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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±0.75V)
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_{IN}	15	V
Operating temperature range	Topr	0~60	°C
Storage temperature range	Tstg	−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	Vref	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

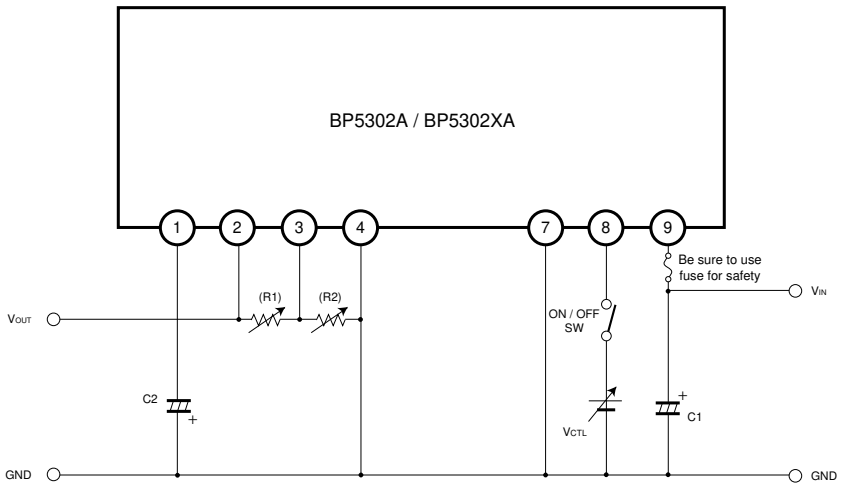


Fig.1

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

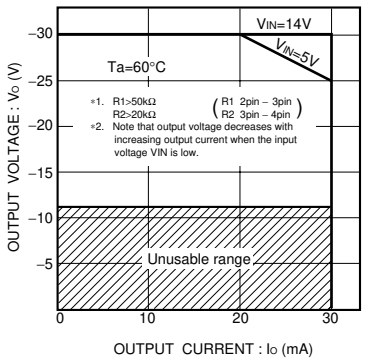


Fig.2 Derating curve

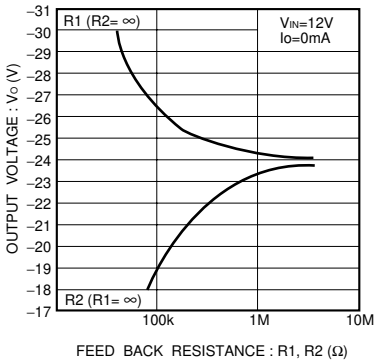


Fig.3 Output voltage vs. Feedback resistance (R1, R2)

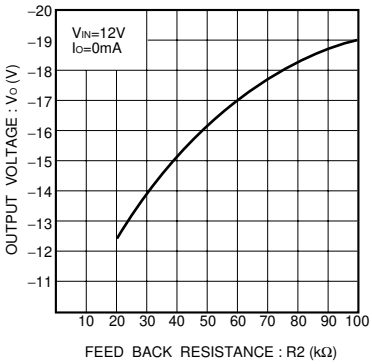
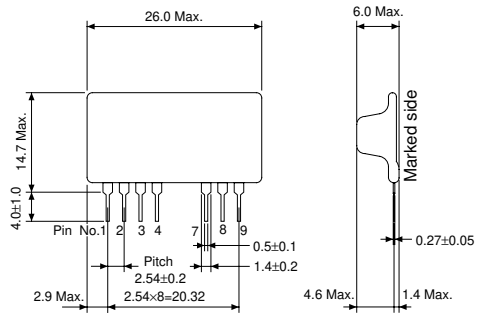


Fig.4 Output voltage vs. Feedback resistance (R2<100kΩ)

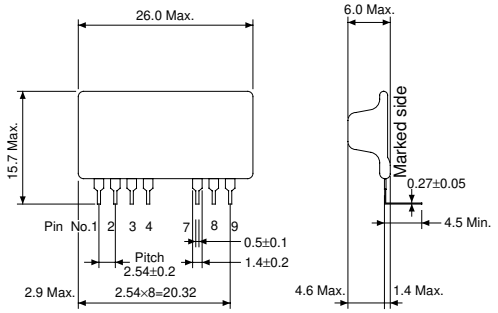
● External dimensions (Units : mm)

BP5302A



SIP9

BP5302XA



SIP9 (L forming)

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1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment etc.).
   If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the Company's sales staff in advance. If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:
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   [b] Installation of redundant circuits in the case of single-circuit failure
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   [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 othe 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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