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Technical application guide PrevaLED® Core G7 Food and Fashion LED modules

Light is OSRAM

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Please note:

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1 Introduction

PrevaLED® Core G7 Food and Fashion LED modules offer special light colors for food and fashion applications. They provide an excellent way to enhance any shopping experience: The quality of light makes the customer stay longer in the store and may support the buying decision.

1.1 Food applications: Fresh and tasty food colors

PrevaLED® Core G7 Food LED modules create light that makes food look fresh and tasty. The following special types are available:



— **Bread (927):** Warm tone and crusty appearance for fresh bread and bakery products.



— **Fruit and vegetables (S35):** Spice up your vegetables and bring out the brilliance and natural tone of fruit.



— **Meat (S40):** A dedicated color coordinate and excellent contrast help to show marbled meat and sausages in the best light.



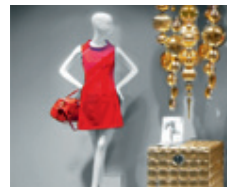
— **Fish (S65):** A cool color temperature emphasizes the freshness of seafood and fish.

1.2 Fashion applications: Brilliant colors and high contrast

PrevaLED® Core G7 Fashion LED modules highlight the attractiveness of clothes. There are two color applications to choose from:



— **Natural color tone (S35):** The natural color tone S35 puts the focus on brilliance and natural impression. High contrast and excellent color rendering in a close-to-sunlight spectrum.



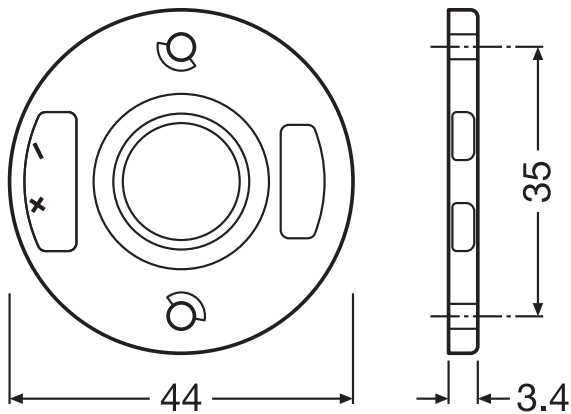
— **Vibrant color boost (S34):** The vibrant color boost S34 makes clothing look highly attractive and may even support the decision making of customers. Vibrant color accents in combination with brilliance make the difference.

1.3 Ordering information

PrevaLED® Core G7 Food and Fashion LED modules

Application		Product reference	Product number (EAN 10)	Nominal luminous flux [lm]	LES category
Food	Bread	PL-CORE-G7 2000-927 L15 H1	4052899534384	2000	LES 15
		PL-CORE-G7 3000-927 L15 H1	4052899534544	3000	LES 15
		PL-CORE-G7 5000-927 L15 H1	4052899534704	5000	LES 15
	Fruit and vegetables	PL-CORE-G7 3000-S35 L15 H1	4052899576582	3000	LES 15
		PL-CORE-G7 5000-S35 L15 H1	4052899576605	5000	LES 15
	Meat	PL-CORE-G7 2000-S40 L15 H1	4052899576544	2000	LES 15
		PL-CORE-G7 3000-S40 L15 H1	4052899576568	3000	LES 15
	Fish	PL-CORE-G7 2000-S65 L15 H1	4052899576629	2000	LES 15
PL-CORE-G7 3000-S65 L15 H1		4052899576667	3000	LES 15	
Fashion	Natural color tone	PL-CORE-G7 3000-S35 L15 H1	4052899576582	3000	LES 15
		PL-CORE-G7 5000-S35 L15 H1	4052899576605	5000	LES 15
	Vibrant color boost	PL-CORE-G7 5000-S34 L15 H1	4052899576681	5000	LES 15

1.4 Dimensions



All dimensions in mm



Example of PrevaLED® Core G7 Food and Fashion LED modules with LES 15

2 Optical considerations

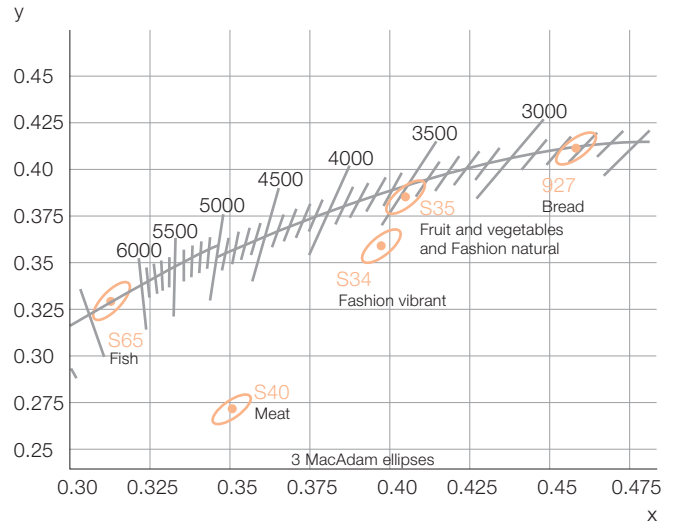
2.1 Color temperature

PrevaLED® Core G7 Food and Fashion LED modules are currently available in 6 500K, 4 076K, 3 375K, 3 500K and 2 700K. The average values of color coordinates within the CIE 1931 color space are given below (average guiding values for reference only).

	Bread	Fruit and vegetables	Meat	Fish	Fashion natural	Fashion vibrant
	2700 K	3500 K	4076 K	6500 K	3500 K	3375 K
Cx	0.4578	0.4044	0.3510	0.3123	0.4044	0.3970
Cy	0.4101	0.3837	0.2731	0.3282	0.3837	0.3578

Values measured at $t_p = 65^\circ\text{C}$

Within each special color temperature, the PrevaLED® Core G7 Food and Fashion series provides a maximum color variation of three threshold value units (MacAdam steps). The diagram on the right shows these threshold values within the CIE 1931 color space.



Chromaticity coordinate groups:

Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of ± 0.005 and an expanded uncertainty of ± 0.01 (according to GUM with a coverage factor of $k = 3$). For testing, the chromaticity coordinate ellipses are approximated with polygons.

2.2 Color rendering

The table below shows the individual R_a values from R1 to R14 for the available special color temperatures as well as CRI and TM30 values.

R_a values DIN 6169 (average guiding values for reference only)

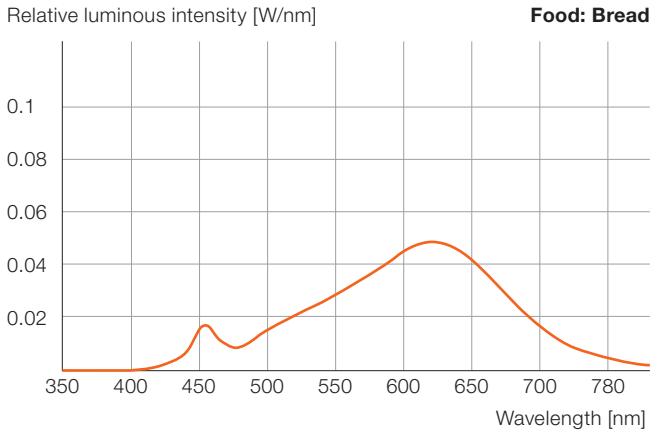
	General CRI	Dusky pink	Mustard yellow	Yellowish green	Light green	Turquoise	Azure	Aster violet	Lilac violet	Red, saturated	Yellow, saturated	Green, saturated	Blue, saturated	Pink, skin color	Leaf green	TM30	TM30	
	R_a	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R_f	R_g	
PL-CORE-G7 Food: Bread	CCT = 2700 K	91	90	95	99	90	90	95	90	77	51	89	91	82	92	99	90	97
PL-CORE-G7 Food: Fruit and vegetables	CCT = 3500 K	92	92	95	97	88	91	88	95	92	81	88	78	90	91	98	92	103
PL-CORE-G7 Food: Meat	CCT = 4076 K	53	41	69	79	39	44	65	74	16	-93	44	28	51	45	84	66	131
PL-CORE-G7 Food: Fish	CCT = 6500 K	86	85	91	93	85	85	85	89	74	21	77	85	62	87	97	83	95
PL-CORE-G7 Fashion: Natural color tone	CCT = 3500 K	92	92	95	97	88	91	88	95	92	81	88	78	90	91	98	92	103
PL-CORE-G7 Fashion: Vibrant color boost	CCT = 3375 K	86	85	96	83	78	87	96	86	75	52	95	75	94	87	88	83	114

2.3 Spectral distribution

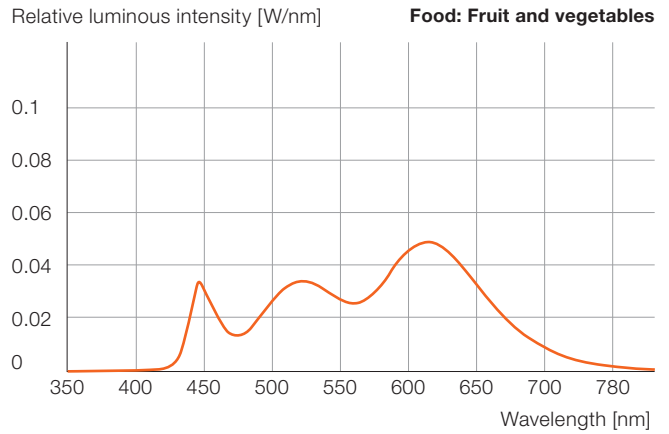
The typical spectral distribution of the PrevaLED® Core G7 Food and Fashion LED modules is shown in the following diagrams. The spectra are uniformly scaled for all colors

over the same integrated area of the spectrum to make them comparable to each other. The Y-axis is then the scaled intensity per wavelength channel: [W/nm].

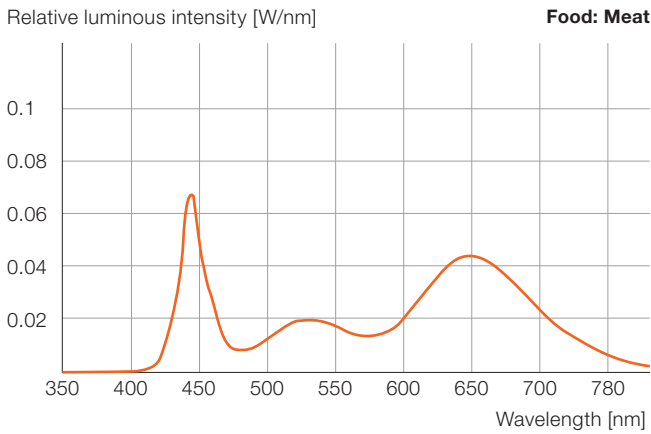
Average guiding values for reference only



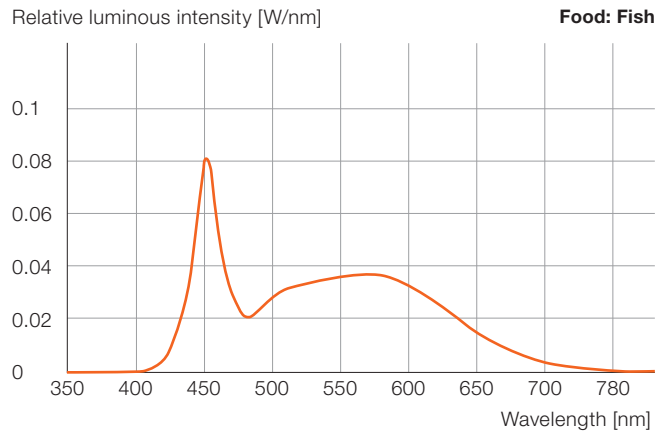
Values measured at $t_p = 65^\circ\text{C}$



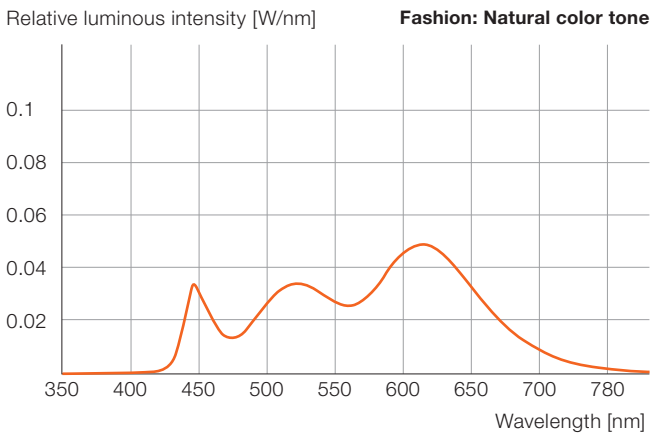
Values measured at $t_p = 65^\circ\text{C}$



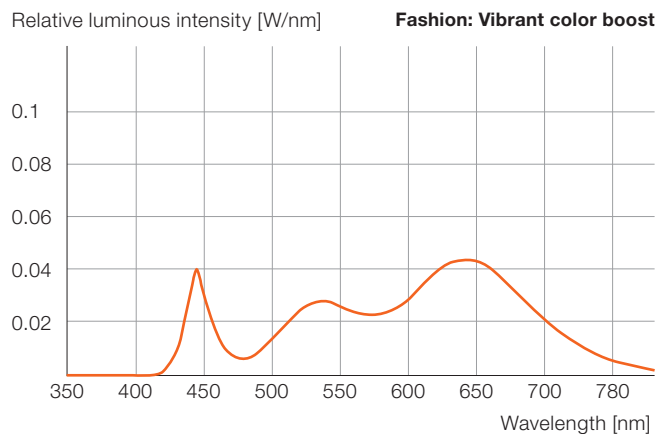
Values measured at $t_p = 65^\circ\text{C}$



Values measured at $t_p = 65^\circ\text{C}$



Values measured at $t_p = 65^\circ\text{C}$



Values measured at $t_p = 65^\circ\text{C}$

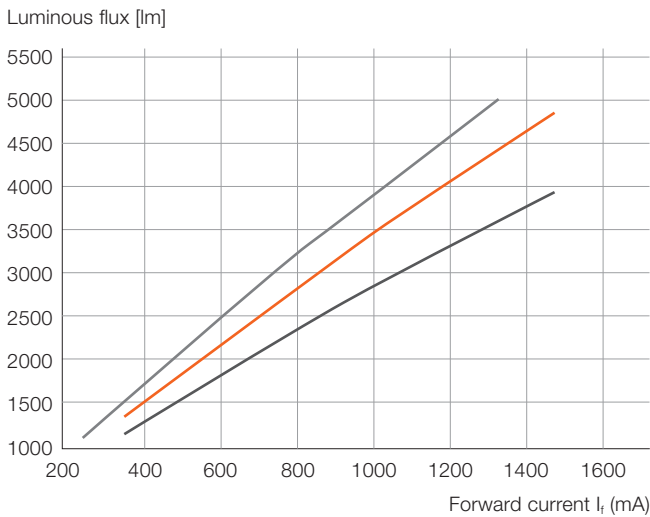
2.4 Luminous flux behavior

The following diagrams show the luminous flux as a function of the operating current for PrevaLED® Core G7 Food and Fashion LED modules. Data related to the operating current is derived from a t_p temperature of 65 °C.

Luminous flux as a function of forward current (I_f)

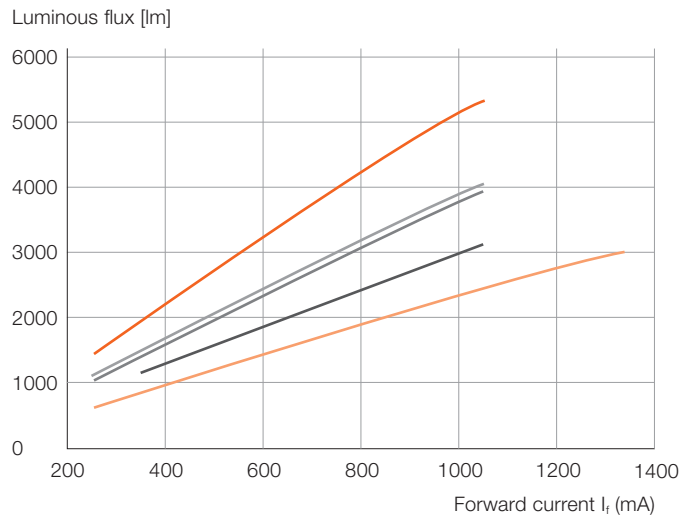
PL-CORE-G7 5000-XXX L15 H1 Luminous flux as a function of forward current at $t_c = 65\text{ °C}$ (average guiding values for reference only)

- PL-CORE-G7 5000-S34 L15 H1 Fashion: Vibrant color boost
- PL-CORE-G7 5000-S35 L15 H1 Food: Fruit and vegetables and Fashion: Natural color tone
- PL-CORE-G7 5000-927 L15 H1 Food: Bread



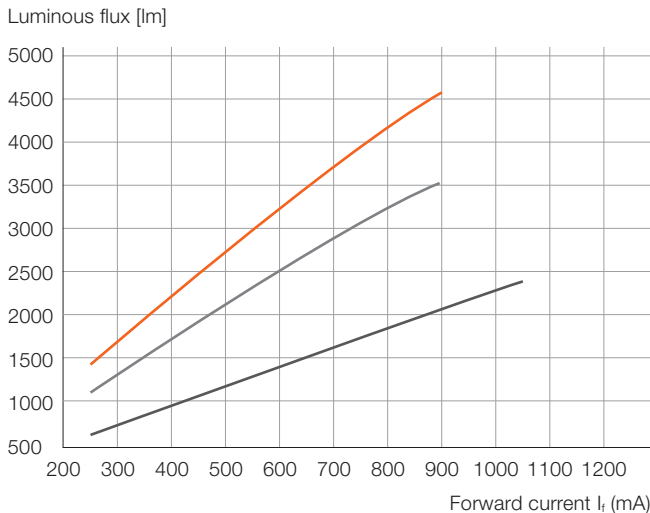
PL-CORE-G7 3000-XXX L15 H1 Luminous flux as a function of forward current at $t_c = 65\text{ °C}$ (average guiding values for reference only)

- PL-CORE-G7 5000-S34 L15 H1 at 3000lm Fashion: Vibrant color boost
- PL-CORE-G7 3000-S65 L15 H1 Food: Fish
- PL-CORE-G7 3000-S35 L15 H1 Food: Fruit and vegetables and Fashion: Natural color tone
- PL-CORE-G7 3000-S40 L15 H1 Food: Meat
- PL-CORE-G7 3000-927 L15 H1 Food: Bread



PL-CORE-G7 2000-XXX L15 H1 Luminous flux as a function of forward current at $t_c = 65\text{ °C}$ (average guiding values for reference only)

- PL-CORE-G7 2000-S40 L15 H1 Food: Meat
- PL-CORE-G7 2000-S65 L15 H1 Food: Fish
- PL-CORE-G7 2000-927 L15 H1 Food: Bread



Note:

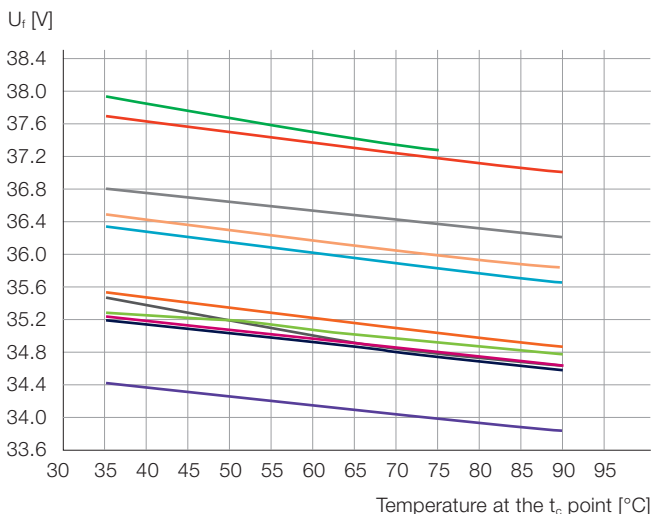
Tolerance for optical and electrical data: +/-10 %

3 Electrical considerations

3.1 Forward voltage as a function of temperature

PL-CORE-G7 X000-XXX L15 H1 Forward voltage (U_f) as a function of temperature at the t_c point at I_{rated}

- PL-CORE-G7 5000-S34 L15 H1 at 3000lm
- PL-CORE-G7 3000-S65 L15 H1
- PL-CORE-G7 2000-S40 L15 H1
- PL-CORE-G7 3000-S35 L15 H1
- PL-CORE-G7 5000-S35 L15 H1
- PL-CORE-G7 2000-927 L15 H1
- PL-CORE-G7 3000-927 L15 H1
- PL-CORE-G7 3000-S40 L15 H1
- PL-CORE-G7 5000-S34 L15 H1 at 5000lm
- PL-CORE-G7 2000-S65 L15 H1
- PL-CORE-G7 5000-927 L15 H1



Note:
Tolerance for optical and electrical data: +/-10 %

3.2 Wiring

PrevaLED® Core G7 Food and Fashion LED modules are equipped with an easy “poke-in” connector. The input clamps can handle solid and stranded wires with a cross-section of 0.5–0.8mm² (AWG 20–18).

Easy “poke-in”:



3.3 LED driver/LED module combination

Please refer to the matrix table below to find the best fitting driver for a dedicated PrevaLED® Core G7 Food and Fashion LED module as well as the luminous flux depending on the set driver current.

PrevaLED® Core G7 Food and Fashion LED modules: Driver matching overview						DALI – SELV				OT FIT LT2 – SELV & LP		
Please note: All information in this overview has been prepared with great care. OSRAM, however, does not accept liability for possible errors, changes and/or omissions. Please check www.osram.com or contact your sales partner for an updated copy of this overview. This overview is for information purposes only and aims to support you in tackling the challenges and taking full advantage of all opportunities the technology has to offer. Please note that this overview is based on own measurements, calculations, tests, specific parameters and assumptions. Individual applications may not be covered and need different handling. Responsibility and testing obligations remain with the luminaire manufacturer/OEM/application planner.						OTI DALI 15/220...240/1A4 LT2	OTI DALI 25/220...240/700 LT2	OTI DALI 35/220...240/1A0 LT2	OTI DALI 50/220...240/1A4 LT2 FAN	OT FIT 15/220...240/500 LT2 S/LP	OT FIT 25/220...240/700 LT2 S/LP	OT FIT 40/220...240/1A0 LT2 S/LP
Product name PrevaLED® Core G7	Application	EAN	Rated current [mA] at $t_p = 65^\circ\text{C}$	Voltage [V] at rated current	Power [W] at rated current	Luminous flux depends on set current				Luminous flux depends on set current		
PL-CORE-G7 2000-927 L15 H1	Food: Bread	4052899534384	465	34.9	16.2	X	X	X		X	X	X
PL-CORE-G7 2000-S40 L15 H1	Food: Meat	4052899576544	858	35.1	30.2			X	X			X
PL-CORE-G7 2000-S65 L15 H1	Food: Fish	4052899576629	349	34.1	11.9	X	X			X	X	
PL-CORE-G7 3000-927 L15 H1	Food: Bread	4052899534544	749	36.1	27.0			X	X			X
PL-CORE-G7 5000-S34 L15 H1 run at 3000lm	Fashion: Vibrant color boost	4052899576681	1014	34.9	35.4			X	X			X
PL-CORE-G7 3000-S35 L15 H1	Food: Fruit and vegetables	4052899576582	776	35.0	27.2			X	X			X
PL-CORE-G7 3000-S35 L15 H1	Fashion: Natural color tone	4052899576582	776	35.0	27.2			X	X			X
PL-CORE-G7 3000-S40 L15 H1	Food: Meat	4052899576568	1334	36.0	48.0				X			
PL-CORE-G7 3000-S65 L15 H1	Food: Fish	4052899576667	546	34.8	19.0		X	X			X	X
PL-CORE-G7 5000-927 L15 H1	Food: Bread	4052899534704	1260	37.3	47.0				X			
PL-CORE-G7 5000-S34 L15 H1	Fashion: Vibrant color boost	4052899576681	1870	37.4	70.0				X			
PL-CORE-G7 5000-S35 L15 H1	Food: Fruit and vegetables	4052899576605	1450	36.5	52.9				X			
PL-CORE-G7 5000-S35 L15 H1	Fashion: Natural color tone	4052899576605	1450	36.5	52.9				X			

Note:

Tolerance for optical and electrical data: +/-10%

PrevaLED® Core G7 Food and Fashion LED modules: Driver matching overview			OT FIT CS G2 – SELV (DIP switch)											
			OT FIT 20/220...240/500 CS G2				OT FIT 30/220...240/700 CS G2				OT FIT 40/220...240/1A0 CS G2			
			Luminous flux [lm] according to current [mA] as follows											
Product name	Application	EAN	250	350	450	500	500	600	650	700	800	900	950	1050
PL-CORE-G7 2000-927 L15 H1	Food: Bread	4052899534384		1541	1940	2133	2133	2507	2687	2863				
PL-CORE-G7 2000-S40 L15 H1	Food: Meat	4052899576544					1223	1447	1557	1666	1880	2088	2190	2390
PL-CORE-G7 2000-S65 L15 H1	Food: Fish	4052899576629	1465	2005	2524	2775								
PL-CORE-G7 3000-927 L15 H1	Food: Bread	4052899534544					2083	2461	2646	2828	3184	3529	3697	4025
PL-CORE-G7 5000-S34 L15 H1 run at 3000lm	Fashion: Vibrant color boost	4052899576681									2431	2701	2833	3093
PL-CORE-G7 3000-S35 L15 H1	Food: Fruit and vegetables	4052899576582					1995	2368	2551	2731	3084	3428	3596	3925
PL-CORE-G7 3000-S35 L15 H1	Fashion: Natural color tone	4052899576582					1995	2368	2551	2731	3084	3428	3596	3925
PL-CORE-G7 3000-S40 L15 H1	Food: Meat	4052899576568												
PL-CORE-G7 3000-S65 L15 H1	Food: Fish	4052899576667	1448	1987	2511	2767	2767	3269	3515	3757				
PL-CORE-G7 5000-927 L15 H1	Food: Bread	4052899534704											3891	4257
PL-CORE-G7 5000-S34 L15 H1	Fashion: Vibrant color boost	4052899576681												
PL-CORE-G7 5000-S35 L15 H1	Food: Fruit and vegetables	4052899576605											3443	3769
PL-CORE-G7 5000-S35 L15 H1	Fashion: Natural color tone	4052899576605											3443	3769

Note:
Tolerance for optical and electrical data: +/-10%

PrevaLED® Core G7 Food and Fashion LED modules: Driver matching overview			ELEMENT 15/220...240/350	ELEMENT 20/220...240/500	ELEMENT 30/220...240/700	ELEMENT 38/220...240/900	ELEMENT 45/220...240/1A0	ELEMENT 60/220...240/1A4
			Luminous flux [lm] according to current [mA] as follows					
Product name	Application	EAN	350	500	700	900	1050	1400
PL-CORE-G7 2000-927 L15 H1	Food: Bread	4052899534384		2133	2863			
PL-CORE-G7 2000-S40 L15 H1	Food: Meat	4052899576544				2088	2390	
PL-CORE-G7 2000-S65 L15 H1	Food: Fish	4052899576629	2005	2775				
PL-CORE-G7 3000-927 L15 H1	Food: Bread	4052899534544			2828	3529		
PL-CORE-G7 5000-S34 L15 H1 run at 3000lm	Fashion: Vibrant color boost	4052899576681					3093	3957
PL-CORE-G7 3000-S35 L15 H1	Food: Fruit and vegetables	4052899576582			2731	3428		
PL-CORE-G7 3000-S35 L15 H1	Fashion: Natural color tone	4052899576582			2731	3428		
PL-CORE-G7 3000-S40 L15 H1	Food: Meat	4052899576568					2431	3145
PL-CORE-G7 3000-S65 L15 H1	Food: Fish	4052899576667		2767	3757			
PL-CORE-G7 5000-927 L15 H1	Food: Bread	4052899534704					4257	5400
PL-CORE-G7 5000-S34 L15 H1	Fashion: Vibrant color boost	4052899576681						3957
PL-CORE-G7 5000-S35 L15 H1	Food: Fruit and vegetables	4052899576605					3769	4853
PL-CORE-G7 5000-S35 L15 H1	Fashion: Natural color tone	4052899576605					3769	4853

Note:

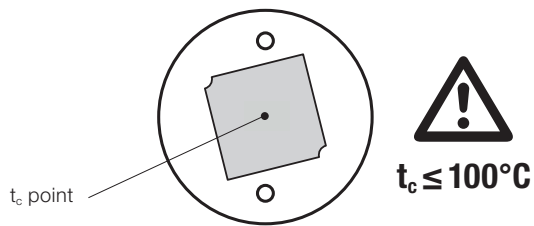
Tolerance for optical and electrical data: +/-10%

4 Lifetime and thermal considerations

4.1 t_c point location and temperature measurement

The t_c point is the location where to check if the chosen cooling solution (heat sink and TIM) is sufficient to ensure the LED module performance. The t_c point is located on the back of the LED module under the center of the light-emitting surface (see following image).

Location of the t_c point



4.2 Lifetime and guarantee

To enable a lifetime of **60 000 hours (L80B10)**, the temperature at the t_c point must not exceed 65 °C. The maximum temperature reached at the t_c point must not exceed 100 °C.

For PrevaLED® Core G7 Food and Fashion LED modules, you have a 5-year guarantee. On special request, we can extend this guarantee to 7 years. Please approach your dedicated OSRAM sales contact for more information.

Note:

Please keep in mind that you need a direct contact between the thermocouple and the PCB. It is mandatory to use TIM (e.g. thermal paste) for a proper thermal coupling!

Higher t_c temperatures lead to a shorter lifetime of the PrevaLED® Core G7 Food and Fashion LED modules. Moreover, the failure rate will also increase. t_c temperatures beyond 100 °C will destroy the modules within a short period of time.

4.3 Thermal power values

The thermal power that has to be dissipated for PrevaLED® Core G7 Food and Fashion LED modules is shown in the following table.

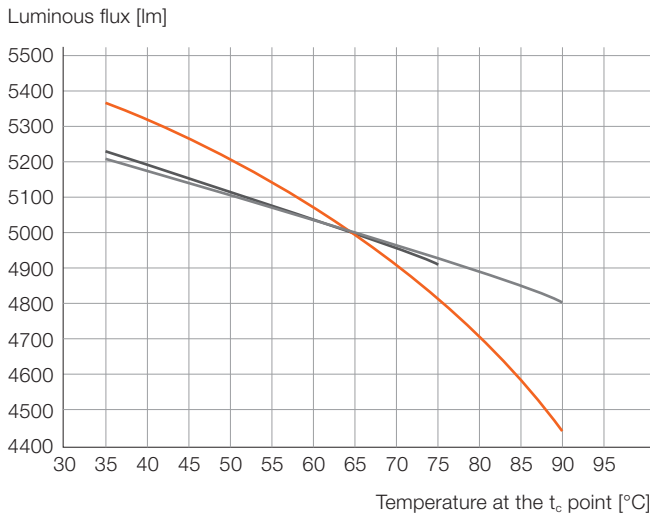
Product	Typ. thermal power at nominal current	Typ. thermal resistance at nominal current	Max. thermal power	Max. thermal resistance	
	$P_{th typ}$ [W]	$R_{th typ}$ [K/W]	$P_{th max}$ [W]	$R_{th max}$ [K/W]	Application
PL-CORE-G7 2000-S65 L15 H1	5.4	7.3	7.3	5.5	Food: Fish
PL-CORE-G7 3000-S65 L15 H1	9.3	4.3	11.8	3.4	Food: Fish
PL-CORE-G7 2000-S40 L15 H1	23.7	1.7	26.4	1.5	Food: Meat
PL-CORE-G7 3000-S40 L15 H1	38.3	1.0	41.3	1.0	Food: Meat
PL-CORE-G7 3000-S35 L15 H1	17.5	2.3	20.4	2.0	Food: Fruit and vegetables and Fashion: Natural color tone
PL-CORE-G7 5000-S35 L15 H1	36.8	1.1	39.9	1.0	Food: Fruit and vegetables and Fashion: Natural color tone
PL-CORE-G7 5000-S34 L15 H1 at 3000lm	25.8	1.6	29.3	1.4	Fashion: Vibrant color boost
PL-CORE-G7 5000-S34 L15 H1	53.8	0.7	55.6	0.7	Fashion: Vibrant color boost
PL-CORE-G7 5000-927 L15 H1	30.9	1.3	32.7	1.2	Food: Bread
PL-CORE-G7 3000-927 L15 H1	17.3	2.3	19.4	2.1	Food: Bread
PL-CORE-G7 2000-927 L15 H1	9.7	4.1	11.6	3.4	Food: Bread

4.4 Luminous flux as a function of temperature

The luminous flux of PrevaLED® Core G7 Food and Fashion LED modules depends on their temperature. 100% of the luminous flux is usually achieved at the performance temperature of 65 °C. The following exemplary diagrams show the behavior of the luminous flux output as a function of the temperature at the t_c point.

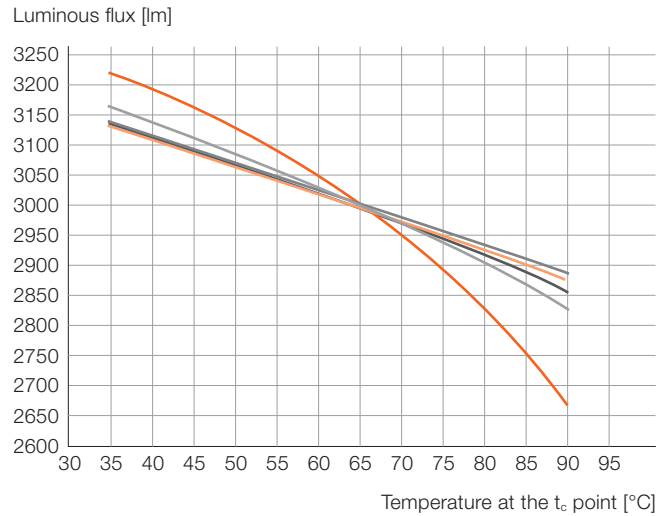
PL-CORE-G7 5000-XXX L15 H1 Luminous flux as a function of temperature at I_{rated} (average guiding values for reference only)

- PL-CORE-G7 5000-S34 L15 H1 at 5000lm
- PL-CORE-G7 5000-S35 L15 H1
- PL-CORE-G7 5000-927 L15 H1



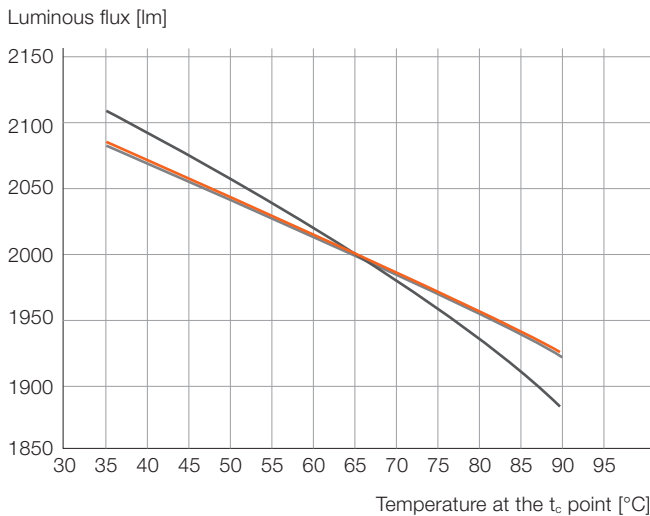
PL-CORE-G7 3000-XXX L15 H1 Luminous flux as a function of temperature at I_{rated} (average guiding values for reference only)

- PL-CORE-G7 5000-S34 L15 H1 at 3000lm
- PL-CORE-G7 3000-927 L15 H1
- PL-CORE-G7 3000-S35 L15 H1
- PL-CORE-G7 3000-S65 L15 H1
- PL-CORE-G7 3000-S40 L15 H1



PL-CORE-G7 2000-XXX L15 H1 Luminous flux as a function of temperature at I_{rated} (average guiding values for reference only)

- PL-CORE-G7 2000-S40 L15 H1
- PL-CORE-G7 2000-S65 L15 H1
- PL-CORE-G7 2000-927 L15 H1



5 Safety and general notes

- High-power LED modules: do not stare into beam or view directly with optical instruments.
- Product shall only be handled by trained/skilled personnel; any liability of OSRAM is excluded to the extent possible under German law.
- Installation of LED modules (with LED drivers) needs to be carried out with regard to all applicable electrical and safety standards.
- The LED modules can be used without any additional insulation with LED drivers with SELV and a max. voltage of 120V_{DC}.
- When mounting a PrevaLED® Core G7 Food and Fashion LED module within a luminaire, it is mandatory to use thermal interface material (TIM) between the back of the LED module and the luminaire housing or heat sink (for details, please see the application guide for standard PrevaLED® Core G7 LED modules).



6 Norms and standards

Safety:	IEC/EN 62031
Photobiological safety:	IEC/EN 62471
Risk group:	RG1
Ingress protection:	–
Approvals:	CE



Disclaimer

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Modules perfectly matched to OSRAM OPTOTRONIC® LED drivers. For current photometric data and important safety, installation and application information, see www.osram.com/prevaled. All the technical parameters apply to the entire module. In view of the complex manufacturing process for light-emitting diodes, the typical values given above for the technical LED parameters are merely statistical values that do not necessarily correspond to the actual technical parameters of an individual product; individual products may vary from the typical values.

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