STK554U3XXGEVB

STK554U3xx Series Evaluation Board User's Manual

ON Semiconductor®

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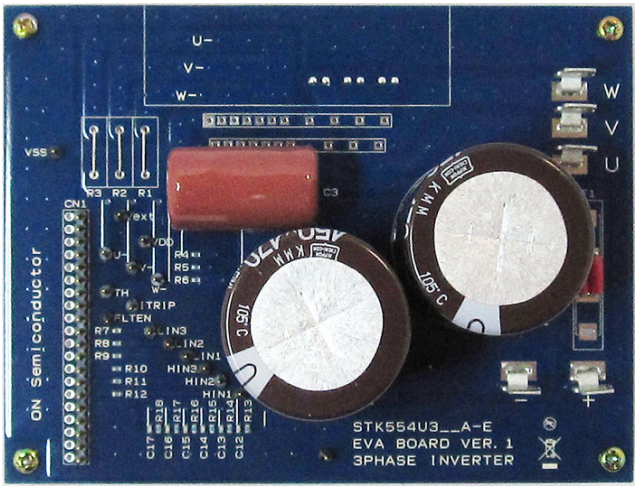
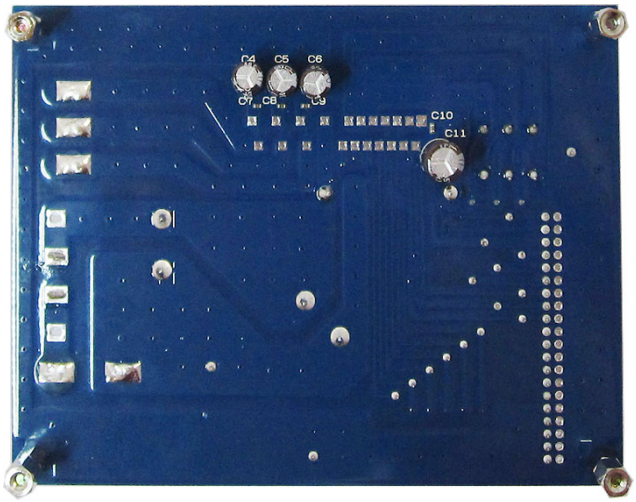
EVAL BOARD USER'S MANUAL

Introduction

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



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

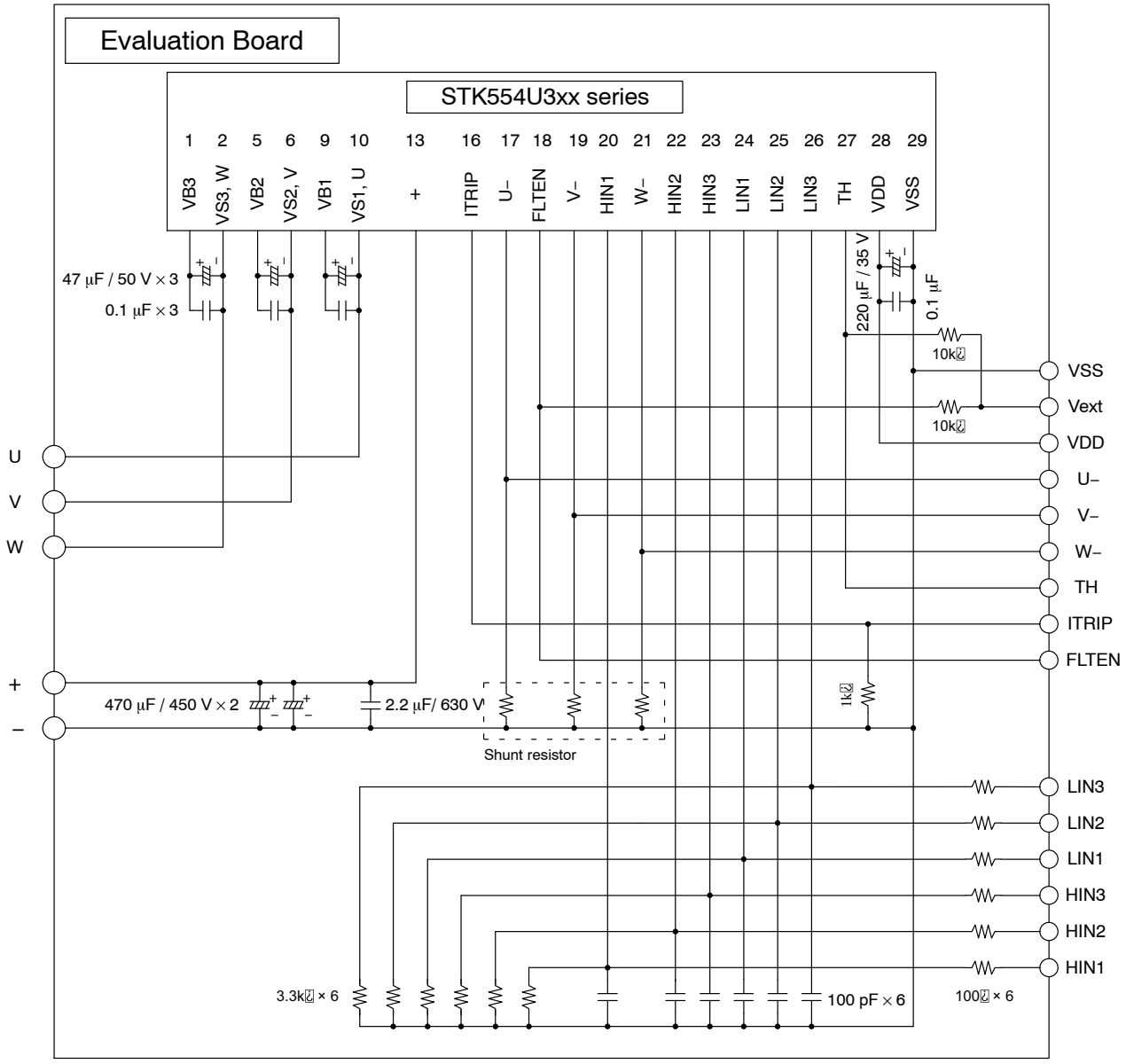
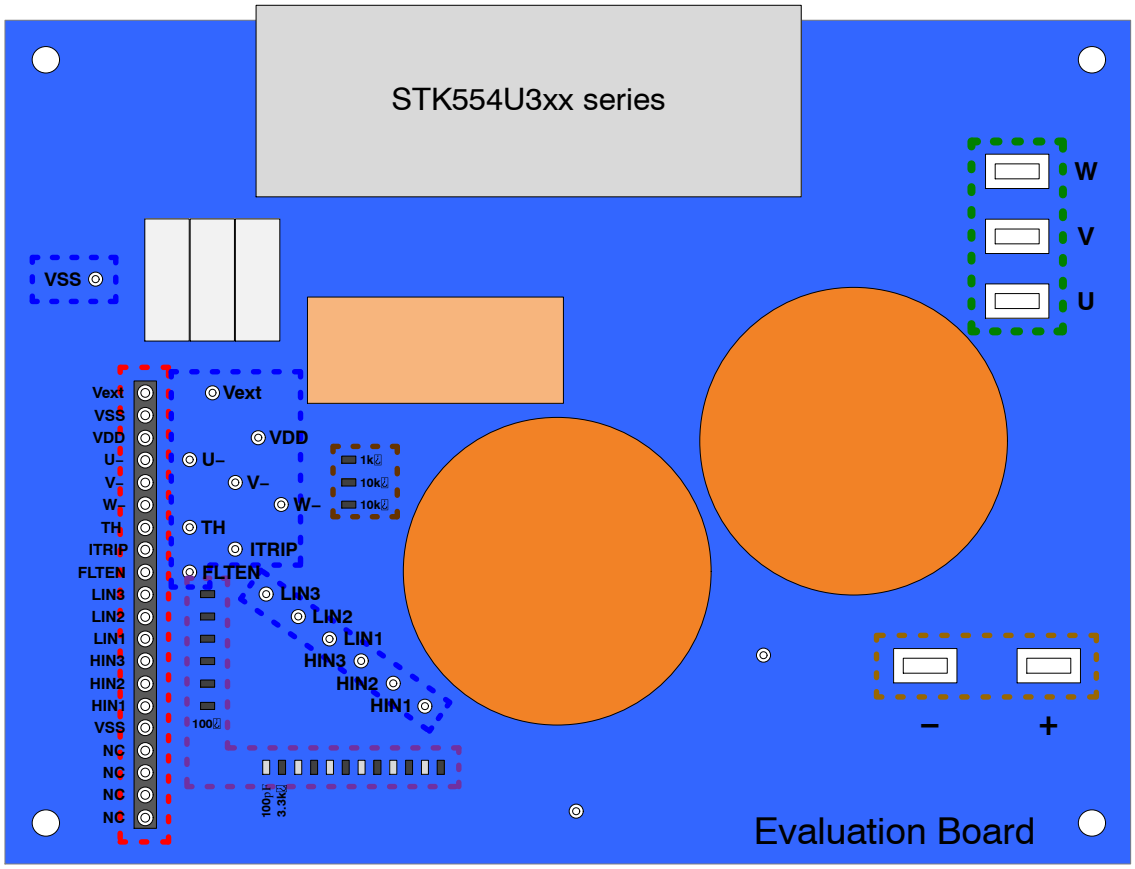


Figure 2. Circuit Diagram

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

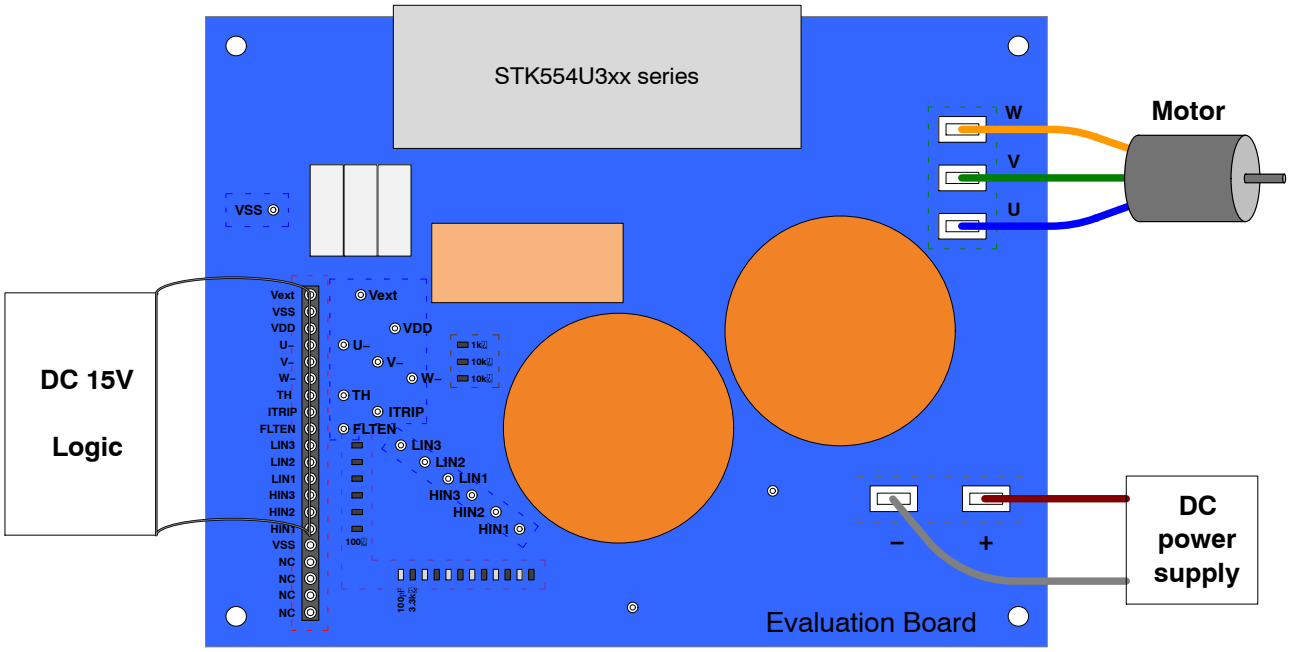


Figure 4.

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.

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 μm

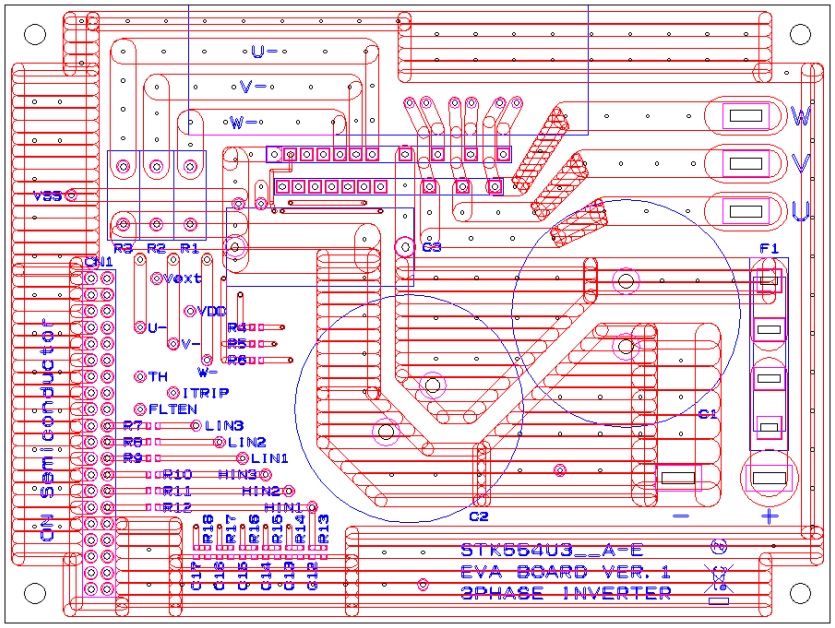


Figure 5. Layout (Top View) − Surface

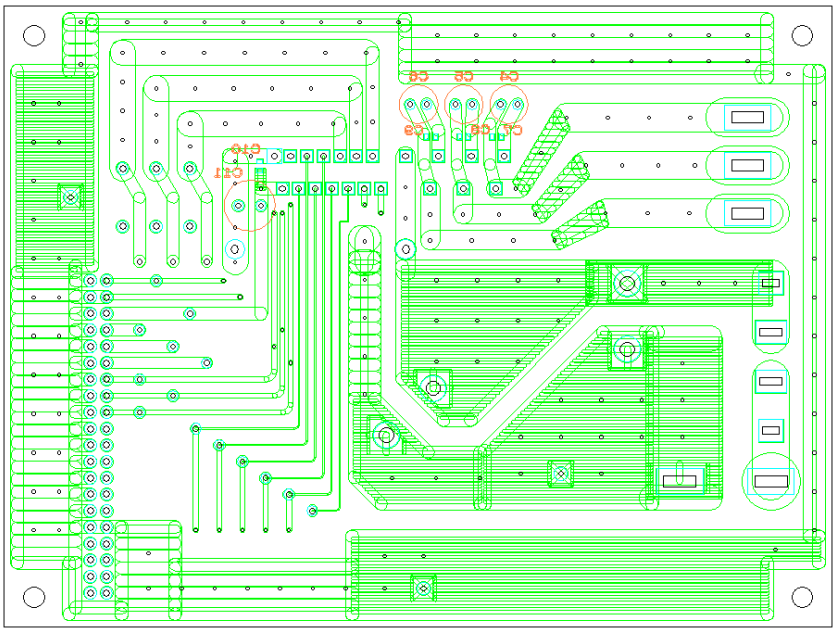


Figure 6. Layout (Top View) − Back Side

BILL OF MATERIALS

Table 2. EVALUATION BOARD BILL OF MATERIALS

Compon-ents	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 ± 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 μm 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 μm Uniformly apply silicon grease to whole back. (Figure 9)

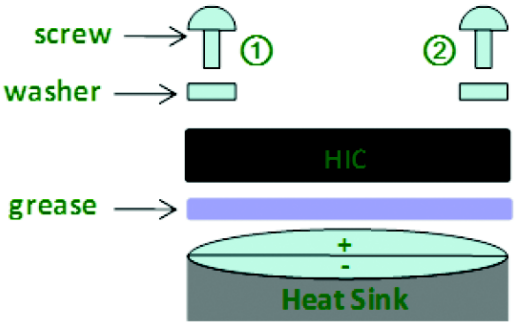


Figure 7. Mount HIC on a Heat Sink

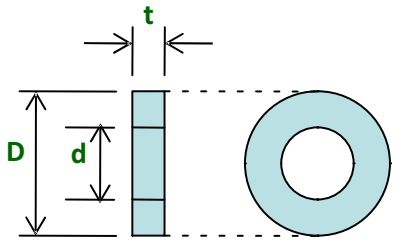


Figure 8. Size of Washer

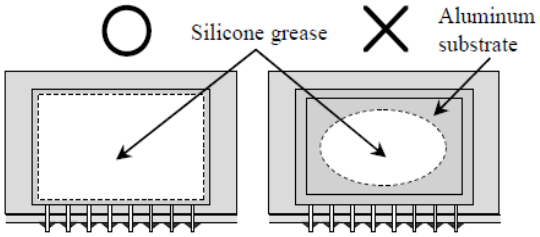


Figure 9. About Uniformly Application

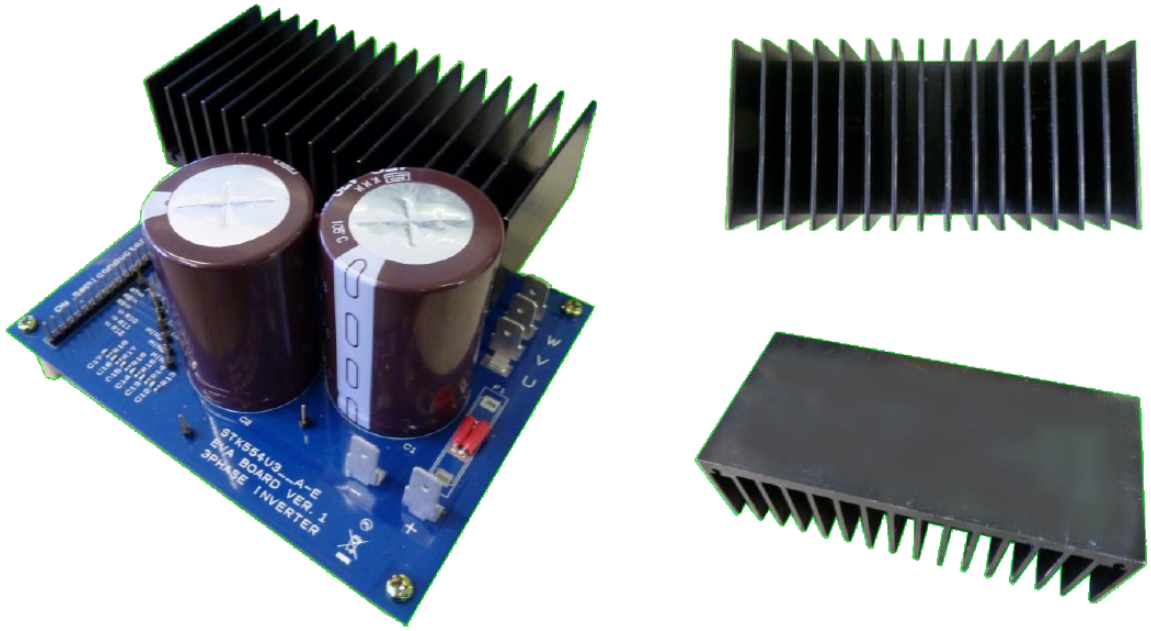


Figure 10. Installation Example of the Heat Sink

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

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