



**Endicott Research Group, Inc.**

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

**SFDEB3894F**



**Specifications and Applications Information**

02/26/09

Preliminary

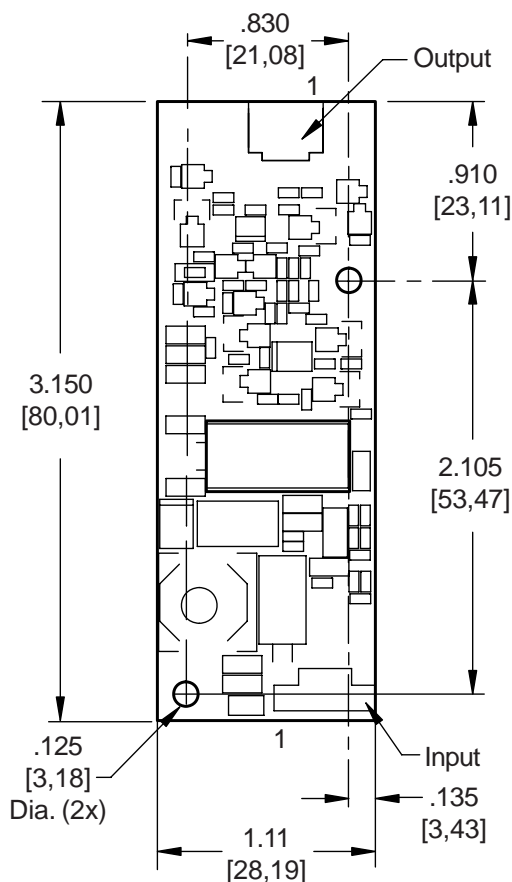
**Smart Force LED Driver**

The ERG *Smart Force Series* of LED Drivers are specifically designed for applications which require wide dimming and LCD brightness stability over a wide input voltage range. The SFDEB3894F is designed to provide backlighting for the Sharp LQ104V1DG62.

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

- ✓ 8 mm or less in height
- ✓ Wide input voltage range
- ✓ Constant LED current
- ✓ External dimming
- ✓ High dimming ratio
- ✓ Soft start
- ✓ One year warranty

Package Configuration



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

Mass: 13 grams



Connectors	
Input Connector	Output Connector *
Molex 53261-0571	Molex 53261-1271
J1-1 Vin(+) J1-2 Vin(+) J1-3 GND J1-4 GND J1-5 Enable	J2-1 Cathode 3 J2-2 Anode 3 J2-3 (do not use) J2-4 (do not use) J2-5 Cathode 2 J2-6 Anode 2 J2-7 (do not use) J2-8 (do not use) J2-9 Cathode 1 J2-10 Anode 1 J2-11 (do not use) J2-12 (do not use)
	* Requires harness ERG part number H12206XXX recommended



## Absolute Maximum Ratings

Rating	Symbol	Value	Units
Input Voltage Range	$V_{in}$	-0.3 to +20.0	Vdc
Storage Temperature	$T_{stg}$	-40 to +85	°C
Enable Input Voltage	$V_{Enable}$	0 to $V_{in}$	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	$V_{in}$	+10.0	+12.0	+20.0	Vdc
Component Surface Temperature (Note 1)	$T_s$	-20	-	+80	°C
Input Current	$I_{in}$	-	0.54	-	Adc
Peak Inrush Current (Note 2)	$I_{peak}$	-	2.5	-	Adc
LED String Voltage	$V_{LED}$	-	18.6	21.7	Vdc
Efficiency	$\eta$	-	71	-	%
Output Current (per string)	$I_{out}$	78	82	86	mAdc
<b>Enable Pin</b> (Note 3)					
Turn-on Threshold	$V_{thon}$	-	-	2.0	Vdc
Turn-off Threshold	$V_{thoff}$	0.8	-	-	Vdc
Enable Input Impedance (Note 4)	$R_{Enable}$	-	5	-	kOhms

Specifications subject to change without notice.

Note 1 Surface temperature must not exceed  $80^{\circ}\text{C}$ . SOT89 package to be at or below  $110^{\circ}\text{C}$ . SOT89 package is  $75^{\circ}\text{C}$  at  $25^{\circ}\text{C}$  ambient temperature.

Note 2 Peak inrush occurs over a 1 to 3 ms time period, during initial startup.

Note 3 The input voltage to the driver must be within its operating characteristic before the driver is enabled, otherwise the driver may not start or may shut down unexpectedly.

Note 4 Input impedance is 5.0 kOhms to GND.



## Application Information

The ERG SFDEB3894F has been designed to be configured in multiple ways:

### NO DIMMING

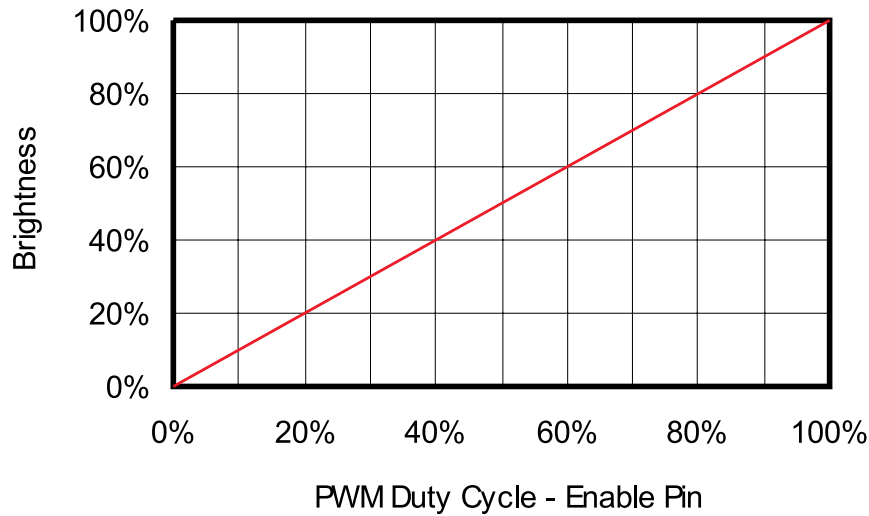
- OPERATION: The SFD driver can be configured to operate without dimming by pulling up the Enable Pin (J1-5).
- Pins 1 and 2 of connector J1 must be connected to +Vin, between 10 and 20 Vdc. Pins 3 and 4 of connector J1 must be connected to GND.

### EXTERNAL PWM DIMMING

- OPERATION: External PWM configuration as shown in Figure 1 allows the user to control display brightness with an externally generated PWM signal. The user is responsible to provide the PWM signal. A dimming ratio up to 5000:1 at  $\leq 200$  Hz is possible with this configuration.
- DIMMING: Dimming is accomplished by applying a PWM signal to the Enable Pin (J1-5). PWM on and off levels are specified in the Operating Characteristics section of the data sheet. Display brightness is modulated by controlling the PWM duty cycle as shown in Graph 1.
- Pins 1 and 2 of connector J1 must be connected to +Vin, between 10 and 20 Vdc. Pins 3 and 4 of connector J1 must be connected to GND.



## EXTERNAL PWM DIMMING



Graph 1

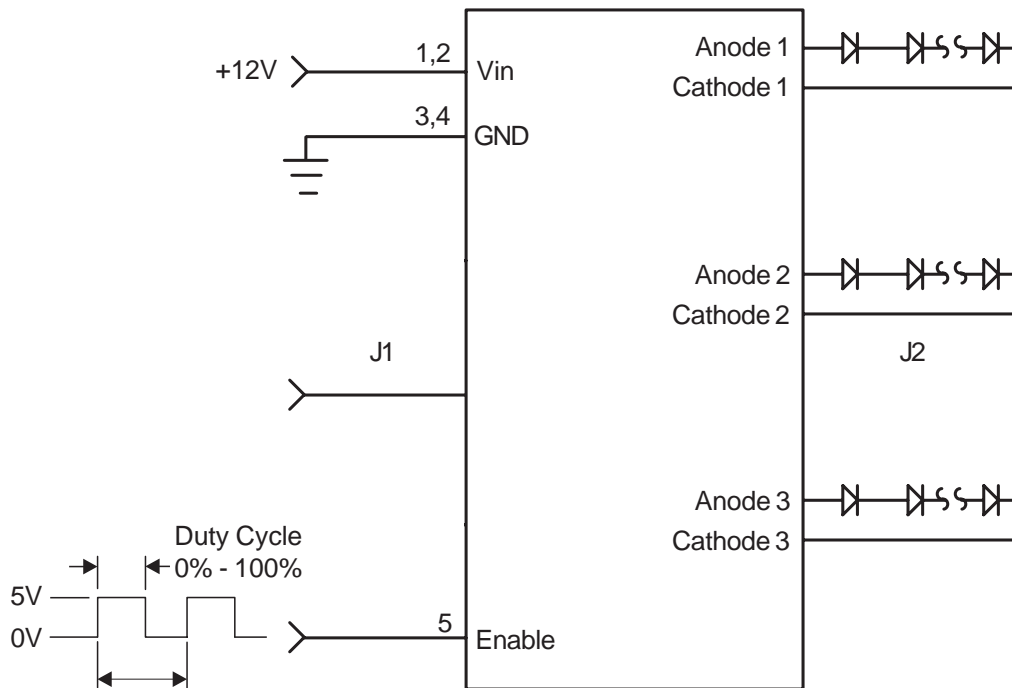


Figure 1



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.