ACT4088EVK1 User's Guide

Description

This document describes the characteristic and operation of the Active Semi ACT4088EVK1evaluation kit (EVK). It provides setup and operation instructions, schematic, layout, BOM, and test data. This EVK demonstrates the ACT4088US-T. Other ACT4088US-Txxx options can be evaluated on this EVK by replacing the IC and any other necessary components.

Features

The EVK is a standard DC/DC solution. The EVK contains the high efficiency step-down DC/DC converter that operates in CV(Constant Output Voltage) mode. The EVK provides up to 1.5A output current at 1.5MHz switching frequency. It operates from Vin=4.5V to 28V and utilizes current-mode operation to provide excellent line and load transient response. Gerber files are available to minimize time-to-market for applications that want to use the EVK as an end product.

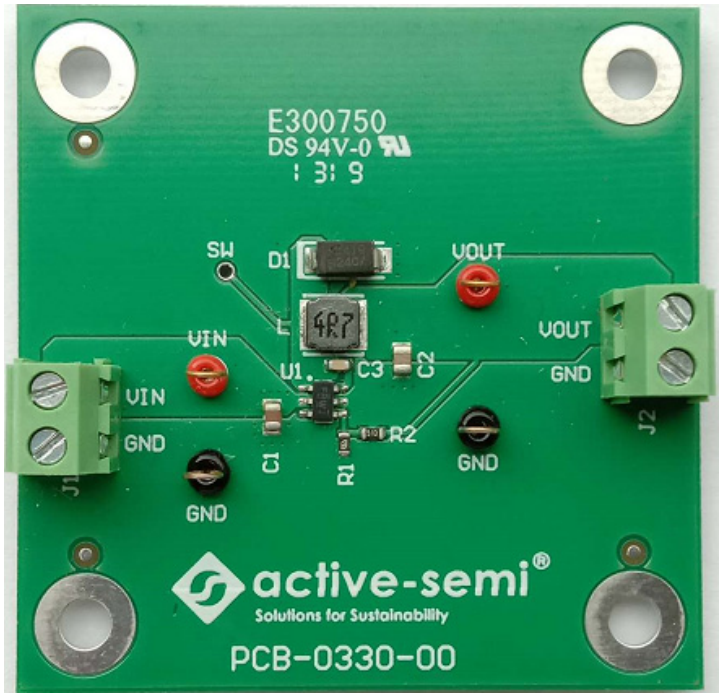


Figure 1 – EVK Picture

Setup

Required Equipment

ACT4088EVK1

Power supply – 5V @2 A for full power operation

Oscilloscope – >100MHz, >2 channels

Loads –Electronic/resistive load with 3 A minimum current capability.

Digital Multi-meters (DMM)

Windows compatible computer with spare USB port.

EVK Setup

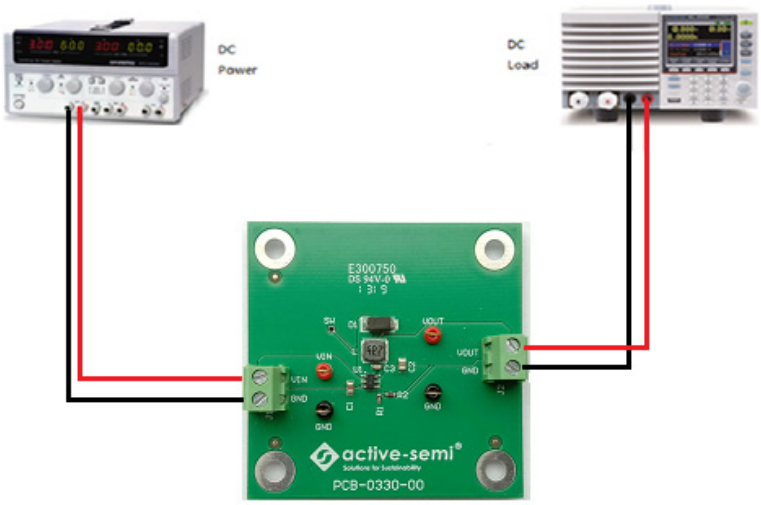


Figure 2 – EVK Setup

Hardware Setup

1. Connect a DC power supply across VIN and GND on the EVK.
2. Connect the load across VOUT and GND on the EVK.
3. Recommended Operating Conditions

Table 1. Recommended Operating Conditions

Parameter	Description	Min	Typ	Max	Unit
VIN		4.5		28	V
Current Limit I_{LTM}	V_{IN} = 12V, V_{OUT} = 5V		1.8		A

EVK Operation

Turn on

Apply 12V to VIN. The output automatically turns on and provides a 5V output voltage.

PCB Layout

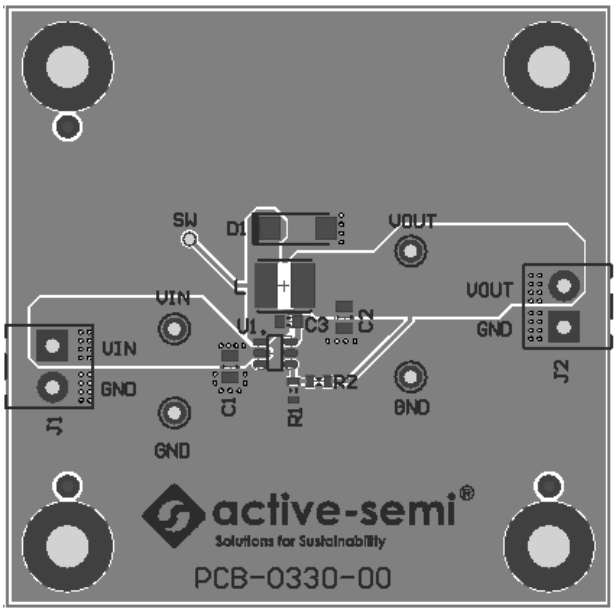


Figure 3 – Top Layer

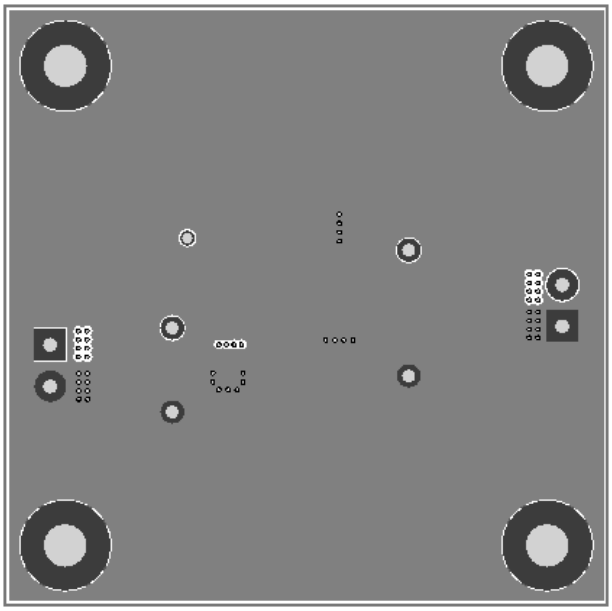


Figure 4 – Bottom Layer

Test Results

Output Regulation

VIN(V)	Output Voltage at Max load(V)	Output Voltage at No load(V)	Load regulation (%)	Iload(max)
12V	5.012	5.007	0.1	1.5A
18V	5.013	5.009	0.08	
24V	5.015	5.01	0.1	

Efficiency (Ta=25C)

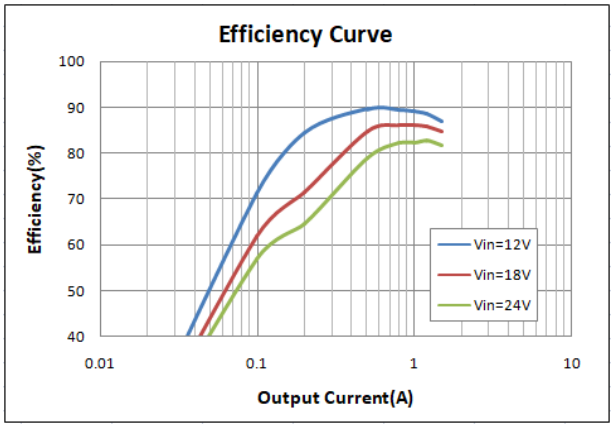


Figure 5 – Efficiency Curve

Power Loss

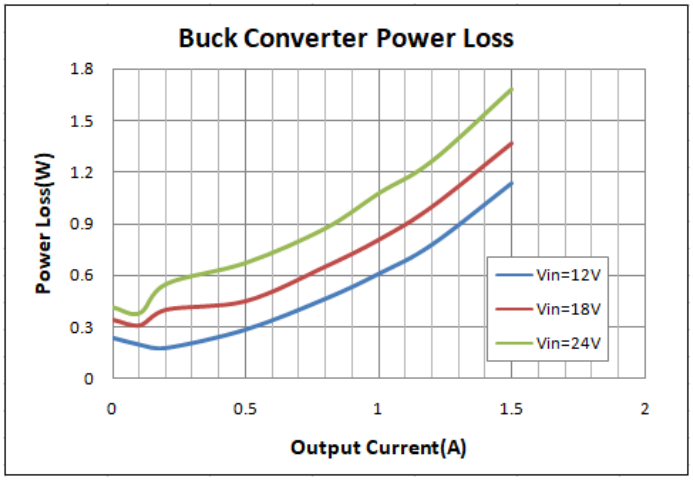
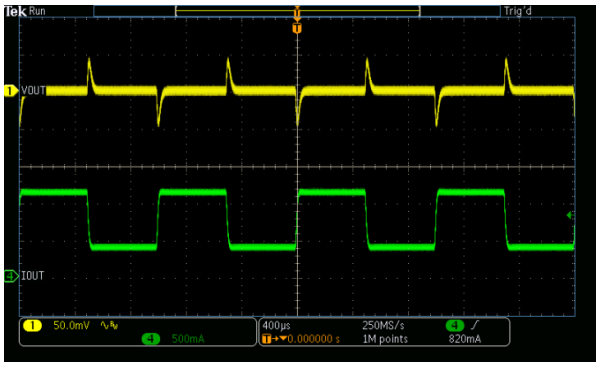


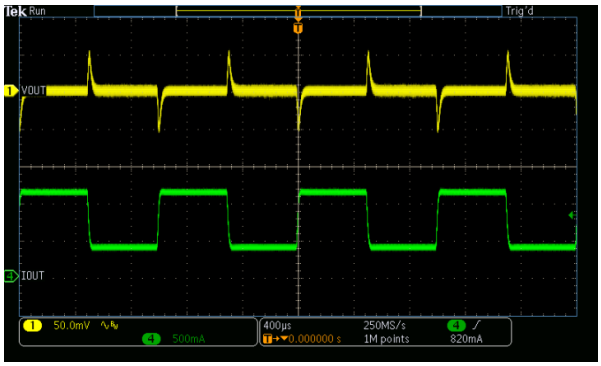
Figure 6 – Power Loss Curve

Load Dynamic Response

Vin=12V load step 0.375A-1.125A -0.375A

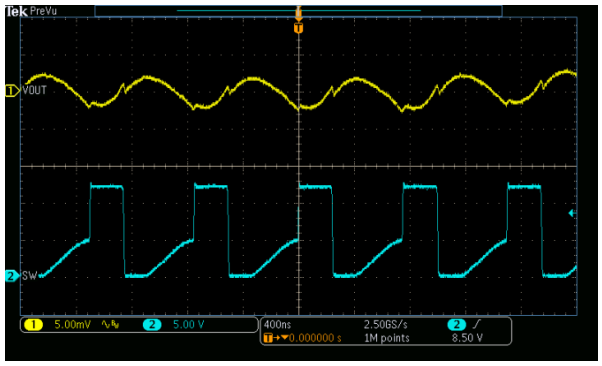


Vin=20V load step 0.375A-1.125A -0.375A

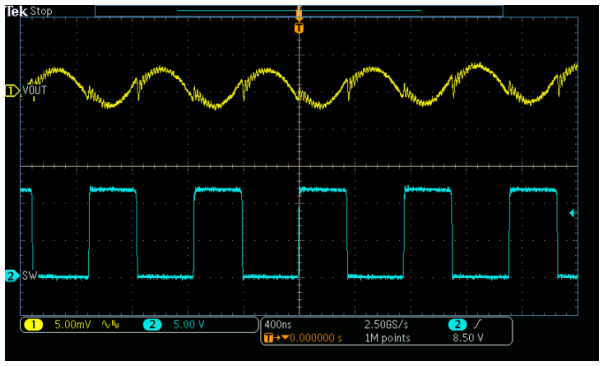


Vout Ripple and SW(Vin=12V)

No load



Iout =1A



Schematic

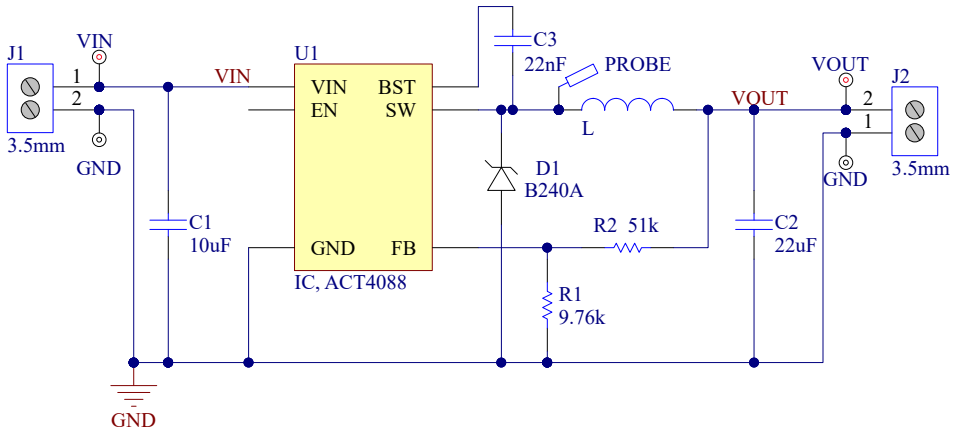


Figure 7 – ACT4088EVK1 Schematic

Bill of Materials

BOM LIST

Item	Designator	Footprint	Package	QYT	MFR	Part Number
1	C1	Capacitor, Ceramic, 10uF/35V, 20%, X5R	0805	1	Murata/TDK	std
2	C2	Capacitor, Ceramic, 22uF/10V, 20%, X5R	0805	1	Murata/TDK	std
3	C3	Capacitor, Ceramic, 22nF/25V, 20%, X5R	0603	1	Murata/TDK	std
4	D1	Diode, Zener, B240A	SMA	1	Diodes	std
5	J1, J2	Terminal Block, 2 Pins, 3. 5mm		2	Wurth Elektronik	691214110002
6	L	Inductor, 4.7uH, 2.2A	4020	1	Wurth Elektronik	74404042047
7	R1	Resistor, 9.76k, 5%	0603	1	Murata/TDK	std
8	R2	Resistor, 51k, 5%	0603	1	Murata/TDK	std
9	TP1, TP3	Test Point, Red	0.063"	2	Wurth Elektronik	5000
10	TP2, TP4	Test Point, Black	0.063"	2	Wurth Elektronik	5001
11	U1	IC, ACT4088	SOT23-6	1	Active-semi	ACT4088US-T