

# Surface-mount type power supply unit for LCD drives

## BP5307

The BP5307 is a DC / DC converter unit designed for driving liquid crystal displays (LCDs). The unit supplies a positive voltage for LCDs from a logic circuit power supply (+5V). Being in a compact and light surface-mount package, the IC can be built into a LCD panel.

### ●Applications

LCD panels of personal computers, word processors, and copiers

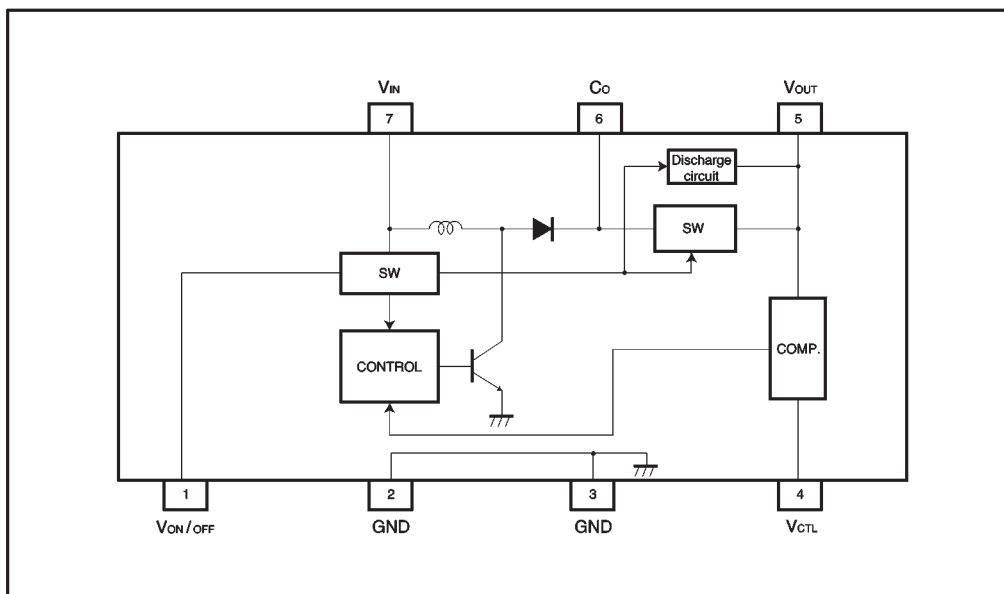
### ●Features

- 1) Automatic mounting and reflow soldering are possible.
- 2) With a maximum thickness of 4.1mm, the IC can be built into a LCD panel.
- 3) Output voltage can be regulated by a microcontroller.
- 4) Discharge circuit is built in for output. (Fall time: 1ms Typ.)

### ●Absolute maximum ratings (Ta = 25°C)

| Parameter             | Symbol           | Limits  | Unit |
|-----------------------|------------------|---------|------|
| Power supply voltage  | V <sub>IN</sub>  | 7.0     | V    |
| Operating temperature | T <sub>opr</sub> | 0~+60   | °C   |
| Storage temperature   | T <sub>stg</sub> | -20~+85 | °C   |

### ●Block diagram



## ● Pin descriptions

| Pin No. | Pin name              | Function   |
|---------|-----------------------|--|
| 1       | V <sub>ON / OFF</sub> | Output ON/OFF control ; output starts when the pin is HIGH level, and stops when the pin is LOW or OPEN  |
| 2       | GND                   | Internally connected ground  |
| 3       | GND                   |  |
| 4       | V <sub>CTL</sub>      | Output voltage can be adjusted by the input voltage of 0.8-2.8 V, which is available even when the pin is OPEN; typically V <sub>OUT</sub> = 34V when OPEN |
| 5       | V <sub>OUT</sub>      | Output; connect a low-impedance capacitor with a recommended capacitance of 47 $\mu$ F between this pin and GND  |
| 6       | C <sub>O</sub>        | External capacitor connection ; connect a low-impedance capacitor with a recommended capacitance of 10 $\mu$ F between this pin and GND                    |
| 7       | V <sub>IN</sub>       | Input; connect a low-impedance capacitor with a recommended capacitance of 10 $\mu$ F between this pin and GND   |

● Electrical characteristics (unless otherwise noted, Ta = 25°C and V<sub>CTL</sub> = 0.8V)

| Parameter                        | Symbol            | Min.  | Typ.  | Max.  | Unit              | Conditions  |
|----------------------------------|-------------------|-------|-------|-------|-------------------|---|
| Input voltage                    | V <sub>IN</sub>   | 4.5   | 5.0   | 5.5   | V                 | —   |
| Output current                   | I <sub>OUT</sub>  | 0     | —     | 40    | mA                | V <sub>CTL</sub> =0.8~2.8V  |
| Output voltage 1                 | V <sub>OUT1</sub> | 30.00 | 32.00 | 33.60 | V                 | V <sub>IN</sub> =4.5~5.5V<br>V <sub>CTL</sub> =0.8V, I <sub>OUT</sub> =0~40mA |
| Output voltage 2                 | V <sub>OUT2</sub> | 16.00 | 19.00 | 20.00 | V                 | V <sub>IN</sub> =4.5~5.5V<br>V <sub>CTL</sub> =2.8V, I <sub>OUT</sub> =0~40mA |
| Ripple noise voltage             | V <sub>r</sub>    | —     | 200   | 300   | mV <sub>P-P</sub> | V <sub>IN</sub> =5V, I <sub>OUT</sub> =40mA*                                  |
| Efficiency                       | $\eta$            | 60    | 70    | —     | %                 | V <sub>IN</sub> =5V, I <sub>OUT</sub> =40mA                                   |
| ON/OFF CTL voltage when ON       | V <sub>ON</sub>   | 2.5   | —     | 5.5   | V                 | V <sub>IN</sub> =4.5~5.5V Output ON   |
| ON/OFF CTL voltage when OFF      | V <sub>OFF</sub>  | —     | —     | 0.7   | V                 | V <sub>IN</sub> =4.5~5.5V Output OFF<br>(Alternatively, when OPEN)            |
| V <sub>CTL</sub> applied voltage | V <sub>CTL</sub>  | 0     | —     | 4.0   | V                 | —   |
| Oscillation frequency            | f <sub>sw</sub>   | —     | 100   | —     | kHz               | —   |

\* Measured with a band width of 20 MHz.

## ● Measurement circuit

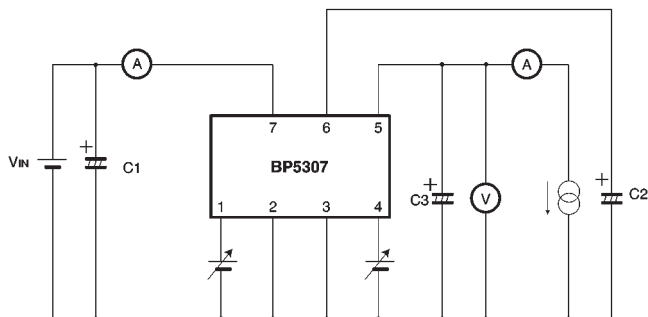


Fig. 1

C1 : 10  $\mu$ F / 50V (NICHICON PL-series or equivalent)C2 : 10  $\mu$ F / 50V (NICHICON PL-series or equivalent)C3 : 47  $\mu$ F / 50V (NICHICON PL-series or equivalent)

## ● Electrical characteristic curves

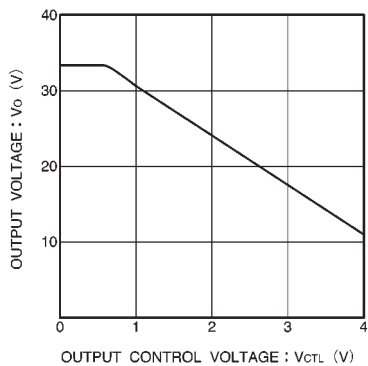


Fig. 2 Output voltage vs. output control voltage

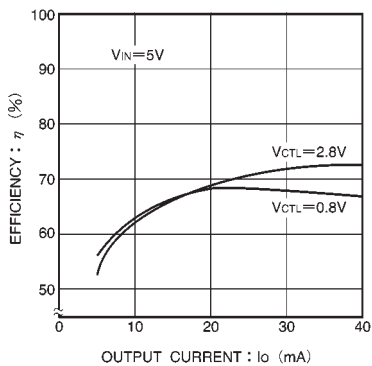


Fig. 3 Efficiency

● Recommended pad dimensions

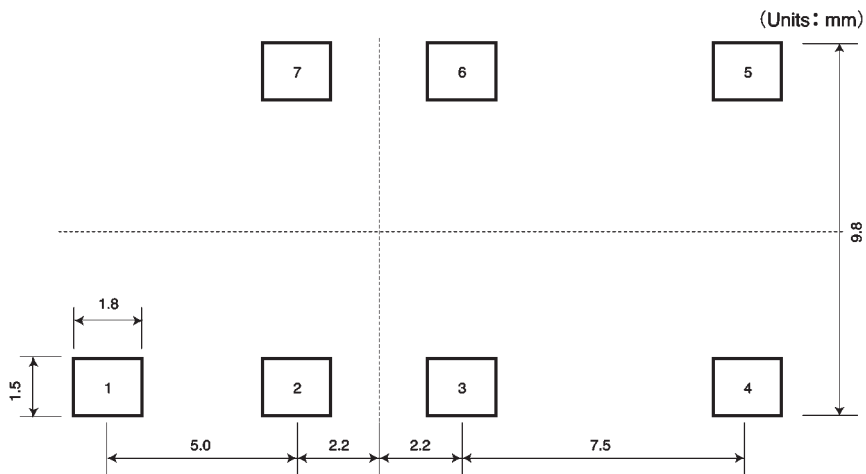


Fig. 4

● Operation notes

The soldering used inside the unit is equivalent to H63 solder, so it will remelt during reflow. Be sure not to subject the unit to any vibrations when passing through the reflow furnace.

● External dimensions (Units: mm)

