



# Endicott Research Group, Inc.

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## Specifications and Applications Information

05/01/04

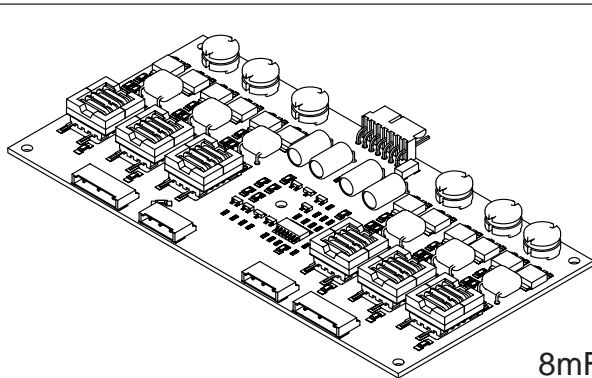
Preliminary

The ERG 8mF62682 (8mF Series) DC to AC inverter features onboard connectors and can be easily dimmed using the onboard PWM with an external analog voltage. This unit is less than 9mm in height and the five mounting holes makes installation very straight forward.

Powered by a regulated +12 Volt DC source, the 8mF62682 is designed to power the Sharp Q150X1DW11 6 tube backlight, with onboard PWM.

### Product Features

- ✓ Small Package Size, less than 9mm in height.
- ✓ High Dimming Ratio (Greater than 1000:1)
- ✓ High Efficiency
- ✓ Made in U.S.A.



8mF Package

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

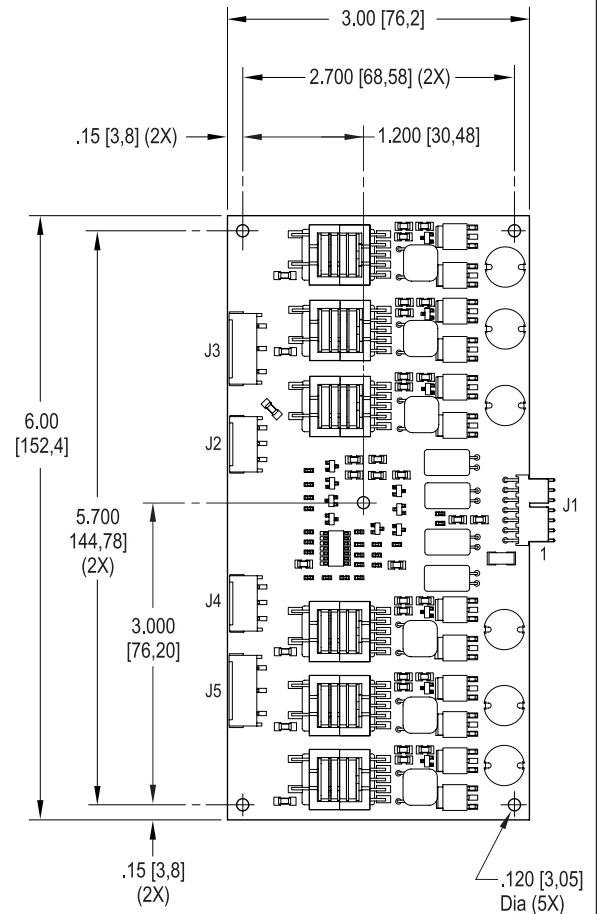
### Connectors

Input J1 Molex 22-05-3071	Output J3,J5 JST SM03(6.0)B-BHS-1-TB	Output J2,J4 JST SM03(4.0)B-BHSS-1-TB
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# 8mF62682

## Six Tube DC to AC Inverter

### Package Configuration



Mass: 93 grams

### Pin Descriptions

J1-1 Vin	J2-1 ACreturn	J3-1 ACout
J1-2 Vin	J2-2 ACreturn	J3-2 ACout
J1-3 GND	J2-3 ACreturn	J3-3 ACout
J1-4 GND		
J1-5 Enable/PWM	J4-1 ACreturn	J5-1 ACout
J1-6 Control *	J4-2 ACreturn	J5-2 ACout
J1-7 N/C	J4-3 ACreturn	J5-3 ACout

\* Valid only with onboard PWM

**Absolute Maximum Ratings** (Note 1)

Rating	Symbol	Value	Units
Input Voltage	$V_{in}$	-0.3 to +13.2	Vdc
Operating Temperature	$T_a$	-0 to +85	°C
Storage Temperature	$T_s$	-40 to +85	°C

**Recommended Operating Conditions**

Rating	Symbol	Value	Units
Input Voltage	$V_{in}$	+10.8 to 12.6	Vdc
Operating Temperature (Note 2)	$T_a$	0 to +50	°C

**Electrical Characteristics**

Unless otherwise noted  $V_{in} = 12.00$  Volts dc and  $T_a = 25^\circ\text{C}$

Characteristic	Symbol	Min	Typ	Max	Units
Input Current	$I_{in}$	-	2.0	2.4	$A_{DC}$
Input Ripple Current	$I_{rip}$	-	60	-	$mA_{pk-pk}$
Operating Frequency	$F_o$	33	38	43	KHz
Efficiency	$\eta$	-	90	-	%
Output Voltage (no load)	$V_{start}$	1500	-	-	V
Output Voltage (with lamp)	$V_{out}$	-	680	-	V
Output Current (per tube)	$I_{out}$	-	6.2	-	$mArms$
<b>Enable (pin J1-5)</b>					
Turn-off Threshold	$V_{thoff}$	-	-	2	V
Turn-On Threshold	$V_{thon}$	4	-	-	V
Impedance to $V_{in}$	$R_{Disable}$	9.5	10	10.5	V

**(Note 1)** Reliable and predictable operation of the device is not guaranteed with applied stresses at or beyond those listed in "Absolute Maximum Ratings". Operation at these limits may reduce device reliability and is therefore not recommended. Please refer to "Recommended Operating Conditions" for reliable operation of the device.

**(Note 2)** Reliable operation above  $70^\circ\text{C}$  is possible if airflow is provided.

Input voltage specification modified for clarity on 5/2004.



### Onboard PWM

Unless otherwise noted  $V_{in} = 12.00$  Volts DC ,  $T_a = 25$  °C and unit has been running for 20 minutes.

Characteristic	Symbol	Min	Typ	Max	Units
Frequency	$f_{pwm}$	-	160	-	Hz
Control Full On	$V_{ctrl}$	-	<.5	-	V
Control Full Off	$V_{ctrlh}$	-	>4.5	-	V
Control Input Bias Current	$I_{cbias}$	-	-	10	uA

### Pin Descriptions

- Vin** Input voltage to the inverter. Both pins should be connected for optimum reliability and efficiency .
- GND** Inverter ground. Both pins should be connected for optimum reliability and efficiency.
- Control** Analog voltage input to the onboard pulse width modulator. Increasing this voltage increases the off time of the onboard PWM resulting in decreased brightness.
- Enable/Disable** Inverter Enable/Disable. If this pin is driven high, the inverter is enabled. Pull this pin low to disable inverter operation.

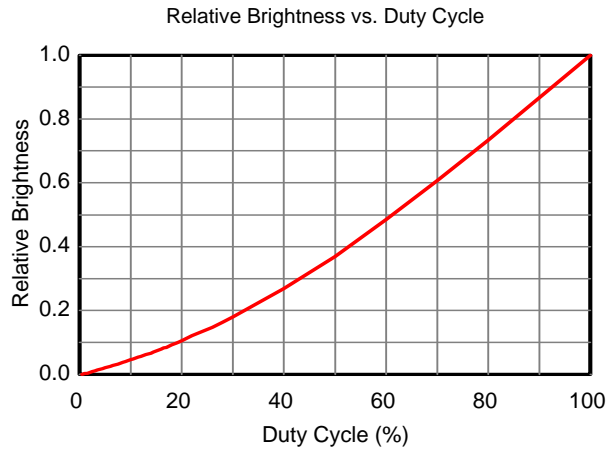
### Application information

The 8mF series of inverters is designed to power up to six cold cathode fluorescent tubes with combined power from ten watts to forty watts. An external enable/disable control and an onboard analog controlled pulse width modulator provide flexibility in allowing either PWM or analog methods for dimming. The 8mF inverter can reliably dim to less than 0.5% duty cycle, which results in an electrical dimming ratio of greater than 200:1. Depending upon the attached backlight assembly, optical dimming ratios of greater than 1000:1 can be accomplished. Graph 1 shows the relationship of relative brightness to duty cycle for a typical backlight assembly.

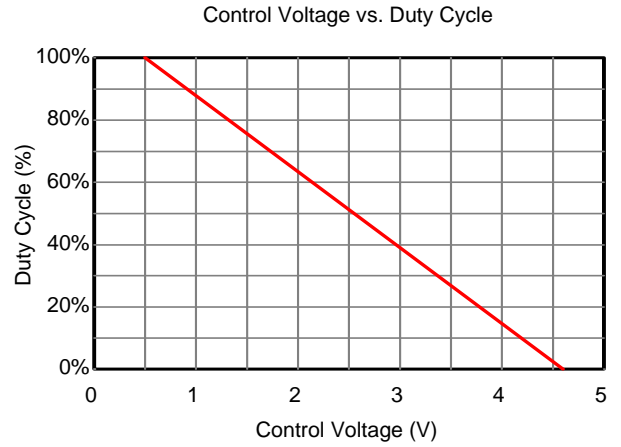
External shutdown or external PWM operation of the inverter is accomplished using the Enable/Disable pin. Enabling the inverter is accomplished by pulling this pin high (above  $V_{thon}$ ). Pulling this pin low (below  $V_{thoff}$ ) disables the inverter.

If analog voltage dimming is required, the onboard PWM can be enabled. The analog voltage is applied to the Control pin. Figure 1 shows how to connect the inverter for onboard PWM operation. Graph 2 shows the relationship of PWM duty cycle to input control voltage.

If more than one inverter is used in a backlight assembly, the PWM signal for each inverter should be synchronized to prevent flickering. Connect the Enable/Disable pin of each inverter to the external PWM source.

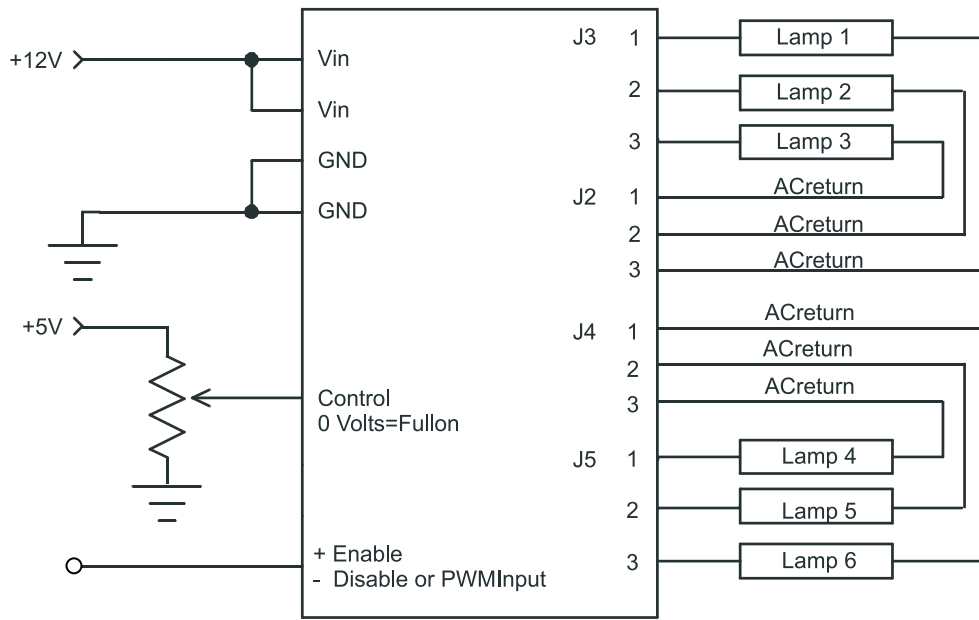


Graph 1



Graph 2

Typical Application



\* Valid only with onboard PWM

Figure 1



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