Evaluation Board DB_ SA23002ATWD

High-Efficiency 5.5V Input, 2A Single Synchronous Buck Converter

Introduction

The SA23002ATWD high-efficiency synchronous Buck converter can deliver 2A output current over an input voltage range from 2.8V to 5.5V. It uses built-in power MOSFETs to supply a resistor-configurable output voltage between 0.6V and V_{IN}. The fixed 2.35MHz switching frequency allows for small external inductor and capacitor values.

Design Specifications

Input Voltage (V)	Output Current (A)	Output Voltage (V)
2.8-5.5	0-2A	0.6-Vin

Schematic

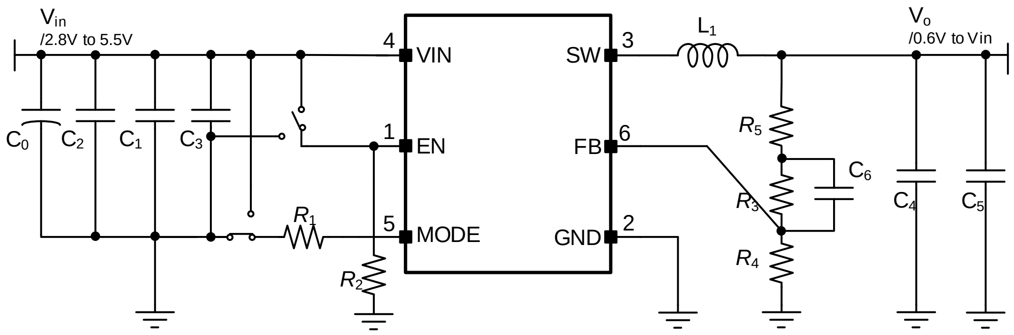


Figure 1. Schematic Diagram

Recommended Table

Table 1. Recommended Component Selection

V_{OUT}	C_{OUT}	R_3	R_4	C_6	Exact Output Voltage
0.6V	22μF*2	0	NC	NC	0.6V
0.85V	22μF	49.9kΩ	120kΩ	47pF	0.85V
1.2V	22μF	100kΩ	100kΩ	22pF	1.2V
1.8V	22μF	200kΩ	100kΩ	22pF	1.8V
3.3V	22μF	270kΩ	60.4kΩ	47pF	3.282V

Quick Start Guide (Refer to Figure 2)

1. Connect the output load to V_{OUT} and GND output connectors. Preset the load current to between 0A and 2A.
2. Preset the input supply to a voltage between 2.8V and 5.5V. Turn the supply off. Connect the input supply to V_{IN} and GND input connectors.
3. Turn on the input supply and measure the output voltage.

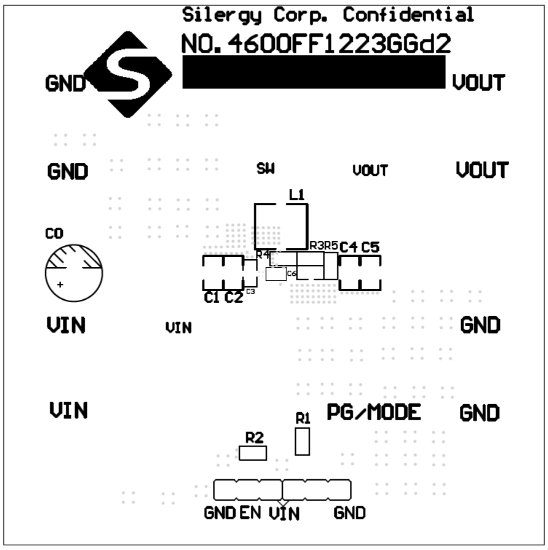
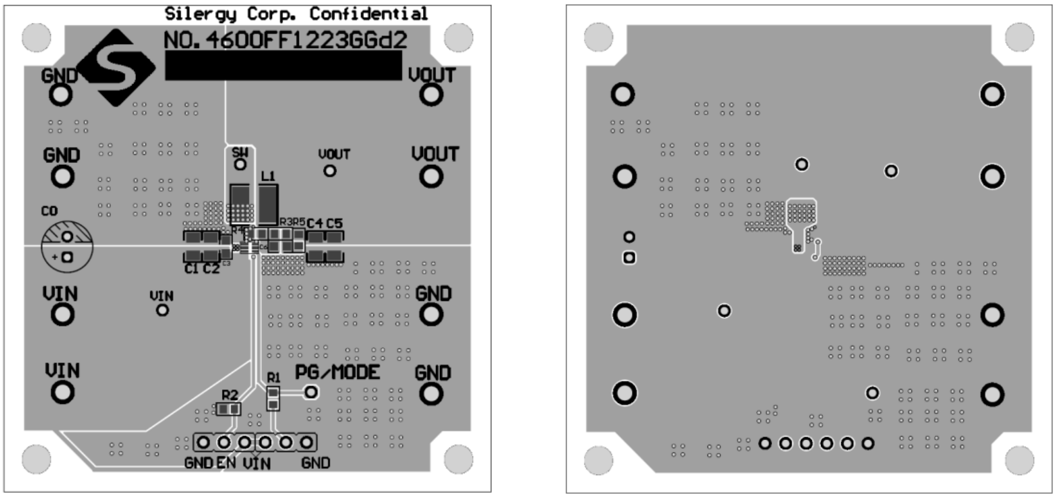


Figure 2. Top Silkscreen

PCB Layout



(a) (b)

Figure 3. PCB Layout Plots:

(a) Top Layer, (b) Bottom Layer

BOM List

Symbol	Parameter	Part Number	Manufacturer
C_0, C_1, C_2, C_5	NC		
C_3	X7T 10μF 6.3V 0603	GCM188D70J106ME36D	muRata
C_4	X7T 22μF 6.3V 0603	GRM188D70J226ME01	muRata
L_1	0.47μH	DFE252012PD-R47M=P2	muRata
R_1	100kΩ 0603		
R_2	NC		
R_5	0Ω		

Output Voltage Ripple Test

A proper output ripple measurement should be done according to Figure 4 setup. Output voltage ripple should be measured across the output ceramic cap near the IC.

1. Remove the ground clip and head of the probe. Wind thin wires around the ground ring of the probe. Solder the end of the ground ring wire to the negative node of the C_{OUT}. Touch the probe tip to the positive node of the C_{OUT}. Refer to Figure 4.
2. Minimize the loop formed by C_{OUT} terminals, probe tip and ground ring.
3. Change the probing direction to decouple the electromagnetic noise generated from the nearby Buck inductor (Refer to Figure 4).

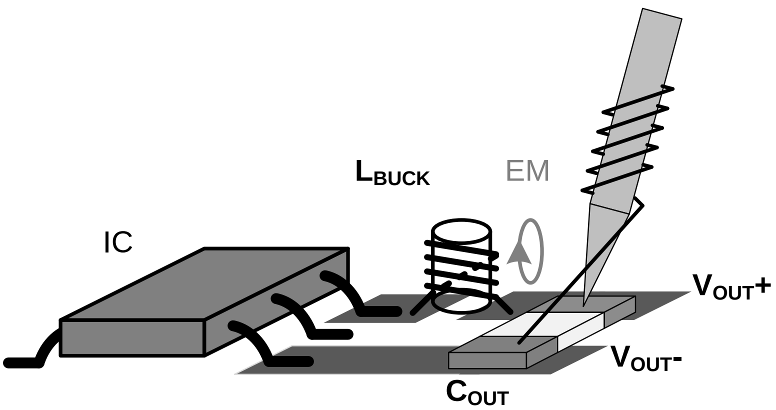


Figure 4. Recommended Way to Measure the Output Voltage Ripple