

**PHILIPS**

**Fortimo**

**LED**

Fortimo LED Line 1ft  
650lm 3R HV4



Datasheet

# Fortimo LED Line Gen4

Fortimo LED Line is designed to produce pure white light for general lighting applications with high efficiency levels. The Fortimo LED Line portfolio consists of 2 main ranges of products, which have been differentiated by the number of rows of LEDs on the module. Both ranges feature a variety of different length modules, lumen packages and color temperatures for all the different types of linear luminaires.

## Key features and benefits

- State-of-the-art LED module efficiency of up to 190 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, 4000 and 5000 K)
- Two module lengths: 1 ft/280 mm or 2 ft/560 mm
- Three lumen packages: 650, 1100 and 2000 lm per foot/280 mm
- LED module range with 1 or 3 rows of LEDs
- Tunable lumen output, efficacy and lifetime
- Push-in connectors enabling automated wiring
- Wide temperature (Tc) range from -40 °C up to +90 °C
- Five year system warranty

May 2017

 Zhaga

## Ordering data

Commercial product name	EOC	12NC	Box quantity
Fortimo LED Line 1ft 650lm 830 3R HV4	8718696 901625 00	9290 015 43706	180
Fortimo LED Line 1ft 650lm 840 3R HV4	8718696 901632 00	9290 015 43806	180
Fortimo LED Line 1ft 650lm 850 3R HV4	8718696 901649 00	9290 015 43906	180

## Drive currents

Parameter	Nominal*	Life**	Max***	Unit
Fortimo LED Line 1ft 650lm 3R HV4	120	278	278	mA

## Module temperatures

Parameter	Nominal*	Life**	Max***	Unit
T <sub>c</sub> (case temperature at T <sub>c</sub> point)	35	75	80	°C

\* Nominal value at which typical performance is specified

\*\* Value at which life time is specified

\*\*\* Maximum value for safe operation, do not operate above this value

## Optical characteristics - table per color (CCT)

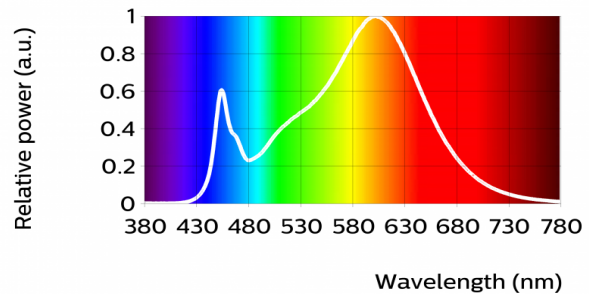
### Fortimo LED Line 1ft 650lm 830 3R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	559	604	649	lm
Module efficacy	148	164	181	lm/W
Correlated color temperature (CCT)		3000		K
Color coordinates (CIEx, CIEy)		(0.433, 0.400)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=3

Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	830	lm	lm/W
80% I-nom 96mA	Tc 25 °C	492	168
	Tc-nom 35 °C	486	167
	Tc-life 75 °C	456	151
I-nom 120mA	Tc 25 °C	613	166
	Tc-nom 35 °C	604	164
	Tc-life 75 °C	565	157
I-life 278mA	Tc 25 °C	1348	149
	Tc-nom 35 °C	1327	147
	Tc-life 75 °C	1232	140



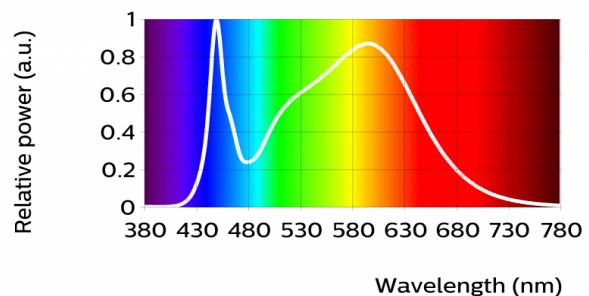
### Fortimo LED Line 1ft 650lm 840 3R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	601	650	699	lm
Module efficacy	159	177	195	lm/W
Correlated color temperature (CCT)		4000		K
Color coordinates (CIEx, CIEy)		(0.383, 0.375)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=6

Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	840	lm	lm/W
80% I-nom 96mA	Tc 25 °C	530	181
	Tc-nom 35 °C	523	180
	Tc-life 75 °C	490	173
I-nom 120mA	Tc 25 °C	659	178
	Tc-nom 35 °C	650	177
	Tc-life 75 °C	608	169
I-life 278mA	Tc 25 °C	1452	160
	Tc-nom 35 °C	1429	159
	Tc-life 75 °C	1326	150



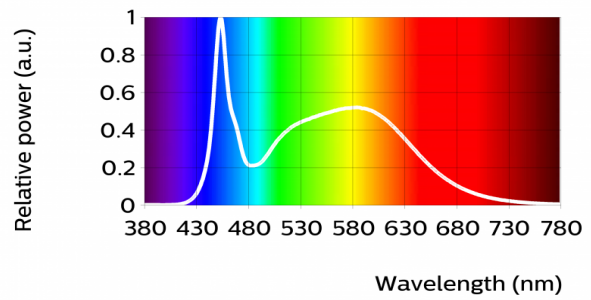
Fortimo LED Line 1ft 650lm 850 3R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	601	650	699	lm
Module efficacy	159	177	195	lm/W
Correlated color temperature (CCT)		5000		K
Color coordinates (CIEx, CIEy)		(0.345, 0.352)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=5

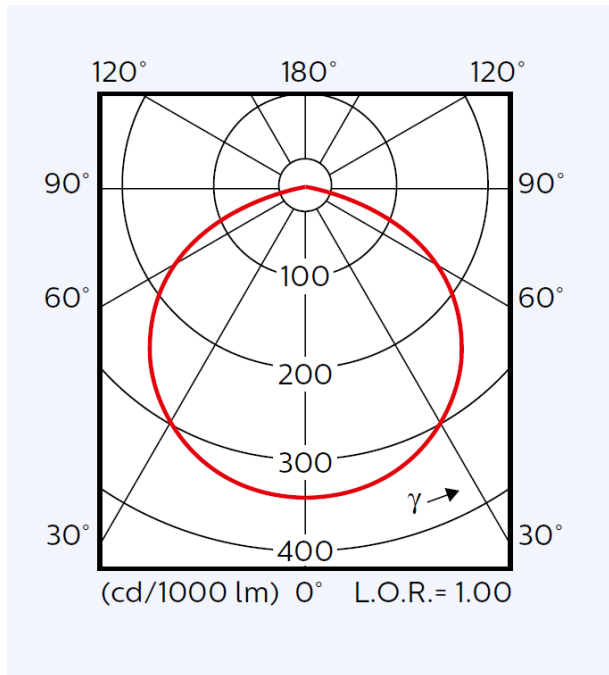
Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	850	lm	lm/W
80% I-nom 96mA	Tc 25 °C	530	181
	Tc-nom 35 °C	523	180
	Tc-life 75 °C	490	173
I-nom 120mA	Tc 25 °C	659	178
	Tc-nom 35 °C	650	177
	Tc-life 75 °C	608	169
I-life 278mA	Tc 25 °C	1452	160
	Tc-nom 35 °C	1429	159
	Tc-life 75 °C	1326	150



## 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

[Fortimo LED Line 1ft 650lm 830 3R HV4](#)  
[Fortimo LED Line 1ft 650lm 840 3R HV4](#)  
[Fortimo LED Line 1ft 650lm 850 3R HV4](#)

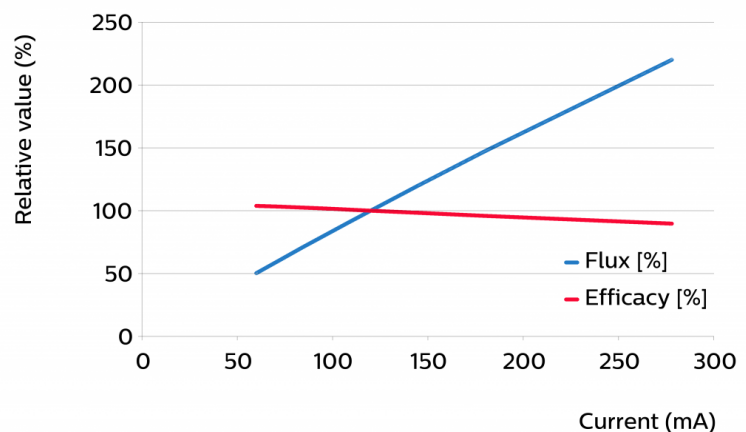
Parameter	Min	Typ	Max	Unit
Forward voltage	30.0	30.6	31.2	V
Power consumption	3.6	3.7	3.8	W
Number of modules in series per chain			8	

Measurement precision for Vf +/- 3%. Measurement precision for power +/- 3.3%  
 Specifications stated at Tc-nom and I-nom  
 Bins D and I

## Tuning information

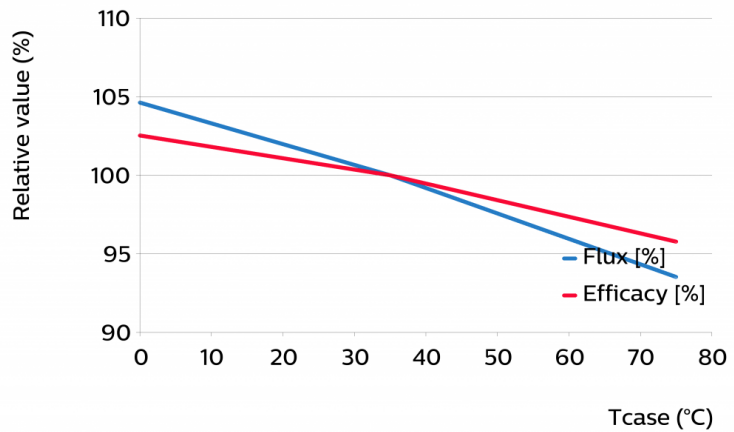
Flux and efficacy versus current (at Tc nominal)

I [mA]	Flux [%]	Efficacy [%]
278	220	90
180	147	96
144	119	98
120	100	100
108	90	101
96	80	102
84	70	102
72	60	103
60	50	104



Flux and efficacy versus temperature at Tc (at I nominal)

Tcase [°C]	Flux [%]	Efficacy [%]
75	94	96
35	100	100
0	105	103



## Lumen maintenance

Operation point	Lumen maintenance x 1000 hours	L70			L80			L90		
		B50	B20	B10	B50	B20	B10	B50	B20	B10
80% I-nom 96mA	Tc 25°C	>70	>70	>70	64	61	60	30	29	28
	Tc-nom 35°C	>70	>70	>70	64	61	60	30	29	28
	Tc-life 75°C	>70	>70	>70	49	47	46	23	22	22
I-nom 120mA	Tc 25°C	>70	>70	>70	60	57	56	28	27	27
	Tc-nom 35°C	>70	>70	>70	60	57	56	28	27	27
	Tc-life 75°C	>70	>70	70	46	44	43	22	21	21
I-life 278mA	Tc 25°C	>70	>70	>70	56	53	52	26	25	25
	Tc-nom 35°C	>70	>70	>70	56	53	52	26	25	25
	Tc-life 75°C	69	66	65	43	41	40	20	20	19

Values in the table are based on available LM80 LED data (12000 hours). Lumen maintenance will be updated once additional measurement data becomes available.

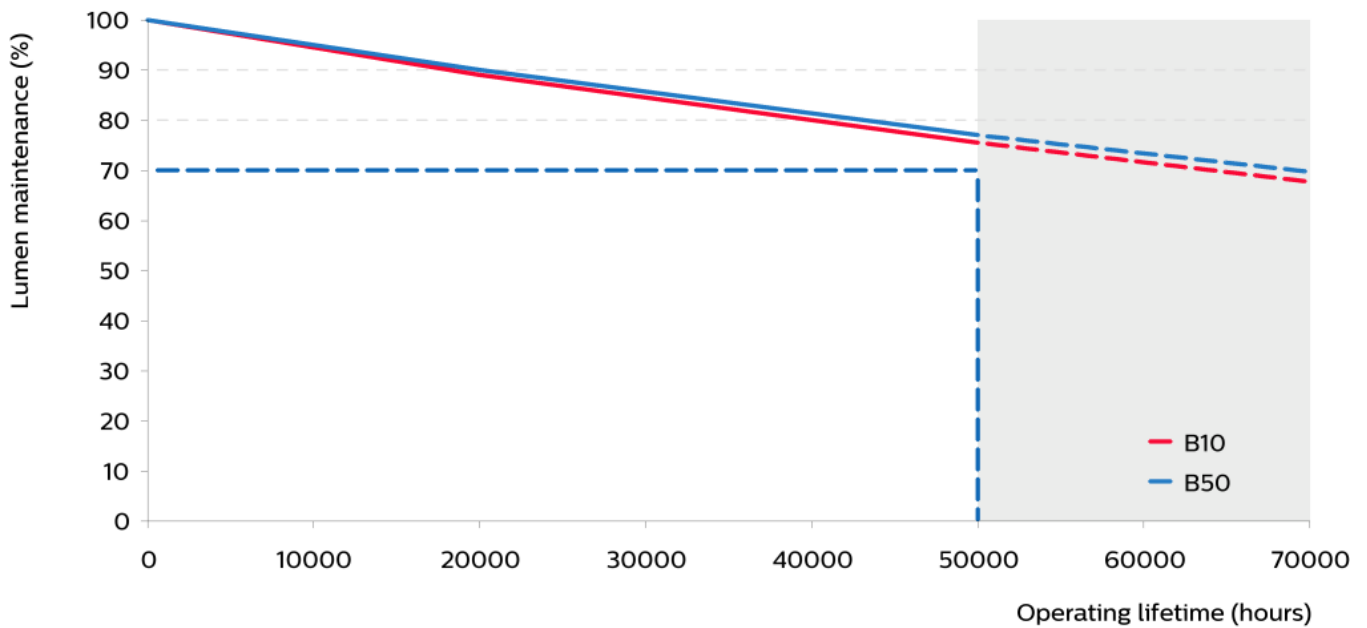
## Thermal switching table

Calculated number of switches at which the survival rate of the population  $\geq 90\%$ , at a given ambient temperature and delta T with respect to Tc (where  $T_c = T_{\text{ambient}} + \Delta T$ )

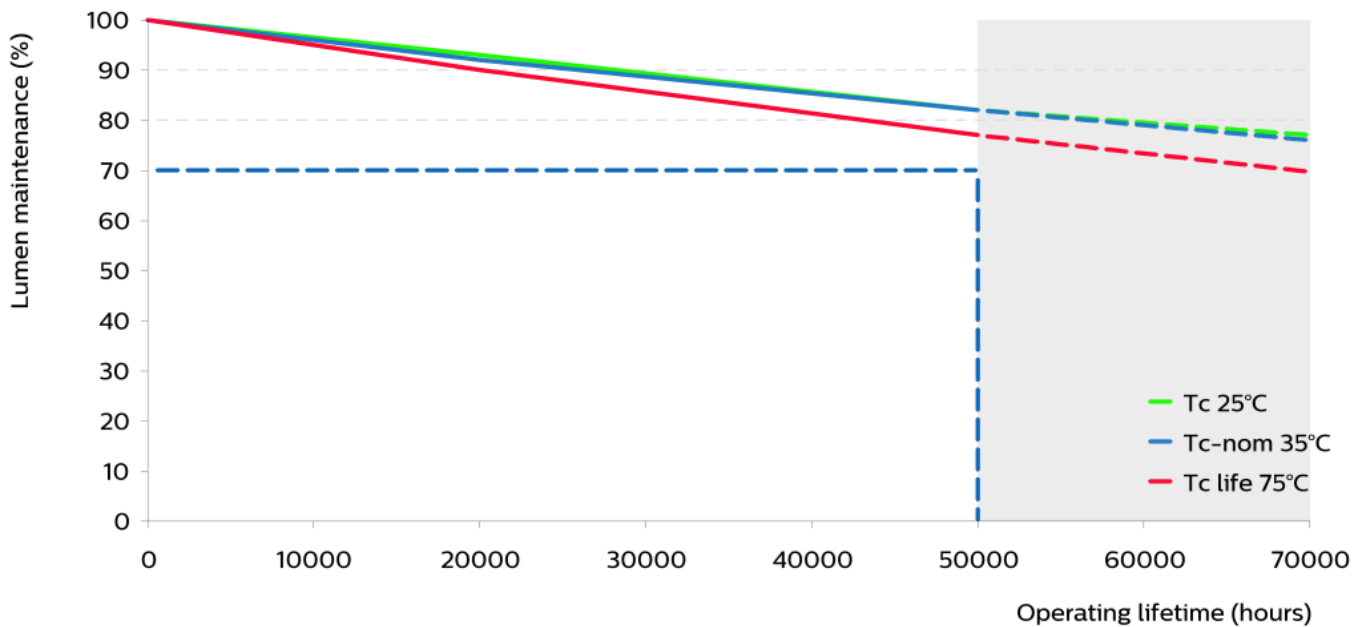
		Tambient [°C]												
		-40	-30	-20	-10	0	10	20	30	40	50	60	70	
delta T [°C] (delta T = Tc - Tambient)	Continuous operation or dimming only	10	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k
		20	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X
		30	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X
		40	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X	X	X
		50	49 k	49 k	49 k	49 k	49 k	49 k	49 k	49 k	X	X	X	X
		60	25 k	25 k	25 k	25 k	25 k	25 k	25 k	X	X	X	X	X
		70	14 k	14 k	14 k	14 k	14 k	X	X	X	X	X	X	X
		80	8 k	8 k	8 k	8 k	X	X	X	X	X	X	X	X
		90	5 k	5 k	5 k	X	X	X	X	X	X	X	X	X
		100	4 k	4 k	X	X	X	X	X	X	X	X	X	X

## Lumen maintenance graphs

### Lumen maintenance at I-life and Tc-life conditions

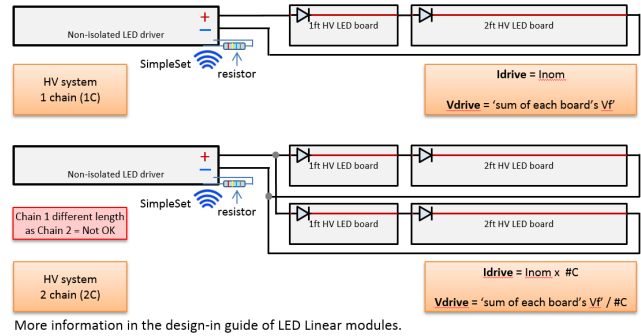


### Lumen maintenance for B50 at current I-life conditions



## Wiring

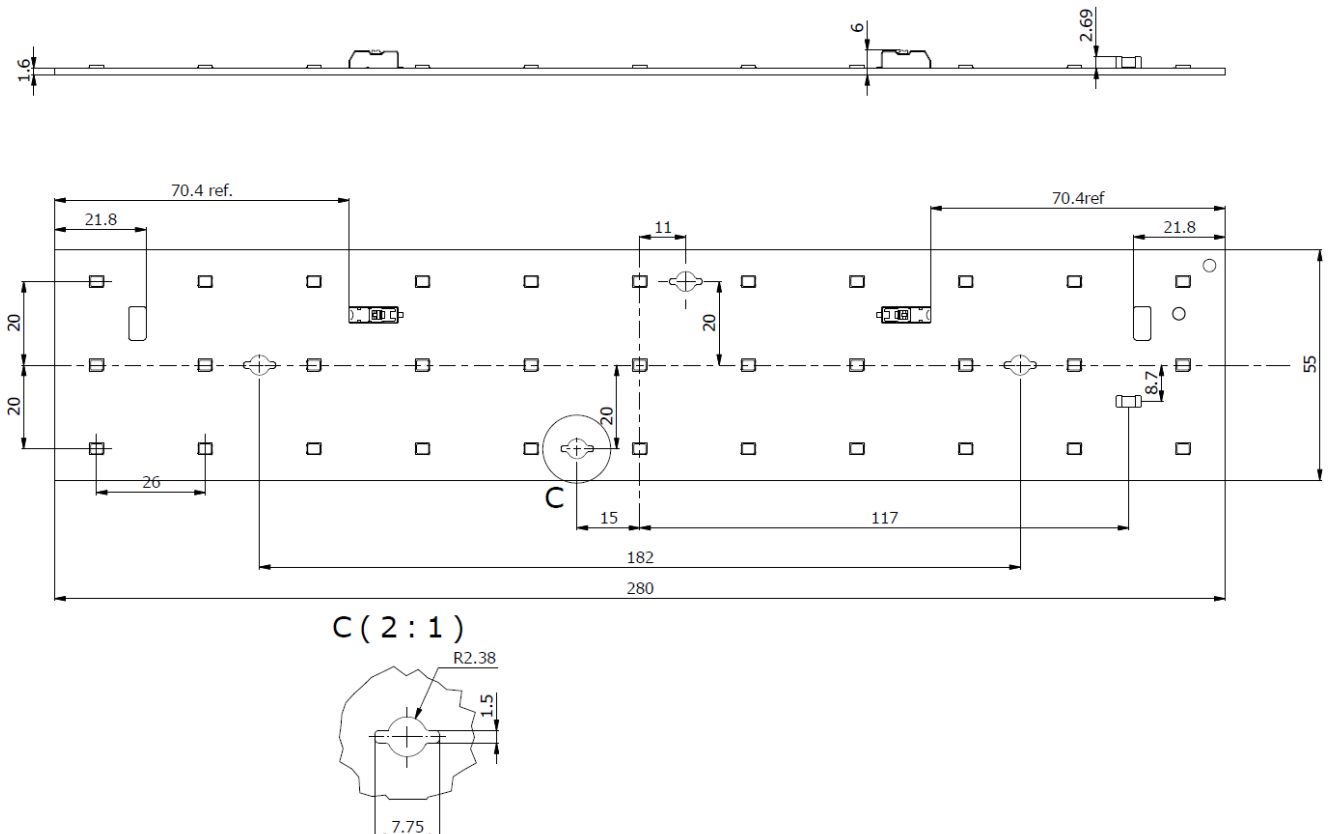
Specification item	Value	Unit	Condition
Input wire cross-section	0.33...0.5	mm <sup>2</sup>	stranded wire
	20...22	AWG	stranded wire
Input wire strip length	7.5...8.5	mm	
Input wire cross-section	0.33...0.75	mm <sup>2</sup>	solid, fused, stranded
	18...22	AWG	solid, fused, stranded
Input wire strip length	7.5...8.5	mm	



## Mechanical characteristics

Fortimo LED Line 1ft 650lm 830 3R HV4  
 Fortimo LED Line 1ft 650lm 840 3R HV4  
 Fortimo LED Line 1ft 650lm 850 3R HV4

Parameter	Min	Typ	Max	Unit
Length	279.5	280	280.5	mm
Width	54.5	55	55.5	mm
Height excl. connector	4.19	4.29	4.39	mm
Height incl. connector	5.6	5.8	6	mm
Warpage (IPC-TM-650)			0.75	%





## Absolute ratings

Parameter	Min	Typ	Max	Unit
Current through the LED module (I-max)			278	mA
Case temperature (Tc-max)			80	°C
Power at rated Vf-max and I-max			9.6	W
ESD (direct contact)			8	kV
ESD (air)			15	kV
Working voltage			420	V <sub>dc</sub>
Voltage strength	1840			V <sub>ac</sub>
Ambient temperature	-40			°C

## Application information

### Certificates and Standards

IEC 62384

IEC 62031:2008 (First Edition) + A1:2012 + A2:2014

Relevant clauses of EN 62471:2008 (With IEC/TR 62471-2: 2009 and IEC/TR 62778: 2014)

UL 8750

ENEC+

CE

ENEC

IEC/TR 62278:2014

### Environmental

RoHS/REACH

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Compliant\*

\*L28W6

### Application

IP rating	No IP-rating
Overheating protection	No protection
Luminaire class	IEC Class I and IEC Class II
Dimming	Yes



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