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MC2C2702

Specifications and Applications Information

02/08/11

Twelve Lamp DC to AC Inverter

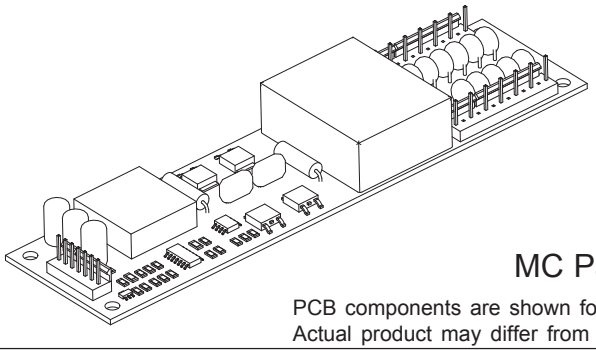
The ERG MC2C2702 (MC Series) DC to AC inverter features onboard connectors and can be easily dimmed using an external pulse-width modulated control signal or by using the onboard PWM with an external analog voltage. This unit is only 17mm in height and the four mounting holes make installation very straight forward.

Powered by a regulated 12 Volt DC source, the MC2C2702 is designed to power the backlight of the 12-lamp NEC NL128102AC31-01/01B/01E display.

Product Features

- ✓ Small Package Size, less than 17mm in height
- ✓ High Dimming Ratio (Greater than 1000:1)
- ✓ High Efficiency
- ✓ Made in U.S.A.

This unit complements our R Series of DC to AC Inverters

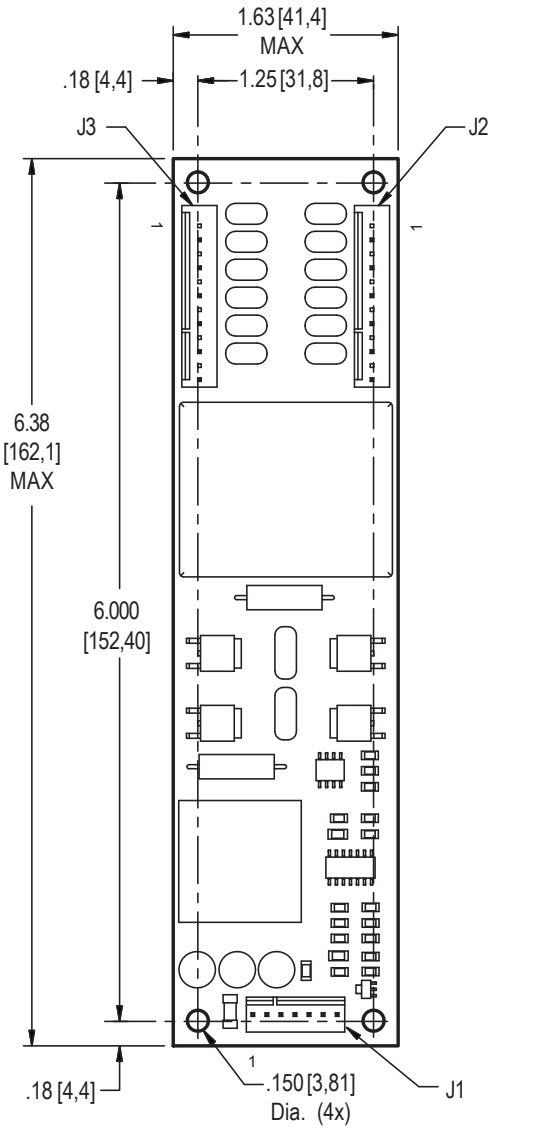


MC Package

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

Connectors	
Input	Outputs
J1 Molex 22-23-2071	J2, J3 Molex 22-23-2131

Package Configuration



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

Mass: 77 grams

Pin Descriptions

J1-1 +Vin	J2-1 ACout	J3-1 ACout
J1-2 +Vin	J2-3 ACout	J3-3 ACout
J1-3 GND	J2-5 ACout	J3-5 ACout
J1-4 GND	J2-7 ACout	J3-7 ACout
J1-5 Control	J2-9 ACout	J3-9 ACout
J1-6 Enable	J2-11 ACout	J3-11 ACout
J1-7 PWMout	J2-13 ACreturn	J3-13 ACreturn

Absolute Maximum Ratings

Rating	Symbol	Value	Units
Input Voltage Range	V_{in}	-0.3 to +15	Vdc
Storage Temperature	T_{stg}	-40 to +85	°C

Operating Characteristics

With a load simulating the referenced display and lamp warm-up of 20 minutes.
Unless otherwise noted Vin = 12.00 Volts dc and Ta = 25°C.

Characteristic	Symbol	Min	Typ	Max	Units
Input Voltage	V_{in}	+10.8	+12.0	+12.6	Vdc
Component Surface Temperature (note 1)	T_s	-20	-	+80	°C
Input Current (note 2)	I_{in}	-	3.3	3.8	Adc
Input Ripple Current	I_{rip}	-	25	-	mA_{pk-pk}
Operating Frequency	F_o	24	29	34	kHz
Minimum Output Voltage (note 3)	V_{out} (min)	1600	-	-	Vrms
Efficiency	η	-	98	-	%
Output Current (per lamp)	I_{out}	-	4.3	-	mArms
Output Voltage	V_{out}	-	750	-	Vrms
Enable Pin					
Turn-off Threshold	V_{thoff}	GND	-	0.5	Vdc
Turn-on Threshold	V_{thon}	2.0	-	Vin	Vdc
Impedance to Vin	R_{Enable}	-	10	-	kOhms

Specifications subject to change without notice.

(Note 1) Surface temperature must not exceed 80 degrees C; thermal management actions may be required.
(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.

Application Notes:

1) The minimum distance from high voltage areas of the inverter to any conductive material should be .12 inches per kilovolt of starting voltage.
2) Mounting hardware to be non-conductive.
3) Open framed inverters should not be used in applications at altitudes over 10,000 feet.
4) ACreturn should be left floating, not grounded.
5) Contact ERG for possible exceptions.

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	-	H_Z
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.

Enable Inverter enable. 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.

PWMout Output of the onboard PWM generator.

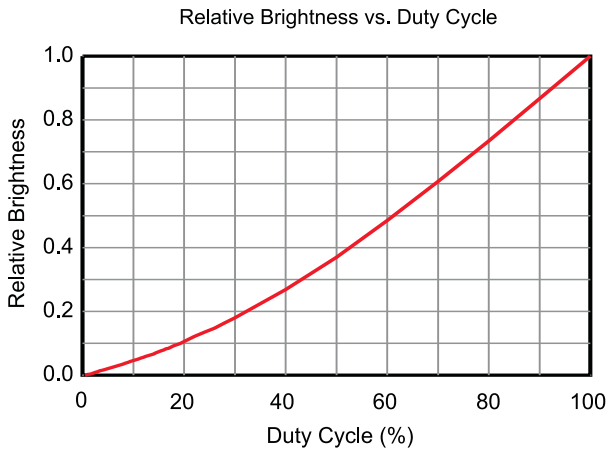
Application information

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

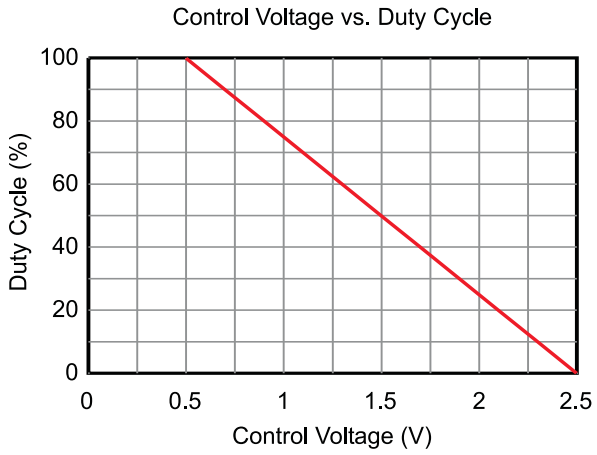
External shutdown or external PWM operation of the inverter is accomplished using the Enable pin. Pulling this pin low (below Vthoff) disables the inverter. Enabling the inverter is accomplished by floating this pin or by pulling this pin high (above Vthon). It should be noted that this pin is resistively coupled to the input voltage on the inverter (+Vin), and therefore may have to be buffered to interface TTL logic.

If analog voltage dimming is required, the onboard PWM is enabled by connecting the PWMout pin to the Enable 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 Enable 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 Enable 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.



Graph 1



Graph 2

Typical Application

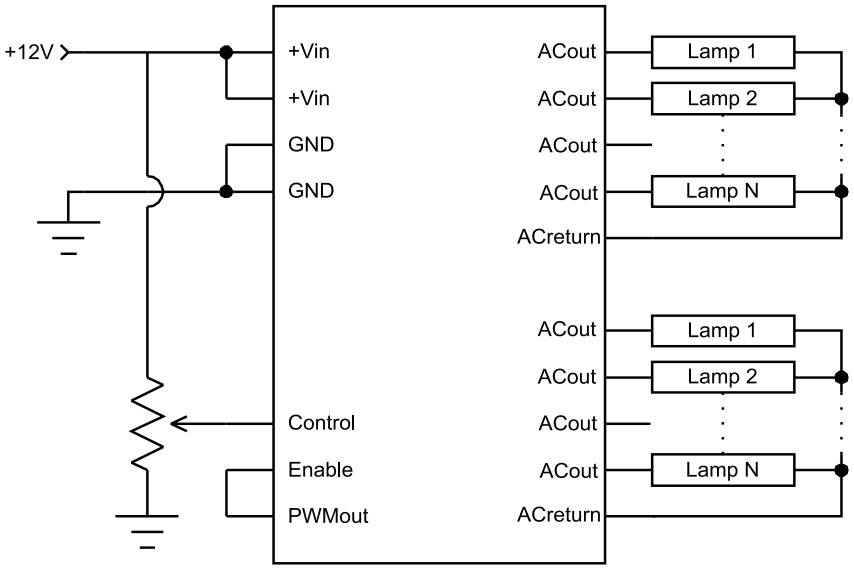


Figure 1