

DC/DC converter for LCDs

BP5319 / BP5319X

The BP5319, BP5319X is a DC/DC converter designed for driving liquid crystal displays(LCDs).
If this module is used, a negative power supply for LCD can be made of the power supply easily 5V.

●Applications

A power supply for the LCD panels in copiers, facsimile, personal computers, word processors, musical instrument, and units.

●Features

- 1) High accurate output voltage ($-24V \pm 0.75V$).
- 2) High conversion efficiency (75%Typ).
- 3) An output voltage can be changed by the external resistor.
- 4) Built-in protect 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}	7	V
Output current	I _o	30	mA
ON/OFF control voltage	V _{CTL}	7	V
Operating temperature	T _{opr}	-10~+60	°C
Storage temperature	T _{stg}	-30~+85	°C

Power Module

●Electrical characteristics (Unless otherwise noted, Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V _{IN}	4.5	-	5.5	V	
Output current	I _{OUT}	-	-	30	mA	
Output voltage	V _{OUT}	-24.75	-24.00	-23.25	V	V _{IN} =5V, I _{OUT} =25mA
Line regulation	ΔV1	-	-	0.24	V	V _{IN} =4.5~5.5V, I _{OUT} =25mA
Load regulation	ΔV2	-	-	0.24	V	V _{IN} =5V, I _{OUT} =0~25mA
Output voltage temperature Coefficient	ΔVt	-	-10	-	mV/°C	V _{IN} =5V, I _{OUT} =25mA ²
Ripple noise voltage	v1	-	-	150	mV _{P-P}	V _{IN} =5V, I _{OUT} =25mA ¹
Conversion efficiency	η	70	75	-	%	V _{IN} =5V, I _{OUT} =25mA
ON/OFF CTL voltage when OFF	V _{CTL}	2.0	-	-	V	V _{IN} =5V
ON/OFF CTL voltage when ON	V _{CTL}	-	-	0.5	V	V _{IN} =5V (Alternatively, when Open)
ON/OFF CTL input current	I _{CTL}	-	100	150	μA	V _{IN} =4.5~5.5V, V _{CTL} =5V ²
Current consumption when OFF	I _{OFF}	-	-	0.5	mA	V _{IN} =4.5~5.5V, V _{CTL} =5V ²
R1 resistance	R1	50	-	∞	kΩ	V _{IN} =4.5~5.5V, V _{CTL} =5V ²
R2 resistance	R2	50	-	∞	kΩ	V _{IN} =4.5~5.5V, V _{CTL} =5V ²

*1 Measured with a bandwidth of 20MHz.

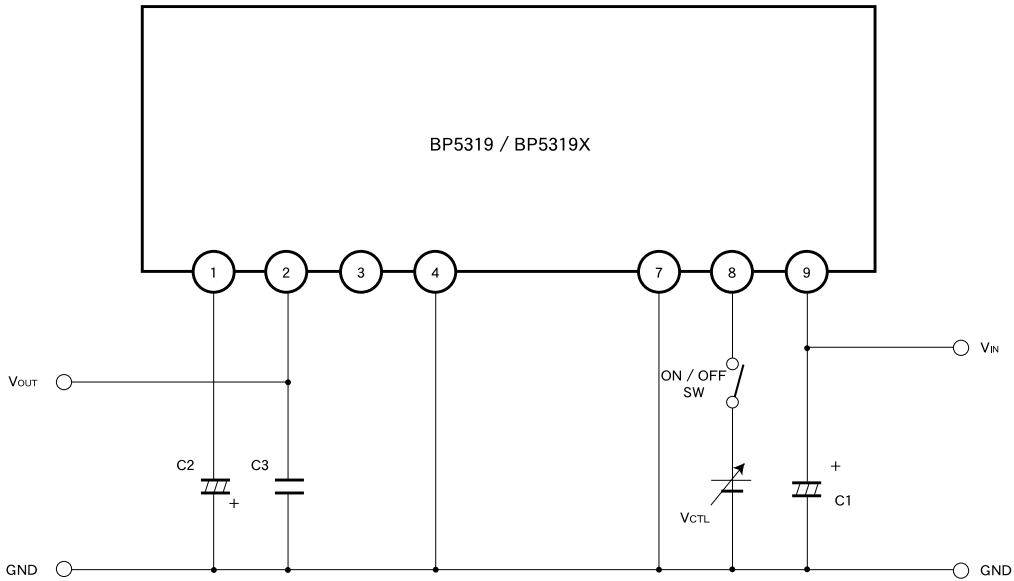
*2 Ta = -10~60°C

●Pin descriptions

Pin No.	Pin name	Function
1	Co	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. pins 4 and 7 is internal connection.
8	V _{CTL}	Output ON/OFF control pin; output starts when the pin is LOW level or OPEN, and stops when the pin HIGH level.
9	V _{IN}	Input pin; connect a low-impedance capacitor with a recommended capacitance of 100μF between this pin and GND.

Power Module

● Measurement circuit



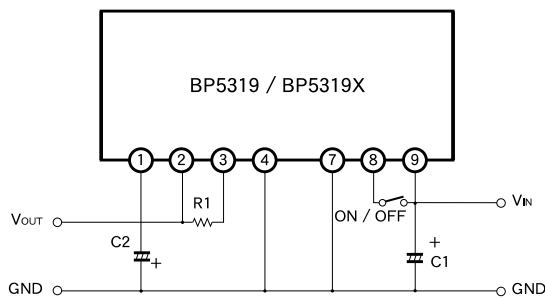
- C1 : 100 μ F / 16V (NICHICON PL-series or equivalent)
- C2 : 47 μ F / 35V (NICHICON PL-series or equivalent)
- C3 : 0.022 μ F / 50V (Ceramic capacitor)

● Operation notes

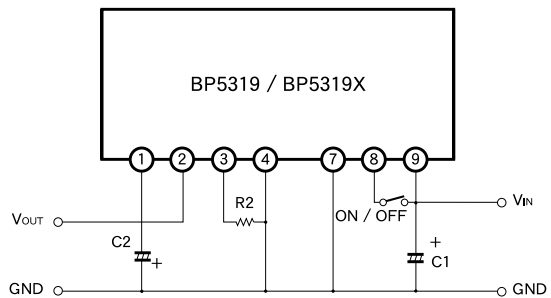
- (1) Place I/O external capacitors as near as possible to the connection pins. In particular, make sure to minimize the impedance between the input-side capacitor(C1)and pin 9
(Reference value: A length less than 50mm for a copper foil of 1.0mm wide and 35 μ m thickness).
- (2) Avoid frequent switching using the ON/OFF CTL pin (four times per second at the maximum).

● Application example

- (1) When increasing the output voltage
(A minus side).



- (2) When reducing the output voltage
(It is drawn to the zero electric potential wear).



Note) Set up the change of the output voltage in the range of the territory(Fig.2) which can be used.

Power Module

● Electrical characteristic curves

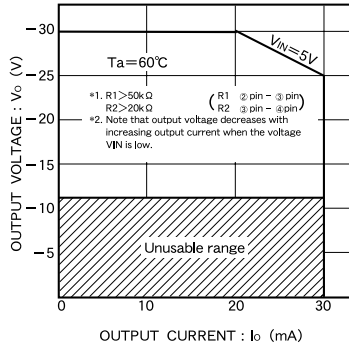


Fig.2 Use possibility range

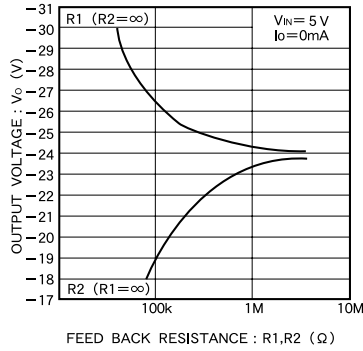


Fig.3 Output voltage vs. Feedback resistance (R1, R2)

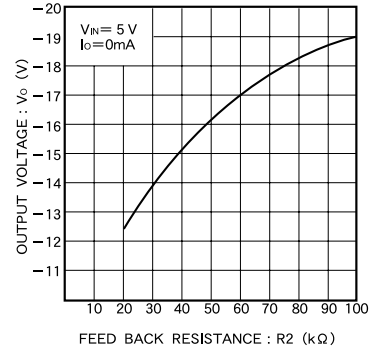


Fig.4 Output voltage vs. Feedback resistance (R2 < 100kΩ)

● External dimensions (Units: mm)

