..8.5	mm	
Tested cable length	4000	mm	Total length of wiring including LED modules, one way

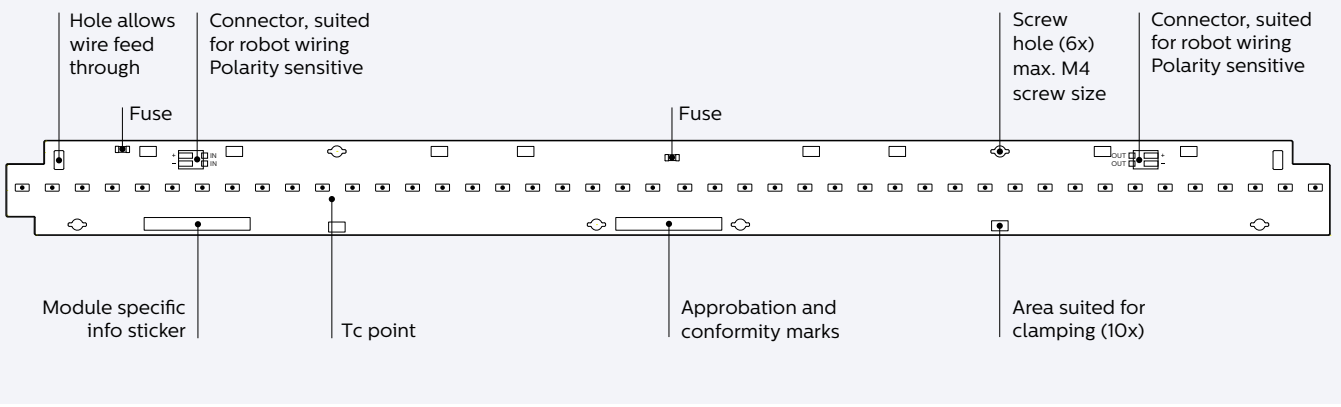
Connector suited for robot wiring.

Mechanical characteristics

Parameter	Min	Typ	Max	Unit
Length	560.2	560.7	561.2	mm
Width	39.5	40	40.5	mm
Height excl. connector	2	2.1	2.2	mm
Height incl. connector	5.6	5.8	6	mm
Warpage (IPC-TM-650)			4	%

Bow & Twist of the PCB after production tested and released according IPC-TM-650 2.4.22.





Application information

Compliance and approval
IEC / EN 62031, IEC / EN 62471, UL 8750

Photobiological safety
Risk group: Risk group 1

Environmental
RoHS / REACH

Application information

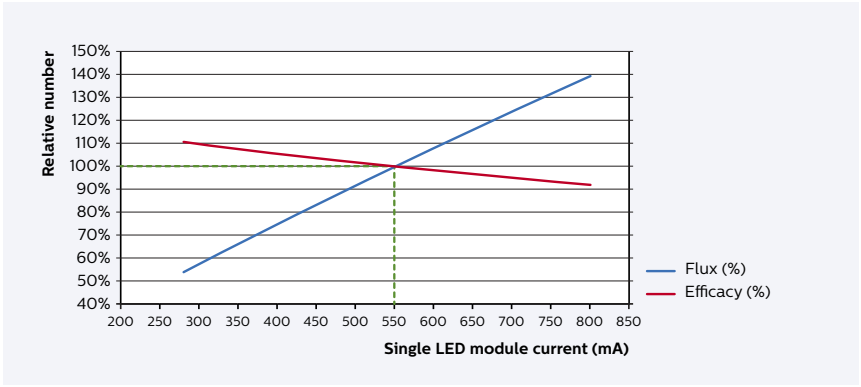
Zhaga	
Designation of the Book-7 LLE category	L56W4
Luminous Flux category	C020
CCT category	3000 K, 4000 K
CRI	90
The position of the temperature measurement point tp	Same as Tc point
The value of tp,max	50

IP rating	**No IP rating**
Overheating protection	No protection
Luminaire class	IEC Class II

Warranted number of full thermal product cycles at which the survival rate of the population ≥90%, at 25 °C ambient temperature

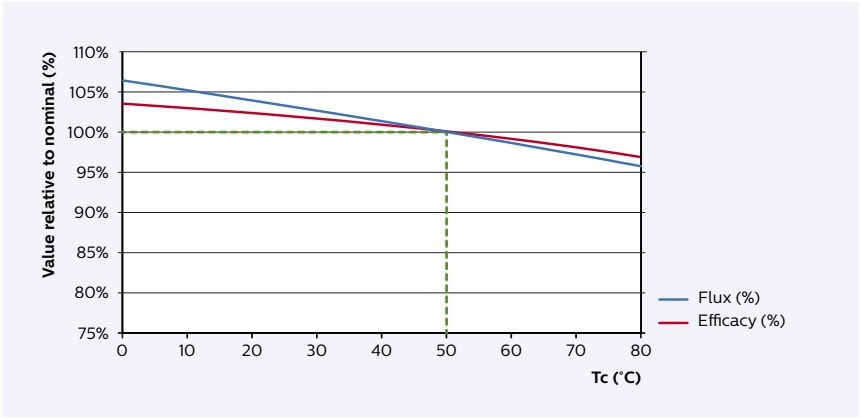
Case temperature Tc [°C]	**Amount of cycles**
35	14,600
40	14,600
45	14,600
50	14,600
55	14,600
60	14,600
65	14,600
70	14,600
75	14,600
80	14,600
85	14,600

Tuning information



Flux and efficacy versus current

	I [mA]	Flux [%]	Efficacy [%]
50% Inom	280	54%	111%
	320	61%	109%
	360	68%	107%
	400	75%	106%
80% Inom	440	82%	104%
	480	88%	103%
	520	95%	101%
I nom	**550**	**100%**	**100%**
	560	102%	100%
	600	108%	98%
	640	114%	97%
	680	121%	96%
	720	127%	94%
	760	133%	93%
I life	800	139%	92%

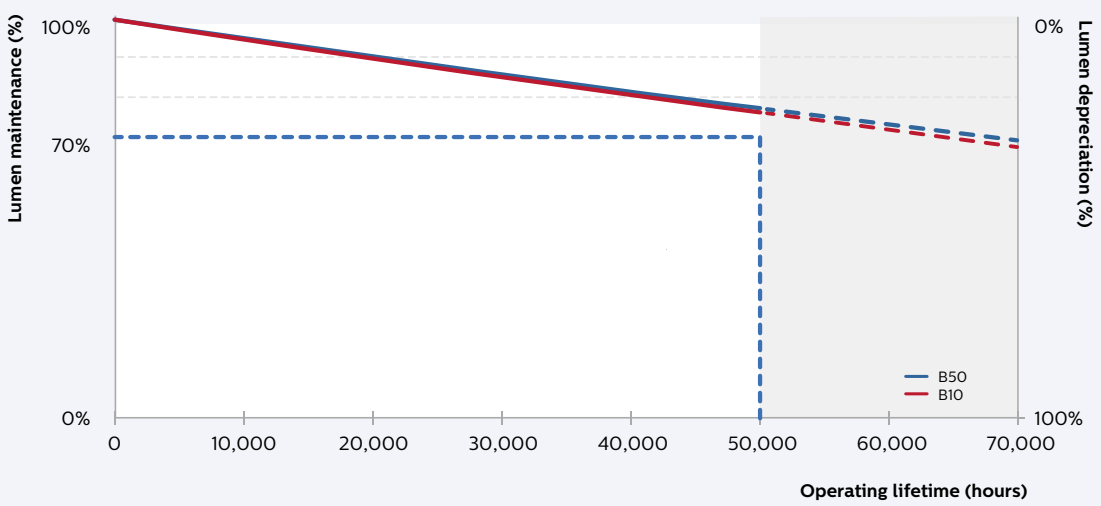


Flux and efficacy versus temperature at Tc

	Tc [°C]	Flux [%]	Efficacy [%]
	0	106%	104%
	20	104%	102%
	25	103%	102%
	30	**102%**	**101%**
	40	101%	100%
Tc nom	**50**	**100%**	**100%**
	60	98%	99%
	70	97%	98%
Tc Life	80	95%	97%

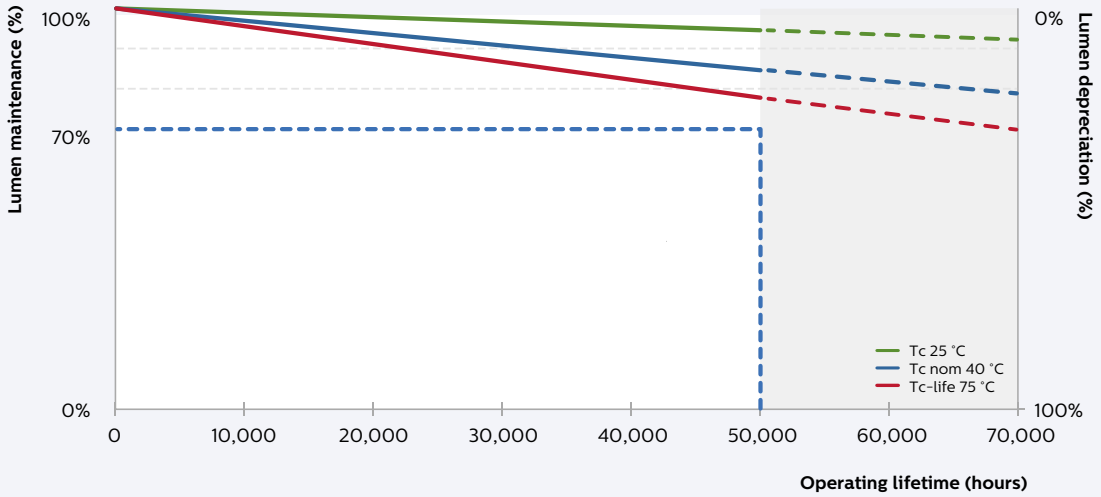
Lumen maintenance

Lumen maintenance at l-life and Tc-life conditions



Lumen depreciation as a function of operating hours for l-life and Tc-life.

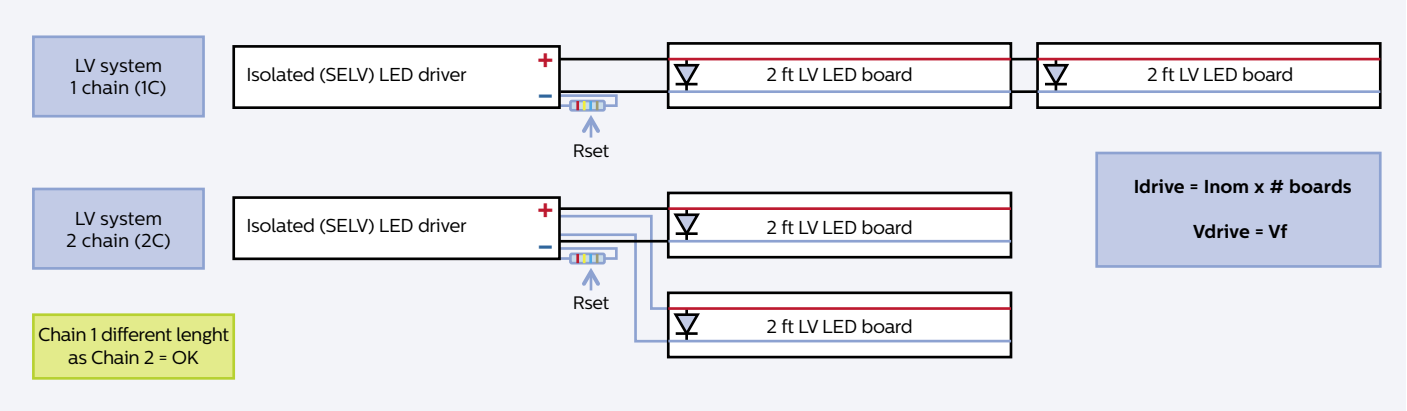
Lumen maintenance for B50 at current l-life conditions

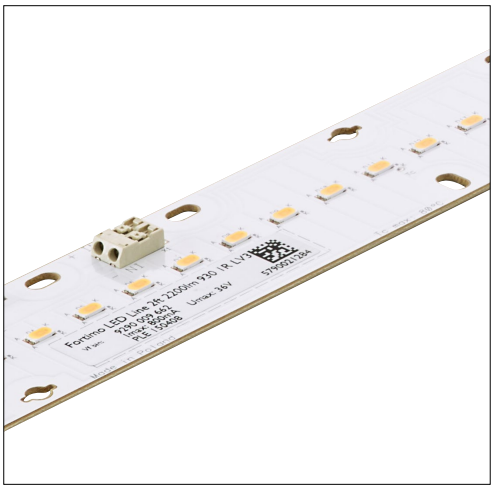


Lumen depreciation as a function of operating hours at different Tc values and l-life.

Wiring schematic

Examples





06/2015
Data subject to change

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