# AN-2284 LM34926 Isolated Evaluation Board

## 1 Introduction

An isolated bias supply is implemented in this evaluation board with LM34926 Constant-On-Time regulator. LM34926 regulator integrates both the high and low side power switches essential for creating isolated buck converter.

Board Specifications:

- Input Range: 20V to 100V
- Primary Output Voltage: 10V
- Secondary (Isolated) Output Voltage: 9.5V
- Maximum Load Current (Primary + Secondary): 250mA
- Maximum Power Output: 2.5W
- Nominal Switching Frequency: 750kHz
- Efficiency (FIN = 36V, IOUT2 = 250mA): 77 percent
- Board size: 2 inch x 2 inch

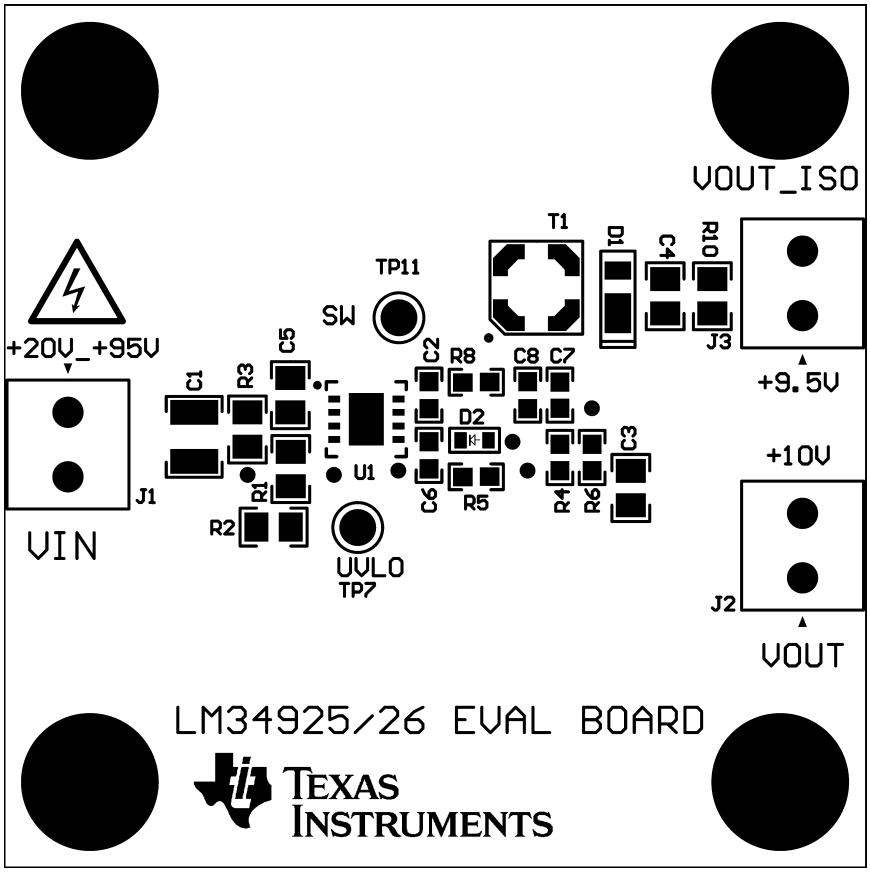


**Figure 1. LM34926 Evaluation Board (Top View)**

## 2 UVLO Threshold and Hysteresis

The UVLO resistors are selected using the following two equations:

$$V_{IN(HYS)} = I_{HYS}R_1 \quad (1)$$

and

$$V_{IN\ (UVLO,rising)} = 1.225V \times \left(\frac{R_1}{R_2} + 1\right) \quad (2)$$

On this evaluation board R1 = 127kΩ and R2 = 8.25kΩ, resulting in UVLO rising threshold at VIN = 20.5V and a hysteresis of 2.54V.

### *2.1 Board Connection and Start-up*

The input connections are made using TP1 (VIN) and TP2 (GND) terminals. The primary output appears at TP3 (VOUT1) and TP4 (GND). The secondary (isolated) output is available across TP5 (VOUT2) and TP6 (IGND). The input voltage should be gradually increased above UVLO set point of 20.5V. Both the outputs (VOUT1 and VOUT2) should be close to 10V at this point. This board is designed to function with input voltage range of 20V to 100V. The minimum VIN threshold can be changed by changing the UVLO resistors R1, R2. VIN should not exceed 100V.

The magnetics in this design is optimized for solution size, and therefore limits the output power. **The total load at the output should not exceed 250mA, otherwise the coupled inductor will saturate/overheat, which can destroy both the coupled inductor and the regulator IC U1**. If a sustained over-current situation is to be tolerated, a coupled inductor with higher saturation and rms ratings should be used.

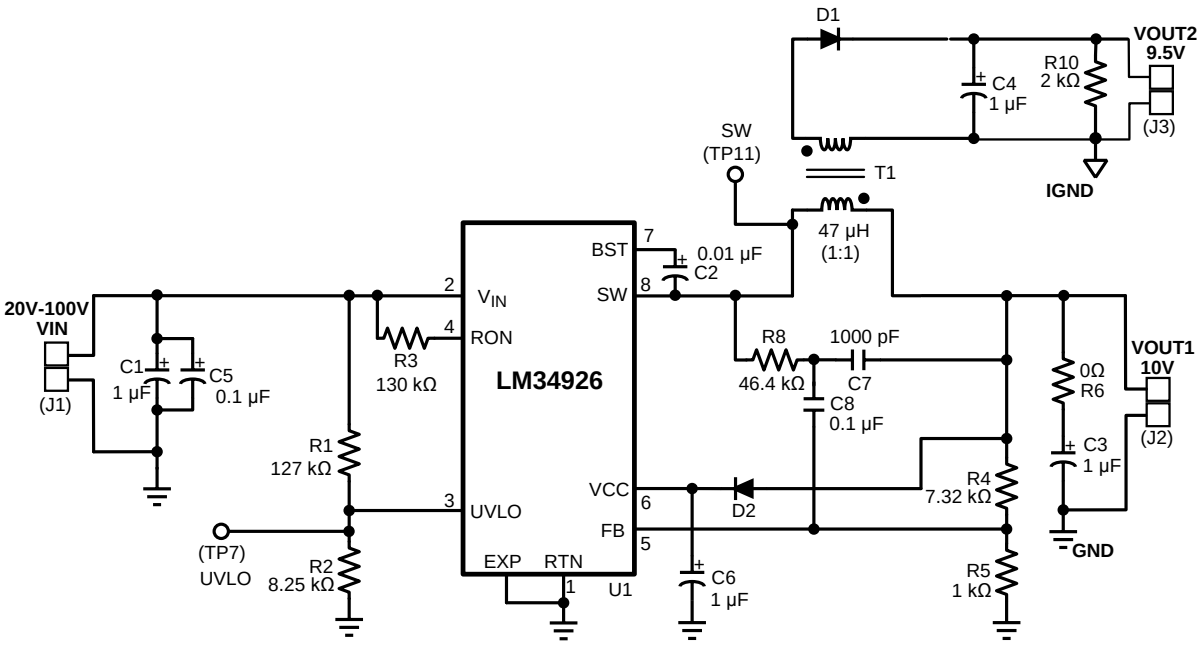


**Figure 2. Complete Evaluation Board Schematic**

# 3 Bill of Materials

**Table 1. Bill of Materials**

| Item | Description | Mfg., Part Number | Package | Value |
|---|---|---|---|---|
| U1 | Sync Switching Regulator | Texas Instruments, LM34926 | WSON-8 | 100V, 300mA |
| T1 | Coupled Inductor, 1500 VDC | Coilcraft, LPD5030V-473ME | 5mm x 5mm | 47uH, 0.47A |
| | Alternate Part | Wurth, 750312750 | 8.26mm x 6.60mm | 22uH, 0.76A |
| D1 | Schottky Diode | Diodes Inc., DFLS1100-7 | Pwr–DI123 | 100V, 1A |
| D2 | Schottky Diode | Diodes Inc., SDM10U45-7 | SOD–523 | 40V, 100mA |
| C1 | Ceramic Capacitor | MuRata, GRM32CR72A105KA35L | 1210 | 1uF, 100V, X7R |
| C2 | Ceramic Capacitor | TDK, C1608X7R1C103K | 0603 | 0.01uF, 16V, X7R |
| C3, C4 | Ceramic Capacitor | TDK, C2012X7R1E105K | 0805 | 1uF, 25V, X7R |
| C5 | Ceramic Capacitor | Kemet, C0805C104K1RACTU | 0805 | 0.1uF, 100V, X7R |
| C6 | Ceramic Capacitor | TDK, C1608X7R1C105K | 0603 | 1uF, 16V, X7R |
| C7 | Ceramic Capacitor | Murata, GRM188R71E102KA01D | 0603 | 1000pF,25V, X7R |
| C8 | Ceramic Capacitor | AVX, 0603YC104KAT2A | 0603 | 0.1uF, 16V, X7R |
| R1 | Resistor | Vishay/Dale, CRCW0805127KFKEA | 0805 | 127kΩ, 1% |
| R2 | Resistor | Vishay/Dale, CRCW08058K25FKEA | 0805 | 8.25kΩ, 1% |
| R3 | Resistor | Vishay/Dale, CRCW0805130KFKEA | 0805 | 130kΩ, 1% |
| R4 | Resistor | Panasonic, ERJ-3EKF7321V | 0603 | 7.32kΩ, 1% |
| R5 | Resistor | Panasonic, ERJ-3EKF1001V | 0603 | 1.0kΩ,1% |
| R6 | Resistor | Yageo, RC0603JR-070RL | 0603 | 0Ω |
| R8 | Resistor | Panasonic, ERJ-3EKF4642V | 0603 | 46.4kΩ, 1% |
| R10 | Resistor | Panasonic, ERJ-6GEYJ202V | 0805 | 2kΩ, 5% |

# 4 Performance Curves

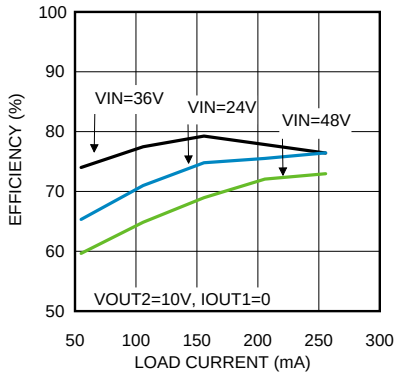


**Figure 3. Efficiency at 750kHz, VOUT1=10V**

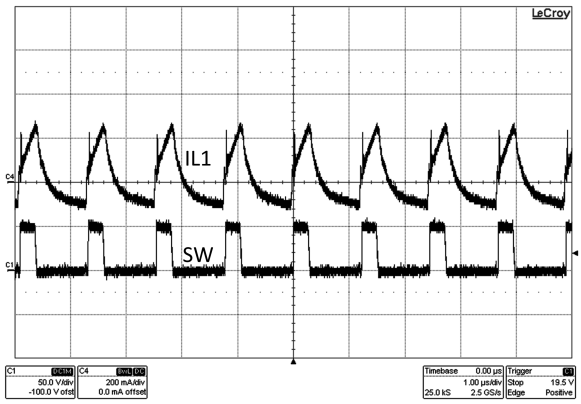


**Figure 4. Steady State Waveform (VIN=48V, IOUT1=0mA, IOUT2= 100mA)**

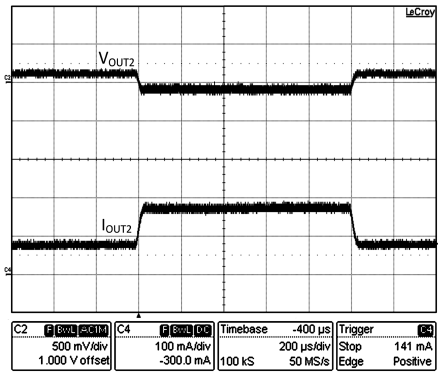


**Figure 5. Step Load Response (VIN=48V, IOUT1=0, Step Load on IOUT2=80mA-180mA)**

## 5 PC Board Layout

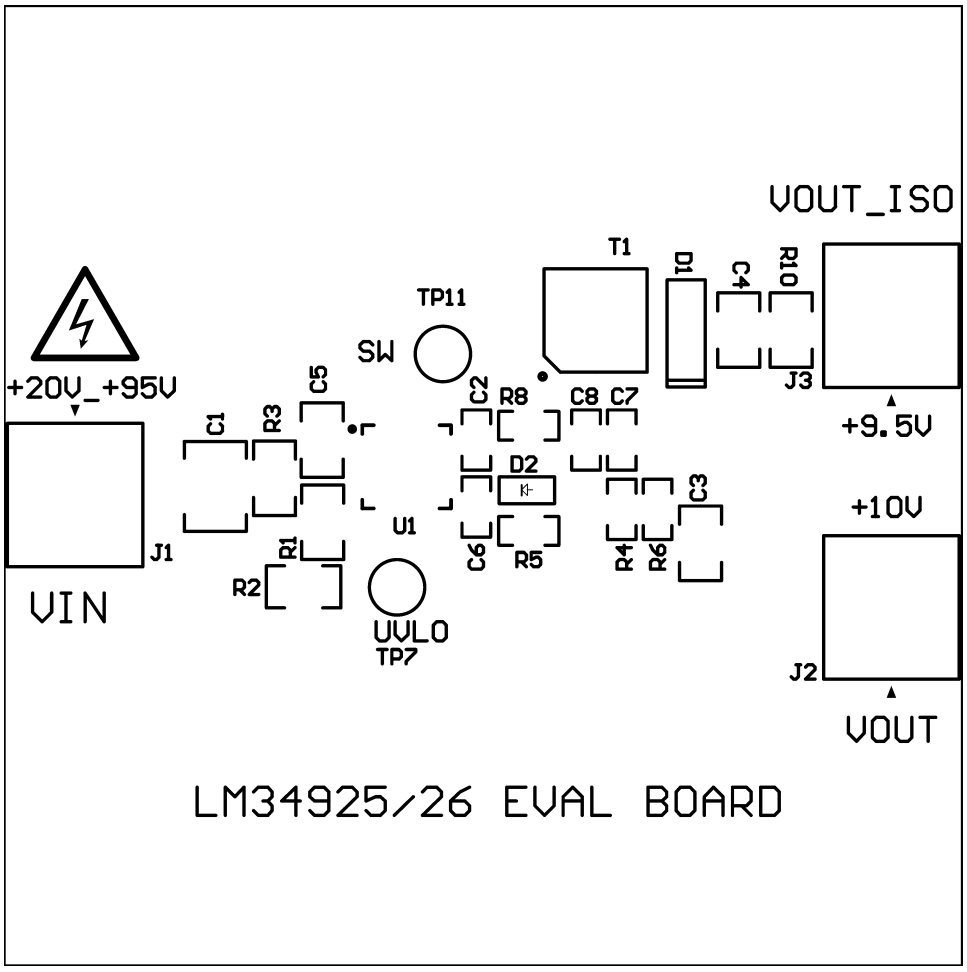


**Figure 6. Board Silkscreen**

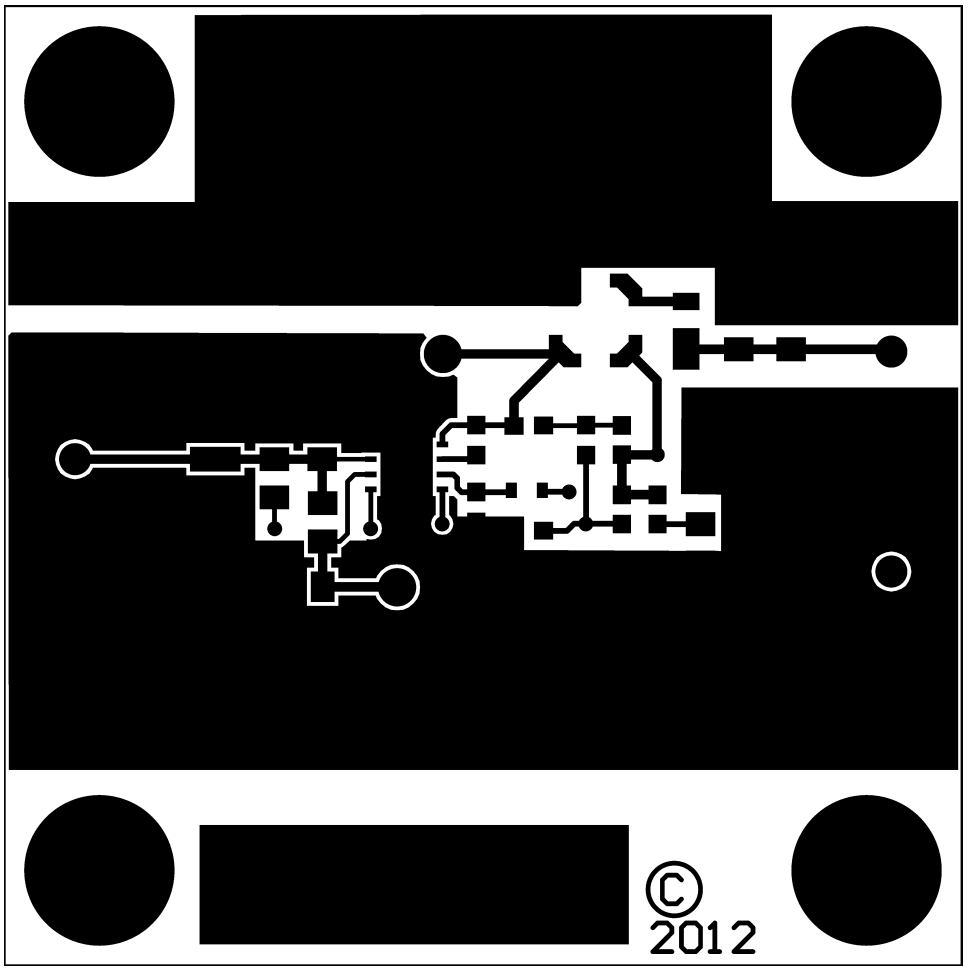


**Figure 7. Board Top Layer**

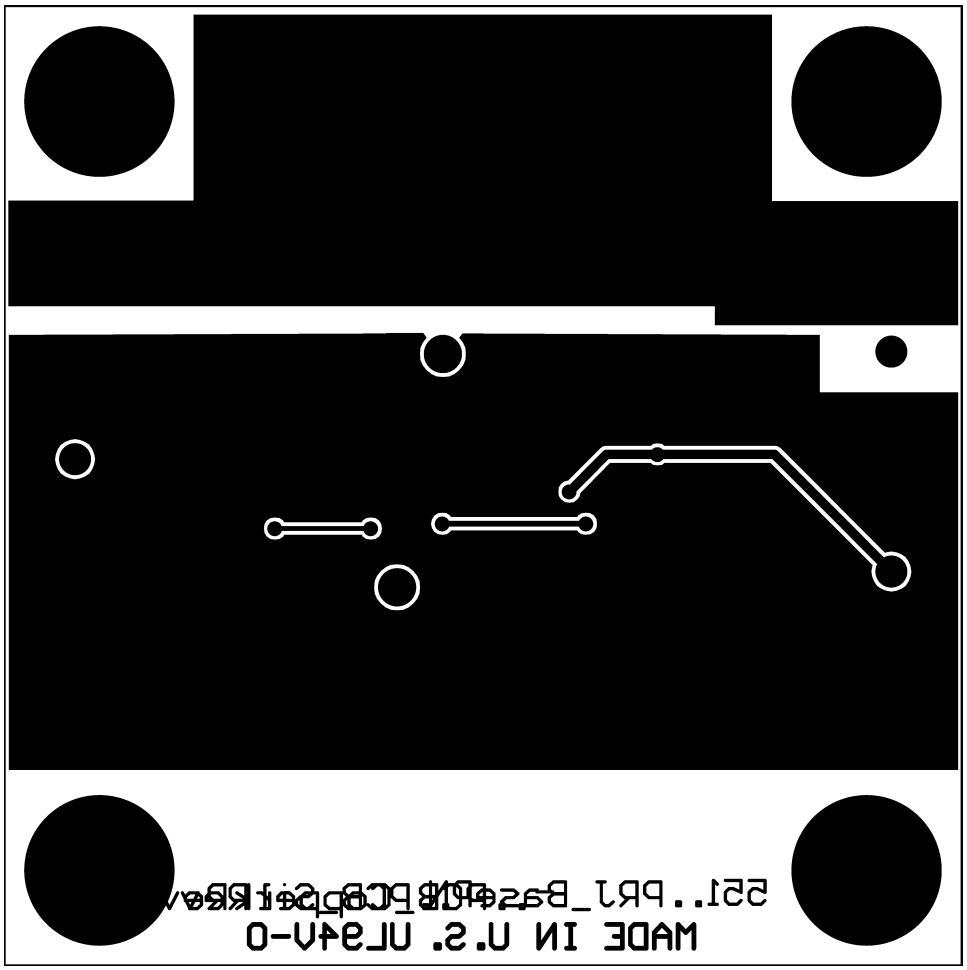

**Figure 8. Board Bottom Layer**

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
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