



# DC / DC converter for LCDs BP5302A / BP5302XA

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The BP5302A and BP5302XA are DC / DC converters for supplying power to liquid crystal display (LCD) panels. The modules supply a negative voltage from a positive power supply. They are available in a single in-line package as an upright (BP5302A) or L-shaped lead (BP5302XA) type.

## ● Applications

LCD panels in personal computers and word processors

## ● Features

- 1) Wide input voltage range.(+5V to +14V)
- 2) High accurate output voltage. (  $-24\pm0.75V$  )
- 3) High conversion efficiency. (Typ. 80%)
- 4) Built-in protection circuit.
- 5) Built-in ON/OFF switch.
- 6) Compact and light.
- 7) Available as an upright or L-shaped lead type.

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

Parameter	Symbol	Limits	Unit
Input voltage	V <sub>IN</sub>	15	V
Operating temperature range	T <sub>opr</sub>	0~60	°C
Storage temperature range	T <sub>stg</sub>	-30~85	°C

## ● Electrical characteristics

(Unless otherwise noted: Ta=25°C, and R1 and R2 resistors in the measurement circuit of Fig.1 are disconnected)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>IN</sub>	5	-	14	V	
Output current	I <sub>OUT</sub>	-	-	30	mA	
Output voltage	V <sub>OUT</sub>	-23.25	-24.00	-24.75	V	V <sub>IN</sub> =12V, I <sub>OUT</sub> =20mA
Line regulation	DV1	-	-	0.75	V	V <sub>IN</sub> =5~14V, I <sub>OUT</sub> =20mA
Load regulation	DV2	-	-	0.5	V	V <sub>IN</sub> =12V, I <sub>OUT</sub> =0~20mA
Ripple nose voltage	n1	-	-	200	mV <sub>P-P</sub>	V <sub>IN</sub> =12V, I <sub>OUT</sub> =20mA *
Efficiency	h	70	80	-	%	V <sub>IN</sub> =12V, I <sub>OUT</sub> =20mA
ON / OFF CTL voltage when ON	V <sub>CTL</sub>	1.5	-	6.0	V	V <sub>IN</sub> =5~14V
ON / OFF CTL voltage when OFF	V <sub>CTL</sub>	-	-	0.5	V	V <sub>IN</sub> =5~14V
ON / OFF CTL current	I <sub>CTL</sub>	-	-	150	μA	V <sub>IN</sub> =5~14V, V <sub>CTL</sub> =5V
Current consumption when OFF	I <sub>OFF</sub>	-	-	10	μA	V <sub>IN</sub> =5~14V, V <sub>CTL</sub> =0V
R1 resistance	R1	50	-	∞	kΩ	V <sub>IN</sub> =5~14V, V <sub>CTL</sub> =5V
R2 resistance	R2	20	-	∞	kΩ	V <sub>IN</sub> =5~14V, V <sub>CTL</sub> =5V

\* Measured with a band width of 20MHz.

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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

### ● Measurement circuit and Application example

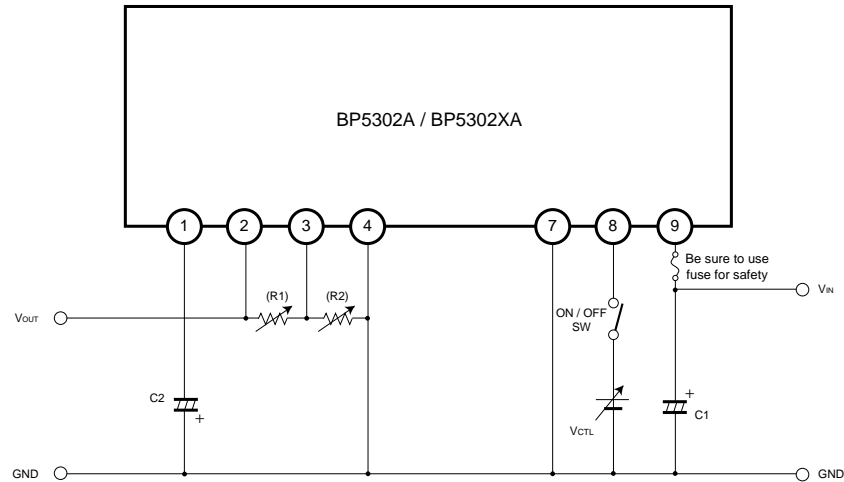


Fig.1

C1 : 100 $\mu$ F / 16V (Low impedance)  
 C2 : 47 $\mu$ F / 35V (Low impedance)  
 R1, R2 : Resistors for adjusting output voltage  
 (Disconnected during test measurement)

### ● Operation notes

- (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. (Reference value: A length less than 50mm is recommended for a copper foil of 1.0mm wide and 35 $\mu$ F thick.)
- (2) Avoid frequent switching using the ON/OFF CTL pin (5 times per second at the maximum).
- (3) R1 and R2 resistors, which are used for changing the output voltage, are usually not required.

# BP5302A / BP5302XA

## Electrical characteristic curves

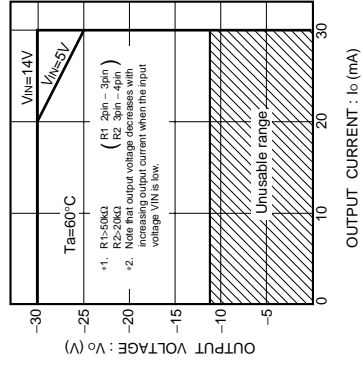


Fig.2 Derating curve

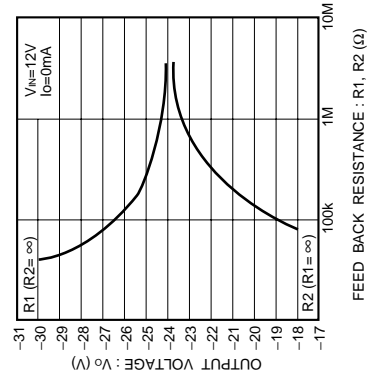


Fig.3 Output voltage vs. Feedback resistance (R1, R2)

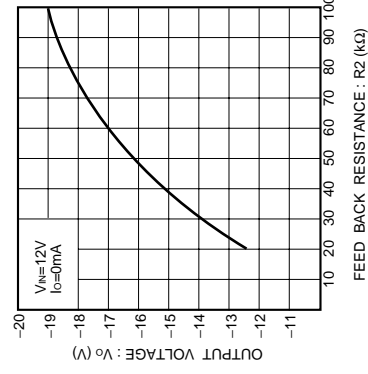
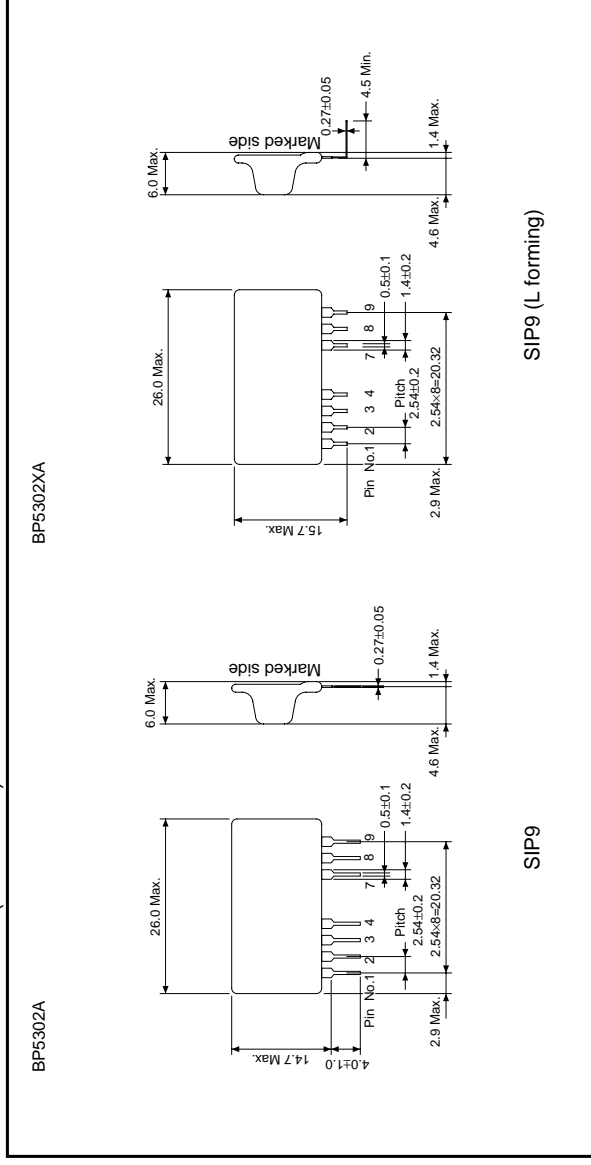


Fig.4 Output voltage vs. Feedback resistance ( $R_2 < 100k\Omega$ )

## External dimensions (Units : mm)



- [b] Installation of redundant circuits in the case of single circuit failure
- 2) The products are designed for use in a standard environment and not in any special environments. Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
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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
  - 3) The products are not radiation resistant.
  - 4) The Company is not responsible for any problems resulting from use of the products under conditions not recommended herein.
  - 5) The Company should be notified of any product safety issues. Moreover, product safety issues should be periodically monitored by the customer.

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