

### General Description

The PAM8906 Self-Excitation evaluation board is designed to give an overview of connecting the PAM8906 with a self-excitation piezo sounder.

For this application, we will focus on the VOUT=10V and VOUT=12V versions. In typical circumstances, the VOUT=10V version with the right piezo sounder can achieve 90dB SPL at a 3m distance.

### Key Features

- Supply Input Voltage Range: 2.1V to 5.5V
- Intergraded Boost Converter with up to 36VPP output, supporting 10V, 12V, or 18V VOUT
- Automatic Shutdown and Wake-Up Control, supporting External PWM Input or Self-Excitation
- Low Current Consumption, with Shutdown Current < 1 $\mu$ A
- High-Speed Driver Designed with Very Short Turn-On/Turn-Off
- No Voltage Cross Output at Shutdown Mode, High Impedence Output at Shutdown Mode
- Available in the Space-Saving MSOP-10 Package

### Evaluation Board Schematic

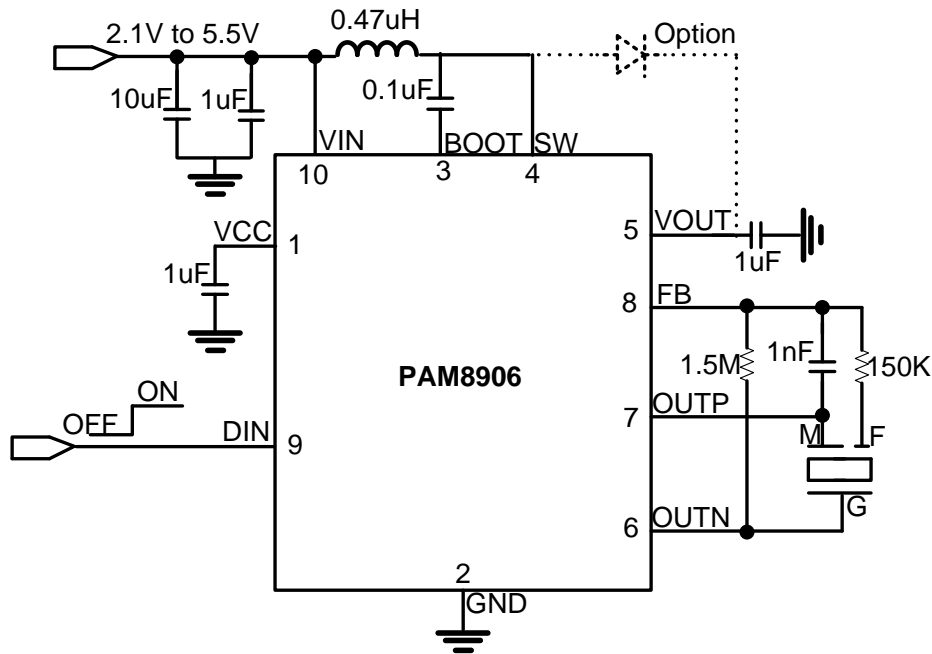


Figure 1. Evaluation Board Schematic

**Evaluation Board View**

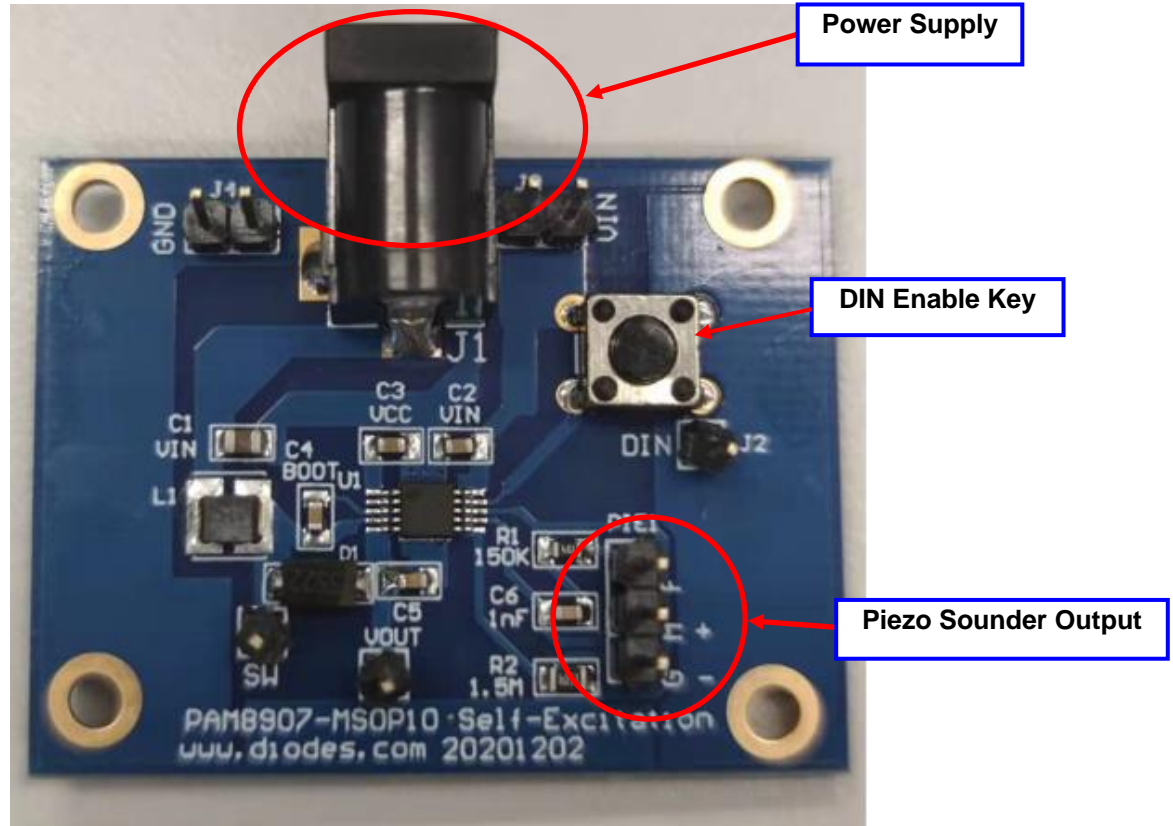


Figure 2. Evaluation Board View

**EVB Operational Sequence**

- a. Preset the power supply to be between 2.1V to 5.5V.
- b. Turn off the power supply.
- c. Connect power supply to EVB power.
- d. Connect the PIEZO to the output jack.
- e. Turn on the power supply.
- f. Press down the DIN button to enable the chip.

### **External Components Selection**

#### **Power Supply Decoupling Caps (C1, C2)**

1. C1 must be placed very close to the inductor.
2. C3 must be placed very close to the IC VIN pin terminal.

#### **Boot Output Capacitor (C4)**

1. For lower output ripple, low ESR is required.
2. For low leakage current, 0.1  $\mu$ F, a X5R/X7R ceramic capacitor is recommended.

#### **VCC Capacitor (C3)**

1. 1  $\mu$ F, X5R/X7R ceramic capacitor is recommended.
2. Place close to the VCC pin terminal.

#### **VOU Capacitor (C5)**

3. 1  $\mu$ F, X5R/X7R 25V ceramic capacitor is recommended.
4. Place close to the VOUP pin terminal.

### **PCB Layout Guidelines**

#### **Ground**

1. Use plane grounding or separate grounds.
2. For the VIN/VCC/VOUP cap's ground, it is necessary to use a wide and short line to connect with GND (pin2).

#### **Power Supply**

1. Boost Power and VIN must be separated and tied together at the system power supply.
2. It is recommended to route all power supply traces to be as short and thick as possible.
3. Any barricades placed in the power supply trace may result in poor amplifier performance.

#### **Components Placement**

1. Power supply capacitors (C1,C2) should be placed very close to the L1 pin.
2. Power supply capacitor (C5) should be placed very close to the PAM8906 VOUP pin.

**PCB Layout Example**

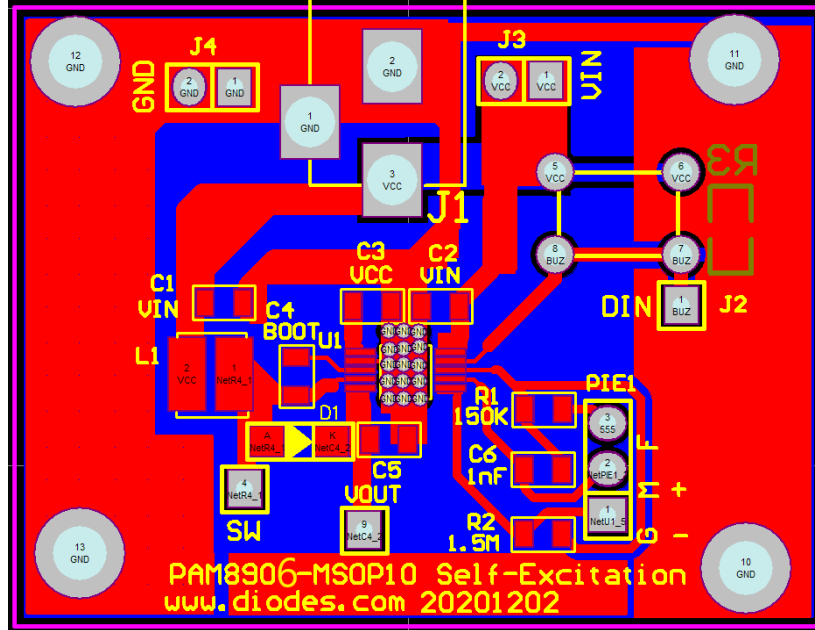


Figure 3. PCB Top Layer

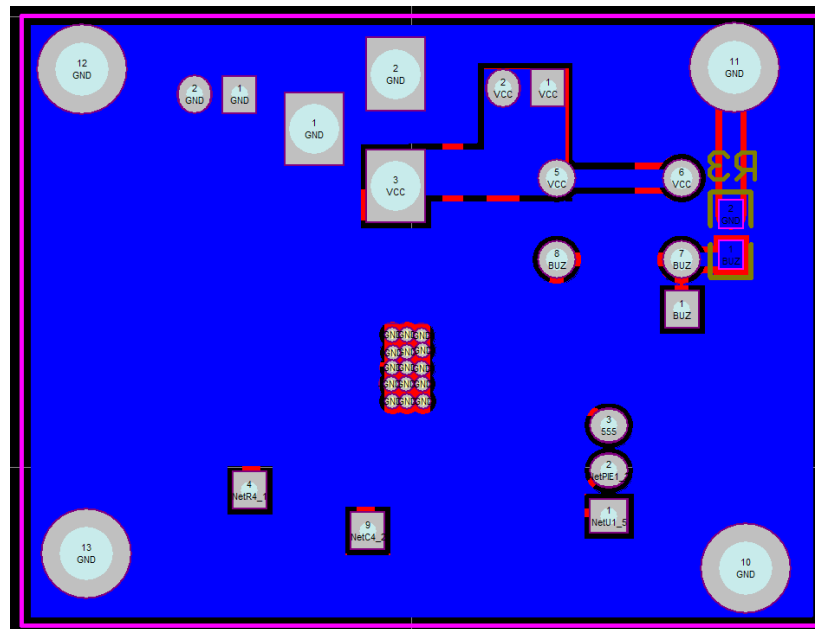


Figure 4. PCB Bottom Layer

### Bill of Materials

Item	Value	Type	Rating	Description
C1	10uF	X5R/X7R, Ceramic/0805	10V	VBAT decoupling CAP
C2	1uF	X5R/X7R, Ceramic/0603	10V	VIN decoupling CAP
C3	1uF	X5R/X7R, Ceramic/0603	10V	VCC CAP
C4	0.1uF	X5R/X7R, Ceramic/0603	25V	Boot CAP
C5	1uF	X5R/X7R, Ceramic/0603	25V	Boost CAP
L1	0.47uH	2A	-	Boost inductance
R1	150K	0603	-	-
C6	1nF	X5R/X7R, Ceramic/0603	25V	-
R2	1.5M	0603	-	-
R3	10k	0603	-	-
IC1	-	PAM8906	-	-

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