

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/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_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

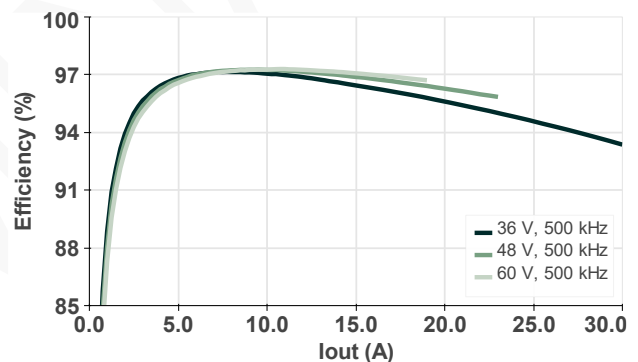


Figure 1. EVK typical efficiency using the 1/4 voltage conversion ratio.

*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 |
| 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 | | | | 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

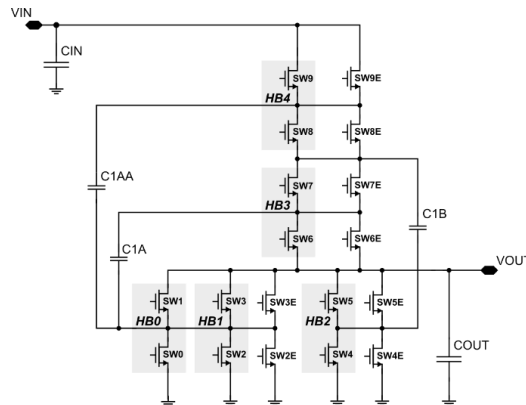


Figure 2. Simplified schematic of the switched-capacitor power converter implemented in the SCG10ECX Evaluation Kit. The highlighted transistors are integrated inside the SCG10ECX chip.

2. Evaluation kit

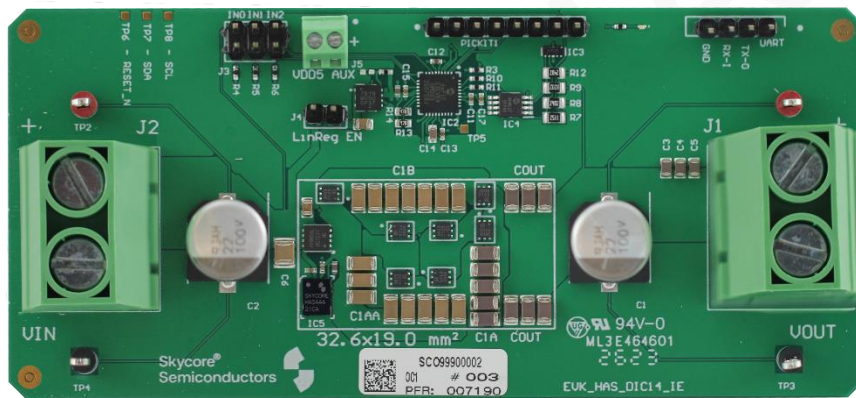


Figure 3. SCG10ECX Evaluation Kit with external power transistors. All the components of the power converter are enclosed in the white rectangle.

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. |

ELIMINARY

Published by

Skycore ApS
Fruebjergvej 3
2100 Copenhagen, Denmark
Email: info@skycore-semi.com

Document reference

PB_SCG10ECX_DIC14_IE_D_EVK_003

Important Notice

Skycore® Semiconductors assumes no responsibility arising from the use of the described specifications and provides no warranty for the use of this product. Before implementation of a product, the recipient of this datasheet must verify any function and other technical information given herein in the actual application. The applications presented herein are used solely for the purpose of illustration and Skycore® Semiconductors makes no warranty or representation that such applications will be suitable without further modification, nor recommends the use of its products for applications that may present a risk to human life due to malfunction or other unintended effects. Skycore® Semiconductors' products are not authorized for use as critical components in life support devices or systems. Skycore® Semiconductors reserves the right to alter this product or its specifications without prior notification.

All referenced product or service names and trademarks are the property of their respective owners.