
PRODUCT INFORMATION

Vol. 64

Full and Half Excitation Two-Phase Stepping Motor Drivers Developed

Phase signal distribution IC incorporated in the same package.

STK672-110, STK672-120

Overview

Two-phase stepping motors are motors that are advanced by a fixed angle by applying or removing the motor drive current from the various coils in a controlled manner. These motors are optimal for use in precision equipment, and are widely used in both office and industrial applications. For example, copiers, a typical office product, use two-phase stepping motors for original document handling, paper handling, and post-processing such as sorting.

Drive of motors requires following three function blocks: (1) four MOSFETs, (2) a current detection circuit, and (3) 4-signal distribution IC to another MOSFET. As for the STK6710 Series which Sanyo has provided since 1990, a component which combines two blocks above (1) and (2) is configured into the package, though another separate IC for (3) is also required.

Now, Sanyo has developed the STK672-100 Series hybrid ICs that combine the phase signal distribution IC into the STK6710 Series ICs and thus simplify the motor drive structure. This new series reduces the number of components in this system from two to one, and furthermore, achieves a package size reduction of about 70% as compared to the earlier series. This can both simplify parts management in the manufacturing process and also provide a significant reduction in the printed circuit board mounting area.

This new series allows stepping motor rotation to be controlled easily by simplifying the four input signals previously required to a single clock input signal by incorporating the phase distribution IC on chip and by providing input pins for 2-phase (full) and 1-2 phase (half) excitation timing switching and direction switching. The motor phase currents are controlled by comparing the voltage drop across an internal current detection resistor with a reference voltage externally applied. This external reference voltage can be arbitrary determined by dividing the 5 V power supply voltage with a resistor. Other improvements include a reduction in the resistance of the current detection resistor from the 0.33 Ω in the earlier STK6710 Series products to 0.22 Ω , thus reducing the internal power dissipation in these hybrid ICs.

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Features

- Unipolar constant-current control technique circuit structure that incorporates on chip the phase signal distribution IC required with the earlier STK6710 Series full-stepping drivers.
- Printed circuit board mounting area reduced by 70% from that required for the STK6710 Series products.
- Allows the motor speed to be controlled to be proportional to the frequency of an external clock signal by incorporating the phase signal distribution IC in the same package.
- Supports two types of excitation timing, two phase (full) and 1-2 phase (half), and rotation direction control
- Built-in current detection resistor (STK672-110: 0.22 Ω , STK672-120: 0.165 Ω)

Specifications

- Motor current output
 - STK672-110: 1.8 A (2.65 A at a substrate temperature of 25°C)
 - STK672-120: 2.4 A (4.0 A at a substrate temperature of 25°C)
- Motor drive voltage: DC 10 to 42 V
- Input clock frequency: DC to 25 kHz. Minimum pulse width: 20 μ s
- Package dimensions
 - STK672-110: 32.5 \times 26.0 \times 8.5 mm (width \times height \times depth)
 - STK672-120: 46.6 \times 25.5 \times 8.5 mm (width \times height \times depth)

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Sample Availability

Samples of the STK672-110 and STK672-120 are available in August 1998; production quantities of the STK672-110 will be anticipated in November 1998 and the STK672-120 will be anticipated in February 1999.

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