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| Device | Application | Input Voltage | Output Voltage | Output Current | Topology |
|----------|-------------|---------------|----------------|----------------|----------|
| NCP3030B | DC-DC | 9-16V | 3.3V | 0.01-9A | Buck |

Table 1: Buck Power Supply

| Characteristic | Min | Typ | Max | Unit |
|----------------------------------|------|-------|------|---------|
| Input Voltage | 9 | 12 | 16 | V |
| Output Voltage | 3.33 | 3.265 | 3.28 | V |
| Output Current | .01 | 3 | 9 | A |
| Oscillator Frequency (NCP3030B) | 2.1 | 2.4 | 2.7 | MHz |
| Output Voltage Ripple | | 86 | | mVpk-pk |
| Load Regulation | | | | |
| Iout = 0.02-9A, Vin= 9V NCP3030 | | 0.99 | | mV/A |
| Iout = 0.02-9A, Vin= 18V NCP3030 | | 0.78 | | |

Circuit Description

The PCB for the NCP3030 is a 2-layer board for use in applications up to 50W. The synchronous buck converter uses voltage mode control, which can also be compensated externally with a transconductance amplifier. The soft-start time is fixed. The NCP3030 demonstration board is a flexible design allowing the use of electrolytic capacitors or ceramic capacitors. Also Q1 and Q3 (MOSFET's) footprints allows the use of SOIC-8NB, SO8-FL, u8FL and D-PAK packages.

Performance

The following figures show typical performance of the NCP3030 demonstration boards.

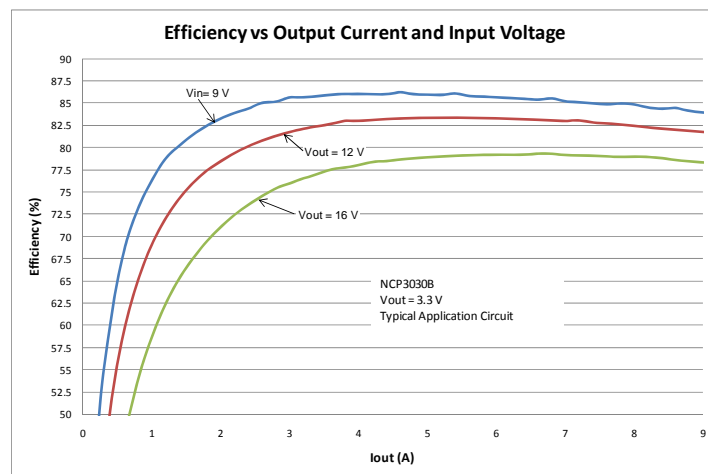


Figure 1: NCP3030B Efficiency at 9V-16.0V with a 3.3V Output Voltage

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Load Regulation vs Input Voltage

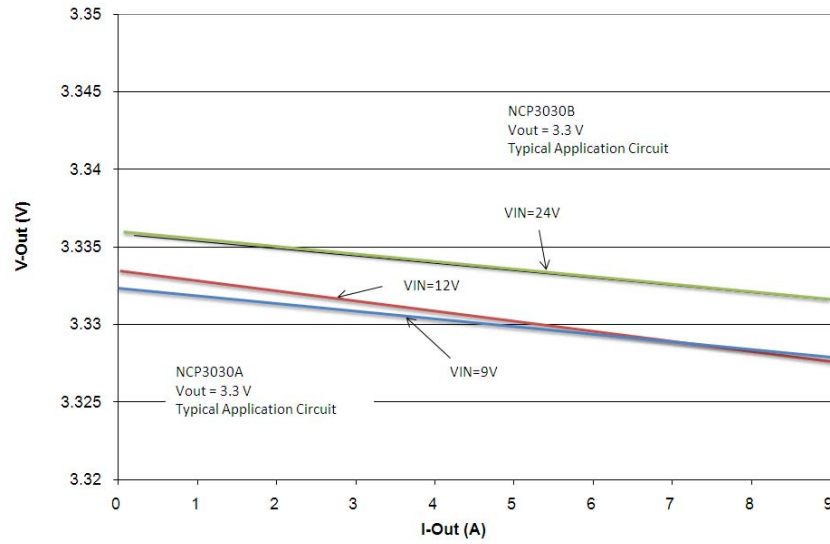


Figure 2: NCP3030B Load Regulation

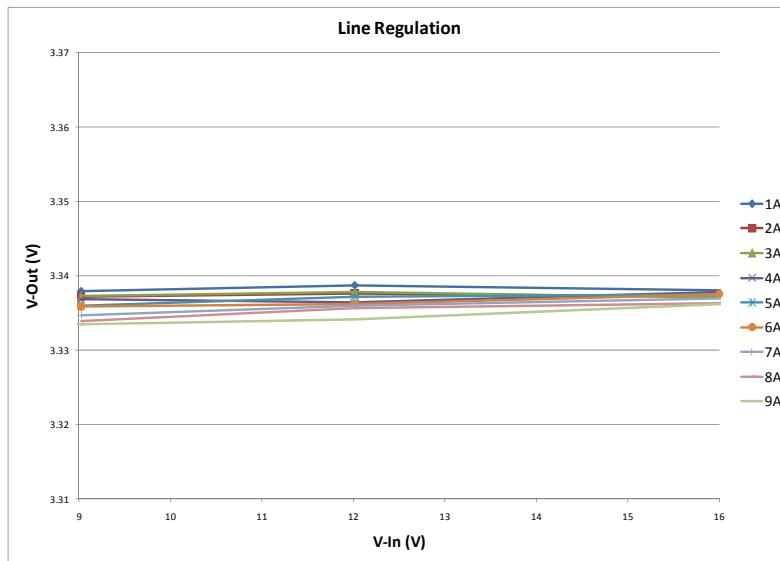


Figure 3: NCP3030B Line Regulation

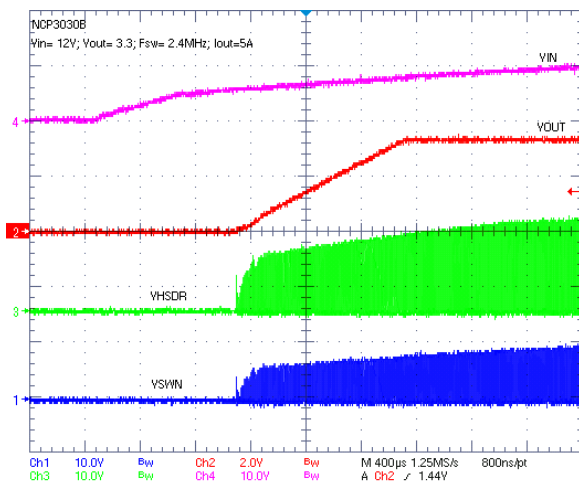


Figure 4: Startup Waveforms (NCP3030B)

Input = 12 V, Output = 3.3 V, Load = 5 A,
CH4 (Purple) = VIN, CH2 (Red) = VOUT,
CH3 (Green) = VHSDR, CH1 (Blue) = SWN
CH1 = CH3 = CH4: 10.0 V/div; CH2: 2.0 V/div;
Time Scale: 400 µs/div

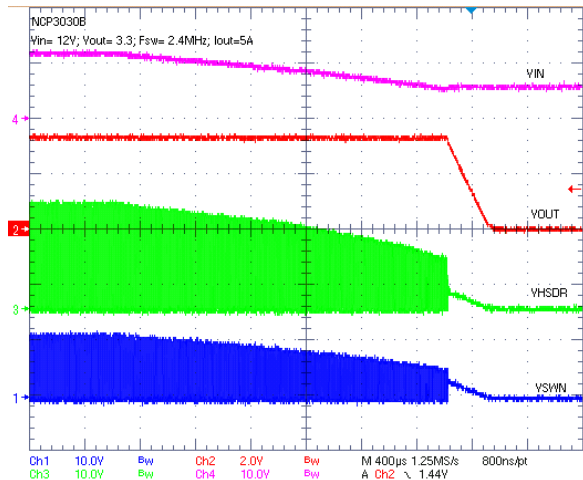


Figure 5: Shutdown Waveforms (NCP3030B)

Input = 12 V, Output = 3.3 V, Load = 5 A,
 CH4 (Purple) = VIN, CH2 (Red) = VOUT,
 CH3 (Green) = VHSDR, CH1 (Blue) =SWN
 CH1 = CH3 = CH4: 10.0 V/div; CH2: 2.0 V/div;
 Time Scale: 400 μs/div

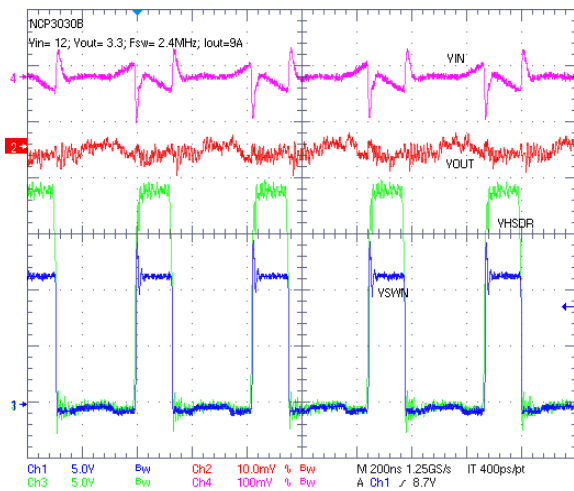


Figure 6: Switching Waveforms (NCP3030B)

Input = 12 V, Output = 3.3 V, Load = 9 A,
 CH4 (Purple) = VIN, CH2 (Red) = VOUT,
 CH3 (Green) = VHSDR, CH1 (Blue) =SWN
 CH1 = CH3: 5.0 V/div; CH2: 10 mV/div; CH4:100mV/div
 Time Scale: 200 ns/div

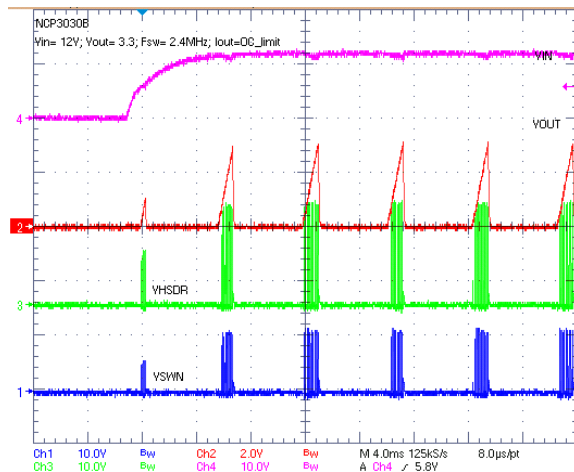
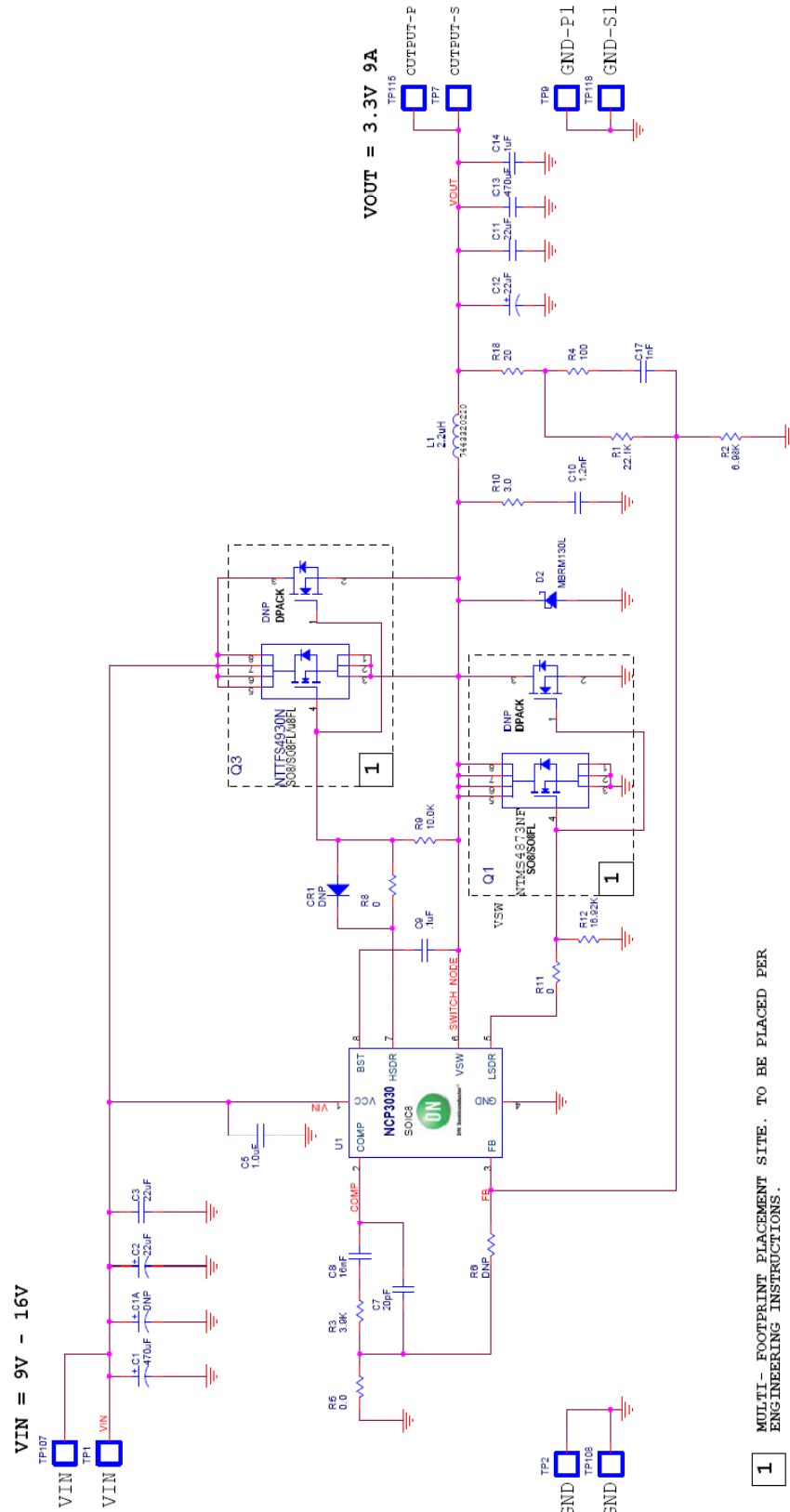


Figure 7: Startup into Current Limit (NCP3030B)

Input = 12 V, Output = 3.3 V, Load = 5 A,
 CH4 (Purple) = VIN, CH2 (Red) = VOUT,
 CH3 (Green) = VHSDR, CH1 (Blue) =SWN
 CH1 = CH3 = CH4: 10.0 V/div; CH2: 2.0 V/div;
 Time Scale: 400 μs/div

Schematics



1 MULTI-FOOTPRINT PLACEMENT SITE. TO BE PLACED PER ENGINEERING INSTRUCTIONS.

Figure 8: NCP3030 Demo Board Schematic

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| Bill Of Materials | | | |
|-------------------|----------|------------------|------------|
| Item | Quantity | Reference | Part |
| 1 | 5 | CR1,C1A,Q2,Q4,R6 | Not Placed |
| 2 | 2 | C1,C13 | 470uF |
| 3 | 3 | C2,C11,C12 | 22uF |
| 4 | 2 | C14,C3 | 1uF |
| 5 | 1 | C5 | 1.0uF |
| 6 | 1 | C7 | 20pF |
| 7 | 1 | C8 | 16nF |
| 8 | 1 | C9 | 0.1uF |
| 9 | 1 | C10 | 1.2nF |
| 10 | 1 | C17 | 1nF |
| 11 | 1 | D2 | MBRM130L |
| 12 | 1 | L1 | 2.2uH |
| 13 | 1 | Q1 | NTMFS4935N |
| 14 | 1 | Q3 | NTTFS4930N |
| 15 | 1 | R1 | 22.1K |
| 16 | 1 | R2 | 6.98K |
| 17 | 1 | R3 | 3.9K |
| 18 | 1 | R4 | 100 |
| 19 | 1 | R5 | 0 |
| 20 | 2 | R11,R8 | 0 |
| 21 | 1 | R9 | 10.0K |
| 22 | 1 | R10 | 3 |
| 23 | 1 | R12 | 16.92K |
| 24 | 1 | R18 | 20 |
| 25 | 1 | U1 | NCP3030 |

Table 1: NCP3030 Demo Board Bill Of Materials

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