MIC4826

High Voltage EL Lamp Driver

Advance Information

General Description

The MIC4826 is a hivoltage driver designed for driving EL lamps of up to 14nF (typically 4.5 square inches). The input supply voltage range is from 1.8V to 3.5V. The device uses a single inductor and a minimum number of passive components. The nominal regulated output voltage that is applied to the EL lamp is ±80V. the chip can be enabled/disabled by connecting the resistor on R_{SW-OSC} to V_{DD}/ground.

The MIC4826 has two internal oscillator, a switching MOSFET, and a high voltage EL lamp driver. The frequency for the switching MOSFET is set by an external resistor connected between the R_{EL-OSC} pin and the V_{DD} pin. An external inductor is connected between C_S and ground. The EL lamp is conected between V_A and V_B.

The switching MOSFET charges the external inductor and discharges it into the capacitor at C_S. The voltage at C_S will start to increase. Once the voltage at C_S reaches a nominal value of 80V, the switching MOSFET is turned OFF to conserve power. The outputs V_A and V_B are configured as an H-bridge and are switcng in oppisite states to achieve 160V peak-to-peak across the EL lamp.

Features

- Processed with high voltage CMOS technology
- 1.8V to 3.5V operating supply voltage
- DC to AC conversion
- Adjustable output frequency
- Adjustable switch frequency
- Output voltage regulation
- Enable/disable function

Applications

- Mobile Cellular Phones
- Pagers
- Portable transcievers
- Remote control units
- Calculators

Ordering Information

Part Number	Junction Temp. Range*	Package
MIC4826MS	–25°C to +85°C	8-lead MSOP
MIC4826M	–25°C to +85°C	8-lead SOP

Typical Application

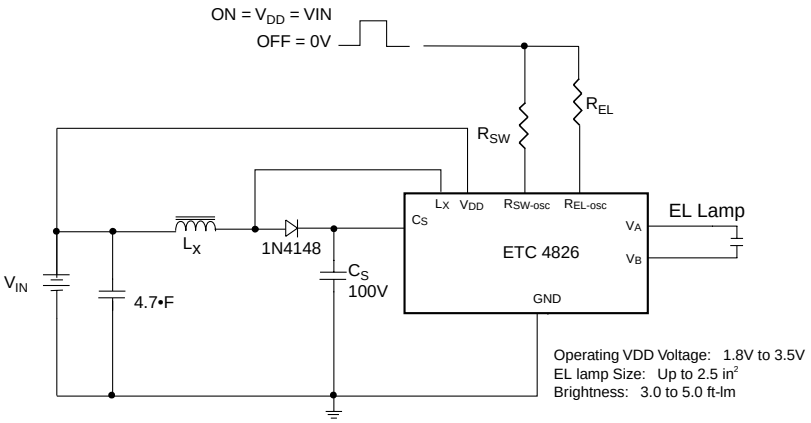
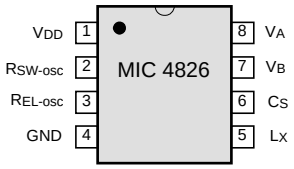


Figure 1. Single Supply Configuration

V_{IN}	I_{IN}	V_{CS}	f_{EL}	L_X	C_S	R_{SW}	R_{EL}	Lamp Size	Brightness
3.0V	23mA	80V	195Hz	560µA	0.01µF	750k	2M	3.0in^2	4ft-lm

Typical Performance

Pin Configuration



8-Lead SOP
8-Lead MSOP

Pin Description

Pin Number	Pin Name	Pin Function
1	V_{DD}	Power supply input voltage
2	R_{SW-OSC}	Input for setting switched converter frequency
3	R_{EL-OSC}	Input for setting EL lamp driver frequency
4	GND	IC Ground
5	L_X	Open drain input of switched converter FET
6	C_S	Regulated output of the witched converter
7	V_B	Output to EL lamp, polarity is not important
8	V_A	Output to EL lamp, polarity is not important

Absolute Maximum Ratings (Note 1)

Supply Voltage (V_{DD}) ..... –0.5V to 4.5V
Output Voltage (V_{CS}) ..... 0.5V to 120V
Lead Temperature (soldering, 10 sec.) ..... 300°C
Storage Temperature (T_S) ..... –65° to 85°C

Operating Ratings (Note 2)

Operating Temperature Range
MIC4826M ..... –25°C to 85°C
MIC4826MS ..... –25°C to 85°C
Power Dissipation
MIC4826M 400mW
MIC4826MS 250mW

Electrical Characteristics

V_{IN} = 3.0; R_{SW} = 750kΩ; R_{EL} = 2.0MΩ; T_A = 25°C, **bold** values indicate –40°C ≤ T_A ≤ +85°C; unless noted

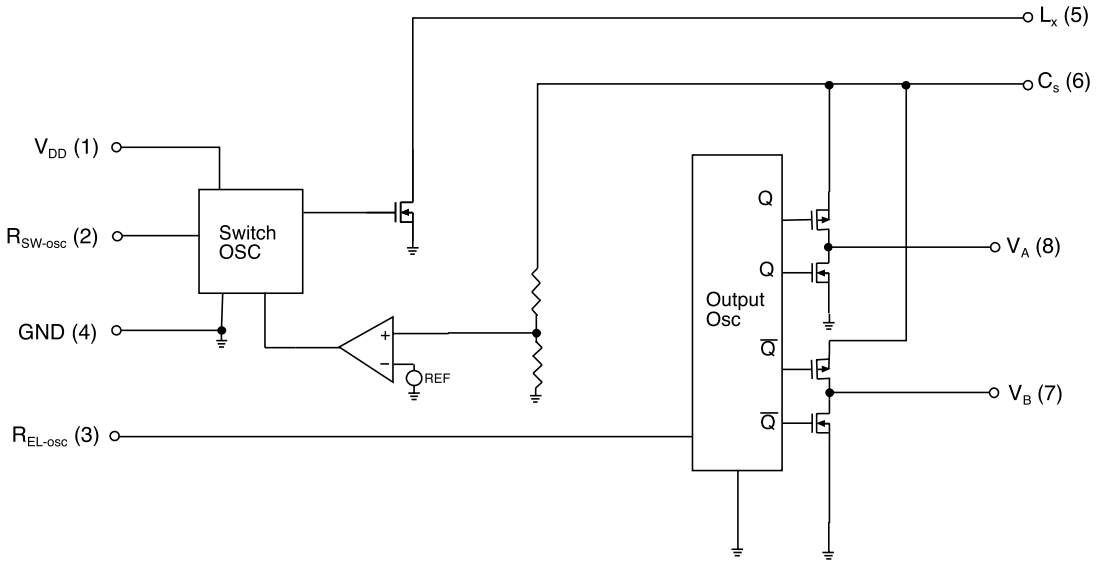
Parameter	Condition	Min	Typ	Max	Units
On-resistance of switching transistor	I = 100mA			7.0	Ω
Output voltage regulation, V_{CS}	V_{DD} = 1.8V to 3.5V	75	80	85	V
Output peak-to-peak voltage V_A - V_B	V_{DD} = 1.8V to 3.5V	150	160	170	V
Quiescent V_{DD} supply current, disabled, I_{DDQ}	R_{SW-OSC} = Low			100	nA
Input current going into the V_{DD} pin, I_{DD}	V_{DD} = 1.8V to 3.5V, (Figure 1.)			150	µA
Input current including inductor current, I_{IN}	V_{IN} = 1.5V, (Figure 2.)		35	45	mA
Output Voltage on V_{CS}	V_{IN} = 1.5V, (Figure 2.)	65	70		V
V_{A-B} output drive frequency, f_{EL}	V_{IN} = 1.5V, (Figure 2.)	300	375	450	Hz
Switching transistor frequency, f_{SW}	V_{IN} = 1.5V, (Figure 2.)		80		kHz
Switching transistor duty cycle, D			88		%

Note 1. Exceeding the absolute maximum rating may damage the device.

Note 2. The device is not guaranteed to function outside its operating rating.

Note 3. Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

Functional Diagram



Applications Information

Split Supply Configuration

The MIC4826 can also be used for handheld devices operating froma single cell 1.5V battery where a regulated voltage is available. This is shown in Figure 2. The regulated voltage can be used to run the internal logic of the MIC4826. The amount of current necessary to run the internal logic is typically 150µA at V_{DD} between 1.8V and 3.5V. therefore, the regulated voltage could easily provide the current without being loaded down

The MIC4826 used in this configuration can also be enabled/disabled via logic control signal on the R_{SW} and R_{EL} resistors as shown if Figure 2.

Figure 2 can also be used with high battery voltages such as 12 as long as the input voltage, V_{DD}, to the MIC4826 device is within its specifications of 1.8V to 3.5V.

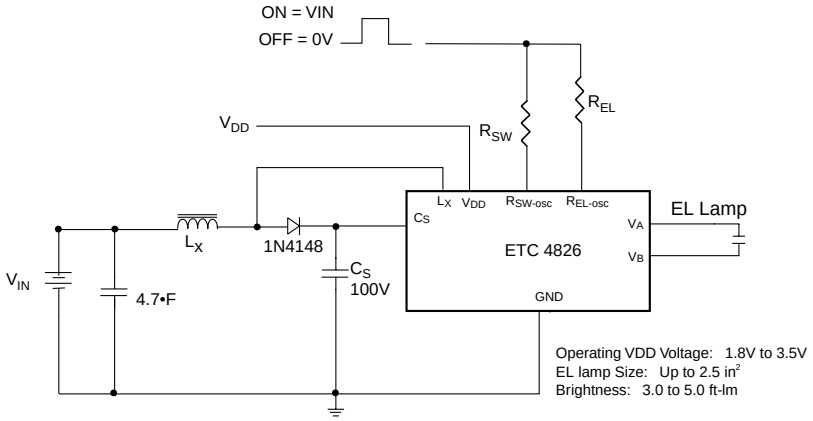
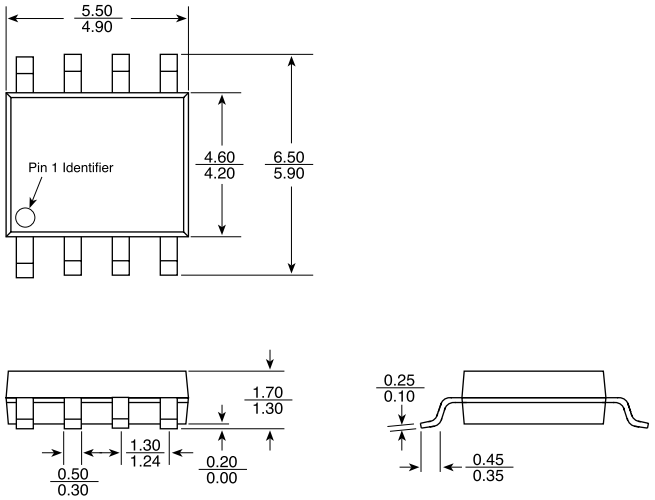


Figure 2. Split Supply Configuration

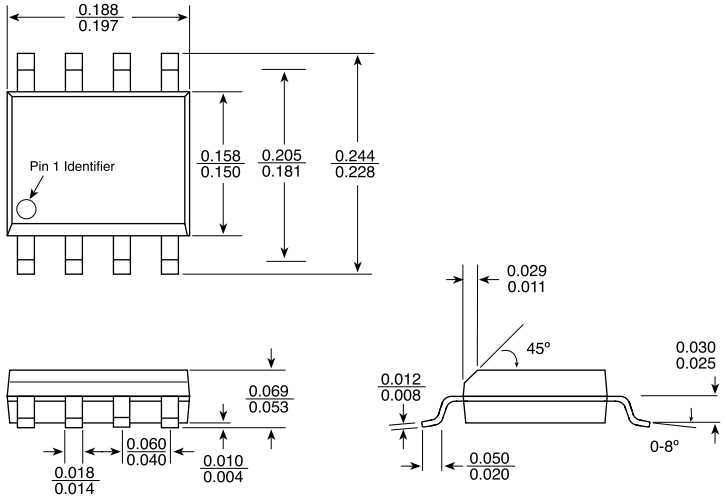
V_{IN}	I_{IN}	V_{CS}	f_{EL}	L_X	C_S	R_{SW}	R_{EL}	Lamp Size	Brightness
1.5V	35mA	66V	345Hz	220µA	0.1µF	560k	1M	1.6in^2	5ft-lm

Typical Performance

Package Information



8-Lead MSOP (MS)



All Dimensions in inches

8-Lead SOP (M)

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