

ENEC LICENSE

License No. ENEC-01127-P8
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License Holder Signify Netherlands B.V.
 High Tech Campus 48
 Eindhoven, 5656 AE Netherlands

Production site

Certification Mark See Annex 1

Certified Product Model Built-in LED Module
 Main series: **Fortimo LED line** *p xu ylm zcc qR eVgd a*
 (see Page 2-4 for Product Key explanation and variant series)

Trademark 

Rated Voltage / Frequency HV: I_{max}: 1200 mA ===
 LV: I_{max}: 2000 mA ===
 (see Page 2-4 for further ratings)

Rated Current / Power see Rated Voltage / Frequency

Insulation Class -

Degree of protection (IP) -

Tested acc. to EN IEC 62031:2020

Test Report No. 4789718816.1.1 issued on 2021-02-20

Additional Information The report was revised to include technical modifications.

Certification Manager
 Jan-Erik Storgaard

Certification Body

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Model Details:

Product Key:

Main series: Fortimo LED line *p xu ylm zcc qR eVgd a*

Where:

- p* = Performance (may be blank or "PR" or "ST" or "VO");
- x* = Product length in feet or mm or inch (1-4 digits/characters (for example 1.5 or 102));
- u* = Measurement unit for product length (two characters, may be "ft" or "mm" or "in");
- y* = Lumen output (three or four or five digits);
- z* = CRI of LED divided by 10 (one digit, may be "8" or "9");
- cc* = Color temperature of LED divided by 100 (two digits, may be between 27 and 73);
- q* = Number of LED's rows (one digit, may be "1" or "2" or "3" or "4" or "6" or "9" or "T");
- e* = Voltage type (one character, may be "H" or "L");
- g* = Number of LED module's generation (one digit, may be "2" or "3" or "4" or "5");
- d* = Connector designator (may be blank or "F" = front connector, or "B" = back connector, or "D" = dual entry connector);
- a* = Commercial suffix for commercial purposes (optional)

Maximum ratings of the series:

Type	Supply DC Current [mA]	Power [W]	Number of LEDs	t _c [°C]	Max. working voltage for basic insulation to mount. surface [V]
HV	570	40	72	90	420 (°)
HV (*)	1000	93,6	176	95	420
HV (**)	1000	40	120	85	420
HV (***)	640 (V _{f tot} 81,5 V) or 320 (V _{f tot} 163 V)	52,2	46	95	420
HV (****)	1200	86,4	184	85	420 (°°)
HV (*****)	800	21	32	80	350 (°°°)
LV	1120	40	44	90	120
LV(#)	1440	47,52	88	85	120

(*) : High flux modules (≥ 2000 lm/ft), T_c: 85 if g=5.
 (**) : Only for model Fortimo LED line 2ft 1250lm zcc 2R HVgd a
 (***) : When q = "T" in the product key. Maximum current depends on connecting method of the module.
 (****) : For model Lunux (Fortimo LED line 415mm 12000lm zcc 9R HV4 L)
 (*****) : For model Fortimo LED line 1ft 800lm zcc 4R HV4 L

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(°): 450 V for model Fortimo LED line 1ft ylm zcc 3R HV4B T with parameter $y \leq 1500$ lm
(°°): When 1 mm additional creepage to mounting surface is taken near the supply terminal (to be verified in the final product)
(°°°): When insulating washers (or plastic optics) are used on fixing screws.
(#) Middle Flux module (between 700 and 1700lm per ft)

Product Key:

Variant series 1: *b Strip p w x y l t zcc s d eVgD a*

Where:

b = Family name (may be "Fortimo LED" or "CertaFlux LED" or "FO" or "CF");
p = Performance (may be blank or "PR" or "ST" or "VO" or "OC" or "CES" or "ST FT" or "PR FT");
w = Product width in mm (optional) (two digits, if it is omitted width is 20 mm);
x = Product length in feet or mm or inch (1-4 digits/characters (for example 1.5 or 102));
y = Measurement unit for product length (two characters, may be "ft" or "mm" or "in");
l = Value of Lumen output or Value of Lumen output divided by 100 (1-4 digits);
t = Measurement unit for Lumen output (may be "lm" or "L");
t = **Connector designator, optional in case of "ft" or "in" (may be blank or "FC" = front connector or "BC" = back connector);**
z = CRI of LED divided by 10 (one digit (or blank when $p = \text{"CES"}$), may be "8" or "9");
cc = Color temperature of LED divided by 100 (two digits or six characters (or blank when $p = \text{"CES"}$), may be a value between 27 to 65 (or "27-865" or "27-965" (when $p = \text{"PR FT"}$ or "ST FT"))));
s = Specials (may be blank or "HE" = High Efficiency, or "PW" = Premium White);
d = Connector designator in case of "ft" or "in" (may be blank or "NA" or "1R" or "FC" = front connector or "BC" = back connector);
e = Voltage type (one character, may be "H" or "L");
g = Number of LED module's generation (one or two digits, may be "1" or "2" or "3" or "4" or "4+" or "5" or "6");
D = Connector designator in case of "mm" (may be blank or "F" = front connector, or "B" = back connector);
a = Commercial suffix for commercial purposes (optional)

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Maximum ratings of the series:

Type	Flux Type	Flux [lm]	Supply DC Current [mA]	LED Current [mA]	Power [W]	Number of LEDs	t _c [°C]	Max. working voltage for basic insulation to mount. surface [V]
HV	-	5500	600	190	89,1	180	85	420 (350 for $b = \text{Fortimo}$ and $g \geq 4$) (350 for $b = \text{CertaFlux}$ and $g \geq 3$)
	-	2200	600	150	35,64	72	80	
	-	2200 (°)	2 x 480	240	2 x 38,4	96	80	
	-	2300 (§)	720	240	37	48	95	
	-	2200 (§§)	1000	200	69	100	85	
	-	4400	720	180	71,3	144	90	
	-	6400 (*)	600	200	93,6	138	95	
	HF	6000	720	240	60,48	84	95	
	HF	6900 (**)	720	180	59,04	96	85	
	-	5500	600	240	89,4	45	80	
	-	4400	600	200	71,28	36	80	
	-	275	600	200	3,96	8	85	
LV	-	5500	1900	190	72	144	85	120 (350 for Fortimo LED Strip 1450mm 5500lm LV5F)
	-	5500	2000	150	71,3	144	80	
	-	2200 (°)	2 x 700	175	2 x 30,8	112	95	
	-	2200 (§)	800	200	30	48	85	
	-	2200 (§§)	2000	200	69	100	80	
	HF	4000	400	200	39	72	95	
		8000	1800	150	63	144	95	
	-	5500	2000	240	79,2	12	80	

(°): When $p = \text{"ST FT"}$ or "PR FT" in the product key. LED Modules with 2 separated circuits not insulated from each other.

(§): When $p = \text{"OC"}$ in the product key

(§§): When $p = \text{"CES"}$ in the product key

(*): When $w = \text{"12"}$ in the product key

HF means Flux $\geq 2000 \text{ lm/ft}$

(**): When $a = \text{"T"}$ in the product key

Note: "HV/LV" term above indicates that the module can be used in both HV mode or LV mode.

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Additional information:

This certificate replaces the earlier issued ENEC-01127-P7-M3 dated 2020-08-31 due to

- Addition of new LED Chip Seoul Semiconductor STW8C12C-E0(3030 series) to Fortimo LED line series.

- The model Fortimo LED Strip 2ft 2200lm 835 HV1 KR is identical to the model Fortimo LED Strip 2ft 2200lm 835 HV3, the difference between names is only for commercial purpose.

- The model "Fortimo LED Strip 4ft..." can be also labelled as "Fortimo LED Strip 1150mm..."

- The model "Fortimo LED Strip 5ft..." can be also labelled as "Fortimo LED Strip 1450mm..."

- The insulation between active parts of LED module and accessible conductive parts (metal mounting surface) is tested for basic insulation related to the working voltages listed in the tables of maximum ratings.

- HV modules, modules having Platform shape *b* in the Product Key of variant series 1 = "Slim", module "LBA LineP 2ft 4000lm zcc L5", module "Fortimo LED line 2ft 4000lm zcc 1R LV3" and all modules of variant series 2 shall use PCBs with PTI > 600 V.

- Manufacturer and customers shall maintain clearances and creepage distances between tracks on PCB and screws/accessible conductive parts in compliance with table 11.1 of IEC/EN 60598-1 using working voltage values listed in the tables of maximum ratings and considering basic insulation. When Connector designator "D" or "d" in the Product Keys = "B" or "BC" or "D" clearances and creepage distances shall be also maintained between accessible conductive parts and terminals mounted in the back of the modules or all metal terminals.

- M4 fixing screws with diameter of their heads not exceeding 8 mm shall be used (if in metallic material). Modules having

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Number of LED's rows q in the Product Key of main series = "2" or Platform shape b in the Product Key of variant series 1 = "2Line" or "Slim" shall use M3 fixing screws with diameter of their heads not exceeding 5,6 mm. Manufacturer recommends for all modules the use of washers made in insulating material. The fasteners used to secure the module to the mounting surface must be tightened with a torque between 0,6 and 1 Nm.

- For Linux LED Module (Fortimo LED line 415mm 12000lm zcc 9R HV4 L) only insulating struts shall be used.

- LED Module "LBA Slims xft ylm zcc Hh d a" shall be used only with insulating washers made of suitable material, having 2,2 mm minimum thickness, with the internal hole suitable for only M3 screws and having the external diameter not less than 5,6 mm and it shall be installed with creepage/clearance distances to metal mounting surface of at least 1 mm.

- LED Modules of Variant series 2 having in the product key p = "ST FT" or "PR FT" (Flex Tune) are composed by two separated circuits not insulated from each other.

- The modules can be supplied only by electronic LED Controlgears separately approved according to IEC/EN 61347-2-13 and protected against output short-circuit and overload.

- Modules having Platform shape b in the Product Key of variant series 1 = "USlim" can be supplied only by SELV LED Controlgears having $U_{out\ max} = 120\ Vdc$.

- The customer is obligated to add an appropriated cooling system to the LED module in order to not exceed t_c value and the maximum temperatures of the module's components. Temperature test shall be performed on the final product to verify the effectiveness of this cooling system.

- HV (High Voltage) modules can be used in series configuration if the total voltage of the load of LED controlgear does not exceed the maximum working voltages listed on ratings.

- LV (Low Voltage) modules can be used in parallel configuration if the current per module does not exceed its rated current and the current in the chain of modules does not exceed 2 A for modules with terminals Molex Lite-Trap, Mini Lite-Trap, BJB, WAGO and Tyco Electronics and 1 A for modules with terminals Molex Flexi-Mate.

- The modules have been also evaluated according to IEC TR 62778 (Second Edition): RISK GROUP 1 UNLIMITED with exception of modules having LED 3020, LED NF2*757DRT-V1, LED NF2*757GRT-V1 and LED 3030-2D 6V which are classified RISK GROUP 2 (Worst value of $E_{thr} = 338\ lx$) (See also photobiological test report for more information).

The following standard was also applied:

- IEC/TR 62778: 2014

Test results are reported on separate test report No. 4789421463.2 issued by UL International Italia S.r.l. The modules are classified as RISK GROUP 1 UNLIMITED with exception of modules having LED 3020 series, LED NF2*757DRT-V1, LED NF2*757GRT-V1 and LED 3030-2D 6V series which are classified as RISK GROUP 2 (Worst value of $E_{thr} = 338\ lx$) (See also photobiological test report for more information).

Test results are reported on separate test report No. 4789425955.2.1-1, issued by UL-CCIC Company Limited. The modules having APT 5630 are classified as RISK GROUP 1 UNLIMITED (See also photobiological test report for more information).

Test results are reported on separate test report No. 4789718816.2.1, issued by UL-CCIC Company Limited. The modules having APT 3030 EMC 3V 2D are classified as RISK GROUP 1 UNLIMITED (See also photobiological test report for more information).

Test results are reported on separate test report No. 4789718946.2.1, issued by UL-CCIC Company Limited. The modules having Seoul Semiconductor STW8C12C-E0(3030 series) are classified as RISK GROUP 1 UNLIMITED (See also photobiological test report for more information).

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Annex 1 to License No. ENEC-01127-P8

Annex of the form of the Mark



15 is the identification number of the Certification Body

Size of the mark:

The size of the mark may be reduced on the condition that it remains legible and that the ratio $b/a=1,7$ is kept.

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