

DC / DC converter for LCDs

BP5302A / BP5302XA

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. ($-24 \pm 0.75\text{V}$)
- 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 _{IN}	15	V
Operating temperature range	T _{opr}	0~60	°C
Storage temperature range	T _{stg}	-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 _{IN}	5	—	14	V	
Output current	I _{OUT}	—	—	30	mA	
Output voltage	V _{OUT}	-23.25	-24.00	-24.75	V	V _{IN} =12V, I _{OUT} =20mA
Line regulation	DV1	—	—	0.75	V	V _{IN} =5~14V, I _{OUT} =20mA
Load regulation	DV2	—	—	0.5	V	V _{IN} =12V, I _{OUT} =0~20mA
Ripple nose voltage	n1	—	—	200	mV _{P-P}	V _{IN} =12V, I _{OUT} =20mA *
Efficiency	h	70	80	-	%	V _{IN} =12V, I _{OUT} =20mA
ON / OFF CTL votage when ON	V _{CTL}	1.5	—	6.0	V	V _{IN} =5~14V
ON / OFF CTL votage when OFF	V _{CTL}	—	—	0.5	V	V _{IN} =5~14V
		(Alternatively, when OPEN)				
ON / OFF CTL current	I _{CTL}	—	—	150	μA	V _{IN} =5~14V, V _{CTL} =5V
Current consumption when OFF	I _{OFF}	—	—	10	μA	V _{IN} =5~14V, V _{CTL} =0V
R1 resistance	R1	50	—	∞	kΩ	V _{IN} =5~14V, V _{CTL} =5V
R2 resistance	R2	20	—	∞	kΩ	V _{IN} =5~14V, V _{CTL} =5V

* Measured with a band width of 20MHz.

● Pin descriptions

Pin No.	Pin name	Function
1	C _o	Output smoothing capacitor connection pin; connect a low-impedance capacitor with a recommended capacitance of 47μF between this pin and GND
2	V _{OUT}	Output pin
3	V _{ref}	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 _{CTL}	Output ON / OFF control pin; output starts when the pin is HIGH level, and stops when the pin is LOW or OPEN
9	V _{IN}	Input pin; connect a low-impedance capacitor with a recommended capacitance of 100μF between this pin and GND

● Measurement circuit and Application example

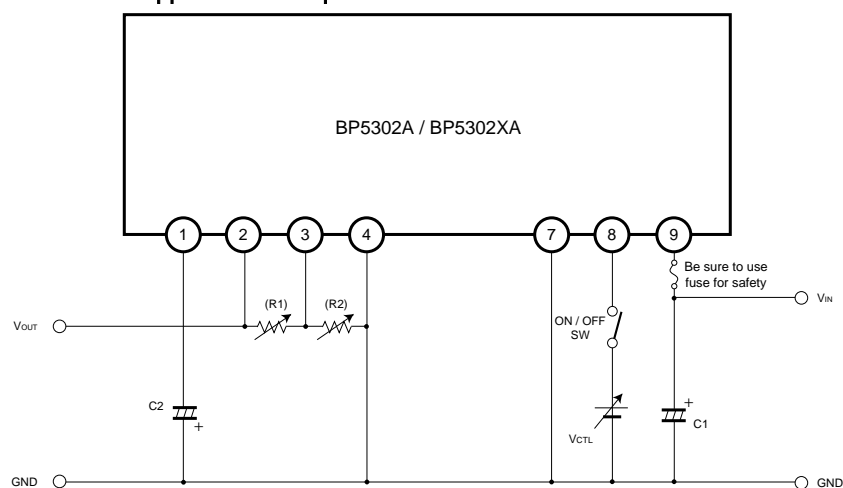


Fig.1

C1 : 100μF / 16V (Low impedance)
 C2 : 47μF / 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 35μF 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.

● Electrical characteristic curves

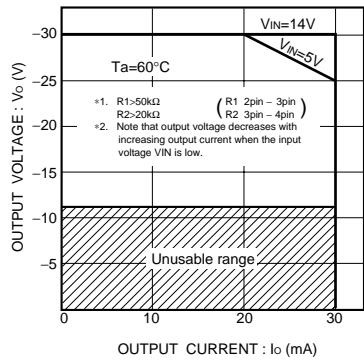


Fig.2 Derating curve

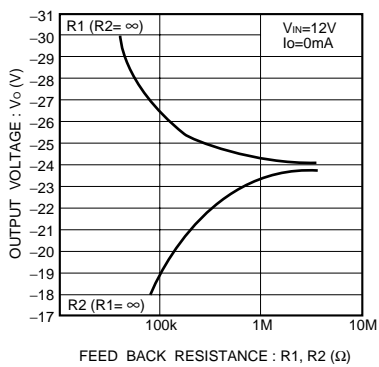


Fig.3 Output voltage vs. Feedback resistance (R1, R2)

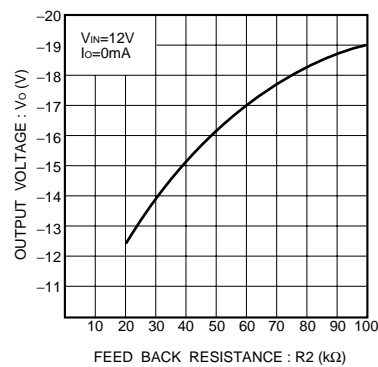
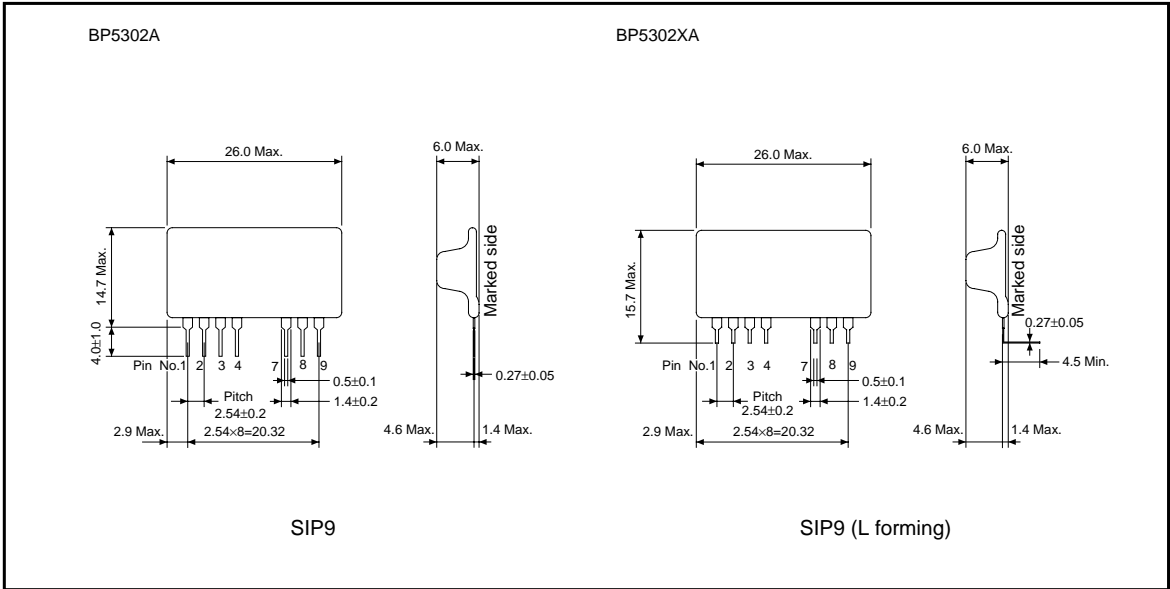


Fig.4 Output voltage vs. Feedback resistance (R2<100kΩ)

● External dimensions (Units : mm)



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