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

SFD2HB4404F

RoHS Compliant

Specifications and Applications Information

02/08/16

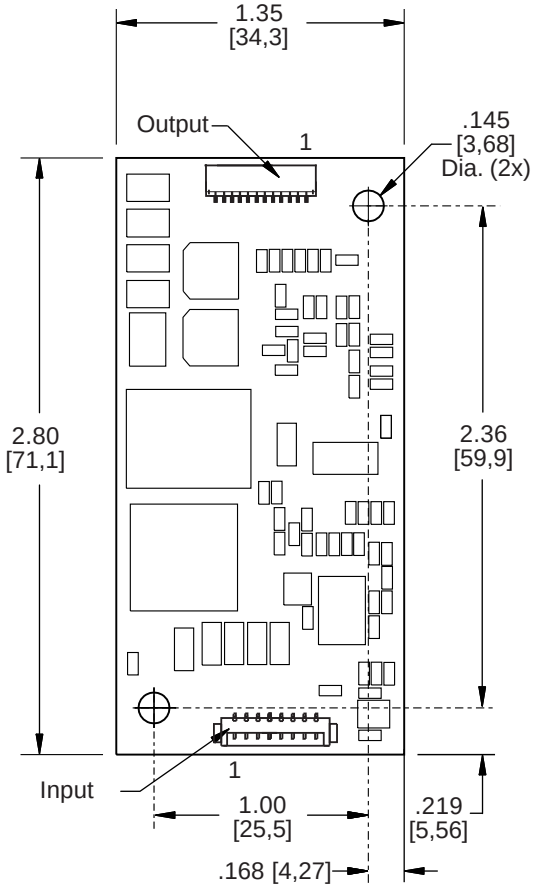
Smart Force LED Driver

The ERG **Smart Force Series** of LED Drivers are specifically designed for applications which require high efficiency, small footprint and LCD brightness stability from a 12 Volt dc source. The SFD2HB4404F is designed to provide backlight power for the NLT NL12880BC20-07F display.

Designed, manufactured and supported within the USA, the SFD2H features:

- ✓ Less than 10 mm in height
- ✓ Constant LED current
- ✓ Open and short circuit protection
- ✓ High efficiency
- ✓ Separate enable and dimming function
- ✓ 1250:1 dimming ratio
- ✓ Soft start
- ✓ One year warranty

Package Configuration



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

Connectors	
Input Connector Molex 53261-0871	**Output Connector *** JST SM12B-SRSS-TB
J1-1 Vin(+) J1-2 Vin(+) J1-3 Vin(+) J1-4 GND J1-5 GND J1-6 GND J1-7 Enable J1-8 Control	J2-1 Cathode 1 J2-7 (do not use) J2-2 Cathode 2 J2-8 Anode 1 J2-3 Cathode 3 J2-9 Anode 2 J2-4 Cathode 4 J2-10 Anode 3 J2-5 Cathode 5 J2-11 (do not use) J2-6 (do not use) J2-12 (do not use) * Requires harness: ERG part number H2H150F recommended

Mass: 13 grams typ.

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Absolute Maximum Ratings

Rating	Symbol	Value	Units
Input Voltage Range	V_{in}	-0.3 to +20	Vdc
Storage Temperature	T_{stg}	-40 to +85	°C
Enable Input Voltage	V_{Enable}	0 to +5.5	Vdc
Control Input Voltage	V_{PWM}	0 to +5.5	Vdc

Operating Characteristics

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	+18.0	Vdc
Component Surface Temperature (Note 1)	T_s	-40	-	+80	°C
Input Current	I_{in}	-	1.33	-	Adc
LED String Voltage (Note 2)	V_{LED}	23	-	33	Vdc
Efficiency (Note 3)	η	-	90	-	%
Output Current (per string)	I_{out}	100	106	111	mAdc
Enable Pin (Note 4)					
Turn-on Threshold	V_{thon}	-	-	2.0	Vdc
Turn-off Threshold	V_{thoff}	0.4	-	-	Vdc
Enable Input Impedance (Note 5)	R_{Enable}	-	9	-	kOhms
Control Pin (Notes 6,7)					
Full-on Threshold	V_{thon}	-	0.5	-	Vdc
Minimum Pulse Width Threshold	V_{PWmin}	-	4.5	-	Vdc
Control Input Bias Current	I_{Cbias}	-	-	50	uA
Frequency	F_{PWM}	-	250	-	Hz

Specifications subject to change without notice.

(Operating Characteristics notes are continued on next page.)

Note 1 Surface temperature must not exceed 80°C, except Q1, which cannot exceed 105°C.
Note 2 If maximum string voltage is exceeded, driver will enter overvoltage self protection mode and shut down. Reducing the LED string voltage then toggling the Enable and/or power cycling the driver, will restart the driver.
Note 3 Efficiency is calculated using a 27.2V LED string.
Note 4 If the Enable pin is floated, the driver defaults to the OFF mode.
Note 5 Enable pin input impedance is 9kΩ to ground.
Note 6 If the Control pin is floated while the Enable pin is active high, the driver defaults to the full ON mode.
Note 7 Control pin input impedance is 100kΩ to ground.

Application Information

The ERG SFD2H4404F has been designed to be configured in multiple ways:

NO DIMMING

- OPERATION: The SFD2H can be configured to operate without dimming by floating the Control (J1-8) pin.
- Pins 1, 2 and 3 of connector J1 must be connected to +Vin, between 10.8 and 18 Vdc. Pins 4, 5 and 6 of connector J1 must be connected to GND.
- Enable Pin (J1-7) must be high for the driver to be on.
- Disabling driver: Pulling the Enable Pin (J1-7) below the minimum turn-off threshold or allowing the Enable Pin to float, will disable the driver.

ONBOARD PWM DIMMING

- OPERATION: Onboard PWM configuration as shown in Figure 1 allows the user to control display brightness by controlling the onboard PWM generator. The user is responsible to provide an analog control signal.
- DIMMING: Dimming is accomplished by applying an analog voltage to the Control Pin (J1-8). Display brightness is modulated by controlling the Control Pin voltage as shown in Graph 1 and Graph 2.
- ENABLE/DISABLE: The driver may be enabled or disabled (turned on and off) by applying a DC voltage to the Enable Pin(J1-7). Enable Pin on and off levels are specified in the Operating Characteristics section of the data sheet.
- Pins 1, 2 and 3 of connector J1 must be connected to +Vin, between 10.8 and 18 Vdc. Pins 4, 5 and 6 of connector J1 must be connected to GND.

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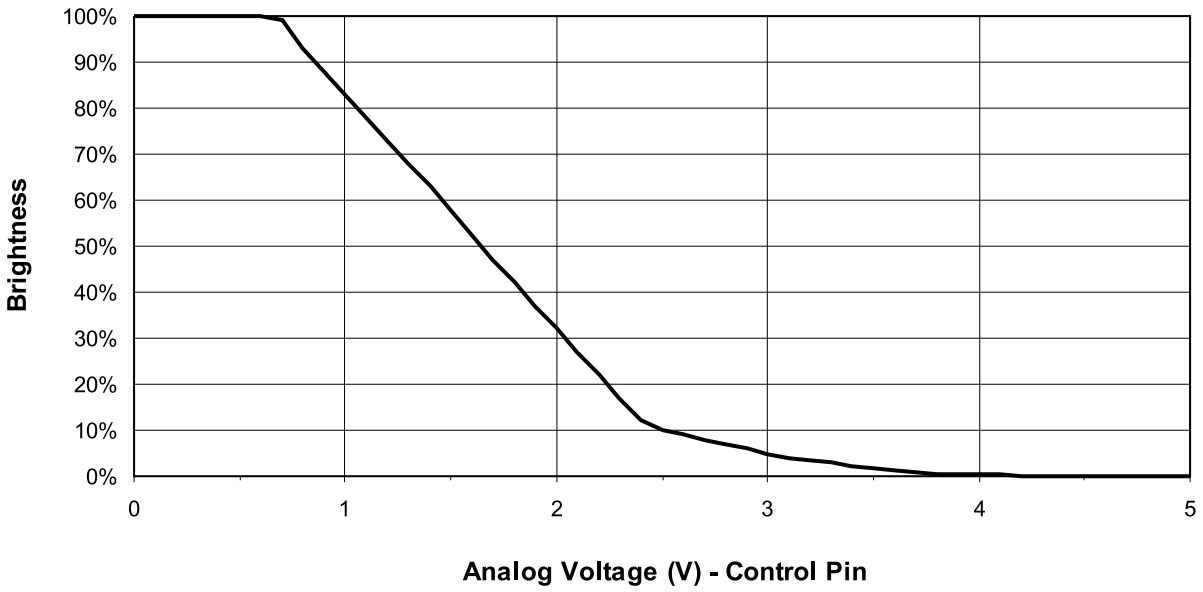
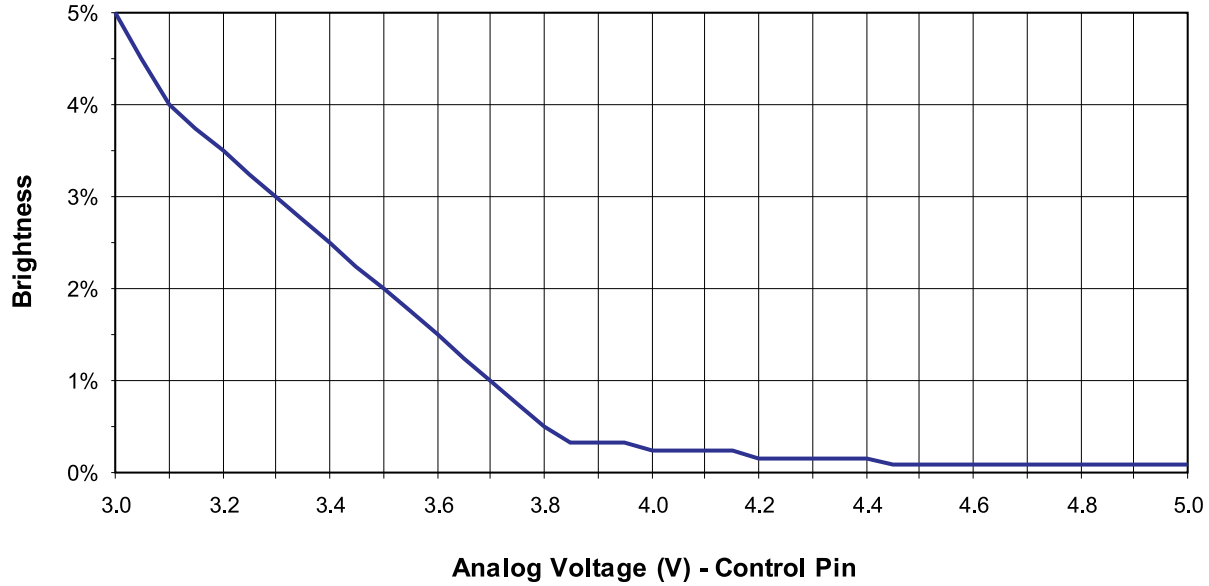
ONBOARD PWM DIMMING



Graph 1

EXPANDED VIEW OF ONBOARD PWM DIMMING
(lower dimming region)



Graph 2

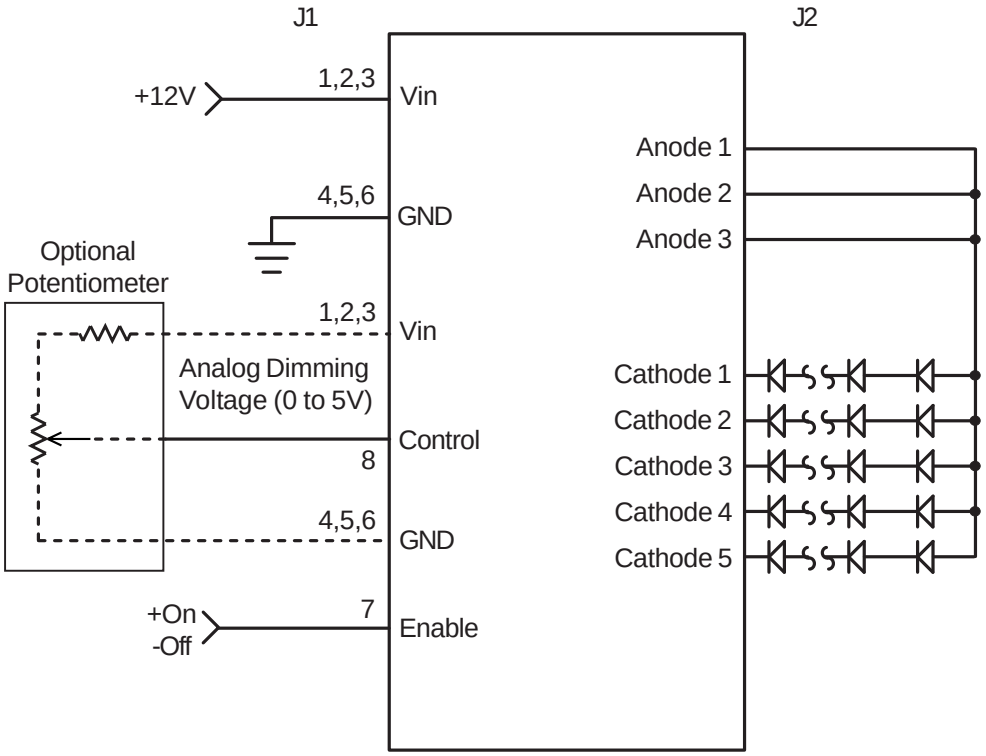


Figure 1