
Getting started with the STEVAL-OET005 development kit

Introduction

The **STEVAL-OET005** kit allows evaluating ST ESD protection devices or filtering devices for USB Type-C™ connectors. There are two different kits available for sale. Each kit contains an evaluation board and a testing board.

1 Getting started

1.1 Overview

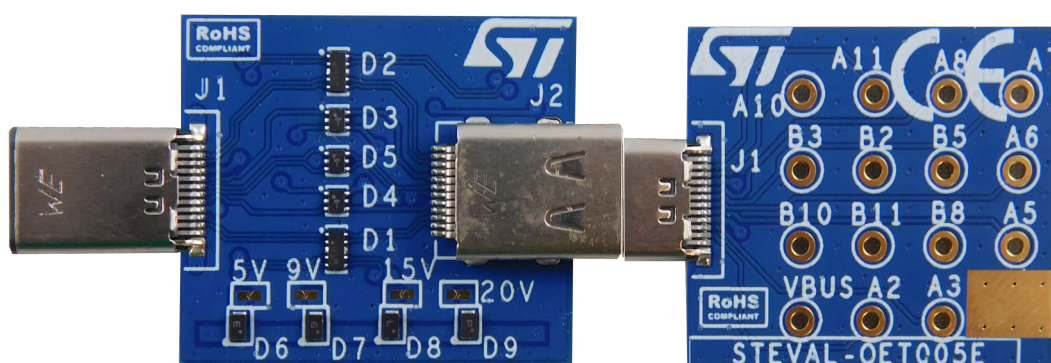
The STEVAL-OET005 kit features:

- data, control, and power lines protection
- a plug and a receptacle that allow inserting a PCB between a host and a cable, or a device and a cable

Two kits are available to be ordered separately. Each kit contains an evaluation board and a testing board, as described below.

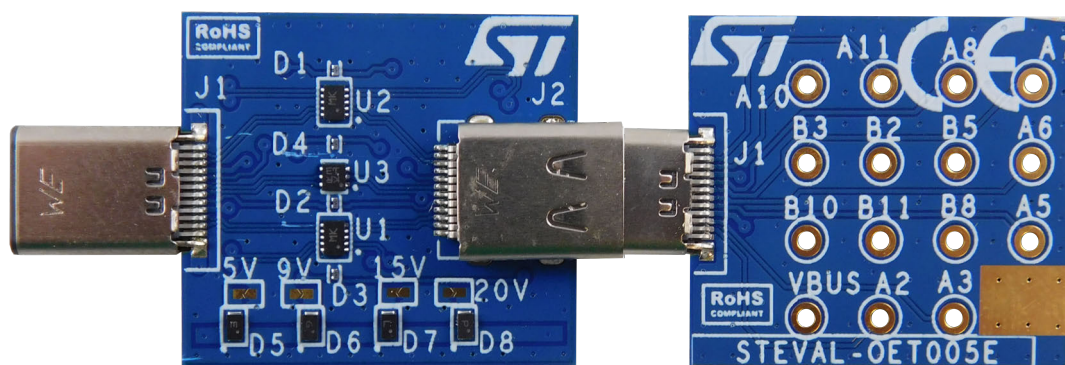
The STEVAL-OET005VC kit provides a protection solution of all lines (data, control, and power) in a 500 μm pitch package. This kit contains the STEVAL-OET005C evaluation board and the STEVAL-OET005E testing board.

Figure 1. STEVAL-OET005VC kit



The STEVAL-OET005VD kit provides a protection and filtering solution (common mode filters and protection for all lines) in a 500 μm pitch and 0201 package. This kit contains the STEVAL-OET005D evaluation board and the STEVAL-OET005E testing board.

Figure 2. STEVAL-OET005VD kit



1.2 How to use the kit

Step 1. Before using the STEVAL-OET005C and STEVAL-OET005D, solder the bridge setup: shunt the solder bridge corresponding to the maximum voltage of VBus (5 V, 9 V, 15 V, or 20 V).

Warning:

The power supply voltage must be lower than or equal to the VBus voltage selected on the evaluation board. Otherwise, the protection device (TVS) may burn if the power supply is not protected against overcurrent.

- Step 2.** Insert the evaluation board (STEVAL-OET005C or STEVAL-OET005D) between a USB Type-C™ host and a USB Type-C™ device.

For instance, connect the evaluation board between a USB Type-C™ key and a personal computer to show the ESD protection transparency.

Figure 3. Connecting the evaluation board



- Step 3.** Plug the testing board in place of a USB Type-C™ device to perform the ESD test on the equipment with a TVS inserted between ESD shoots and equipment.

Figure 4. Connecting the evaluation board



2 Schematic diagrams

2.1 STEVAL-OET005VC schematic diagrams

Figure 5. STEVAL-OET005C evaluation board circuit schematic

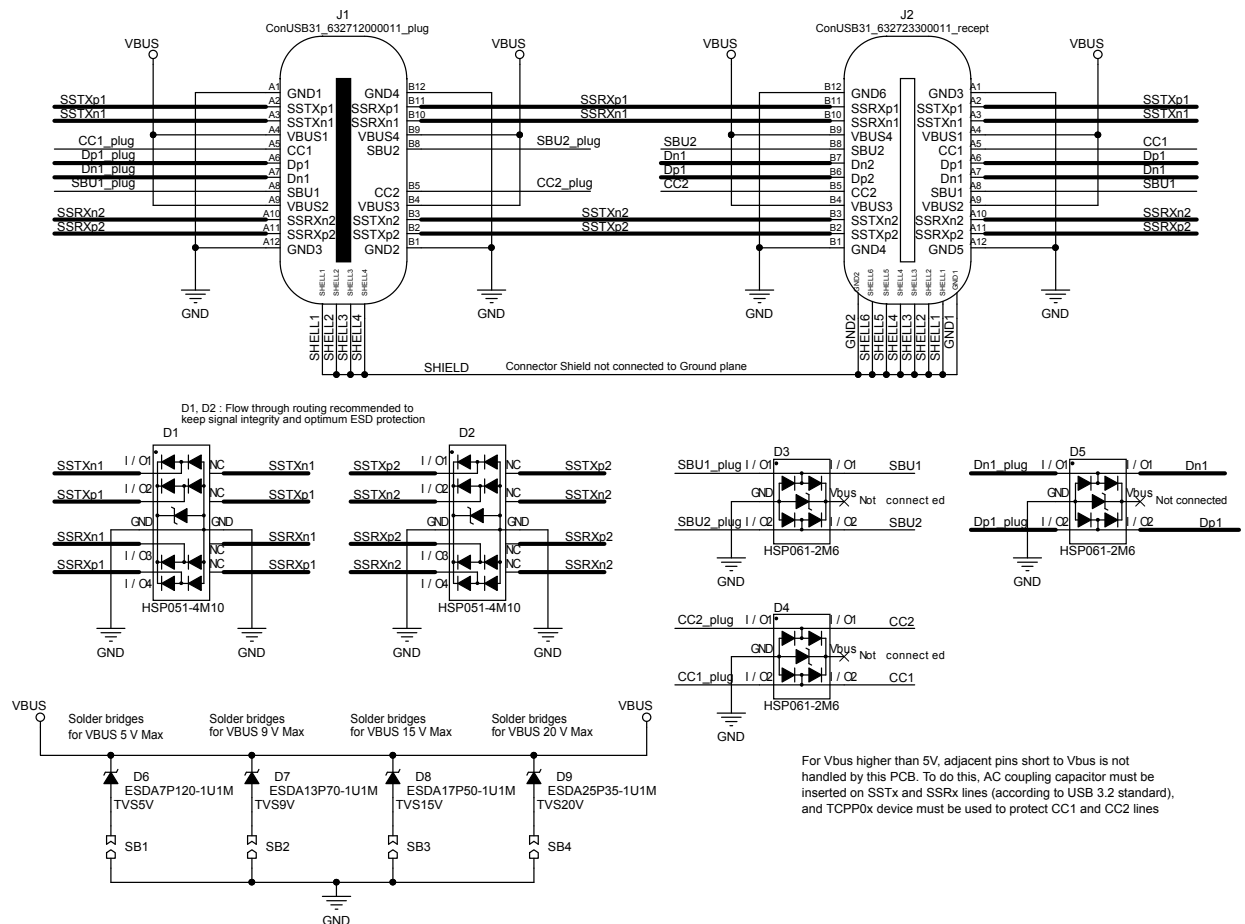
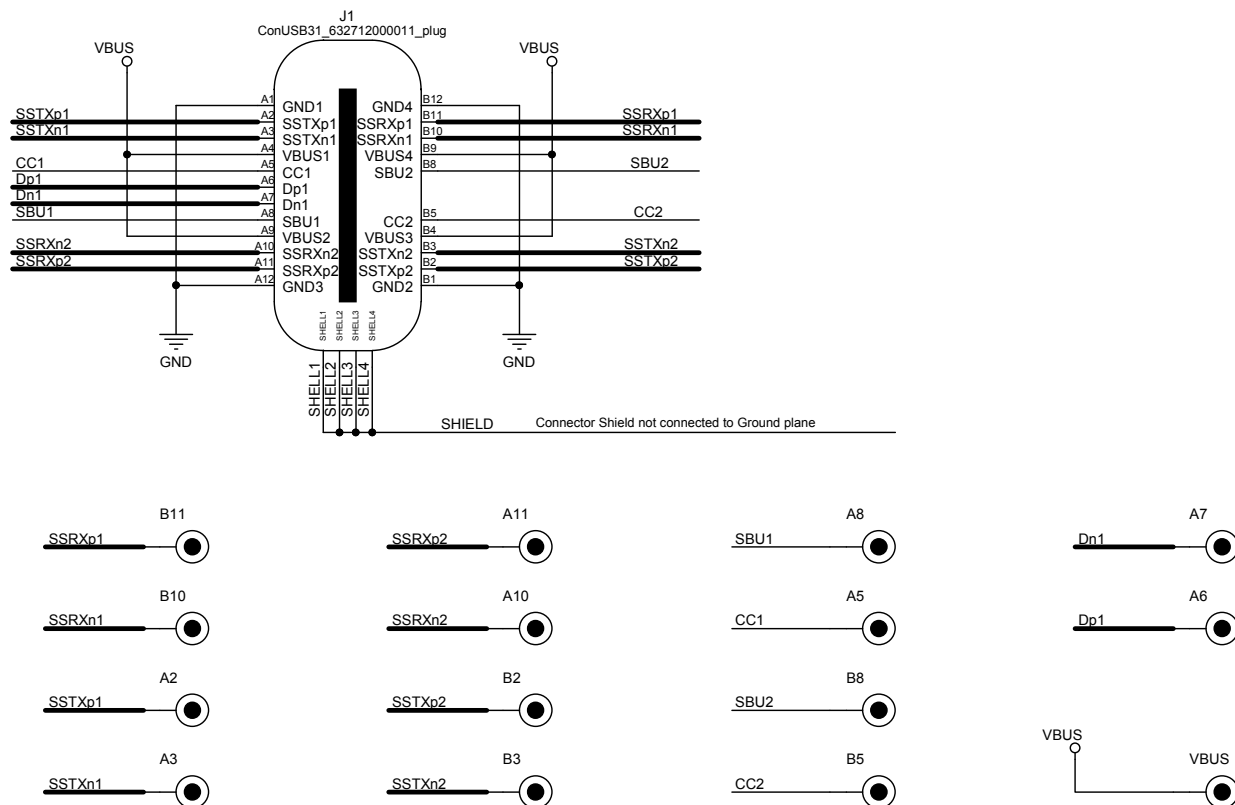


Figure 6. STEVAL-OET005E testing board circuit schematic



2.2 STEVAL-OET005VD schematic diagrams

Figure 7. STEVAL-OET005D evaluation board circuit schematic

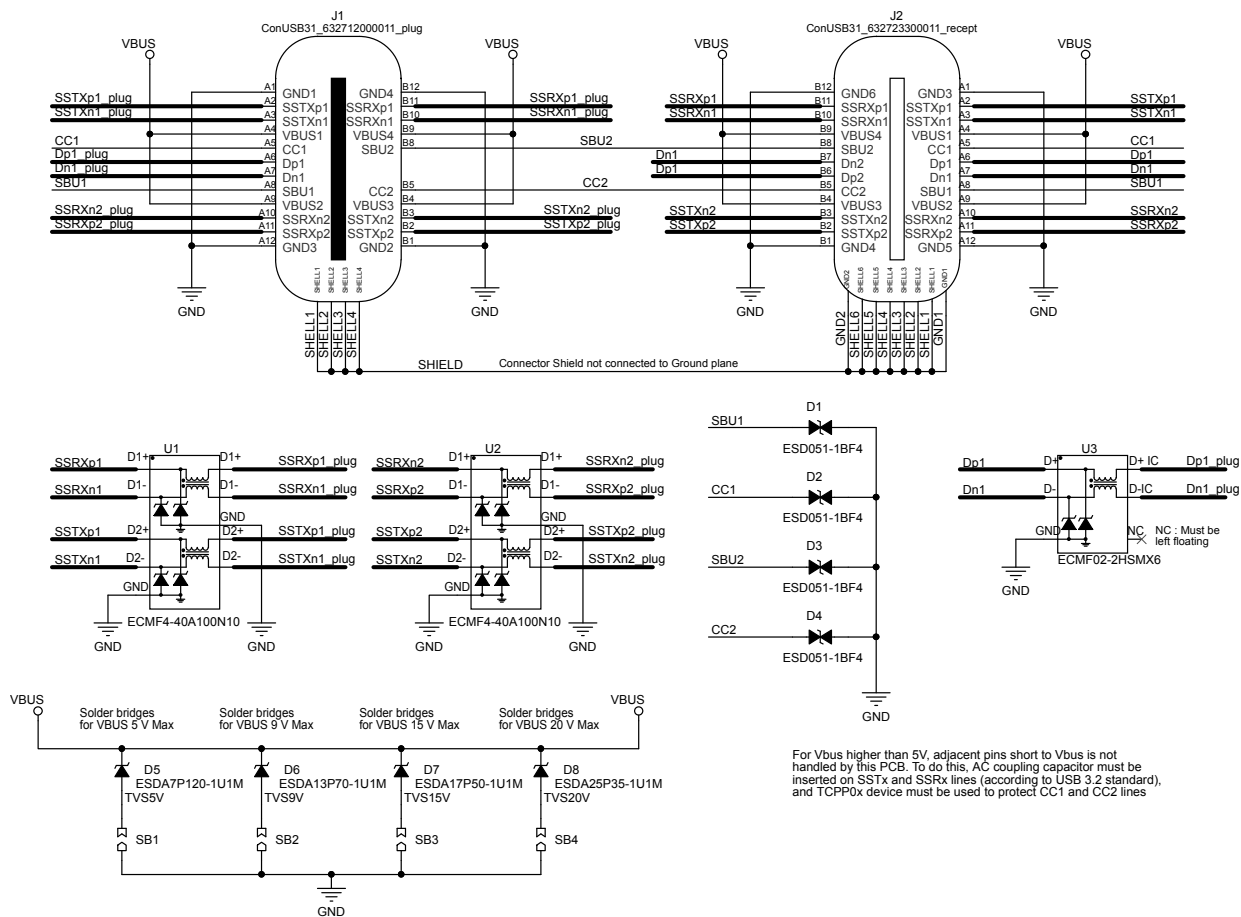
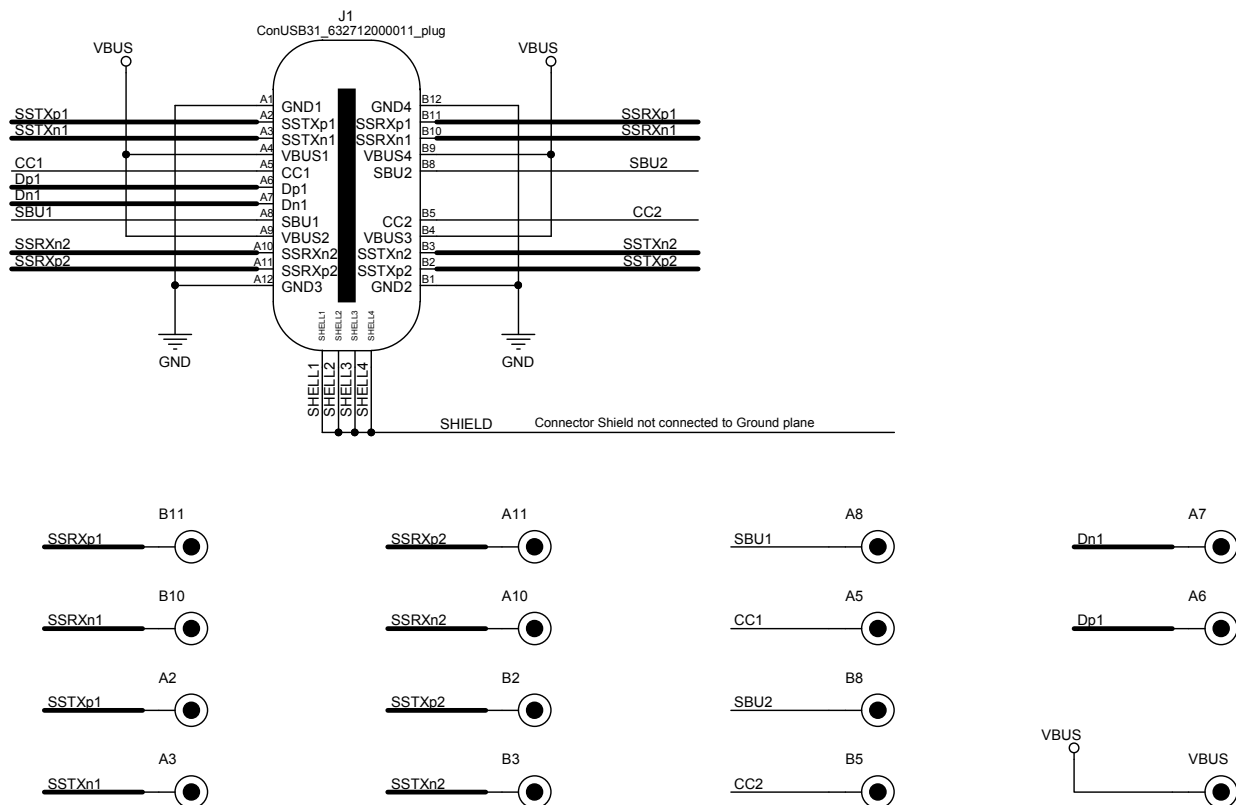


Figure 8. STEVAL-OET005E testing board circuit schematic



3 Bill of materials

3.1 STEVAL-OET005VC bill of materials

Table 1. STEVAL-OET005VC bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	Table 2. STEVAL-OET005C	-	Evaluation board	ST	Not available for separate sale
2	1	Table 3. STEVAL-OET005E	-	Testing board	ST	Not available for separate sale

Table 2. STEVAL-OET005C bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	2	D1, D2	HSP051-4M10, QFN-10L	Four-line ESD protection for high-speed lines	ST	HSP051-4M10
2	3	D3, D4, D5	HSP061-2M6, QFN-6L	Two-line ESD protection for high-speed lines	ST	HSP061-2M6
3	1	D6	ESDA7P120-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA7P120-1U1M
4	1	D7	ESDA13P70-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA13P70-1U1M
5	1	D8	ESDA17P50-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA17P50-1U1M
6	1	D9	ESDA25P35-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA25P35-1U1M
7	1	J1	USB Type-C™ connector, USB_TypeC_Plug,	USB Type-C™ connector	Wurth Electronics Inc.	632712000011
8	1	J2	USB Type-C™ connector, USB_TypeC_Receptacle	USB Type-C™ connector	Wurth Electronics Inc.	632723300011

Table 3. STEVAL-OET005E bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	J1	USB Type-C™ connector, USB_TypeC_Plug	USB Type-C™ connector	Wurth Electronics Inc.	632712000011

3.2 STEVAL-OET005VD bill of materials

Table 4. STEVAL-OET005VD bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	Table 5. STEVAL-OET005D	-	Evaluation board	ST	Not available for separate sale
2	1	Table 6. STEVAL-OET005E	-	Testing board	ST	Not available for separate sale

Table 5. STEVAL-OET005D bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	4	D1, D2, D3, D4	ESD051-1BF4, ST0201	Low clamping single-line bidirectional ESD protection	ST	ESD051-1BF4

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
2	1	D5	ESDA7P120-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA7P120-1U1M
3	1	D6	ESDA13P70-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA13P70-1U1M
4	1	D7	ESDA17P50-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA17P50-1U1M
5	1	D8	ESDA25P35-1U1M, QFN-2L	High-power transient voltage suppressor	ST	ESDA25P35-1U1M
6	1	J1	USB Type-C™ connector, USB_TypeC_Plug,	USB Type-C™ connector	Würth Electronics Inc.	632712000011
7	1	J2	USB Type-C™ connector, USB_TypeC_Receptacle	USB Type-C™ connector	Würth Electronics Inc.	632723300011
8	2	U1, U2	ECMF4-40A100N10, QFN-10L	Common mode filter with ESD protection for high-speed serial interfaces	ST	ECMF4-40A100N10
9	1	U3	ECMF02-2HSMX6, QFN-6L	ESD protected common mode filter for USB3.0 interface	ST	ECMF02-2HSMX6

Table 6. STEVAL-OET005E bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	J1	USB Type-C™ connector, USB_TypeC_Plug	USB Type-C™ connector	Würth Electronics Inc.	632712000011

4 Kit versions

Table 7. STEVAL-OET005 kit versions

PCB version ⁽¹⁾	Schematic diagrams	Bill of materials
STEVAL\$OET005VCA	STEVAL\$OET005VCA schematic diagrams	STEVAL\$OET005VCA bill of materials
STEVAL\$OET005VDA	STEVAL\$OET005VDA schematic diagrams	STEVAL\$OET005VDA bill of materials

1. The STEVAL\$OET005VCA code identifies the first version of the STEVAL-OET005VC kit. The STEVAL\$OET005VDA code identifies the first version of the STEVAL-OET005VD kit.

5 Regulatory compliance information

Formal Notice Required by the U.S. Federal Communications Commission

FCC NOTICE

This kit is designed to allow:

(1) Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine

whether to incorporate such items in a finished product and

(2) Software developers to write software applications for use with the end product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter 3.1.2.

Formal Product Notice Required by Industry Canada Innovation, Science and Economic Development

Canada compliance:

For evaluation purposes only. This kit generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to Industry Canada (IC) rules.

À des fins d'évaluation uniquement. Ce kit génère, utilise et peut émettre de l'énergie radiofréquence et n'a pas été testé pour sa conformité aux limites des appareils informatiques conformément aux règles d'Industrie Canada (IC).

Formal product notice required by EU

This device is in conformity with the essential requirements of the Directive 2015/863/EU (RoHS).

Revision history

Table 8. Document revision history

Date	Revision	Changes
15-Nov-2022	1	Initial release.
15-Dec-2022	2	Minor text changes throughout the document.

Contents

1	Getting started	2
1.1	Overview	2
1.2	How to use the kit	2
2	Schematic diagrams	4
2.1	STEVAL-OET005VC schematic diagrams	4
2.2	STEVAL-OET005VD schematic diagrams	6
3	Bill of materials	8
3.1	STEVAL-OET005VC bill of materials	8
3.2	STEVAL-OET005VD bill of materials	8
4	Kit versions	10
5	Regulatory compliance information	11
	Revision history	12
	List of tables	14
	List of figures	15

List of tables

Table 1.	STEVAL-OET005VC bill of materials	8
Table 2.	STEVAL-OET005C bill of materials	8
Table 3.	STEVAL-OET005E bill of materials.	8
Table 4.	STEVAL-OET005VD bill of materials	8
Table 5.	STEVAL-OET005D bill of materials	8
Table 6.	STEVAL-OET005E bill of materials.	9
Table 7.	STEVAL-OET005 kit versions	10
Table 8.	Document revision history	12

List of figures

Figure 1.	STEVAL-OET005VC kit	2
Figure 2.	STEVAL-OET005VD kit	2
Figure 3.	Connecting the evaluation board	3
Figure 4.	Connecting the evaluation board	3
Figure 5.	STEVAL-OET005C evaluation board circuit schematic	4
Figure 6.	STEVAL-OET005E testing board circuit schematic	5
Figure 7.	STEVAL-OET005D evaluation board circuit schematic	6
Figure 8.	STEVAL-OET005E testing board circuit schematic	7

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics – All rights reserved