

STK554U3XXGEVB

STK554U3xx Series Evaluation Board User's Manual



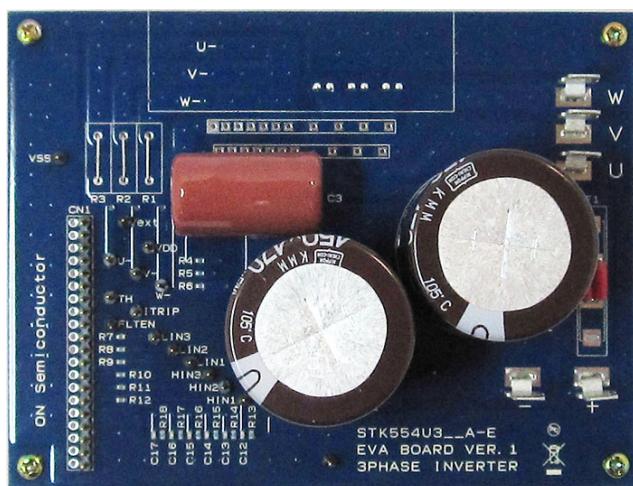
ON Semiconductor®

<http://onsemi.com>

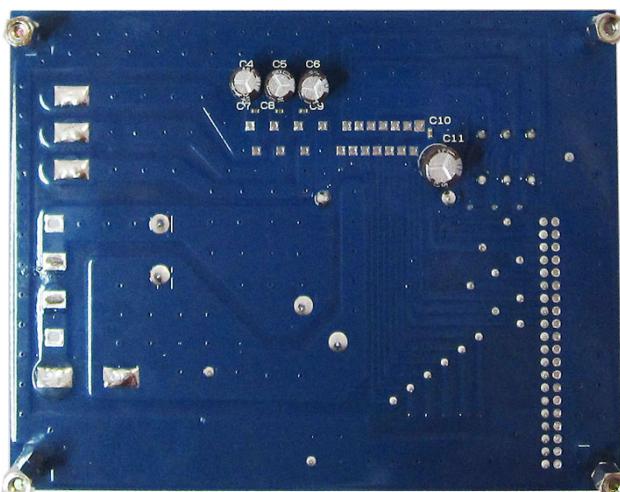
Introduction

By using this board, STK554U3xx series (SIP1A / 3shunt) can be evaluated.

EVAL BOARD USER'S MANUAL



Surface



Back side

Figure 1. Evaluation Board Photos

Table 1.

ONPN of Evaluation Board	ONPN of HIC	Id max
STK554U362AGEVB	STK554U362A-E	10 A
STK554U392CGEVB	STK554U392A-E	15 A
STK554U3A2AGEVB	STK554U3A2A-E	20 A

CIRCUIT DIAGRAM

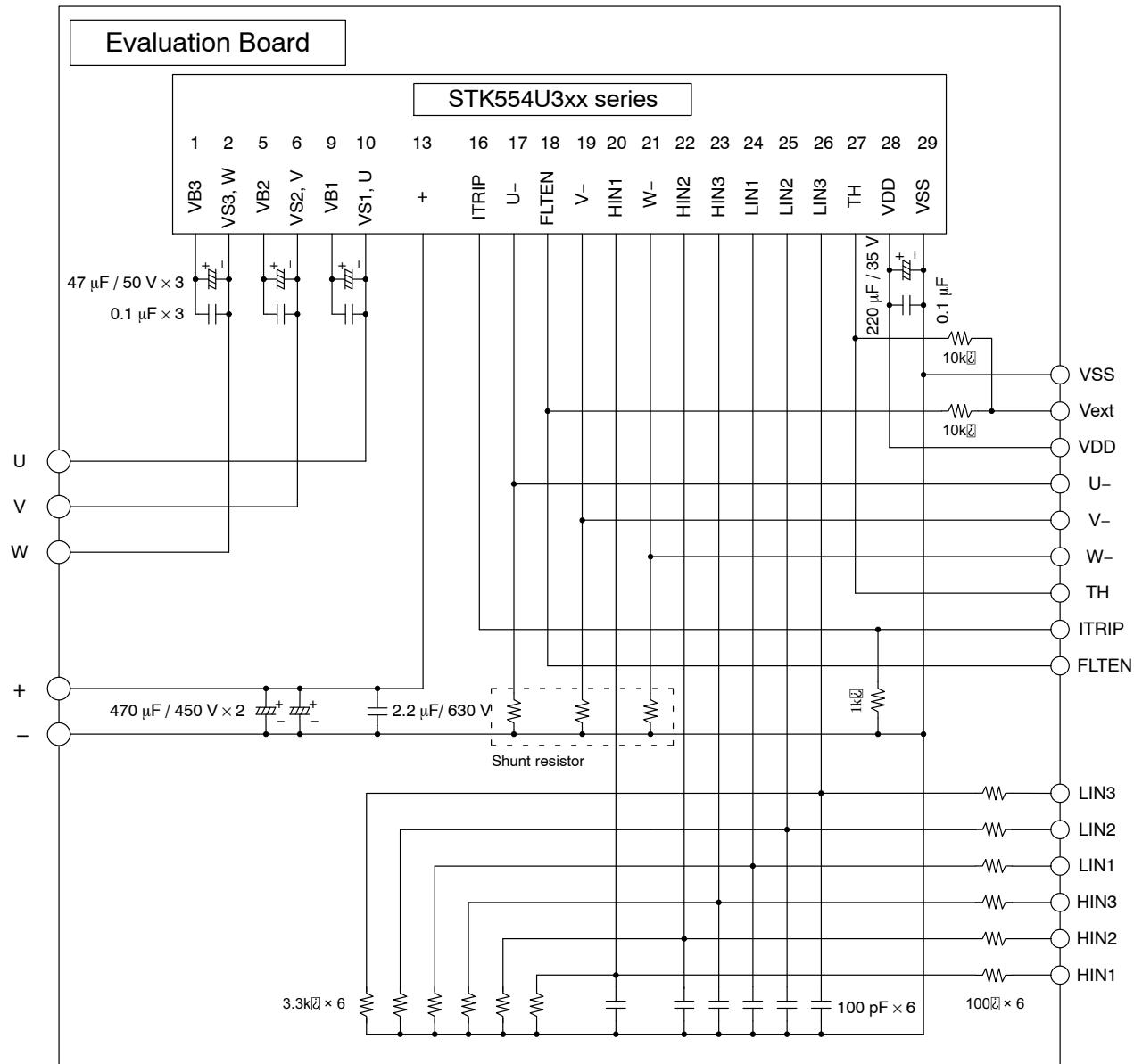
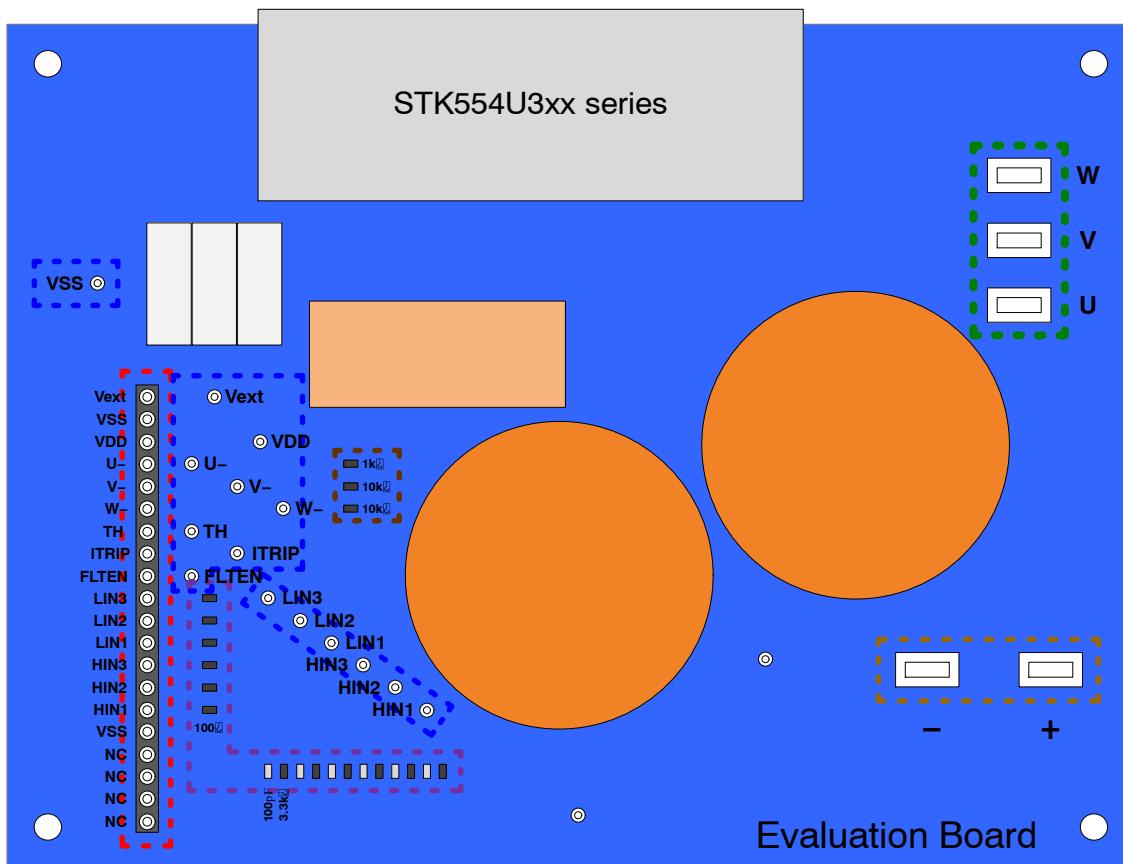


Figure 2. Circuit Diagram

PIN DESCRIPTION

**Red line frame: Connector**

For the connection to the control part

Vext terminal is connected pull-up resistor for TH and Fault pins. Please impress arbitrary voltage to this terminal.

Blue line frame: Test pins

For monitoring each control signal

Purple line frame: Low pass filter and pull-down resistor for control terminal

Low pass filter is composed of resistor of 100 Ω and capacitor of 100 pF.

Brown line frame:

Pull-up resistor for FLTEN and TH
Pull-down resistor for ITRIP

- ITRIP pull-down 1 kΩ
- TH pull-up 10 kΩ
- FLTEN pull-up 10 kΩ

Green line frame: U, V, W terminal

Please connect to the motor.

Orange line frame: +, - terminal

Please connect to DC power supply.

Figure 3.

OPERATION PROCEDURE

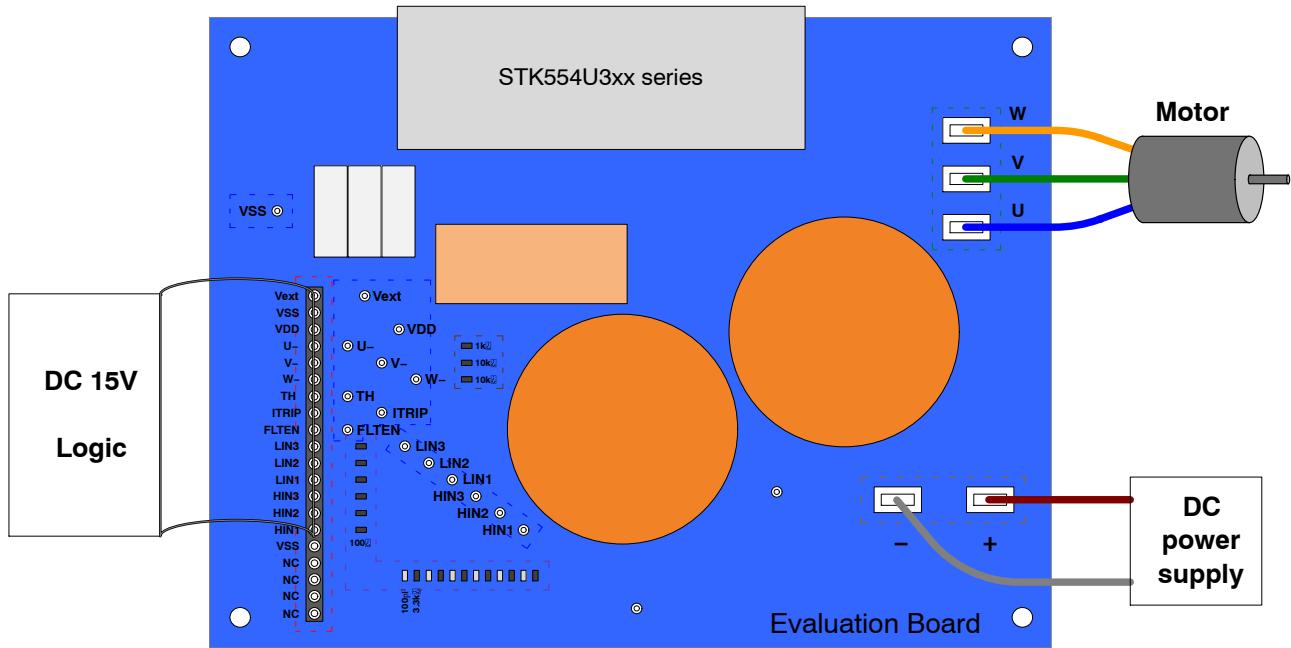


Figure 4.

Step 1: Please connect HIC, each power supply, logic parts, and the motor to the evaluation board, and confirm that each power supply is OFF at this time.

Step 2: Please impress the power supply of DC 15 V.

Step 3: Please perform a voltage setup according to specifications, and impress the power supply between the “+” and the “-” terminal.

Step 4: By inputting signal to the logic part, HIC control is started. (Therefore, please set electric charge to the boot-strap capacitor of upper side to turn on lower side IGBT before running.)

NOTE: When turning off the power supply part and the logic part, please carry out in the reverse order to above steps.

STK554U3XXGEVB

LAYOUT

Length: 96 mm

Side: 128 mm

Thickness: 1.6 mm

Rigid double-sided substrate (Material: FR-4)
Both sides resist coating
Copper foil thickness: 70 μ m

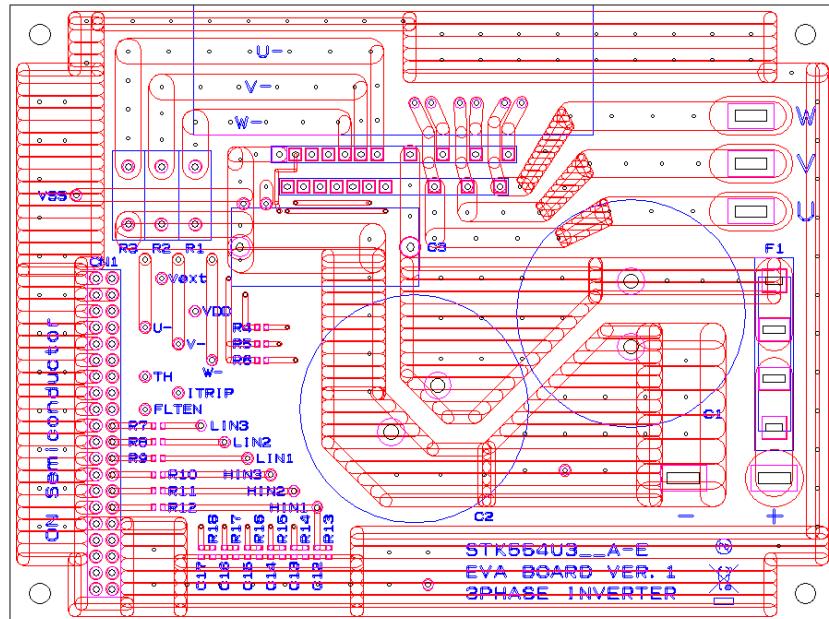


Figure 5. Layout (Top View) – Surface

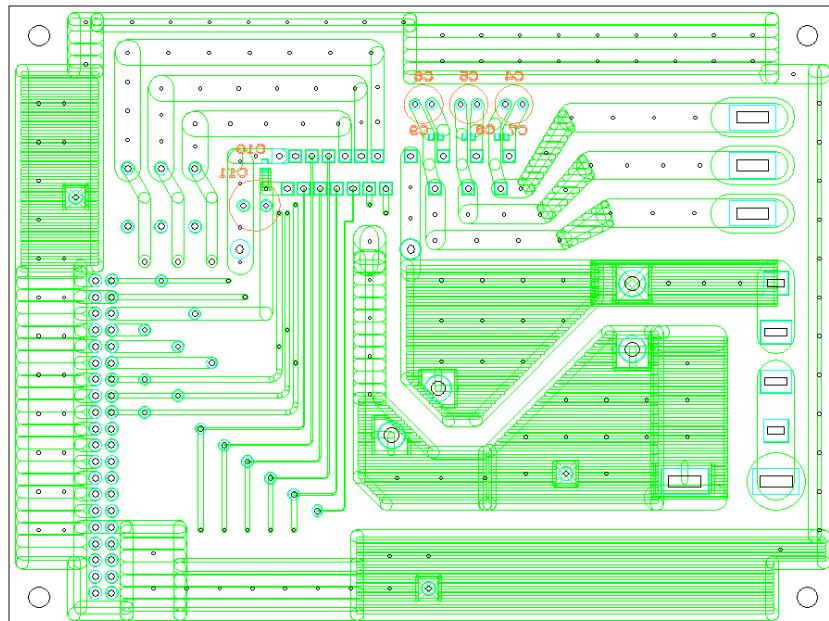


Figure 6. Layout (Top View) – Back Side

STK554U3XXGEVB

BILL OF MATERIALS

Table 2. EVALUATION BOARD BILL OF MATERIALS

Components	Symbol	SMD	DIP	Manufacturer	Part Number	Specification	Supplement	
Resistor	R1–3		3	FUKUSHIMA FUTABA ELECTRIC	MPC75 0.05Ω J MPC75 0.02Ω J	50 mΩ/ 5W /±5% 20 mΩ/ 5W /±5%	Metal plate resistor	Shunt 10A:50mΩ, 15A/20A:20mΩ
	R4	1		KOA	RK73H1JTTD1001F	1 kΩ / ±1%	Chip (1608 size)	ITRIP pull-down
	R5, R6	2		KOA	RK73H1JTTD1002F	10 kΩ / ±1%	Chip (1608 size)	TM pull-up, FLTEN pull-up
	R7–12	6		KOA	RK73H1JTTD1000F	100 Ω / ±1%	Chip (1608 size)	Low pass filter
	R13–18	6		KOA	RK73H1JTTD3301F	3.3 kΩ / ±1%	Chip (1608 size)	Signal input pin pull-down
Capacitor	C1, C2		2	Nippon Chemi-Con	EKMM451VSN471MA50S	470 μF / 450 V	Aluminum electrolytic capacitor	Plus-Minus
	C3		1	PANASONIC	ECQE6225JT	2.2 μF / 630 V / ±5%	Film capacitor	Plus-Minus, Snubber
	C4–C6		3	Nippon Chemi-Con	EKMG500ELL470MF11D	47 μF / 50 V	Aluminum electrolytic capacitor	VB-VS
	C7–C10	4		MURATA MANUFACTURING	GRM188B31H104K	0.1 μF / ±10%	Chip (1608 size)	VB-VS, VDD-VSS
	C11		1	Nippon Chemi-Con	EKMG350ELL221MHB5D	220 μF / 35 V	Aluminum electrolytic capacitor	VDD-VSS
	C12–17	6		MURATA MANUFACTURING	GRM1882C1H101J	100 pF / ±5%	Chip (1608 size)	Low pass filter
Connector	CN1		1	HIROSE ELECTRIC	A2-20PA-2.54DSA	20 pin / 2.54 pitch		
Pin (small)	VSS, Vext, VDD, U-, V-, W-, TH, ITRIP, FLTEN, LIN3, LIN2, LIN1, HIN3, HIN2, HIN1, (VSS2, Minus)		15 (17)	HIROSE ELECTRIC	A2-20PA-2.54DSA	20 pin / 2.54 pitch	By dividing the 20-pin connector into one by 1pin, please use them as small pins. (Quantity is a number in the state divided into each 1pin.)	
Pin (large)	U, V, W, +, -		5	(Sanyo stock)				
IC	IC1		1	SANYO SEMICONDUCTOR	STK554U3xxA-E	SIP1A / 3shunt		
	Total	25	32 (34)				*Chip component size 1608: L = 1.6 mm, W = 0.8 mm	

Heat Sink Mounting

First, please mount the HIC on the heat sink. Next, mount the HIC on the evaluation board.

In the case of mounting the HIC on the evaluation board first, you can not mount the heat sink.

Table 3.

Item	Recommended Condition
Pitch	56.0 \pm 0.1 mm (Please refer to Package Outline Diagram)
Screw	Diameter: M3 Bind machine screw, Truss machine screw, Pan machine screw
Washer	Plane washer This size is D = 7 mm, d = 3.2 mm and t = 0.5 mm (Figure 8) JIS B 1256
Heat Sink	Material: copper or Aluminum Warpage (the surface that contacts H-IC): -50 to 100 μ m Screw holes must be countersunk. No contamination on the heat sink surface that contacts H-IC.
Torque	Final tightening: 0.6 to 0.9 Nm Temporary tightening: 20 to 30% of final tightening
Grease	Silicon grease Thickness: 100 to 200 μ m Uniformly apply silicon grease to whole back. (Figure 9)

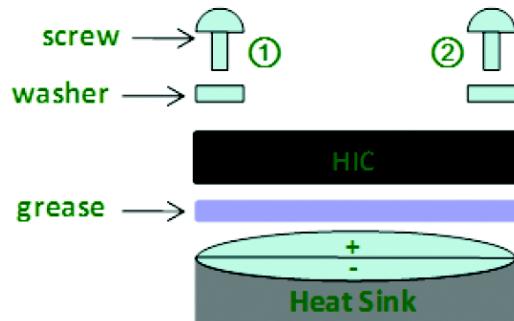


Figure 7. Mount HIC on a Heat Sink

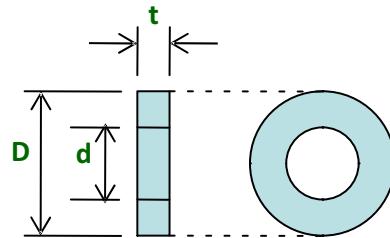


Figure 8. Size of Washer

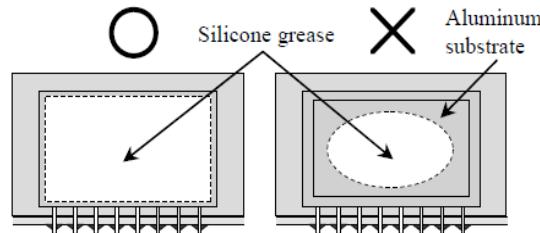


Figure 9. About Uniformly Application

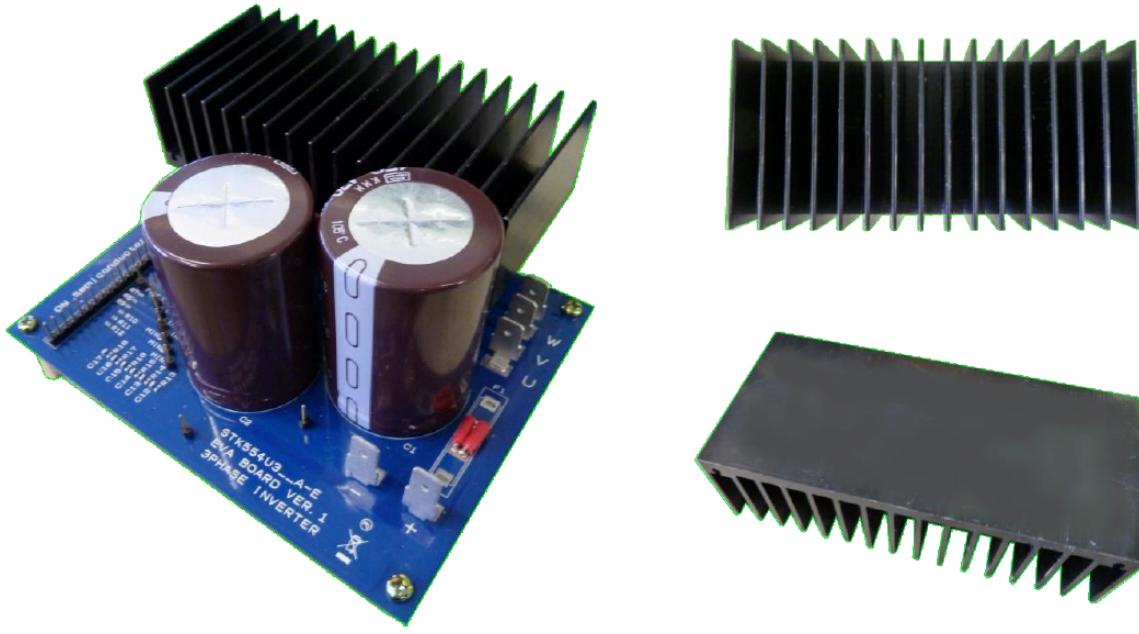


Figure 10. Installation Example of the Heat Sink

The heat sink of this example is assumed operation at 10 A. Heat sink thermal resistance: 2.0 deg./W

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor 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 as such not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and should as such 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 delivered "AS IS" and without warranty of any kind including, but not limited to, that the board is production-worthy, that the functions contained in the board will meet your requirements, or that the operation of the board will be uninterrupted or error free. ON Semiconductor expressly disclaims all warranties, express, implied or otherwise, including without limitation, warranties of fitness for a particular purpose and non-infringement of intellectual property rights.

ON Semiconductor 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 ON Semiconductor shall not constitute any representation or warranty by ON Semiconductor, and no additional obligations or liabilities shall arise from ON Semiconductor having provided such information or services.

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. Should you purchase or use the board for any such unintended or unauthorized application, you shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of 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 ON Semiconductor 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.

ON Semiconductor does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: ON Semiconductor 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 ON Semiconductor is advised of the possibility of such damages. In no event shall ON Semiconductor'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.

For more information and documentation, please visit www.onsemi.com.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative

