Power supply unit for LCDs

BP5302 / BP5302F

The BP5302 and BP5302F are DC / DC converter units for supplying power to liquid crystal display (LCD) panels. The ICs supply a negative voltage from a positive power supply. They are available in a single in-line package as an upright (BP5302) or L-shaped lead (BP5302F) type.

●Applications

LCD panels in personal computers, word processors, copiers and facsimiles

●Features

1) Wide input voltage range. (+5 to + 14V)
2) Accurate output voltage. (−24 ± 0.75V)
3) High conversion efficiency. (typically 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

Parameter	Symbol	Limits	Unit
Input voltage	V_{IN}	15	V
Operating temperature	Topr	0～+60	℃
Storage temperature	Tstg	−30～+85	℃

●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	ΔV1	—	—	0.75	V	V_{IN}=5～14V, I_{OUT}=20mA
Load regulation	ΔV2	—	—	0.5	V	V_{IN}=12V, I_{OUT}=0～20mA
Ripple noise voltage	υ 1	—	—	200	mV_{P-P}	V_{IN}=12V, I_{OUT}=20mA *
Efficiency	η	70	80	—	%	V_{IN}=12V, I_{OUT}=20mA
ON/OFF CTL voltage when ON	V_{CTL}	1.5	—	6.0	V	V_{IN}=5～14V
ON/OFF CTL voltage when OFF	V_{CTL}	—	—	0.5	V	V_{IN}=5～14V
		(Alternatively, when OPEN)				
ON/OFF CTL 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 20 MHz.

●Pin descriptions

Pin No.	Pin name	Functions
1	Co	Output smoothing capacitor connection; connect a low-impedance capacitor with a recommended capacitance of 47 μF between this pin and GND
2	V_{OUT}	Output
3	Vref	Output voltage pin for contrast adjustment; output voltage is adjusted by connecting a resistor between pins 2 and 3 or pins 3 and 4
4, 7	GND	Ground
8	V_{CTL}	Output ON/OFF control; output starts when the pin is HIGH level, and stops when the pin is LOW or OPEN
9	V_{IN}	Input; connect a low-impedance capacitor with a recommended capacitance of 100 μF between this pin and GND

●Measurement circuit and application example

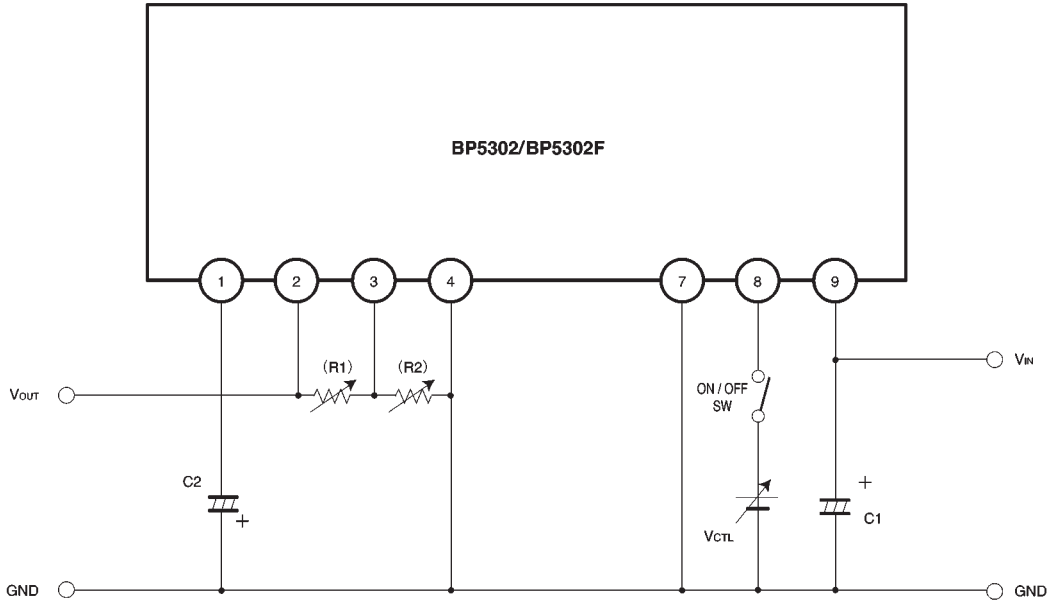


Fig. 1

C1: 100 μF / 16V (NICHICON PL-series or equivalent)
C2: 47 μF / 35V (NICHICON PL-series or equivalent)
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 valve: A length less than 50mm is recommended for a copper foil of 1.0mm wide and 35μm 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

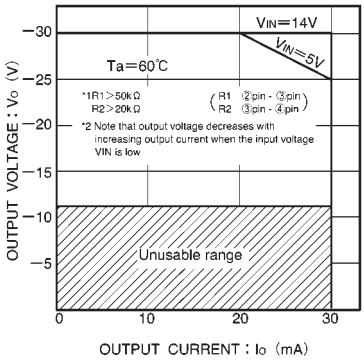


Fig. 2 Derating curve

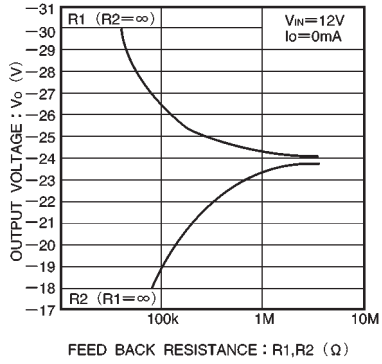


Fig. 3 Output voltage vs. feedback resistance (R1, R2)

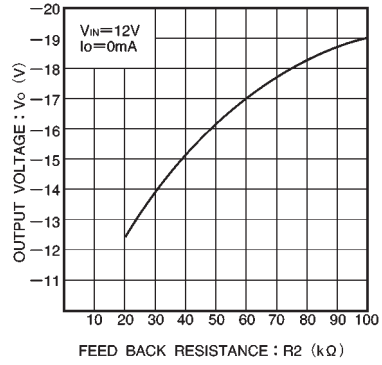
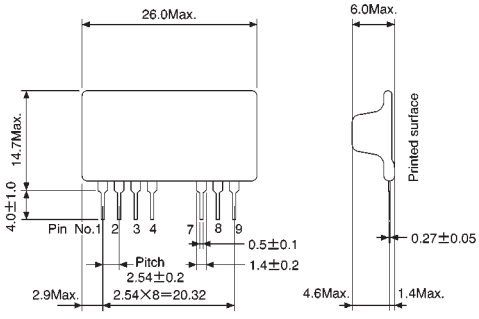


Fig. 4 Output voltage feedback resistance (R2 < 100 kΩ)

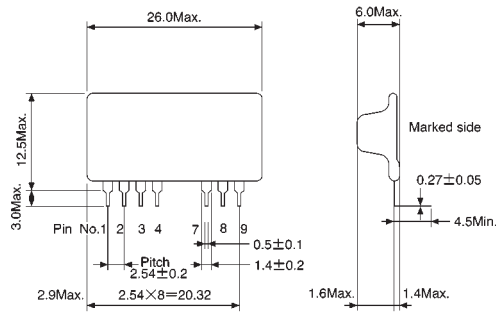
●External dimensions (Units: mm)

BP5302



ZIP16

BP5302F



SOP16