
AP3428 EV Board User Guide

1. AP3428 General Description

The AP3428 is a 1A step-down DC-DC converter. At heavy load, the constant-frequency PWM control performs excellent stability and transient response. No external compensation components are required.

The AP3428 supports a range of input voltages from 2.5V to 5.5V, allowing the use of a single Li+/Li-polymer cell, multiple Alkaline/NiMH cell, and other standard power sources. The output voltage is adjustable from 0.6V to the input voltage. The AP3428 employs internal power switch and synchronous rectifier to minimize external part count and realize high efficiency. During shutdown, the input is disconnected from the output and the shutdown current is less than 1 μ A. Other key features include over-temperature and short circuit protection, and under-voltage lockout to prevent deep battery discharge.

The AP3428 delivers 1A maximum output current while consuming only 40 μ A of no-load quiescent current. Ultra-low RDS(ON) integrated MOSFETs and 100% duty cycle operation make the AP3401 an ideal choice for high output voltage, high current applications which require a low dropout threshold.

The AP3428 is available in U-DFN2020-6 packages.

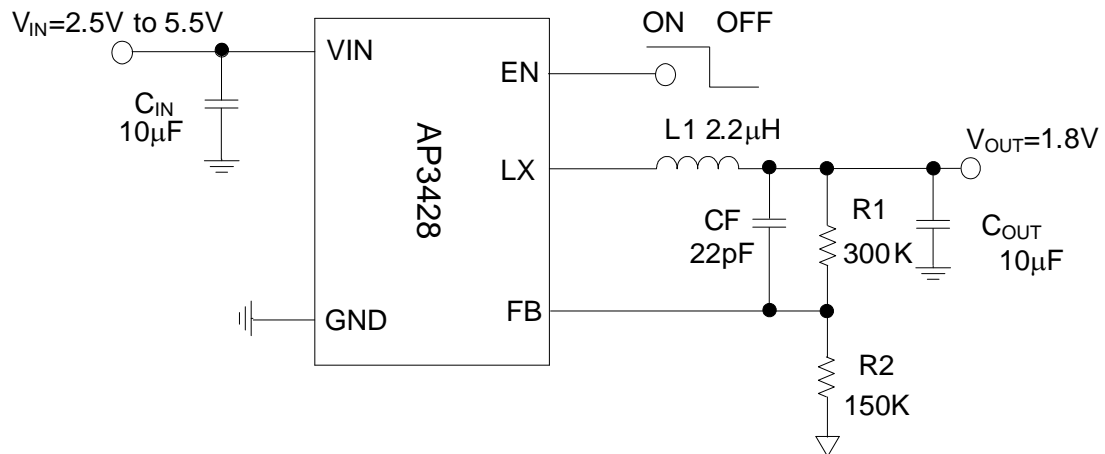
2. Key Features

- Output Current: Up to 1A
- Output Voltage: 0.6V to V_{in}
- Input Voltage: 2.5V to 5.5V
- 0.6V Reference Voltage With $\pm 2\%$ Precision
- 40 μ A (Typ) No Load Quiescent Current
- Shutdown Current: $< 1 \mu$ A
- 100% Duty Cycle Operation
- 1.5MHz Switching Frequency
- Internal Soft Start
- No external Compensation Required
- Current Limit Protection
- Thermal Shutdown
- U-DFN2020-6 Packages

This application note contains new product information. Diodes, Inc. reserves the right to modify the product specification without notice.

No liability is assumed as a result of the use of this product. No rights under any patent accompany the sale of the product.

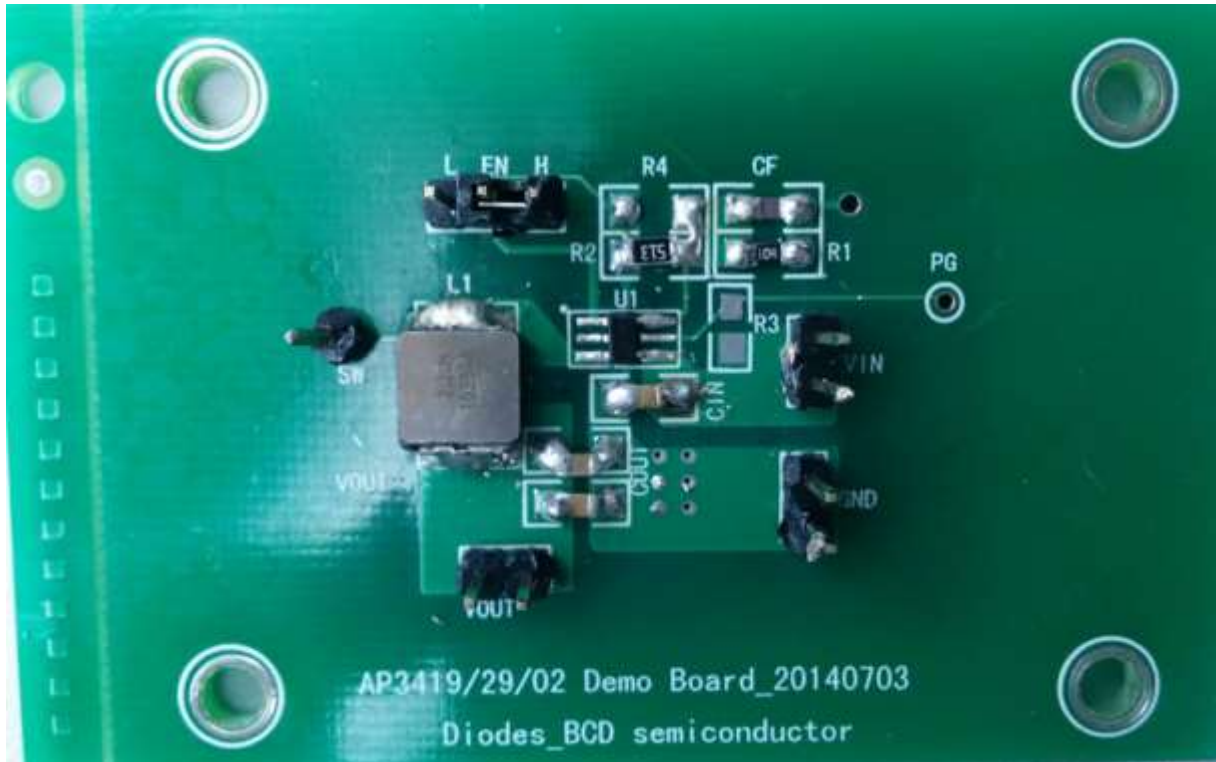
3. EV Board Schematic



4. EVB AP3428 Description

AP3428 EVB is suitable evaluation board for the AP3428, a DC/DC converter. The board is targeted to be used in providing a simple and convenient evaluation environment for the AP3428. Requires parts, power supply connectors etc. on the board, which makes it easy to be evaluated.

5. EV Board View



6. Resistor select for output voltage setting

$$V_{out} = (1 + R1/R2) \times V_{ref} \quad (V_{ref} = 0.6V)$$

V _o	R1	R2	CF	L1
3.3V	450k	100k	22pF	2.2uH
1.8V	300k	150k	22pF	2.2uH
1.0V	91k	120k	22pF	2.2uH

This application note contains new product information. Diodes, Inc. reserves the right to modify the product specification without notice.

No liability is assumed as a result of the use of this product. No rights under any patent accompany the sale of the product.

7. External Components Selection

Input & output Capacitors (C_{in} , C_{out})

- (1) For lower output ripple, low ESR is required.
- (2) Low leakage current needed, X5R/X7R ceramic recommend, multiple capacitor parallel connection.
- (3) The C_{in} and C_{out} capacitances are greater than 4.7 μ F and 10 μ F respective.

Output Voltage programmer resistors (R_1 , $R_{2/4}$)

- (1) For programmer output voltage
- (2) For accurate output voltage, 1% tolerance is required.

Inductor (L_1)

- (1) Low DCR for good efficiency
- (2) Inductance saturate current must higher than the output current
- (3) The recommend inductance is 2.2 μ H

8. Evaluation board BOM list for AP3428:

Item	Value	Type	Rating	Description	Description
CIN	10 μ F	X5R/X7R, Ceramic/0805	10V	Input coupling CAP	TAIYO YUDEN EMK212ABJ106KD-T
COUT	10 μ F	X5R/X7R, Ceramic/0805	10V	Output coupling CAP	TAIYO YUDEN EMK212ABJ106KD-T
L1	2.2 μ H		>3A	Inductor	CDMC6D28NP-2R2M
R1	300K	0805	1%	Voltage set RES*	
R2	150K	0805	1%		
R3	Floating				Parallel Res of R2
CF	22pF	0805		Feedforward CAP	
IC		AP3428		UDFN2020	

*Note: The present value of R1/R2 are based on $V_{out}=1.8V$

