
AP63205 EVB User Guide

AE Department

1. General Description

The AP63205 is a 2A, synchronous buck converter with up to 32V wide input voltage range, which fully integrates a 140mΩ high-side MOSFET and a 70mΩ low-side MOSFET to provide high efficiency step-down DC/DC conversion. The AP63205 adopts peak current mode control with the integrated compensation network, which makes AP63205 easily to be used by minimizing the off-chip component count. The AP63205 supports the Pulse Skipping Modulation (PSM) with typical 22uA Ultra-low Quiescent and achieved high efficient performance at light load conditions.

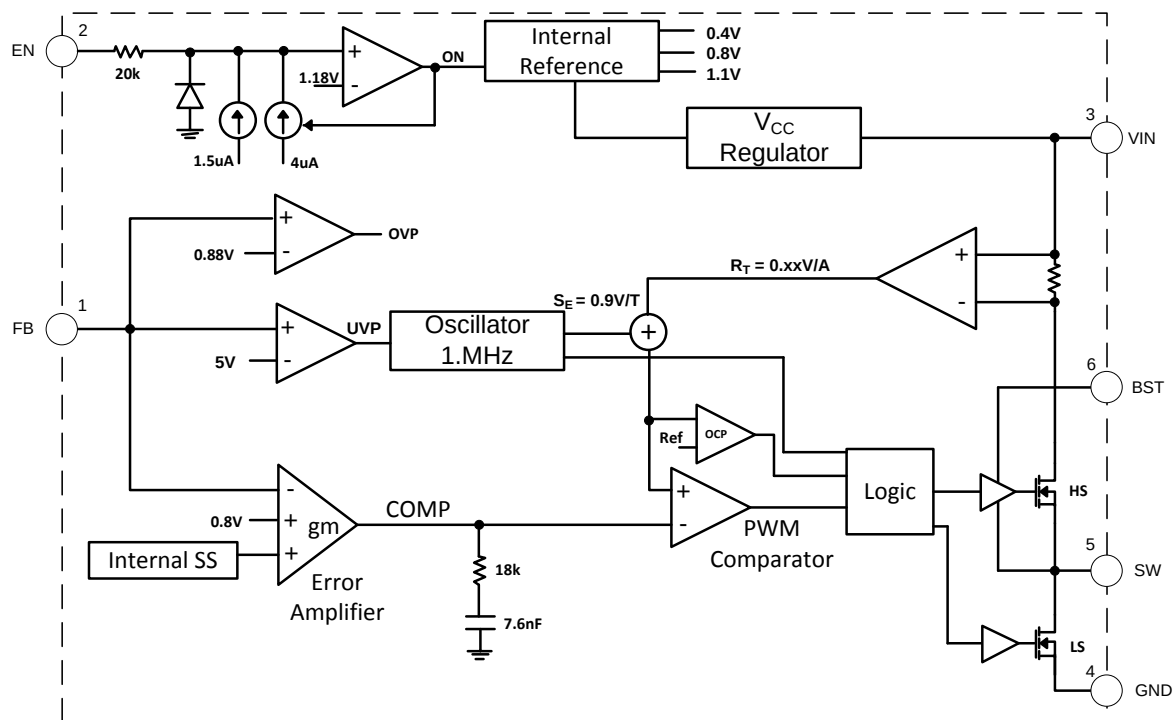
The AP63205 is fixed output buck converters with optimized design for Electromagnetic Interference (EMI) reduction. The AP63205 features Frequency Spread Spectrum (FSS) with $\pm 6\%$ jittering span of the 1.1MHz switching frequency and modulation rate 1/512 of switching frequency to reduce the conducted EMI. The converter has proprietary designed gate driver scheme to resist switching node ringing without sacrificing MOSFET turn on and turn off time, which further erases high frequency radiation EMI noise caused by the MOSFETs hard switching.

The AP63205 offers output overvoltage protection, cycle-by-cycle peak current limit, and thermal shutdown protection. The device is available in a low-profile TSOT23-6 package.

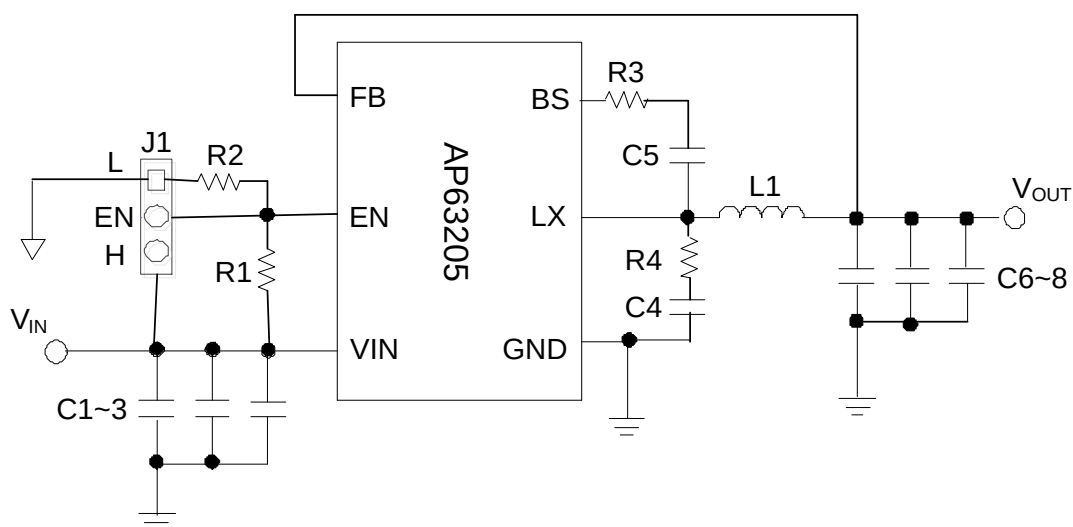
2. Key Features

- EMI Reduction with Switching Node Ringing-free
- 3.8V-32V Wide Input Voltage Range
- Up to 2A Continuous Output Load Current
- Shutdown Current: $<1\mu\text{A}$
- 1.1MHz Switching Frequency with 6% Frequency Spread Spectrum (FSS)
- Precision Enable Threshold for Programmable UVLO Threshold and Hysteresis
- Low Dropout Mode Operation
- No External Compensation Required
- Current Limit Protection
- Short Circuit Protection
- Over Output Voltage Protection
- Thermal Shutdown

3. Function Block



4. AP63205 EV Board Schematic



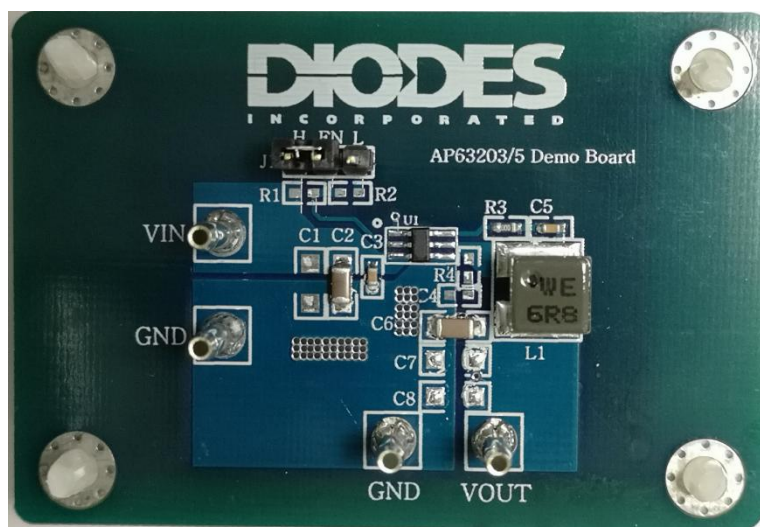
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5. AP63205 EV Board Description

The EV board is suitable evaluation board for the AP63205, a DC/DC converter. The board is targeted to be used in providing a simple and convenient evaluation environment for the AP63205. Requires parts, power supply connectors etc. on the board, which makes it easy to be evaluated.

6. AP63205 EV Board View



7. Setting the Output Voltage of AP63205

(1) Setting the output voltage

The AP63205 is fixed output buck converters; the output voltage is 5V. connect VFB pin to output directly as schematic shown.

8. External Components Selection

1) 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 10 μ F and 44 μ F respective. 66 μ F output

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capacitance is recommended.

2) Bootstrap Voltage Regulator

(1) An external 0.1uF ceramic capacitor is required as bootstrap capacitor between BST and SW pin to work as high side power MOSFET gate driver.

3) Inductor (L)

- (1) Low DCR for good efficiency
- (2) Inductance saturate current must higher than the output current
- (3) The recommended inductance is 4.7uH

9. EV Board BOM List for AP63205

Item	Value	Type	Rating	Description	Description
C2	10uF	X5R/X7R, Ceramic/1206	35V	Input CAP	
C3	0.1uF	X5R/X7R, Ceramic/0603	50V	Input CAP	Würth PART 885 012 206 095
C4	100pF	0603	100V	Feedback CAP	Würth PART 885 012 206 102
C5	0.1uF	X5R/X7R, Ceramic/0603	50V	Bootstrap CAP	Würth PART 885 012 206 095
C6 & C7	22uF	X5R/X7R, Ceramic/1206	25V	Output CAP	
L1	6.8uH	6060	5.0A	Inductor	Würth PART 744 393 460 68
R3	0	0603	1%	Bootstrap RES	
U1		AP63205		TSOT23-6	Diodes BCD

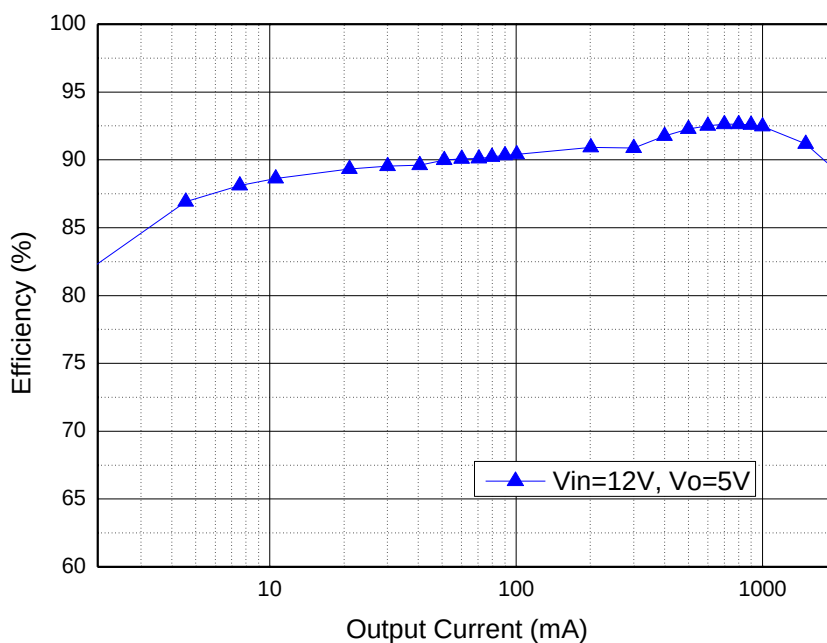
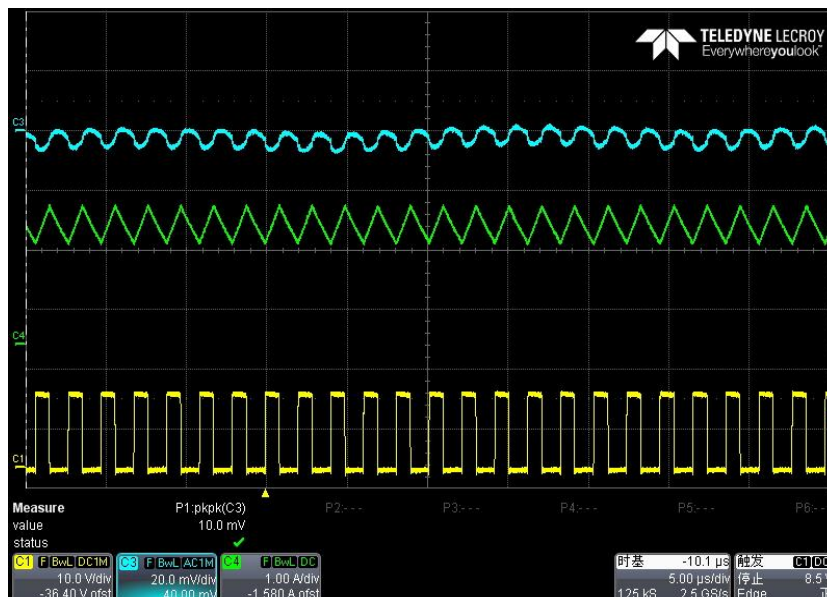
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10. Test Waveforms and Efficiency

Test condition: $V_{in}=12V$ $V_o=5.0V$ $I_o=2.0A$

(Blue: V_{out-AC} ; Yellow: V_{sw} ; Green: I_L)



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