

# 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

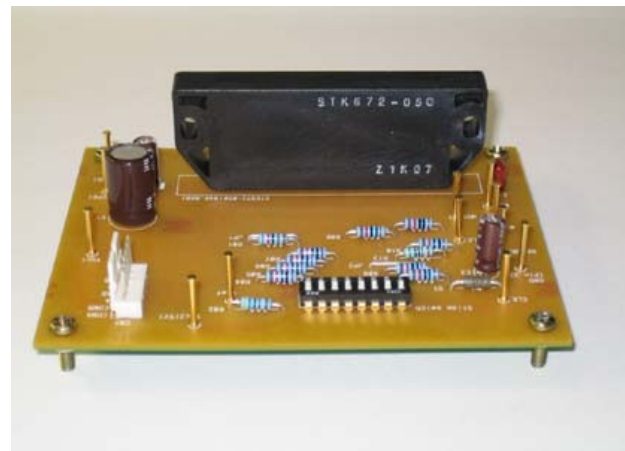


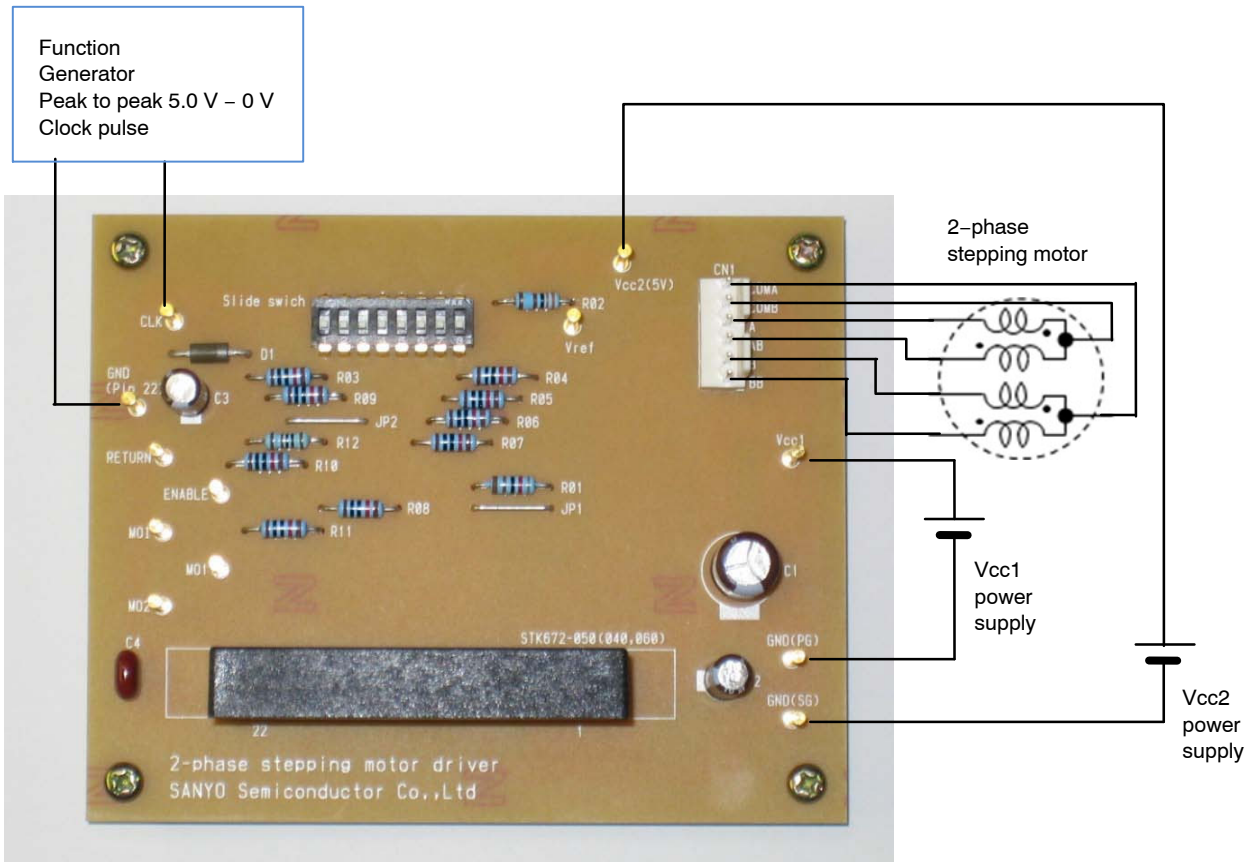
Figure 1. STK672 Series Evaluation Boards

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)

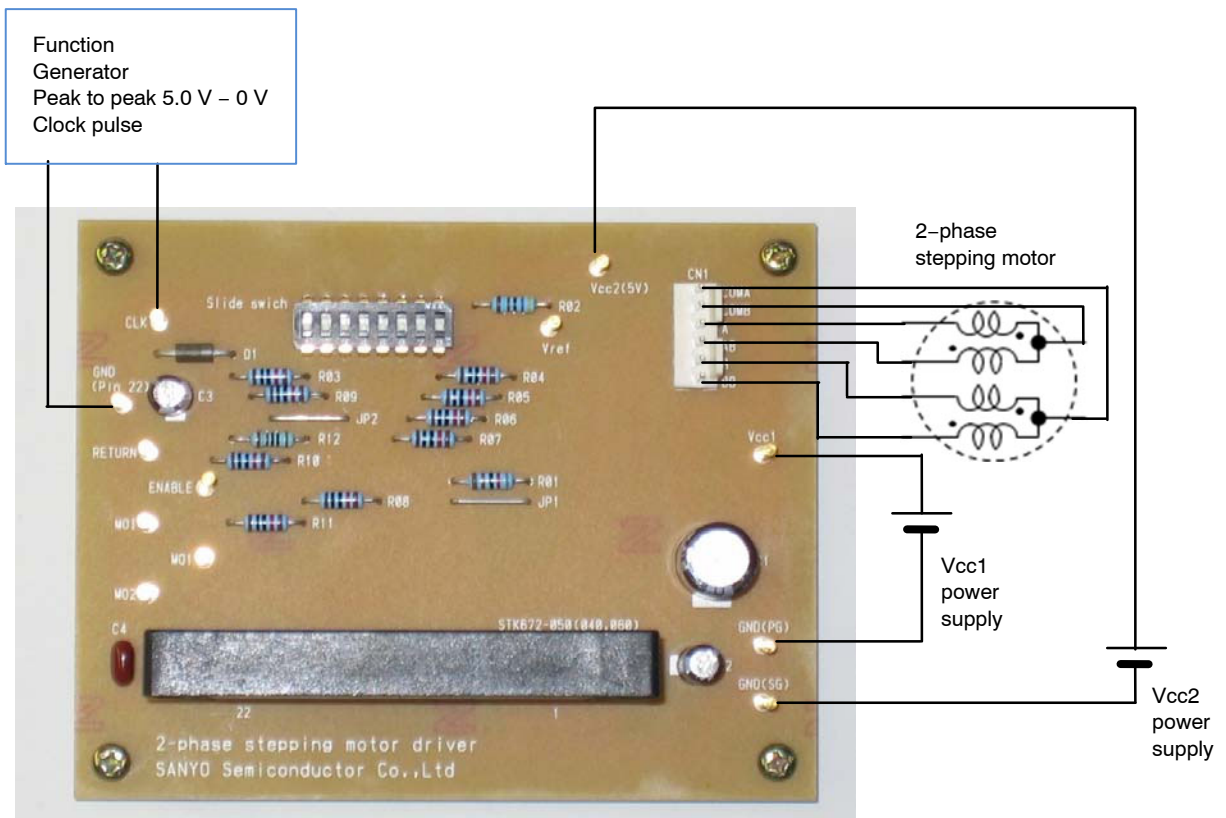
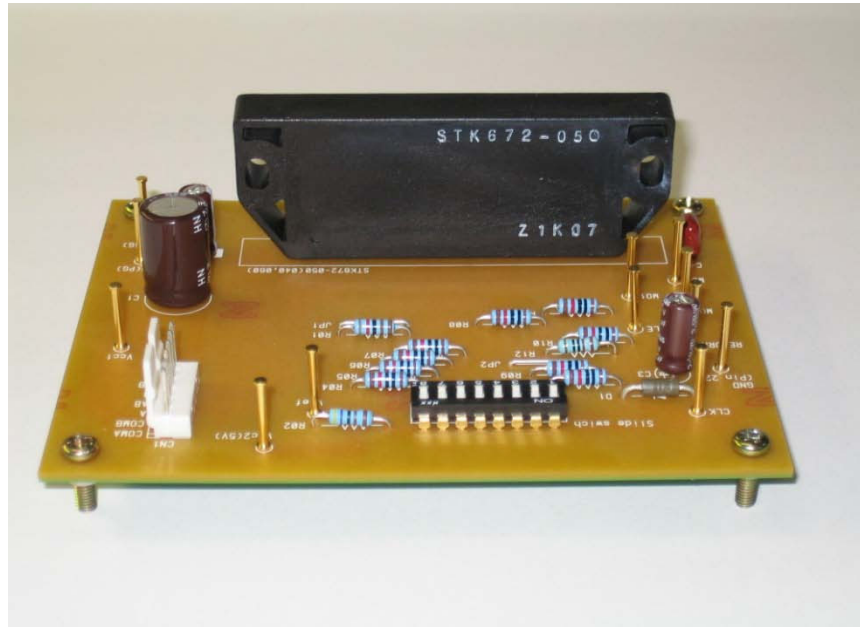


Figure 3. STK672-050-E Evaluation Board

# 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

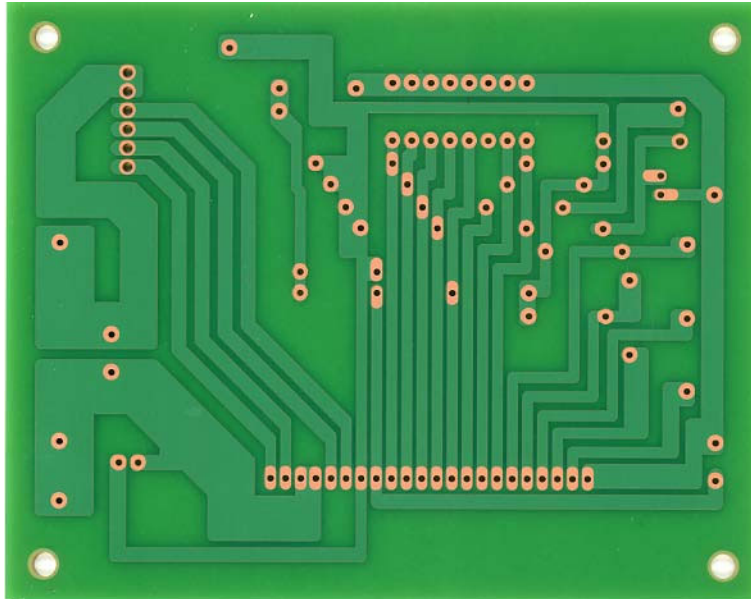


Figure 4. Copper Side (35  $\mu$ )

## ALLOWABLE POWER DISSIPATION (Reference value)

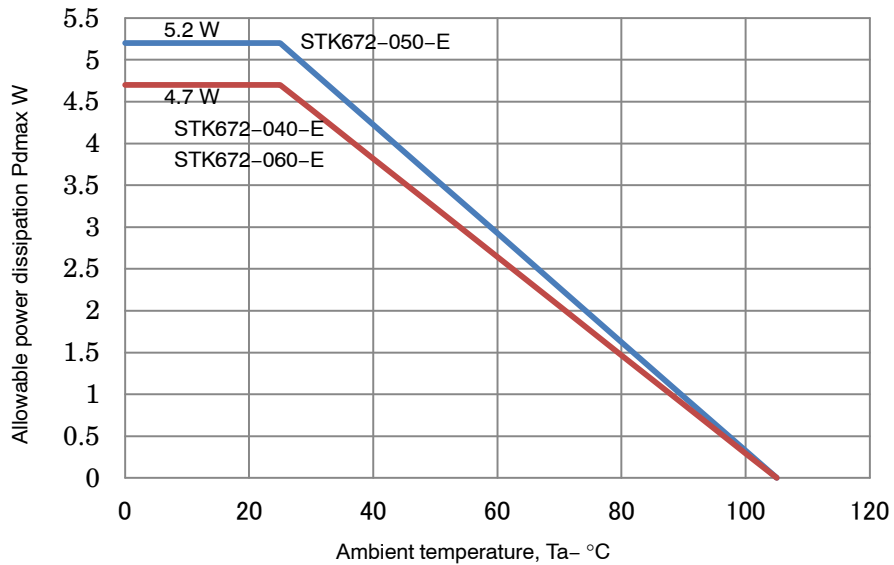


Figure 5. Allowable Power Dissipation

EVALUATION CIRCUIT

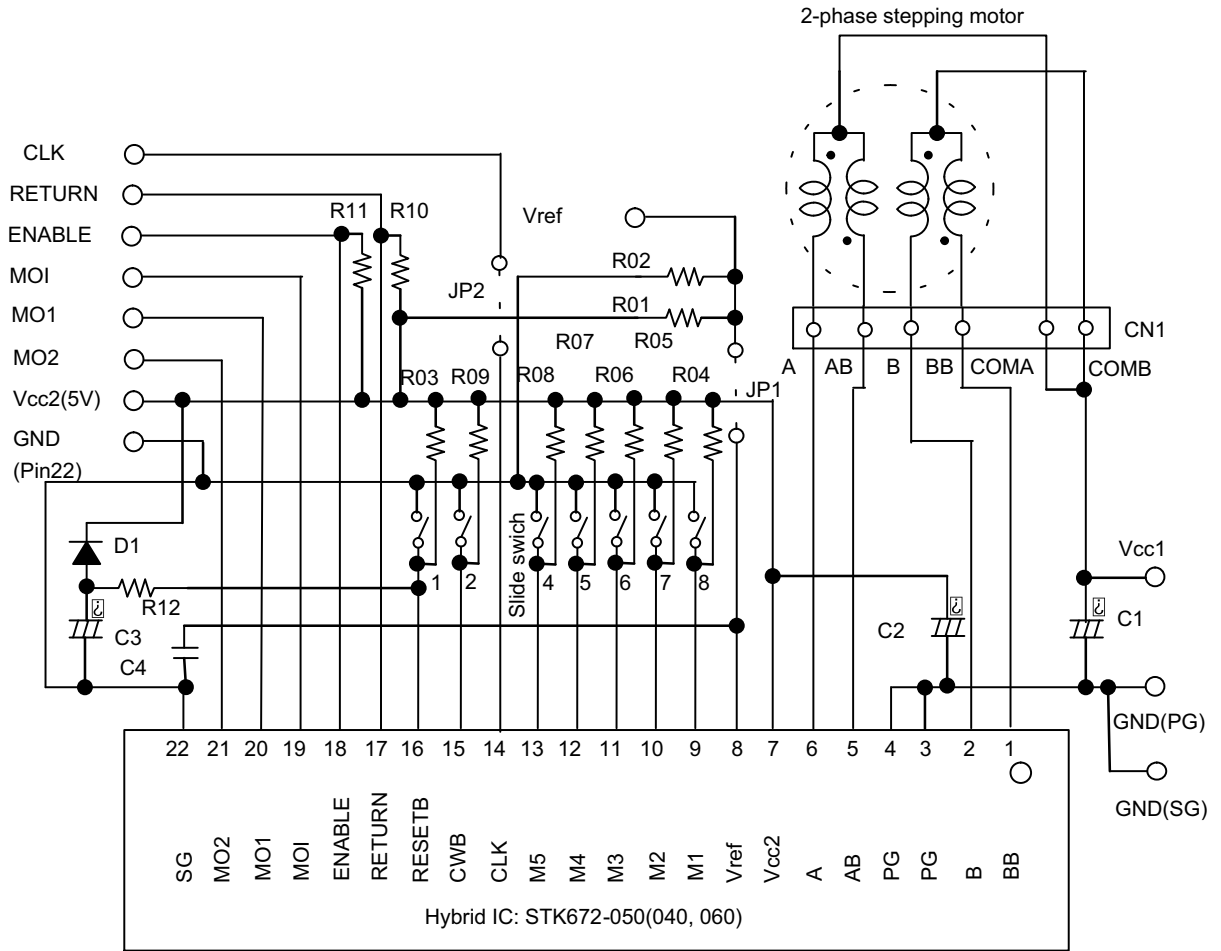


Figure 6. Evaluation Circuit

# 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	Foot-print	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 (An ON Semiconductor Company)	DS135AE	YES	YES
HIC	1	Hybrid IC				SANYO Semiconductor (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

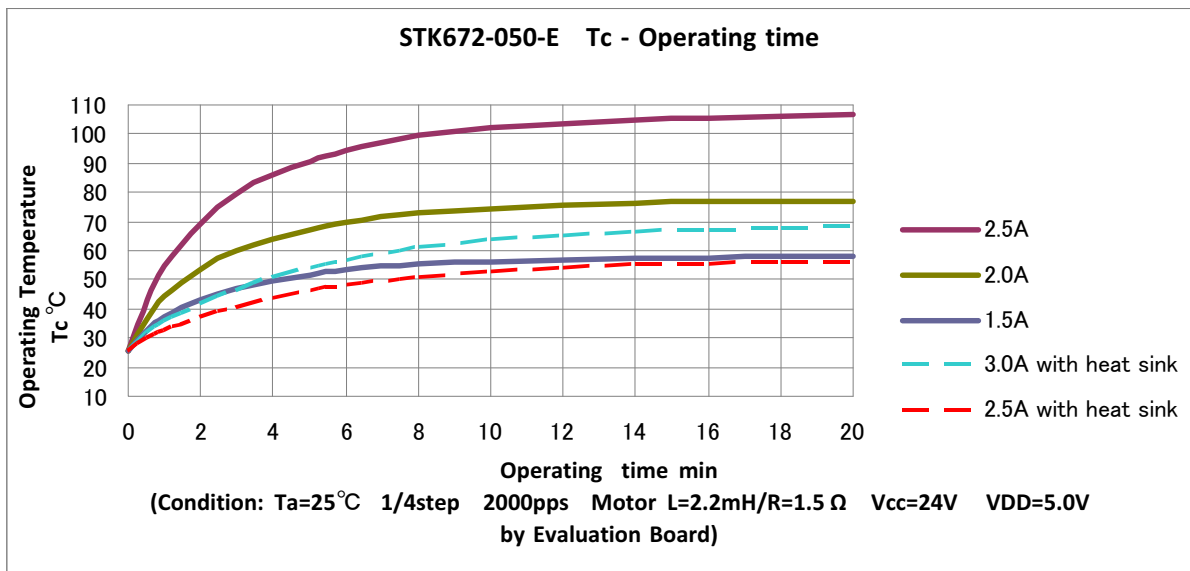
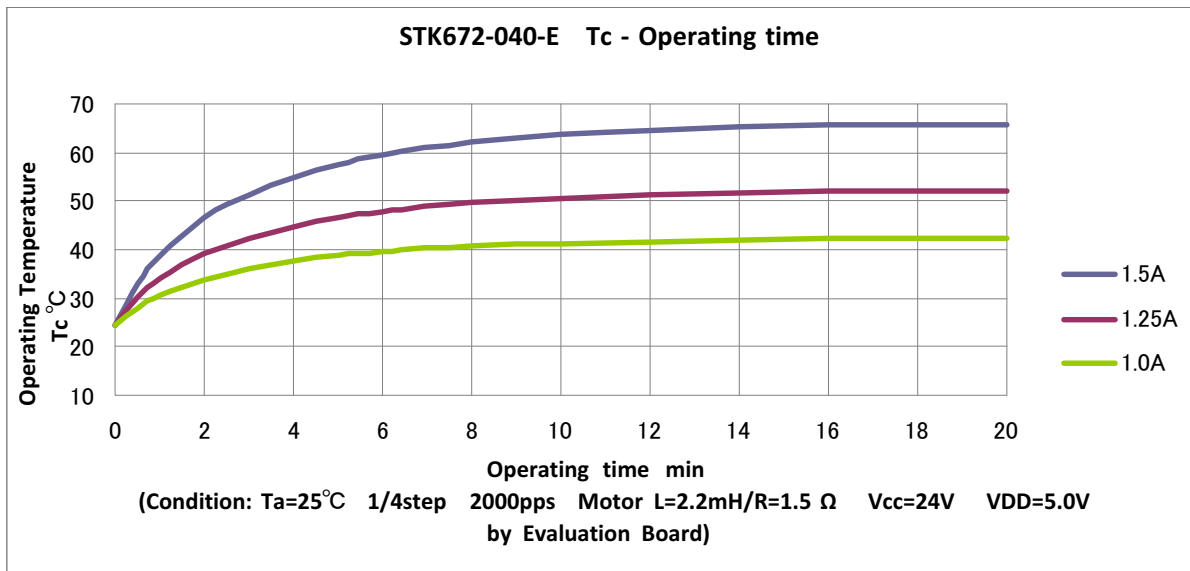
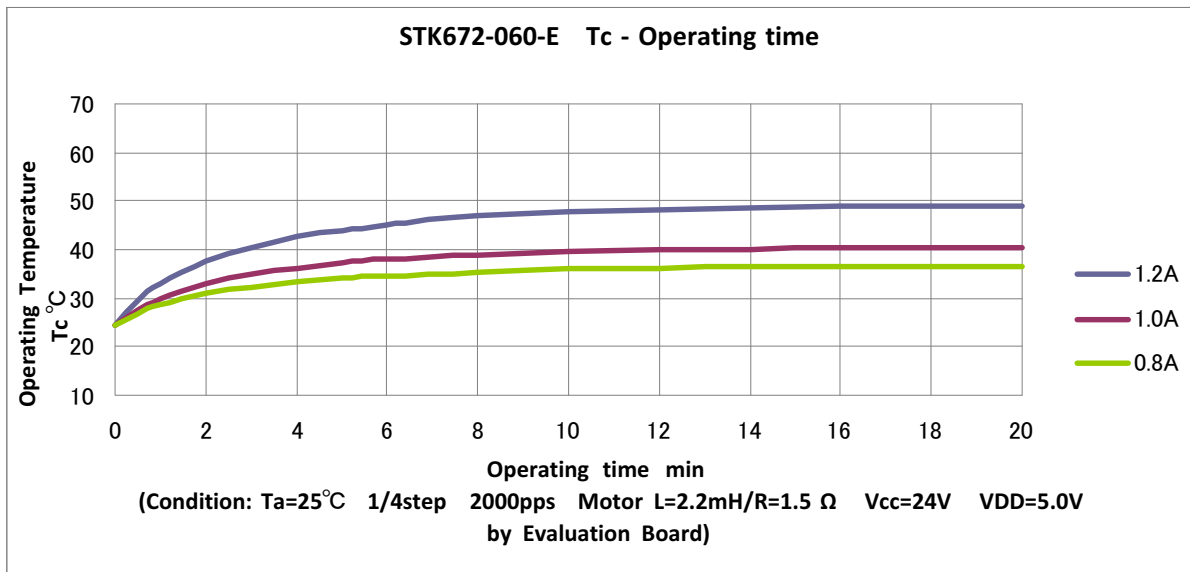


Figure 7. Operating Temperature

## 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



**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

The evaluation board/kit (research and development board/kit) (hereinafter the "board") is not a finished product and is not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and will only be used in laboratory/development areas by persons with an engineering/technical training and familiar with the risks associated with handling electrical/mechanical components, systems and subsystems. This person assumes full responsibility/liability for proper and safe handling. Any other use, resale or redistribution for any other purpose is strictly prohibited.

**THE BOARD IS PROVIDED BY ONSEMI TO YOU "AS IS" AND WITHOUT ANY REPRESENTATIONS OR WARRANTIES WHATSOEVER. WITHOUT LIMITING THE FOREGOING, ONSEMI (AND ITS LICENSORS/SUPPLIERS) HEREBY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES IN RELATION TO THE BOARD, ANY MODIFICATIONS, OR THIS AGREEMENT, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY AND ALL REPRESENTATIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON-INFRINGEMENT, AND THOSE ARISING FROM A COURSE OF DEALING, TRADE USAGE, TRADE CUSTOM OR TRADE PRACTICE.**

**onsemi** reserves the right to make changes without further notice to any board.

You are responsible for determining whether the board will be suitable for your intended use or application or will achieve your intended results. Prior to using or distributing any systems that have been evaluated, designed or tested using the board, you agree to test and validate your design to confirm the functionality for your application. Any technical, applications or design information or advice, quality characterization, reliability data or other services provided by **onsemi** shall not constitute any representation or warranty by **onsemi**, and no additional obligations or liabilities shall arise from **onsemi** having provided such information or services.

**onsemi** products including the boards are not designed, intended, or authorized for use in life support systems, or any FDA Class 3 medical devices or medical devices with a similar or equivalent classification in a foreign jurisdiction, or any devices intended for implantation in the human body. You agree to indemnify, defend and hold harmless **onsemi**, its directors, officers, employees, representatives, agents, subsidiaries, affiliates, distributors, and assigns, against any and all liabilities, losses, costs, damages, judgments, and expenses, arising out of any claim, demand, investigation, lawsuit, regulatory action or cause of action arising out of or associated with any unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of any products and/or the board.

This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and may not meet the technical requirements of these or other related directives.

FCC WARNING – This evaluation board/kit is intended for use for engineering development, demonstration, or evaluation purposes only and is not considered by **onsemi** to be a finished end product fit for general consumer use. It may generate, use, or radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment may cause interference with radio communications, in which case the user shall be responsible, at its expense, to take whatever measures may be required to correct this interference.

**onsemi** does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: **onsemi** shall not be liable for any special, consequential, incidental, indirect or punitive damages, including, but not limited to the costs of requalification, delay, loss of profits or goodwill, arising out of or in connection with the board, even if **onsemi** is advised of the possibility of such damages. In no event shall **onsemi**'s aggregate liability from any obligation arising out of or in connection with the board, under any theory of liability, exceed the purchase price paid for the board, if any.

The board is provided to you subject to the license and other terms per **onsemi**'s standard terms and conditions of sale. For more information and documentation, please visit [www.onsemi.com](http://www.onsemi.com).

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)