30W Fully Integrated Synchronous Boost Converter Evaluation Board

FEATURES

- Wide 2.7V-14V Input Voltage Range
- Wide 4.5V-14.6V Output Voltage Range
- 13mΩ/11mΩ R_{dson} Internal Power MOSFETs
- Up to 12A Switch Current and Programmable Peak Current Limit
- Adjustable 200K-2.2MHz Switching Frequency:
- Selectable PFM or Forced PWM Mode
- Programmable Soft Start
- Output and Feedback Overvoltage Protection
- Thermal Shutdown Protection at 150°C
- DFN-20 3.5mmx4.5mm Package

APPLICATIONS

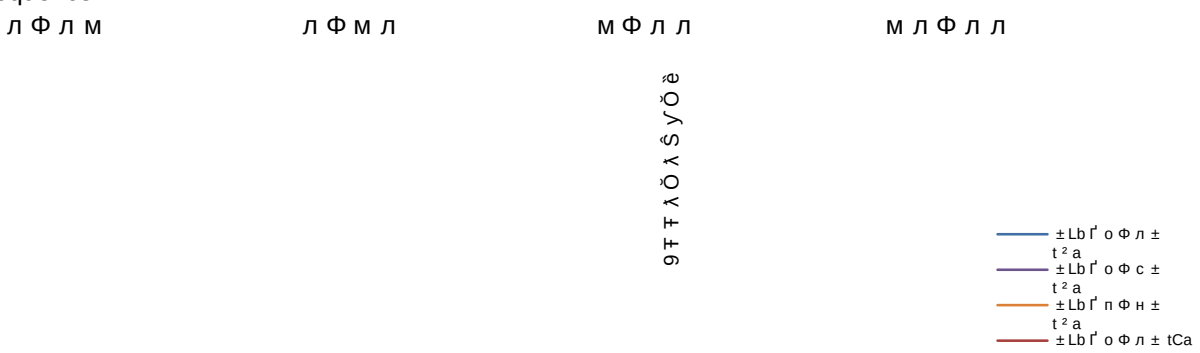
- Bluetooth Audio
- Power Banks
- POS System
- E-Cigarette
- USB Power Delivery

DESCRIPTION

The EV12A0-B-01A Evaluation Board is designed to demonstrate the capabilities of SCT12A0, a high efficiency fully integrated synchronous boost converter. It offers a very compact solution to achieve up to 30W continuous output power over a wide input supply range. The constant off-time peak current-mode operation provides fast transient response and eases loop stabilization. The device features include over-current protection, output over voltage protection and thermal shutdown. The SCT12A0 is available in a space-saving 20-pin DFN 3.5mmx4.5mm package.

This user's guide describes the characteristics,

Input Voltage	DC up to 14V	2.7V-8.4V
Output Voltage	JP2: ON PWM	9V ± 2.5%
Output Current	Continuous DC current	3A



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QUICK START PROCESURE

Evaluation board EV12A0-B-01A is easy to set up to evaluate the performance of the SCT12A0. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions:
   JP1: ON Connect V_{IN} supply to V_{IN} pin of IC.
   JP2: ON Select Forced PWM mode. OFF Select PFM mode.
   JP3: ON Connect EN pin to V_{CC} to enable IC.
2. With power off, connect the input power supply to J1 V_{IN} connector and J2 GND connector. Turn on the power at the input. Make sure that the input voltage does not exceed 14V, and supports sufficient current limit.
3. Check the output voltage at J3. The output voltage should be 9V typical. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, output voltage ripple, efficiency and other parameters.
4. To use the enable function, apply a digital input to the EN pin of JP3.

NOTE.
When measuring the voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across relevant capacitor of VIN or VOUT. See Figure 2 for proper scope probe technique.

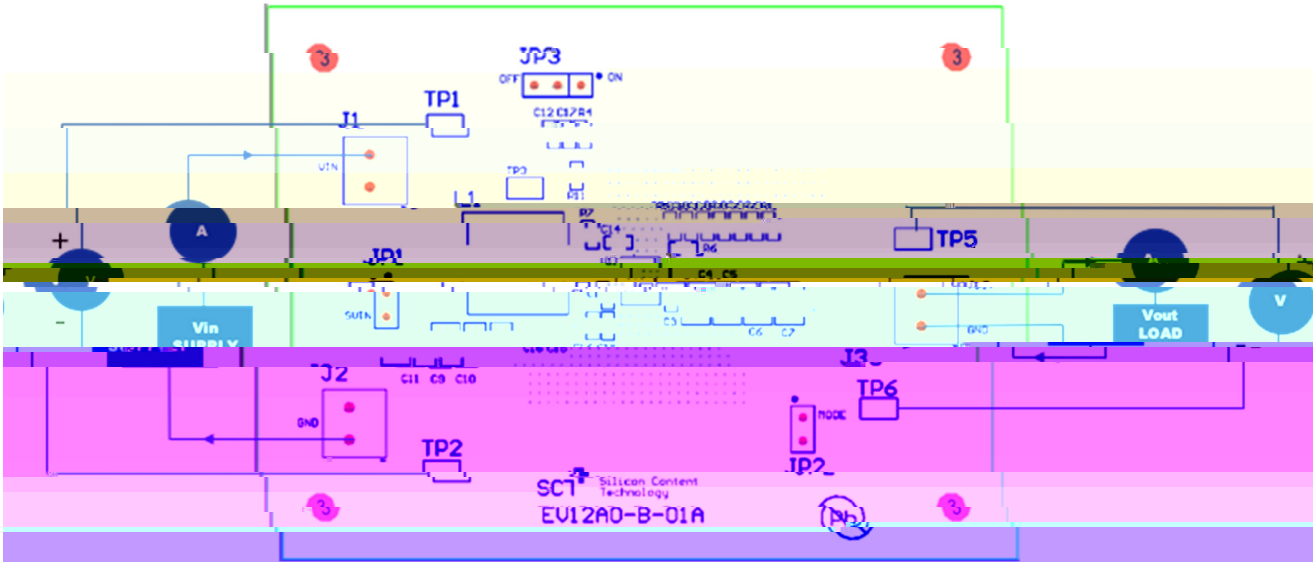

Figure 1. Proper Supply, Load and Measurement Equipment Setup

Figure 2. Measuring Voltage Ripple Across Terminals or Directly Across Ceramic Capacitor

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SCHEMATIC DIAGRAM

Figure 3. Evaluation Board Schematic

BILL OF MATERIALS

Table 2. Bills of Materials

Manufacture	Comment	Designator	Description	Quantity
Silicon Content Technology	SCT12A0	U1	SCT12A0, 30W Synchronous Boost Converter DFN-20L 3.5mmX4.5mm with thermal pad	1
Wurth Elektronix	61300211121	JP1, JP2, JP3	Header, 100mil, 2x1, Tin, TH	3
Wurth Elektronix	691 214 110 002S	J1, J2, J3	Terminal Block, 6A, 3.5mm Pitch, 2-Pos, TH	3
Wurth Elektronix	885 012 206 0-88 à	,h Ǝ Ž ᴰ ᵐ я	0-8N 3nfn 88 MMM ž Ǝ M ŋ ŏ k,h ɑ]	P

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EVB TEST RESULTS

Vin=3.6V, Vout=9V, unless otherwise noted

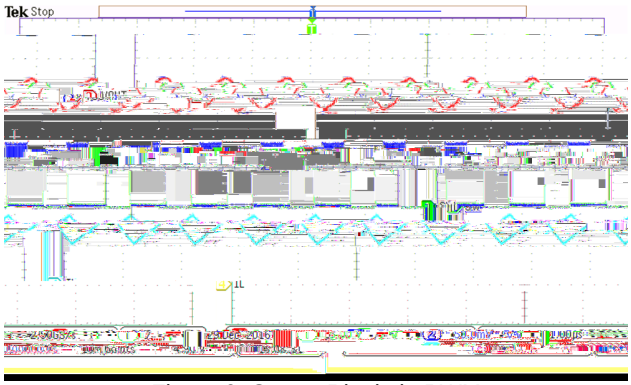

Figure 6. Output Ripple in PWM

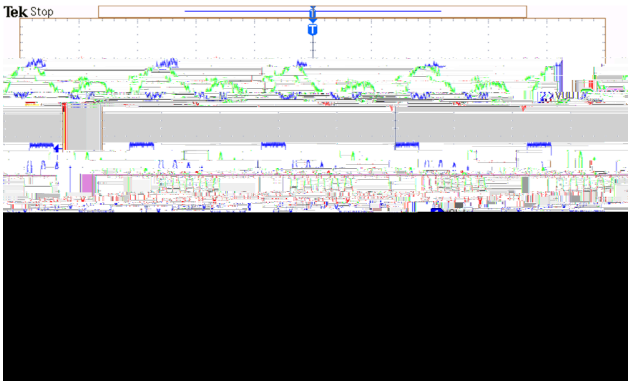

Figure 7. Output Ripple in DCM

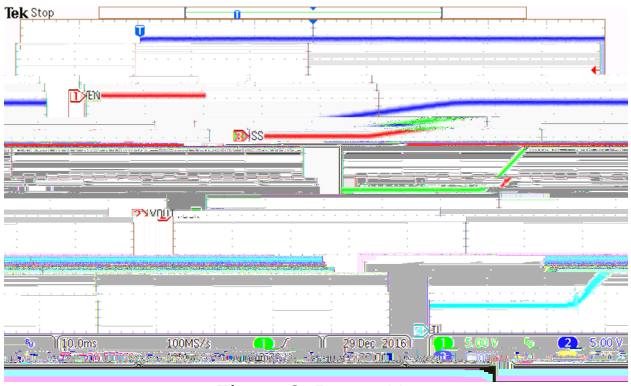

Figure 8. Power Up

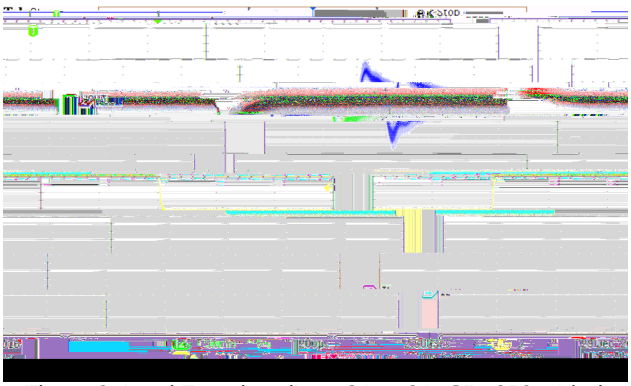

Figure 9. Load Transient (Iout=2A to 3A, SR=250mA/us)

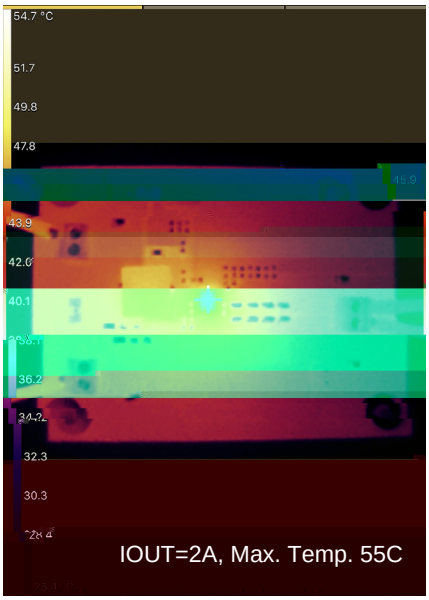

Figure 10. Infrared Thermal Image, Iout=2A

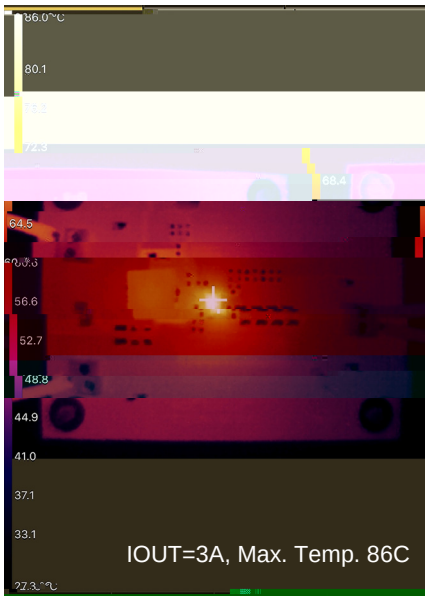

Figure 11. Infrared Thermal Image, Iout=3A

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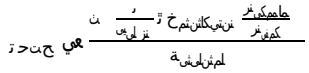
OPTIONAL MODIFICATION

Switching Frequency

The resistor connected from FSW to SW R7 (Default 255KΩ) sets switching frequency of the converter. Use equation 1 to set a desired frequency.



(1)

where:

f

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Silicon Content Technology Co., Ltd.
#1 Floor 2 Building 15, Yard 33 Dijin Road, Haidian District, Beijing 100095
(86 10) 64779806 FAX: (86 10) 64779806 www.silicontent.com
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