Skycore®

EKV_HAS_DIC14_IE_D

SCG10ECX Evaluation Kit - 36-60 V Input, 9-15 V, 30 A Output, 300W

Features

- Peak efficiency: 97.2%
- Full load efficiency: 95.9 %
- 32.6 x 19 mm (1.283 x 0. 748 inches)
- Low profile converter: 1.6 mm (3.2 mm inc. PCB)
- Power density: 5800 W/in^3 (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_IE_D evaluation board is a 300 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, which drives external OptiMOS™ Power transistors for high power output. The board includes the Microchip dsPIC33EV64GM103 16-bit 5 V digital signal controller to configure the operation of the power converter.

Efficiency

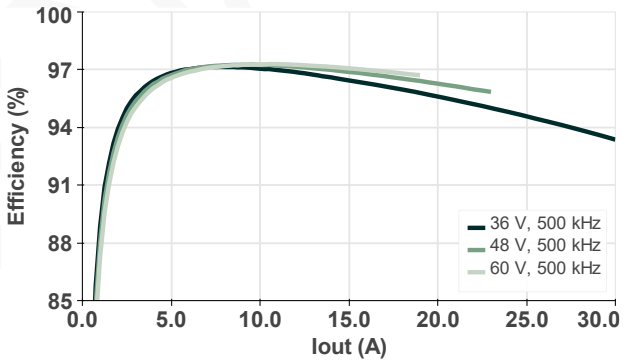

Figure 1. EVK typical efficiency using the 1/4 voltage conversion ratio.

**The power is currently limited by the measurement equipment to 300W. Further measurements at higher power levels will be done.*

Electrical Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{IN}	Input voltage		36	48	60	V
VIN,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				30	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

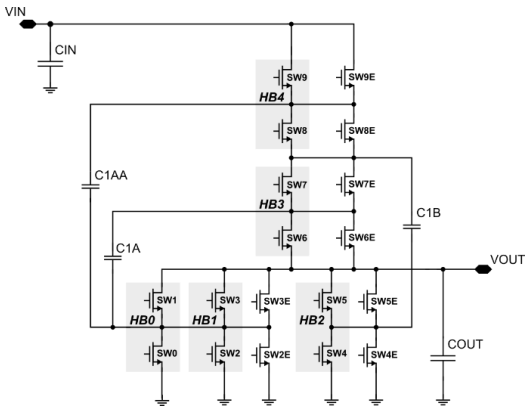

Figure 2. Simplified schematic of the switched-capacitor power converter implemented in the SCG10ECX Evaluation Kit. The highlighted transistors are integrated inside the SCG10ECX chip.

2. Evaluation kit

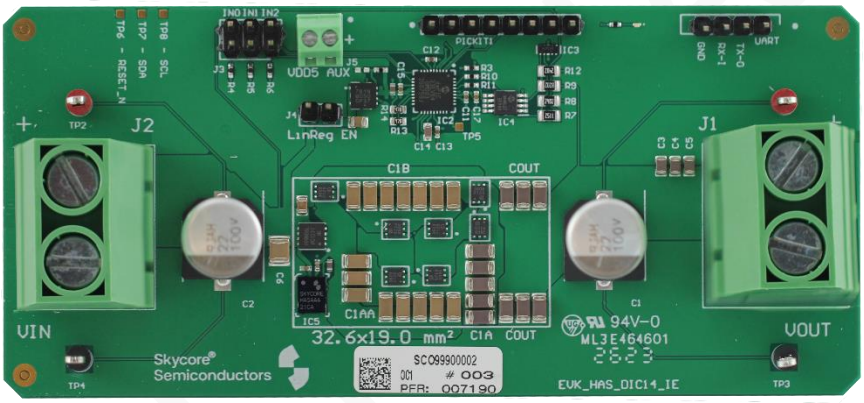

Figure 3. SCG10ECX Evaluation Kit with external power transistors. All the components of the power converter are enclosed in the white rectangle.

3. Bill of materials (Power converter)

Component	Manufacturer	Part number	Value	Amount in parallel
IC	Skycore	SCG10ECX	Preliminary version	1
C1A	Murata	GRM31CC71E226ME15L	22 uF, X7S, 25 V, 1206	5
C1AA	Murata	GRM31CD71H106KE11L	10 uF, X7T, 50 V, 1206	8
C1B	Murata	GRM31CD71H106KE11L	10 uF, X7T, 50 V, 1206	7
CIN	Murata	GRM32EC72A106KE05K	10 uF, X7S, 100 V, 1210	1
COUT	Murata	GRM31CC71E226ME15L	22 uF, X7S, 25 V, 1206	6
CBST	Murata	GRM155R72A472KA01	4.7 nF, X7R, 100 V, 0402	1
SW9E	Infineon	BSZ099N06LS5	60 V, 9.9 mOhm, 46 A	1
SW8E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW7E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW6E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW5E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW4E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW3E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1
SW2E	Infineon	ISK036N03LM5	30 V, 4.6 mOhm, 44 A	1

4. Revision History

Table 1. *Revision history description.*

Date	Revision	Description
30/06/2023	1	Initial release.
25/08/2023	2	Added measurement data and picture of the EVK.

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Document reference

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