

# TM21LN05XX-XX1, TM21LN05XX-XX2

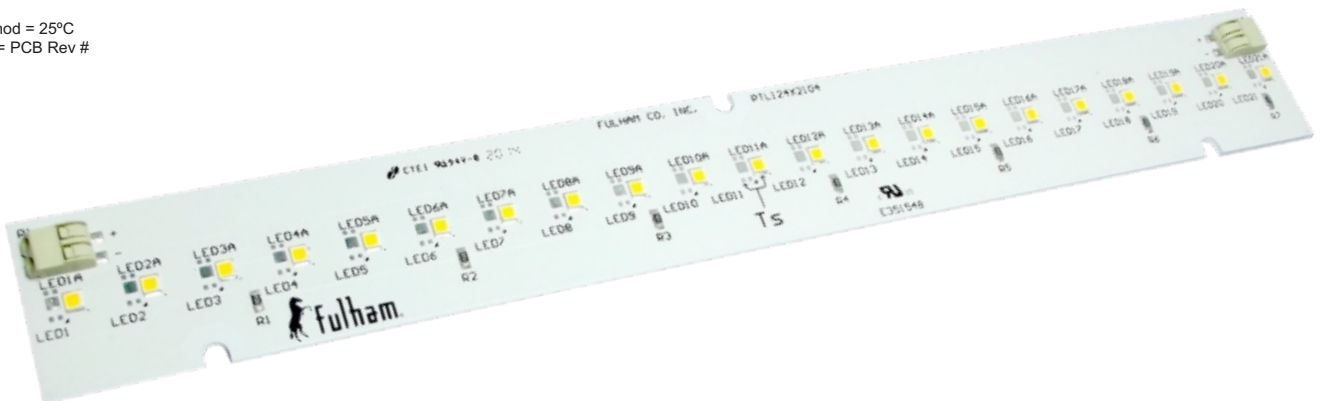
## Constant Current LED Linear Module

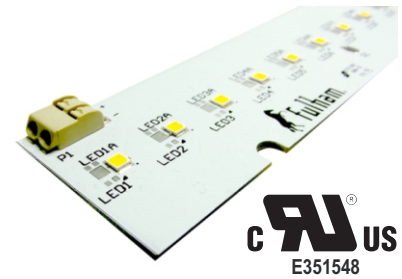
- High Density, high brightness chip array for use in Class 2 Linear applications
- Constant current for maximum efficacy
- Zhaga compliant to size and hole pattern
- On-board connector for ease of assembly
- Available in standard CCT's
- Dimmable when used with a dimmable driver
- Suitable for use in retrofit rebate programs
- Optional lens to diffuse light
- 80 CRI standard and 90 CRI available

## General Ratings

Max Lumen Output @ Max Current	1225 lumens at 4000K / 80 CRI*
Max Current Input	1050 mA
Nominal DC Power Consumption @ Max Current	9.9W
Nominal Operating Voltage @ Max Current	9.4VDC
Beam Angle	120°
CRI	80, 90
Operating Ambient Temperature Range (Ta)	-35 to +40°C
Maximum Case Temperature (Tc)	+90°C (Ts = 95°C)
Estimated Lumen Maintenance (L70)	>50,000 hours at max Ts
Color Consistency	Binning per ANSI C78.377-2008; 7 SDCM
Overall Size	11" x 1.4" x 0.24" (including connector)
Weight	Aluminum Clad: 46 g ; FR4: 40 g
Maximum Screw Installation Torque	Aluminum Clad: 60 inch - ounces; FR4: 35 inch - ounces
Safety/Compliance	cURus (File # E351548, PTL124X20www*, PTL124X21www* ) Class 2 Lighting System RoHS Compliant Zhaga Interface Specification Book 7, Edition 1.1, June 2013
Warranty	5 years with suitable Fulham LED Drivers

\* At Tc mod = 25°C  
\*\* www = PCB Rev #





# TM21LN05XX-XX1, TM21LN05XX-XX2

## Part Numbering Matrix

**TM 21 LN 05 27 - 2 0 1 C**

<u>Color Temperature</u> 27 = 2700K 30* = 3000K 35 = 3500K 40* = 4000K 50 = 5000K	<u>Termination</u> 0 = 22 AWG Wire Stranded Leads 2* = Double Pole Connector	<u>CRI</u> 0* = 80 1 = 90	<u>Board Material</u> 1* = MCPCB 2* = FR4	<u>Module Options</u> Blank* = Standard C = Conformal Coating T = 3M Double-Sided Tape B = Both Coating and Tape
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\* Indicates standard module options. All others are built to order

## Electrical Specifications

LED Module Part Number	Number of LED	Input Current	Abs. Max Forward Voltage	Nom. Forward Voltage	Nom. Rated Power
TM21LN05xx-xxx	21	700mA	10.4VDC	9.1VDC	6.4W
		1050mA**	10.8VDC	9.4VDC	9.9W

\*\* Indicates maximum rated current. Modules may be operated at a current less than or equal to this value. Reference Current vs. Rel. Lum. Flux Table to calculate estimate lumen output at lesser currents.

## Optical Specifications

LED Module Part Number	Color Temperature	Nominal Luminous Flux @ 1050mA/90 CRI	Nominal Luminous Flux @ 1050mA/80 CRI	Efficacy @ 80CRI
TM21LN0530-xxx	3000K	910 lumens	1137 lumens	114 lm/W
TM21LN0540-xxx	4000K	980 lumens	1225 lumens	123 lm/W

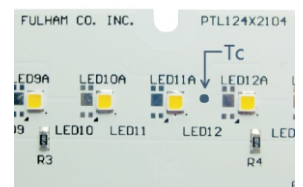
## Current vs Relative Luminous Flux Table

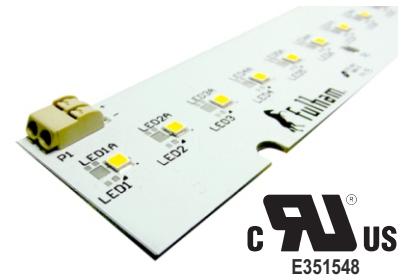
Forward Current (mA)	Lumen De-rating Multiplier
1050 **	1
700	0.69
500	0.50
350	0.38

- 1) Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- 2) Standard lumen output and efficacy is calculated for standard options. Reference CCT vs Rel. Lum. Flux chart for lumen ratio calculation.
- 3) Specifications are subject to change without notice.

## Thermal Specifications

	With Connectors	Without Connectors
Storage Temperature Range	-35 to 100°C	-35 to 100°C
Operating Ambient Temperature Range	-35 to 40°C	-35 to 40°C
Maximum Case Temperature (Tc mod)	90°C (Ts = 95°)	90°C (Ts = 95°)





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## Mechanical Drawings

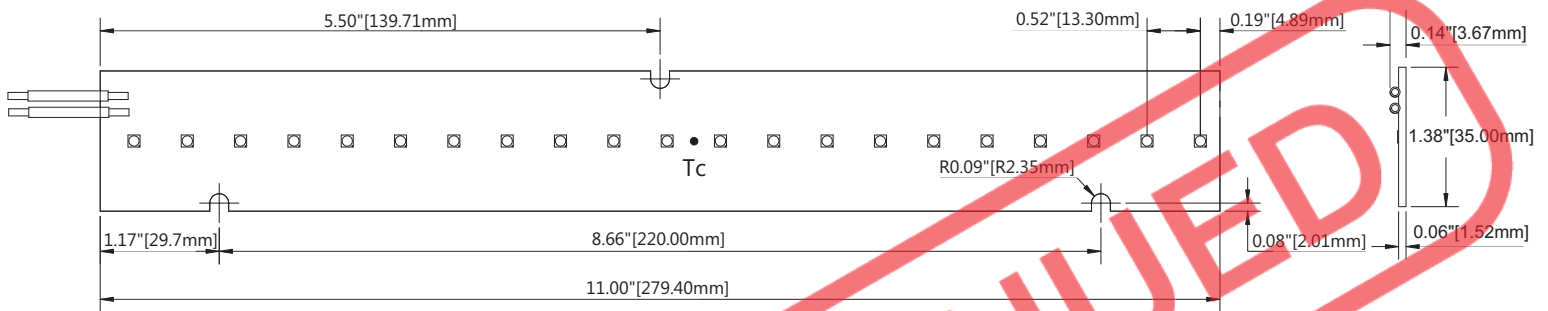


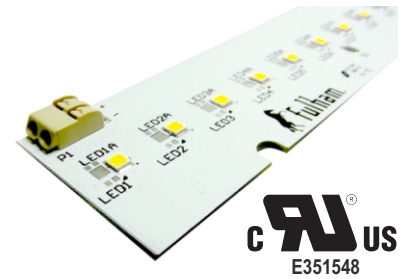
Figure 1: TM21LN05xx-001 Top View with Wires

Figure 2:  
TM21LN05xx-001  
Side View with Wires



Figure 3: TM21LN05xx-201 Top View with Connectors

Figure 4:  
TM21LN05xx-201  
Side View with  
Connectors



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## Accessories

### Interconnects

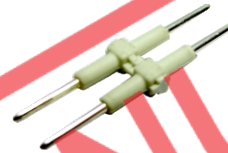
Wago Part Number: Single Pin **2060-901**; Double Pin **2060-902**

- Metal pin(s) to interconnect TM21 and TM42 LED Modules
- Single pin connector for TM21 + TM42 LED Modules in Series
- Double pin connector for TM21 + TM21 LED Modules in Parallel
- For more detailed information, please visit Wago's website: <http://www.wago.com/infomaterial/pdf/51284479.pdf>

Single Pin



Double Pin



### 11" Diffuser Lens

Fulham Part Number: **TLE-OPT-120-002**

- 11" white polycarbonate diffuser lens
- Use same mounting holes as TM21 LED Module

Diffuser Lens

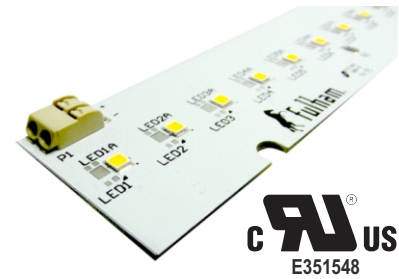


TM21 + Diffuser Lens



TM21 + Diffuser Lens + Double Pin Interconnect



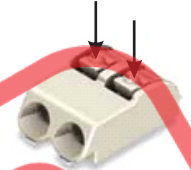


## TM21LN05XX-XX1, TM21LN05XX-XX2

### Termination Notes

- If connectors are used, use solid wire size 24 – 18 AWG, rated at a minimum 50V, minimum 105°C, and stripped to length between 6-7 mm (0.24-0.28 inches).
- Push button for insertion of conductor and for easy removal of wires.

Push Button



### Fastening Notes

- If fastening by screw hole, use any screw with diameter less than 0.185 in (4.7mm). Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation. Suggested screw sizes: #6 or M4 Pan Head screw.
- If fastening using double-sided tape, start with clean, dust-free surface. Peel backing and place LED module on mounting surface. Firmly press down on the module to ensure good adherence. Follow the double-side tape manufacturer's installation instructions.

### Environmental Rating

- Modules are rated for dry locations, unless option for conformal coating is requested.
- Conformal coating is acrylic based and rated for Environment and Moisture Protection per IPC-CC-830.

### Electrostatic Sensitive Product (ESD)

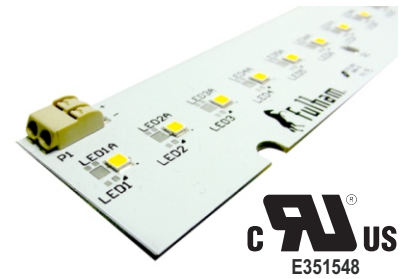
- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

### Thermal Management

- Proper thermal management should be employed to ensure life and reliability of product.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

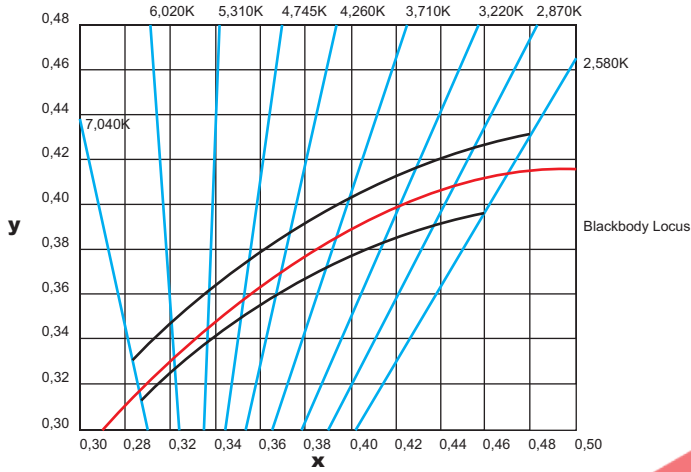
### Polarity Notes

- Modules are polarity sensitive.
- Ensure that “positive” from LED Driver is connected to “positive” of LED modules and that “negative” from LED Driver is connected to “negative” of LED modules.
- Polarities of modules are marked with “+” for positive and “-” for negative.



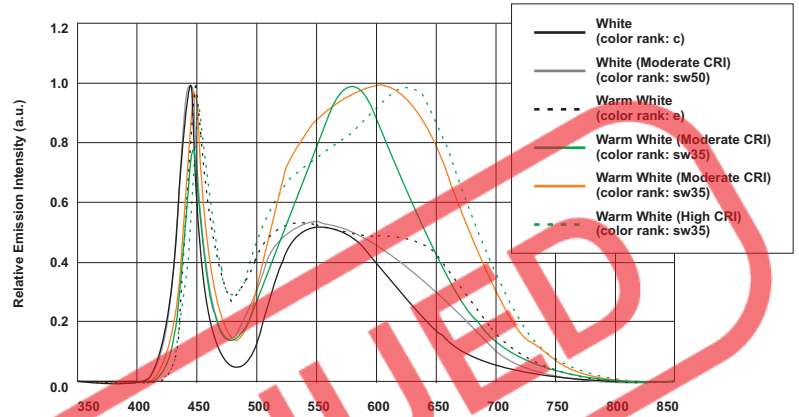
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## Color and Binning



Ref. Nichia  
Chromaticity Diagram for ANSI bins  
For reference only. For more detailed info, contact factory.

## Optical Spectrum\*\*\*



\*\*\* Value varies depending on product type and color rank  
Ref. Nichia  
LED Catalogue 2013  
For reference only. For more detailed info, contact factory.

## Thermal De-Rating

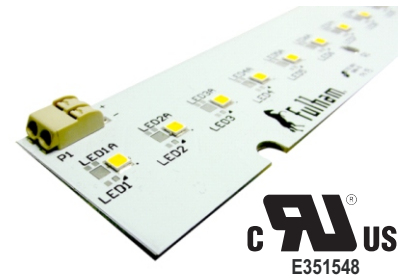
Ambient Temperature (Ta)	Relative Luminous Flux
25°C	1
30°C	0.991
35°C	0.989
40°C	0.980
45°C	0.975
50°C	0.970
55°C	0.960
60°C	0.950

Ref. Nichia  
LED757 Spec Sheet  
For reference only. For more detailed info, contact factory.

## CCT vs Luminous Flux

CCT	Relative Luminous Flux
2700K	0.87
3000K	0.93
3500K	0.96
4000K	1.00
5000K	1.07

Ref. Nichia  
LED757 Spec Sheet  
For reference only. For more detailed info, contact factory.



# TM21LN05XX-XX1, TM21LN05XX-XX2

## Compatible Fulham LED Drivers

Fulham Part Number	Driver Description	# of Modules/Driver	Wiring Diagram
TCD11200700-9C	700 mA, 9W CC Driver, 120V AC Input, TRIAC Dimmable	1	A
T1T11200700-9C	700 mA, 9W CC Driver, 120V AC Input, TRIAC Dimmable	1	A
TCD11200650-18C	650 mA, 18W CC Driver, 120V AC Input, TRIAC Dimmable	2	B
TC11200700-18C	700 mA, 18W CC Driver, 120V AC Input	2	B
T1T11200700-18C	700 mA, 18W CC Driver, 120V AC Input, TRIAC Dimmable	2	B
T1T11201000-20C	1000 mA, 20W CC Driver, 120V AC Input, TRIAC Dimmable	2	B
T1(M1)UNV0700-28C	700 mA, 28W CC Driver, Universal Input (0-10V Dimmable)	2-4	B
T1M13470700-28C	700 mA, 28W CC Driver, 347V Input, 0-10V Dimmable	2-4	B
T1UNV0700-36C	700 mA, 33W CC Driver, Universal Input	4	B
T1(M1)UNV0700-40C	700 mA, 40W CC Driver, Universal Input (0-10V Dimmable)	2-5	B
T1M13470700-40C	700 mA, 40W CC Driver, 347V Input, 0-10V Dimmable	2-5	B
T1(M1)UNV1050-42C	1050 mA, 42W CC Driver, Universal Input (0-10V Dimmable)	2-4	B
T1M2UNV0700-49L	700 mA, 49W CC Driver, Universal Input, 2 output channels, 0-10V Dimmable	4 (2/Ch)	F
T1M1UNV1400-60L	1400 mA, 60W CC Driver, Universal Input, 0-10V Dimmable	4 (2S/2P)	D
		8 (4S/2P)	D
T1M4UNV0700(1000)-100L/C	700(1000) mA, 100W CC Driver, Universal Input, 4 output channels, 0-10V Dimmable	12 (3/Ch)	F
T1A4UNV700(1000)-100L/C	700(1000) mA, 100W CC Driver, Universal Input, 4 output channels, DALI, 1 control channel	12 (3/Ch)	F
T2A4UNV0700(1000)-100L/C	700(1000) mA, 100W CC Driver, Universal Input, 4 output channels, DALI, 2 control channels	12 (3/Ch)	F
T4N4UNV0700(1000)-100K/B	700(1000) mA, 100W CC Driver, Universal Input, 4 output channels, DMX/DALI, 4 control channels	12 (3/Ch)	F
FHS2-UNV-36L	HotSpot2 at 350 - 700 mA output.		

**NOTE:**  
 1. Subject to rated loading conditions.  
 2. Modules are polarity sensitive. Ensure that "positive" from LED Driver is connected to "positive" of LED modules and that "negative" from LED Driver is connected to "negative" of LED modules.  
 3. List is subject to change without notice.

## Wiring Diagrams

