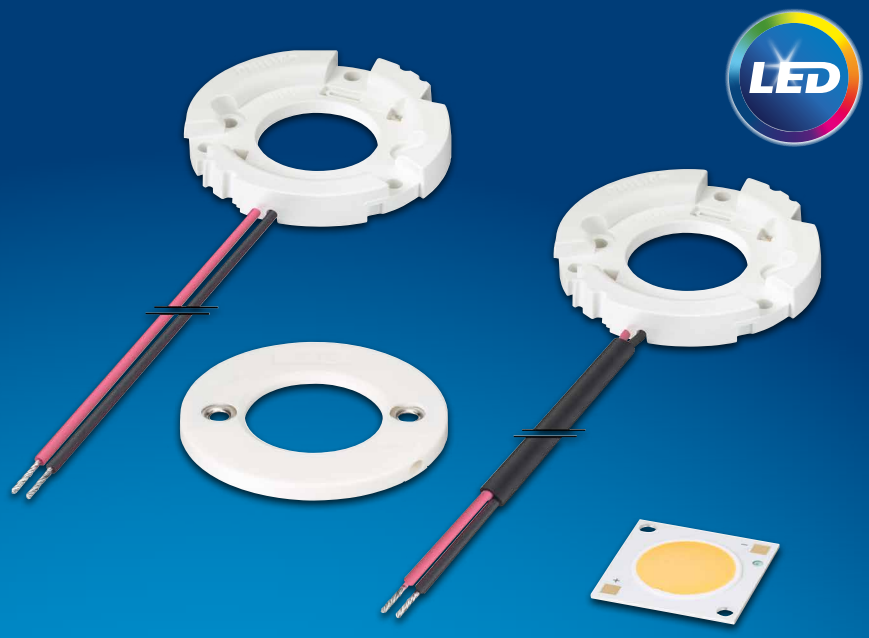
PHILIPS

Fortimo

LED system

SLM 1211 L19 Gen5



Datasheet

Experience **bright and vivid** colors

Fortimo SLM 1211 L19 G5

Fortimo LED SLM Gen5 continues to focus on the combination of Quality of Light and performance. By offering the CoB separate from the holder, even more flexibility in possible system combinations and specifications is achieved. This results in an extensive portfolio of lumen ranges, CCTs and spectras. Please also check the online Easy Design-in Tool for your perfect system combination (www.easydesignintool.com)

Key features and benefits

- High quality of white light
- Small LES for narrow beam angles and small reflector designs
- Flexibility to select a different lumen output between 700 and 6000 lm
- High energy efficacy of up to 147 lm/W or even higher
- System proposition (CoB + Holder + driver)
- Xitanium window drivers with SimpleSet for maximum flexibility
- Mini drivers for smallest possible luminaire designs
- Five years system warranty
- Over 50,000 hours lifetime
- Three dedicated product lines:
  - SLM Gen5 Premium White
  - SLM Gen5 CrispWhite
  - SLM Gen5 Food

October 2015

This product is available in the following options. It is possible to combine these with any of the holders from the portfolio. The customer has full flexibility to tune the CoB to get the required lumen output and/or efficacy. More details can be found further on in the document.

Ordering data

Commercial product name	EOC	12NC
Fortimo SLM C 830 1211 L19 2828 G5	6947939 118571 00	9290 009 87680
Fortimo SLM C 835 1211 L19 2828 G5	6947939 118595 00	9290 009 87780
Fortimo SLM C 840 1211 L19 2828 G5	6947939 118618 00	9290 009 87880
Fortimo SLM C 927 1211 L19 2828 G5	6947939 118632 00	9290 009 87980
Fortimo SLM C 930 1211 L19 2828 G5	6947939 120567 00	9290 015 00380
Fortimo SLM C 935 1211 L19 2828 G5	6947939 118533 00	9290 009 88080
Fortimo SLM C 940 1211 L19 2828 G5	6947939 118298 00	9290 009 88180

Drive currents and case temperatures

Parameter	Nominal*	Life**	Max***	Unit
I (current through the LED module)	1200	1200	1500	mA
Tc (Case temperature at Tc point)	85	85	95	°C

* Nominal value at which typical performance is specified.
** Value at which lifetime is specified.
*** Maximum value for safe operation, do not operate above this value.

Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Nominal Current		1200	1500	mA
Forward Voltage		34.7	37.7	V
Power consumption		41.7	45.3	W

Specifications stated at Tc-nom and I-nom.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Current through the LED module (I-max)			1500	mA
Case temperature (Tc-max)			95	°C
Power at rated Tc-max and I-max			53.6	W
ESD Human Body Model (HBM) Class 3A JESD22-A114-E 8 kV			8	kV
ESD Machine Model (MM) Class B JESD22-A115-B			400	kV
Ambient temperature	-20		40	°C
Storage temperature	-40		80	°C

Optical characteristics - table per color (CCT)

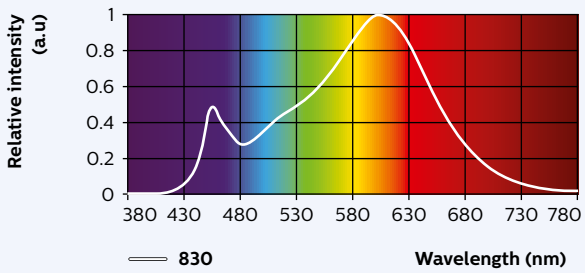
Fortimo SLM 830 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		3000		K
Color Coordinates (CIEx, CIEy)		(0.434, 0.403)		-
CRI	80			-
Energy Efficiency Label		A++		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	830	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	4370	133
	Tc-nom 85 °C	4210	130
	Tc-max 95 °C	4130	128
I-nom = I - life 1200 mA	Tc 65 °C	5290	125
	Tc-nom 85 °C	5090	122
	Tc-max 95 °C	4980	120
I-max 1500 mA	Tc 65 °C	6370	117
	Tc-nom 85 °C	6120	114
	Tc-max 95 °C	5980	112

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances.
Please refer to the warranty window to ensure that your operating conditions are covered.



Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
84	83	94	93	80	84	94	81	60	12	87	80	76	86	97

Fortimo SLM 835 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		3500		K
Color Coordinates (CIEx, CIEy)		(0.407, 0.392)		-
CRI	80			-
Energy Efficiency Label		A++		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	835	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	4540	138
	Tc-nom 85 °C	4380	135
	Tc-max 95 °C	4290	133
I-nom = I - life 1200 mA	Tc 65 °C	5500	131
	Tc-nom 85 °C	5290	127
	Tc-max 95 °C	5180	125
I-max 1500 mA	Tc 65 °C	6630	122
	Tc-nom 85 °C	6360	118
	Tc-max 95 °C	6220	116

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances.
Please refer to the warranty window to ensure that your operating conditions are covered.

Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
85	86	96	93	80	85	94	83	65	22	90	79	71	89	97

Optical characteristics - table per color (CCT)

Fortimo SLM 840 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		4000		K
Color Coordinates (CIEx, CIEy)		(0.382, 0.380)		-
CRI	80			-
Energy Efficiency Label		A++		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	840	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	4690	143
	Tc-nom 85 °C	4530	139
	Tc-max 95 °C	4440	137
I-nom = I - life 1200 mA	Tc 65 °C	5680	135
	Tc-nom 85 °C	5470	131
	Tc-max 95 °C	5350	129
I-max 1500 mA	Tc 65 °C	6650	126
	Tc-nom 85 °C	6580	122
	Tc-max 95 °C	6430	120

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Tolerance for Vf data is ±10%.
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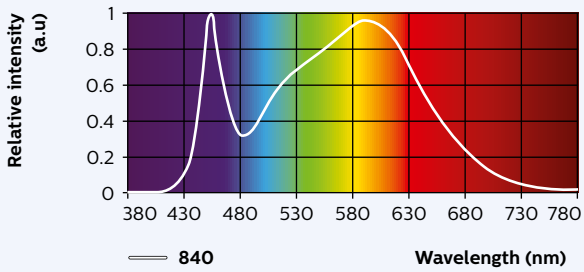


Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
82	80	89	96	79	80	85	86	63	5	74	77	58	82	98

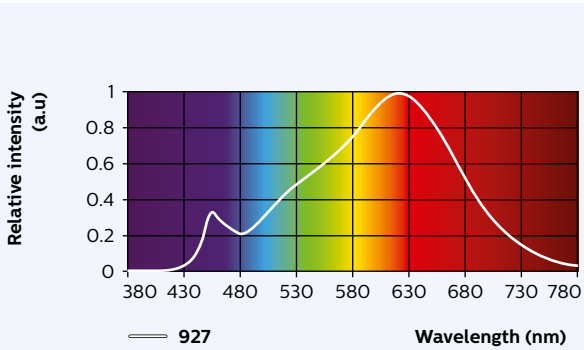
Fortimo SLM 927 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		2700		K
Color Coordinates (CIEx, CIEy)		(0.458, 0.410)		-
CRI	90			-
Energy Efficiency Label		A+		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	927	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	3620	110
	Tc-nom 85 °C	3500	108
	Tc-max 95 °C	3430	106
I-nom = I - life 1200 mA	Tc 65 °C	4390	104
	Tc-nom 85 °C	4220	101
	Tc-max 95 °C	4130	100
I-max 1500 mA	Tc 65 °C	5290	97
	Tc-nom 85 °C	5080	94
	Tc-max 95 °C	4960	93

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances.
Please refer to the warranty window to ensure that your operating conditions are covered.



Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
92	92	96	99	91	91	96	91	79	54	90	91	81	93	99

Optical characteristics - table per color (CCT)

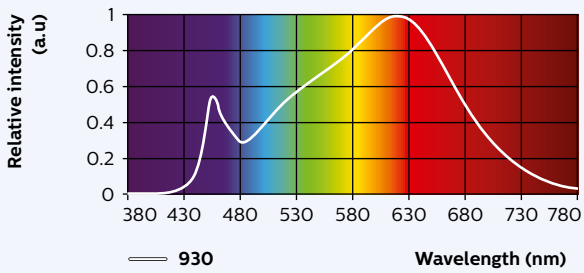
Fortimo SLM 930 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		3000		K
Color Coordinates (CIEx, CIEy)		(0.434, 0.403)		-
CRI	90			-
Energy Efficiency Label		A+		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	930	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	3760	114
	Tc-nom 85 °C	3620	112
	Tc-max 95 °C	3550	110
I-nom = I - life 1200 mA	Tc 65 °C	4550	108
	Tc-nom 85 °C	4380	105
	Tc-max 95 °C	4280	103
I-max 1500 mA	Tc 65 °C	5480	101
	Tc-nom 85 °C	5260	98
	Tc-max 95 °C	5140	96

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances.
Please refer to the warranty window to ensure that your operating conditions are covered.



Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
93	93	97	99	901	92	96	91	81	58	92	92	77	94	99

Optical characteristics - table per color (CCT)

Fortimo SLM 935 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		3500		K
Color Coordinates (CIEx, CIEy)		(0.407, 0.392)		-
CRI	90			-
Energy Efficiency Label		A+		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	935	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	3880	118
	Tc-nom 85 °C	3750	115
	Tc-max 95 °C	3670	114
I-nom = I - life 1200 mA	Tc 65 °C	4700	112
	Tc-nom 85 °C	4520	109
	Tc-max 95 °C	4430	107
I-max 1500 mA	Tc 65 °C	5670	104
	Tc-nom 85 °C	5440	101
	Tc-max 95 °C	5310	109

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances.
Please refer to the warranty window to ensure that your operating conditions are covered.

Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
94	95	99	98	91	93	96	92	85	69	96	92	76	97	99

Optical characteristics - table per color (CCT)

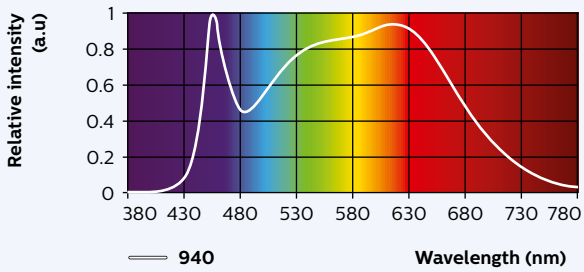
Fortimo SLM 940 1211 L19 G5

Parameter	Min	Typ	Max	Unit
Correlated color temperature (CCT) range		4000		K
Color Coordinates (CIEx, CIEy)		(0.382, 0.380)		-
CRI	90			-
Energy Efficiency Label		A+		-
Radiation Angle				deg

Color consistency of 3 SDCM, averaged over the module.
Tolerance of ± 0.005 on x, y coordinates.

Operation Point	940	lm	Lm/W
80% I-nom 960 mA	Tc 65 °C	4060	124
	Tc-nom 85 °C	3920	121
	Tc-max 95 °C	3840	119
I-nom = I - life 1200 mA	Tc 65 °C	4920	117
	Tc-nom 85 °C	4730	114
	Tc-max 95 °C	4630	112
I-max 1500 mA	Tc 65 °C	5930	109
	Tc-nom 85 °C	5690	106
	Tc-max 95 °C	5560	104

Tolerance for flux data is ±10%.
Tolerance for Vf data is ±10%.
Tolerance for efficacy data is dependent on the above mentioned tolerances. Please refer to the warranty window to ensure that your operating conditions are covered.

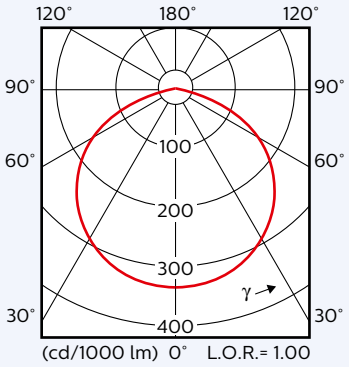


Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

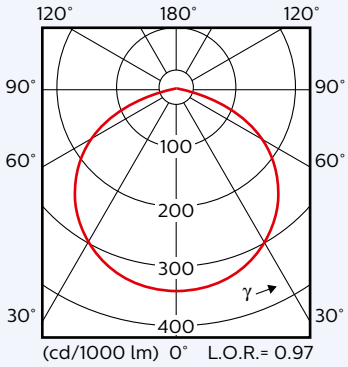
Ri	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
93	93	97	98	90	91	94	94	87	68	90	90	69	94	98

Beam shape

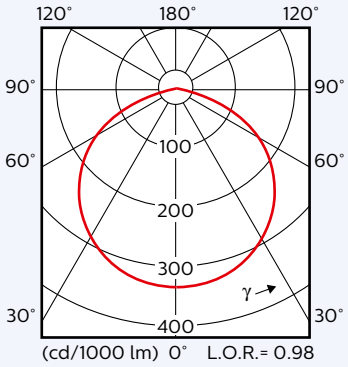
The Philips LED module generates a Lambertian beam shape, which is a pragmatic starting point for OEMs wishing to design secondary optics.



CoB without a holder



CoB with a standard/ down-light holder



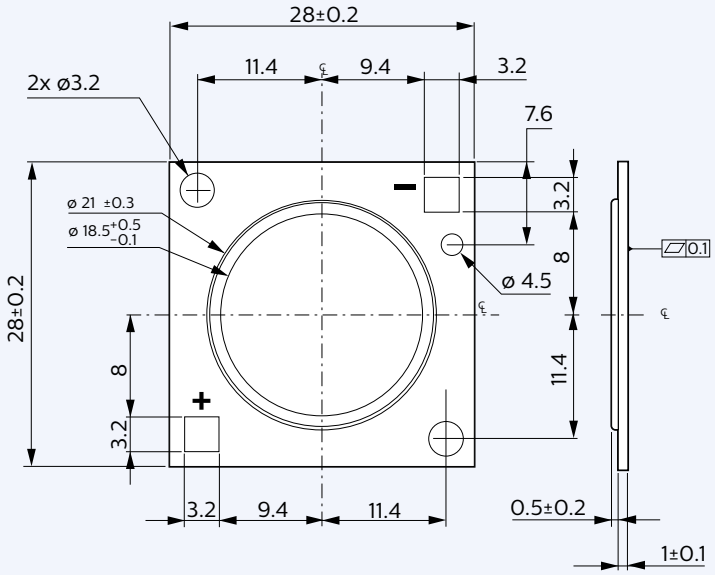
CoB with a poke-in holder

Lifetime

Operation point	Lifetime x 1000 hours	L70			L80			L90		
		B50	B20	B10	B50	B20	B10	B50	B20	B10
80% I-nom 960 mA	Tc 65 °C	>50	>50	>50	>50	>50	>50	>50	49	39
	Tc-nom 85 °C	>50	>50	>50	>50	46	37	33	22	17
	Tc-max 95 °C	>50	>50	41	48	32	25	23	15	12
I-nom = I - life 1200 mA	Tc 65 °C	>50	>50	>50	>50	>50	>50	>50	42	34
	Tc-nom 85 °C	>50	>50	>50	>50	40	32	29	19	15
	Tc-max 95 °C	>50	45	36	42	28	22	20	13	11
I-max 1500 mA	Tc 65 °C	>50	>50	>50	>50	>50	>50	>50	34	28
	Tc-nom 85 °C	>50	>50	43	>50	34	27	24	16	13
	Tc-max 95 °C	>50	37	30	36	23	19	17	11	9

Please refer to the warranty window to ensure that your operating conditions are covered.
>50 k hours claim is based on extrapolating raw LM80-data by using statistical techniques.

Mechanical characteristics



Application information

Compliance and approval

IEC / EN 62031, IEC / EN 62471

Environmental

RoHS/REACH

Photobiological safety

Item	Result: Risk group
Actinic UV	Exempt
Near-UV	Exempt
Retinal Blue Light	Risk Group 1
Retinal thermal	Exempt
Infrared Eye	Exempt
Thermal skin	Pass

Environmental

RoHS/REACH

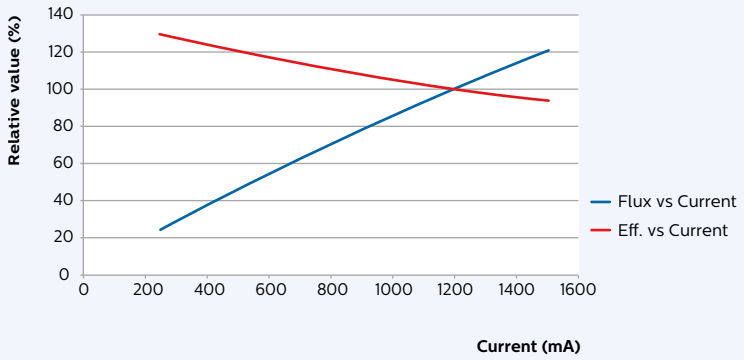
IP rating	No IP Rating
Overheating protection	No Protection

Tuning information

Flux and efficacy versus current (at Tc = 85 °C)

I [mA]	Flux [%]	Efficacy [%]
250	24.4%	129.5%
300	28.9%	127.9%
500	46.8%	120.5%
750	66.8%	112.3%
950	81.9%	106.6%
1050	89.4%	104.1%
1200	**100.0%**	**100.0%**
1400	113.9%	95.1%
1500	120.2%	93.4%

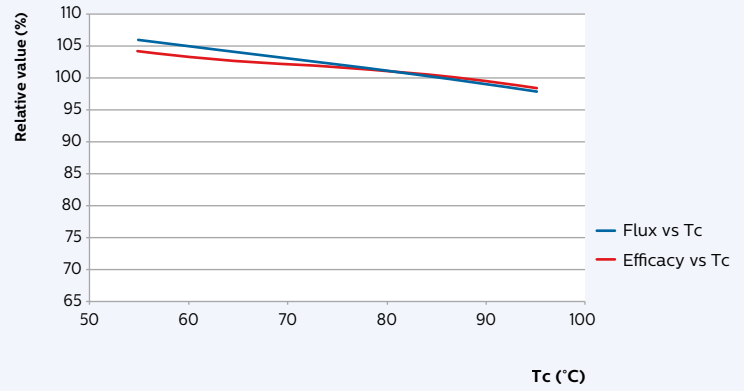
Note: Performance above already considers 1-3% optical loss when holder is added to the COB.



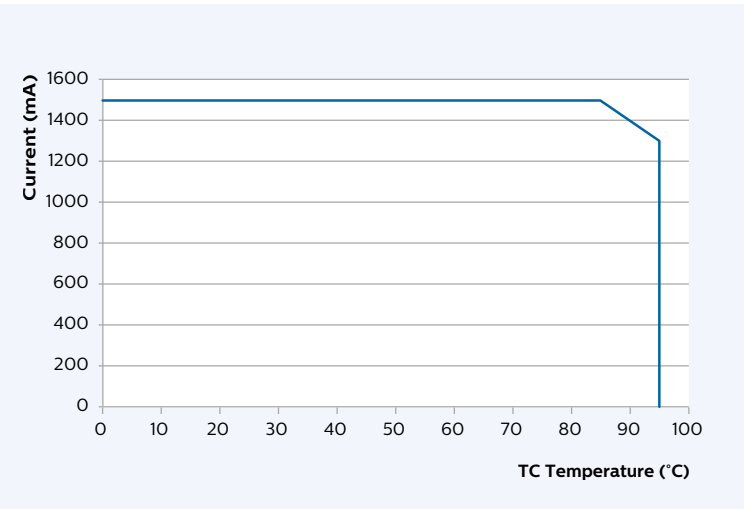
Flux and efficacy versus temperature (at I = 1200 mA)

Tc [°C]	Flux [%]	Efficacy [%]
95	97.8%	98.4%
85	**100.0%**	**100.0%**
75	102.0%	101.6%
65	103.9%	102.5%
55	105.7%	104.1%

Note: Performance above already considers 1-3% optical loss when holder is added to the COB.

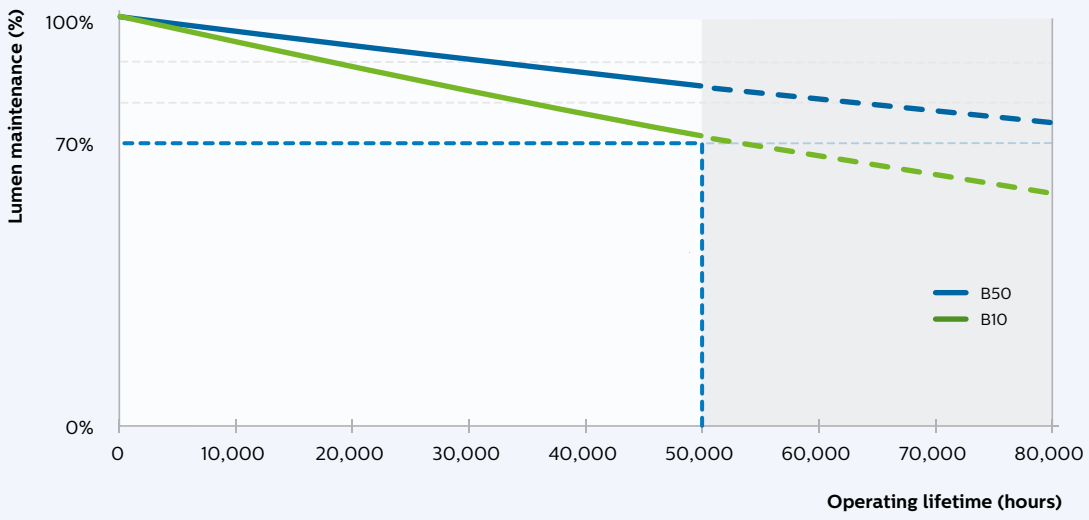


Warranty Window



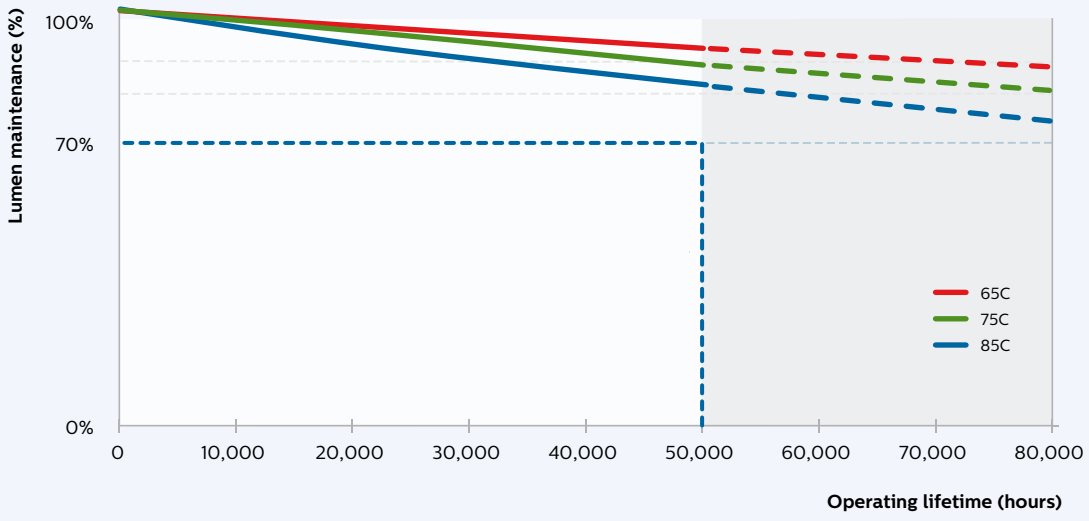
Lumen maintenance

Lumen maintenance at I-life and Tc-life conditions



>50 k hours claim is based on extrapolating raw LM80-data by using statistical techniques.

Lumen maintenance for B50 at current I-life conditions



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10/2015
Data subject to change.

www.philips.com/technology