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

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)

ON Semiconductor®

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EVAL BOARD USER'S MANUAL

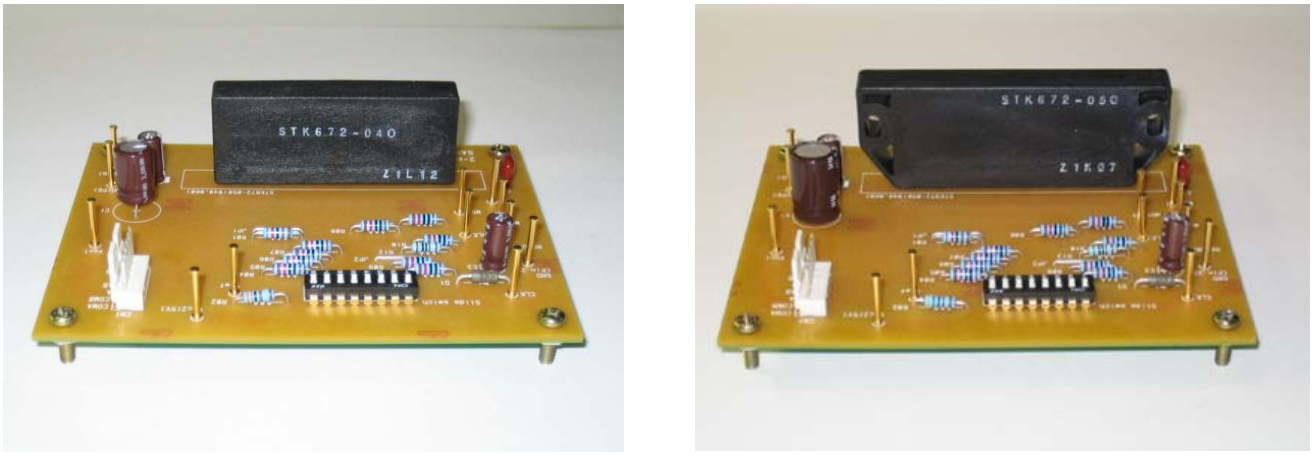


Figure 1. STK672 Series Evaluation Boards

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

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EVALUATION BOARD

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



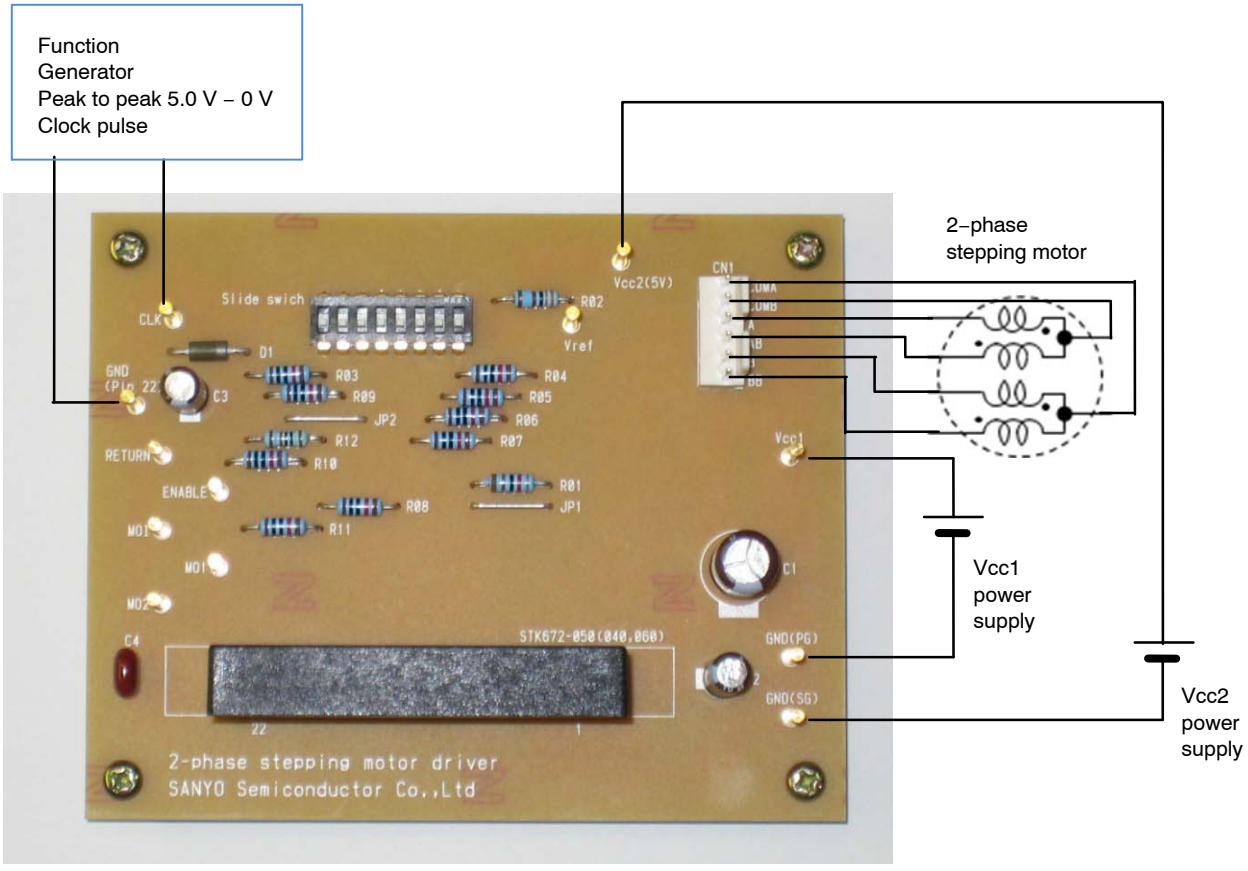
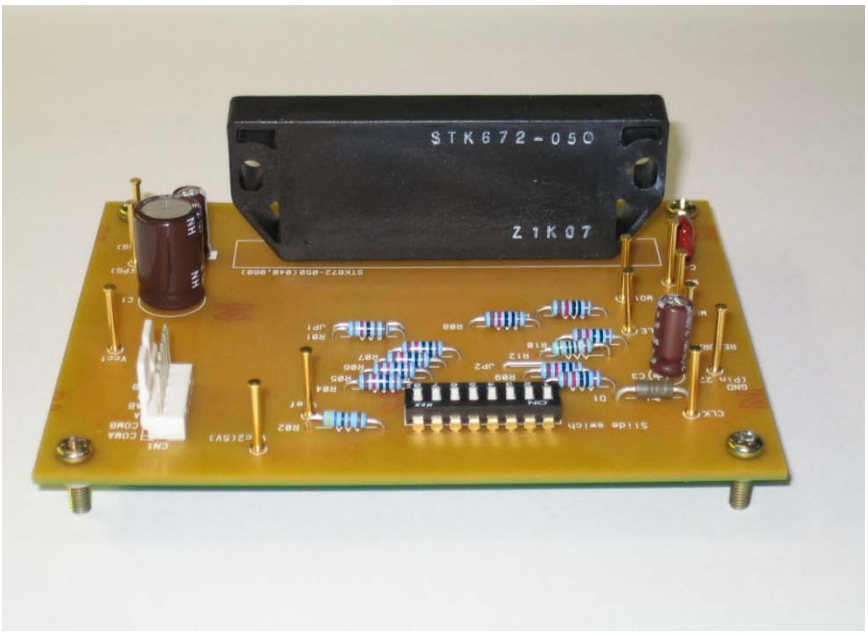


Figure 2. STK672−040−E / STK672−060−E Evaluation Board

EVALUATION BOARD

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



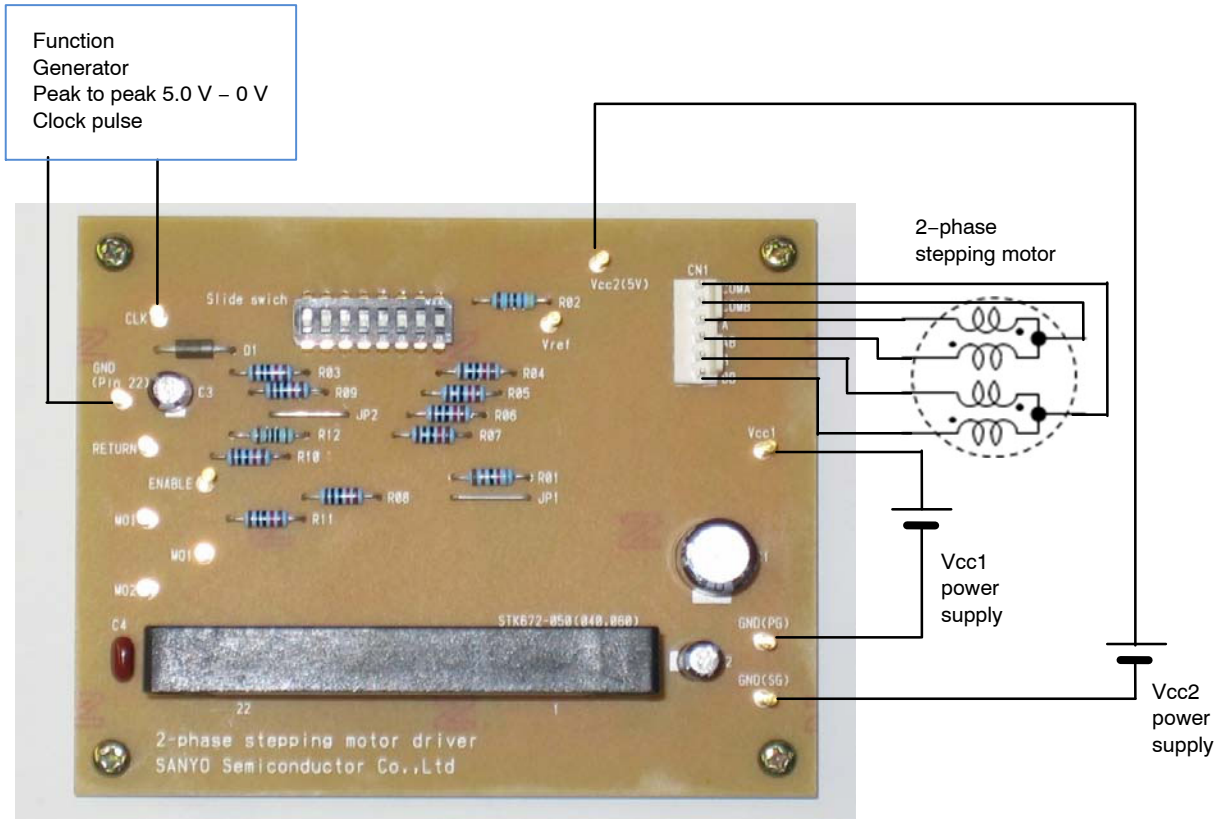


Figure 3. STK672−050−E Evaluation Board

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

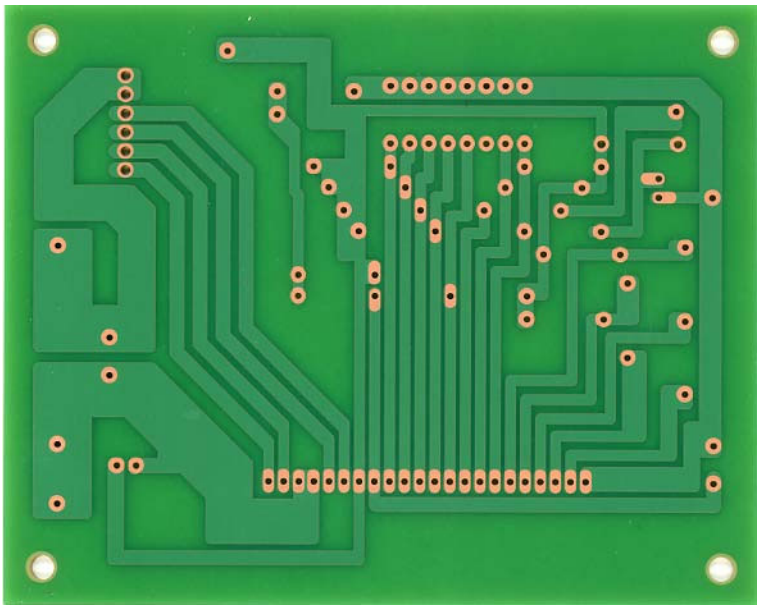


Figure 4. Copper Side (35 μ)

ALLOWABLE POWER DISSIPATION (Reference value)

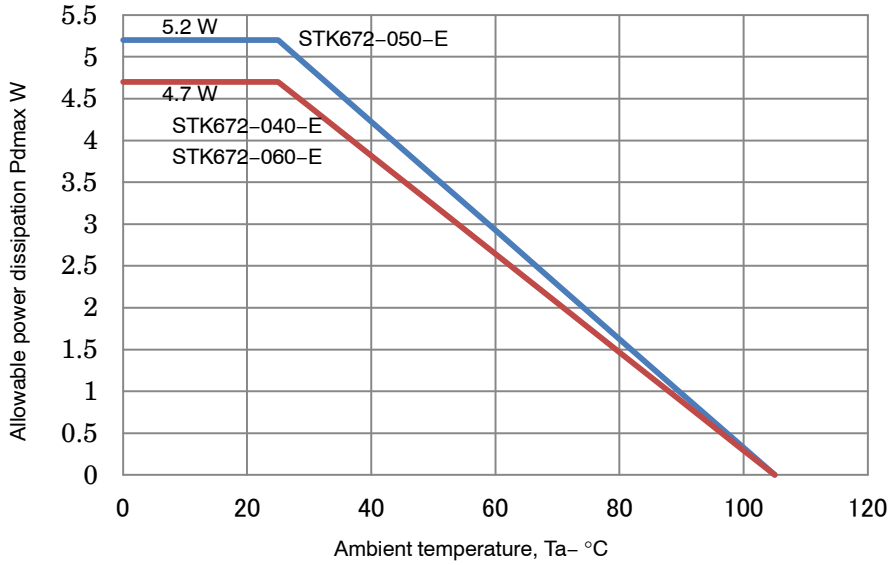


Figure 5. Allowable Power Dissipation

EVALUATION CIRCUIT

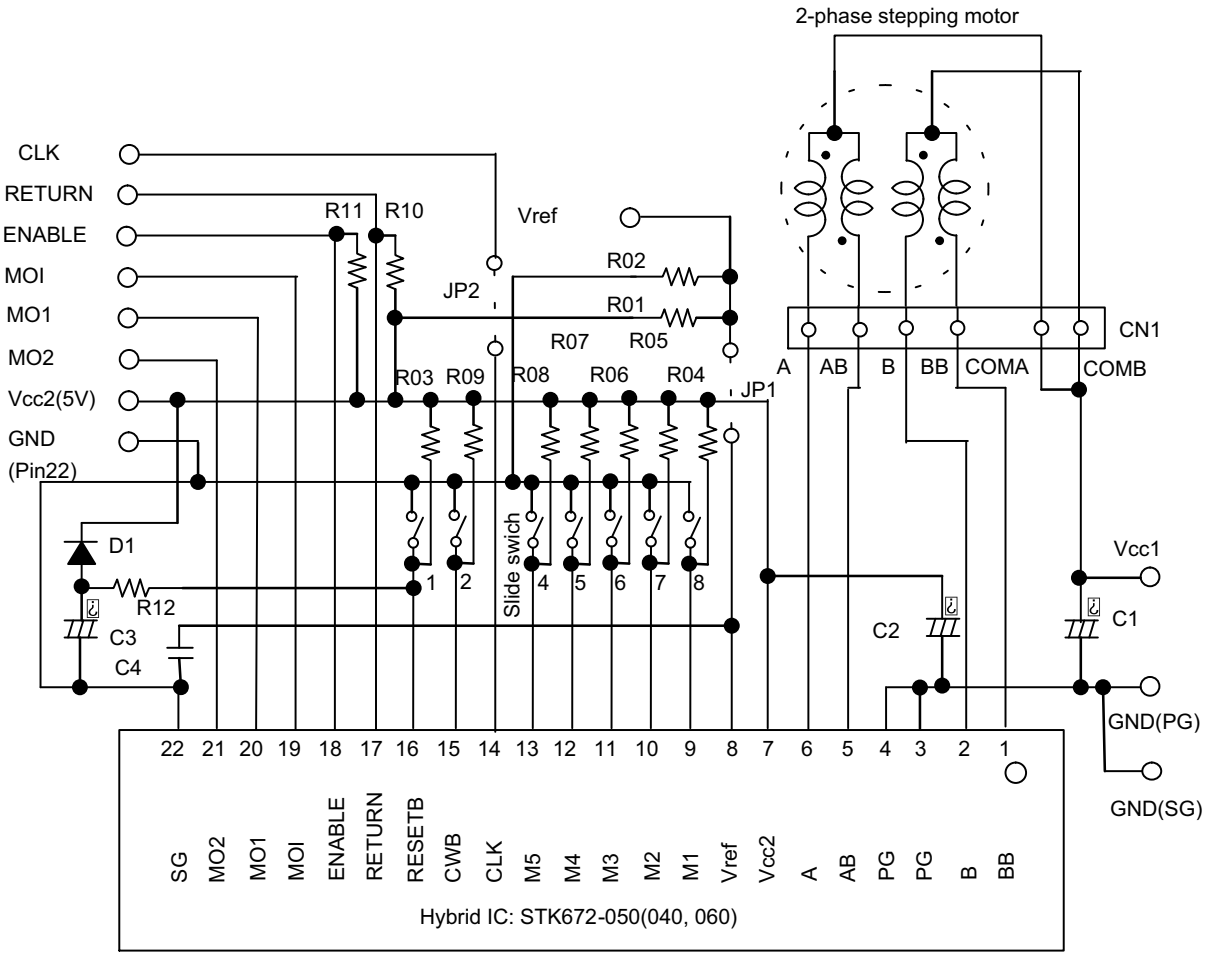


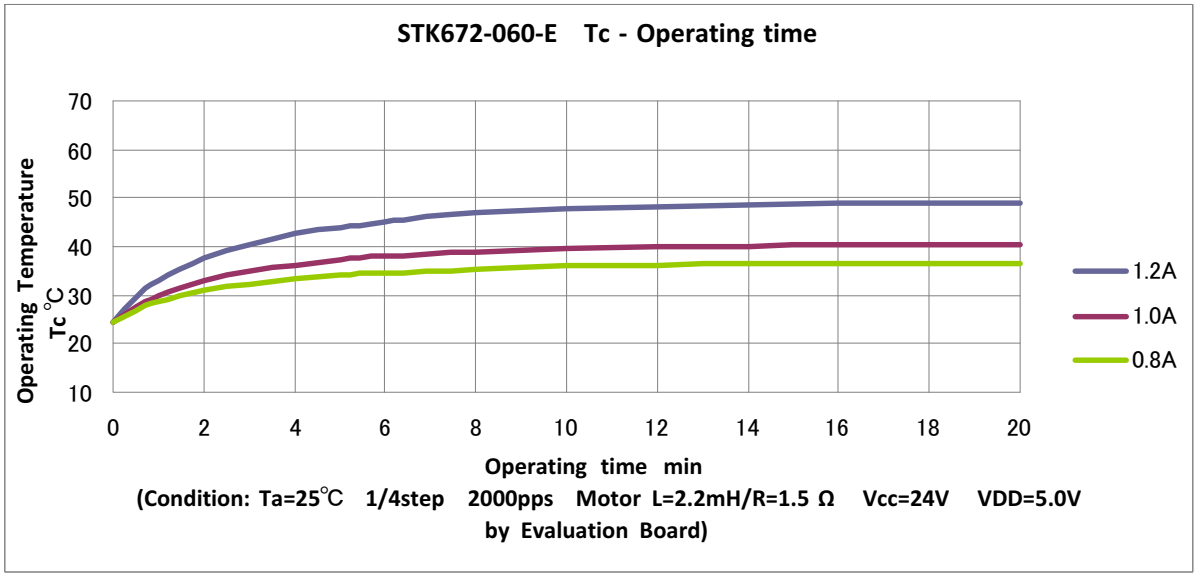
Figure 6. Evaluation Circuit

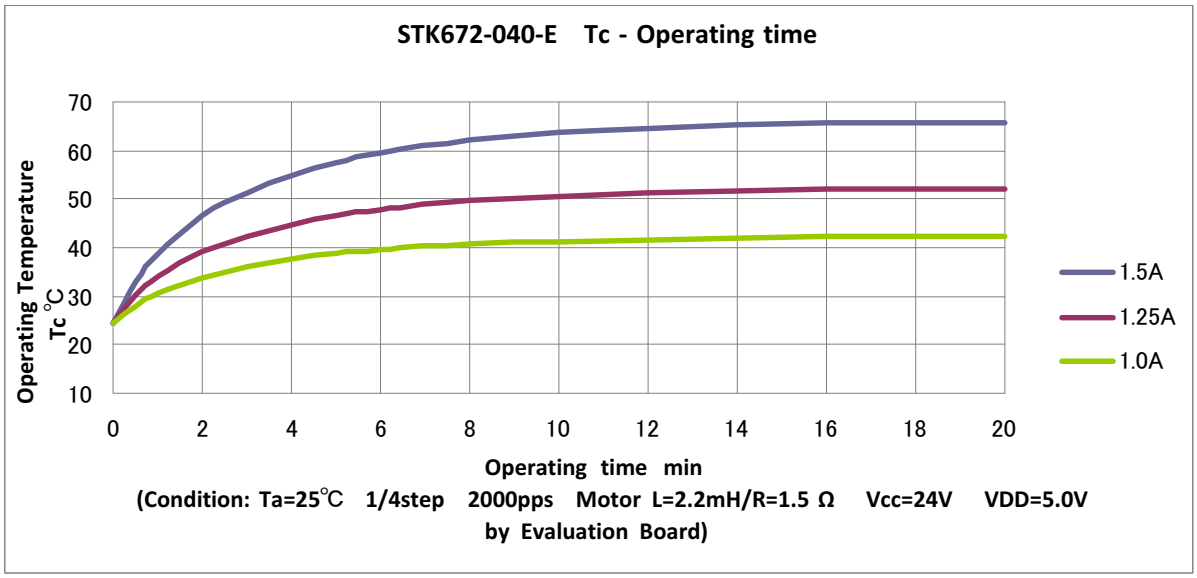
BILL OF MATERIALS

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 μF / 50 V	±20%		SUN ELECTRONICS	50ME220CA	YES	YES
C2	1	Vcc2 Bypass Capacitor	10 μF / 50 V	±20%		SUN ELECTRONICS	50ME10CA	YES	YES
C3	1	Capacitor for power on reset circuit	10 μF / 50 V	±20%		SUN ELECTRONICS	50ME10CA	YES	YES
C4	1	Vref stabilization Capacitor	0.1 μF / 50 V	±10%		Panasonic	ECQV1H104JL2	YES	YES
R01	1	Resistor to set Vref		±1%		AKAHANE ELECTRONICS	RN14S****FK	YES	YES
R02	1	Resistor to set Vref		±1%		AKAHANE ELECTRONICS	RN14S****FK	YES	YES
R03 to R11	9	Pull-up Resistor	10 kΩ	±5%		AKAHANE ELECTRONICS	RN14S103JK	YES	YES
R12	1	Resistor for power on reset circuit	1 kΩ	±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.





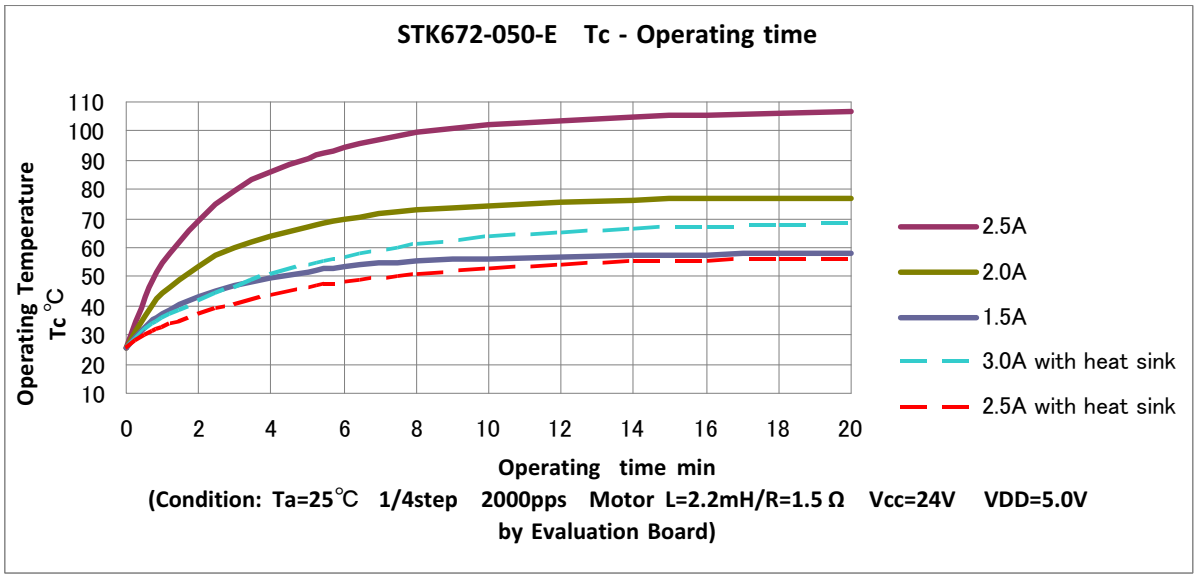


Figure 7. Operating Temperature

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) x Vref/Rs, Rs: The hybrid IC internal current detection resistor (0.33 Ω 3%)
Vref = Vcc2 (5.0 V) x R02 / (R01 + R02) = IOH x Rs x 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) x Vref/Rs, Rs: The hybrid IC internal current detection resistor (0.2 Ω 3%)
Vref = Vcc2 (5.0 V) x R02 / (R01 + R02) = IOH x Rs x 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) x Vref/Rs, Rs: The hybrid IC internal current detection resistor (0.22 Ω 3%)
Vref = Vcc2 (5.0 V) x R02 / (R01 + R02) = IOH x Rs x 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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