UM11834

P3T1755DP-ARD evaluation board

Rev. 1.0 — 15 February 2023 **User manual**

Document information

Information	Content
Keywords	P3T1755, I^2C/I3C-bus, I3C IBI, temperature resolution of 0.0625 °C, 12-bit A-to-D conversion, 0.5 °C temperature accuracy.
Abstract	The P3T1755DP-ARD evaluation board allows for easy test and design of the P3T1755, which is an I3C, I^2C-bus, 0.5 °C accuracy, digital temperature sensor. This evaluation board, along with the MIMXRT685-EVK MCU board provides an easy to use evaluation platform.

Revision history

Rev	Date	Description
v.1.0	20230215	Initial version

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1 Introduction

The P3T1755DP-ARD evaluation board features an I3C, I^2C-bus, 0.5 °C accuracy, digital temperature sensor. A graphical interface allows the user to easily explore the different functions of the driver. The board can be connected in parallel with other I^2C-bus demo boards to create an evaluation system.

The IC communicates to the host via the industry standard I^2C-bus port. The evaluation software runs under Microsoft Windows 7, 8, or 10 PC platform.

2 Features

- A complete evaluation platform for the P3T1755DP I3C, I^2C-bus, 0.5 °C accuracy, digital temperature sensor
- Easy to use GUI-based software demonstrates the capabilities of the P3T1755DP
- On-board temperature sensor for system thermal management experiments
- Convenient test points for easy scope measurements and signal access
- USB interface to the host PC
- Power supply from USB port (x2) or external power supply can be used to power P3T1755DP-ARD evaluation board

3 Getting started

3.1 Assumptions

Familiarity with the SPI-bus is helpful but not required.

3.2 Static handling requirements

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling. You must use a ground strap or touch the PC case or other grounded source before unpacking or handling the hardware.

3.3 Minimum system requirements

- PC Pentium processor (or equivalent)
- One USB port (either 3.0 or 2.0 or 1.1 compatible)
- Windows 7, 8, or 10
- MIMXRT685-EVK MCU board (from www.nxp.com)

3.4 Power requirements

The MIMXRT685-EVK MCU board obtains power from the PC USB port. Two USB parts can be connected to the MIMXRT685-EVK MCU board simultaneously. Use an external power supply option if exceeding the USB port current capabilities.

4 Hardware installation

4.1 P3T1755DP-ARD EV board and MIMXRT685-EVK MCU board connection

The P3T1755DP-ARD evaluation board is connected to an MIMXRT685-EVK MCU board using four connectors (J4/J5/J7/J8 on P3T1755DP-ARD board and J27/J28/J29/J30 on MIMXRT685-EVK board) for I^2C-bus and power supply, and one connector (J18 on P3T1755DP-ARD board and J on MIMXRT685-EVK board) for I3C-bus.

The MIMXRT685-EVK MCU board communicates with P3T1755DP-ARD demo GUI through PC USB port and uses I^2C or I3C-bus to communicate to P3T1755.

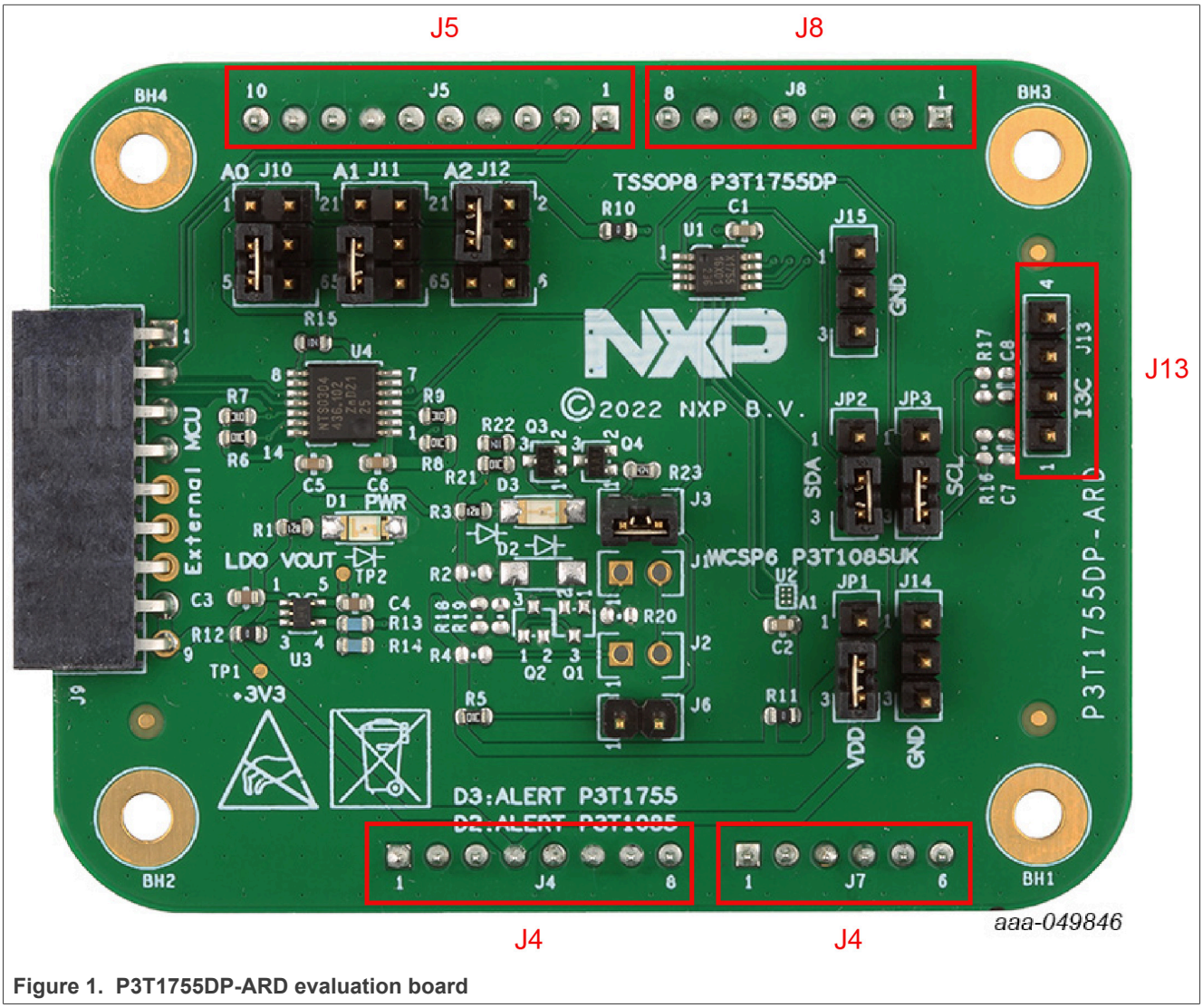

Figure 1. P3T1755DP-ARD evaluation board

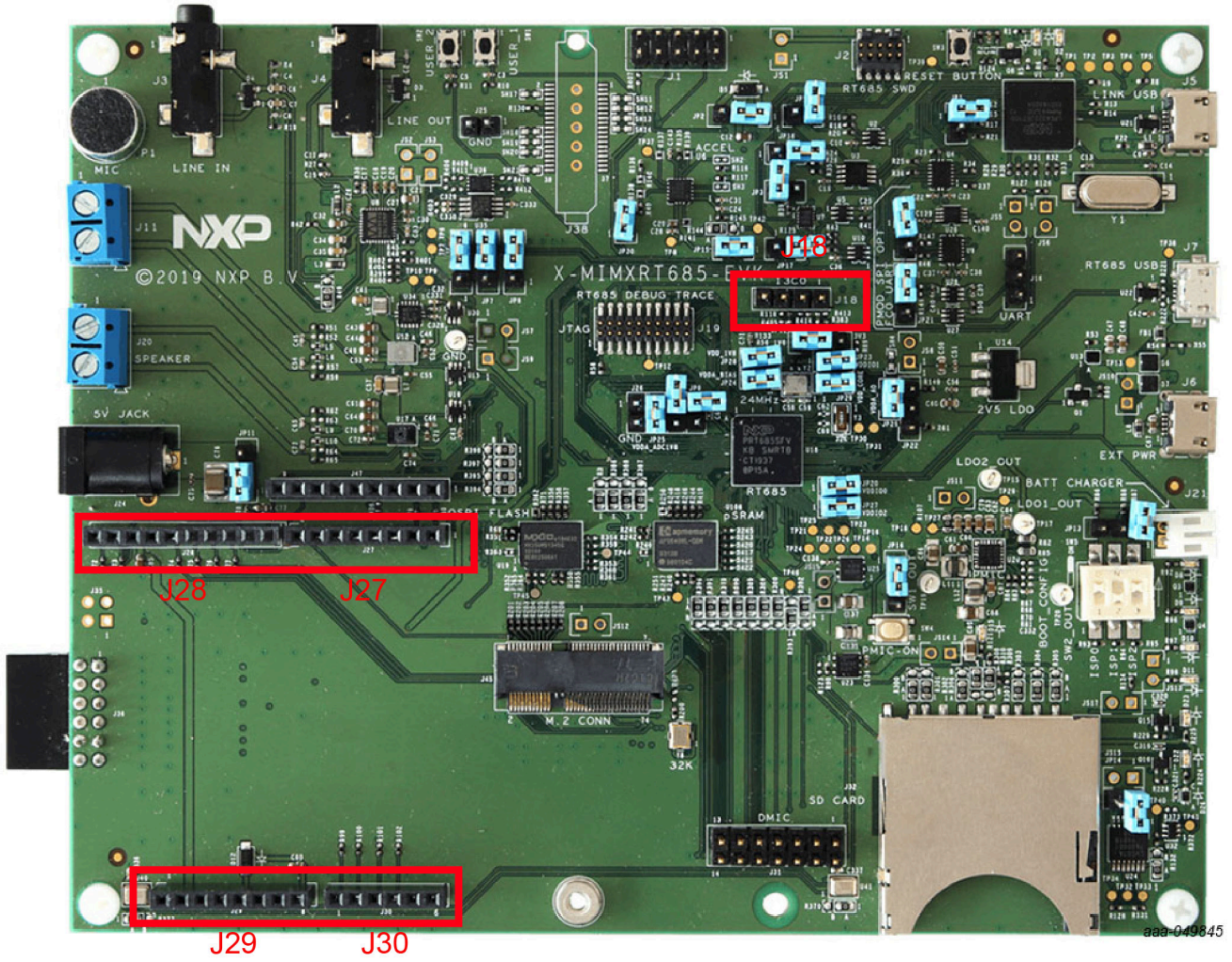

Figure 2. MIMXRT685-EVK MCU evaluation board

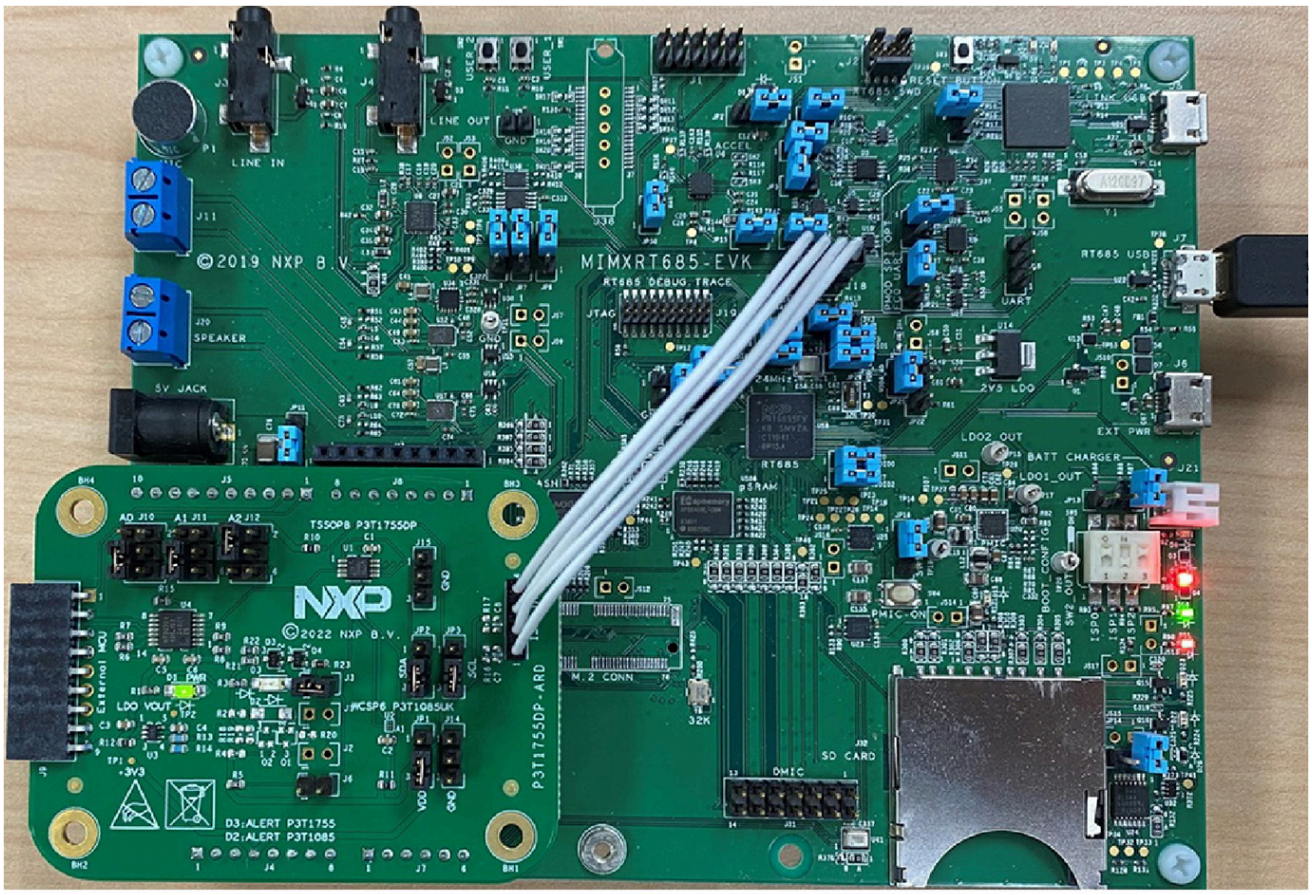

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Figure 3. P3T1755DP-ARD evaluation board connecting to the MIMXRT685-EVK MCU board

Use J7 (USB Micro-B connector) on MIMXRT685-EVK for power supply and GUI communication port.

5 Hardware description

- J4/J5/J7/J8 are connected to the MIMXRT685-EVK MCU board for P3T1755DP-ARD power supply and I^2C-bus interface.
- J13 is connected to the MIMXRT685-EVK MCU board for P3T1755DP-ARD I3C-bus interface.
- JP1 selects P3T1755DP VDD power supply.
- J10 selects P3T1755DP I^2C target address.
- JP2/JP3 select I^2C or I3C-bus interface.

Table 1. P3T1755DP-ARD board main components

Device	Description	Location
P3T1755DP	I3C, I^2C-bus, 0.5 °C accuracy, digital temperature sensor	U1
TPS71701DCKT	Adjustable output voltage LDO	U3
NTS0304EPWJ	4-bit dual supply translating transceiver	U4
Green LED	Power supply on LED	D1
Red LED	Alert LED	D3

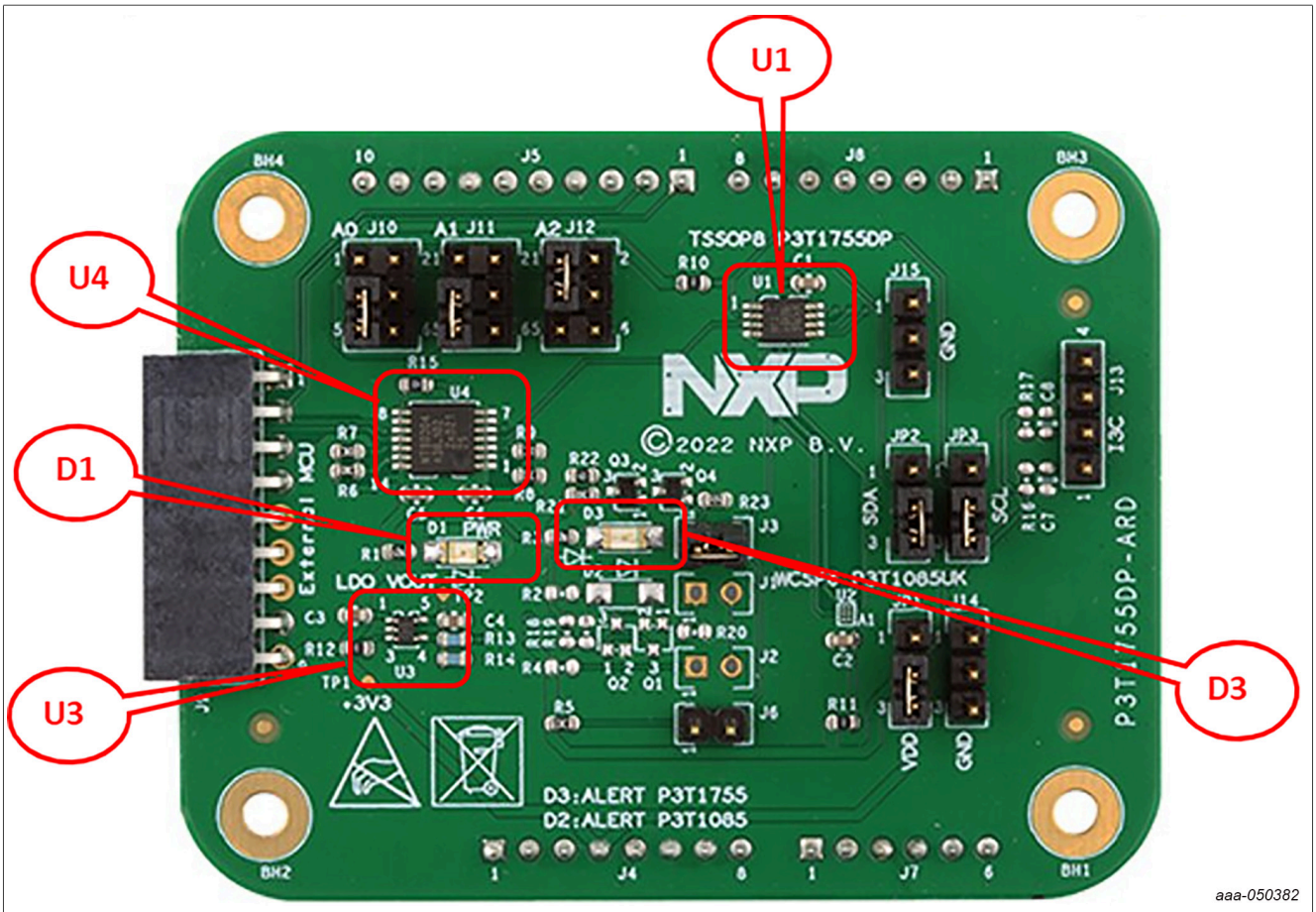

Figure 4. P3T1755DP-ARD board main components

Table 2. Jumper settings

Jumper	Default setting	Comment
J1	1-2	1-2: Alert LED is used. Open: No Alert LED used.
J2	Open	1-2: Alert pin 10 kΩ pull-up resistor is selected. Open: No Alert pin 10 kΩ pull-up resistor selected.
J3	DNP	No used
J4-J5		Arduino connector
J6	DNP	No used
J7-J8	N/A	Arduino connector
J9		External MCU interface connector
J10	3-5	1-3: A0 pin connected to VDD 3-5: A0 pin connected to ground 2-4: A0 pin connected to SCL 4-6: A0 pin connected to SDA
J11-12	DNP	No used
J13		I3C connector
J14-15		Ground test pins

Table 2. Jumper settings...*continued*

Jumper	Default setting	Comment
JP1	2-3	1-2: VDD = 1.8 V 2-3: VDD = 3.3 V
JP2	2-3	1-2: SDA = SDA_I3C 2-3: SDA = SDA_I2C
JP3	2-3	1-2: SCL = SCL_I3C 2-3: SCL = SCL_I2C

6 Schematic

The schematic diagram of P3T1755DP-ARD EVB is available at URL: http://www.nxp.com/P3T1755DP-ARD.

7 P3T1755DP-ARD EVB demo GUI

7.1 Run P3T1755DP-ARD GUI V0.1.exe on Windows 7,8,10 PC

1. As shown in Figure 5, click “Connect” button to connect MIMXRT685-EVK board
2. Use Setting tab to select I^2C and I3C-bus speed
3. Use I^2C tab to use I^2C-bus to access to the P3T1755
4. Use I3C tab to use I3C-bus to access to the P3T1755

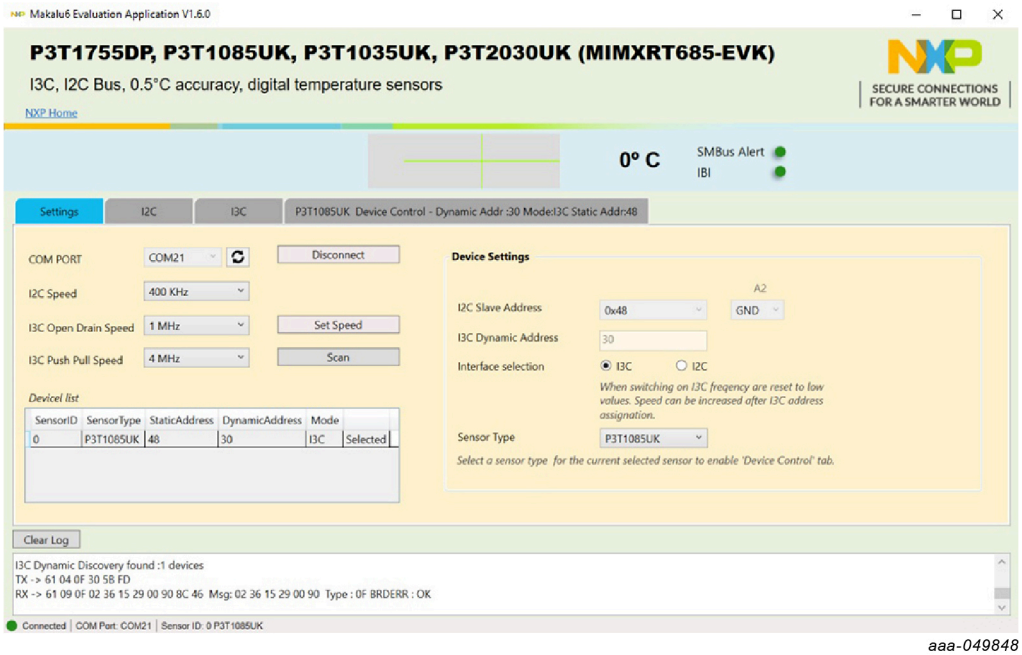

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Figure 5. Settings tab

8 Abbreviations

Table 3. Abbreviations

Acronym	Description
DUT	Device Under Test

Table 3. Abbreviations...*continued*

Acronym	Description
ESD	Electro Static Discharge
EVK	Evaluation Board
GUI	Graphical User Interface
I^2C bus	Inter-Integrated Circuit bus
IC	Integrated Circuit
I/O	Input / Output
LED	Light Emitting Diode
PC	Personal Computer
SPI	Serial Peripheral Interface
USB	Universal Serial Bus

9 References

1. *P3T1755DP - I3C, I^2C-bus, 0.5 °C accuracy, digital temperature sensor*; Product data sheet; NXP Semiconductors

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