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# SFDHDB4342F



## Specifications and Applications Information

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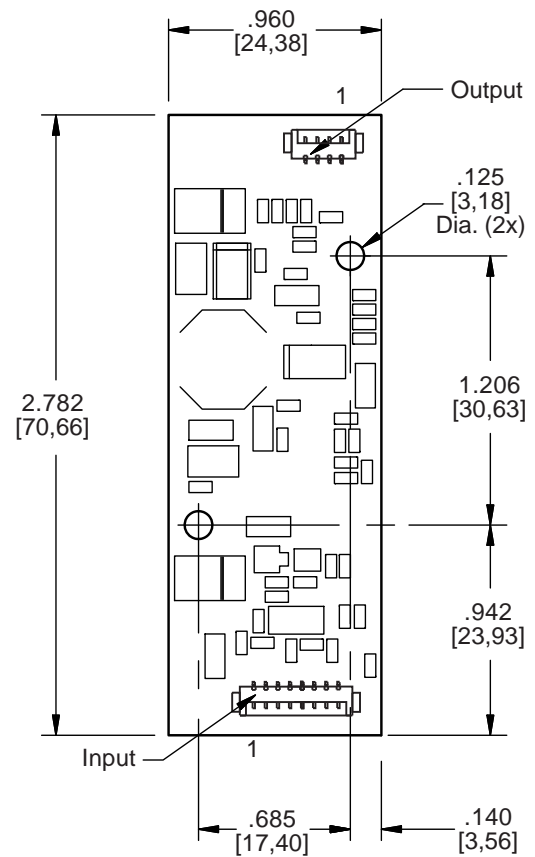
## Smart Force LED Driver

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 SFDHDB4342F is designed to provide backlight power for the ERG SFS4293F LED stick.

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

- ✓ Less than 5 mm in height
- ✓ Constant LED current
- ✓ Open and short circuit protection
- ✓ High efficiency
- ✓ Separate enable and dimming function
- ✓ Analog dimming function
- ✓ Soft start
- ✓ One year warranty

### Package Configuration



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

Connectors	
Input Connector	Output Connector
Molex 53261-0871	Molex 53261-0471
J1-1 Vin(+) J1-2 Vin(+) J1-3 GND J1-4 GND J1-5 Enable J1-6 N/C J1-7 Control J1-8 Fault Indicator (output)	J2-1 Cathode 1 J2-2 Anode A J2-3 Cathode 2 J2-4 N/C

Mass: 8 grams typ.



**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
Enable Input Voltage	$V_{Enable}$	0 to +5.5	Vdc
Control Input Voltage	$V_{PWM}$	0 to +5.5	Vdc
Fault Indicator	$V_{FL}$	0 to +4.0	Vdc

**Operating Characteristics**

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	+13.2	Vdc
Component Surface Temperature (Note 1)	$T_s$	-40	-	+80	°C
Input Current	$I_{in}$	-	0.56	-	Adc
LED String Voltage (Note 2)	$V_{LED}$	15	-	35	Vdc
Efficiency (Note 3)	$\eta$	-	87	-	%
Output Current (per string)	$I_{out}$	95.8	100.8	105.0	mAdc
<b>Enable Pin</b> (Note 4)					
Turn-on Threshold	$V_{thon}$	-	-	2.0	Vdc
Turn-off Threshold	$V_{thoff}$	0.8	-	-	Vdc
Enable Input Impedance (Note 5)	$R_{Enable}$	-	100	-	kOhms
<b>Control Pin</b> (Notes 6,7)					
Full-on Threshold	$V_{thon}$	-	0.5	-	Vdc
Minimum Pulse Width Threshold	$V_{PWmin}$	-	5.0	-	Vdc
Control Input Bias Current	$I_{Cbias}$	-	-	10	uA
Frequency	$F_{PWM}$	-	245	-	Hz

(Operating Characteristics and notes are continued on next page.)



## Operating Characteristics (continued)

Characteristic	Symbol	Min	Typ	Max	Units
<b>Fault Indicator</b>					
No Fault Level (Note 8)	$V_{NFL}$	-	3.7	-	Vdc
Fault Level (Note 8)	$V_{FL}$	-	0.3	-	Vdc

Specifications subject to change without notice.

- Note 1 Surface temperature must not exceed 80°C, except U1, 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 29V LED string.
- Note 4 If the Enable pin is floated, the driver defaults to the OFF mode.
- Note 5 Enable pin input impedance is 100kΩ 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 112kΩ to ground.
- Note 8 Loading with an impedance less than 100kΩ to Vcc or to ground may cause the default levels to change.



## Application Information

The ERG SFDHDB4342F has been designed to be configured in multiple ways:

### NO DIMMING

- OPERATION: The SFDHD can be configured to operate without dimming. Contact ERG for details.
- Pins 1 and 2 of connector J1 must be connected to +Vin, between 10.8 and 13.2 Vdc. Pins 3 and 4 of connector J1 must be connected to GND.
- DISABLING DRIVER: Pulling the Enable pin (J1-5) below the minimum turn-off threshold of 0.8V 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 (J1-7). Display brightness is modulated as shown in Graph 1. Reversed dimming slope to that shown in Graph 1 is possible. Contact ERG for details.
- ENABLE/DISABLE: The driver may be enabled by applying a DC voltage to the Enable Pin(J1-5). Enable Pin on and off levels are specified in the Operating Characteristics section of the data sheet. The driver can be disabled by applying a minimum turn-off threshold of 0.8V or by allowing the Enable Pin to float.

### EXTERNAL PWM DIMMING

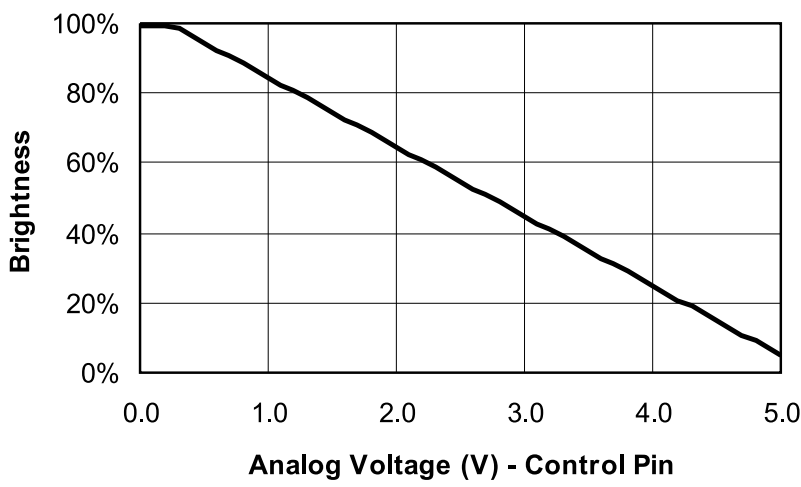
- Dimming with a user provided external PWM signal is possible. PWM signal levels must conform to the enable voltage levels of  $V_{thon}$  and  $V_{thoff}$  as specified. Contact ERG for details.

### FAULT INDICATOR

- The Fault Indicator pin (J1-8) may be used as a feedback signal that will fall below the fault level of 0.3V in the case of an open string, a shorted string, an output overvoltage condition, or an over temperature condition. If used, this pin should be loaded with a high impedance stage as specified in the Operating Characteristics. Do not drive this pin with a voltage, as it will damage the driver.



## ONBOARD PWM DIMMING



Graph 1

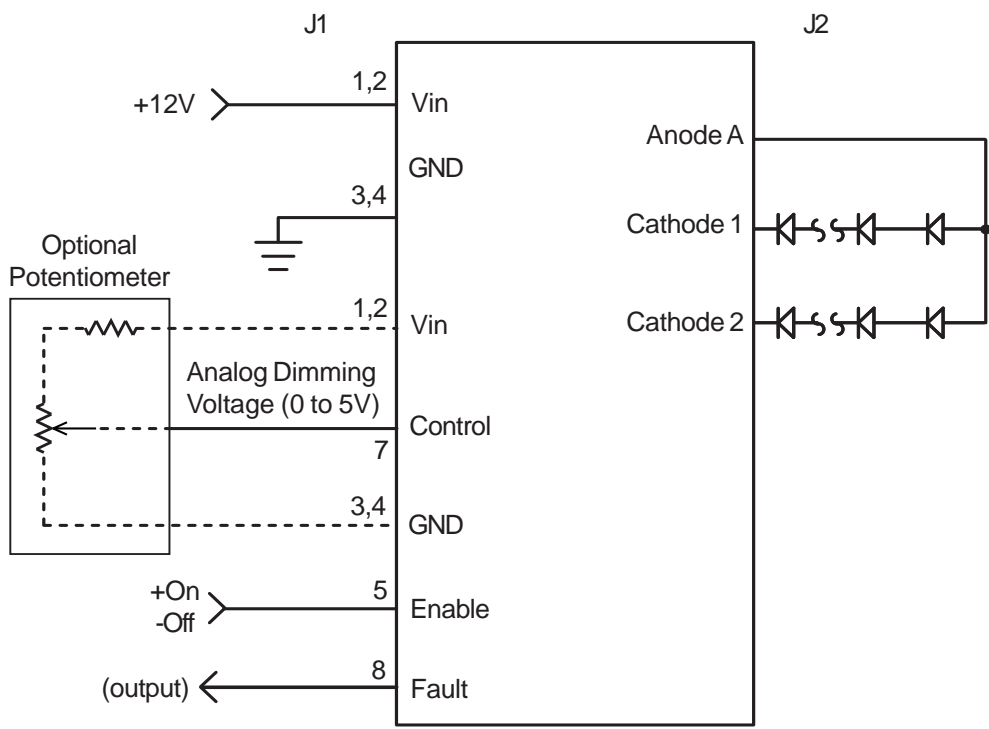


Figure 1



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