

# STK672-040GEVB, STK672-050GEVB, STK672-060GEVB



ON Semiconductor®

<http://onsemi.com>

## STK672 Series Evaluation Board User's Manual

Thick-Film Hybrid IC Unipolar  
Constant-current Chopper (external  
Excitation PWM) Circuit with Built-in  
Microstepping Controller Stepping Motor  
Driver (sine wave drive)

### EVAL BOARD USER'S MANUAL

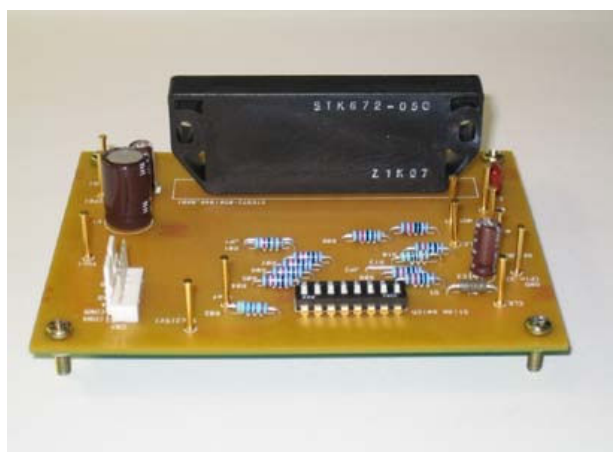


Figure 1. STK672 Series Evaluation Boards

This Evaluation Board User's Manual describes the set-up and use of the STK672 Series Evaluation Board for SANYO Semiconductor (An ON Semiconductor Company) Thick-Film Hybrid IC Unipolar Constant-Current Chopper Circuit with Built-in Microstepping Controller Stepping Motor Driver devices STK672-040-E, STK672-050-E, and STK672-060-E. For datasheets and additional information on these devices, please visit the ON Semiconductor website at [www.onsemi.com](http://www.onsemi.com)

# STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

## EVALUATION BOARD

STK672-040-E and STK672-060-E (100.0 mm x 80.0 mm x 1.6 mm, phenol 1-layer board)

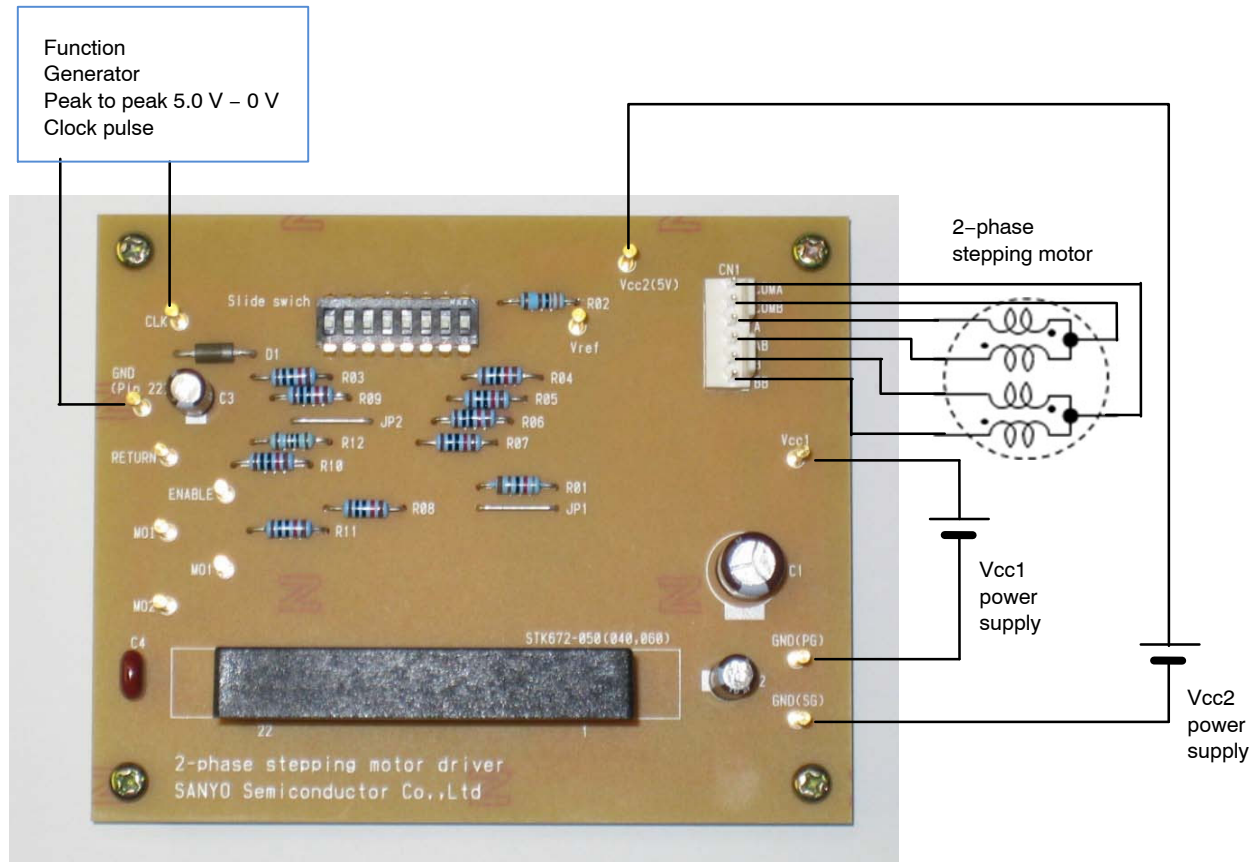


Figure 2. STK672-040-E / STK672-060-E Evaluation Board

# STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

## EVALUATION BOARD

STK672-050-E (100.0 mm x 80.0 mm x 1.6 mm, phenol 1-layer board)

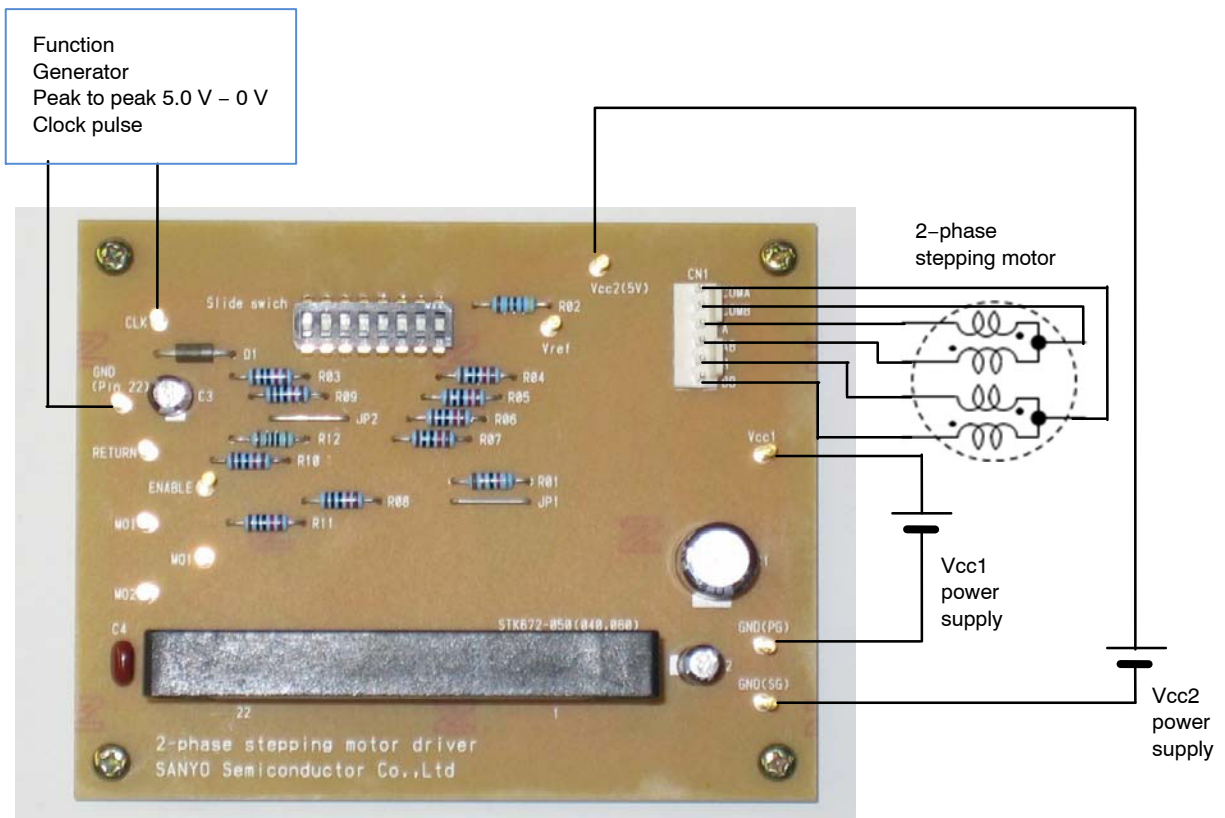
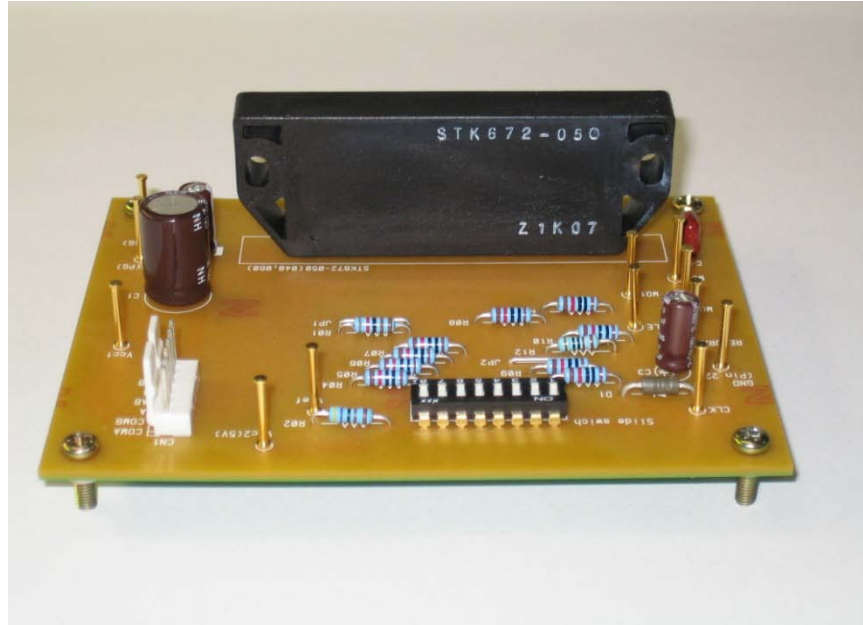


Figure 3. STK672-050-E Evaluation Board

## STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

### SUBSTRATE SPECIFICATIONS

(Substrate recommended for operation of STK672-050-E)

Size: 100 mm x 80 mm x 1.6 mm 1-layer board

Material: Phenol

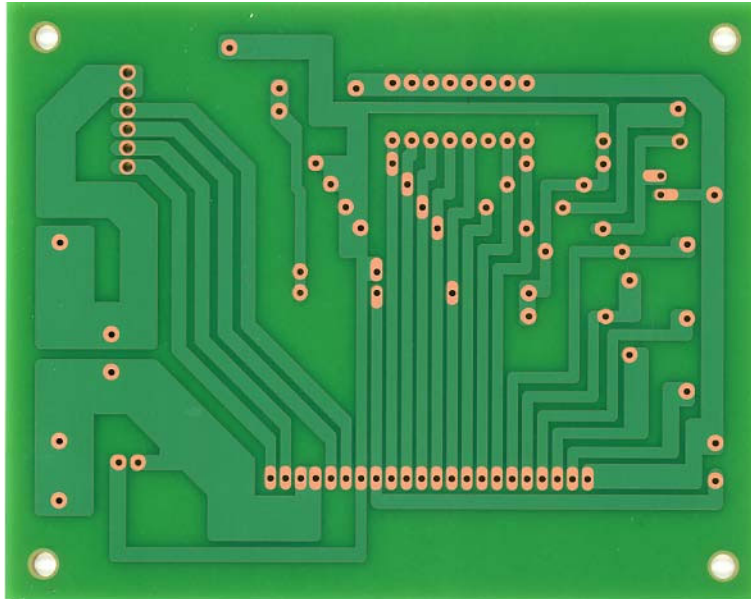


Figure 4. Copper Side (35  $\mu$ )

### ALLOWABLE POWER DISSIPATION (Reference value)

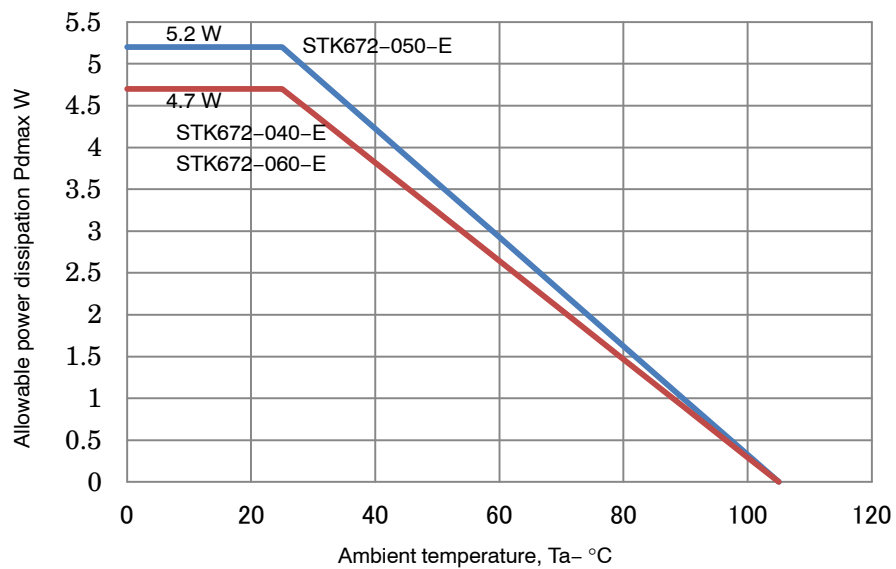


Figure 5. Allowable Power Dissipation

EVALUATION CIRCUIT

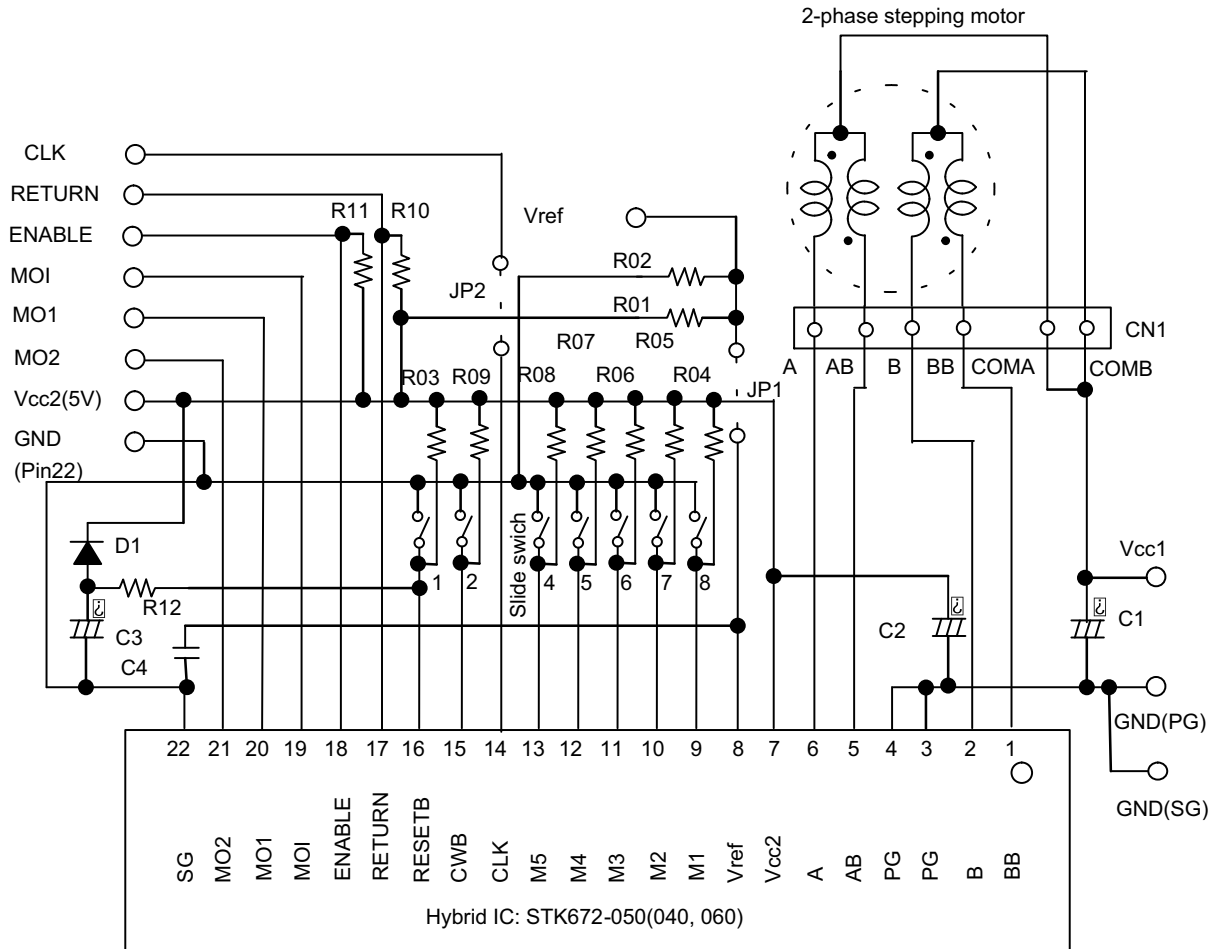


Figure 6. Evaluation Circuit

# STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

## BILL OF MATERIALS

Table 1. BILL OF MATERIALS FOR STK672-050-E EVALUATION BOARD

| Designator   | QTY | Description                          | Value              | Tolerance  | Footprint | Manufacturer                                         | Manufacturer Part Number | Substitution Allowed | Lead Free |
|--------------|-----|--------------------------------------|--------------------|------------|-----------|------------------------------------------------------|--------------------------|----------------------|-----------|
| C1           | 1   | Vcc1 Bypass Capacitor                | 220 $\mu$ F / 50 V | $\pm 20\%$ |           | SUN ELECTRONICS                                      | 50ME220CA                | YES                  | YES       |
| C2           | 1   | Vcc2 Bypass Capacitor                | 10 $\mu$ F / 50 V  | $\pm 20\%$ |           | SUN ELECTRONICS                                      | 50ME10CA                 | YES                  | YES       |
| C3           | 1   | Capacitor for power on reset circuit | 10 $\mu$ F / 50 V  | $\pm 20\%$ |           | SUN ELECTRONICS                                      | 50ME10CA                 | YES                  | YES       |
| C4           | 1   | Vref stabilization Capacitor         | 0.1 $\mu$ F / 50 V | $\pm 10\%$ |           | Panasonic                                            | ECQV1H104JL2             | YES                  | YES       |
| R01          | 1   | Resistor to set Vref                 |                    | $\pm 1\%$  |           | AKAHANE ELECTRONICS                                  | RN14S****FK              | YES                  | YES       |
| R02          | 1   | Resistor to set Vref                 |                    | $\pm 1\%$  |           | AKAHANE ELECTRONICS                                  | RN14S****FK              | YES                  | YES       |
| R03 to R11   | 9   | Pull-up Resistor                     | 10 k $\Omega$      | $\pm 5\%$  |           | AKAHANE ELECTRONICS                                  | RN14S103JK               | YES                  | YES       |
| R12          | 1   | Resistor for power on reset circuit  | 1 k $\Omega$       | $\pm 5\%$  |           | AKAHANE ELECTRONICS                                  | RN14S102JK               | YES                  | YES       |
| D1           | 1   | Diode for power on reset circuit     |                    |            |           | SANYO Semiconductor<br>(An ON Semiconductor Company) | DS135AE                  | YES                  | YES       |
| HIC          | 1   | Hybrid IC                            |                    |            |           | SANYO Semiconductor<br>(An ON Semiconductor Company) | STK672-050               | NO                   | YES       |
| CN1          | 1   | Vertical Header                      |                    |            |           | MOLEX                                                | 5045-06A                 | YES                  | YES       |
| Slide switch | 1   | Dip slide switch                     |                    |            |           | NIHON KAIHEIKI                                       | JS01-08AP4-ST            | YES                  | YES       |
| JP1, JP2     | 2   | Jumper                               |                    |            |           | Mac-Eight                                            | JR-4                     | YES                  | YES       |
| TP1 to TP12  | 12  | Test Point                           |                    |            |           | Mac-Eight                                            | ST-1-3                   | YES                  | YES       |

NOTE: R01 and R02 are used to Vref for current setting.  
Therefore their value is not mentioned in this table.

# STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

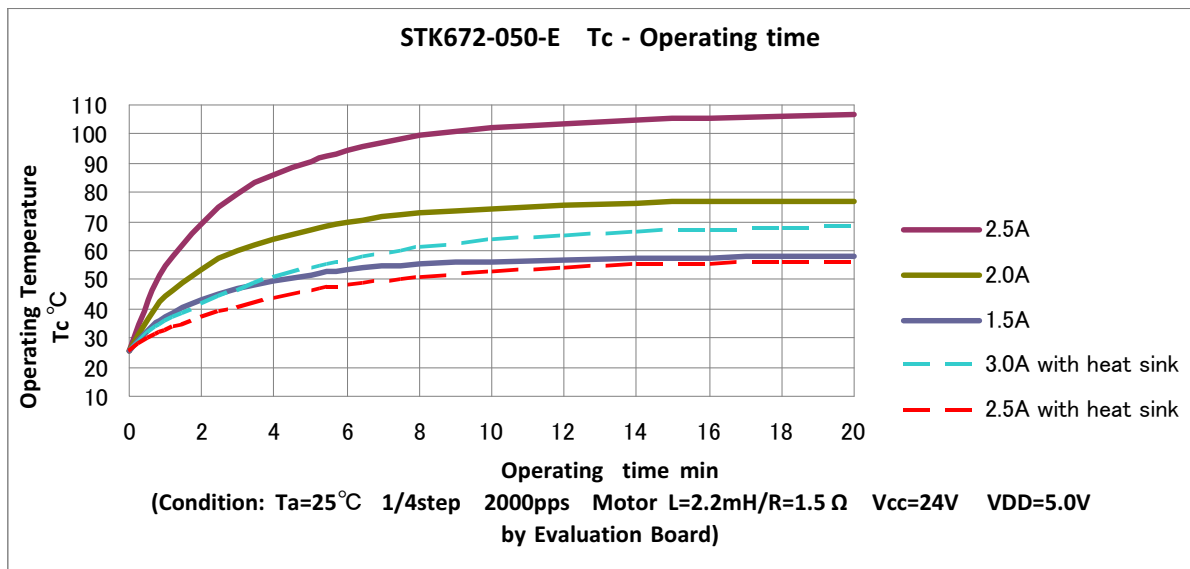
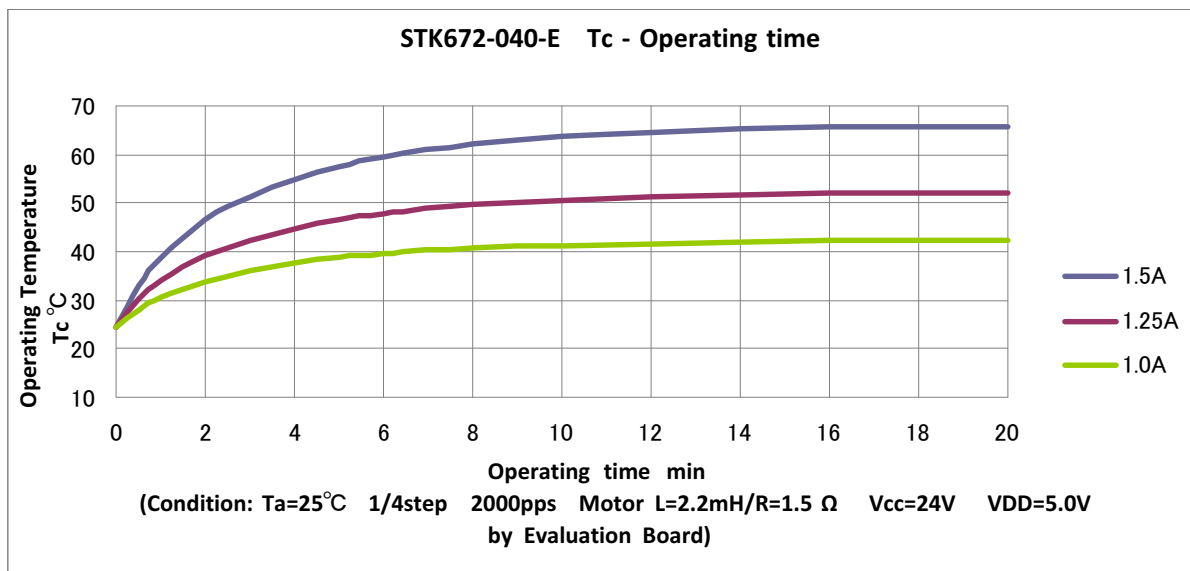
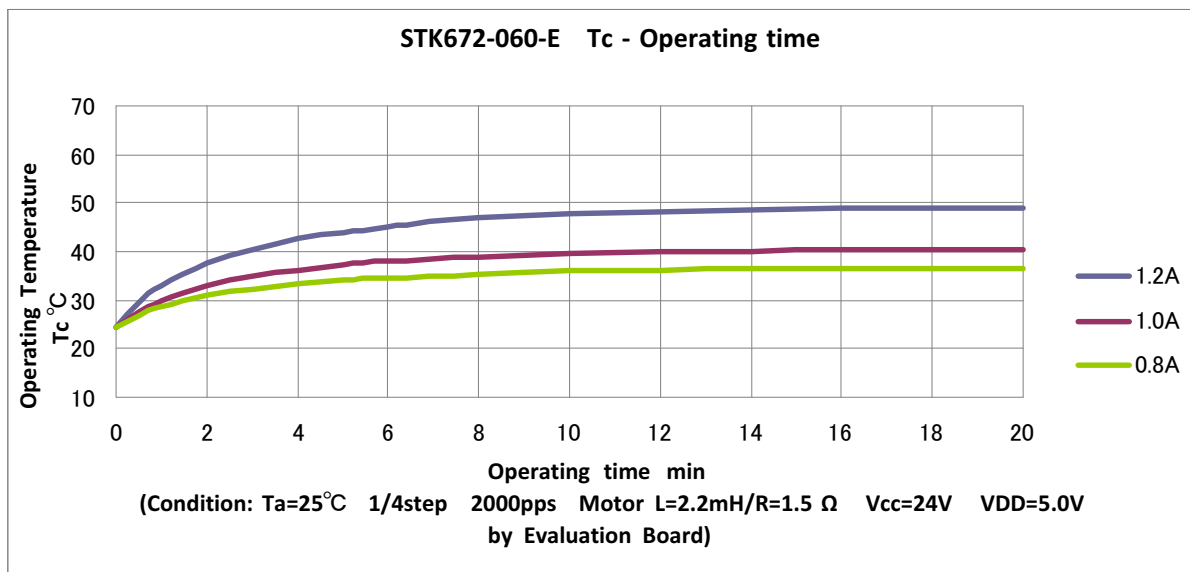


Figure 7. Operating Temperature

## STK672-040GEVB, STK672-050GEVB, STK672-060GEVB

NOTES: Heat sink size used in STK672-050-E  
IOH = 3.0 A and 2.5 A: 100 mm X 70 mm X  
2.0 mm Al plate (no surface finish)  
The Tc temperature should be checked in the  
center of the metal surface of the product  
package.

### EVALUATION BOARD SETUP

#### [Supply Voltage]

Vcc1 (10 to 45 V): Power Supply for stepping motor  
Vref (0 to 2.5 V): Const. Current Control for Reference  
Voltage  
Vcc2 (5 V): Power Supply for internal logic IC

#### [Toggle Switch State]

ON Side: Low (GND)  
OFF Side: High (5 V pull up resistors)

#### [Operation Guide]

1. Motor Connection:  
Connect the stepping motor to A, AB, B, BB,  
COMA, and COMB.
2. Initial Condition Setting:  
Set "ON" the slide switch RESETB, and set "ON  
or OFF" M1 to M5 depend on step mode, and set  
"ON or OFF" CWB, and set low CLK.
3. Power Supply:  
At first, supply DC voltage to Vcc2, and VREF.  
Next, supply DC voltage to Vcc1.
4. Ready for Operation from Standby State:  
Turn "OFF" the slide switch RESETB.  
Output A and BB are set initial position 70%.
5. Motor Operation:  
Input the CLK signal into the terminal CLK.

#### [Setting the motor current]

The motor current IOH is set by the Vref voltage on the  
hybrid IC pin 8. The following formula gives the  
relationship between IOH and Vref.

##### STK672-040-E

$IOH = (1/3) \times Vref / Rs$ , Rs: The hybrid IC internal current  
detection resistor (0.33  $\Omega$  3%)  
 $Vref = Vcc2 (5.0 V) \times R02 / (R01 + R02) = IOH \times Rs \times 3$   
In case of IOH = 1.2 A, Vref = 1.2 x 0.33 x 3 = 1.19 V

##### STK672-050-E

$IOH = (1/3) \times Vref / Rs$ , Rs: The hybrid IC internal current  
detection resistor (0.2  $\Omega$  3%)  
 $Vref = Vcc2 (5.0 V) \times R02 / (R01 + R02) = IOH \times Rs \times 3$   
In case of IOH = 2.0 A, Vref = 2.0 x 0.2 x 3 = 1.2 V

##### STK672-060-E

$IOH = (1/7.66) \times Vref / Rs$ , Rs: The hybrid IC internal current  
detection resistor (0.22  $\Omega$  3%)  
 $Vref = Vcc2 (5.0 V) \times R02 / (R01 + R02) = IOH \times Rs \times 7.66$   
In case of IOH = 0.8 A, Vref = 0.8 x 0.22 x 7.66 = 1.35 V

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