

Small, High Efficiency Solution Drives Two Piezo Motors

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Introduction

Piezoelectric motors are used in digital cameras for autofocus, zooming and optical image stabilization. They are relatively small, lightweight and efficient, but they also require a complicated driving scheme. Traditionally, this challenge has been met with the use of separate circuits, including a step-up converter and an oversized generic full bridge drive IC. The resulting high component count and large board space are especially problematic in the design of cameras for ever shrinking cell phones. The LT3572 solves these problems by combining a step-up regulator and a dual full bridge driver in a 4mm x 4mm QFN package.

A Simple Integrated Solution to Drive Two Piezo Motors

Figure 1 shows a typical LT3572 Piezo motor drive circuit. A step-up converter with a high efficiency internal switch is used to generate 30V from a low voltage power source such as a Li-Ion battery or any input power source within the part's wide input voltage range of 2.7V to 10V. The LT3572 uses a peak current mode control architecture, which improves line and load transient response compared to other schemes. The switching frequency is adjustable from 500kHz to 2.5MHz, set either by an external resistor or synchronized to an external clock source of up to 2.5MHz. This allows selection of the optimum frequency for any given design. The soft-start feature limits the inrush current drawn from the supply upon start-up. A PGOOD pin indicates when the output of the step-up converter is in regulation and the Piezo drivers can start switching. The step-up converter and both Piezo drivers have their own shutdown control.

The high output voltage of the step-up converter, adjustable up to 40V, is available for the drivers at the OUT pin. The LT3572 is capable of inde-

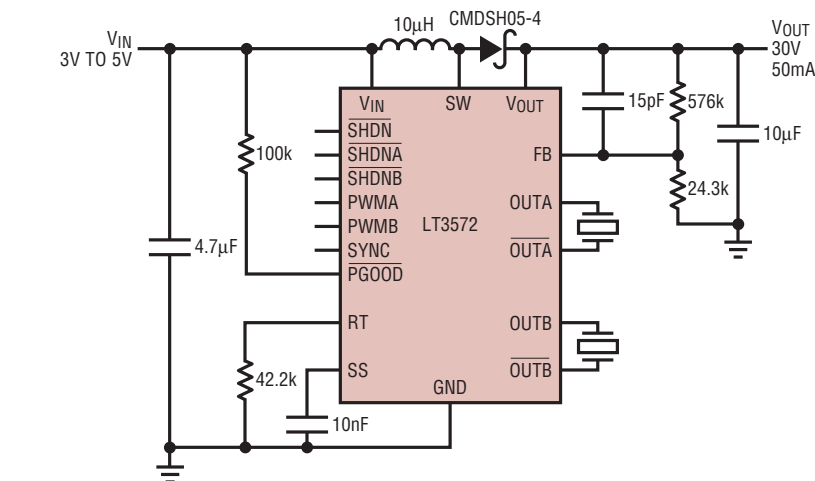


Figure 1. A typical LT3572 Piezo motor drive circuit

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pendently driving two Piezo motors with two input PWM signals. The motors respond accordingly based on the duty cycle and the frequency of the PWM signals. The drivers operate in an H-bridge fashion, where the OUTA and OUTB pins are the same polarity as the PWMA and PWMB pins respectively and the $\overline{\text{OUTA}}$ and $\overline{\text{OUTB}}$ pins are inverted from PWMA and PWMB respectively. Each H-bridge can drive a 2.2nF capacitor with rise and fall times less than 100ns. Figure 2

shows a typical layout. The LT3572 is available in a small 4mm x 4mm QFN package.

Conclusion

The LT3572 is a complete Piezo motor drive solution with a built-in high efficiency 40V, 1.2A internal switch and integrated dual 500mA full bridge drivers. It includes other features to minimize the application footprint, including fixed frequency, soft-start, and internal compensation. **LT**

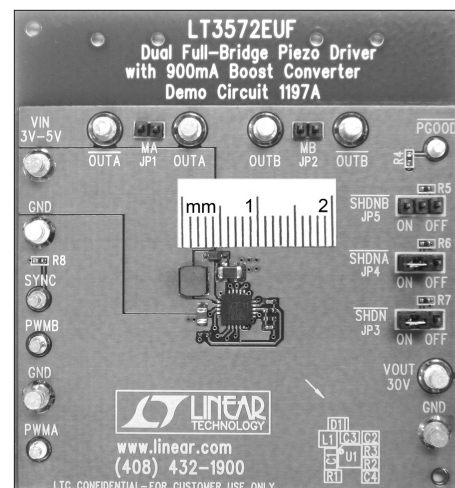


Figure 2. Typical layout for the Figure 1 converter