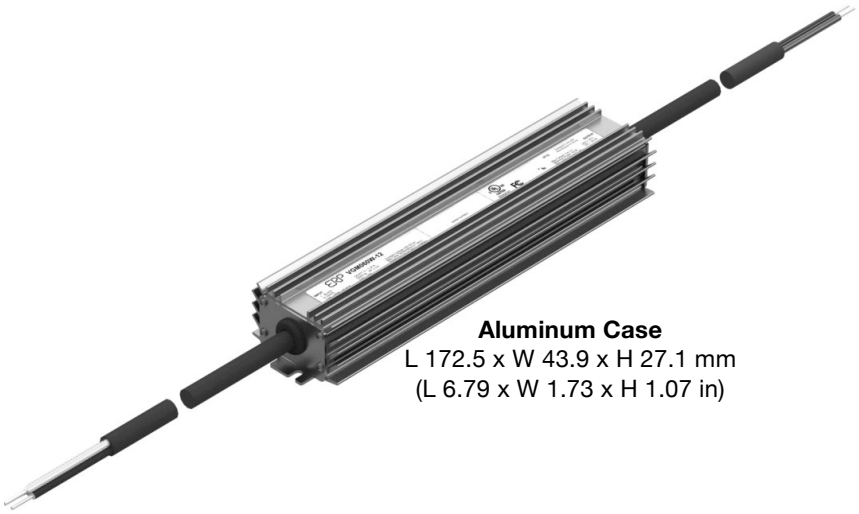
VGM Series

VGM060W-12 60 W
VGM100W-24 90 W

100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

Nominal Input Voltage	Max. Output Power	Nominal Output Voltage	Max. Output Current	Efficiency	Max. Case Temperature	THD	Power Factor
120 & 277 Vac	90 W	12, 24 Vdc	5, 3.75 A	up to 85% typical	90°C (measured at the hot spot)	< 20%	> 0.9



Aluminum Case
L 172.5 x W 43.9 x H 27.1 mm
(L 6.79 x W 1.73 x H 1.07 in)

Typical Application Diagram

Wiring Diagram

ORDERING INFORMATION

ERP Part Number	Nominal Input Voltage (Vac)	Pout Max (W)	Vout Nom (Vdc)	Iout Min (A)	Iout Max (A)	Open Loop Voltage (No Load Vout Max) (Vdc)
VGM060W-12	120 & 277	60	12	0.1	5	12.84
VGM100W-24	120 & 277	90	24	0.2	3.75	25.68

TYPICAL APPLICATIONS

- Signage
- Strip lights

FEATURES

- Class 2 power supply
- IP66-rated case with silicone-based potting
- Surge protection:
  - IEC61000-4-5: 6 kV line to line/6 kV line to earth
  - 2.5 kV ring wave: ANSI/IEEE c62.41.1-2002 & c62.41.2-2002 category A
- Complies with ENERGY STAR®, DLC (DesignLight Consortium®) and CA Title 24 technical requirements
- Lifetime: 50,000 hours min at 50° C ambient temperature
- UL879 SAM (Sign Component Manual) listing
- Worldwide safety approvals

CA Title 24

5 Year Warranty

100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

1 - INPUT SPECIFICATION (@25° C ambient temperature)

	Units	Minimum	Typical	Maximum	Notes
Input Voltage Range (Vin)	Vac	90	120 & 277	305	•The rated output voltage for each model is achieved at Vin≥105 Vac & at Vin≥249 Vac •At maximum load
Input Frequency Range	Hz	47	50/60	63	
Input Current (Iin)	A			1.05 A @ 120 Vac 0.48 A @ 277 Vac	
Power Factor (PF)		0.9	> 0.9		•At nominal input voltage •From 100% to 60% of rated power
Inrush Current	A	Meets NEMA-410 requirements			•At any point on the sine wave and 25°C
Leakage Current	µA			400 µA @ 120 Vac 920 µA @ 277 Vac	Measured per IEC60950-1
Input Harmonics	Complies with IEC61000-3-2 for Class C equipment				
Total Harmonics Distortion (THD)				20%	•At nominal input voltage •From 100% to 60% of rated power •Complies with DLC (Design Light Consortium) technical requirements
Efficiency	%	-	up to 85%	-	Measured with nominal input voltage
Isolation	The AC input to the main DC output is isolated.				

2 - MAIN OUTPUT SPECIFICATION (@25° C ambient temperature)

	Units	Minimum	Typical	Maximum	Notes
Output Voltage (Vout)	Vdc		12, 24		See ordering information for details
Output Current (Iout)	A			12 Vdc: 5.0 A 24 Vdc: 3.75 A	The rated output voltage for each model is achieved at Vin≥105 Vac & at Vin≥249 Vac.
Output Voltage Regulation	%	-5		5	•At nominal AC line voltage •Includes load and current set point variations.
Output Voltage Overshoot	%	-	-	10	The driver does not operate outside of the regulation requirements for more than 500 ms during power on with maximum load.
Ripple Voltage	≤ 5% of rated output voltage for each model				•Measured at maximum load and nominal input voltage •Calculated in accordance with the IES Lighting Handbook, 9th edition
Start-up Time	ms			500	•Measured from application of AC line voltage to 100% light output •Measured at nominal AC input voltage and with maximum loading •Complies with ENERGY STAR® luminaire specification.

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3 - ENVIRONMENTAL CONDITIONS

	Units	Minimum	Typical	Maximum	Notes
Operating Ambient Temperature (Ta)	°C	-40		+50	
Maximum Case Temperature (Tc)	°C			+90	Case temperature measured at the hot spot •tc (see label in page 9)
Storage Temperature	°C	-40		+85	
Humidity	%	5	-	95	Non-condensing
Cooling	Convection cooled				
Acoustic Noise	dBA			24	Measured at a distance of 1 meter
Mechanical Shock Protection	per EN60068-2-27				
Vibration Protection	per EN60068-2-6 & EN60068-2-64				
MTBF	> 200,000 hours when operated at nominal input and output conditions, and at Ta ≤ 50°C				
Lifetime	50,000 hours at Ta ≤ 50°C ambient temperature and at a 50% duty cycle (this assumes the VGM driver is turned on for 12 hours per day)				

4 - EMC COMPLIANCE AND SAFETY APPROVALS

EMC Compliance			
Conducted and Radiated EMI		FCC CFR Title 47 Part 15 Class A at 120 Vac and at 277 Vac	
Harmonic Current Emissions		IEC61000-3-2	For Class C equipment
Voltage Fluctuations & Flicker		IEC61000-3-3	
Immunity Compliance	**ESD (Electrostatic Discharge)**	IEC61000-4-2	6 kV contact discharge, 8 kV air discharge, level 3
	RF Electromagnetic Field Susceptibility	IEC61000-4-3	3 V/m, 80 - 1000 MHz, 80% modulated at a distance of 3 meters
	Electrical Fast Transient	IEC61000-4-4	± 2 kV on AC power port for 1 minute, ±1 kV on signal/control lines
	Surge	IEC61000-4-5	•± 6 kV line to line (differential mode) /± 6 kV line to common mode ground (tested to secondary ground) on AC power port, ±0.5 kV for outdoor cables
		ANSI/IEEE c62.41.1-2002 & c62.41.2-2002 category A, 2.5 kV ring wave	
	Conducted RF Disturbances	IEC61000-4-6	3V, 0.15-80 MHz, 80% modulated
	Voltage Dips	IEC61000-4-11	>95% dip, 0.5 period; 30% dip, 25 periods; 95% reduction, 250 periods

Safety Agency Approvals	
UL	UL8750 recognized Class 2, UL879 SAM (Sign Component Manual) listing
cUL	CAN/CSA C22.2 No. 250.13-14 LED equipment for lighting applications

Safety					
	Units	Minimum	Typical	Maximum	Notes
Hi Pot (High Potential) or Dielectric voltage-withstand	Vdc	2500			•Insulation between the input (AC line and Neutral) and the output •Tested at the RMS voltage equivalent of 1767 Vac

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5 - PROTECTION FEATURES

Under-Voltage (Brownout)

The VGM series provides protection circuitry such that an application of an input voltage below the minimum stated in section 1 (Input Specification) shall not cause damage to the driver.

Internal Over temperature Protection

The VGM is equipped with an internal temperature sensor on the primary power train. Failure to stay within the convection power rating will cause the driver to shut down. The main output current will be resumed when the temperature of the built-in temperature sensor cools adequately.

Output Open Load

A no load condition will not damage the VGM or cause a hazardous condition. The driver will remain stable and operate normally after application of a load. When the LED load is removed, the output voltage of the VGM series is limited to 7% about the output voltage of each model.

Over Power Protection

The VGM will shut down and auto recover in an over power condition. This condition will cause no damage to the power supply.

Input Over Current Protection

The VGM series incorporates a primary AC line fuse for input over current protection.

Short Circuit and Over Current Protection

The VGM series is protected against short-circuit such that a short from any output to return shall not result in a fire hazard or shock hazard. The driver shall hiccup as a result of a short circuit or over current fault. Removal of the fault will return the driver to within normal operation. The driver shall recover, with no damage, from a short across the output for an indefinite period of time.

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7 - PREDICTED LIFETIME VERSUS CASE AND AMBIENT TEMPERATURE

Lifetime is defined by the measurement of the temperatures of all the electrolytic capacitors whose failure would affect light output under the nominal LED load and worst case AC line voltage. The graph in figure 1 are determined by the electrolytic capacitor with the shortest lifetime, among all electrolytic capacitors. It represents a worst case scenario in which the LED driver is powered 12 hours/day, 7 days/week. The lifetime of an electrolytic capacitor is measured when any of the following changes in performance are observed:

1) Capacitance changes more than 20% of initial value
2) Dissipation Factor (tan δ): 150% or less of initial specified value
3) Equivalent Series Resistance (ESR): 150% or less of initial specified value
4) Leakage current: less of initial specified value

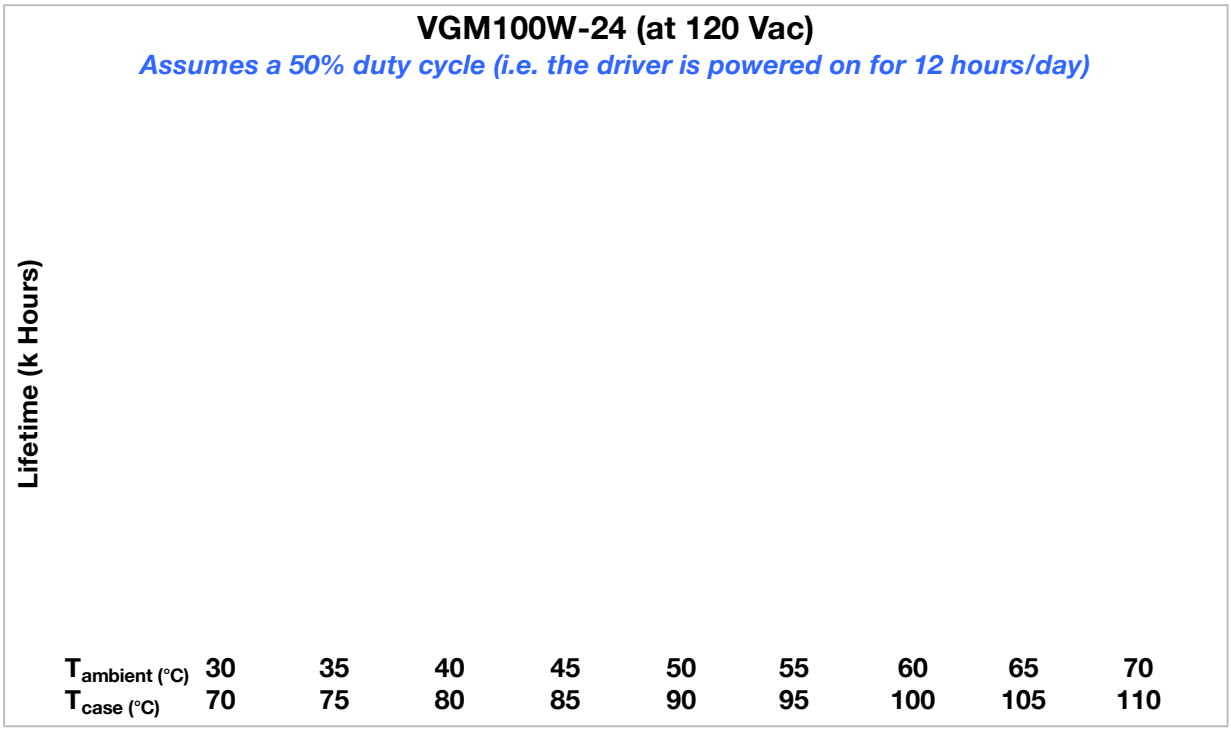

Figure 1

Notes:

- *The ambient temperature $T_{ambient}$ and the differential between $T_{ambient}$ and T_{case} mentioned in the above graphs are relevant only as long as both the driver and the light fixture are exposed to the same ambient room temperature. If the LED driver is housed in an enclosure or covered by insulation material, then the ambient room temperature is no longer valid. In this situation, please refer only to the case temperature T_{case}.*
- *It should be noted the graph "Lifetime vs. Ambient Temperature" may have an error induced in the final application if the mounting has restricted convection flow around the case. For applications where this is evident, the actual case temperature measured at the Tc point in the application should be used for reliability calculations.*

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8 – EFFICIENCY VERSUS LOAD

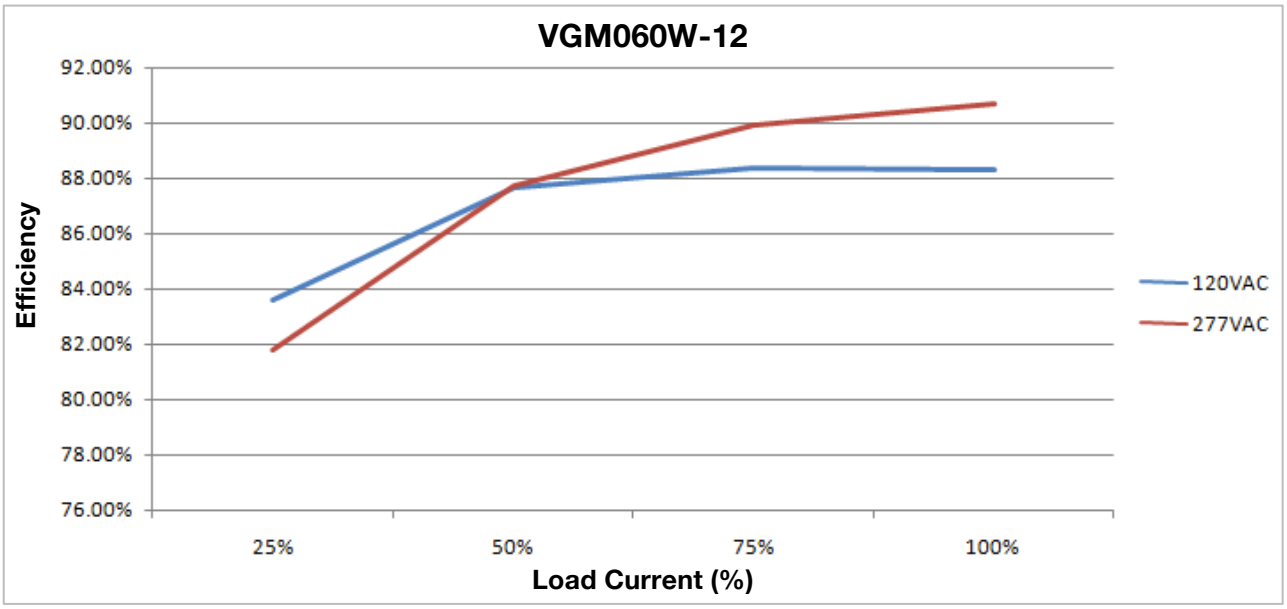

Figure 2

9 – POWER FACTOR VERSUS LOAD

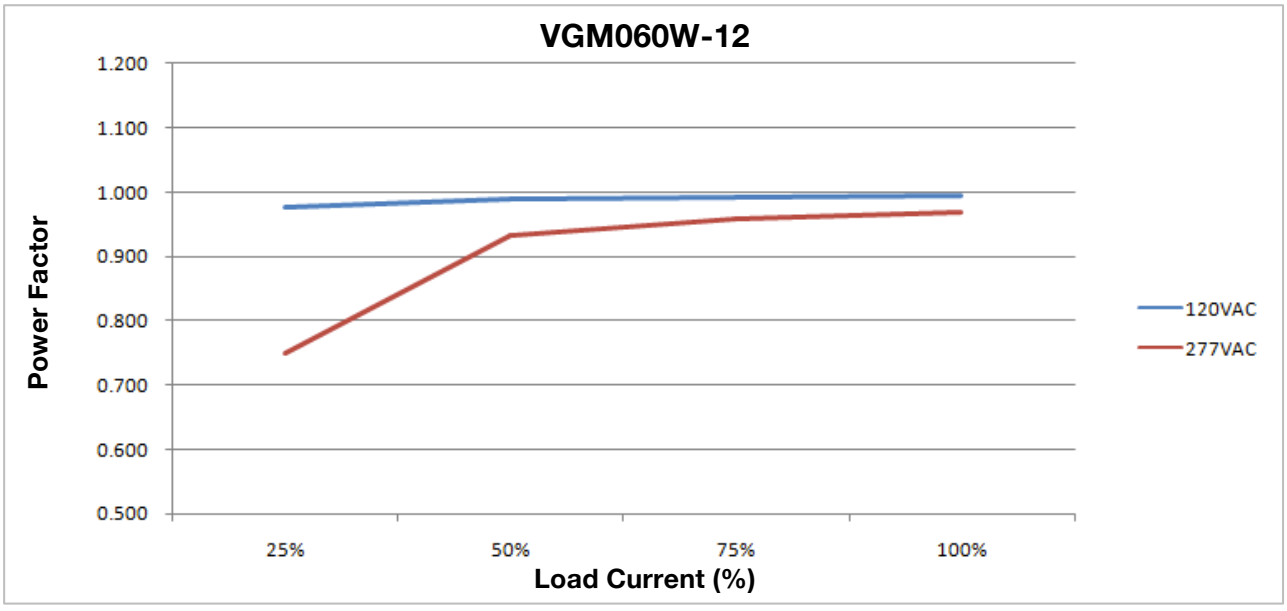

Figure 3

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10 – THD VERSUS LOAD

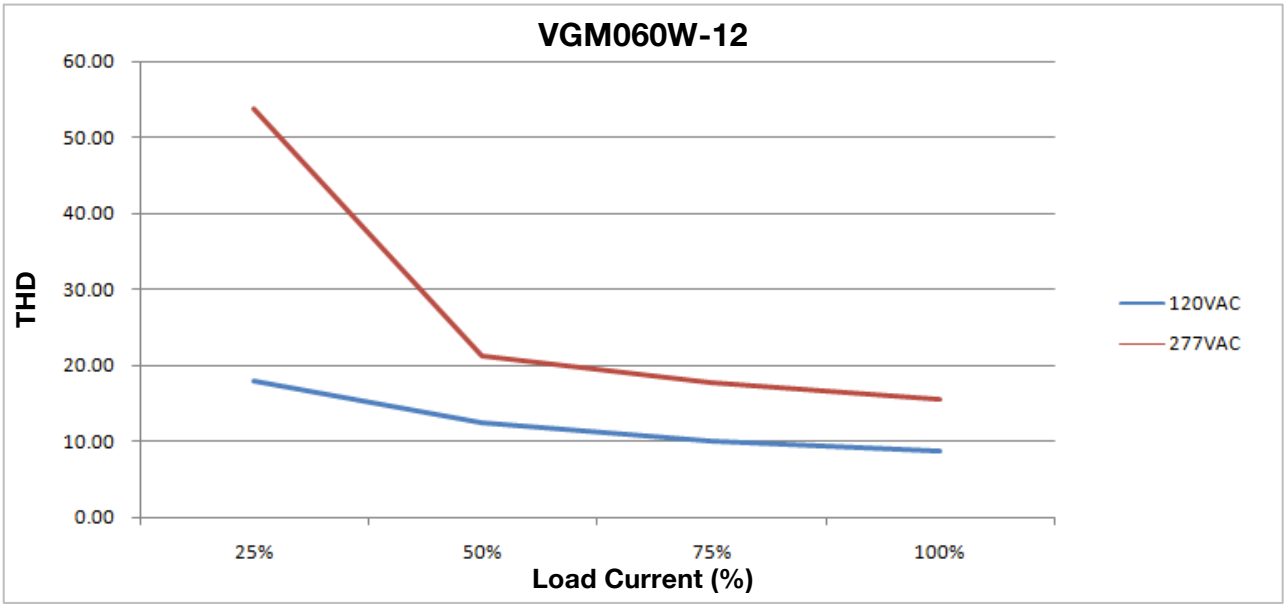


Figure 4

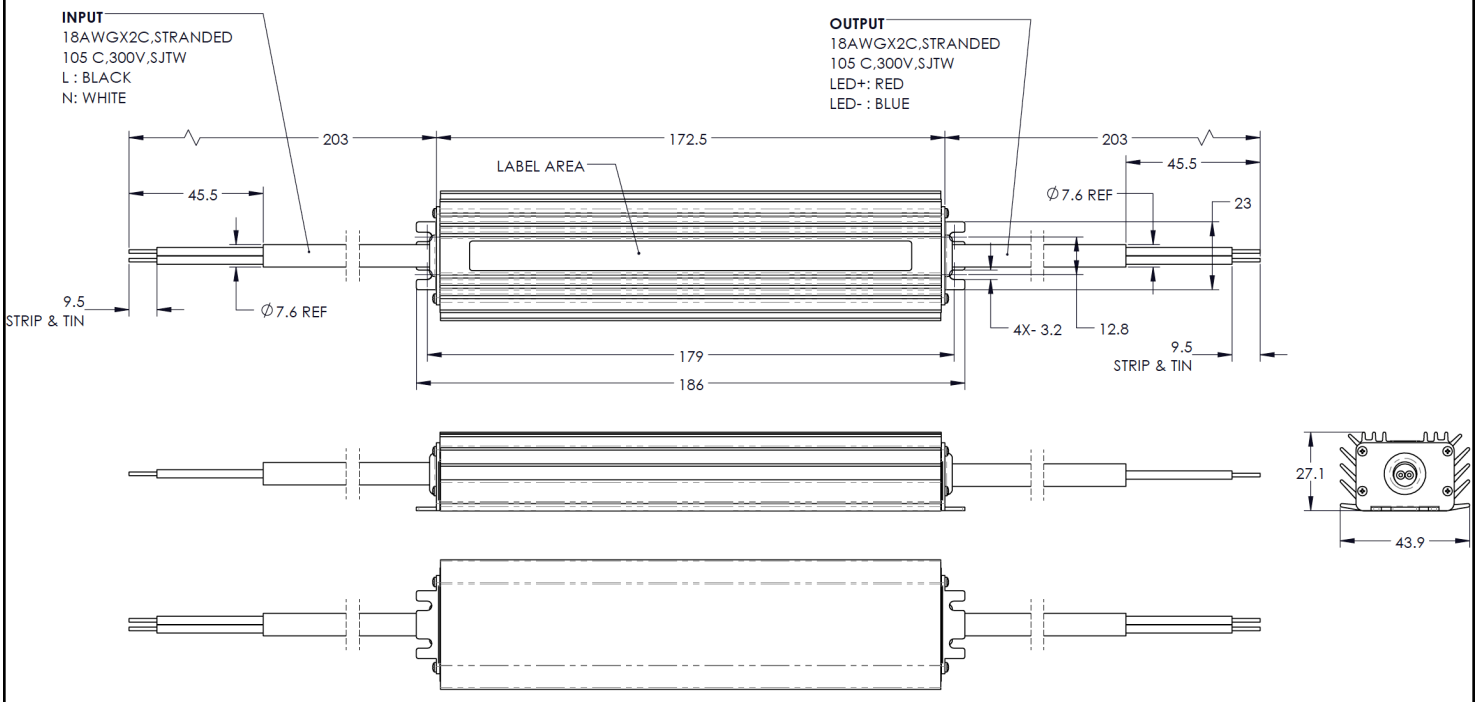
100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

11 - MECHANICAL DETAILS

Packaging Options: Aluminum case
I/O Connections: Jacketed wires, 18 AWG on all leads, 203mm (8 in) long, 105°C rated, stranded, stripped by approximately 5mm, and tinned. All the wires, on both input and output, have a 300 V insulation rating.
Ingress Protection: IP66 rated
Mounting Instructions: The VGM driver case must be secured on a flat metal baseplate or surface.

12 - OUTLINE DRAWINGS

Dimensions: L 172.5 x W 43.9 x H 27.1 mm (L 6.79 x W 1.73 x H 1.07 in)
Volume:
Weight:



All dimensions are in mm
Figure 5

100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

13 - LABELING

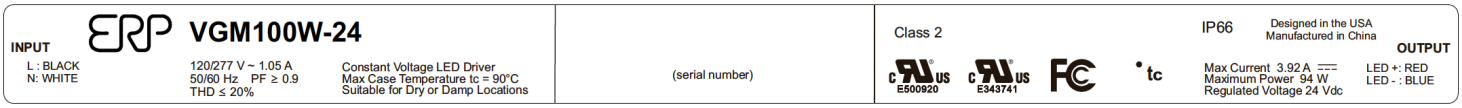


Figure 6

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