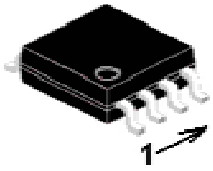
GENERAL DESCRIPTION

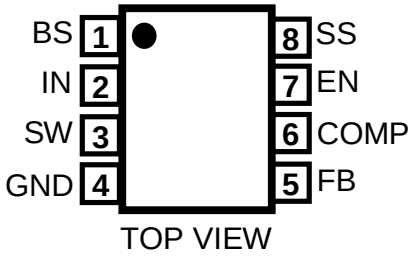
The BCT1203-EVB is the evaluation board for the BCT1203. A step down monolithic regulator with a built in internal power MOSFET, capable of driving up to 3A continuous output current with excellent line and load regulation. The output voltage can be set from 0.8V to 16V. Requiring a minimum number of external components, it offers simple to use, but high efficiency and advanced protection features including pulse-by-pulse current limiting and thermal shutdown. Adjustable soft-start reduces the stress on the input source at turn-on and the regulator draws only 20µA in shutdown mode. BCT1203 is available in a Lead-Free SOIC8 with exposed pad package.

APPLICATIONS

- Simple High Efficiency Step-down
- Consumer: TV, STB, DVD, VCR
- Car Audio / TV / Navigation
- Battery Charger
- Pre-Regulator for Linear Regulators

PACKAGE DIAGRAMS





TOP VIEW

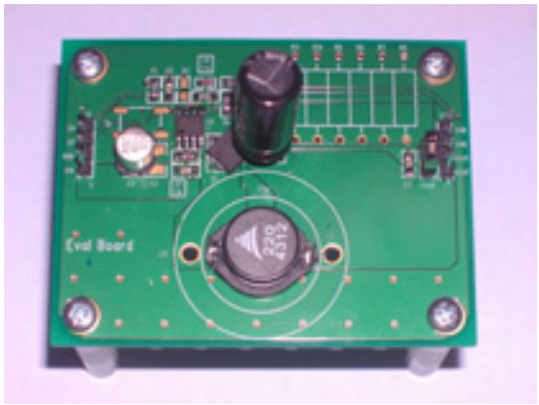
FEATURES

- Wide V_{IN} Range: 4.5 to 20V
- 3A Output Current
- High Efficiency up to 95%
- Output Adjustable from 0.8 to 16V
- 500 KHz Fixed Frequency internal oscillator
- 20 µA Shutdown Mode
- Pulse-to-Pulse Current Limiting
- Thermal Shutdown
- Automatic Soft-Start
- Compact SOIC8 with Exposed Pad

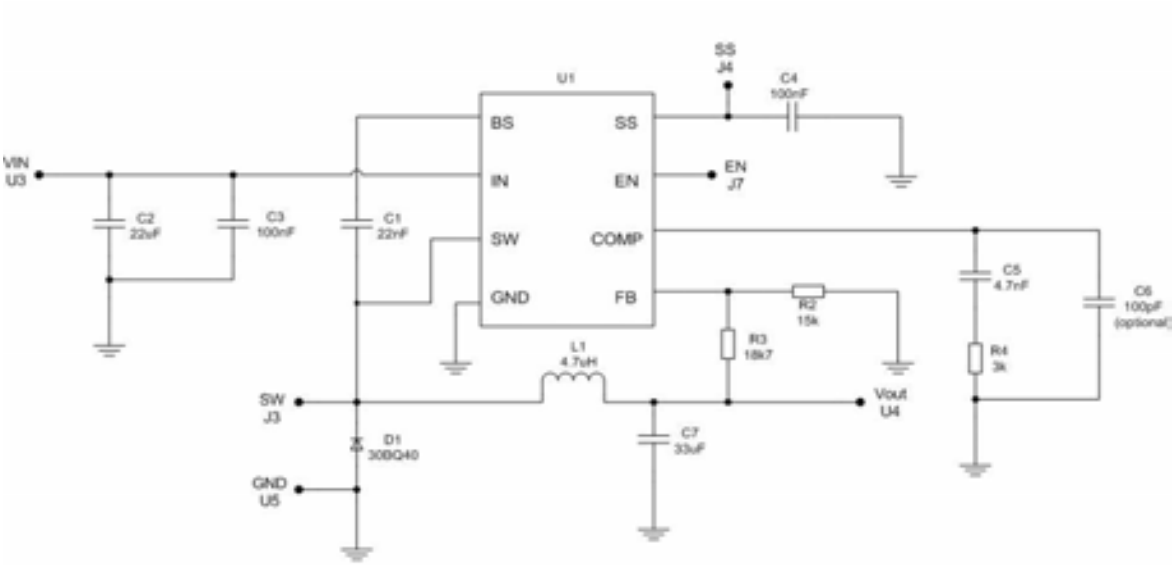
ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	5 / 12	V
Output Voltage	V_{OUT}	1.8 / 5	V
Output Current	I_{OUT}	0 – 3	A

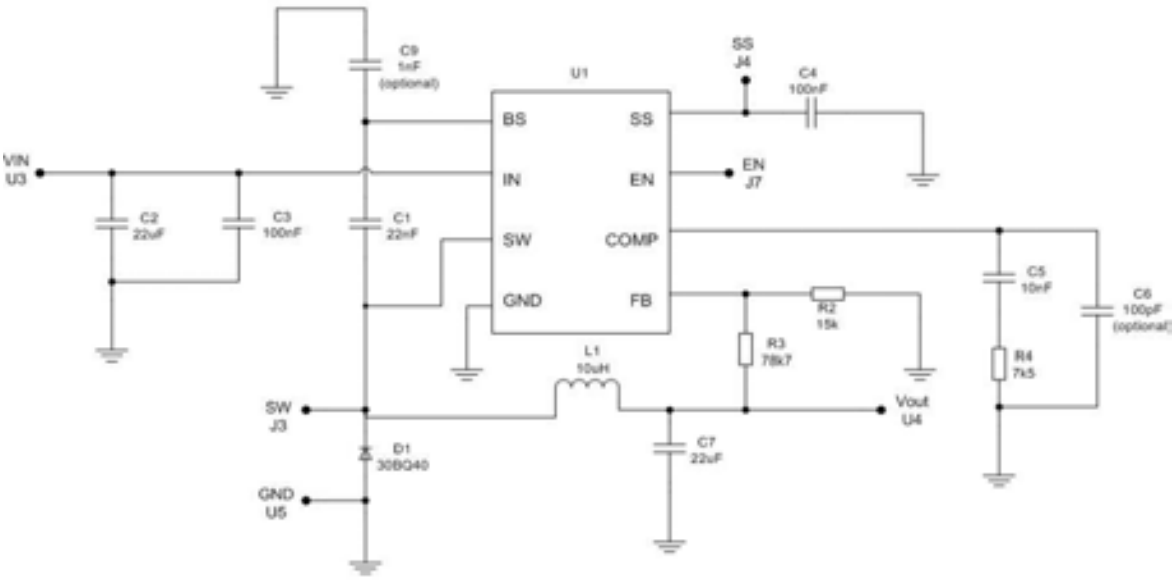
BCT1203 EVALUATION BOARD



TYPICAL APPLICATION CIRCUITS



V_{IN} = 5V, V_{OUT} = 1.8V, I_{OUT} = 0A ~ 3A



V_{IN} = 12V, V_{OUT} = 5V, I_{OUT} = 0A ~ 3A

QUICK SET-UP GUIDE

1. Preset the DC supply input (VIN) according to the application circuit above. Turn off VIN.
2. Connect the positive and negative terminals of the DC supply input to VIN and GND respectively.
3. Loads (voltage, current, resistance) can be connected to U4 by resistors or electronic load.
4. Leave EN pin float "ALWAYS ON" if you do not use the shutdown feature.
5. Turn on VIN.
6. Several test points are available for probing:
    a. J7 = ENABLE pin
    b. J4 = SS pin
    c. U5 = GND
    d. U4 = VOUT pin

CONFIGURATION TABLE

V_{OUT}	R3	R4	C5	L1
1.8 V	18.7 kΩ	3 kΩ	4.7 nF	4.7 µH
2.5 V	31.6 kΩ	3.9 kΩ	5.6 nF	4.7 – 6.8 µH
3.3 V	46.4 kΩ	5.6 kΩ	8.2 nF	6.8 – 10 µH
5 V	78.7 kΩ	7.5 kΩ	10 nF	10 – 15 µH
12 V	210 kΩ	10 kΩ	3.3 nF	15 – 22 µH

DESIGN NOTES

1. **The voltage divider network formed by R2 and R3 sets the output voltage regulation point.** It is simply calculated by the equation below:

    $R3 = R2 \times (V_{OUT} - V_{REF}) / V_{REF}$
    Where: V_{REF} = 0.8 V, R2=15K Ohms (Can be 10K ~ 100K ohms)

    From this equation the closest standard (E96) resistance values were chosen. V_{OUT} can be further trimmed by adding a resistor across R3. Metal film resistors with 1% or less tolerance are recommended.

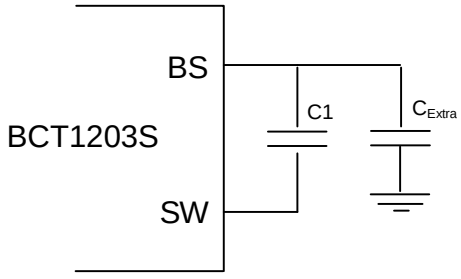
2. **For Automatic Start-up, please leave EN pin unconnected.**
    The EN pin provides an enabling feature and has the following turn-on/off characteristic:

    ON Threshold = 2.8 V
    OFF Threshold = 0.7 V

3. **An additional Bootstrap cap is recommended when V_{IN} > 12V & I_{OUT} < 1.5A.**

This tiny 1nF will help to generate high efficiency & ease powering the high side switch.

In most cases,
C1 = 22nF and C_{Extra} = 1nF will assure the reliable stability of Bootstrap voltage level.



PERFORMANCE CHARACTERISTICS

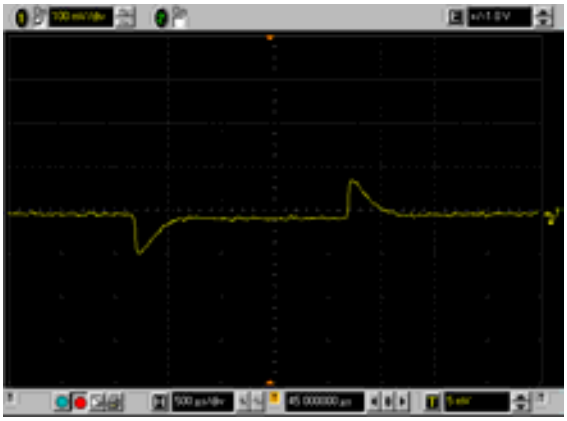
Switching Waveforms (V_{OUT} & V_{SW})

V_{IN}/V_{OUT} = 12V/5V at Load Current 2A

Soft Start

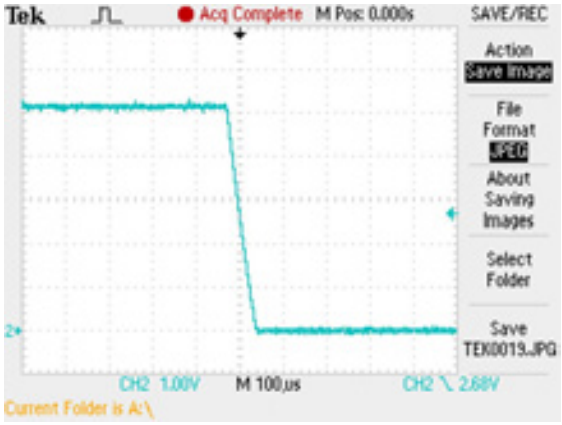
V_{IN}/V_{OUT} = 12V/2V with a 1uF cap at 2A

Load Transient Waveform



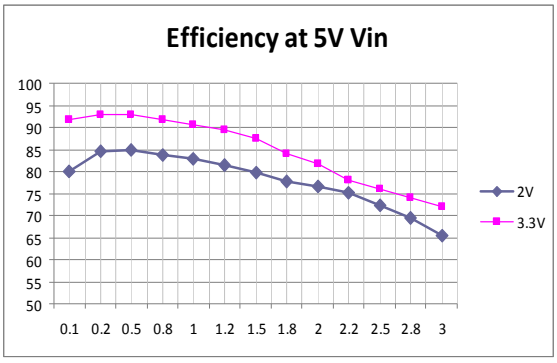
V_{IN}/V_{OUT} = 12V/5V, 1A-2A Step

Turn Off Waveform

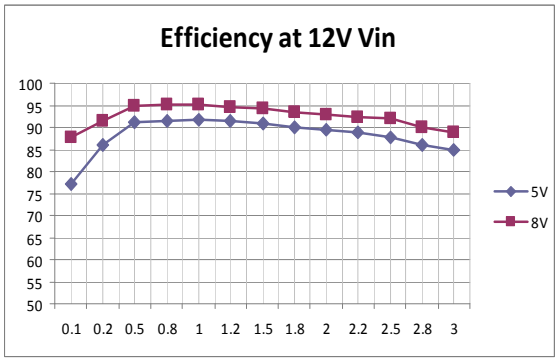


V_{IN}/V_{OUT} = 12V/5V at Load Current 2A

Power Efficiency I



Power Efficiency II



PRINTED CIRCUIT BOARD LAYOUT

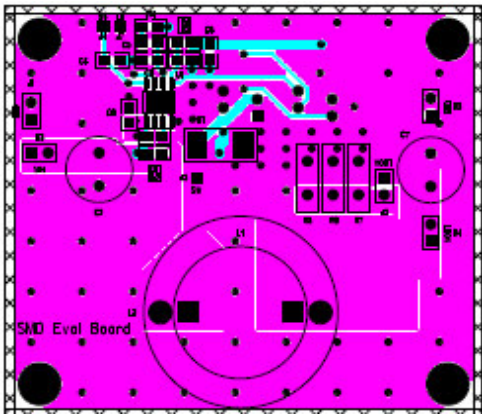


Figure 7: Top Silkscreen Layer

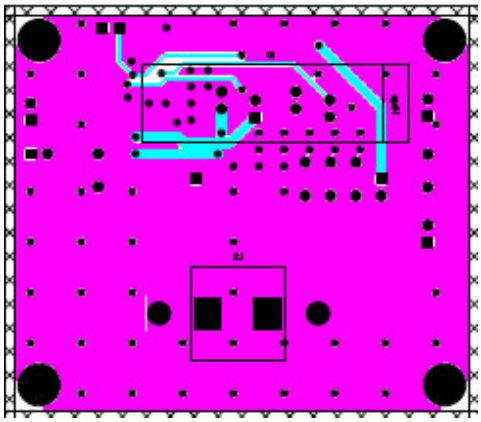


Figure 8: Bottom Silkscreen Layer