VGM Series

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

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</tr>
</thead>
<tbody>
<tr>
<td>120/277 Vac</td>
<td>94 W</td>
<td>12, 24, Vdc</td>
<td>5, 3.92 A</td>
<td>up to 90% typical</td>
<td>100°C (measured at the hot spot)</td>
<td>&lt; 20%</td>
<td>&gt; 0.9</td>
</tr>
</tbody>
</table>

Aluminum Case
L 172 x W 43.9 x H 27.1 mm
(L 6.77 x W 1.73 x H 1.07 in)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ERP Part Number</th>
<th>Nominal Input Voltage (Vac)</th>
<th>Pout Max (W)</th>
<th>Vout Nom (Vdc)</th>
<th>Iout Min (A)</th>
<th>Iout Max (A)</th>
<th>Open Loop Voltage (No Load Vout Max) (Vdc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGM060W-12</td>
<td>120/277</td>
<td>60</td>
<td>12</td>
<td>0.1</td>
<td>5</td>
<td>12.84</td>
</tr>
<tr>
<td>VGM100W-24</td>
<td>120/277</td>
<td>94</td>
<td>24</td>
<td>0.2</td>
<td>3.92</td>
<td>25.68</td>
</tr>
</tbody>
</table>

FEATURES
- Class 2 power supply
- IP66-rated case with silicone-based potting
- Complies with ENERGY STAR®, DLC (DesignLight Consortium®) and CA Title 24 technical requirements
- Lifetime: 50,000 hours min at 60°C ambient temperature
- UL879 SAM (Sign Component Manual) listing
- Worldwide safety approvals

TYPICAL APPLICATIONS
- Signage
- Strip lights

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

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

<table>
<thead>
<tr>
<th>Units</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Notes</th>
</tr>
</thead>
</table>
| 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 |
| Power Factor (PF) | | | > 0.9 | | • At nominal input voltage  
  • From 100% to 60% of rated power |
| Inrush Current | A | | Meets NEMA-410 requirements |
| Leakage Current | µA | | 400 µA @ 120 Vac |
| Input Harmonics | | | Measured per IEC60950-1 |
| Total Harmonics Distortion (THD) | | | 20% |
| Efficiency | % | - | up to 90% | - | Measured with nominal input voltage |
| Isolation | | | The AC input to the main DC output is isolated and meets Class II reinforced/double insulation power supply |

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

<table>
<thead>
<tr>
<th>Units</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage (Vout)</td>
<td>Vdc</td>
<td>12, 24</td>
<td></td>
<td>See ordering information for details</td>
</tr>
<tr>
<td>Output Current (Iout)</td>
<td>A</td>
<td></td>
<td>12 Vdc: 5.0 A 24 Vdc: 3.92 A</td>
<td></td>
</tr>
</tbody>
</table>
| 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 according to 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. |
100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

### 3 - ENVIRONMENTAL CONDITIONS

<table>
<thead>
<tr>
<th>Units</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Ambient Temperature (Ta)</td>
<td>°C</td>
<td>-40</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Maximum Case Temperature (Tc)</td>
<td>°C</td>
<td>-40</td>
<td>100</td>
<td>Case temperature measured at the hot spot, t_c (see label in page 9)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>°C</td>
<td>-40</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>%</td>
<td>5</td>
<td>95</td>
<td>Non-condensing</td>
</tr>
<tr>
<td>Cooling</td>
<td></td>
<td></td>
<td>Convection cooled</td>
<td></td>
</tr>
<tr>
<td>Acoustic Noise</td>
<td>dBA</td>
<td>24</td>
<td>Measured at a distance of 1 meter</td>
<td></td>
</tr>
<tr>
<td>Mechanical Shock Protection</td>
<td></td>
<td></td>
<td>per EN60068-2-27</td>
<td></td>
</tr>
<tr>
<td>Vibration Protection</td>
<td></td>
<td></td>
<td>per EN60068-2-6 &amp; EN60068-2-64</td>
<td></td>
</tr>
<tr>
<td>MTBF</td>
<td></td>
<td>&gt; 200,000 hours when operated at nominal input and output conditions, and at Ta ≤ 60°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifetime</td>
<td></td>
<td>50,000 hours at Ta ≤ 60°C ambient temperature and at a 50% duty cycle (this assumes the VGM driver is turned on for 12 hours per day)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4 - EMC COMPLIANCE AND SAFETY APPROVALS

#### EMC Compliance

- Conducted and Radiated EMI: FCC CFR Title 47 Part 15 Class B at 120 Vac and Class A at 277 Vac
- Harmonic Current Emissions: IEC61000-3-2, For Class C equipment
- Voltage Fluctuations & Flicker: IEC61000-3-3
- 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 Surge: IEC61000-4-4, ±2 kV on AC power port for 1 minute, ±1 kV on signal/control lines
- Electrical Fast Transient 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
- Conducted RF Disturbances: ANSI/IEEE c62.41.1-2002 & c62.41.2-2002 Category A, 2.5 kV ring wave
- Voltage Dips: IEC61000-4-11, >95% dip, 0.5 period; 30% dip, 25 periods; 95% reduction, 250 periods

#### Safety Agency Approvals

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

#### Safety

<table>
<thead>
<tr>
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<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi Pot (High Potential) or Dielectric voltage-withstand</td>
<td>Vdc</td>
<td>2500</td>
<td></td>
<td>Insulation between the input (AC line and Neutral) and the output. Tested at the RMS voltage equivalent of 1767 Vac</td>
</tr>
</tbody>
</table>
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 hiccups 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.
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 is 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

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.
8 – EFFICIENCY VERSUS LOAD

Figure 2

9 – POWER FACTOR VERSUS LOAD

Figure 3
100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

Figure 4

THD VERSUS LOAD

VGM060W-12

Load Current (%)

25%  50%  75%  100%

20.00

10.00

0.00

Source: SaveEnergy@erp-power.com
100 & 60 W, Efficient, CV Class 2 LED Drivers for Signage Applications

11 - MECHANICAL DETAILS

Packaging Options: Aluminum case
I/O Connections: Jacketed wires, 203mm (8 in) long, NEMA 5-15 plug
Ingress Protection: IP66 rated
Mounting Instructions: The VGM driver case must be secured on a flat surface.

12 - OUTLINE DRAWINGS

Dimensions: L 172 x W 43.9 x H 27.1 mm (L 6.77 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

VGM Series

VGM060W-12 60 W
VGM100W-24 94 W

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