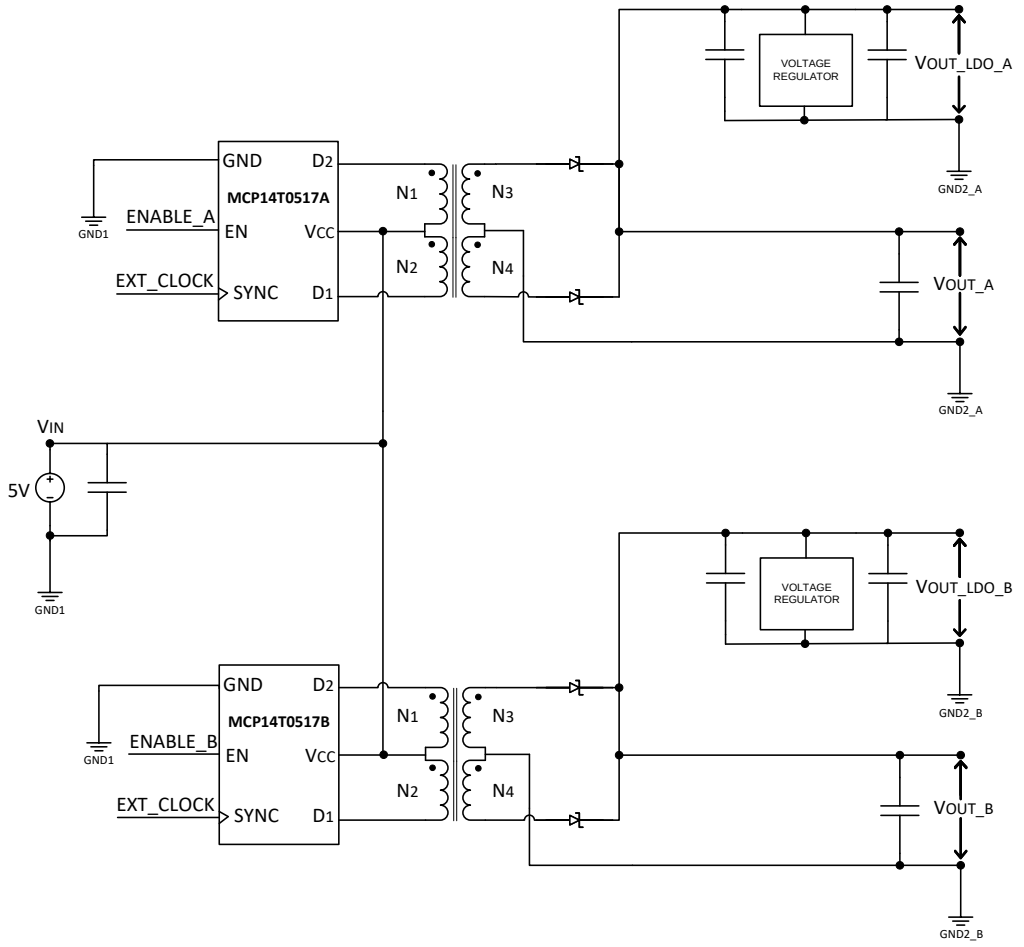
EV76D05A

MCP14T0517A/B Evaluation Board User's Guide

Introduction

The MCP14T0517A/B Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP14T0517A and MCP14T0517B products. This board demonstrates the MCP14T0517A and MCP14T0517B configured in two isolated power supplies, each one providing a regulated output voltage of typically 5V and a 500 mA load current.

Figure 1. MCP14T0517A/B Evaluation Board Block Diagram



The board features two channels, one for MCP14T0517A and one for MCP14T0517B. Each channel has two outputs: one regulated via MCP1727 LDO and one unregulated. Other on-board features include connectors and test points for the input and outputs, on-board and external enable control, connectors and test points for the internal/external clock and the programable 1 MHz clock signal via the on-board PIC12F1822 microcontroller.

Features

The MCP14T0517A/B Evaluation Board has the following features:

- Input Voltage (VCC): 5V
- Typical Regulated Output Voltage (VLDO_A and VLDO_B): 5V
- Output Current: up to 500 mA (on each channel)
- Switching Frequency: 150 kHz for the MCP14T0517A and 450 kHz for the MCP14T0517B
- On-board programable clock via PIC12F1822 microcontroller of up to 1 MHz (resulting in a switching frequency of up to 500 kHz)
- Synchronization with external clock signal
- On-board/external enable control
- Overcurrent and Overtemperature Protections
- Ro-HS Compliant

What is the MCP14T0517A/B Evaluation Board

The MCP14T0517A/B Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP14T0517A and MCP14T0517B products. This board demonstrates the MCP14T0517A and MCP14T0517B configured in two isolated power supplies.

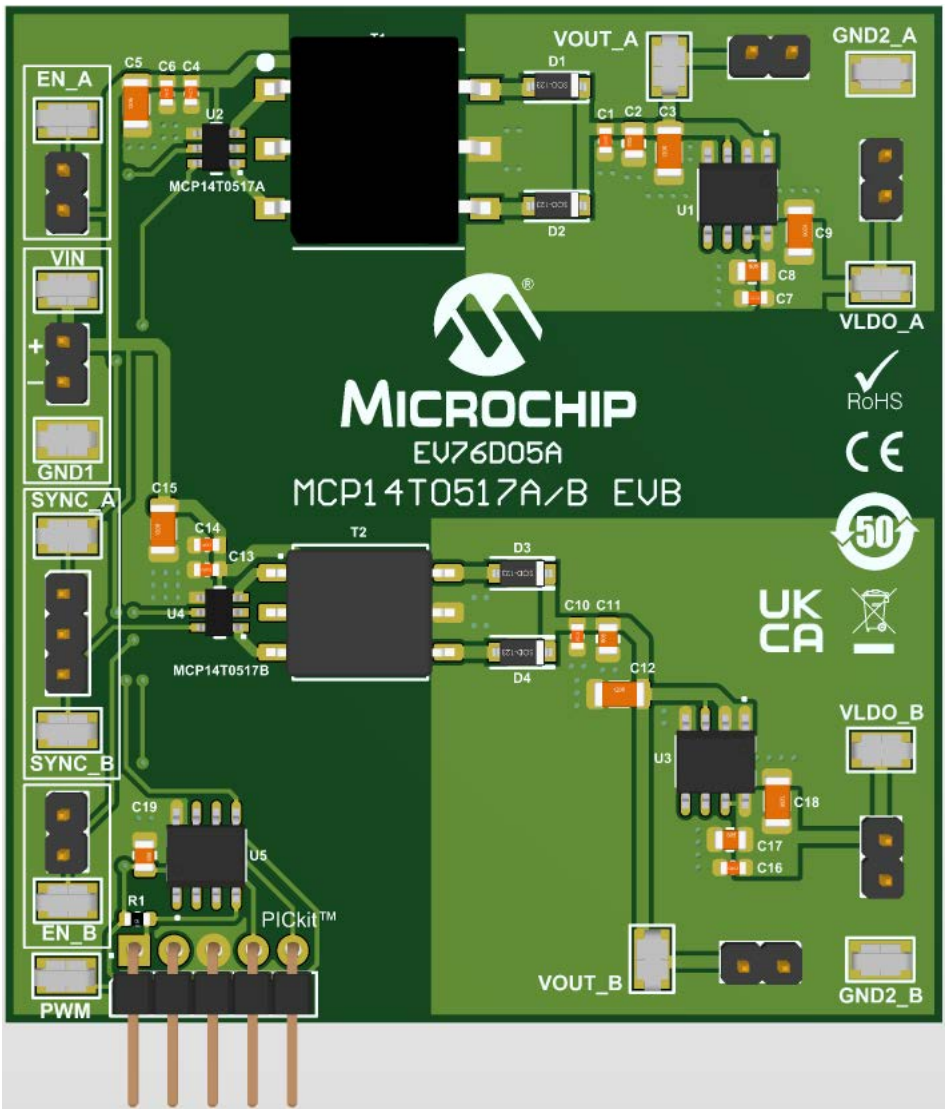
The MCP14T0517A/B Evaluation Board has been developed to evaluate MCP14T0517A and MCP14T0517B capabilities, such as providing a regulated output voltage of 5V and up to 500 mA current for each channel, enable control, synchronization with external clock signal and on-board programable clock signal.

Kit contents

The MCP14T0517A/B Evaluation Board kit includes:

- MCP14T0517A/B Evaluation Board PCB
- Two jumpers
- MCP14T0517A/B Evaluation Board User's Guide
- A ".hex" file to program the on-board microcontroller to generate a clock signal of 1 MHz frequency

Figure 2. MCP14T0517A/B Evaluation Board PCB Top View

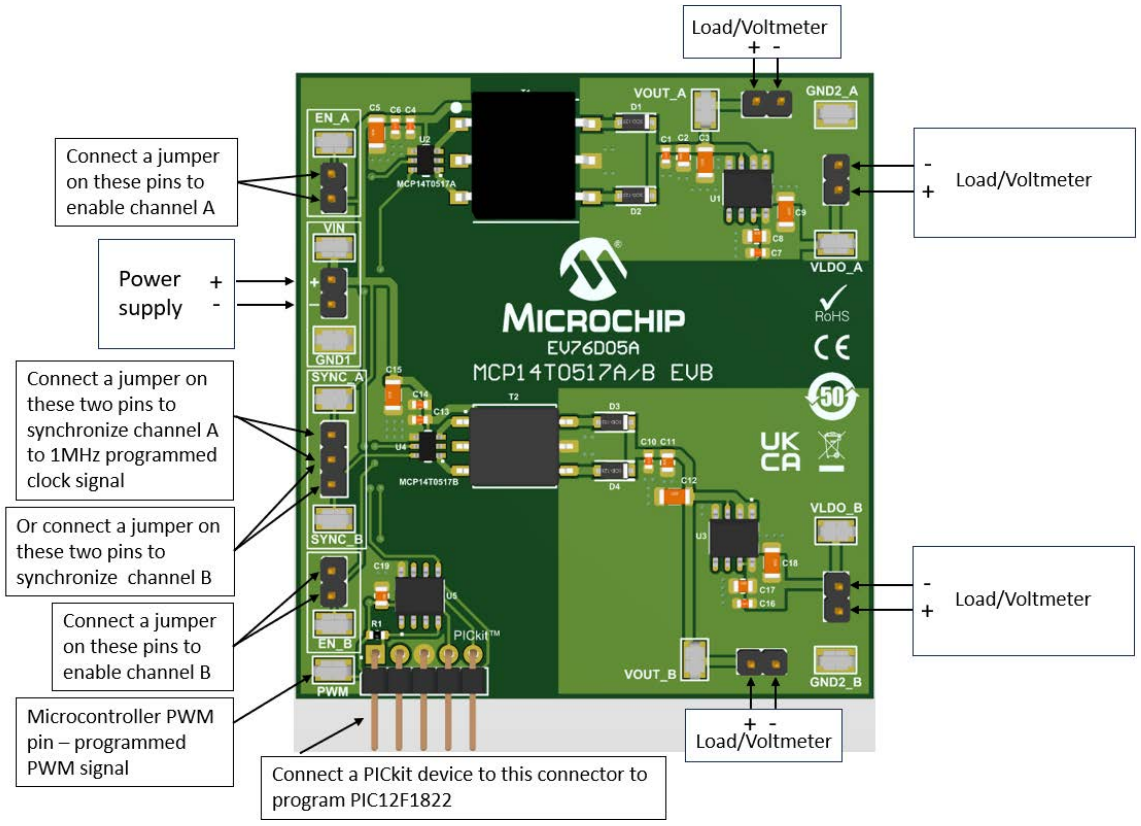


1. Setup and Configuration

To set up and power the MCP14T0517A/B Evaluation Board, complete the following steps:

1. Connect a jumper to the two-pin EN_A header and/or connect a jumper to the two-pin EN_B header to enable MCP14T0517A and/or MCP14T0517B, as shown in Figure 1-1.
2. Connect voltmeters to the four outputs: VOUT_A, VLDO_A, VOUT_B, VLDO_B to monitor the output voltages, as shown in Figure 1-1.
3. Connect a power source to the VIN header or to the nearby test points, as shown in Figure 1-1.
4. Set the power supply to 5V.
5. Read the output voltage on the voltmeters. Alternatively, use electronic loads instead of voltmeters on one of the four outputs. A current of up to 500 mA can be drawn from either the MCP14T0517A channel or MCP14T0517B channel. Refer to Chapter 4 for the Output Voltage vs Output Current characteristics.
6. To enable the external clock of 1 MHz, on either the MCP14T0517A or MCP14T0517B, connect a jumper to the SYNC_A/SYNC_B header on the two upper pins for MCP14T0517A, or the two bottom pins for MCP14T0517B, as shown in Figure 1-1.

Figure 1-1. MCP14T0517A/B Evaluation Board PCB Pins and Connectors



2. Board Design

This chapter contains the following schematic and layouts for the MCP14T0517A/B Evaluation Board:

- Schematic
- Top Copper and Silk
- Bottom Copper and Silk

Figure 2-1. Schematic

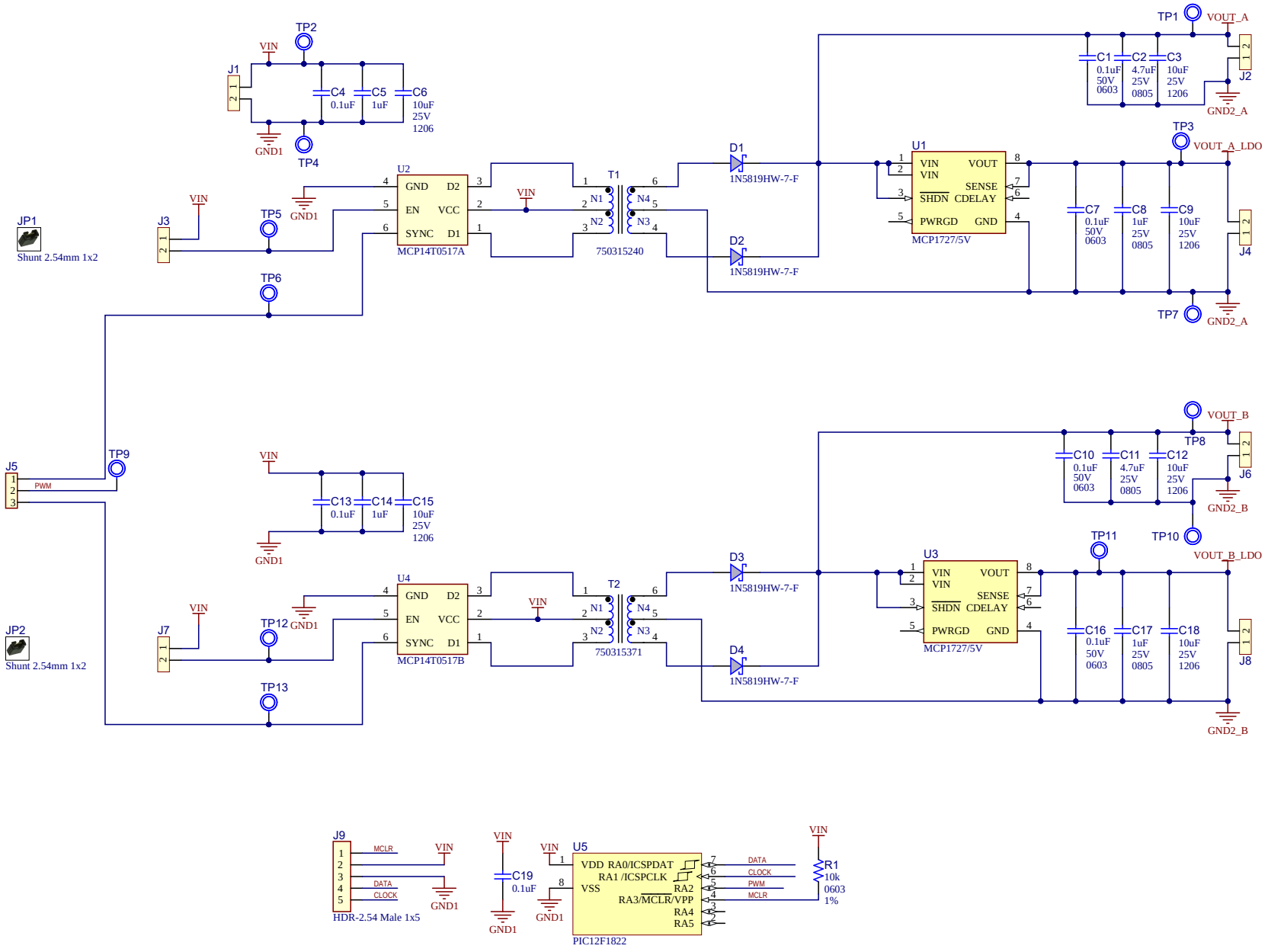


Figure 2-2. Top Copper and Silk

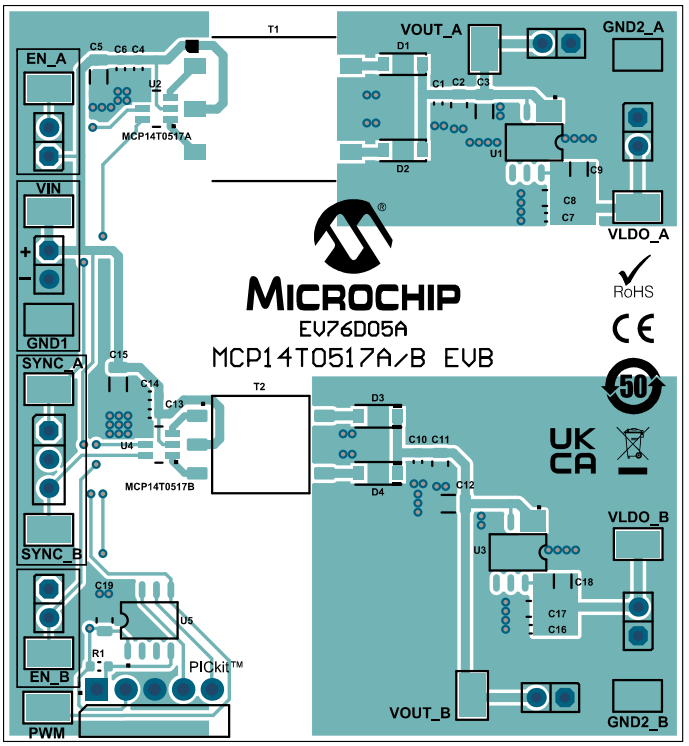
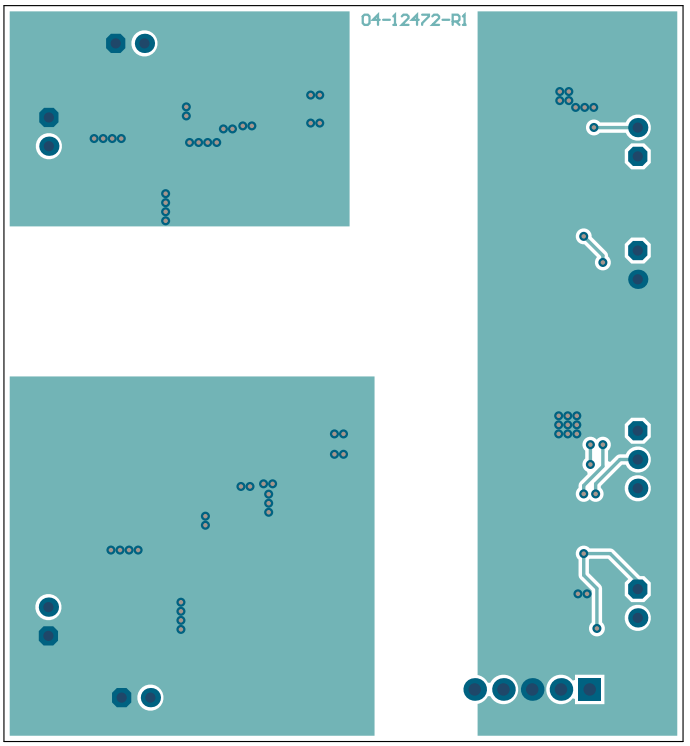


Figure 2-3. Bottom Copper and Silk



3. Bill of Materials (BOM)

Table 3-1. Bill of Materials (BOM)

Qty.	Reference	Description	Manufacturer	Part Number
6	C1, C4, C7, C10, C13, C16	Capacitor, Ceramic, 0.1 µF, 50V, 10%, X7R, SMD, 0603, AEC-Q200	Kyocera AVX	06035C104K4Z4A
2	C2, C11	Capacitor, Ceramic, 4.7 µF, 25V, 20%, Y5V, SMD, 0805	TDK Corporation	C2012Y5V1E475Z
6	C3, C6, C9, C12, C15, C18	Capacitor, Ceramic, 10 µF, 25V, 10%, X7R, SMD, 1206	Murata Electronics	GRM31CR71E106KA12L
2	C5, C14	Capacitor, Ceramic, 1 µF, 50V, 10%, X7R, SMD, 0603	Taiyo Yuden Co., Ltd.	UMK107AB7105KA-T
2	C8, C17	Capacitor, Ceramic, 1 µF, 25V, 20%, Y5V, SMD, 0805	KEMET	C0805C105Z3VACTU
1	C19	Capacitor, Ceramic, 0.1 µF, 50V, 10%, X7R, SMD, 0805	Kyocera AVX	KGM21NR71H104KT
4	D1, D2, D3, D4	Diode, Schottky, 450 mV, 1A, 40V, SMD, SOD-123	Diodes Incorporated®	1N5819HW-7-F
7	J1, J2, J3, J4, J6, J7, J8	Connector, Header-2.54, Male, 1x2, Gold, 5.84 MH, TH, Verical	FCI	68000-202HLF
1	J5	Connector, Header-2.54, Male, 1x3, Gold, 6.10 MH TH VERT	METZ CONNECT GmbH	PR20203VBNN
1	J9	Connector, Header-2.54, Male, 1x5, Gold, 6 MH TH R/A	Würth Elektronik	61300511021
2	JP1, JP2	Mechanical, Header&Wire, Jumper, 2.54 mm, 1x2	FCI	63429-202LF
1	R1	Resistor, Thin Film, 10k, 1%, 1/8W, SMD, 0603	Stackpole Electronics, Inc.	RNCP0603FTD10K0
1	T1	Power Transformers, XFMR, FWD, P-P, DC/DC, Inductance 110 µH, SMD	Würth Elektronik	750315240
1	T2	Power Transformers, XFMR, FWD, P-P, DC/DC, Inductance 72 µH SMD	Würth Elektronik	750315371
13	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13	Connector, Test Point, TAB, Silver, Mini, 3.8 x 2.03, SMD	Keystone® Electronics Corp.	5019
1	PCB1	Printed Circuit Board	—	04-12472-R1
1	PCBA1	PCB Assembly	—	02-1415-R1

Table 3-2. Bill of Materials (BOM) – Microchip Parts

Qty.	Reference	Description	Manufacturer	Part Number
2	U1, U3	Analog LDO, 5V, 8L SOIC	Microchip Technology Inc.	MCP1727T-5002E/SN
1	U2	Analog Transformer Driver, Push-Pull, 150 kHz, 6L SOT-23	Microchip Technology Inc.	MCP14T0517AT-E/CH
1	U4	Analog Transformer Driver, Push-Pull 450 kHz, 6L SOT-23	Microchip Technology Inc.	MCP14T0517BT-E/CH
1	U5	MCU, 8-BIT, 32 MHz, 3.5 kB, 128B, 8L SOIC	Microchip Technology Inc.	PIC12F1822T-E/SN

4. Performance Data and Waveforms

This chapter shows some of the typical performance parameters and waveforms of the MCP14T0517A/B Evaluation Board.

Figure 4-1. Channel MCP14T0517A - V_OUT_A and V_LDO_A outputs with internal clock - output characteristic

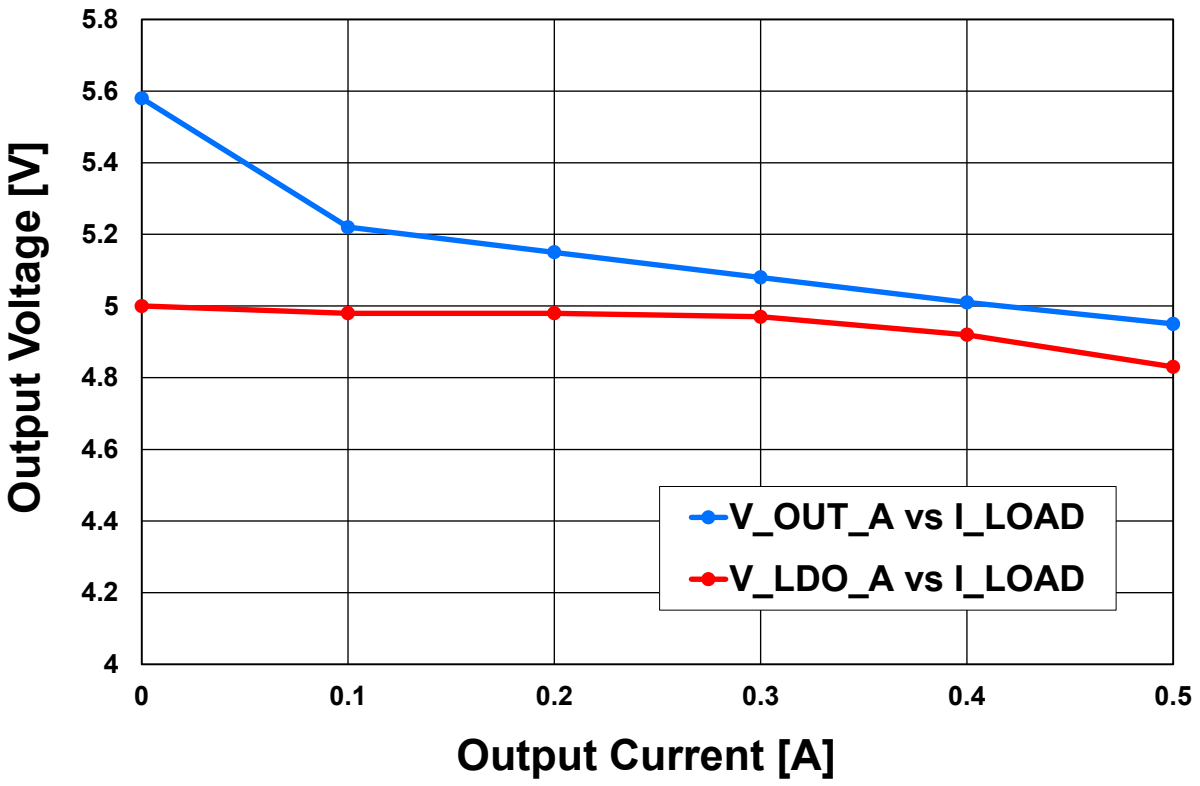


Figure 4-2. Channel MCP14T0517A - V_OUT_A and V_LDO_A outputs with 1 MHz external clock - output characteristic

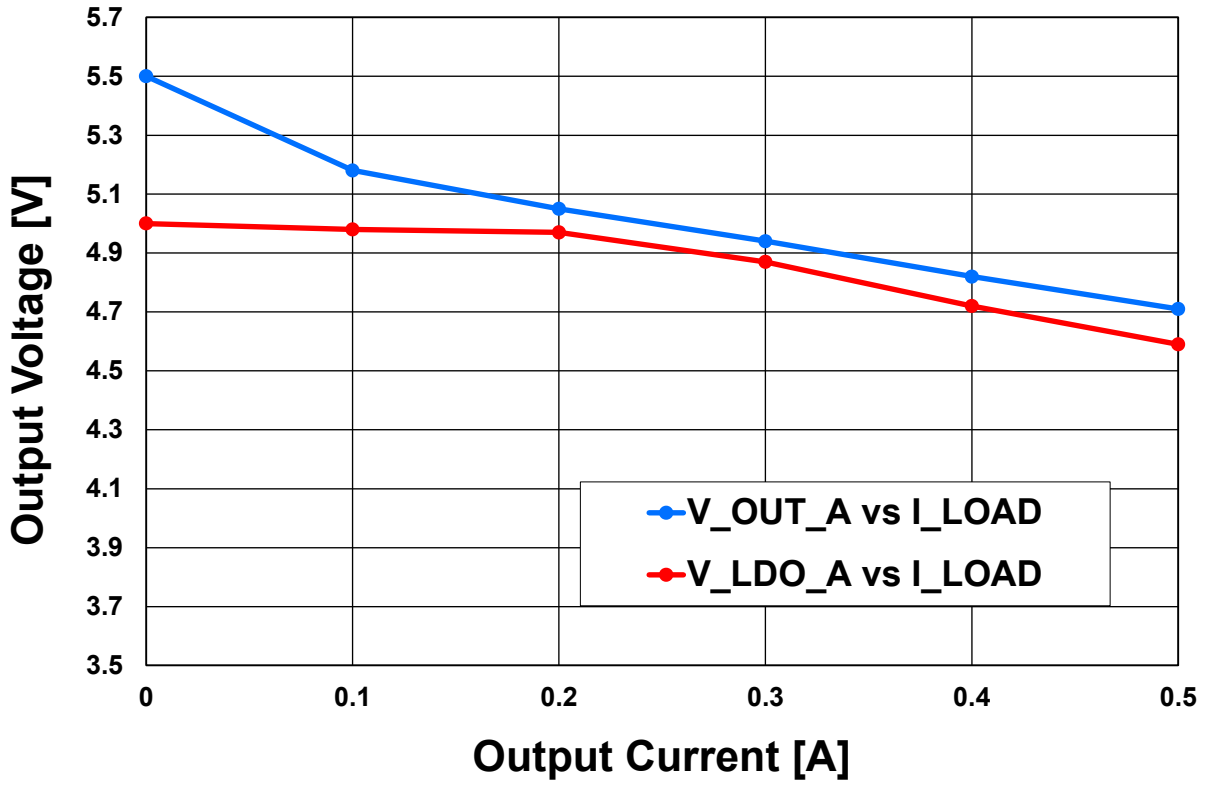


Figure 4-3. Channel MCP14T0517B - V_OUT_B and V_LDO_B outputs with internal clock - output characteristic

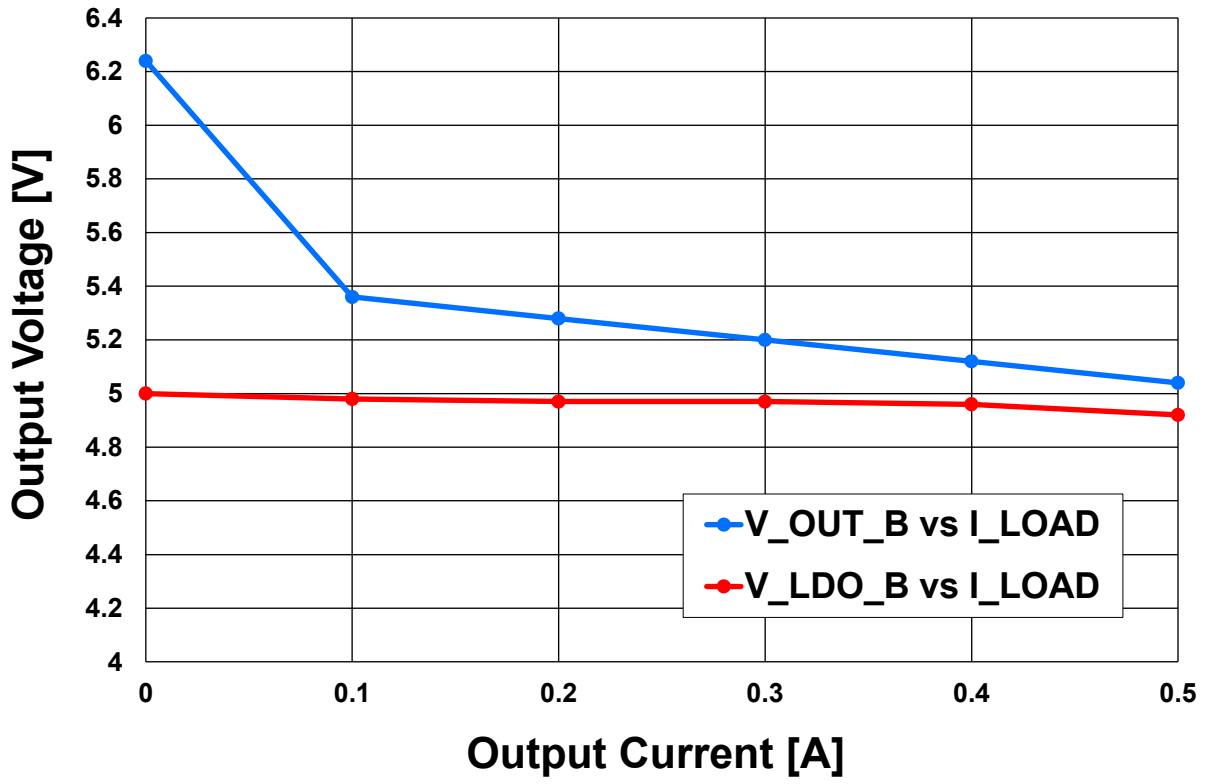


Figure 4-4. Channel MCP14T0517B - V_OUT_B and V_LDO_B outputs with 1 MHz external clock - output characteristic

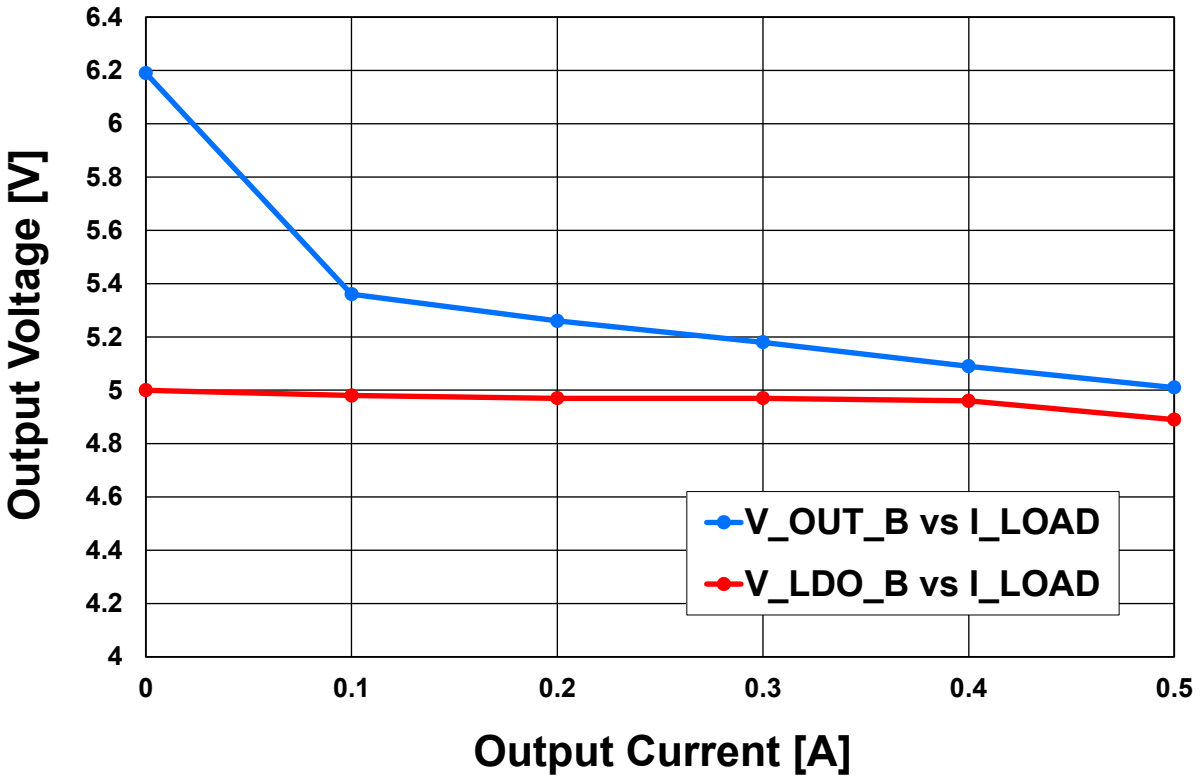


Figure 4-5. Channel MCP14T0517A with internal clock - D1 and D2 signal waveforms (C1/C2: 5V/div)

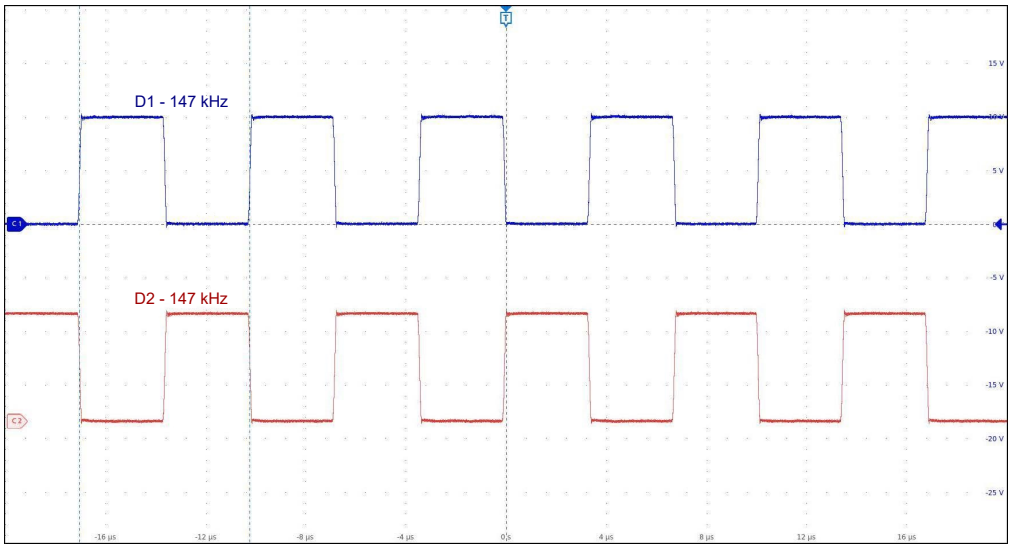


Figure 4-6. Channel MCP14T0517A with 1 MHz external clock - D1, D2, SYNC_A signal waveforms (C1/C2: 5V/div; C3: 2V/div)

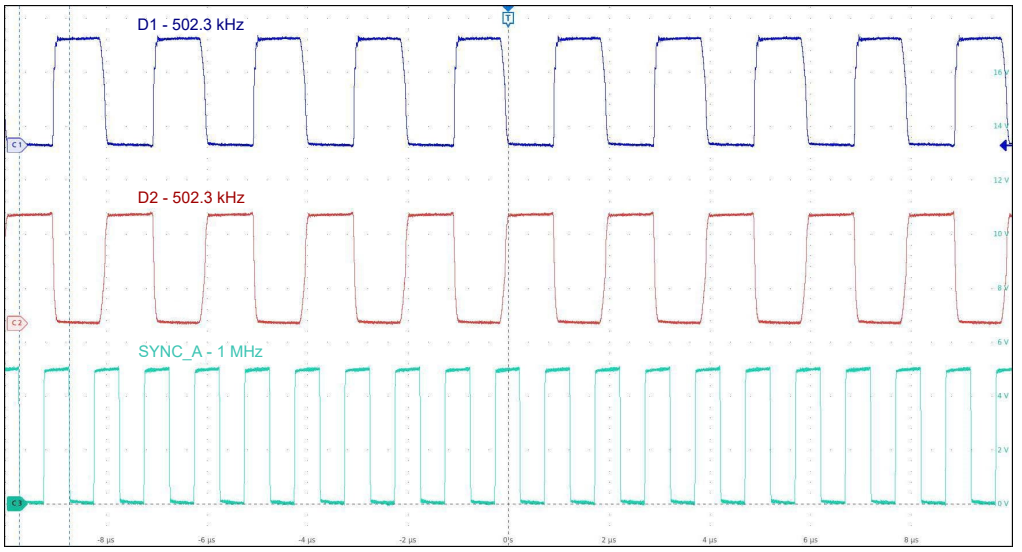


Figure 4-7. Channel MCP14T0517B with internal clock - D1 and D2 signal waveforms (C1/C2: 5V/div)

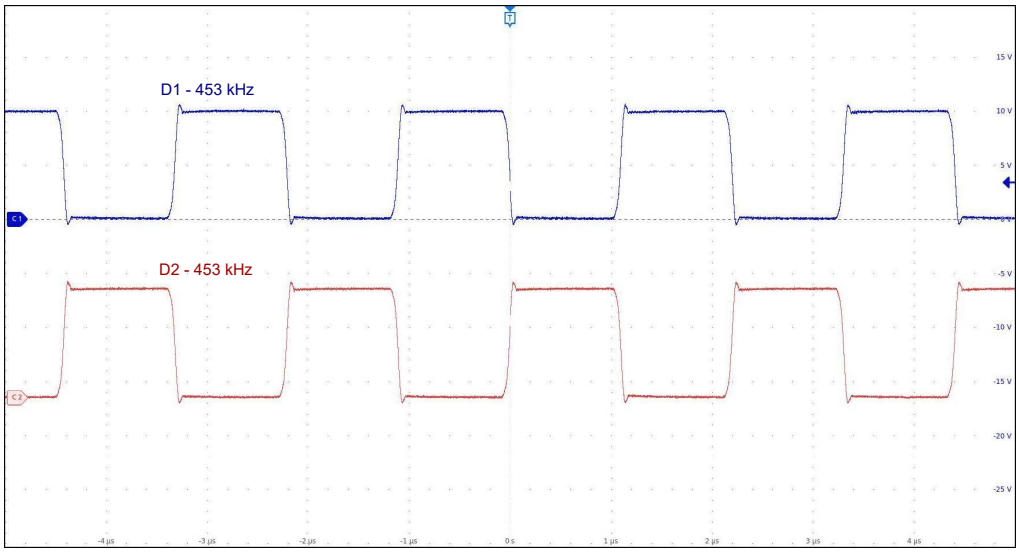
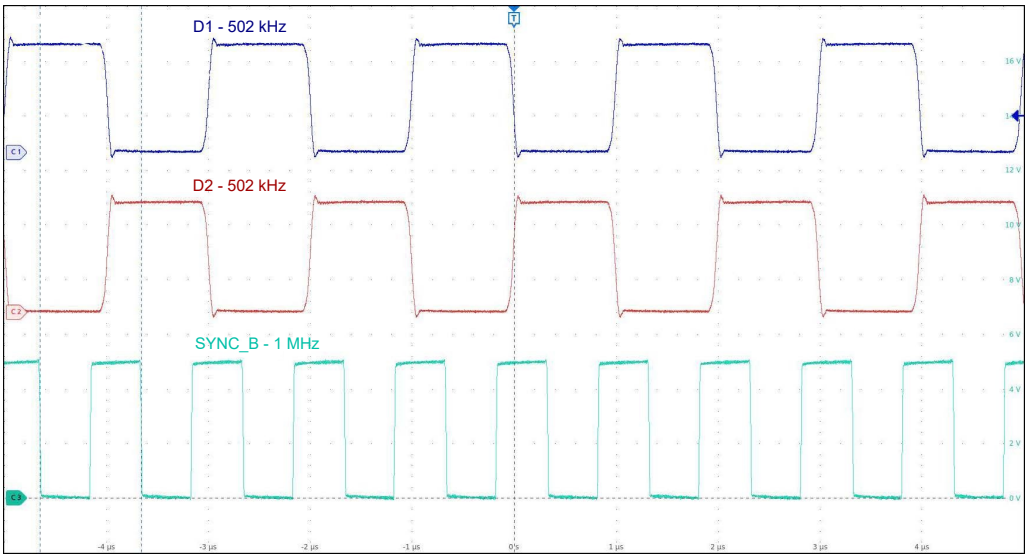


Figure 4-8. Channel MCP14T0517B with 1 MHz external clock - D1, D2, SYNC_B signal waveforms (C1/C2: 5V/div; C3: 2V/div)



5. References

Table 5-1. Recommended Reading

Source	Document Title	Literature Number	Available
Microchip Technology, Inc.	MCP14T0517 Datasheet	DS-20007067	

6. Revision History

Doc. Rev.	Date	Comments
A	12/2025	Initial release of this document.

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