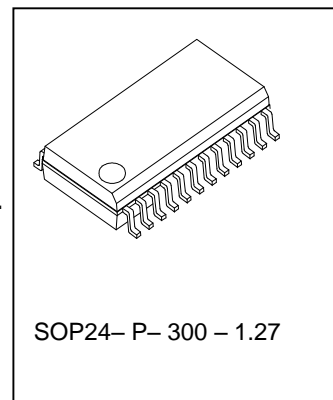


Transformerless AC/DC Constant Current Driver

Features

- n Directly powered by 110 VAC, Transformerless
- n Constant output current , 18 mA
- n Drive one string of LEDs. V_{OUT} is up to 60 V while applying 110V AC.
- n Small footprint: 24-pin SOP24 package



Description

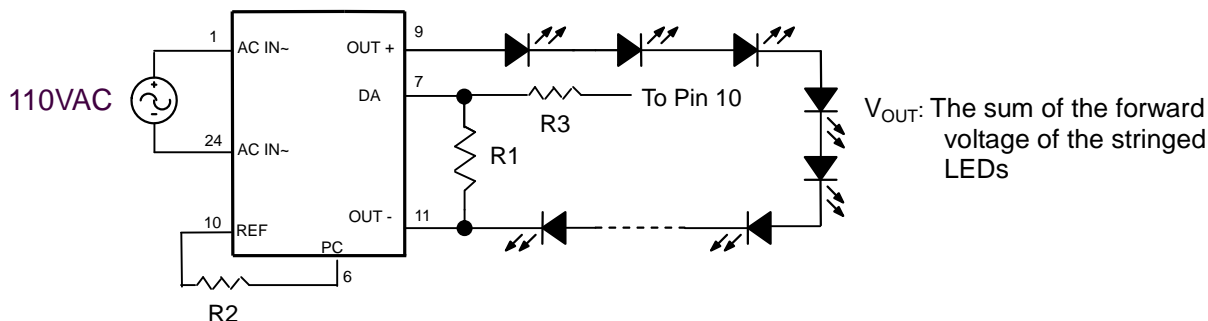
Featuring the small footprint, MBI6001N1D, a constant current driver is specifically designed for LED lighting where the space is concerned.

MBI6001N1D can be directly powered by 110 VAC and provide the constant current, 18 mA, to LEDs.

Applications

- n LED Lamps
- n LED Sign and Channel Letter
- n Indication Sign
- n Low Power LED Lighting

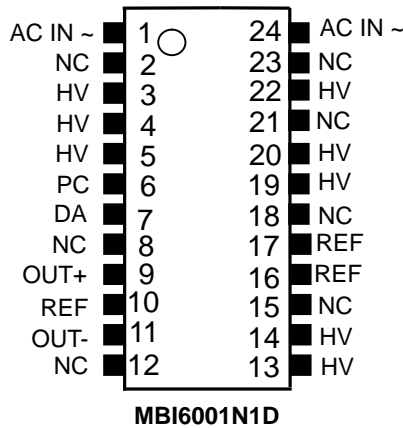
Typical Application Circuit



Caution: No pin is connected to the earth ground.

Pin Configuration

Ordering Information



Part	Blink	VAC Range	Package
MBI6001N1D	NA	100V ~ 120V	SOP24

Pin Description (SOP24)

Pin	Name	I/O	Function
1	AC IN ~	In	AC voltage input node1
2	NC	-	No connection
3	HV	-	No connection (Note 1)
4	HV	-	No connection (Note 1)
5	HV	-	No connection (Note 1)
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 (Note 1)
14	HV	-	No connection (Note 1)
15	NC	-	No connection
16	REF	-	Internal reference voltage low
17	REF	-	Internal reference voltage low
18	NC	-	No connection
19	HV	-	No connection (Note 1)
20	HV	-	No connection (Note 1)
21	NC	-	No connection (Note 1)
22	HV	-	No connection (Note 1)
23	NC	-	No connection
24	AC IN ~	In	AC voltage input node2

Note 1: These Pins should be kept away from being touched by hands (High voltage 110VAC).

Environmental Specification

Operation Temperature Range ---- -20°C to 50°C (LEDs are set in the 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

(VAC= 110V, Ta = 25°C, unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTE
AC Input Voltage	V _{AC}	100	110	120	Vrms	
AC Input Frequency	Freq.	50		60	Hz	
Output Voltage	V _{OUT}	8	-	60	V	V _{OUT} : The sum of the forward voltage of the stringed LEDs.
Output Current	I _{OUT}		18		mA	See <i>Application Information</i>

Application Information

Output Current - I_{OUT}

With a selected resistor, R1, being connected between DA and OUT- (refer 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 numbers of LEDs being used, I_{OUT} will vary within the range of $\pm 15\%$. Please see Fig. 1.

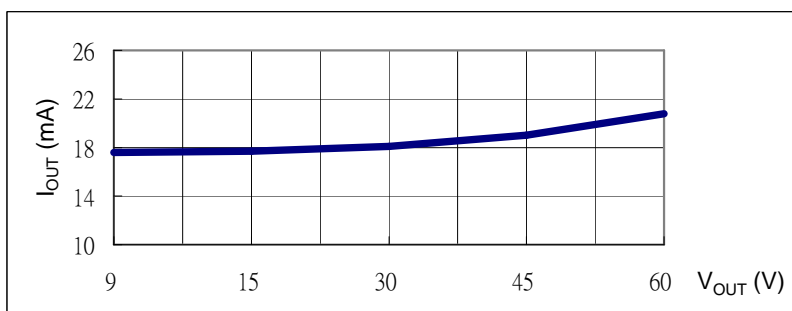


Fig. 1 - I_{OUT} vs. V_{OUT} (@ 110 VAC, $T_a = 25\text{ }^\circ\text{C}$)

Surface Temperature vs. V_{OUT}

The temperature on the surface of package will be around $60\text{ }^\circ\text{C}$ when V_{OUT} is smaller than 60V. Temperature will rise up while V_{OUT} is getting larger. Please see Fig. 2.

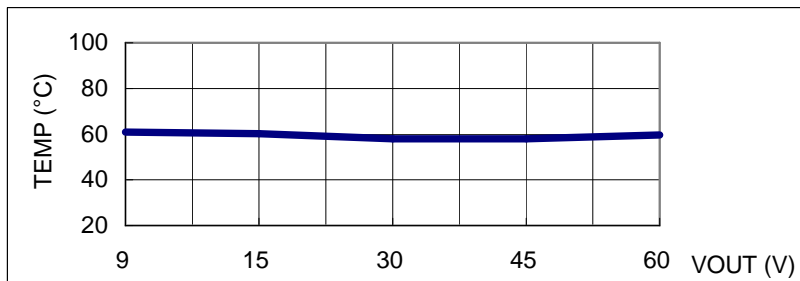


Fig. 2 - Temperature vs. V_{OUT} (@ 110 VAC, $T_a = 25\text{ }^\circ\text{C}$)

Line Regulation

I_{OUT} will vary obviously with AC Input voltage. For instance, at $V_{OUT} = 50\text{ V}$, I_{OUT} will increase 20% while input voltage varies from 110 VAC to 100 VAC, but decrease 15% while input voltage varies from 110 VAC to 120 VAC.

LED Selection Consideration

MBI6001N1D provides constant average output current to drive LEDs. The output to LEDs is actually a sequence of current pulses. Their peak value can be adjusted by a resistor, R2, which connects from PC to REF (refer to **Typical Application Circuit**). It is recommended to select LEDs with higher peak forward current $I_F(\text{peak})$.

Cautions

MBI6001N1D is directly powered by 110V AC. There are several pins with high AC voltage. Please don't touch any pin by hand after the power is on. Also, it is important to keep preventing pins from short circuit.

Outline Drawings

SOP24 – P – 300 – 1.27

