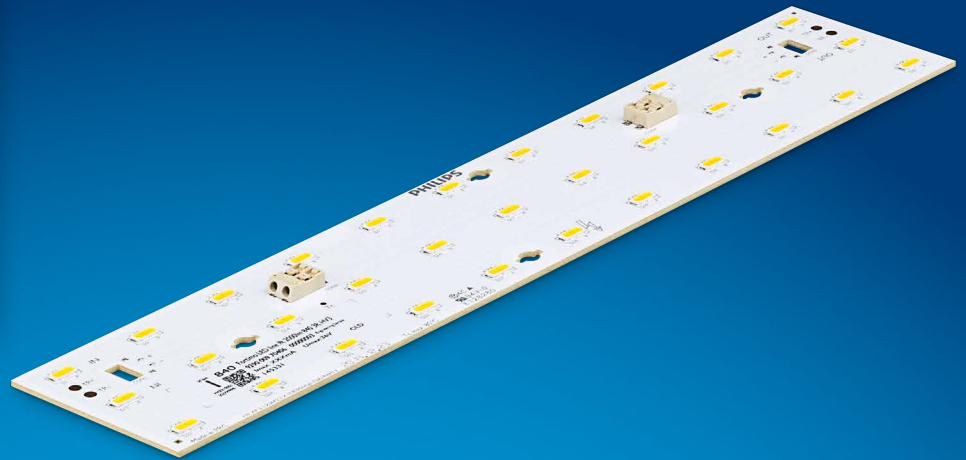


**PHILIPS**

Fortimo

LED system

LED Line 1 ft  
2000 lm 3R HV2



## Datasheet

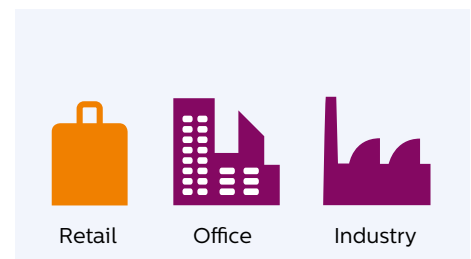
# Fortimo LED Line High Flux Gen2

Fortimo LED Line High Flux system are designed to enable LED lighting at higher application heights where more light is needed, such as trunking, battens and high-bay applications in warehouses, factories or big retail stores.

### Key features and benefits

- LED module efficiency of up to 158 lm/W
- Long life-time: up to >100,000 hours
- High color rendering: CRI >80
- Excellent color consistency of 3 SDCM
- High Tc life of 90 °C for usage in rough application conditions
- Tc range of -40 °C to + 95 °C enables extreme ambient temperatures
- Choice of color temperatures (3000 K, 3500 K, 4000 K and 5000 K)
- Lumen package: 2000 lm per foot (tunable up to 3000 lm per foot)

### Suitable for:



October 2015



## Ordering data

Commercial product name	EOC	12NC
Fortimo LED Line 1ft 2000lm 830 3R HV2	8718696 480946 00	9290 009 70306
Fortimo LED Line 1ft 2000lm 835 3R HV2	8718696 480960 00	9290 009 71006
Fortimo LED Line 1ft 2000lm 840 3R HV2	8718696 480984 00	9290 009 70406
Fortimo LED Line 1ft 2000lm 850 3R HV2	8718696 481004 00	9290 009 70506

## Drive currents and case temperatures

Parameter	Nominal*	Life**	Max***	Unit
I (current through the LED module)	426	630	650	mA
Tc (case temperature at Tc point)	45	90	95	°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 1 ft 2000 lm 830 3R HV2

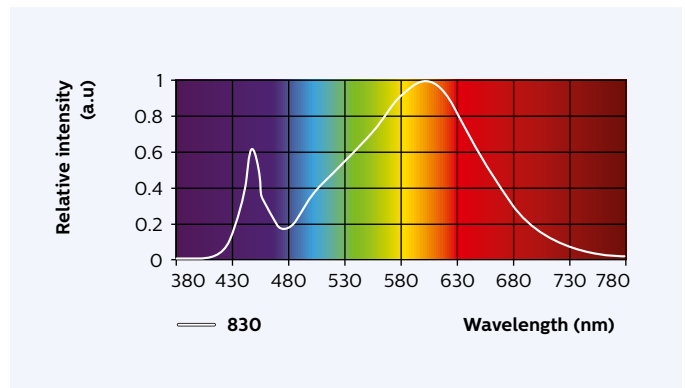
Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		3000		K
Color coordinates (CIEx, CIEy)		(0.437, 0.404)		-
CRI	80			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	830	lm	lm/W
80% I-nom 341 mA	Tc 25 °C	1588	154
	Tc-nom 45 °C	1531	151
	Tc-life 90 °C	1404	144
I-nom 426 mA	Tc 25 °C	1970	150
	<b>Tc-nom 45 °C</b>	<b>1900</b>	<b>147</b>
	Tc-life 90 °C	1743	141
I-life 630 mA	Tc 25 °C	2854	141
	Tc-nom 45 °C	2755	138
	Tc-life 90 °C	2530	132

Tolerance for flux data is ±7.5%.

Tolerance for efficacy data is ±10%.



### Fortimo LED Line 1 ft 2000 lm 835 3R HV2

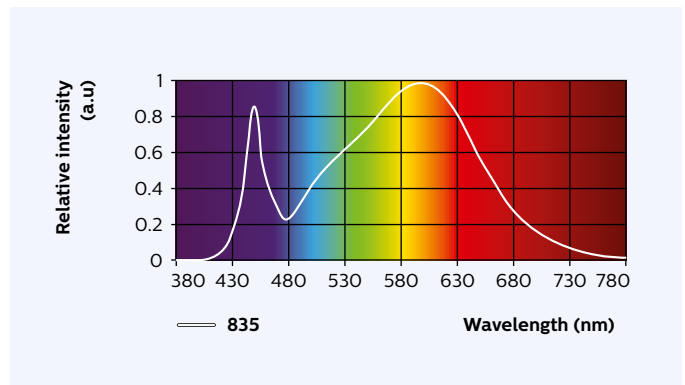
Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		3500		K
Color coordinates (CIEx, CIEy)		(0.410, 0.393)		-
CRI	80			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	835	lm	lm/W
80% I-nom 341 mA	Tc 25 °C	1638	159
	Tc-nom 45 °C	1579	156
	Tc-life 90 °C	1448	149
I-nom 426 mA	Tc 25 °C	2032	155
	<b>Tc-nom 45 °C</b>	<b>1960</b>	<b>152</b>
	Tc-life 90 °C	1798	145
I-life 630 mA	Tc 25 °C	2944	146
	Tc-nom 45 °C	2841	143
	Tc-life 90 °C	2609	136

Tolerance for flux data is ±7.5%.

Tolerance for efficacy data is ±10%.



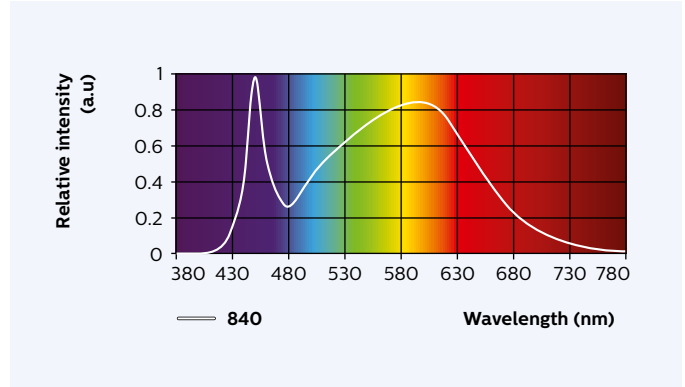
## Fortimo LED Line 1 ft 2000 lm 840 3R HV2

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		4000		K
Color coordinates (CIEx, CIEy)		(0.384, 0.382)		-
CRI	80			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	840	lm	lm/W
80% I-nom 341 mA	Tc 25 °C	1671	162
	Tc-nom 45 °C	1612	159
	Tc-life 90 °C	1478	152
I-nom 426 mA	Tc 25 °C	2073	158
	<b>Tc-nom 45 °C</b>	<b>2000</b>	<b>155</b>
	Tc-life 90 °C	1835	148
I-life 630 mA	Tc 25 °C	3004	149
	Tc-nom 45 °C	2899	146
	Tc-life 90 °C	2663	139

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



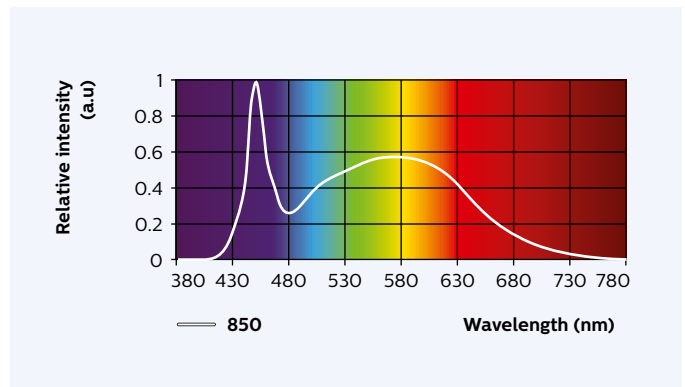
## Fortimo LED Line 1 ft 2000 lm 850 3R HV2

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT)		5000		K
Color coordinates (CIEx, CIEy)		(0.346, 0.358)		-
CRI	80			-
Radiation angle		120		deg

Color consistency of 3 SDCM, averaged over the module.

Operation point	850	lm	lm/W
80% I-nom 341 mA	Tc 25 °C	1671	162
	Tc-nom 45 °C	1612	159
	Tc-life 90 °C	1478	152
I-nom 426 mA	Tc 25 °C	2073	158
	<b>Tc-nom 45 °C</b>	<b>2000</b>	<b>155</b>
	Tc-life 90 °C	1835	148
I-life 630 mA	Tc 25 °C	3004	149
	Tc-nom 45 °C	2899	146
	Tc-life 90 °C	2663	139

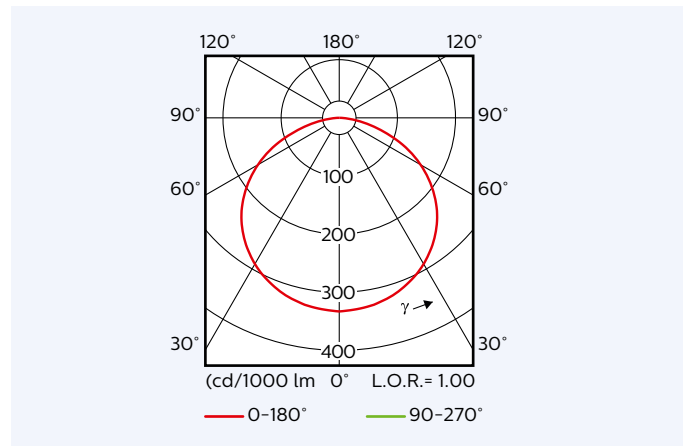
Tolerance for flux data is ±7.5%.  
Tolerance for efficacy data is ±10%.



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

## 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		426		mA
Forward voltage	28.9	30.3	31.7	V
Power consumption	12.3	12.9	13.5	W
Energy efficiency label		A++		
Minimum dimming for performance	10			%
Number of modules per chain			8	
Bins		2 (I 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 340 mA	Tc 25 °C	>100	100	100	94	91	90	44	43	42
	Tc-nom 45 °C	100	100	99	65	63	62	31	30	29
	Tc-life 90 °C	63	61	60	39	38	38	19	18	18
I-nom 426 mA	Tc 25 °C	>100	100	100	94	91	90	44	43	42
	Tc-nom 45 °C	100	100	99	65	63	62	31	30	29
	Tc-life 90 °C	63	61	60	39	38	38	19	18	18
I-life 630 mA	Tc 25 °C	>100	100	100	94	91	90	44	43	42
	Tc 45 °C	100	100	99	65	63	62	31	30	29
	Tc-life 90 °C	63	61	60	39	38	38	19	18	18

Values in the table are based on available LM80 LED data (12000h). Lumen maintenance will be updated once additional measurement data becomes available. >70k hours claim is based on extrapolating raw LM80-data to lower temperatures and currents by using statistical techniques.

Parameter	Min	Typ	Max	Unit
$\Delta u'v'$ 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)			650	mA
Case temperature (Tc-max)			95	°C
Power rated at U-max and I-max			22.7	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

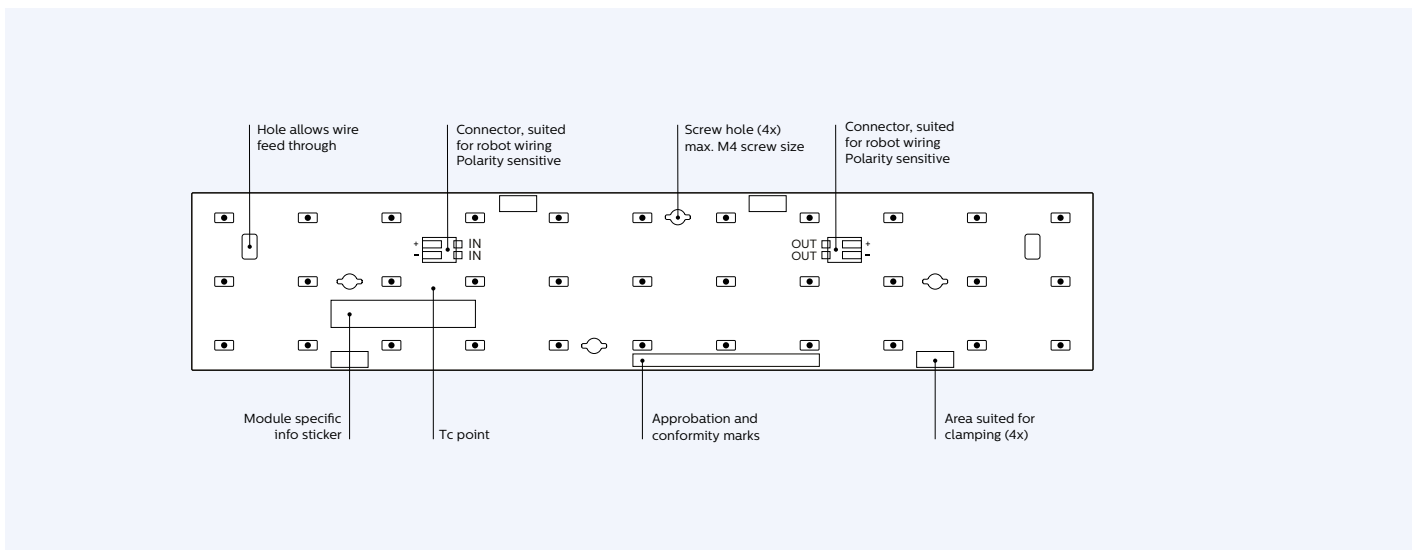
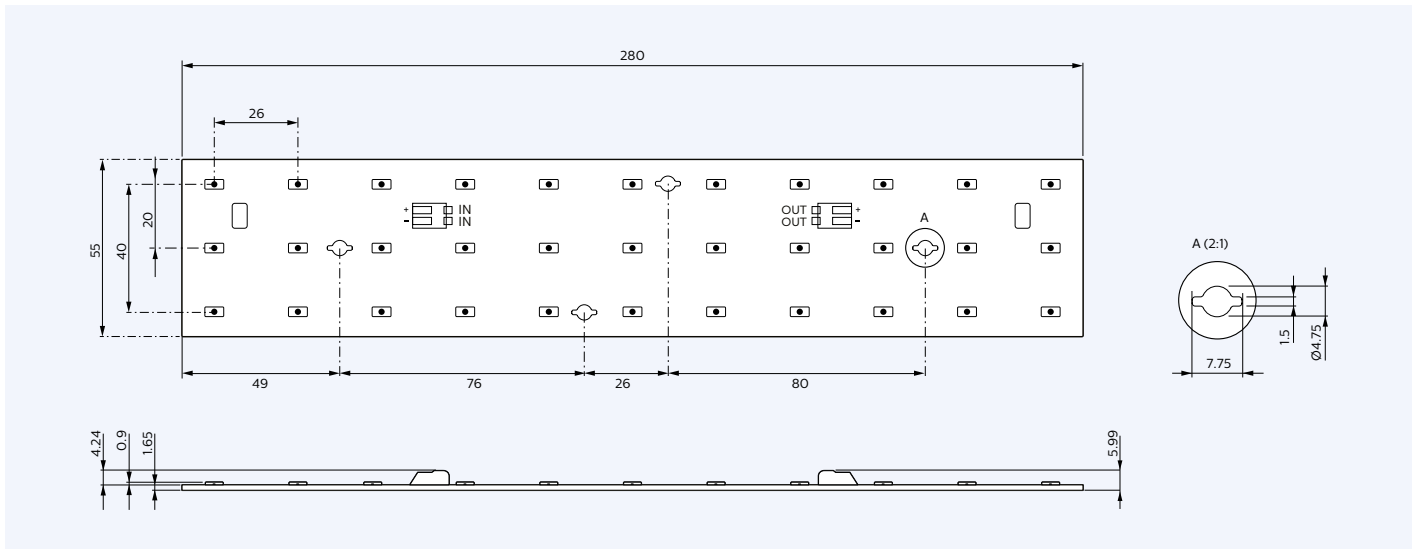
Specification item	Value	Unit	Condition
Input wire cross-section	0.2...0.75	mm <sup>2</sup>	Solid
	18...24	AWG	
	0.3...0.5	mm <sup>2</sup>	Stranded
	20...22	AWG	
Input wire strip length	7.5..8.5	mm	
Tested cable length	4000	mm	Total length of wiring including LED modules, one way

Connector suited for robot wiring.

## Mechanical characteristics

Parameter	Min	Typ	Max	Unit
Length	279.75	280	280.25	mm
Width	54.8	55	55.2	mm
Height excl. connector	1.5	1.65	1.8	mm
Height incl. connector	5.65	5.85	6.05	mm
Warpage (IPC-TM-650)			2.1	mm

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



## Application information

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### Compliance and approval

IEC / EN 62031, IEC / EN 62471

### Photobiological safety

Risk Group: Risk Group 1

### Environmental

RoHS / REACH

## Application information

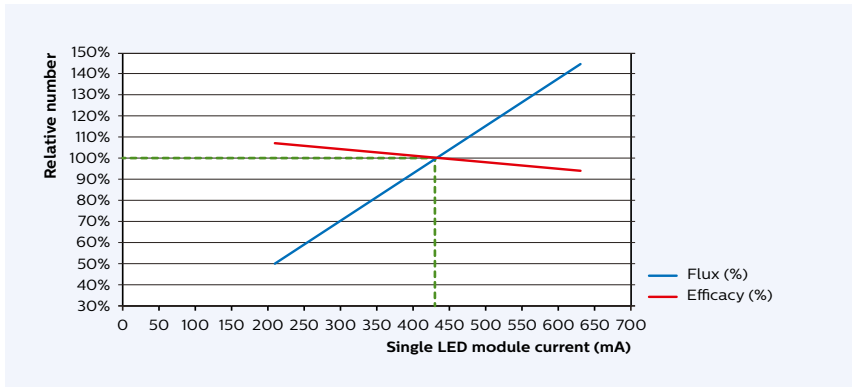
<b>Zhaga</b>	
Designation of the Book-7 LLE category	L28W6
Luminous Flux category	C020
CCT category	3000 K, 3500 K, 4000 K, 5000 K
CRI	80
The position of the temperature measurement point $t_p$	Same as $T_c$ point
The value of $t_p$ , max	45

<b>IP rating</b>	<b>No IP rating</b>
Overheating protection	No protection
Luminaire class	IEC Class I or Class II

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

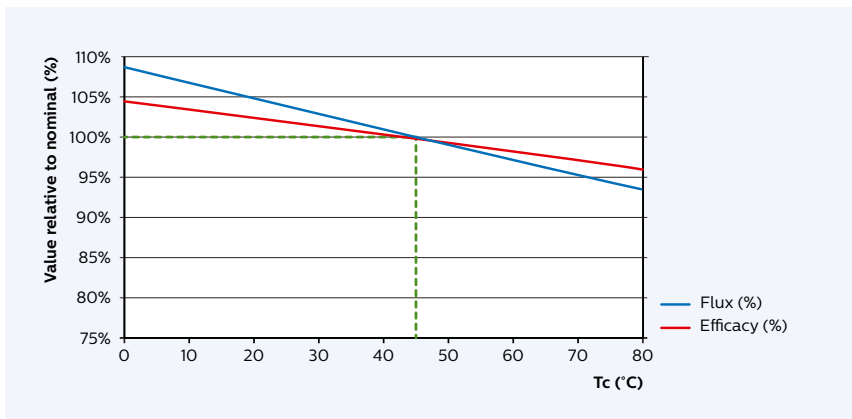
<b>Case temperature <math>T_c</math> [°C]</b>	<b>Amount of cycles</b>
35	14,600
40	
45	
50	14,600
55	
60	
65	14,600
70	
75	
80	14,600
85	14,600
90	13,000
95	

## Tuning information



### Flux and efficacy versus current

	I [mA]	Flux [%]	Efficacy [%]
50% Inom	210	50%	107%
	250	59%	106%
	300	71%	104%
	350	83%	102%
<b>I nom</b>	<b>426</b>	<b>100%</b>	<b>100%</b>
	500	117%	98%
I-life	630	145%	94%

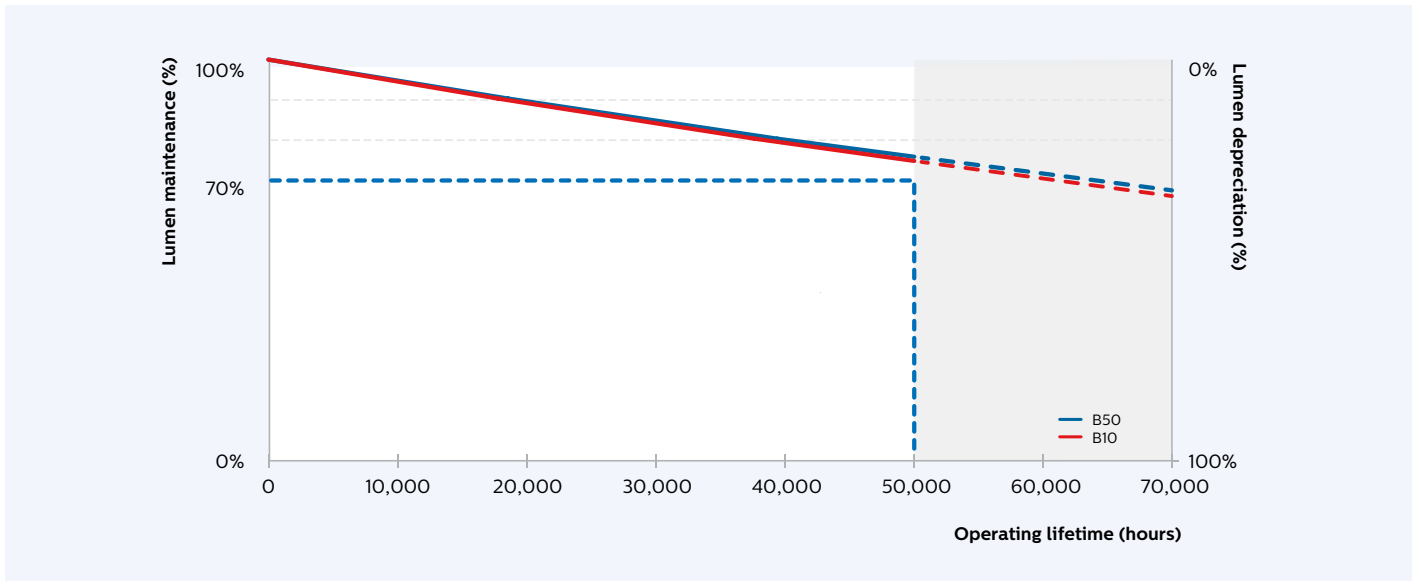


### Flux and efficacy versus temperature at Tc

	Tc [°C]	Flux [%]	Efficacy [%]
(Tc-life)	90	92%	95%
	80	94%	96%
	70	95%	97%
	60	97%	99%
	55	98%	99%
<b>(Tc-nom)</b>	<b>45</b>	<b>100%</b>	<b>100%</b>
	25	104%	102%
	0	108%	104%

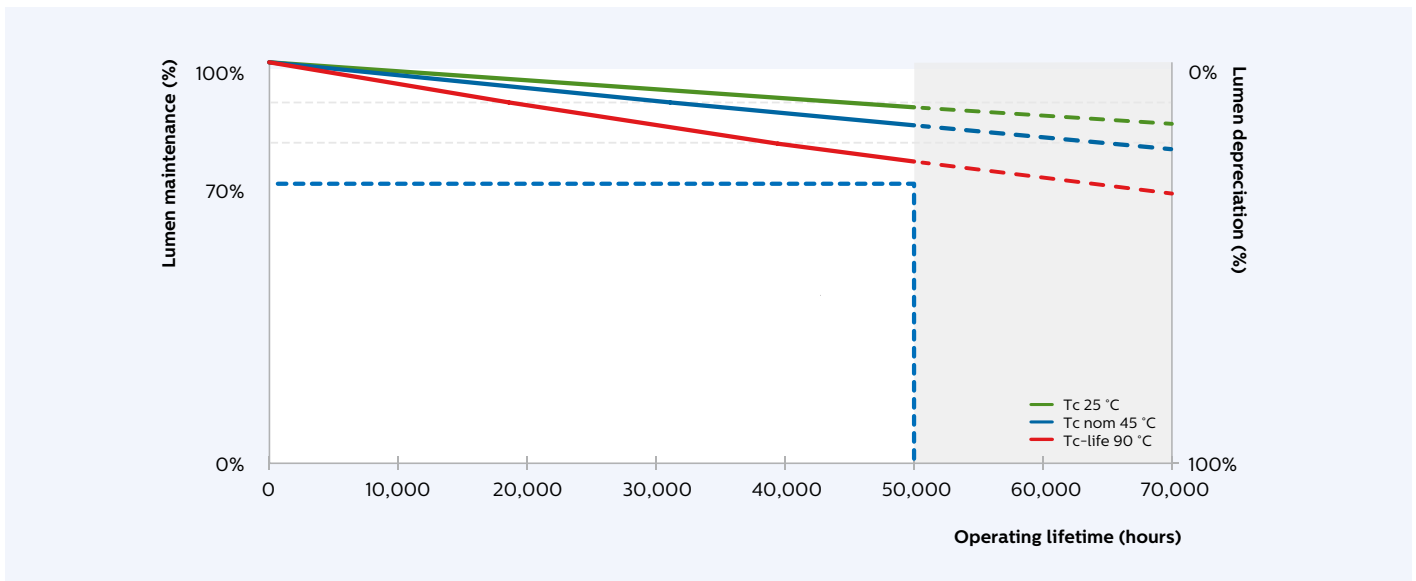
## Lumen maintenance

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



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

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

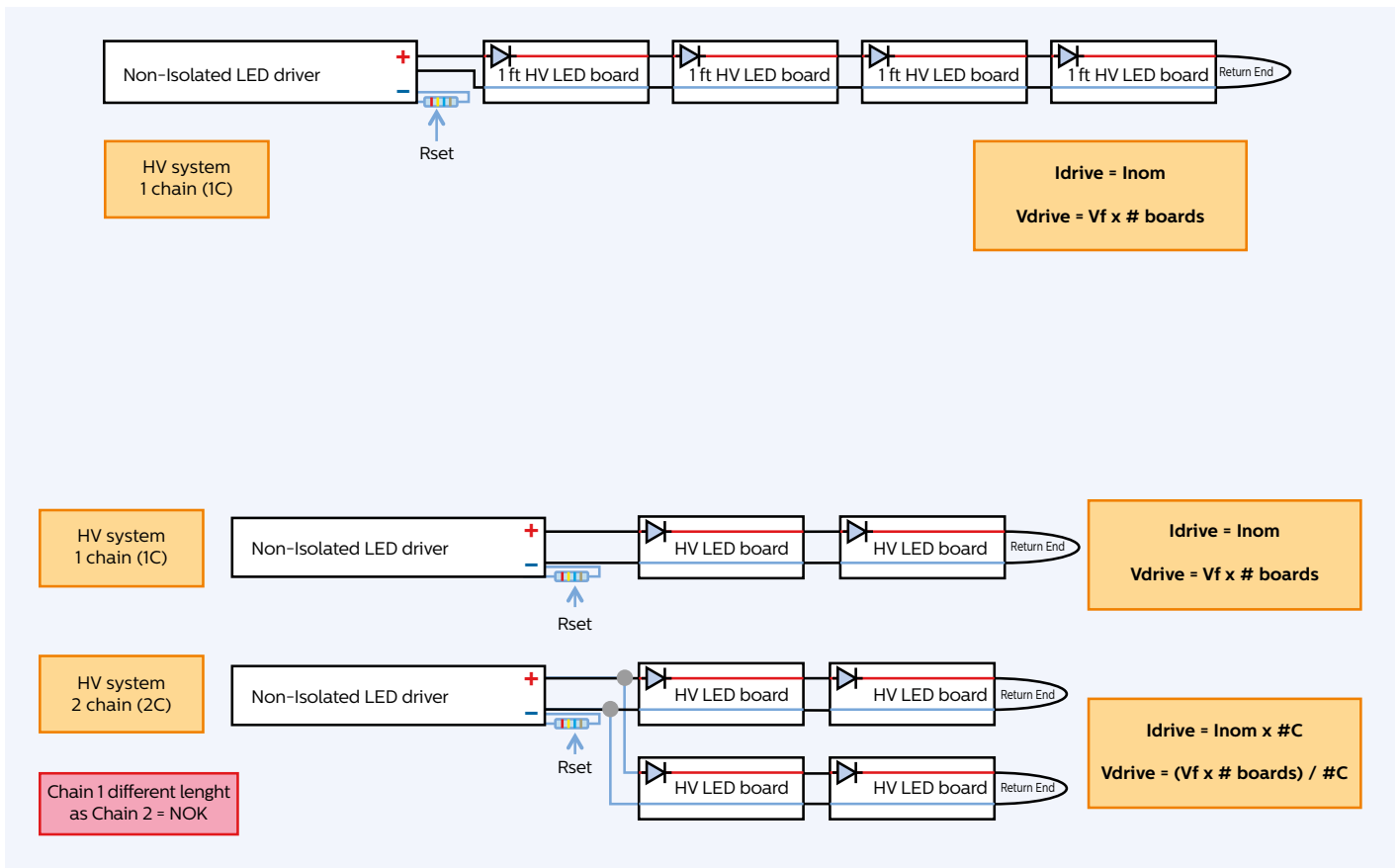


Lumen depreciation as a function of operating hours at different Tc values and I-life.



# Wiring schematic

## Examples





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10/2015  
Data subject to change