



# VM2240190HB8xxA

## 13" ROUND DC MODULE, DUAL CHANNELS INPUT, 2400mA MAX PER CHANNEL

- Suitable for high output low bay, high bay applications
- Dual channels input
- Each channel for use in UL Class 2 lighting systems
- High lumen, high efficacy
- Suitable for DLC applications: L70 >60,000hrs/L90 =40,000hrs
- Meets UL8750 recognized
- RoHS compliant

### General Specifications

	Min.	Typical	Max.
Input Voltage, per channel <sup>①</sup>	34VDC	38.2VDC	42VDC
Input Current, per channel <sup>①</sup>	400 mA	2400mA	2400mA
Input Power, total channels <sup>①</sup>	27W	183.4W	202W
Initial Lumens, total channels @4000K / 80CRI		29,401 lumens	
Initial Efficacy, total channels @4000K / 80CRI		160 lm/W	
Beam Angle	120°		
CRI	80CRI standard, 90CRI available		
Storage Temperature Range	-40°C to 100°C / -40°F to 212°F		
Operating Temperature Range (ta)	-40°C to 55°C / -40°F to 131°F		
Maximum Case Temperature (Tc)	L70: Tc max 105°C / L90: Tc max 105°C		
Estimated Lumen Maintenance <sup>②</sup>	L70: >60,000Hrs / L90: 40,000Hrs		
Color Consistency	Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM		
Overall Size	13" Dia. x 0.24" H (330.2mm Dia. x 6.1mm H)		
PCB Material / Thermal Conductivity	MCPCB (Aluminum Clad), 1.6mm thickness, 2oz copper, 1.5W/mK		
LED Quantity	416pcs, Mid power 2835 0.5W		
Module Weight	350g / 0.77lb		
PCB Part Number	PTL032C02M1		
Maximum Screw Installation Torque	25 inch - ounces		
Connector Type	Wago 2060-452 (2 pin connector)		
Packaging: Master Carton	20pcs/carton		
Thermal Feedback	Not Available		
Safety/Compliance	cURus (File # E351548) Suitable for UL Class 2 Lighting Systems RoHS Compliant Dry and Damp Location		
Energy Efficiency Label (EEI-Label)	A++		
Warranty	5 years @ Max. Tc from the date of manufacture		

<sup>①</sup>Nominal ratings. Performance based on Tc mod = 25°C. See thermal de-rating chart (pg. 5) for higher temperature operation

<sup>②</sup>TM-21 Reported Numbers



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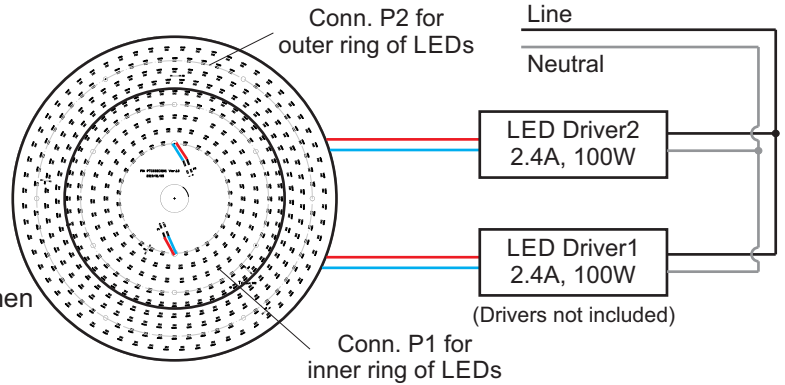
## Electrical and Optical Specifications

### Wiring Diagram1:

Connect with two drivers: each driver connect to each of the push-wire connectors on PCB.

Driver requirement: Max. 2.4A, 100W.

If one driver is switched off, calculate half power & lumen from below chart.



LED Module Part Number	Number of LED	Input Current per channel	Nom. Forward Voltage	Nom. Rated Power	Max. Fwd. Voltage	Max. Rated Power	Nom. Lum. Flux @4000K/80 CRI	Nom. Efficacy @4000K/80 CRI
VM2240190HBxxxA	416	400 mA	34.9 V	27.9 W	38 V	30 W	5587 lm	200 lm/W
		450 mA	35.0 V	31.5 W	39 V	35 W	6275 lm	199 lm/W
		500 mA	35.1 V	35.1 W	39 V	39 W	6960 lm	198 lm/W
		550 mA	35.3 V	38.8 W	39 V	43 W	7642 lm	197 lm/W
		600 mA	35.4 V	42.4 W	39 V	47 W	8320 lm	196 lm/W
		650 mA	35.5 V	46.1 W	39 V	51 W	8996 lm	195 lm/W
		700 mA	35.6 V	49.8 W	39 V	55 W	9668 lm	194 lm/W
		750 mA	35.7 V	53.5 W	39 V	59 W	10337 lm	193 lm/W
		800 mA	35.8 V	57.2 W	39 V	62 W	11002 lm	192 lm/W
		850 mA	35.8 V	60.9 W	39 V	66 W	11663 lm	191 lm/W
		900 mA	35.9 V	64.7 W	40 V	72 W	12320 lm	190 lm/W
		950 mA	36.0 V	68.4 W	40 V	76 W	12973 lm	190 lm/W
		1000 mA	36.1 V	72.2 W	40 V	80 W	13622 lm	189 lm/W
		1050 mA	36.2 V	76.0 W	40 V	84 W	14266 lm	188 lm/W
		1100 mA	36.3 V	79.8 W	40 V	88 W	14905 lm	187 lm/W
		1150 mA	36.3 V	83.6 W	40 V	92 W	15540 lm	186 lm/W
		1200 mA	36.4 V	87.4 W	40 V	96 W	16170 lm	185 lm/W
		1250 mA	36.5 V	91.3 W	40 V	100 W	16795 lm	184 lm/W
		1300 mA	36.6 V	95.1 W	40 V	104 W	17414 lm	183 lm/W
		1350 mA	36.7 V	99.0 W	40 V	108 W	18028 lm	182 lm/W
		1400 mA	36.7 V	102.9 W	40 V	112 W	18637 lm	181 lm/W
		1450 mA	36.8 V	106.8 W	40 V	116 W	19240 lm	180 lm/W
		1500 mA	36.9 V	110.7 W	41 V	123 W	19837 lm	179 lm/W
		1550 mA	37.0 V	114.6 W	41 V	127 W	20428 lm	178 lm/W
		1600 mA	37.0 V	118.5 W	41 V	131 W	21012 lm	177 lm/W
		1650 mA	37.1 V	122.5 W	41 V	135 W	21591 lm	176 lm/W
		1700 mA	37.2 V	126.4 W	41 V	139 W	22163 lm	175 lm/W
		1750 mA	37.3 V	130.4 W	41 V	144 W	22728 lm	174 lm/W
1800 mA	37.3 V	134.4 W	41 V	148 W	23286 lm	173 lm/W		
1850 mA	37.4 V	138.4 W	41 V	152 W	23838 lm	172 lm/W		
1900 mA	37.5 V	142.4 W	41 V	156 W	24382 lm	171 lm/W		
1950 mA	37.6 V	146.5 W	41 V	160 W	24919 lm	170 lm/W		
2000 mA	37.6 V	150.5 W	41 V	164 W	25449 lm	169 lm/W		
2050 mA	37.7 V	154.6 W	41 V	168 W	25971 lm	168 lm/W		
2100 mA	37.8 V	158.7 W	42 V	176 W	26486 lm	167 lm/W		
2150 mA	37.8 V	162.7 W	42 V	181 W	26992 lm	166 lm/W		
2200 mA	37.9 V	166.8 W	42 V	185 W	27491 lm	165 lm/W		
2250 mA	38.0 V	171.0 W	42 V	189 W	27981 lm	164 lm/W		
2300 mA	38.1 V	175.1 W	42 V	193 W	28463 lm	163 lm/W		
2350 mA	38.1 V	179.2 W	42 V	197 W	28936 lm	161 lm/W		
2400 mA*	38.2 V	183.4 W	42 V	202 W	29401 lm	160 lm/W		



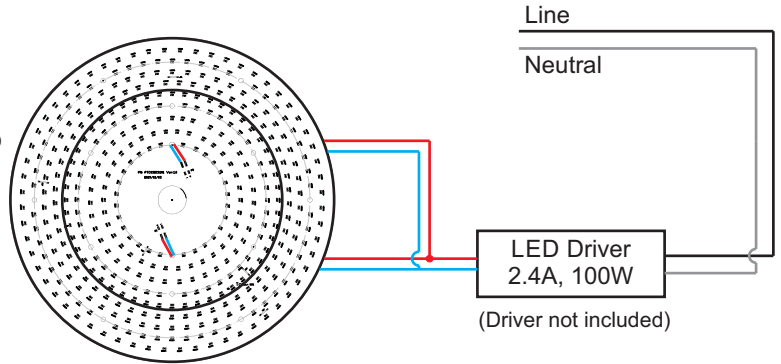
# VM2240190HB8xxA

## Electrical and Optical Specifications

### Wiring Diagram2:

Connect with single driver: the driver output connect to both of the push-wire connectors on PCB.

Driver requirement: Max. 2.4A, 100W.



LED Module Part Number	Number of LED	Input Current	Nom. Forward Voltage	Nom. Rated Power	Max. Fwd. Voltage	Max. Rated Power	Nom. Lum. Flux @4000K/80 CRI	Nom. Efficacy @4000K/80 CRI
VM2240190HBxxxA	416	400 mA	33.9 V	13.6 W	37 V	15 W	2813 lm	208 lm/W
		450 mA	34.1 V	15.3 W	37 V	17 W	3161 lm	206 lm/W
		500 mA	34.2 V	17.1 W	38 V	19 W	3510 lm	205 lm/W
		550 mA	34.4 V	18.9 W	38 V	21 W	3857 lm	204 lm/W
		600 mA	34.5 V	20.7 W	38 V	23 W	4205 lm	203 lm/W
		650 mA	34.6 V	22.5 W	38 V	25 W	4551 lm	202 lm/W
		700 mA	34.7 V	24.3 W	38 V	27 W	4897 lm	202 lm/W
		750 mA	34.8 V	26.1 W	38 V	29 W	5243 lm	201 lm/W
		800 mA	34.9 V	27.9 W	38 V	30 W	5587 lm	200 lm/W
		850 mA	34.9 V	29.7 W	38 V	32 W	5931 lm	200 lm/W
		900 mA	35.0 V	31.5 W	39 V	35 W	6275 lm	199 lm/W
		950 mA	35.1 V	33.3 W	39 V	37 W	6618 lm	199 lm/W
		1000 mA	35.1 V	35.1 W	39 V	39 W	6960 lm	198 lm/W
		1050 mA	35.2 V	37.0 W	39 V	41 W	7301 lm	198 lm/W
		1100 mA	35.3 V	38.8 W	39 V	43 W	7642 lm	197 lm/W
		1150 mA	35.3 V	40.6 W	39 V	45 W	7981 lm	197 lm/W
		1200 mA	35.4 V	42.4 W	39 V	47 W	8320 lm	196 lm/W
		1250 mA	35.4 V	44.3 W	39 V	49 W	8659 lm	196 lm/W
		1300 mA	35.5 V	46.1 W	39 V	51 W	8996 lm	195 lm/W
		1350 mA	35.5 V	48.0 W	39 V	53 W	9332 lm	195 lm/W
		1400 mA	35.6 V	49.8 W	39 V	55 W	9668 lm	194 lm/W
		1450 mA	35.6 V	51.6 W	39 V	57 W	10003 lm	194 lm/W
		1500 mA	35.7 V	53.5 W	39 V	59 W	10337 lm	193 lm/W
		1550 mA	35.7 V	55.4 W	39 V	60 W	10670 lm	193 lm/W
1600 mA	35.8 V	57.2 W	39 V	62 W	11002 lm	192 lm/W		
1650 mA	35.8 V	59.1 W	39 V	64 W	11333 lm	192 lm/W		
1700 mA	35.8 V	60.9 W	39 V	66 W	11663 lm	191 lm/W		
1750 mA	35.9 V	62.8 W	39 V	68 W	11992 lm	191 lm/W		
1800 mA	35.9 V	64.7 W	40 V	72 W	12320 lm	190 lm/W		
1850 mA	36.0 V	66.6 W	40 V	74 W	12647 lm	190 lm/W		
1900 mA	36.0 V	68.4 W	40 V	76 W	12973 lm	190 lm/W		
1950 mA	36.1 V	70.3 W	40 V	78 W	13298 lm	189 lm/W		
2000 mA	36.1 V	72.2 W	40 V	80 W	13622 lm	189 lm/W		
2050 mA	36.1 V	74.1 W	40 V	82 W	13944 lm	188 lm/W		
2100 mA	36.2 V	76.0 W	40 V	84 W	14266 lm	188 lm/W		
2150 mA	36.2 V	77.9 W	40 V	86 W	14586 lm	187 lm/W		
2200 mA	36.3 V	79.8 W	40 V	88 W	14905 lm	187 lm/W		
2250 mA	36.3 V	81.7 W	40 V	90 W	15223 lm	186 lm/W		
2300 mA	36.3 V	83.6 W	40 V	92 W	15540 lm	186 lm/W		
2350 mA	36.4 V	85.5 W	40 V	94 W	15856 lm	185 lm/W		
2400 mA*	36.4 V	87.4 W	40 V	96 W	16170 lm	185 lm/W		



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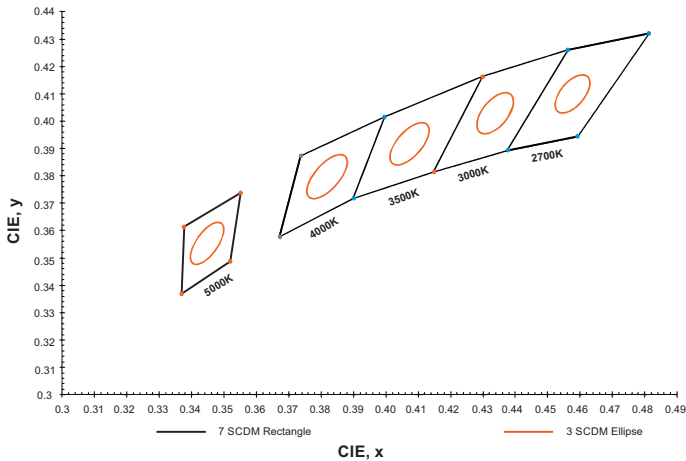
## Luminous Flux De-Rating: CCT and CRI Multipliers

	2700K	3000K	3500K	4000K	5000K	5700K	6500K
CRI 80(R9> 0)	0.924	0.951	0.965	1.000	1.014	1.007	1.000
CRI 90(R9>50)	0.774	0.836	0.829	0.850	0.864	0.864	0.850

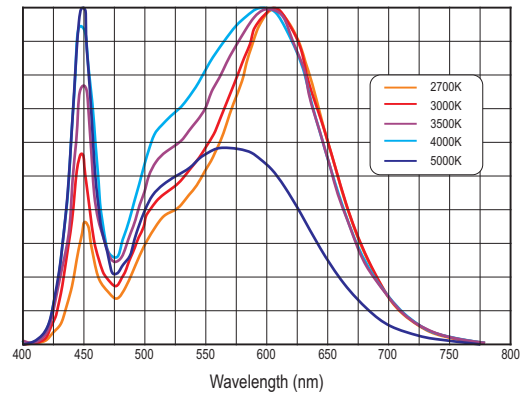
### NOTES:

- 1) Performance data on pg.2 & pg.3 is based on Tc mod = 25°C. See thermal de-rating chart (pg. 5) for higher temperature operation
- 2) Standard lumen output and efficacy is calculated for standard options. Reference CCT & CRI vs Luminous Flux chart for lumen ratio calculation.
- 3) Specifications are subject to change without notice.
- 4) The LED DC Module can be configure with different LED chip quantities, series and parallel design configurations to meet a specific design requirement. Contact Fulham for further assistance.
- 5) Modules may be operated at a current less than or equal to the max. rating, below the max. Tc.
- 6) 70CRI is NOT available.

## Color and Binning



## Optical Spectrum



### NOTES:

- 1) The Color and Binning and Optical Spectrum charts are for reference only. For more detailed info, contact factory.
- 2) Reference Samsung Chromaticity Diagram for Color and Binning. Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM.
- 3) The Optical Spectrum values vary depending on product type and color rank.



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## Thermal Specifications

### DC Module

Storage Temperature Range	-40 to 100°C / -40 to 212°F
Operating Ambient Temperature Range (ta)	-40 to 55°C / -40 to 131°F
Maximum Case Temperature (Tc)	L70 = 105°C (221°F) / L90 = 105°C (221°F)

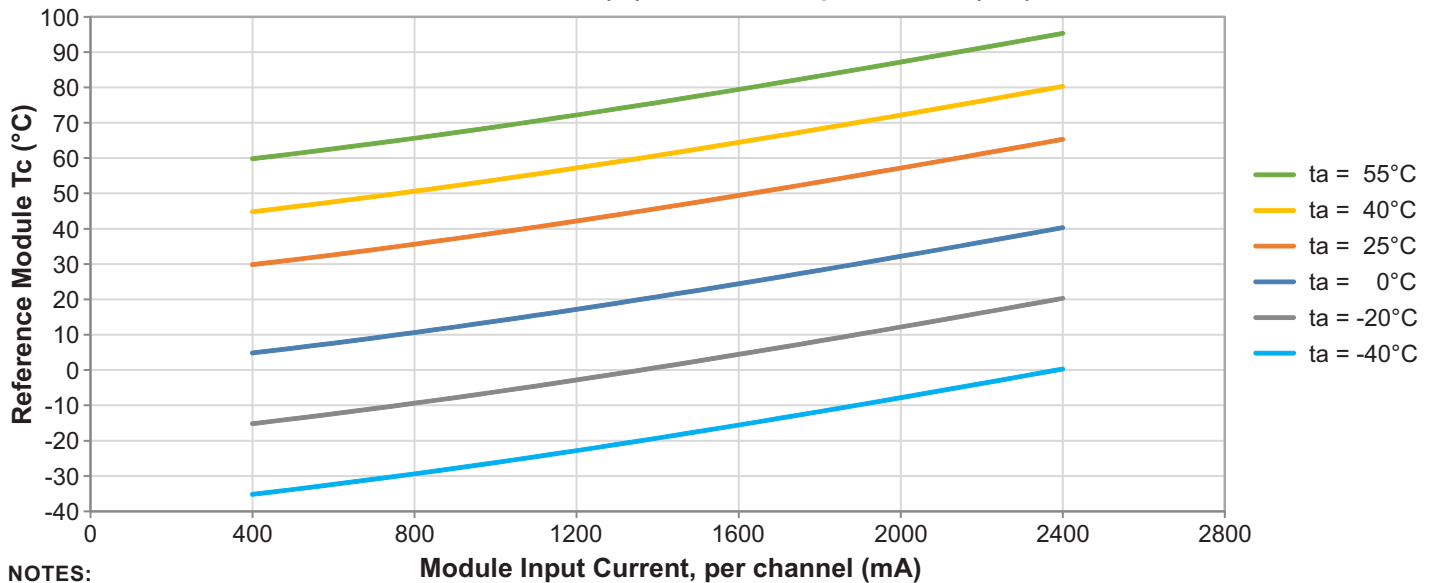


## Thermal De-Rating:

### Tc vs. Luminous Flux vs. Forward Voltage

Module Case Temperature (Tc)	Total Vf Multiplier	Luminous Flux Multiplier
25°C	1.000	1.000
30°C	0.998	0.992
35°C	0.997	0.983
40°C	0.995	0.975
45°C	0.993	0.966
50°C	0.992	0.958
55°C	0.990	0.949
60°C	0.988	0.941
65°C	0.986	0.932
70°C	0.985	0.924
75°C	0.983	0.915
80°C	0.981	0.907
85°C	0.980	0.899
90°C	0.978	0.890
95°C	0.976	0.882
100°C	0.975	0.873
105°C	0.973	0.865

### Module Tc vs. Ambient (ta) vs. Module Input Current (mA)





# VM2240190HB8xxA



## Certification Chart

Model	VM2240190HB8xxA
Classification	
	YES
	YES
	YES
Energy Efficiency Label (EEI-Label)	A++
Suitable for UL Class 2 Lighting System	YES

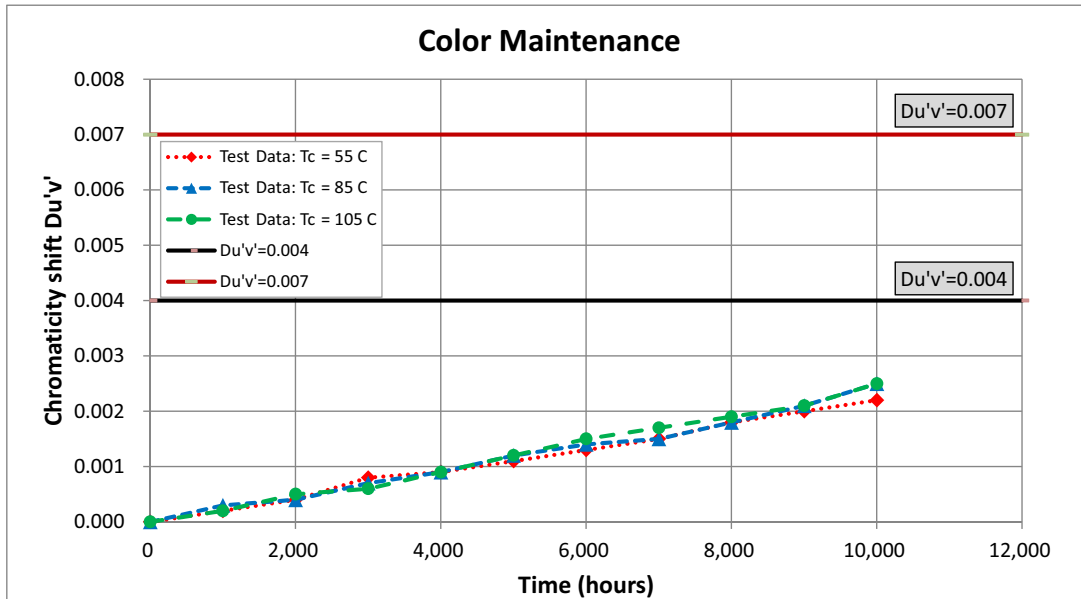
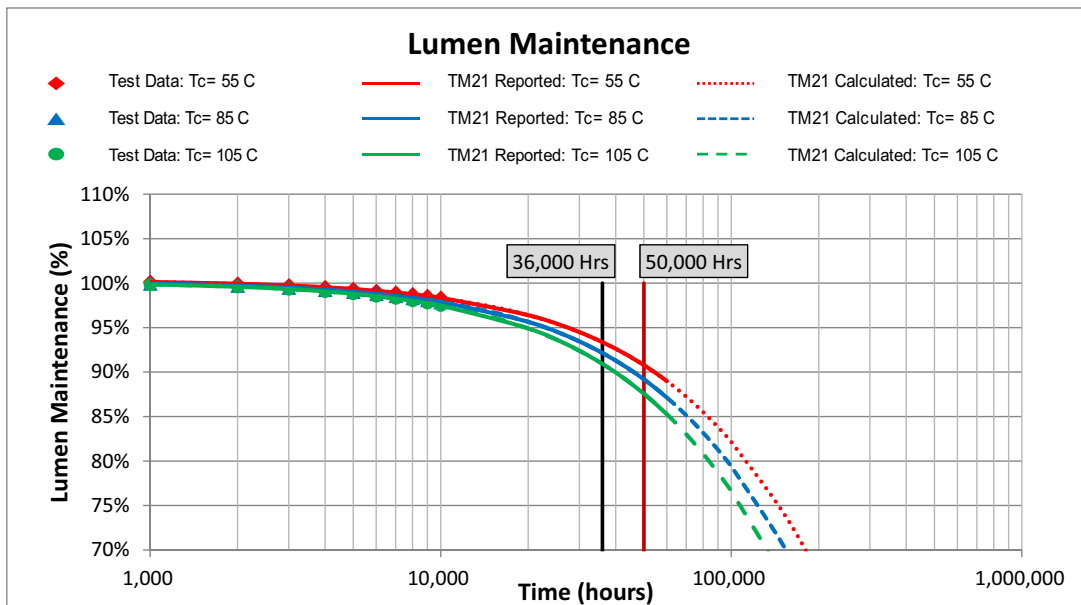
## Energy Star™ TM-21 Calculator Data

Tc Module	Reported L70	Reported L90
55°C	>60,000 Hrs	54,000 Hrs
85°C	>60,000 Hrs	46,000 Hrs
105°C	>60,000 Hrs	40,000 Hrs

Tc Module	Calculated L70	Calculated L90
55°C	180,000 Hrs	54,000 Hrs
85°C	154,000 Hrs	46,000 Hrs
105°C	133,000 Hrs	40,000 Hrs

## LED Lumen & Color Maintenance Data per LM-80 report and TM-21 Calculator







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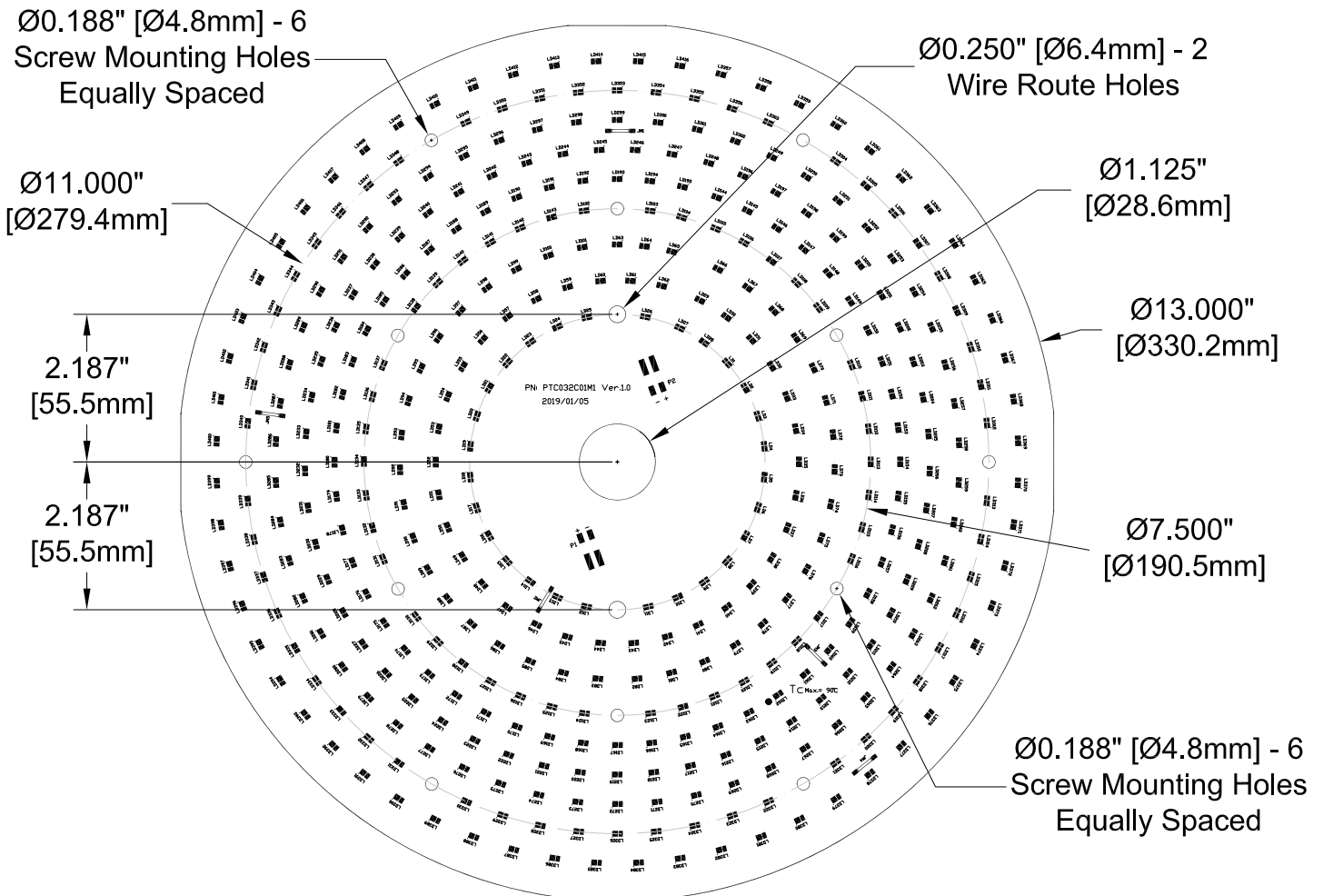


## Mechanical Drawings

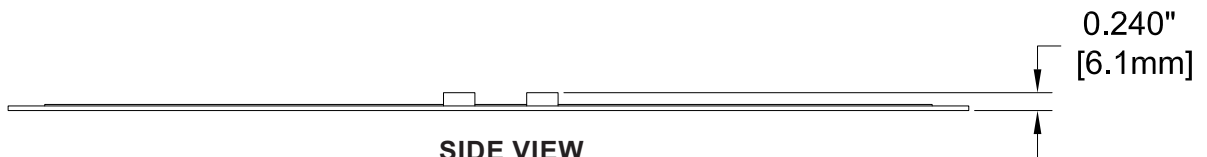
# 13" Diameter

[330.2mm]

Overall Dimensions	
Diameter	13" [330.2mm]
Height	0.24" [6.1mm]



TOP VIEW





# VM2240190HB8xxA

## Luminaire Compatibility

Fulham's VM2240190HBxxxA module is designed to work with SLP Lighting's Highbay and Lowbay luminaires.

### CircLED

The CircLED™ is a thermally conductive molded polymer high bay, offering a lighter weight alternative to die cast fixtures, while thermally managing up to a 200 Watt LED Engine.

<https://www.slplighting.com/circled/>



### CircLED RB

The CircLED™ RB is a thermally conductive molded polymer high bay or low bay, offering a lighter weight alternative to die cast fixtures, while thermally managing up to a 200 Watt LED Engine. The Remote Box Enclosure separates drivers and controls from the array for better heat dissipation.

<https://www.slplighting.com/circled/>



### CircLED RD

The CircLED™ Round Driver is a thermally conductive molded polymer high bay or low bay, offering a lighter weight alternative to die cast fixtures. Features an IP65 rated, round high bay driver.

<https://www.slplighting.com/circled/>



### About SLP Lighting

SLP Lighting has been serving the lighting industry since 1969. A leader in developing and manufacturing a full range of lighting solutions and innovative products. From concept to reality with the customer and end users in mind through the entire process. SLP is known for their high quality lighting components, such as the Citadel Enclosures and are happy to be teaming up with Fulham to provide even more solutions to the lighting market with a new SLP CircLED High Bay Series and Citadel Round Low Bay Enclosure.







# VM2240190HB8xxA

## Guidelines

### Termination Notes

- Connector Type: WAGO #2060-452 / 998-404 (2 pin push wire connector)
  - AWG: 24...18 solid wire
  - Strip length: 7...9mm / 0.28...0.35in
  - Connector Max amp. rating: 9 Amps.



Connector

For more detail information, please visit Wago's website: <http://www.wago.com/infomaterial/pdf/51300133.pdf>

### Fastening Notes

- If fastening by screw hole a recommended screw size: 8-32 x 1/4" flat head drilling screws. Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation.
- BJB P2F (Push-to-Fix) fixing elements for PCBs can be used to fasten LED modules to mounting surface. Reference BJB's website for ordering information and specific model to use: <http://www.bjb.com/index.php?pid=376706&lid=10>.
- HEYCO HEYClip™ Heat Resistant Snap Rivets 9062H is recommended for fast and easy installation with clean and finish look. [https://www.heyco.com/Nylon\\_PVC\\_Hardware/product.cfm?product=Snap-Rivets](https://www.heyco.com/Nylon_PVC_Hardware/product.cfm?product=Snap-Rivets)
- SLP Board Retention Clip is a pop-in-place solution to attach LED Modules to a boardtray in a quick easy manner. They are scratch proof and complete with a conductivity inhibitor coating. No tape or screws are needed when utilizing these clips. <https://www.splighting.com/complimentary-lighting-components/>



Heyco Rivet 9062H



**Note:**

This SLP Board Retention Clip is compatible with SLP's CITADEL fixtures only, not the CircLED fixtures.



SLP Board Retention Clip

### Environmental Rating / Conformal Coating

- The DC Modules have been evaluated for use in dry or damp locations only. If used in wet locations, acceptability and the need for additional evaluation shall be determined in the end product.
- Fulham's DC modules are available with conformal coating; made to order with MOQ and lead time will apply. The conformal coating is a silicone based material which is double sprayed on the module only (LEDs and PCB). Conformal coating is recommended for the following applications: near ocean where salt is present, constant moisture, refrigeration, continuously high humidity, or outdoor applications. An IP rating of IP64 or IP65 is achieved when the conformal coating is used, but other factors should be considered. Fulham still recommends the luminaire also meet an IP64/65 rating.

### 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. Max Tc of module should not be exceeded.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

### Polarity Notes

- DC 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.



# VM2240190HB8xxA

## Part Number Matrix

# V M 2 240 190 HB8 XXA

Product Line	Type	Input Channel	Input Current	Max. Power	Design	CRI	Color Temperature	Option
V = Vizion	M = Module (UL Class 2)	2 = 2 channels	240 = 2400mA Max. per channel	190 = 190W	HB = Highbay	⊙8 = 80 9 = 90	27 = 2700K ⊙30 = 3000K 35 = 3500K 40 = 4000K ⊙50 = 5000K 57 = 5700K 65 = 6500K	A = 416 LEDs

All CCT & CRI options are made to order with MOQ (minimum order quantities) and lead time.  
 ⊙ Limited stock for 80CRI 3000K & 5000K Available.

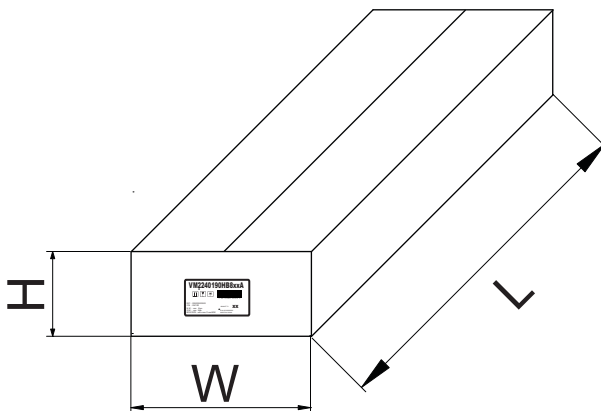
## Product Image: Highbay DC Module



TOP VIEW

## Packaging

### Master Carton



OUTER DIMENSION		
L	W	H
14.96" (380mm)	14.96" (380mm)	9.06" (230mm)
Net Weight	Gross Weight	QUANTITY
18.08 lbs. (8.2 kg)	21.74 lbs. (9.86 kg)	20pc.