

# NCV8871LVB

## NCV8871 Automotive Grade Boost Controller Low Power Boost Evaluation Board User's Manual



ON Semiconductor®

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### EVAL BOARD USER'S MANUAL

#### Description

The NCV8871LVB evaluation board provides an opportunity to evaluate the NCV887100 in a 10 W start stop boost application. The board supplies a 10.6 V output with 1 A of output current from as low as a 5 V input. The enable pin can also be used to synchronize the supply to an external clock.

#### Key Features

- 10.6 V Output Voltage
- 1 A Output Current
- Fixed Frequency Operation at 170 kHz
- Regulates Fully Loaded From as Low as 5 V Input
- Survives 35 V Load Dump
- External Clock Synchronization up to 340 kHz
- Automotive Grade



Figure 1. NCV8871LVB Evaluation Board

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**Table 1. EVALUATION BOARD TERMINAL DESCRIPTIONS**

| Terminal | Function                                                                                  |
|----------|-------------------------------------------------------------------------------------------|
| VIN      | Positive dc input voltage.                                                                |
| GND      | Common dc return.                                                                         |
| VOOUT    | Dc output voltage.                                                                        |
| EN/SYNC  | Dc enable voltage and external clock synchronization. A dc logic low disables the device. |

**Table 2. ABSOLUTE MAXIMUM RATINGS** (Voltages are with respect to GND)

| Rating                      | Value      | Unit |
|-----------------------------|------------|------|
| Dc Supply Voltage (VIN)     | -0.3 to 35 | V    |
| Dc Supply Voltage (EN/SYNC) | -0.3 to 6  | V    |
| Ambient Temperature         | -40 to 85  | °C   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**Table 3. ELECTRICAL CHARACTERISTICS** (TA = 25°C, 4.5 ≤ VIN ≤ 18 V, IOOUT ≤ 2 A, unless otherwise specified)

| Characteristic      | Conditions    | Typical Value | Unit |
|---------------------|---------------|---------------|------|
| Output Voltage      |               | 10.6          | V    |
| Voltage Accuracy    | -40 ≤ TA ≤ 85 | 4             | %    |
| Switching Frequency |               | 170           | kHz  |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

SCHEMATIC

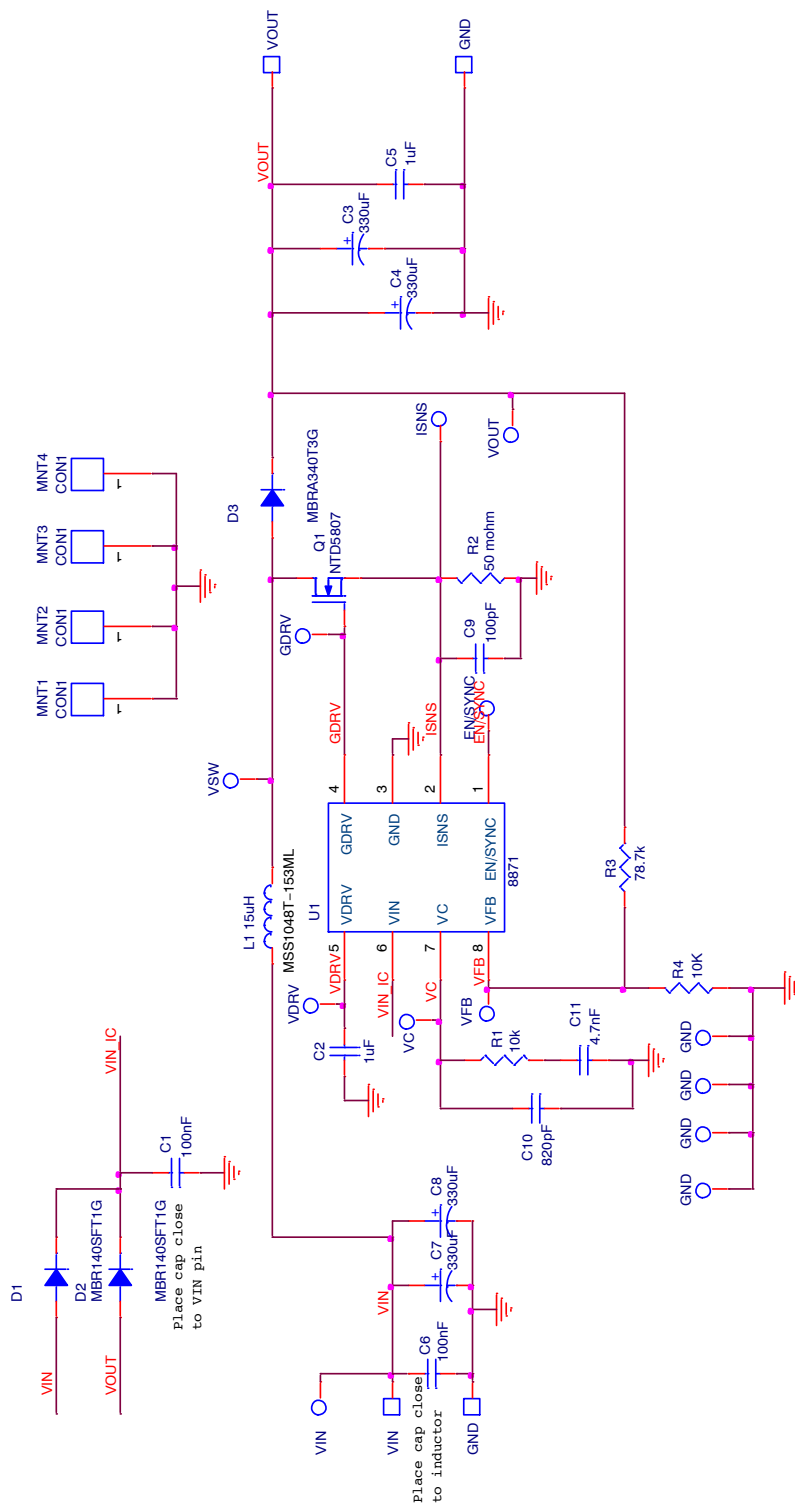


Figure 2. NCV8871 Evaluation Board Schematic

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## PCB LAYOUT

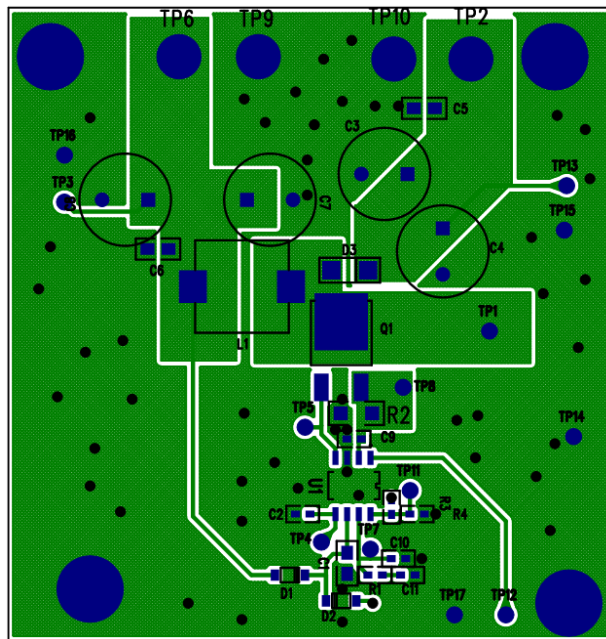


Figure 3. Top Layout

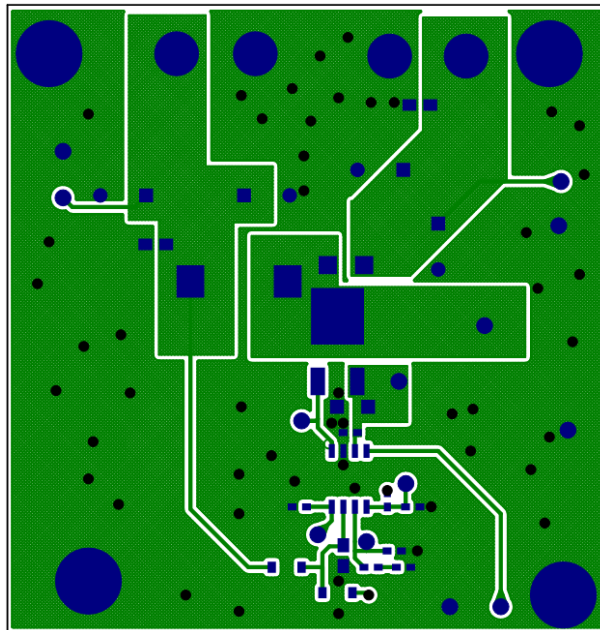


Figure 4. Bottom Layout

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## BILL OF MATERIALS

**Table 4. BILL OF MATERIALS**

| Item Number | Quantity | Value         | Part Number        | Part Reference |
|-------------|----------|---------------|--------------------|----------------|
| 1           | 2        | 100 nF        | GCM188R71H104KA57D | C1, C6         |
| 2           | 1        | 1 $\mu$ F     | GCM188R71C105KA64D | C2             |
| 3           | 4        | 330 $\mu$ F   | 35ZLH330M10X12.5   | C3, C4, C7, C8 |
| 4           | 1        | 1 $\mu$ F     | GCM21BR7YA105KA55L | C5             |
| 5           | 1        | 100 pF        |                    | C9             |
| 6           | 1        | 820 pF        |                    | C10            |
| 7           | 1        | 1.5 nF        |                    | C11            |
| 8           | 2        | MBR140SFT1G   | MBR140SFT1G        | D1, D2         |
| 9           | 1        | MBRA340T3G    | MBRA340T3G         | D3             |
| 10          | 1        | 15 $\mu$ H    | MSS1048T-153ML     | L1             |
| 11          | 1        | CON1          |                    | MNT1           |
| 12          | 1        | CON1          |                    | MNT2           |
| 13          | 1        | CON1          |                    | MNT3           |
| 14          | 1        | CON1          |                    | MNT4           |
| 15          | 1        | NTD5807       | NTD5802NT4G        | Q1             |
| 16          | 1        | 21.5k         |                    | R1             |
| 17          | 1        | 80 m $\Omega$ | WSL1206R0800FEA    | R2             |
| 18          | 1        | 78.7k         |                    | R3             |
| 19          | 1        | 10K           |                    | R4             |
| 20          | 1        | VSW           |                    | TP1            |
| 21          | 1        | VOUT          |                    | TP2            |
| 22          | 1        | VIN           |                    | TP3            |
| 23          | 1        | VDRV          |                    | TP4            |
| 24          | 1        | GDRV          |                    | TP5            |
| 25          | 1        | VIN           |                    | TP6            |
| 26          | 1        | VC            |                    | TP7            |
| 27          | 1        | ISNS          |                    | TP8            |
| 28          | 1        | GND           |                    | TP9            |
| 29          | 1        | GND           |                    | TP10           |
| 30          | 1        | VFB           |                    | TP11           |
| 31          | 1        | EN/SYNC       |                    | TP12           |
| 32          | 1        | VOUT          |                    | TP13           |
| 33          | 1        | GND           |                    | TP14           |
| 34          | 1        | GND           |                    | TP15           |
| 35          | 1        | GND           |                    | TP16           |
| 36          | 1        | GND           |                    | TP17           |
| 37          | 1        | NCV8871       | NCV887100D1R2G     | U1             |

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