



Endicott Research Group, Inc.

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10mAD3596

Specifications and Applications Information

04/20/07

Preliminary

10m Class
Two Lamp
DC to AC Inverter

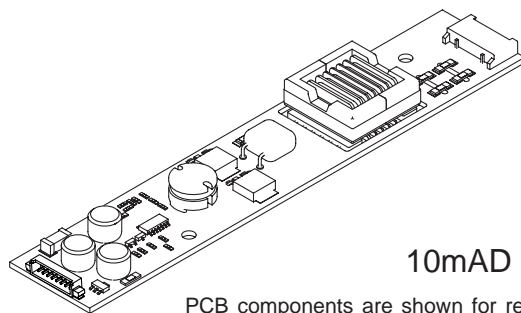
The ERG 10mAD3596 (*10m Class*) low profile dc to ac inverter is specifically designed to power the the following display module(s) to a moderate brightness level from a +12 volt dc power supply.

- NEC NL8060BC31-42(D)

This inverter can be dimmed using an external analog control voltage or an external PWM generator.

This low profile inverter features:

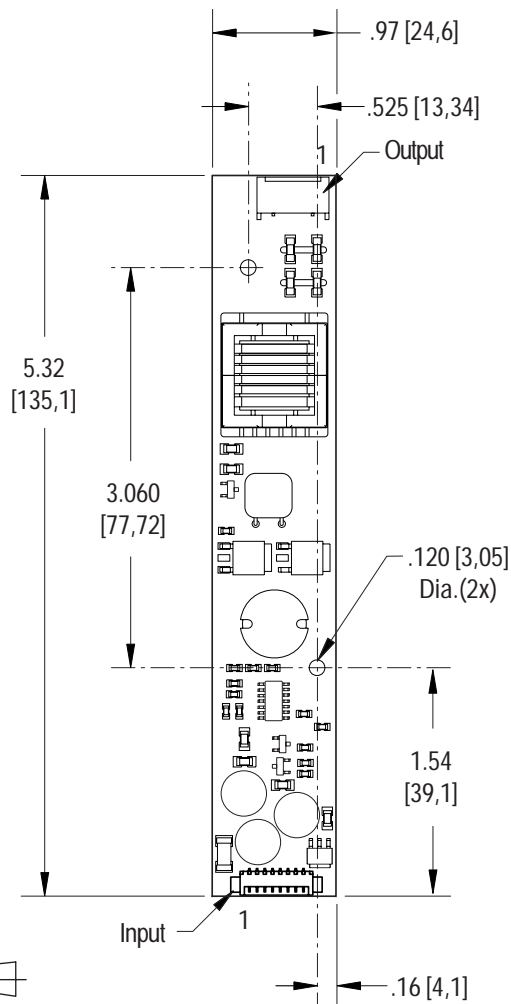
- ✓ Less Than 10 mm in Height
- ✓ LCD Module Specific
- ✓ Display Compatible Output Connector
- ✓ Firm Specifications
- ✓ High Dimming Ratio
- ✓ Application Information
- ✓ Designed, Manufactured and Supported in the USA
- ✓ Custom Input and Output Voltages
- ✓ Flexible System Interface



10mAD Package

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

Package Configuration



Mass: 22 grams

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Connectors

Input Connector	Output Connector
Molex 53261-0871	JST SM04(4.0)B-BHS-1-TB
J1-1 Vin(+)	J2-1 ACout
J1-2 Vin(+)	J2-2 ACout
J1-3 GND	J2-3 ACreturn
J1-4 GND	J2-4 ACreturn
J1-5 Enable	
J1-6 Control	
J1-7 GND	
J1-8 GND	

Absolute Maximum Ratings

Rating	Symbol	Value	Units
Input Voltage Range	V_{in}	-0.3 to +13.2	Vdc
Storage Temperature	T_{stg}	-40 to +85	°C

Operating Characteristics

With the referenced display and lamp warm-up of 5 minutes.
Unless otherwise noted $V_{in} = 12.00$ Volts dc and $T_a = 25^\circ\text{C}$.

Characteristic	Symbol	Min	Typ	Max	Units
Input Voltage	V_{in}	+10.8	+12.0	+12.6	Vdc
Component Surface Temperature (Note 2)	T_s	-20		+80	°C
Input Current (Note 1)	I_{in}	-	0.64	0.74	Adc
Input Ripple Current	I_{rip}	-	20	-	mA _{pk-pk}
Operating Frequency	F_o	35	40	45	kHz
Minimum Output Voltage (Note 3)	$V_{out}(\text{min})$	1600	-	-	Vrms
Efficiency	η	-	78	-	%
Output Current (per lamp)	I_{out}	-	5.4	-	mArms
Output Voltage	V_{out}	-	560	-	Vrms
Enable Pin					
Turn-off Threshold	V_{thoff}	GND	-	0.5	Vdc
Turn-on Threshold	V_{thon}	2.0	-	V_{in}	Vdc
Impedance to V_{in}	R_{Enable}	22.8	24.0	25.2	kOhms

Specifications subject to change without notice.

(Note 1) 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 2) Surface temperature must not exceed 80 degrees C; thermal management actions may be required.

(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) Contact ERG for possible exceptions.



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Made in USA



Onboard PWM

Unless otherwise noted $V_{in} = 12.00$ 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
Control Input Bias Current	I_{cbias}	-	-	10	μA

Pin Descriptions

Vin Input voltage to the inverter.

GND Inverter ground.

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. The inverter is full on when this voltage is near inverter ground.

Enable Inverter Enable. The inverter is always enabled with an internal pullup resistor tied to the enable pin. Pull this pin low to disable inverter operation. The onboard PWM is always utilized.

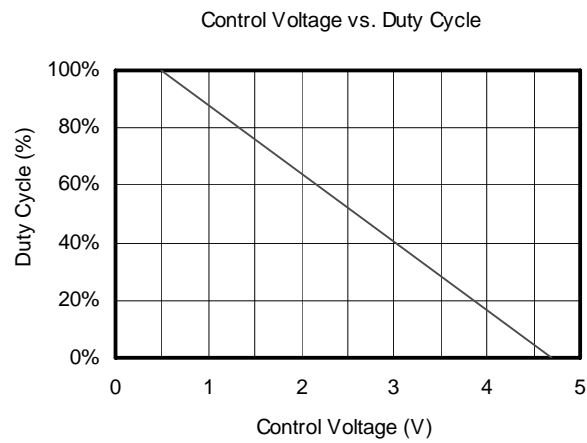
Application information

The 10mAD series of inverters is designed to power two cold cathode fluorescent lamps each with six watts. An external analog control interfaces with an onboard pulse width modulator to provide dimming control. The inverter can reliably dim to less than 5% duty cycle.

External shutdown of the inverter is accomplished using the Enable pin. Pulling this pin low (below V_{thoff}) disables the inverter.

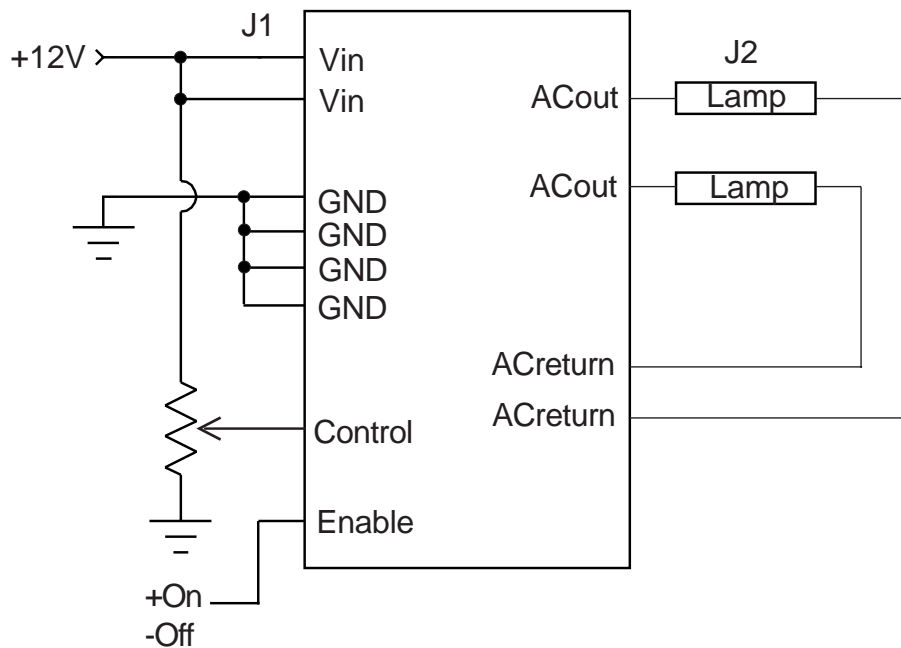
If analog voltage dimming is required, the analog voltage is applied to the Control pin. Figure 1 shows how to connect the inverter for onboard PWM operation. Graph 1 shows the relationship of PWM duty cycle to input control voltage.

If an external PWM is used, simply connect the Enable pin to the PWM source and connect the Control pin to inverter ground. If the onboard PWM is used, connect the analog voltage to the Control pin.



Graph 1

Typical Application



Endicott Research Group, Inc. (ERG) reserves the right to make changes in circuit design and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by ERG is believed to be accurate and reliable. However, no responsibility is assumed by ERG for its use.