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SFDKB3975F



## Specifications and Applications Information

03/23/11

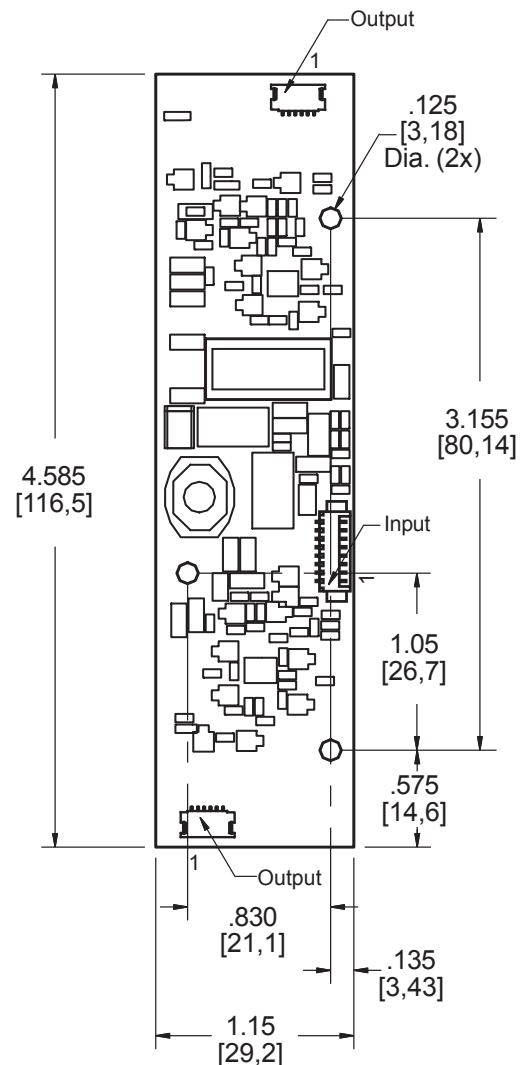
## Smart Force LED Driver

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 SFDKB3975F is designed to provide backlight power for the NEC NL8060BC21-11C display.

Designed, manufactured and supported within the USA, the SFDK 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 Connectors *  |                   |  |  |
|---------------------|----------------------|-------------------|--|--|
| Molex<br>53261-0871 | JST<br>SM06B-SHLS-TF |                   |  |  |
| J1-1 Vin(+)         | J2-1 Anode 1         | J3-1 Anode 3      |  |  |
| J1-2 Vin(+)         | J2-2 Anode 2         | J3-2 Anode 4      |  |  |
| J1-3 GND            | J2-3 (do not use)    | J3-3 (do not use) |  |  |
| J1-4 GND            | J2-4 (do not use)    | J3-4 (do not use) |  |  |
| J1-5 Enable         | J2-5 Cathode 1       | J3-5 Cathode 3    |  |  |
| J1-6 (do not use)   | J2-6 Cathode 2       | J3-6 Cathode 4    |  |  |
| J1-7 (do not use)   |                      |                   |  |  |
| J1-8 (do not use)   |                      |                   |  |  |

\* Requires harness:  
ERG part number H14308304F 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 | +18.0 | Vdc   |
| Component Surface Temperature (Note 1) | $T_s$        | -40   | -     | +80   | °C    |
| Input Current                          | $I_{in}$     | 0.47  | 0.55  | 0.63  | Adc   |
| Peak Inrush Current (Note 2)           | $I_{peak}$   | -     | 1.5   | -     | Adc   |
| LED String Voltage                     | $V_{LED}$    | 20.7  | 23.0  | 26.7  | Vdc   |
| Efficiency                             | $\eta$       | -     | 67    | -     | %     |
| Output Current (per string)            | $I_{out}$    | 45.4  | 47.8  | 50.2  | 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  $110^{\circ}\text{C}$ .
- 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 SFDKB3975F has been designed to be configured in multiple ways:

### NO DIMMING

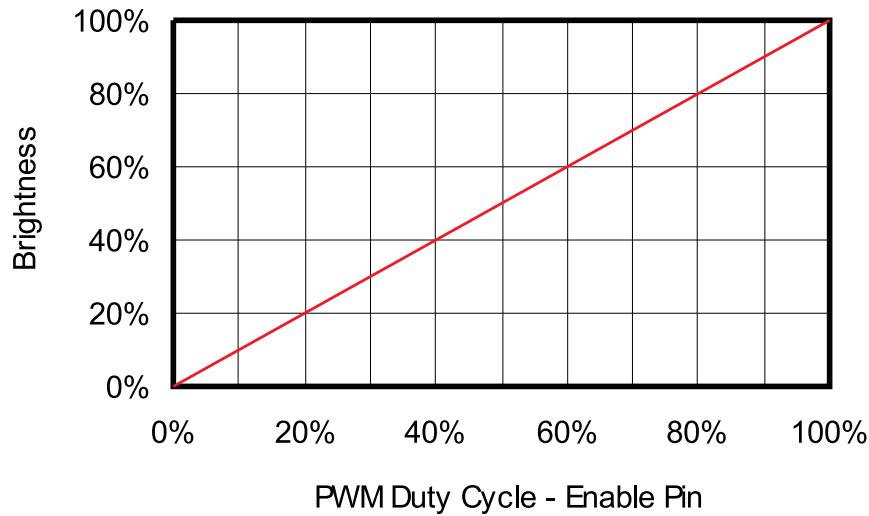
- OPERATION: The SFD driver can be configured to operate without dimming by pulling up the Enable Pin (J1-5).
- Pins 1 and 2 of connector J1 must be connected to +Vin, between 10 and 18 Vdc. Pins 3 and 4 of connector J1 must be connected to GND.

### 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 18 Vdc. Pins 3 and 4 of connector J1 must be connected to GND.



## EXTERNAL PWM DIMMING



Graph 1

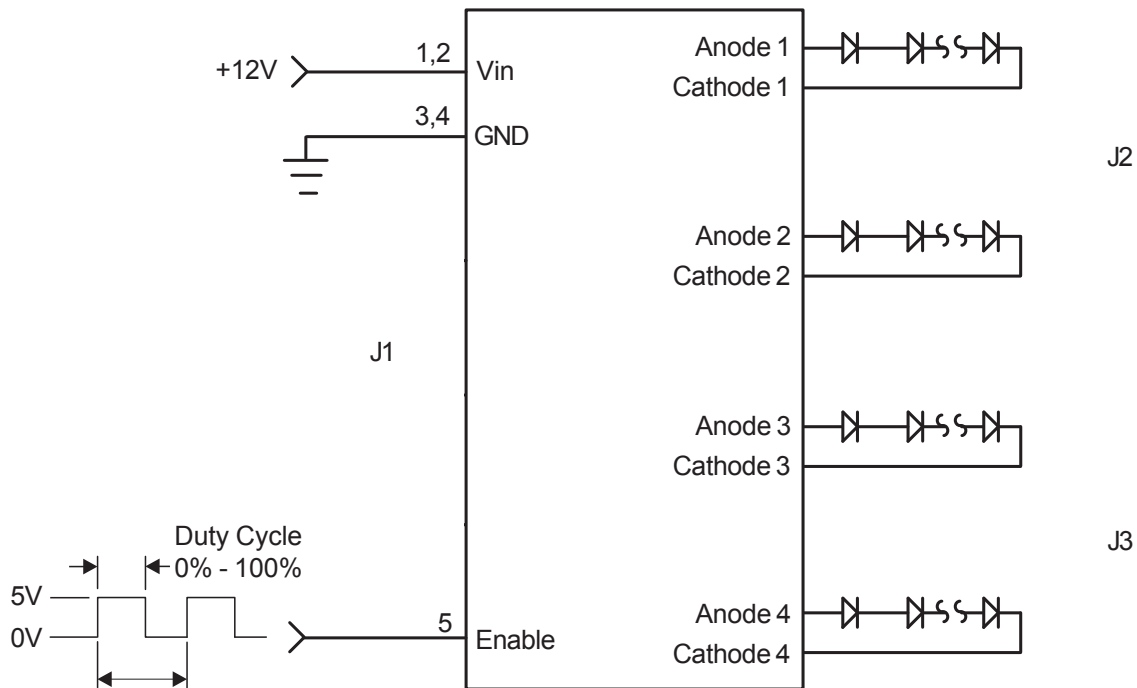


Figure 1



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