

General Description

The EV0004 is an evaluation board designed to demonstrate the capabilities of the MP1025 CCFL Driver IC. The MP1025 is a Power IC that offers a complete solution for driving a single Cold Cathode Fluorescent Lamp (CCFL). This device 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 (patents pending), it greatly increases the power conversion efficiency. The MP1025 supports both analog and burst mode dimming simplifying the module implementation. The MP1025 offers these distinct performance advantages:

1. **More light for less power**
2. **Small board implementation**
3. **Low RF emission**
4. **Low cost external components**

Ordering Information

Board Number	MPS IC Number
EV0004	MP1025EM

Absolute Maximum Ratings

Input Voltage V_{VCC}	6 V
Supply Voltage V_{VDD}	6V
Power Dissipation	1.0 W
Logic Inputs	-0.3V to Vdd+0.3V

Recommended Operating Conditions

Input Voltage V_{VCC}	3.0V to 5.5V
Supply Voltage V_{VDD}	3.0V to 3.6V
Enable Voltage V_{Enable}	0V to Vdd
Brightness Voltage V_{Bright}	0V to 1.0V

Figure 1: EV0004 Evaluation Board (Actual Size)



Figure 2: EV0004 Evaluation Board (Enlarged Size)



Table 1: Enable Burst Truth Table

Enable	Burst	Output L / R
L	X	High Z
H	H	0 volts (Standby)
L	X	High Z
H	L	Normal Operation

Figure 3: EV0004 CCFL Evaluation Board for 1W using Analog Dimming

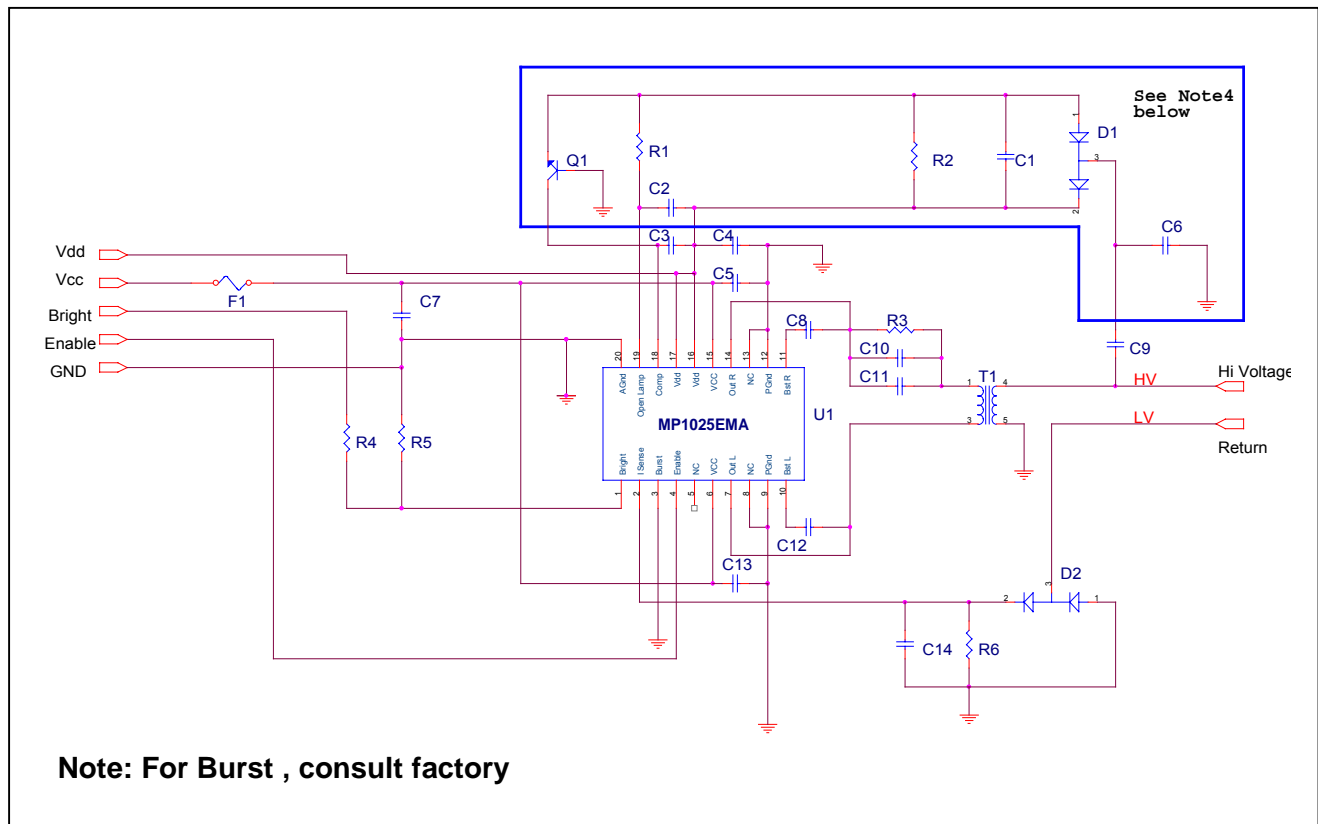


Table 2: EV0004 Evaluation Board Bill of Materials

Item	Qty	Description / Part#	Vendor	Designation
Semiconductors				
1	1	CCFL IC Driver / MP1025EM	MPS	U1
2	1	Transistor / 2SC4617	Any	Q1
Resistors				
3	2	1M Ω , \pm 5%, SMD, 0603	Any	R1, R2
4	1	1K Ω , \pm 5%, SMD, 0603	Any	R3
5	2	100K Ω , \pm 5%, SMD, 0603	Any	R4, R5
6	1	261 Ω \pm 1%, SMD, 0603	Any	R6
Capacitors				
7	1	1nF, 25V, SMD, 0603	Any	C1
8	1	2.2nF, 25V, SMD, 0603	Any	C3
9	2	0.1 μ F, 25V, SMD, 0603	Any	C4, C14
10	2	10nF, 25V, SMD, 0603	Any	C8, C12
11	1	1 μ F, 16V, SMD, 0603	Any	C2
12	5	1 μ F, 10V, SMD, X7R, 0805	Any	C5, C7, C10, C11, C13
13	1	8.2nF, 25V, SMD, 0603	Any	C6
14	1	15pF, 3KV, SMD, 1810	Any	C9
Diode				
15	1	Dual Diode / DA221	Any	D1, D2
Magnetics				
16	1	Transformer / 86V-1009F N=20:2000 , Lp=80uH, Ls=800uH, Lpk=17uH, Lsk=170mH	DELTA	T1

Definition: Lp: Primary, Ls: Secondary (Inductance), Lpk: Primary leakage, Lsk: Secondary leakage (Inductance)

Module Performance

- The following data was collected using a panel with SHARP 4" LCD panel operating voltage of 360Vrms. Starting voltage about 1000Vrms and Vdd of 3.3Vdc.
- Minimum bright 0V---Lamp current 0.6mA
Maximum bright 3V---Lamp current 2mA

Table 3: Module Performance Summary

V _{CC}	V _{BRT}	I _{IN} (A DC)	I _{LAMP} (mA DC)	Frequency (KHz)	Duty Cycle (%)
3V	0V	0.16	0.59	87.5	35.2
3V	1V	0.23	1.17	86.4	44.8
3V	2V	0.29	1.75	83.6	55.0
3V	3V	0.33	2.14	80.2	62.8
4V	0V	0.13	0.59	88.8	27.8
4V	1V	0.18	1.17	88.6	35.2
4V	2V	0.23	1.80	86.8	42.5
4V	3V	0.25	2.14	85.0	46.8
5V	0V	0.10	0.59	89.7	23.3
5V	1V	0.15	1.20	89.5	29.6
5V	2V	0.18	1.77	89.1	34.9
5V	3V	0.21	2.13	88.3	38.4

Layout Considerations

1) 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).

Note: If in doubt, use the Evaluation Board as a reference especially when separating analog and power grounds!

2) Bypass VCC to GND as close to the MP1025 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.

Figure 4: Top View of EV0004 Evaluation Board



Input Connections:

Pin 1: Vdd Power supply (3V to 3.6V)

Pin 2: Vcc Battery power (3V to 5.5V)

Pin 3: Ground

Pin 4: Enable (0V to 3.6V)

Pin 5: Brightness Pin (0V to 3V)*

Note: The evaluation board can be modified for Burst and Pin 5 will be the PWM input. Consult factory for details.

Output Connections:

HV: To lamp Hot

LV: To lamp Return

Caution

Do not apply power until all connections are complete.

Board Layout

Figure 5: Top silk screen

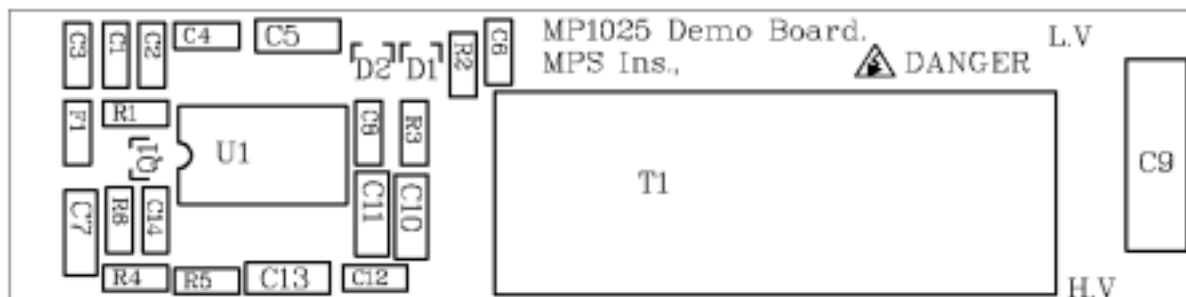


Figure 6: Component side

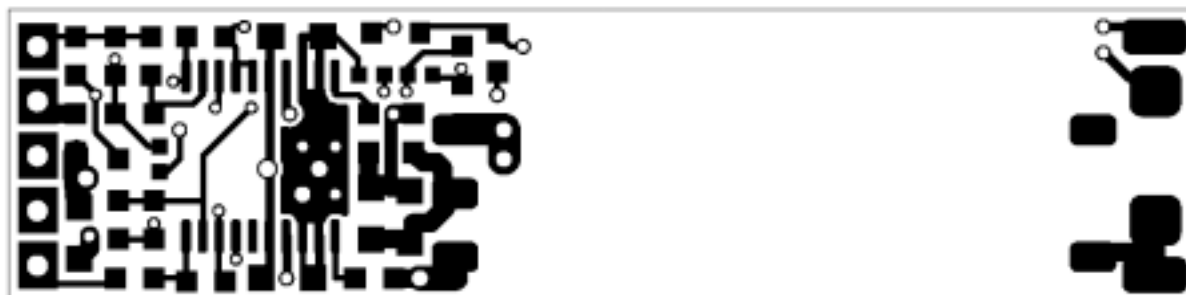
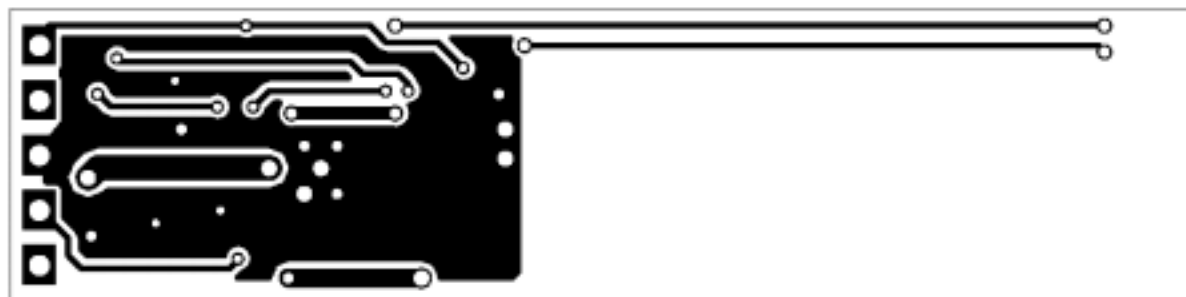


Figure 7: Bottom side



Note: Board Size is 46.5 mm by 11.5mm

NOTICE: MPS believes the information in this document to be accurate and reliable. However, it is subject to change without notice. Please contact the factory for current specifications. No responsibility is assumed by MPS for its use or fit to any application, nor for infringement of patent or other rights of third parties.