

DESCRIPTION

The MP3802 is a high output voltage, DC to AC converter designed for driving Electroluminescent (EL) lamps of up to 5 square inches. The device operates from an input voltage range of 2.5V to 5.5V, making it suitable for 1-cell Li-Ion and 2 or 3-cell alkaline/NiCad/NiMH battery applications. The device uses a single inductor and a minimum number of passive components. The MP3802 converts a low-voltage DC input to a $\pm 120V$ regulated output voltage that drives the EL lamp.

The MP3802 is comprised of two stages: a boost stage and a H-bridge lamp driver stage. The boost stage converts the input voltage up to 120V. The H-bridge stage alternately switches the 120V to each terminal of the EL lamp.

The MP3802 has two separate internal oscillators for the boost and H-bridge stages. The frequency of each oscillator is set independently via external resistors. This flexibility allows the EL lamp circuit to be optimized for maximum performance. Also, the IC can be enabled /disabled by connecting these two resistors to V_{DD}/GND .

The MP3802 is available in an 8-pin MSOP package.

FEATURES

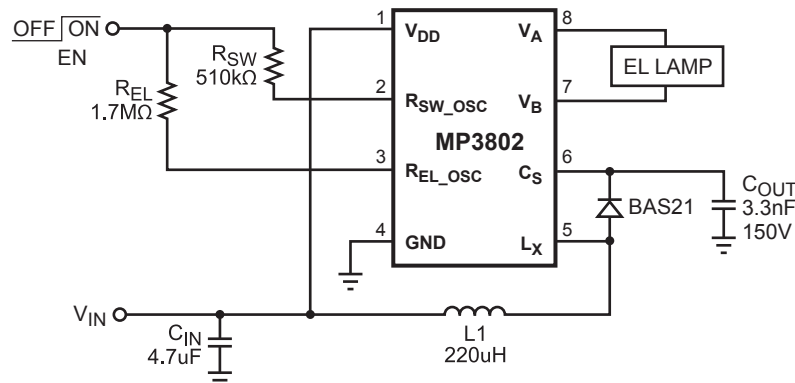
- 2.5V to 5.5V DC Input Voltage
- 240V_{PP} Regulated AC Output Waveform
- Single Cell Lithium-Ion Compatible
- 10nA Shutdown Current
- Adjustable EL Lamp Frequency
- Adjustable Converter Frequency
- Available in MSOP-8
- Split Supply Capability

APPLICATIONS

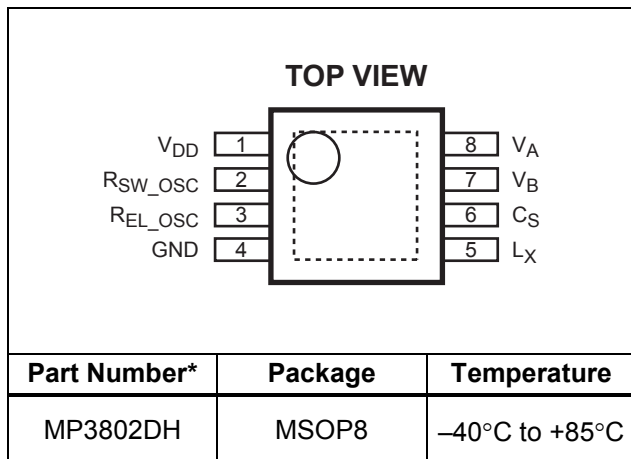
- Portable Multimedia Players
- LCD Backlighting
- PDAs
- Handheld Wireless Communication
- Mobile Phones
- Remote Controls
- Global Positioning Systems (GPS)

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TYPICAL APPLICATION



PACKAGE REFERENCE



* For Tape & Reel, add suffix -Z (eg. MP3802DH-Z)
 For RoHS Compliant Packaging, add suffix -LF
 (eg. MP3802DH-LF-Z)

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾

Supply Voltage (V_{DD}) -0.5V to +6.0V
 Output Voltage (V_{CS} , V_A , V_B) -0.5V to +125V
 All Other Pins -0.5V to $V_{DD} + 0.3V$
 Junction Temperature 150°C
 Lead Temperature 260°C
 Storage Temperature -65°C to +150°C

Recommended Operating Conditions ⁽²⁾

Supply Voltage 2.5V to 5.5V
 Lamp Drive Frequency (f_{EL}) 60Hz to 1KHz
 Switching Transistor Freq 50KHz to 200KHz
 Operating Temperature -40°C to +85°C

Thermal Resistance ⁽³⁾

θ_{JA} θ_{JC}
 MSOP8 150 65... °C/W

Notes:

- 1) Exceeding these ratings may damage the device.
- 2) The device is not guaranteed to function outside of its operating conditions.
- 3) Measured on approximately 1" square of 1 oz copper.

ELECTRICAL CHARACTERISTICS

$V_{IN} = V_{DD} = 3.0V$, $R_{EL} = 1.7M\Omega$, $R_{SW} = 510K\Omega$, $T_A = +25^\circ C$, unless otherwise noted.

| Parameter | Symbol | Condition | Min | Typ | Max | Units |
|--|--------------|--|-----|----------------|-----|----------|
| On Resistance of Switching Transistor | $R_{DS(ON)}$ | $I_{SW} = 100mA$, $V_{CS} = 120V$ | | 9 | | Ω |
| Output Voltage Regulation | V_{CS} | | | 120 | | V |
| Peak to Peak Output Voltage | $V_A - V_B$ | | | 240 | | V |
| Input Low Voltage (Turn Off) | V_{EN-L} | | | $V_{DD} - 0.6$ | | V |
| Input High Voltage (Turn On) | V_{EN-H} | | | $V_{DD} - 0.3$ | | V |
| Shutdown Current | I_{SD} | $V_{EN} = 0V$ | | 10 | | nA |
| Input Supply Current | I_{VDD} | V_A , V_B Open, $V_{EN} = V_{IN}$ | | 100 | | μA |
| Input Current Including Inductor Current | I_{IN} | A 2k Ω resistor is series with a 10nF capacitor connected between V_A and V_B | | 22.5 | | mA |
| EL Lamp Frequency | f_{EL} | | 200 | 250 | 300 | Hz |
| Switching Transistor Frequency | f_{SW} | | | 84 | | KHz |
| Switching Transistor Duty Cycle | D | | | 91 | | % |

Note:

4) Shutdown current is defined as the sum of currents going into V_{DD} , V_{CS} , and SW nodes.

PIN FUNCTIONS

| Pin # | Name | Description |
|-------|---------------------|--|
| 1 | V _{DD} | Supply Voltage. |
| 2 | R _{SW_osc} | Boost Converter Frequency Setting Pin. Refer the frequency setting curve in the typical performance characteristics. |
| 3 | R _{EL_osc} | EL Driver Frequency Setting Pin. Roughly, $f_{EL} = \frac{1.7M\Omega \times 240Hz}{R_{EL}}$ |
| 4 | GND | Ground. Connect the exposed pad to this pin. |
| 5 | L _X | Boost Converter Switching Pin. This pin connects to the N-Channel MOSFET drain. |
| 6 | C _S | Boost Converter Output. Put a 150V, NPO ceramic capacitor at this pin to store the energy transferred from the inductor. |
| 7 | V _B | Output Voltage B on EL Device. |
| 8 | V _A | Output Voltage A on EL Device. |

BLOCK DIAGRAM

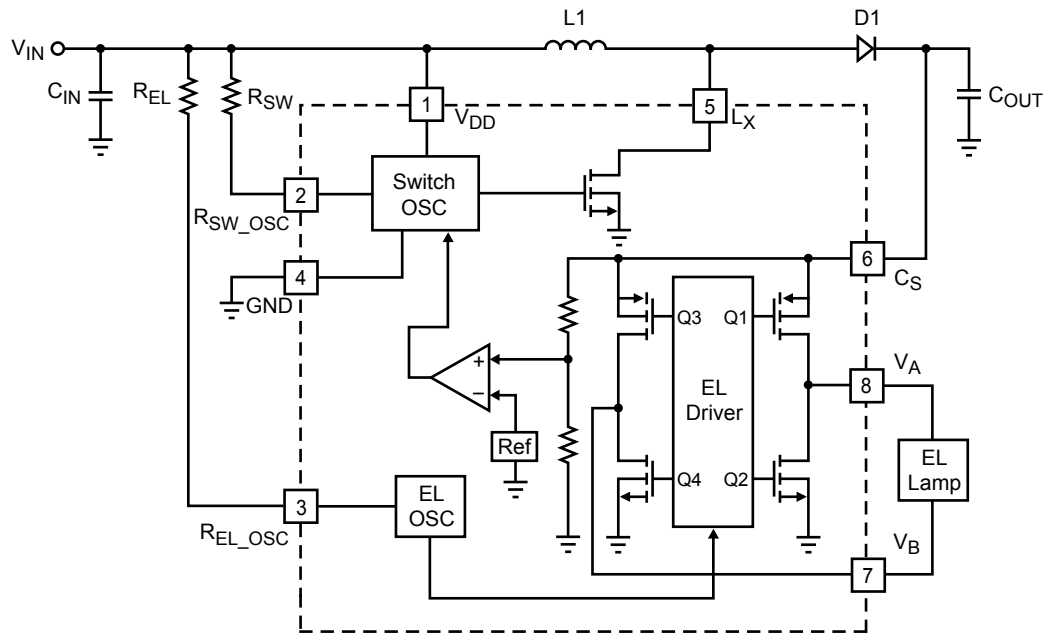
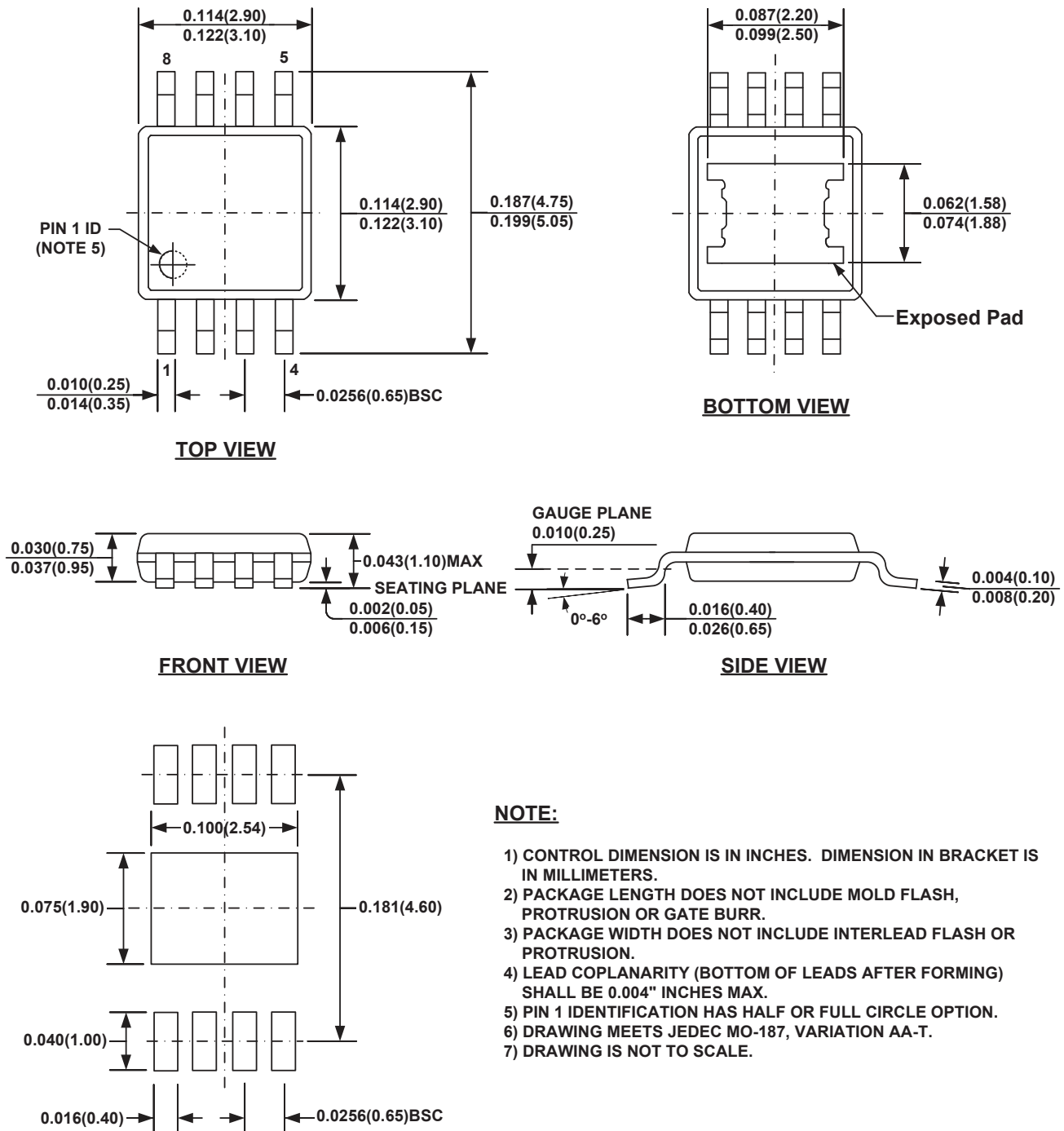


Figure 1—Functional Block Diagram

PACKAGE INFORMATION

MSOP8



RECOMMENDED LAND PATTERN

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