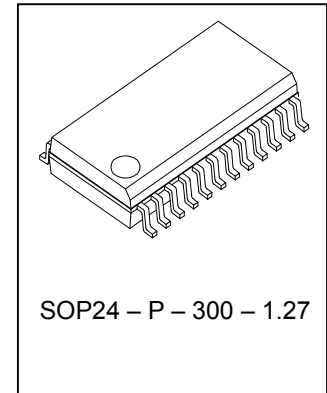


# MBI6001 Transformerless AC/DC Constant Current Driver

June, 2002, V1.0i

## Features

- Directly powered by 220 VAC
- Constant output current and Transformerless, 16 mA
- Drive one chain of LEDs,  $V_{OUT}$  up to 140 V while applying 220V AC
- Reliable technology
- Small footprint 24-pin SOP24 package



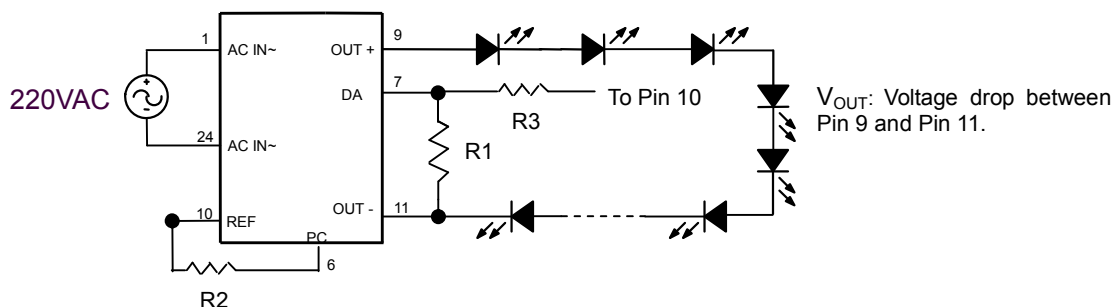
## Description

With the features of transformerless and small footprint, MBI6001 constant current driver is specifically designed for LED lighting. The MBI6001 can be directly powered by 220 VAC and provide 16 mA constant current to the LEDs.

## Applications

- LED Lamps
- LED Sign and Channel Letter
- Indication Sign
- Low Power LEDs Lighting, < 1.5W

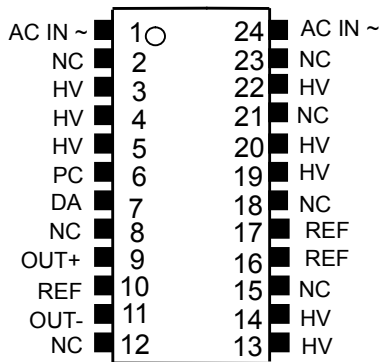
## Typical Application Circuit



Note: There is no pin being connected to earth ground.

**Pin Configuration**

**Ordering Information**



Part	Blink	VAC Range	Package-Pin
MBI6001N2D	NA	200V ~ 260V	SOP-24

MBI6001N2D

**Pin Description (SOP24)**

Pin	Name	I/O	Function
1	AC IN ~	In	AC voltage input node1.
2	NC	-	No connection.
3	HV	-	No connection.
4	HV	-	No connection.
5	HV	-	No connection.
6	PC	In	Peak current adjust.
7	DA	In	Duty adjust.
8	NC	-	No connection.
9	OUT+	Out	Connected to LED anode (+).
10	REF	-	Internal reference voltage low.
11	OUT-	Out	Connected to LED cathode (-).
12	NC	-	No connection.
13	HV	-	No connection.
14	HV	-	No connection.
15	NC	-	No connection.
16	REF	-	Internal reference voltage low.
17	REF	-	Internal reference voltage low.
18	NC	-	No connection.
19	HV	-	No connection.
20	HV	-	No connection.
21	NC	-	No connection.
22	HV	-	No connection.
23	NC	-	No connection.
24	AC IN ~	In	AC voltage input node2.

Note 1: These Pins should be kept away from touching by hands. (High voltage 220VAC)

**Environmental Specification**

Operation Temperature Range ---- -20°C to 50°C

Storage Temperature Range ----- -40°C to 150°C

Cooling ----- Free Air or Thermally Conductive Adhesive

**Absolute Maximum Ratings**

AC Input Voltage ----- 400V, transient

Power Dissipation ----- 1.5 W

Junction Temperature -----120°C

**Electrical Characteristics**

(V<sub>AC</sub>= 220V, T<sub>a</sub> = 25°C, unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTE
AC Input Voltage	V <sub>AC</sub>	200	220	260	V rms	See Applications Information
AC Input Current	I <sub>AC</sub>			0.5	A	
AC Input Frequency	Freq.	50		60	Hz	
Output Voltage	V <sub>OUT</sub>	20	-	140	V	
Output Current	I <sub>OUT</sub>		16		mA	See Applications Information

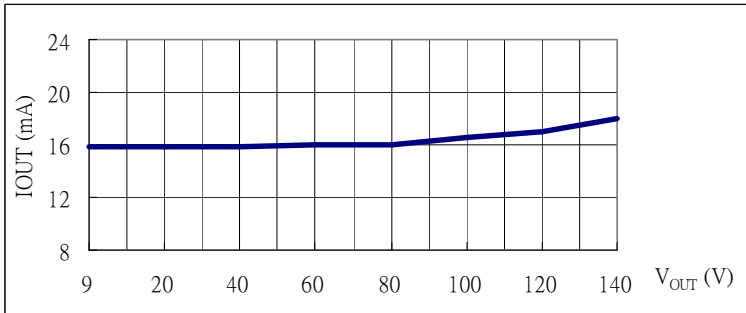
**Applications Information**

**Output Current -  $I_{OUT}$**

With a selected resistor R1 being connected between DA and OUT- (referred to Typical Application Circuit), a constant output current  $I_{OUT}$  can be produced.

However,  $I_{OUT}$  will vary with  $V_{OUT}$ . While  $V_{OUT}$  is changed due to different number of LEDs being used and less than 60V,  $I_{OUT}$  will vary within the range of  $\pm 15\%$ . (See Fig. 1.)

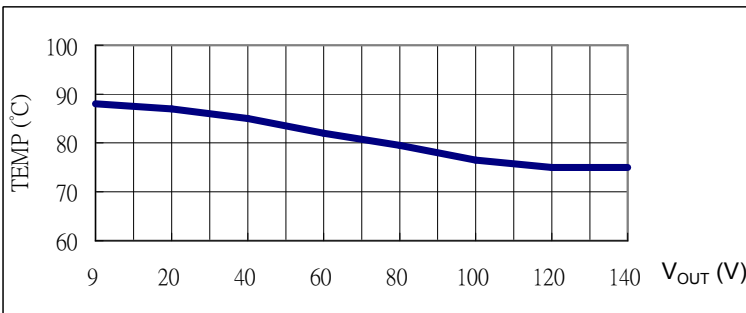
Fig. 1-  $I_{OUT}$  vs.  $V_{OUT}$  (@ 220 VAC,  $T_a= 25^\circ\text{C}$ )



**Surface Temperature vs.  $V_{OUT}$**

The temperature on the surface of package will be higher than  $80^\circ\text{C}$  when  $V_{OUT}$  is smaller than 70V. (See Fig. 2.)

Fig. 2- Temp. vs.  $V_{OUT}$  (@ 220 VAC,  $T_a= 25^\circ\text{C}$ )



### Line Regulation

$I_{OUT}$  will vary obviously with AC Input voltage. For instance, at  $V_{OUT} = 125\text{ V}$ ,  $I_{OUT}$  will increase 20% while input voltage varies from 220 VAC to 200 VAC, but decrease 15% while input voltage varies from 220 VAC to 240 VAC.

### LEDs Selection Consideration

MBI6001 provides constant average output current to drive LEDs. The output to LEDs is actually a train of current pulses. Their peak value can be adjusted by a resistor R2 which connects from PC to V- (referred to Typical Application Circuit). It is recommended to select LEDs with higher peak forward current  $I_F(\text{peak})$ .

### Cautions

MBI6001 is directly power supplied by 220V AC. There are several pins with high AC voltage. Please don't touch any pin by hand(s) after voltage in. Also, it is important to keep preventing pins from short-circuit.

Outline Drawings

SOP24 – P – 300 – 1.27

