

M625L3-C1 - July 16, 2019

Item # M625L3-C1 was discontinued on July 16, 2019. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

COLLIIMATED LED LIGHT SOURCES FOR MICROSCOPY

UV, Visible, and IR LEDs

Mounted LED with Adjustable Collimation Optic

Compatible with Epi-Illumination Port on Olympus, Leica, Nikon, and Zeiss Microscopes



M625L4-C1
For Olympus
BX/IX Microscopes



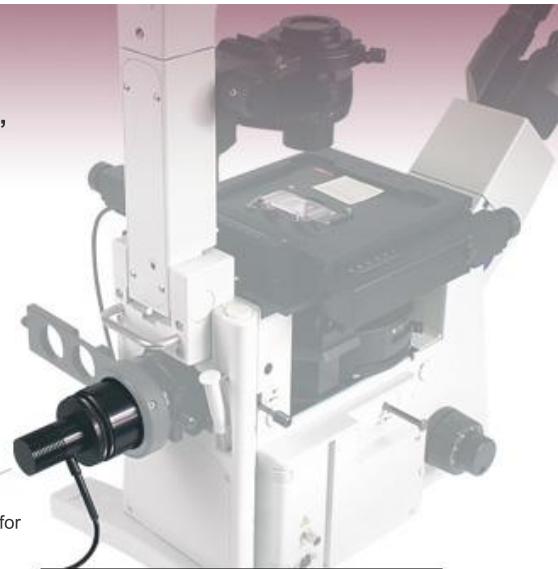
M405LP1-C2
For Leica DMI
Microscopes



M590L3-C5
For Nikon Eclipse
Microscopes



M810L3-C4
For Zeiss Axioskop



M505L4-C1 Used
as a Light Source for
an Olympus IX71

Features

- Illumination Source for Microscope Epi-Illumination Ports, Projectors, and Custom Imaging Systems
- Optimized Thermal Management Provides Output Intensity Stability
- Adjustable Aspheric Collimation Optic with Low f/# (Approximately 0.8)
- Integrated Identification Chip (EEPROM) Stores LED Operating Parameters
- Higher Power LEDs Mounted to Larger Heat Sink with Ø57.0 mm Plastic Housing (See the Tables Below for Details)
- 4-Pin Female Mating Connector for Custom Power Supplies can be Purchased Separately
- Custom Adapters Available - Contact Tech Support for Details

Thorlabs' collimated LED assemblies can be easily connected to standard and epi-illumination ports on most readily available commercial microscopes, including Olympus, Leica, Nikon, and Zeiss. Each collimated LED consists of a mounted LED and a lamphouse-port-compatible housing that contains an AR-coated aspheric collimation optic (see the *Specs* tab for details). If the wavelength or output power you require is not sold on this page, our mounted LEDs and Solis™ High-Power LEDs are available in additional wavelengths and output powers.

Note: Please ensure your microscope is configured to directly accept an external light source. Some microscope assemblies have a permanently installed illuminator or may be otherwise incompatible with the LED light sources below.

The collimation of the beam can be adjusted by changing the position of the aspheric lens with respect to the LED. Interchanging LEDs is easy; simply unscrew one LED from the housing and replace it with a different mounted LED (sold separately). We also offer collimation packages, which can be purchased separately from these LEDs.

The approximate total beam power through the collimation adapter is given in the tables below and on the *Specs* tab. The actual power at the sample plane will be lower due to losses specific to the optical set up of the microscope. If you wish to measure the power at the sample plane for your particular microscope setup, Thorlabs also offers a microscope slide power meter sensor.

Like our mounted LEDs, the package of these collimated LEDs is in direct contact with the heat sink to provide excellent thermal management. This minimizes the degradation of optical output power caused by increased LED temperatures. Please see the *Stability* tab for information on the stable output intensity of these collimated LEDs. Additionally, our M365LP1, M385LP1, and M405LP1 LEDs feature a higher power output and are mounted to a larger Ø57.0 mm heat sink to increase heat dissipation and thermal stability.

For microscope applications requiring compatibility with SM1 (1.035"-40) threading, our mounted LEDs (sold separately) can be collimated using a Ø1" lens and lens tubes. This collimation method also allows for a smaller beam size than the collimators on this page. Please see the *Collimation* tab on our Mounted LEDs presentation for a detailed item list and instructions.

Compatible Controllers

Information concerning compatible controllers is provided on the *LED Drivers* tab. If the LED is driven with a DC2200, DC4100, or DC4104 controller, the integrated EEPROM chip will identify the LED and allow the controller to automatically set the proper current limit to protect the LED from being overdriven. The DC4100 and DC4104 require the DC4100-HUB when used with these LEDs.

- For the bare LED. See the table below for total beam power with the collimation package.
- Our 365 nm to 405 nm LEDs radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided.
- These LEDs have a higher output power (see tables below for total beam power) and are mounted to a Ø57.0 mm heat sink for increased heat dissipation.
- The MCWHL5-C LEDs may not turn off completely when modulated at frequencies above 5 kHz, as the white light is produced by optically stimulating emission from phosphor.
- Correlated color temperature. The wavelength range corresponding to >10% power is approximately 435 - 675 nm.

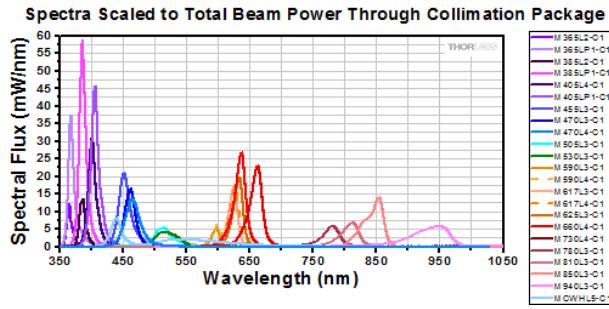
Specifications for LED with Collimating Microscope Adapter Attached

Legend					
LED Mounted to a Heat Sink in a Ø57.0 mm Red Housing			LED Mounted to a Heat Sink in a Ø30.5 mm Black Housing		
The section of the housing that holds the collimation optics is the same size for all LEDs that share the same item # suffix, regardless of the size of the heat sink.					
Item # Suffix	-C1	-C2	-C4	-C5	
Compatible Microscope ^a	Olympus BX and IX	Leica DMI	Zeiss Axioskop and Examiner ^b	Nikon Eclipse (Bayonet Mount)	
Beam Diameter ^{c,d}	50 mm	37 mm	44 mm	43 mm	
Beam Area ^c	1960 mm ²	1080 mm ²	1520 mm ²	1450 mm ²	
Item # Prefix	Included Collimation Lens	Total Beam Power ^d			
M365L2	ACL5040U-A	120 mW	60 mW	80 mW	80 mW
M365LP1	ACL5040U-A	505 mW	350 mW	415 mW	400 mW
M385L2	ACL5040U-A	170 mW	90 mW	110 mW	120 mW
M385LP1	ACL5040U-A	795 mW	520 mW	660 mW	630 mW
M405L3	ACL5040U-A	N/A	440 mW	600 mW	565 mW
M405L4	ACL5040U-A	510 mW	N/A	N/A	N/A
M405LP1	ACL5040U-A	750 mW	450 mW	580 mW	570 mW
M455L3	ACL5040U-A	500 mW	360 mW	430 mW	400 mW
M455L4	ACL5040U-A	630 mW	490 mW	690 mW	630 mW
M470L3	ACL5040U-A	350 mW	250 mW	310 mW	300 mW
M470L4	ACL5040U-A	420 mW	330 mW	460 mW	420 mW
M505L3	ACL5040U-A	210 mW	150 mW	180 mW	170 mW
M505L4	ACL5040U-A	220 mW	170 mW	240 mW	220 mW
M530L3	ACL5040U-A	170 mW	130 mW	150 mW	150 mW
M530L4	ACL5040U-A	200 mW	160 mW	220 mW	200 mW
M590L3	ACL5040U-A	80 mW	60 mW	70 mW	70 mW
M590L4	ACL5040U-A	130 mW	100 mW	140 mW	130 mW
M617L3	ACL5040U-A	320 mW	230 mW	280 mW	260 mW
M617L4	ACL5040U-A	360 mW	280 mW	400 mW	360 mW
M625L3	ACL5040U-A	380 mW	270 mW	-	300 mW
M625L4	ACL5040U-A	630 mW	490 mW	690 mW	630 mW
M660L4	ACL5040U-A	590 mW	400 mW	570 mW	520 mW
M730L4	ACL5040U-B	240 mW	165 mW	-	208 mW
M780L3	ACL5040U-B	210 mW	130 mW	180 mW	170 mW
M810L3	ACL5040U-B	245 mW	210 mW	230 mW	225 mW
M850L3	ACL5040U-B	480 mW	330 mW	400 mW	370 mW
M940L3	ACL5040U-B	430 mW	320 mW	380 mW	340 mW
MCWHL5	ACL5040U-A	440 mW	320 mW	380 mW	340 mW

- Standard or Epi-Illumination Port Required.
- These adapters are compatible with any Zeiss microscopes that use the same dovetail as the Zeiss Axioskop and Examiner microscopes.
- Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power, beam diameter, and beam area of any given LED will vary.
- At the output aperture of the collimation package.

The actual spectral output and total output power of any given LED will vary due to variations in the manufacturing process and operating parameters, such as temperature and current. The typical total beam power of each collimated LED is specified to help you select an LED that suits your needs. In order to provide a point of comparison for the relative powers of LEDs with different nominal wavelengths, the spectra in the plots below have been scaled to the typical total beam power of each collimated LED. This data is representative, not absolute. An Excel file containing the normalized and scaled spectra for each collimation package can be downloaded using the link below each plot.

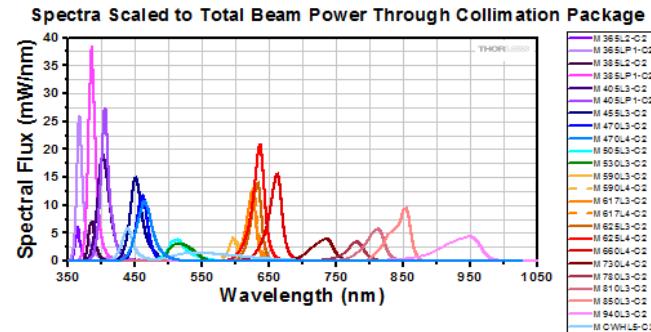
Collimated LEDs for Olympus BX and IX Microscopes



Click to Enlarge

An Excel file containing the data shown in the plot above may be found [here](#).

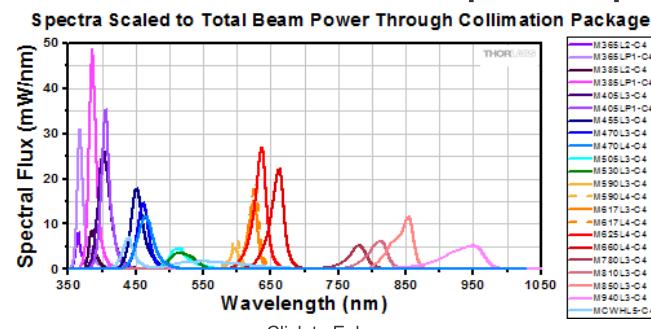
Collimated LEDs for Leica DMI Microscopes



Click to Enlarge

An Excel file containing the data shown in the plot above may be found [here](#).

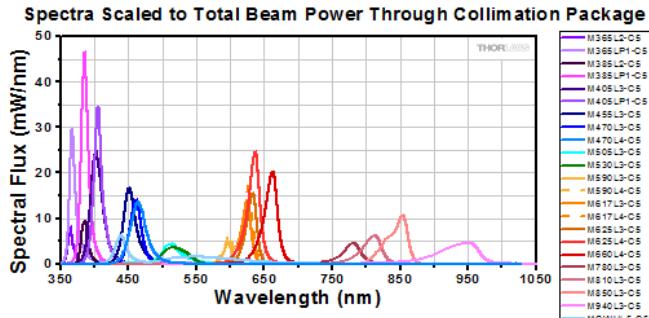
Collimated LEDs for Zeiss Axioskop Microscopes



Click to Enlarge

An Excel file containing the data shown in the plot above may be found [here](#).

Collimated LEDs for Nikon Eclipse Microscopes

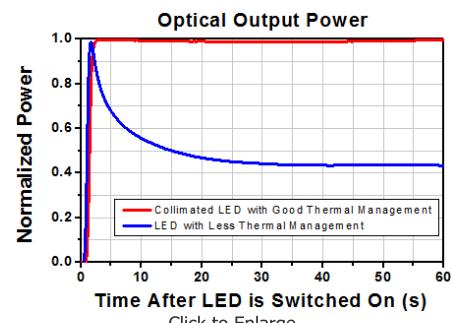


An Excel file containing the data shown in the plot above may be found [here](#).

STABILITY

LED Lifetime and Long-Term Power Stability

One characteristic of LEDs is that they naturally exhibit power degradation with time. Often this power degradation is slow, but there are also instances where large, rapid drops in power, or even complete LED failure, occur. LED lifetimes are defined as the time it takes a specified percentage of a type of LED to fall below some power level. The parameters for the lifetime measurement can be written using the notation B_{XX}/L_{YY} , where XX is the percentage of that type of LED that will provide less than YY percent of the specified output power after the lifetime has elapsed. Thorlabs defines the lifetime of our LEDs as B_{50}/L_{50} , meaning that 50% of the LEDs with a given Item # will fall below 50% of the initial optical power at the end of the specified lifetime. For example, if a batch of 100 LEDs is rated for 150 mW of output power, 50 of these LEDs can be expected to produce an output power of ≤ 75 mW after the specified LED lifetime has elapsed.



Optimized Thermal Management

The thermal dissipation performance of these collimated LEDs has been optimized for stable power output. The heat sink is directly mounted to the LED mount so as to provide optimal thermal contact. By doing so, the degradation of optical output power that can be attributed to increased LED junction temperature is minimized (see the graph to the right).

PIN DIAGRAM

Pin Connection - Male

The diagram to the right shows the male connector of the collimated LED assembly. It is a standard M8 x 1 sensor circular connector. Pins 1 and 2 are the connection to the LED. Pin 3 and 4 are used for the internal EEPROM in these LEDs. If using an LED driver that was not purchased from Thorlabs, be careful that the appropriate connections are made to Pin 1 and Pin 2 and that you do not attempt to drive the LED through the EEPROM pins.



Pin	Specification	Color
1	LED Anode	Brown
2	LED Cathode	White
3	EEPROM GND	Black
4	EEPROM IO	Blue

LED DRIVERS

Compatible Drivers	LEDD1B	DC2200 ^a	DC4100 ^{a,b}	DC4104 ^{a,b}
Click Photos to Enlarge				
LED Driver Current Output (Max)	1.2 A	LED1 Terminal: 10.0 A LED2 Terminal: 2.0 A ^c	1.0 A per Channel	1.0 A per Channel
LED Driver Forward Voltage (Max)	12 V	50 V	5 V	5 V
Modulation Frequency Using External Input (Max)	5 kHz	250 kHz ^{d,e}	100 kHz ^e (Simultaneous Across all Channels)	100 kHz ^e (Independently Controlled Channels)
External Control Interface(s)	Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (8-Pin)
Main Driver Features	Very Compact Footprint 60 mm x 73 mm x 104 mm (W x H x D)	Touchscreen Interface with Internal and External Options for Pulsed and Modulated LED Operation	4 Channels ^b	4 Channels ^b
EEPROM Compatible: Reads Out LED Data for LED Settings	-	✓	✓	✓
LCD Display	-	✓	✓	✓

- Automatically limits to LED's max current via EEPROM readout.
- The DC4100 or DC4104 can power and control up to four LEDs simultaneously when used with the DC4100-HUB. The LEDs on this page all require the DC4100-HUB when used with the DC4100 or DC4104.
- The collimated LEDs sold below are compatible with the LED2 Terminal.
- Small Signal Bandwidth: Modulation not exceeding 20% of full scale current. The driver accepts other waveforms, but the maximum frequency will be reduced.
- The MCWHL5-C LEDs may not turn off completely when modulated at frequencies above 5 kHz, as the white light is produced by optically stimulating emission from phosphor.

Light Emitting Diode (LED) Selection Guide										
Wavelength	LED1200E (2.5 mW)	-	-	M1200D2 (30 mW Min)	M1200L3 (30 mW Min)	-	-	-	-	-
	LED1200L (5 mW)									
1200 nm	LED1300E (2 mW)	-	-	M1300D2 (25 mW Min)	M1300L3 (25 mW Min)	-	-	-	-	-
	LED1300L (3.5 mW)									
1300 nm	LED1450E (2 mW)	-	-	M1450D2 (31 mW Min)	M1450L3 (31 mW Min)	-	-	-	-	-
	LED1450L (5 mW)									
1450 nm	LED1550E (2 mW)	-	-	M1550D2 (31 mW Min)	M1550L3 (31 mW Min)	-	-	-	-	-
	LED1550L (4 mW)									
1600 nm	LED1600L (2 mW)	-	-	-	-	-	-	-	-	-
1650 nm	LED1600P (1.2 mW)	-	-	M1650D2 (13 mW)	M1650L4 (13 mW)	-	-	-	-	-
1750 nm	LED1700P (1.2 mW Quasi-CW, 30 mW Pulsed)	-	-	-	-	-	-	-	-	-
1850 nm	LED1800P (0.9 mW Quasi-CW, 20 mW Pulsed)	-	-	-	-	-	-	-	-	-
1950 nm	LED1900P (1.0 mW Quasi-CW, 25 mW Pulsed)	-	-	-	-	-	-	-	-	-
2050 nm	LED2050P (1.1 mW Quasi-CW, 28 mW Pulsed)	-	-	-	-	-	-	-	-	-
2350 nm	LED2350P (0.8 mW Quasi-CW, 16 mW Pulsed)	-	-	-	-	-	-	-	-	-
4200 nm	LED4300P (0.01 mW Quasi-CW, 0.2 mW Pulsed)	-	-	-	-	-	-	-	-	-
4500 nm	LED4600P (0.006 mW Quasi-CW, 0.12 mW Pulsed)	-	-	-	-	-	-	-	-	-
Wavelength	Unmounted LEDs	Pigtailed LEDs	LEDs in SMT Packages	PCB-Mounted LEDs	Heatsink-Mounted LEDs	Collimated LEDs for Microscopy (Item # Prefix ^a)	Fiber-Coupled LEDs ^b	High-Power LEDs for Microscopy	4-Wavelength LED Source Options ^c	LED Arrays

Light Emitting Diode (LED) Selection Guide										
455 nm (12.5% ^g) and 640 nm	-	-	-	MPRP1D2 (275 mW Min)	MPRP1L4 (275 mW Min)	-	-	-	-	-
572 nm and 625 nm	LEDGR (0.09 mW and 0.19 mW)	-	-	-	-	-	-	-	-	-
588 nm and 617 nm	LEDRY (0.09 mW and 0.19 mW)	-	-	-	-	-	-	-	-	-
467.5 nm, 525 nm, and 627.5 nm	LEDRGBE (5.8 mW, 6.2 mW, and 3.1 mW)	-	-	-	-	-	-	-	-	-
430 - 660 nm (White)	LEDWE-15 (13 mW)	-	-	-	-	-	-	-	-	-
	LEDW7E (15.0 mW)									
	LEDW25E (15.0 mW)									
470 - 850 nm (Broadband)	-	-	-	MBB1D1 (70 mW Min)	MBB1L3 (70 mW Min)	-	MBB1F1 (1.2 mW)	-	-	-
6500 K (Cold White)	-	-	-	MCWHD2 (800 mW Min)	MCWHL5 (800 mW Min)	MCWHL5 (320 mW) ^d	SOLIS-1C (3.3 W) ^e	-	-	-
				MCWHD3 (2350 mW Min)	MCWHLPI (2350 mW Min)					
6200 K (Cold White)	-	-	-	-	-	-	MCWHF2 (21.5 mW)	-	-	-
5000 K (Cold White)	-	-	LEDSW50 (110 mW)	-	-	-	-	-	-	-
4600 - 9000 K (Cold White)	-	-	-	-	-	-	-	-	-	LIUCWHA (250 mW)
4000 K (Warm White)	-	-	LEDSW40 (115 mW)	-	-	-	MWWHF2 (16.3 mW)	-	-	-
3000 K (Warm White)	-	-	LEDSW30 (100 mW)	MWWHD3 (2000 mW Min)	MWHL4 (570 mW Min)	-	SOLIS-2C (3.2 W) ^e	-	-	-
					MWWHLPI (2000 mW Min)					
5700 K (Day Light White)	-	-	-	-	-	-	SOLIS-3C (3.5 W)	-	-	-

- These Collimated LEDs are compatible with the standard and epi-illumination ports on the following microscopes: Olympus BX/IX (Item # Suffix: -C1), Leica DMI (Item # Suffix: -C2), Zeiss Axioskop (Item # Suffix: -C4), and Nikon Eclipse (Bayonet Mount, Item # Suffix: -C5). Typical power when used with MM Fiber with Ø400 µm core, 0.39 NA.
- Our LED4D 4-Wavelength LED Source is available with select combinations of the LEDs at these wavelengths.
- Typical power for LEDs with the Leica DMI collimation package (Item # Suffix: -C2).
- Minimum power for the collimated output of these LEDs. The collimation lens is installed with each LED.
- Typical power for LEDs with the Olympus BX and IX collimation package (Item # Suffix: -C1).
- Percentage of LED intensity that emits in the blue portion of the spectrum, from 400 nm to 525 nm.

M850L3-C1	850 nm, 480 mW (Typ.) Collimated LED for Olympus BX & IX, 1200 mA	\$532.65	Today
M940L3-C1	940 nm, 430 mW (Typ.) Collimated LED for Olympus BX & IX, 1000 mA	\$532.65	Today
MCWHL5-C1	6500 K, 440 mW (Typ.) Collimated LED for Olympus BX & IX, 1000 mA	\$513.74	Today

M810L3-C2	810 nm, 210 mW (Typ.) Collimated LED for Leica DMI, 500 mA	\$532.65	Today
M850L3-C2	850 nm, 330 mW (Typ.) Collimated LED for Leica DMI, 1200 mA	\$532.65	Today
M940L3-C2	940 nm, 320 mW (Typ.) Collimated LED for Leica DMI, 1000 mA	\$532.65	Today
MCWHL5-C2	6500 K, 320 mW (Typ.) Collimated LED for Leica DMI, 1000 mA	\$513.74	Today

MCWHL5-C4

6500 K, 380 mW (Typ.) Collimated LED for Zeiss Axioskop & Examiner, 1000 mA

\$513.74 Today

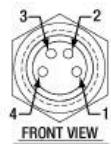
M850L3-C5	850 nm, 370 mW (Typ.) Collimated LED for Nikon Eclipse, 1200 mA	\$573.63	Today
M940L3-C5	940 nm, 340 mW (Typ.) Collimated LED for Nikon Eclipse, 1000 mA	\$573.63	Today
MCWHL5-C5	6500 K, 340 mW (Typ.) Collimated LED for Nikon Eclipse, 1000 mA	\$553.67	Today

Mounted LED Mating Connector

- Pico (M8) Receptacle
- Female 4-Pin for Front Mounting
- 0.5 m Long, 24 AWG Wires
- M8 x 0.5 Panel Mount Thread
- IP 67 and NEMA 6P Rated

The CON8ML-4 connector can be used to mate mounted LEDs featured on this page to user-supplied power supplies. We also offer a male 4-Pin M8 connector cable (Item # CAB-LEDD1).

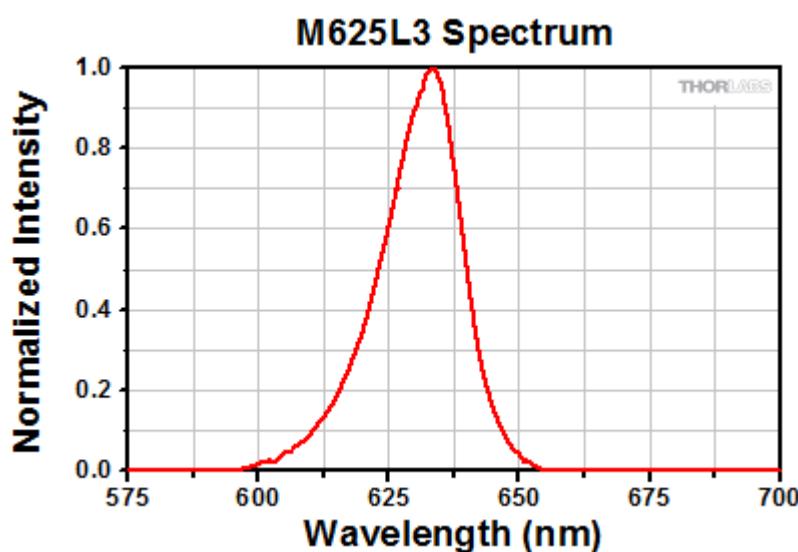
Pin	Color	Specification
1	Brown	LED Anode
2	White	LED Cathode
3	Black	EEPROM GND
4	Blue	EEPROM IO



CON8ML-4 Shown Connected to the 4-Pin M8 Plug of Mounted LED

Part Number	Description	Price	Availability
CON8ML-4	4-Pin Female Mating Connector for Mounted LEDs	\$32.31	Today

Spectrum



The M625L3-C Collimated LEDs each use an M625L3 Mounted LED attached to a microscope-port-compatible collimation package. The spectrum shown here is for the bare (uncollimated) LED.

Click [here](#) to download an Excel file containing the spectral data for a larger wavelength range than shown in the graph above.

