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# DC / DC converter for LCDs

## BP5311A / BP5311XA

The BP5311A and BP5311XA are DC / DC converters for supplying power to liquid crystal display (LCD) panels. The modules supply a positive voltage for LCDs from a logic circuit power supply (+5). They are available in a single in-line package as an upright (BP5311A) or L-shaped lead (BP5311XA) type.

### ● Applications

LCD panels in personal computers and word processors.

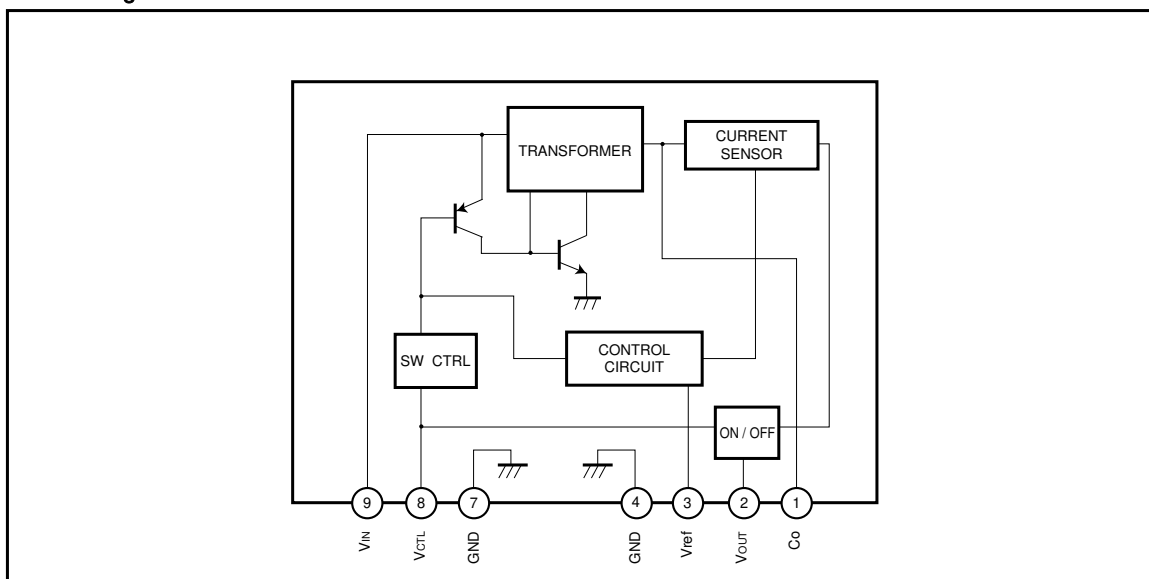
### ● Features

- 1) High conversion efficiency
- 2) Built-in protection circuit
- 3) Built-in ON/OFF switch.
- 4) Compact and light.
- 5) Surface mounting is possible because parts are concentrated on one side.
- 6) Available as an upright or L-shaped lead type.

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

Parameter	Symbol	Limits	Unit
Power supply voltage	$V_{IN}$	7	V
Operating temperature range	$T_{opr}$	0~60	°C
Storage temperature range	$T_{stg}$	-30~+85	°C

### ● Block diagram



## ● Pin descriptions

Pin No.	Pin name	Function
1	Co	Output smoothing capacitor connection pin ; connect a low-impedance capacitor with a recommended capacitance of 47 $\mu$ F between this and GND.
2	V <sub>OUT</sub>	Output pin.
3	V <sub>ref</sub>	Output voltage adjustment pin for contrast ; output voltage is adjusted by connecting a resistor between pins 2 and 3 or pins 3 and 4.
4, 7	GND	Ground pin.
8	V <sub>CTL</sub>	Output ON/OFF control pin ; output starts when the pin is HIGH level, and stops when the pin is LOW or OPEN.
9	V <sub>IN</sub>	Input pin ; connect a low-impedance capacitor with a recommended capacitance of 100 $\mu$ F between this pin and GND.

● Electrical characteristics (unless otherwise noted, T<sub>a</sub>=25°C, V<sub>CTL</sub>=5V, R1~R2 resistors are disconnected)

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>	–	–	25	mA	–
Output voltage	V <sub>OUT1</sub>	28.0	29.5	31.0	V	V <sub>IN</sub> =4.5~5.5V, I <sub>OUT</sub> =0~25mA
Output voltage when OFF	V <sub>OUT2</sub>	–	–	0.3	V	V <sub>IN</sub> =4.5~5.5V, V <sub>CTL</sub> =0V
Ripple noise voltage	v <sub>1</sub>	–	100	200	mV <sub>P-P</sub>	V <sub>IN</sub> =5V, I <sub>OUT</sub> =20mA *
Efficiency	$\eta$	67	77	–	%	V <sub>IN</sub> =5V, I <sub>OUT</sub> =20mA
ON / OFF CTL voltage when ON	V <sub>CTL</sub>	1.5	–	–	V	V <sub>IN</sub> =5V, V <sub>O</sub> >28V
ON / OFF CTL voltage when OFF	V <sub>CTL</sub>	–	–	0.5	V	V <sub>IN</sub> =5V, V <sub>O</sub> <0.3V (Alternatively, when OPEN)
ON / OFF CTL current	I <sub>CTL</sub>	–	–	500	$\mu$ A	V <sub>IN</sub> =5V, V <sub>CTL</sub> =1.5V
Current consumption when OFF	I <sub>OFF</sub>	–	–	50	$\mu$ A	V <sub>IN</sub> =5V, V <sub>CTL</sub> =0V

\* Measured with a band width of 20 MHz.

## ● Measurement circuit / Application example

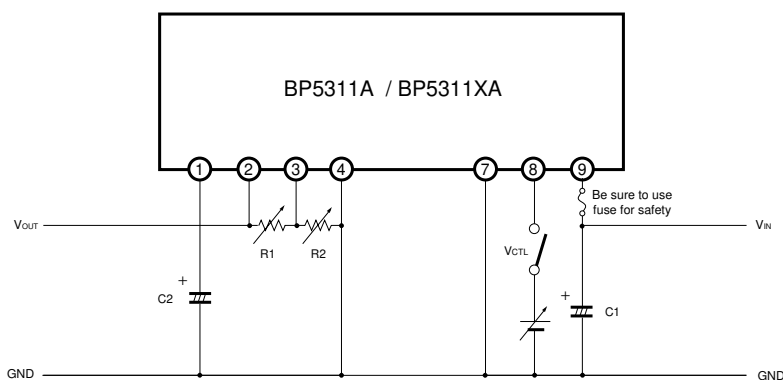


Fig.1

C1 : 100 $\mu$ F / 16V (Low impedance)C2 : 47 $\mu$ F / 35V (Low impedance)

R1, 2 : Resistors for adjusting output voltage (Contrast adjustment)

● Electrical characteristic curves

- (1) Place I/O external capacitors as near as possible to the connection pins. In particular, make sure to minimize the impedance between the input-side capacitor (C1) and pin 9. A length less than 50 mm is recommended for a copper foil of 1.0 mm wide and 35 $\mu$ m thick.
- (2) Avoid frequent switching using the ON/OFF CTL pin (five times per second at the maximum).
- (3) R1 and R2 resistors, which are used for changing the output voltage, are usually not required.

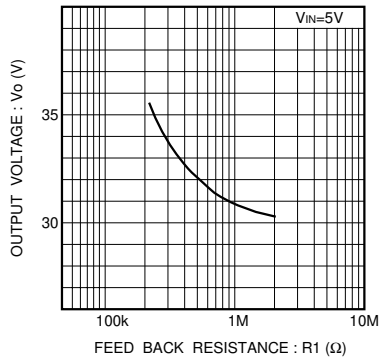


Fig.2 Output voltage vs. feedback resistance (R1)

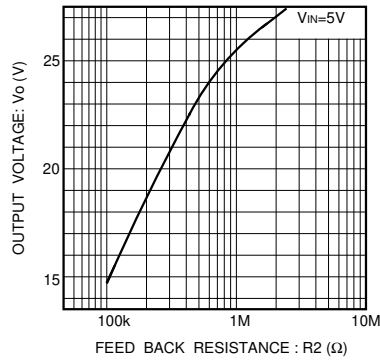
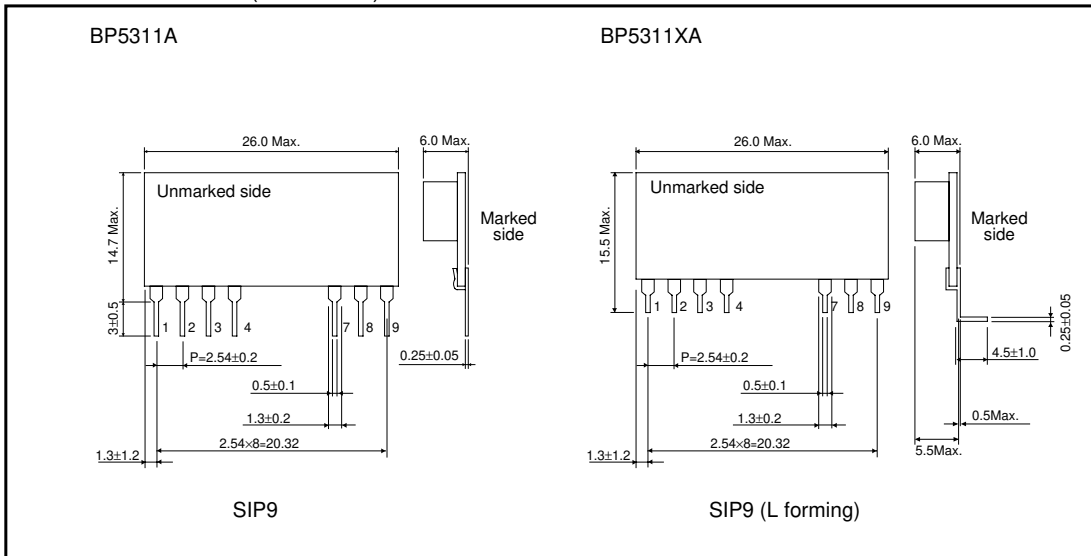


Fig.3 Output voltage and feedback resistance (R2)

● External dimensions (Units : mm)



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  - [b] Installation of redundant circuits in the case of single-circuit failure
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  - [b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
  - [c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use in places where the products are exposed to static electricity or electromagnetic waves
  - [e] Use in proximity to heat-producing components, plastic cords, or other flammable items
  - [f] Use involving sealing or coating the products with resin or other coating materials
  - [g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering
  - [h] Use of the products in places subject to dew condensation
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