

SCG10ECX Evaluation Kit - 36-60 V Input, 9-15 V, 4 A Output, 60W

Features

- Peak efficiency: 94.3%
- Full load efficiency: 90.3 %
- 7.5 x 9 mm (0.295 x 0.354 inches)
- Low profile converter: 1.25 mm (2.85 mm inc. PCB)
- Power density: 5100 W/in³ (power converter)
- Fixed voltage conversion ratio from input to output voltage: 1/4 or 1/3
- Selectable switch conductance
- Selectable frequency
- Selectable dead time
- Soft startup into full resistive load

Applications

- Data centers
- Servers
- 48 V Power supply
- Computing
- Intermediate Bus Converter (IBC)

General Description

The EVK_HAS_DIC14_I_A evaluation board is a 60 W, 36-60 V input switched-capacitor power converter that operates as a DC transformer with a fixed voltage conversion ratio of 1/4 or 1/3. The simplified schematic is shown in Figure 2. It features the preliminary SCG10ECX chip, as the core of the switched-capacitor power converter and the Microchip dsPIC33EV64GM103 16-bit 5 V digital signal controller to configure the operation of the power converter.

Efficiency

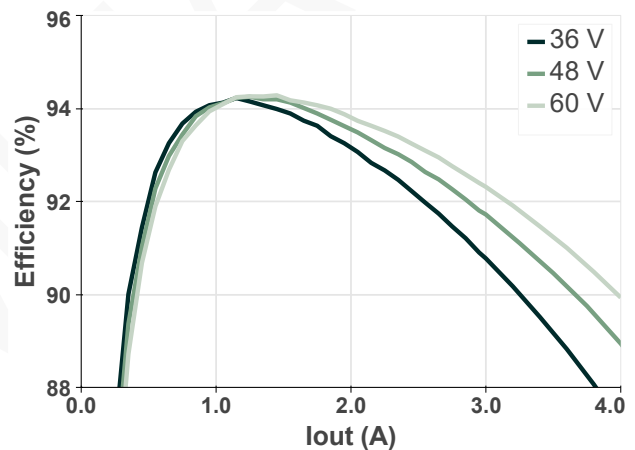


Figure 1. EVK typical efficiency using the 1/4 voltage conversion ratio for different input voltages.

Electrical Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{IN}	Input voltage		36	48	60	V
V _{IN,on}	Input UVLO turn on voltage			24		V
V _{OUT,1/4}	Output Voltage	Fixed ratio 1/4 based on V _{IN}	9	12	15	V
V _{OUT,1/3}	Output Voltage	Fixed ratio 1/3 based on V _{IN}	12	16	20	V
I _{OUT}	Continuous output current	400 LFM airflow			3.6	A
f _S	Switching frequency	Set via jumpers		500	1000	kHz
VDD5	Logic power supply		4.75	5	5.25	V
T _C	Junction operating temperature				125	°C

1. Simplified schematic

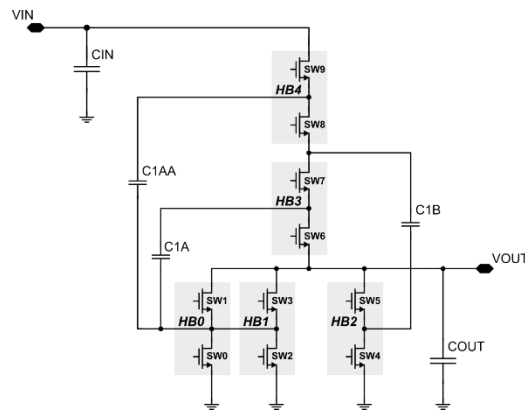


Figure 2. Simplified schematic of the switched-capacitor power converter implemented in the SCG10ECX Evaluation Kit. The highlighted transistors are integrated inside the SCG10ECX chip.

2. Evaluation kit

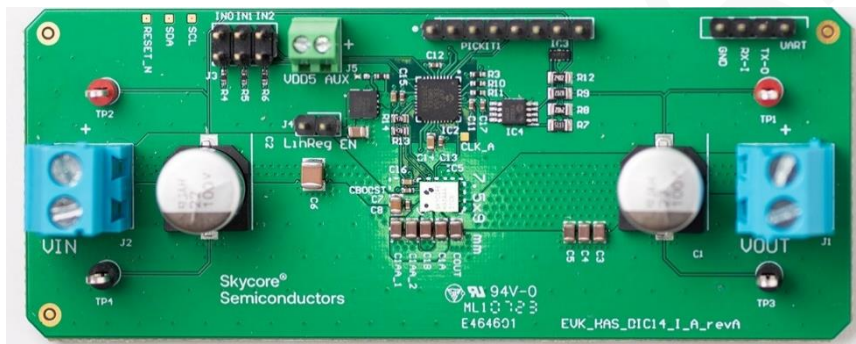


Figure 3. SCG10ECX Evaluation Kit with external power transistors. All the components of the power converter are enclosed in the white rectangle.

3. Bill of materials

Manufacturer	Manufacturer Part number	Description	Quantity
Skycore Semiconductors	SCG10ECX	*SCG10ECX preliminary	1
Murata	GRM21BC71E106KE11L	*Capacitor 10 μ F, X7S, 25 V, 0805	2
Murata	GRM21BC71H475KE11K	*Capacitor 4.7 μ F, X7S, 50 V, 0805	2
Murata	GRM21BC8YA106ME11K	*Capacitor 10 μ F, X6S, 35 V, 0805	1
Würth Elektronik	885012205084	*Capacitor 4.7 nF, X7R, 100 V, 0402	1
Würth Elektronik	885012209071	*Capacitor 2.2 μ F, X7R, 100 V, 1210	1
Würth Elektronik	865060857004	Capacitor Aluminum 33 μ F, 100V	2
Würth Elektronik	885012205018	Capacitor 0.1 μ F, X7R, 10 V, 0402	5
Murata	GRM21BC71E106KE11L	Capacitor 10 μ F, X7S, 25 V, 0805	3
Murata	GCM21BC72A105KE36L	Capacitor 1 μ F, X7S, 100 V, 0805	2
Murata	GRM155R62A104KE14D	Capacitor 0.1 μ F, X5R, 100 V, 0402	1
Murata	GRM155R61A106ME11D	Capacitor 10 μ F, X5R, 10 V,0402	2
TAIYO YUDEN	TMK107BBJ106MA-T	Capacitor 10 μ F, X5R, 25 V, 0603	1
onsemi	NCP781BMN050TAG	Linear regulator Vin=150V Vout=5V	1
Microchip	DSPIC33EV64GM003	MCU 16bit 70MHz 36 pin QFN 5x5	1
onsemi	ESD7004MUTAG	TVS diode	1
Microchip	MCP6042-E/MS	Operational Amplifier	1
Würth Elektronik	691254510002	Terminal block 2 pin 5.08 mm 20A	2

Würth Elektronik	61300621121	Header 6 pin 2.54 mm	1
Würth Elektronik	61300211121	Header 2 pin 2.54 mm	1
Würth Elektronik	691210910002	Terminal block 2 pin 2.54 mm	1
Würth Elektronik	61300811121	Header 8 pin 2.54 mm	1
Würth Elektronik	560112110001	Resistor 0Ω 0402	1
Würth Elektronik	560112110020	Resistor 10 kΩ 0402	4
Würth Elektronik	560112120012	Resistor 510 kΩ 0805	1
Bourns	CR0805-FX-2402ELF	Resistor 24 kΩ 0805	2
Bourns	CR0805-JW-823ELF	Resistor 82 kΩ 0805	1
Würth Elektronik	560112110022	Resistor 100 Ω 0402	2
Würth Elektronik	560112116128	Resistor 3 kΩ 0603	2
Würth Elektronik	61300411121	Header 4 pin 2.54mm pitch TH	1
Keystone Electronics	5010	Connector Hook red color	2
Keystone Electronics	5011	Connector Hook black color	2

*Component used for the power converter

4. Revision History

Table 1. Revision history description.

Date	Revision	Description
30/06/2023	1	Initial release.
24/06/2024	2	Updated Bill of Materials

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