Endicott Research Group, Inc.
2601 Wayne St., Endicott NY 13760
607-754-9187 Fax 607-754-9255
http://www.ergpower.com

MA262371

Specifications and Applications Information

07/20/00 Preliminary

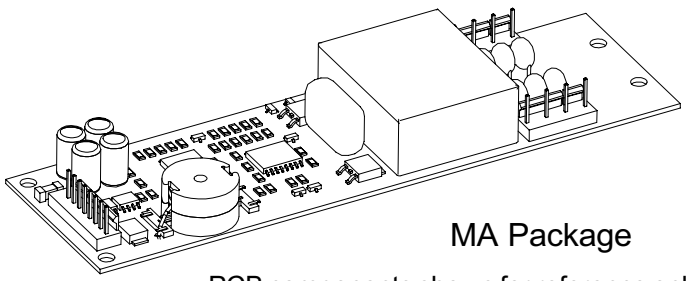
Six Tube DC to AC Inverter

The ERG MA262371 (MA Series) DC to AC inverter features onboard connectors and can be easily dimmed using an external pulse-width modulated control signal or using the onboard PWM with an external analog voltage. This unit is only 17mm in height and the four mounting holes makes installation very straight forward.

Powered by a regulated 12 volt DC source the MA262371 is specially designed to power the Sharp LQ196U1LG01 display.

Product Features

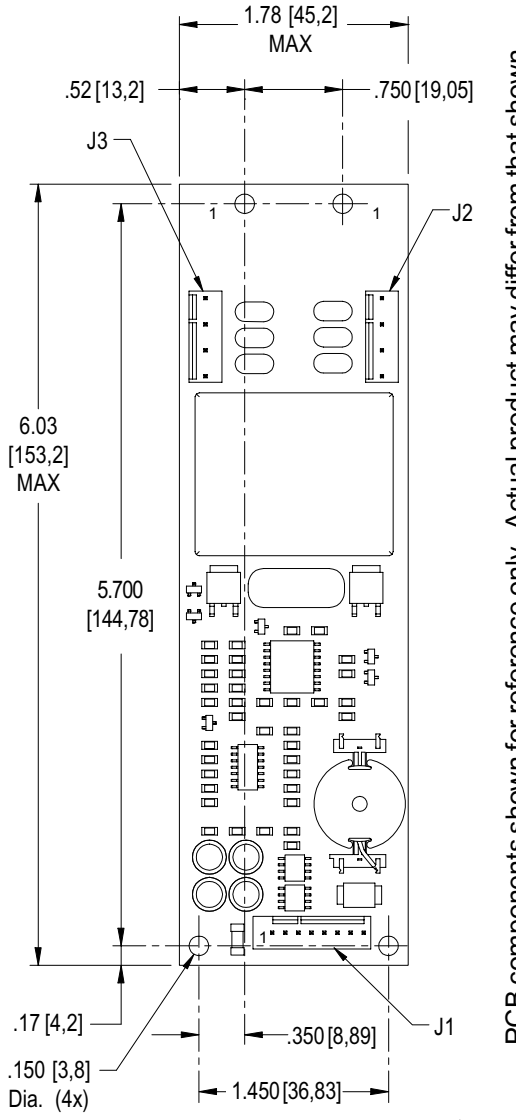
- ✓ Small Package Size, less than 17mm in height.
- ✓ High Efficiency
- ✓ Made in U.S.A.



MA Package

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

Package Configuration



Weight: 100 grams

Connectors		
J1 Molex 22-23-2081	J2 Molex 22-23-2071	J3 Molex 22-23-2071

Pinouts

J1-1 Vin	J2-1 NC	J3-1 NC
J1-2 Vin	J2-3 NC	J3-3 NC
J1-3 GND	J2-5 NC	J3-5 NC
J1-4 GND	J2-7 Lamp	J3-7 Lamp
J1-5 Control	J2-9 Lamp	J3-9 Lamp
J1-6 Disable	J2-11 Lamp	J3-11 Lamp
J1-7 PWMOut	J2-13 AC com.	J3-13 AC com.
J1-8 Hi-Bright		

MA262371

Absolute Maximum Ratings (Note 1)

Rating	Symbol	Value	Units
Input Voltage	V_{in}	-0.3 to +15	V_{DC}
Disable	$V_{Disable}$	-0.3 to V_{in} +0.3	V_{DC}
Control	$V_{Control}$	-0.3 to V_{in} +0.3	V_{DC}
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 13.2	V_{DC}
Operating Temperature (Note 2)	T_a	0 to +50	°C

Electrical Characteristics

Unless otherwise noted Vin = 12.00 Volts DC , T_a = 25 °C, Pin J1-8 "hi-bright" = float, and the unit has been running for 5 minutes.

Characteristic	Symbol	Min	Typ	Max	Units
Inverter					
Input Current	I_{in}	-	2.5	2.8	A_{DC}
Input Ripple Current	I_{rip}	-	150	-	mA_{pk-pk}
Operating Frequency	F_o	40	45	50	KHz
Efficiency	η	-	86	-	%
Output Voltage (no load) (Note 3)	V_{start}	2000	-	-	V
Output Current (per tube) Hi-Brite open	$I_{out\ Hi/O}$	-	6.0	-	mArms
Output Current (per tube) Hi-Brite GND	$I_{out\ Hi/G}$	-	7.75	-	mArms
Disable (pin J1-6)					
Turn-Off Threshold	V_{thoff}	-	-	0.8	V
Turn-On Threshold	V_{thon}	2.0	-	-	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 50°C is possible if airflow is provided.

(Note 3) Provided data is not tested but guaranteed by design.

MA262371

Onboard PWM

Unless otherwise noted Vin = 12.00 Volts DC , T_a = 25 °C and unit has been running for 5 minutes.

Characteristic	Symbol	Min	Typ	Max	Units
Frequency	f_{pwm}	-	160	-	Hz
PWM Output High	V_{pwmoh}	8.0	-	-	V
PWM Output Low	V_{pwmol}	-	-	0.8	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.

Disable Inverter disable. Pull this pin low to disable inverter operation. If this pin is left floating or driven high, the inverter is enabled. If the onboard PWM is utilized, connect this pin to PWMOUT.

Hi-Bright Grounding this pin increases the output current of the inverter. The increase in output current can yield an approximate 25% increase in the backlight brightness. Note that the output current with this pin grounded may exceed the lamp manufacturer's specifications, reducing overall backlight life.

PWMOUT Output of the onboard PWM generator.

Application information

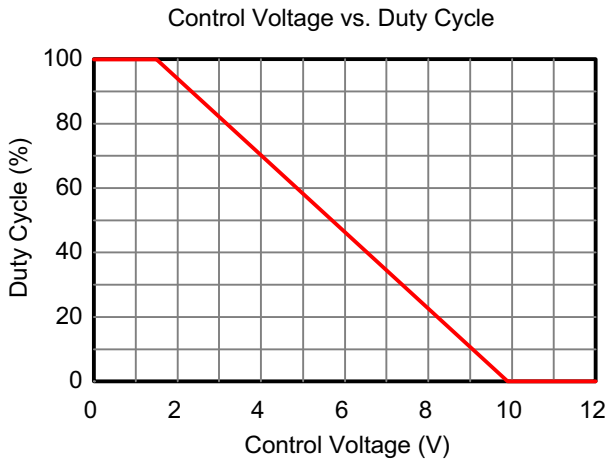
The MA series of inverters is designed to power up to twelve cold cathode fluorescent tubes with combined power from ten watts to forty watts. An external disable control and an onboard pulse width modulator provide flexibility in allowing either analog or PWM methods for dimming.

External shutdown or external PWM operation of the inverter is accomplished using the Disable pin. Pulling this pin low (below Vthoff) disables the inverter. Enabling the inverter is accomplished by floating this pin or pulling this pin high (above Vthon).

If analog voltage dimming is required, the onboard PWM is enabled by connecting the PWMOut pin to the Disable pin. The analog voltage is applied to the Control pin. Figure 1 shows how to connect the inverter for onboard PWM operation. Graph 1 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. If an external PWM is used, simply connect the Disable pin of each inverter to the PWM source. If the onboard PWM is used, connect the analog voltage to the Control pin of one inverter. Connect the PWMOut signal of the inverter with the applied analog voltage to the Disable pin of all of the inverters, including the one with the applied analog voltage. This will utilize the PWM on only one inverter and will slave all of the other inverters.

MA262371



Graph 1

Typical Application

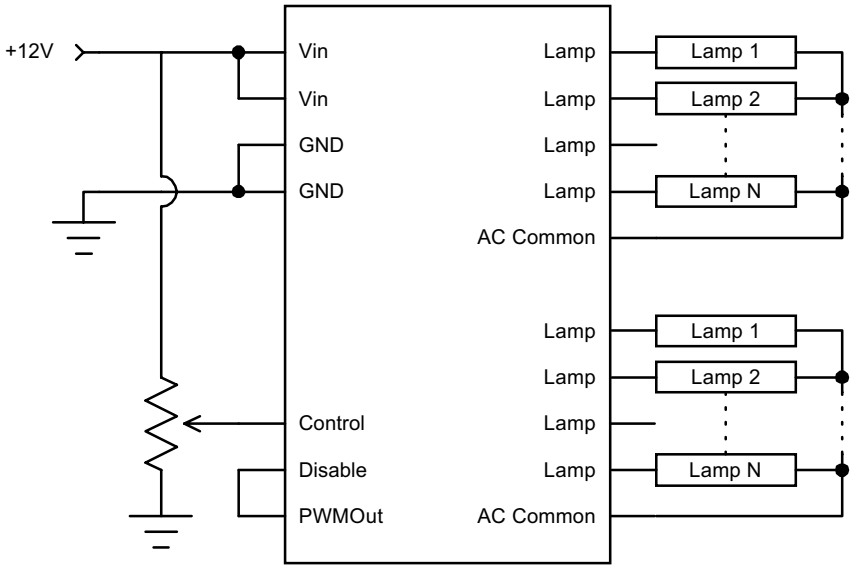


Figure 1