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# SFWA150J2F

RoHS Compliant

## Specifications and Applications Information

08/12/10

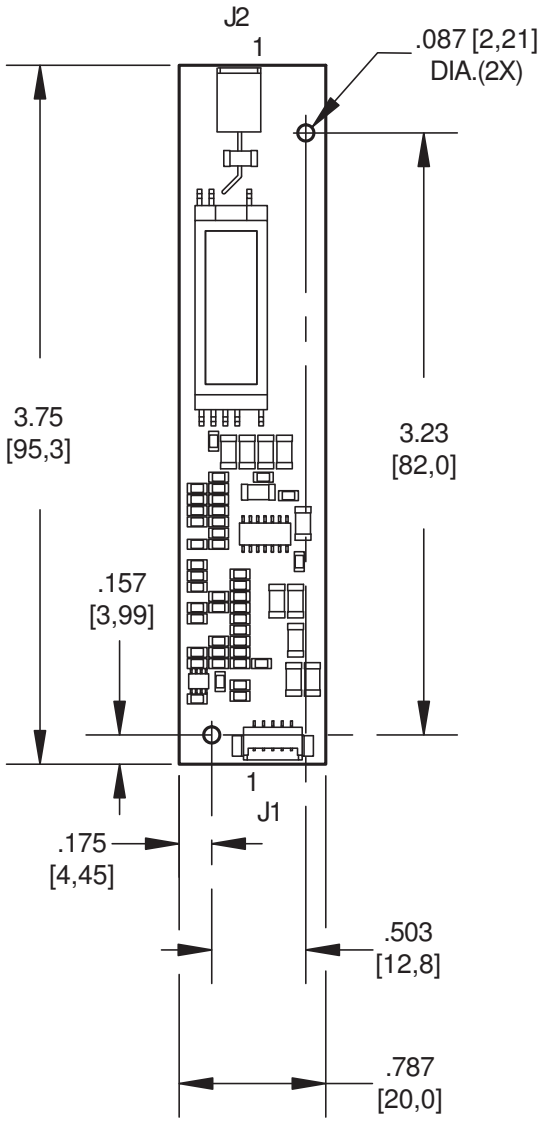
## Smart Force™
Single Lamp Inverter

The ERG SFW Series of DC to AC inverters is specifically designed for applications which require high efficiency, wide dimming and LCD brightness stability over a wide input voltage range.

Designed, manufactured and supported within the USA, the SFW series features:

- ✓ Less than 6mm in Height
- ✓ Onboard regulation of lamp current
- ✓ High efficiency
- ✓ Open lamp detection
- ✓ Onboard PWM dimming
- ✓ Support for a wide range of displays
- ✓ Low EMI emission

Package Configuration




PCB components are shown for reference only. Actual product may differ from that shown.

| Connectors | |
|---|---|
| **Input Connector** | **Output Connector** |
| Molex<br>53261-0571 | JST<br>SM02B-BHSS-1-TB |
| J1-1 +Vin<br>J1-2 GND<br>J1-3 Enable<br>J1-4 Control<br>J1-5 N/C | J2-1 ACout<br>J2-2 ACreturn |

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## Absolute Maximum Ratings

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage Range | $V_{in}$ | -0.3 to +21.0 | Vdc |
| Enable | $V_{Enable}$ | -0.3 to Vin | Vdc |
| Control | $V_{Control}$ | -0.3 to +5.5 | Vdc |
| Ambient Operating Temperature | $T_a$ | -20 to +85 | °C |
| Storage Temperature | $T_{stg}$ | -40 to +85 | °C |

## Operating Characteristics

Unless otherwise noted Vin = 12.0 Vdc, Ta = 25°C, with a simulated load and unit has been running for 5 minutes.

| Characteristic | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input Voltage (note 1) | $V_{in}$ | +8.0 | +12.0 | +18.0 | Vdc |
| Input Current (note 2) | $I_{in}$ | - | 0.44 | 0.51 | Adc |
| Operating Frequency | $F_o$ | | 63 | | kHz |
| Minimum Output Voltage (note 3) | $V_{out\ (min)}$ | 1800 | - | - | Vrms |
| Efficiency | $\eta$ | - | 75 | - | % |
| Output Current (per lamp) (note 4) | $I_{out}$ | - | 5.0 | - | mArms |
| Output Voltage (note 5) | $V_{out}$ | - | - | 800 | Vrms |
| **Enable Pin** | | | | | |
| Turn-off Threshold | $V_{thoff}$ | GND | - | 0.5 | Vdc |
| Turn-on Threshold | $V_{thon}$ | 2.4 | - | Vin | Vdc |

Specifications subject to change without notice.

(Note 1) Vin is measured at the pcb connector.
(Note 2) Input current in excess of maximum may indicate a load/inverter mismatch condition, which can result in reduced reliability. Please contact ERG technical support.
(Note 3) Provided data is not tested but guaranteed by design.
(Note 4) The output current is measured from the AC return lead of the inverter using a Tektronix CT-2 AC current probe terminated into 50 ohms at the oscilloscope input.
(Note 5) Max allowable lamp voltage.

## Onboard PWM

Unless otherwise noted Vin = 12.0 Vdc, $T_a$ = 25 °C and unit has been running for 5 minutes.

| Characteristic | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Frequency | $f_{pwm}$ | - | 290 | - | Hz |
| Minimum Brightness | $V_{control}$ | - | 4.0 | - | V |
| Maximum Brightness | $V_{control}$ | - | 1.3 | - | V |

## Pin Descriptions

**Vin** Input voltage to the inverter.

**GND** Inverter ground.

**Control** Analog voltage input to the onboard pulse width modulator. Graph 1 shows the relationship between Vcontrol and relative display brightness.

**Enable** Inverter Enable.

### Application Information

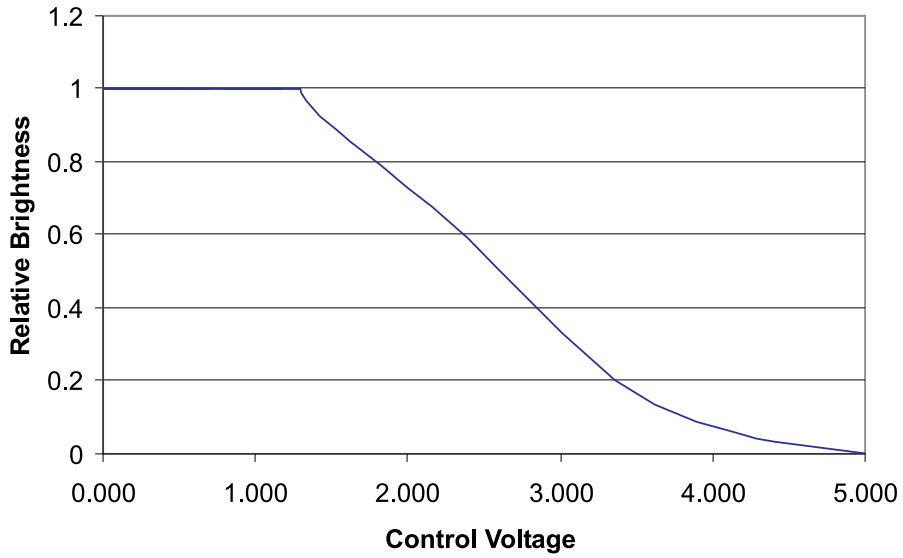
The SFW series of inverters is designed to power one cold cathode fluorescent lamp from a nonregulated DC power source. Enabling the inverter is accomplished by applying a voltage greater than $V_{thon}$ to the Enable pin of the inverter.

Dimming the inverter is accomplished by applying a DC voltage to the Control pin. The applied DC voltage adjusts the duty cycle of the onboard PWM controller thereby changing the brightness of the backlight. Graph 1 shows the typical brightness versus voltage applied to the control pin.

As with all inverters, it is important to take notice that the voltage present at the output pins is quite high and requires special care to be taken when integrating into the final application. The inverter should not be mounted closer than 0.250" (6.4mm) to any other conductive material. In general, the mounting hardware should be nonconductive. Open frame inverters, like the SFW, are not recommended in applications which require operation above 10,000 feet (3000 meters).

To improve the electrical efficiency of the overall application, the input harness cabling should be less than 12 inches (30 cm). The cable assembly between the inverter and the display is best kept below 4 inches (10 cm). If there are any questions or concerns, please feel free to contact ERG for exceptions or recommendations.

Relative Brightness vs Control Voltage




Graph 1

Analog Dimming

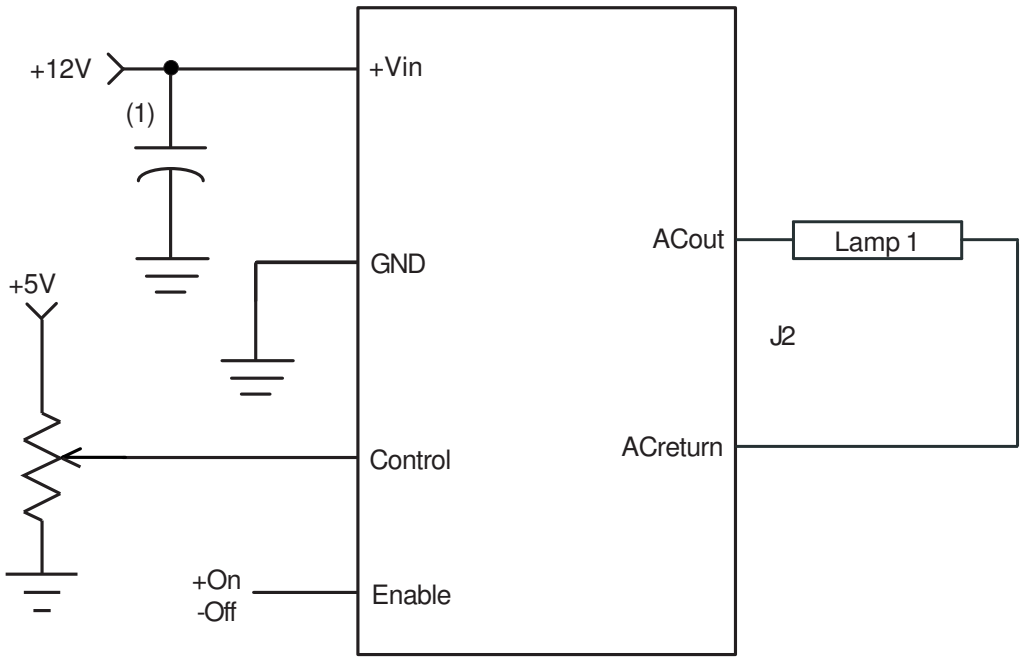



Figure 1

(1) Low ESR type input by-pass capacitor (22 uF - 220 uF) may be required to reduce reflected ripple, and to improve power supply transient response.