

### General Description

The EV0001B is a complete CCFL system based on the MP1015 CCFL driver. The MP1015 is a Power IC that offers a true complete solution for driving a Cold Cathode Fluorescent Lamps (CCFL). This Power IC converts unregulated DC voltage to a nearly pure sine wave required to ignite and operate the CCFL. Based on proprietary power topology and control techniques (patented), it greatly increases the power conversion efficiency. The MP1015 can be used with **analog** or **burst mode** dimming without any additional external components. The MP1015 offers four distinct performance advantages:

1. More light for less power
2. Smallest board implementation possible
3. Low EMI emission
4. Low cost off the shelf components

### Ordering Information

Board Number	MPS IC Number
EV0001B	<a href="#">MP1015EM</a>

Figure 1: EV0001B Evaluation Board



(Actual Size Shown (100mm X x 12mm Y x 6mm Z))

### Absolute Maximum Ratings

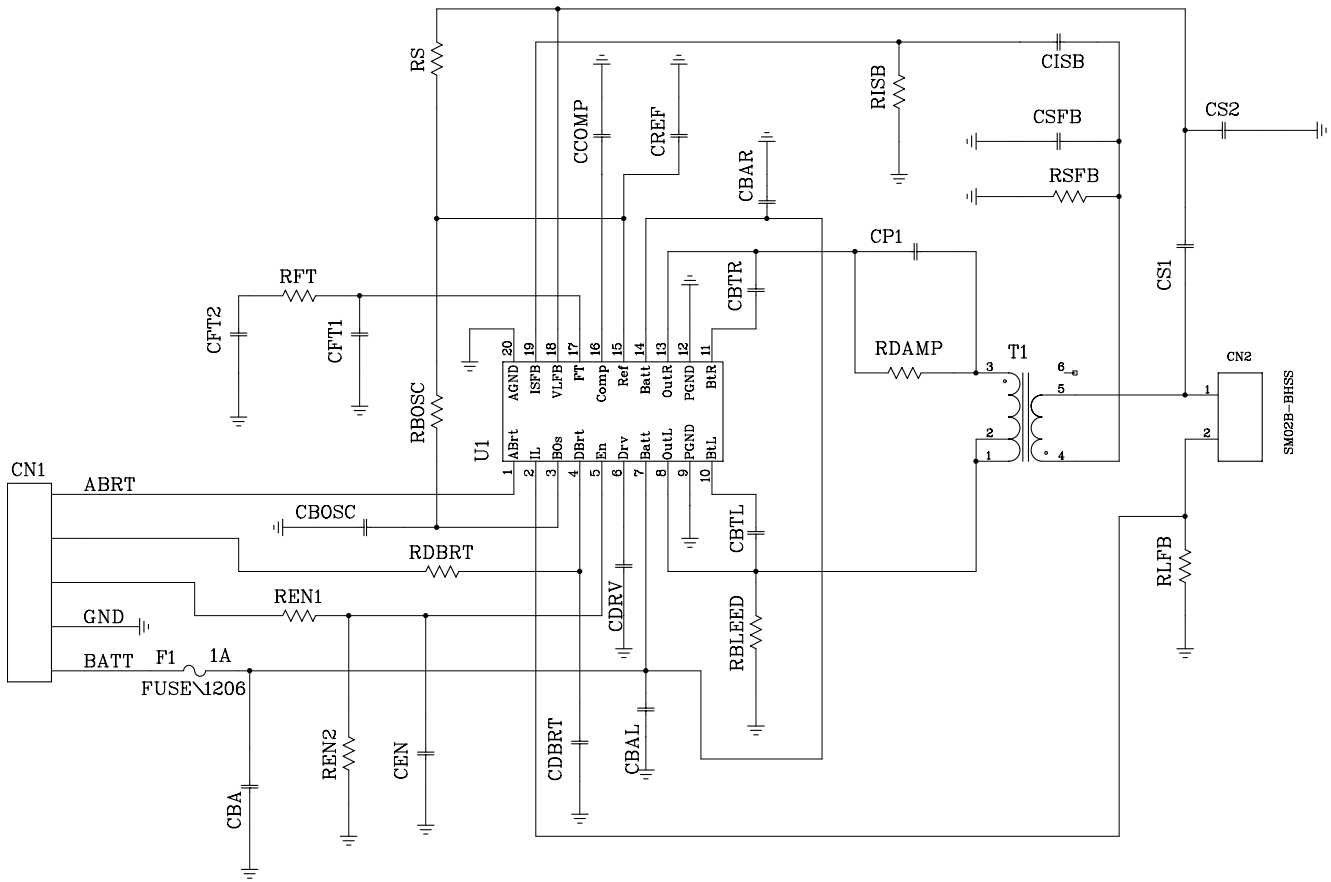
Input Voltage ( $V_{Batt}$ )	25V
Logic Input Voltages	-0.3 to 6.8V
IL, ISFB Input Voltages ( $V_{IL}$ , $V_{ISFB}$ )	+/-6V
VLFB Input Voltage ( $V_{VLFB}$ )	-0.3 to 12V
Power Dissipation	1.0W

### Recommended Operating Conditions

Input Voltage ( $V_{Batt}$ )	9V to 21 V
Analog Brightness Voltage ( $V_{ABrt}$ )	0V to 1.9V
Digital Brightness Voltage ( $V_{DBrt}$ )	0V to 1.8V
Enable ( $V_{EN}$ ) (Note 1)	0V to 5.0V

Note 1: High will enable and Low will disable this chip.  
**Do not float this pin.**

Figure 3: EV0001B Evaluation Board Schematic



EV0001B / MP1015 Evaluation Board

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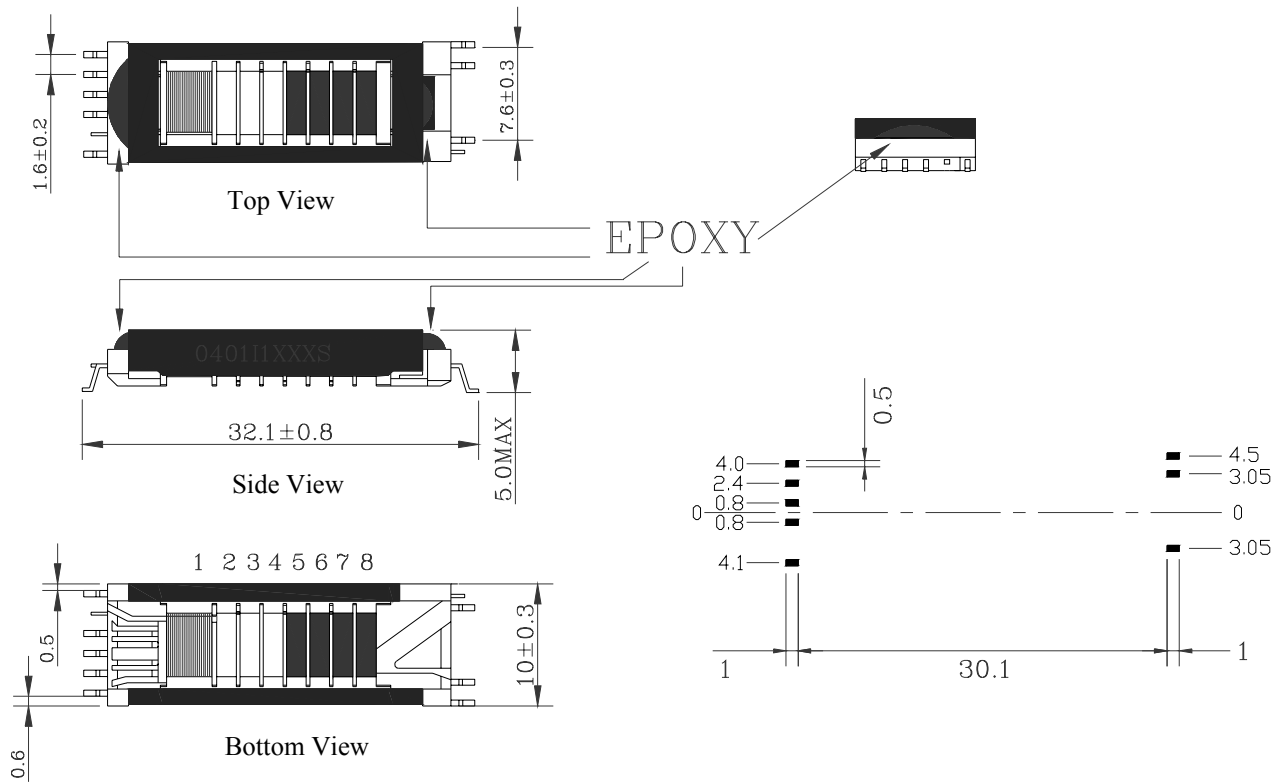
**Table 1: EV0001B Bill of Materials**

Component	Description	QTY
U1	MP1015EM	1
CbtL, CbtR, Cft1	10nF/50V/X7R/0603	3
Ccomp	1.5nF/16V/X7R/0603	1
Csfb	82nF/16V/X7R/0603	1
Cbosc	22nF/6.3V/X7R/0603	1
Cs2	4.7nF/16V/X7R/0603	1
Cs1	10pF/3KV/1810	1
Cp1	1uF/16V/X7R/1206	1
CbaR, CbaL	1uF/25V/Y5V/0805	2
Cba1, Cba2	2.2uF/25V/Y5V/1206	2
Cdrv, Cisb	0.1uF/10V/X7R/0603	2
Cref	0.47uF/6.3V/X7R/0603	1
Cdbr, Cft2	1uF/6.3V/X7R/0603	2
Cen	10nF/10V/Y5V/0603	1
Rlfb	150Ω/1%/0603	1
Rdamp	1KΩ/5%/0603	1
Rbleed	4.3KΩ/5%/0603	1
Rbosc	470KΩ/1%/0603	1
Rs,Risb	300KΩ/5%/0603	2
Rdbr	10KΩ/5%/0603	1
Ren2, Rft	100KΩ/5%/0603	2
Ren1	0Ω/5%/0603	1
Rsfb	2KΩ/5%/0603	1
F1	FUSE/1206/1Amp	1
T1	Darfon Inverter Transformer T0.04121.101 (See Figure 4)	1
	<b>Total</b>	<b>33</b>

**Table 2: EV0001B Transformer Sources\***

Company	Part #	Location	Contact Info
Darfon Electronics	Contact Vendor	Taoyuan , Taiwan	+886-3-329- 4141
Delta Electronics	Contact Vendor	Taoyuan , Taiwan	+886-3-359-1968
Transtek Magnetics	Contact Vendor	USA , and Taiwan	<a href="http://www.transekmagmagnetics.com">http://www.transekmagmagnetics.com</a>
FDK	CD-T-0836-520	Yamaguchi, Japan	<a href="http://www.fdk.co.jp">http://www.fdk.co.jp</a>
Toko	BLC103B	Saitama-Ken, Japan	<a href="http://www.toko.co.jp">http://www.toko.co.jp</a>
Sumida Electric	CIUH8D43	Tokyo, Japan	<a href="http://www.sumida.com">http://www.sumida.com</a> / +81-03-3667-3302

Figure 4: EV0001B Transformer Data\*



pin width= $0.5 \pm 0.2$   
 WINDING SECTION: NO.5 ~ NO.8

## Brightness Control

The MP1015 can operate in three modes: Analog Mode, Burst Mode with a DC input, or Burst Mode with an external PWM. The three modes are dependent on the pin connections as per Table 1. Choosing the required burst repetition frequency can be achieved by an RC combination, as defined in component selection. The MP1015 has a soft on and soft off feature to reduce noise, when using burst mode dimming.

**Table 3: Brightness Control Functionality**

Function	Pin Connection		
	Pin 1	Pin 4	Pin 3
	<b>Abrt</b>	<b>Dbrt</b>	<b>BOsc</b>
Analog Mode	0-1.9V	REF	Gnd
Burst Mode with DC input voltage	REF	0-1.8V	Rbosc Cbosc
Burst Mode from external source	REF	PWM	1.5V*

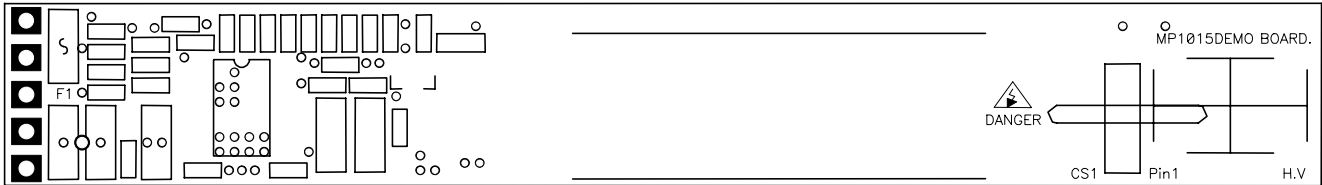
\* Note: Change Cbosc to a Resistor to get 1.5V

**Brightness Polarity:** Burst: 100% duty cycle is at 1.8V  
Analog: 1.9V is maximum brightness

## Circuit Board Layout Considerations

- When designing a printed circuit board, pay strict attention to single point (star) grounding. Keep all high current and output traces well away from the high impedance signals.
- If in doubt, use the Evaluation Board as a reference especially when separating analog ground (AGND) and power ground (PGND)!
- Bypass cap BATT to GND, Ccomp and Cref as close to the Chip as possible. The use and placement of the bulk capacitor and the lower-valued high frequency bypass capacitor is necessary for proper operation of the amplifier.
- Pin# 20 AGND (Analog Ground): Cref, Ccomp, Cft, Cbosc, Cdbr, Ren, Cen should directly connect to Pin #20 AGND, then AGND copper plane should directly connect to PGND copper plane through Pin# 20.

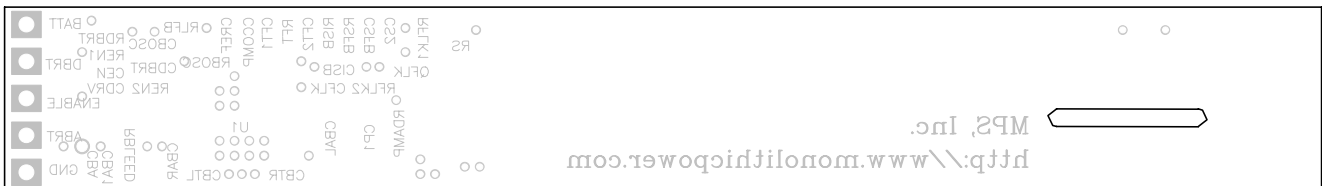
**Figure 5: Top Silkscreen Layer**



**Figure 6: Top Layer**



**Figure 7: Bottom Silkscreen Layer**



**Figure 8: Bottom Layer**



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