XMC™ Link

Based on SEGGER J-Link Technology

About this document

Scope and purpose

This is the user's manual for the XMC™ Link also called isolated debug probe, providing technical information and hints on how to use it.

Intended audience

This document is intended for anyone who wants to use the XMC™ Link.

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1 Introduction

This document describes the features and hardware details of the XMC™ Link. XMC™ Link is an isolated debug probe for all XMC™ microcontrollers.

The debug probe is based on SEGGER J-Link debug firmware, which enables use with DAVE™ and all major third-party compiler/IDEs known from the wide ARM® ecosystem. Table 1 shows its specification.

Table 1 XMC™ Link specification

Supported Processor	All Infineon Cortex®-M based XMC™ Microcontroller
Dimensions	62 x 33 mm (without cables plugged in)
Power	PC side: 5 V via Micro-AB USB Connector Target side: 2.5 V – 5 .5V via one of the debug connector (VDD)
Connectors	• 10-pin Cortex® Debug Connector • 8-pin XMC™ MCU Debug Connector • Micro –AB USB Connector
Supported Protocols	• Serial Wire Debug (SWD) • Single Pin Debug (SPD) • Serial Wire Viewer (SWV via SWO pin) • JTAG • UART-to-USB Bride, Virtual COM (VCOM)
Others	• 1 kV functional isolation

1.1 Block diagram

The block diagram in Figure 1 shows the main components of the XMC™ Link and their interconnections. There are following main building blocks:

- XMC4200 Microcontroller in a VQFN42 package
- Isolating Device
- 10-pin Cortex® Debug Connector
- 8-pin XMC™ MCU Debug Connector
- Micro-AB USB Connector
- 2 LEDs: Debug LED and Communication LED
- 12 MHz Crystal

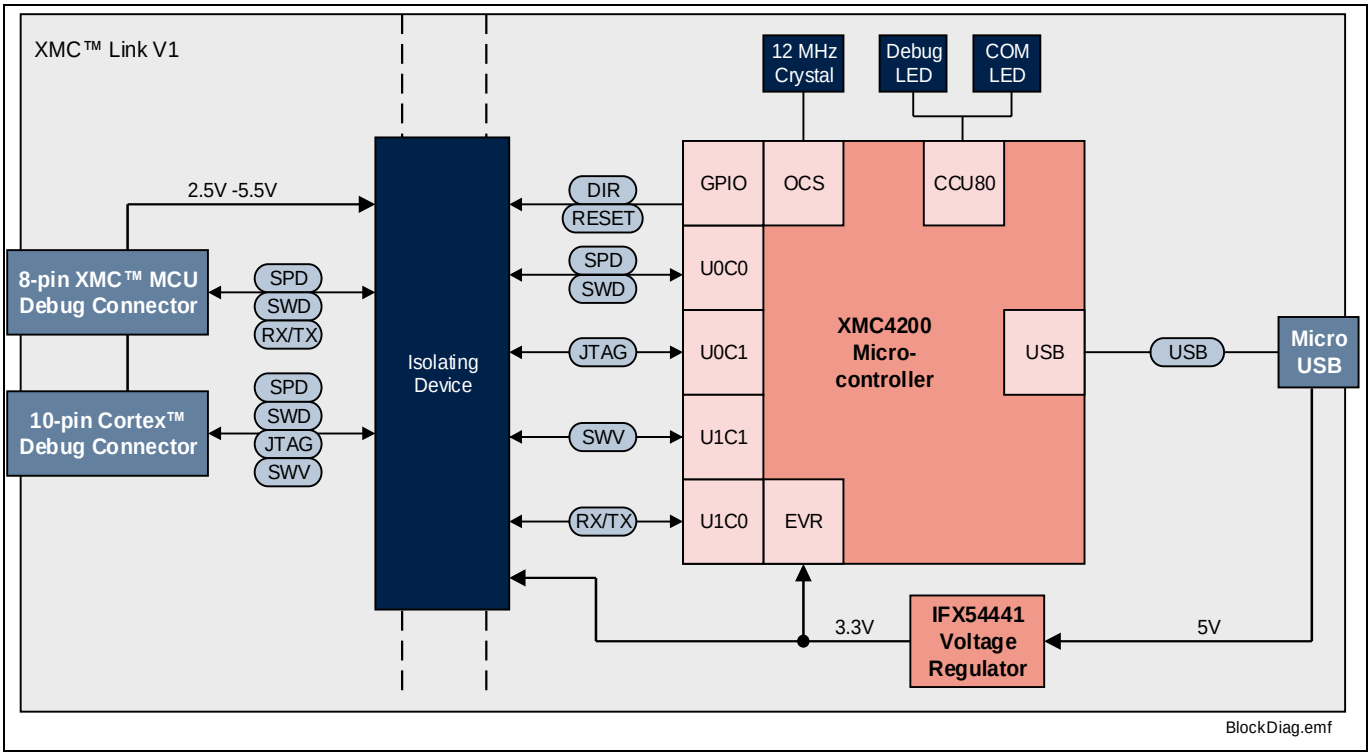

Figure 1 Block diagram of the XMC™ Link

1.2 Getting started

To operate the XMC™ Link the installation of the J-Link Driver is required.

1. Please download the latest version from https://www.segger.com/jlink-software.html and install it on your PC/laptop.

   Note: The J-Link driver is also part of the typical installation of DAVE™ and 3rd party tools supporting SEGGER J-Link.

2. Connect XMC™ Link with your PC/laptop using the Micro USB cable.
3. A proper connection and installation of the J-Link driver is indicated by a constantly illuminated DEBUG LED.
4. Connect your XMC™ target board with XMC™ Link using one of the enclosed cables.
5. Select SEGGER J-Link as debugger in your preferred IDE e.g. DAVE™
6. Start the flash programming and debugging session

2 Hardware description

The following chapters provide a detailed description of the hardware and how it can be used. The hardware is depicted in Figure 2.

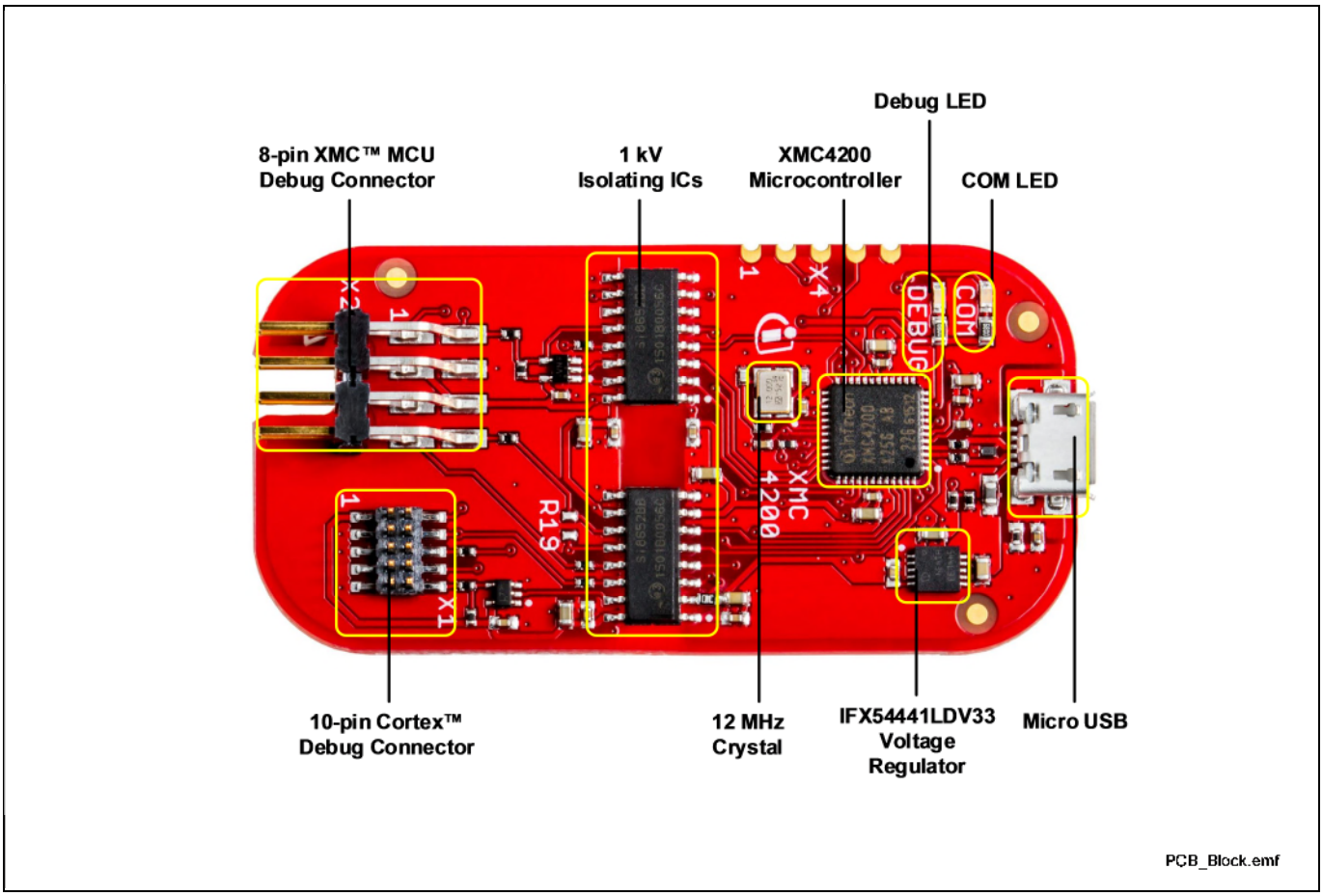

Figure 2 PCB of the XMC™ Link

2.1 Known limitation

XMC Link™ V1 has a minor known limitation which could occur only during programming the BMI of a XMC1000 device in ASC-BSL mode to another BMI mode. This limitation is solved in the PCB version V1.1. The version number is printed on the bottom side of the PCB below the USB connector.

The limitation can be avoided if the XMC™ Link V1 is powered before the target XMC™ will be powered.

2.2 Debug connector

The XMC™ Link can be connected to the XMC™ target microcontroller by either of the debug connectors:

- 8-pin XMC™ MCU Debug Connector (2 x 4 pin, 0.1”, 2.54mm)
- 10-pin Cortex™ Debug Connector (2 x 5 pin, 0.05”, 1.27mm)

The 8-pin XMC™ MCU Debug Connector is mainly used for the XMC1000 applications. The 10-pin Cortex™ Debug Connector can be used for all XMC™ families but is focusing on the XMC4000 family supporting Serial Wire Viewer (SWV) via the SWO pin.

The common debug protocol supported by both connectors is Serial Wire Debug (SWD). Figure 3 provides an overview on all supported debug protocols and communication channels.

	XMC1000 Family		XMC4000 Family
	8-pin XMC™ MCU Debug Connector	10-pin Cortex™ Debug Connector	10-pin Cortex™ Debug Connector
Serial Wire Debug (SWD)	☑	☑	☑
Single Pin Debug (SPD)	☑	☑	
Serial Wire Viewer (SWV/SWO)			☑
Virtual COM Port (UART-to-USB Bridge)	☑		
JTAG			☑

Figure 3 Supported debug protocols

2.2.1 Pinout of debug connectors

The pinout of both debug connectors and to which pins of the XMC™ the debugger must be connected can be found in Table 2 and Table 3.

Table 2 Pinout of the 10-pin Cortex™ debug connector

Pin	Function	XMC1000 Connection (Pin name)	XMC4000 Connection (Pin name)
1	VCC	Power Supply 2.5 V – 5.5 V (VDD)	Power Supply VDDP 3.3 V (VDDP)
2	SWIO/TMS	Serial Wire Data (P0.14 | P1.3)	Serial Wire Data, JTAG-TMS (TMS)
3	GND	Ground (VSS)	Ground (VSS)
4	SWCLK/TCK	Serial Wire Clock (P0.15 | P1.2)	Serial Wire Clock, JTAG-TCK (TCK)
5	GND	Ground (VSS)	Ground (VSS)
6	SWO/TDO	Not connected	Serial Wire Output, JTAG-TDO (P2.1) (optional)
7	KEY	Not connected	Not connected
8	TDI	Not connected	JTAG-TDI (P0.7)(optional)
9	GNDDetect	Can be used to switch off an on-board debug probe (PORST# of OBD) (optional)	
10	RESET#	Not connected	PORST# (mandatory)

Table 3 Pinout of the 8-pin XMC™ MCU debug connector

Pin	Function	XMC1000 Connection (Pin name)
1	SC	Serial Wire Clock (P0.15 | P1.2)
2	SD	Serial Wire Data (P0.14 | P1.3)

Pin	Function	XMC1000 Connection (Pin name)
3	+	Power supply 2.5 V – 5.5 V (VDD)
4	0	Ground (VSS)
5	0	Ground (VSS)
6	+	Power supply 2.5 V – 5.5 V (VDD)
7	TX (PC-TX))	Transmissstion line of PC/laptop, receive line of XMC™ device (optional)
8	RX (PC-RX)	Receive line of PC/laptop, transmission line of of XMC™ device (optional)

2.3 Power supply

XMC™ Link is powered from the Micro USB plug and typically draws about 70 mA. The on-board voltage regulator IFX54441LDV33 generates the required 3.3 V for the XMC4200 microcontroller out of the 5 V USB voltage. The debug probe is not designed to provide power for the target device.

The target application must power the isolated part of the debugger. The isolated side the XMC™ Link draws a few mA of current from the target application.

2.4 Virtual COM Port (UART-to-USB Bridge)

The 8-pin XMC™ MCU Debug Connector supports communication between a PC/laptop and target XMC™ device via Virtual COM Port (UART-to-USB Bridge). Therefore UART pins of the target XMC™ device needs to be connected to TX/RX pins of the debug connector (see Table 3).

Note: Take care of the UART cross connection: TX pin of debugger needs to be connected to RX pin of the XMC device. RX pin of debugger needs to be connected to TX pin of the XMC device.

3 Production data

This chapter covers schematics, board dimensions, component placement and the list of material.

3.1 Schematics

Figure 4 shows the schematics of XMC™ Link V1 in hardware version 1.1.

3.1.1 Differences in hardware versions

In hardware version 1.1 compared to hardware version v1.0 (V1) the pull-down resistor R20 was added to the TX line. The version number is printed on the bottom side of the PCB below the USB connector.

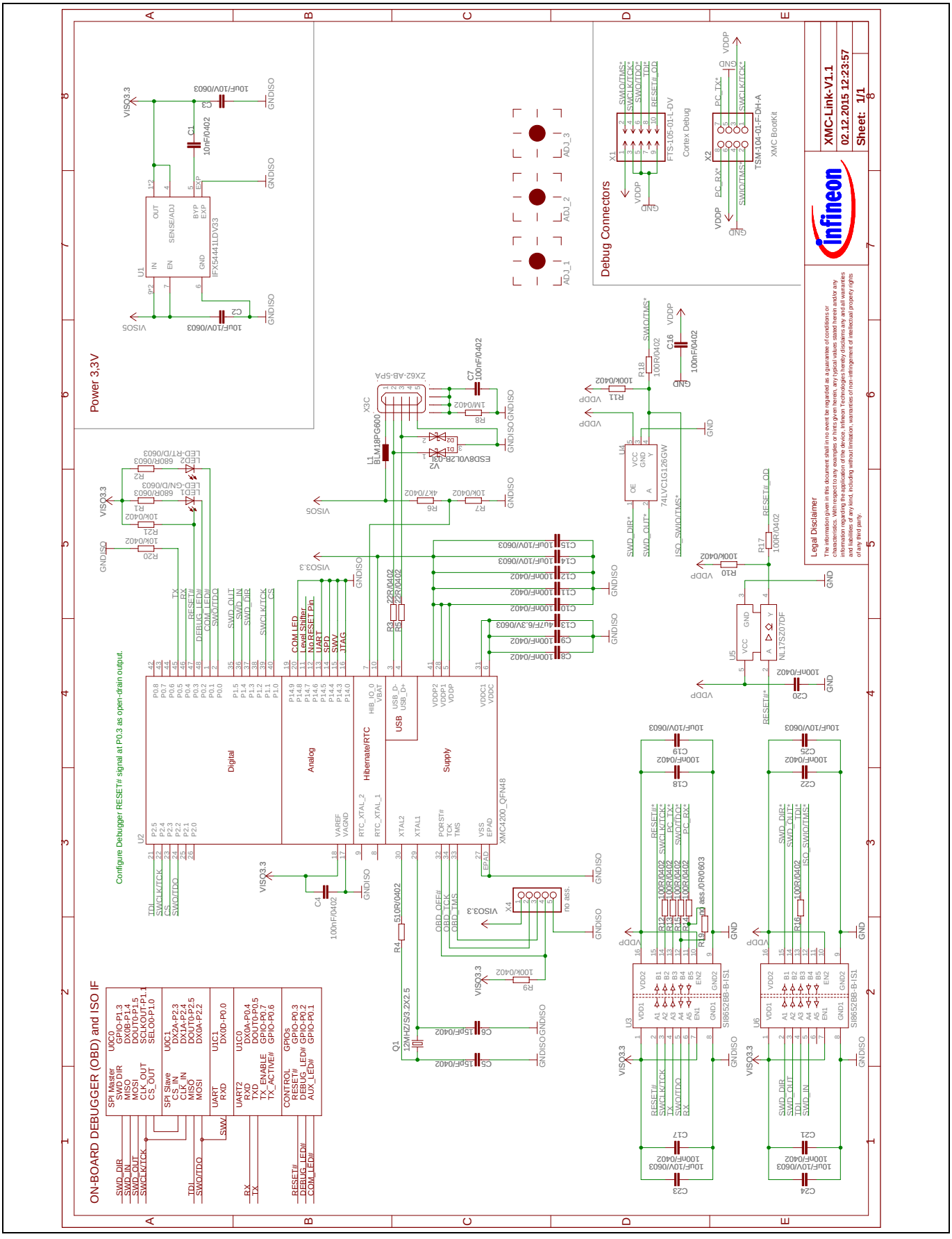

Figure 4 Schematic of the XMC™ Link V1 (Hardware Version 1.1)

3.2 Components placement and geometry

Figure 5 shows the board dimensions and the placement of components on the PCB.

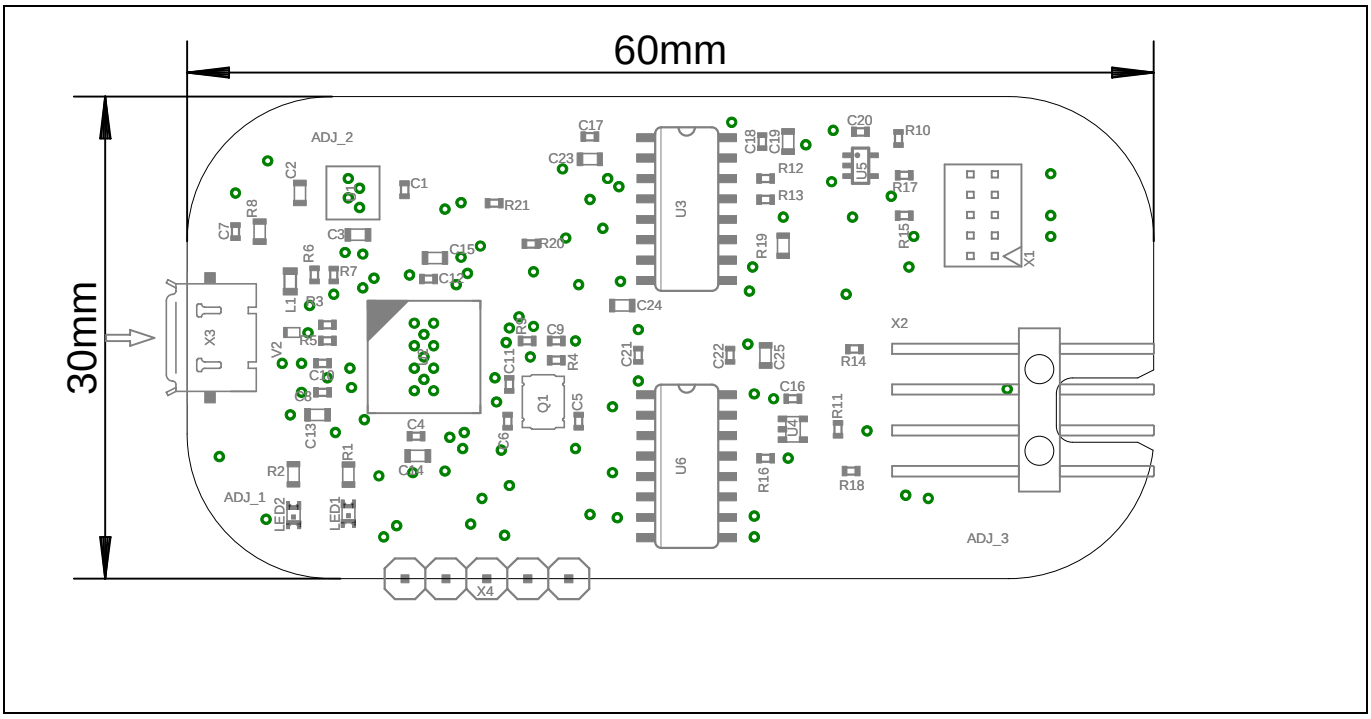

Figure 5 Components placement and geometry

3.3 List of material

The list of material is valid for the XMC™ Link V1 in hardware version 1.1.

Table 4 List of material

Value	Device	Qty	Reference Designator
15pF 50V 10% 0402	Capacitor COG	2	C5, C6
10uF 10V 20% 0603	Capacitor X5R	8	C2, C3, C14, C15, C19, C23, C24, C25
100nF 16V 10% 0402	Capacitor X7R	13	C4, C7, C8, C9, C10, C11, C12, C16, C17, C18, C20, C21, C22
10nF 16V 10% 0402	Capacitor X7R	1	C1
4u7F 6.3V +-10% 0603	Capacitor X7R	1	C13
ZX62-AB-5PA	Connector Micro USB AB SMD Hirose	1	X3
12MHz 3.2x2.5	Crystal 12MHz 4Pad NX3225SA NDK	1	Q1
ESD8V0L2B-03L TSLP-3-1	Diode Protection Infineon	1	V2
BLM18PG600SN1D 0603	Ferrite Bead 60R 500mA Murata	1	L1
SI8652BB-B-IS1 NB-SOIC-16	Isolation IC	2	U3, U6
LSQ971-Z LED-GN 0603	LED SMD gn	1	LED1
LSQ976-Z LED-RT 0603	LED SMD rt	1	LED2
74LVC1G126GW TSSOP5	Line Driver	1	U4

Value	Device	Qty	Reference Designator
SN74LVC1G07 SC70-5	Line Driver	1	U5
XMC4200-Q48K256 QFN48	Microcontroller XMC4200 Infineon	1	U2
FTS-105-01-L-DV 2x5pin 0.05"	Pin Header SMD Samtec	1	X1
TSM-104-01-F-DH-A 2x4pin 0.1"	Pin Header SMD Samtec	1	X2
no ass. 1x5pin 0.1"	Pin Header THT	1	X4
100R 1% 0402	Resistor	7	R12, R13, R14, R15, R16, R17, R18
100k 1% 0402	Resistor	3	R9, R10, R11
10k 1% 0402	Resistor	3	R7, R20, R21
1M 1% 0603	Resistor	1	R8
22R 1% 0402	Resistor	2	R3, R5
4k7 1% 0402	Resistor	1	R6
510R 1% 0402	Resistor	1	R4
680R 1% 0603	Resistor	2	R1, R2
no ass. 0R 0603	Resistor	1	R19
IFX54441LDV33 PG-TSON-10	Voltage Regulator 3.3 V Infineon	1	U1

Revision history

Major changes since the last revision

Page or reference	Description of change

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