

NCV7755 Evaluation Board User's Manual

EVBUM2809/D

Overview

This document gives a detailed description of the NCV7755 Evaluation Board (SSOP-24 EPAD Package) with the bill of materials, board schematic, and a layout overview of the board. An example lab setup is also provided.

The NCV7755 Evaluation Board has been designed for quick evaluation of the NCV7755 octal high-side driver. This evaluation board has been constructed to easily interface with a user's systems and equipment through the various terminals and test points located throughout the board. The evaluation board has the option to integrate an Arduino Nano and be used with accompanying software so most capabilities of the NCV7755 can be realized in a convenient user-friendly manner.

This document should be used with the NCV7755 datasheet available on www.onsemi.com. The evaluation board follows the application diagram; however, the datasheet contains full technical details about the NCV7755 specification, features, timing, and other operations.

Features

- Test Points for Each Output
- Test Points for all Logic Pins
- Optional Onboard 5 V Regulator
- Option For Single Supply Use
- Reverse Polarity Protected
- Arduino Nano Integration
- Additional Demonstration Software

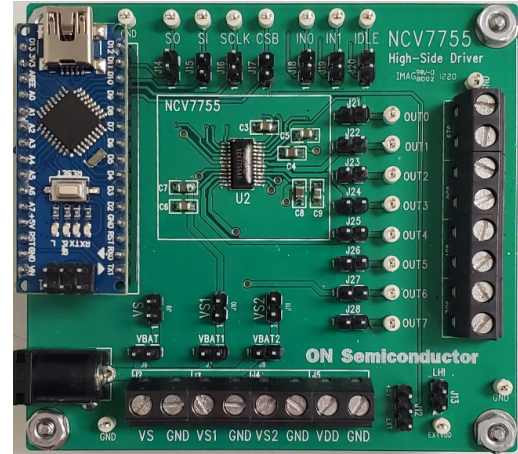


Figure 1. NCV7755 Evaluation Board

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QTY	REFERENCE	DESCRIPTION	DIGI-KEY P/N	MANUFACTURER	MANUFACTURER P/N
5	R1,R2,R3,R4,R5	510 Ohms $\pm 1\%$ 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thick Film	P510CCT-ND	Panasonic Electronic Components	ERJ-6ENF5100V
3	R6,R7,R8	4.7 kOhms $\pm 1\%$ 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thick Film	P4.70KCCT-ND	Panasonic Electronic Components	ERJ-6ENF4701V
1	R9	10 Ohms $\pm 1\%$ 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thick Film	P10.0CCT-ND	Panasonic Electronic Components	ERJ-6ENF10R0V
1	R10	10 kOhms $\pm 1\%$ 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thick Film	P10.0KCCT-ND	Panasonic Electronic Components	ERJ-6ENF1002V
1	J1	Power Barrel Connector Jack 2.50mm ID (0.098"), 5.50mm OD (0.217") Through Hole, Right Angle	CP-102B-ND	CUI Devices	PJ-102B
8	J2,J3,J4,J5,J29,J30,J31,J32	2 Position Wire to Board Terminal Block Horizontal with Board 0.200" (5.08mm) Through Hole	277-6270-ND	Phoenix Contact	1985865
1	C1	0.33 μ F $\pm 10\%$ 50V Ceramic Capacitor X7R 0805 (2012 Metric)	490-8045-1-ND	Murata Electronics	GCM219R71H334KA55D
1	C2	1 μ F $\pm 10\%$ 16V Ceramic Capacitor X7R 0805 (2012 Metric)	1276-6471-1-ND	Samsung Electro-Mechanics	CL21B105KOFNNNG
3	C4,C7,C8	10 μ F $\pm 20\%$ 50V Ceramic Capacitor X5R 0805 (2012 Metric)	490-18664-1-ND	Murata Electronics	GRM21BR61H106ME43L
4	C3,C5,C6,C9	0.1 μ F $\pm 10\%$ 50V Ceramic Capacitor X7R 0805 (2012 Metric) Automotive AEC-Q200	490-11955-1-ND	Murata Electronics	GCD21BR71H104KA01L
8	C10,C11,C12,C13,C14,C15,C16,C17	10000pF $\pm 10\%$ 50V Ceramic Capacitor X7R 0805 (2012 Metric) Automotive AEC-Q200	311-3174-1-ND	Yageo	AC0805KRX7R9BB103
1	Q1	Bipolar (BJT) Transistor NPN 40V 200mA 300MHz 300mW Surface Mount SOT-23-3 (TO-236)	SMMBT3904LT1GOSCT-ND	ON Semiconductor	SMMBT3904LT1G
20	TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,TP17,TP18,TP19,TP20	White PC Test Point, Miniature Phosphor Bronze, Silver Plating 0.040" (1.02mm) Hole Diameter Mounting Type	36-5002-ND	Keystone Electronics	5002
22	J6,J7,J8,J9,J10,J11,J13,J14,J15,J16,J17,J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28	Connector Header Through Hole 2 position 0.100" (2.54mm)	S1011EC-02-ND	Sullins Connector Solutions	PRPC002SAAN-RC
1	J12	Connector Header Through Hole 3 position 0.100" (2.54mm)	5-146280-3-ND	TE Connectivity AMP Connectors	5-146280-3
23	JP Shunts	2 (1 x 2) Position Shunt Connector Open Top, Grip 0.100"	S9341-ND	Sullins Connector Solutions	NPC02SXON-RC
1	U1	40PC Female pin headers for Arduino Nano	HDR100IMP40F-G-V-TH-ND	Chip Quik Inc.	HDR100IMP40F-G-V-TH
1	U2	Octal High Side Driver		ON Semiconductor	NCV7755
1	U3	Linear Voltage Regulator IC Positive Fixed 1 Output 1A DPAK	MC7805BDTGOS-ND	ON Semiconductor	MC7805BDTG
2	D1,D2	Diode Schottky 50V 2A Surface Mount DO-214AA (SMB)	SS25CT-ND	ON Semiconductor	SS25
4	Hex Stand Off	Hex Standoff Threaded #4-40 Aluminum 0.750" (19.05mm) 3/4"	36-8403-ND	Keystone Electronics	8403
4	Stand Off Screw	#4-40 Hex Nut 0.250" (6.35mm) 1/4" Steel	36-9600-ND	Keystone Electronics	9600

Figure 2. Bill of Materials

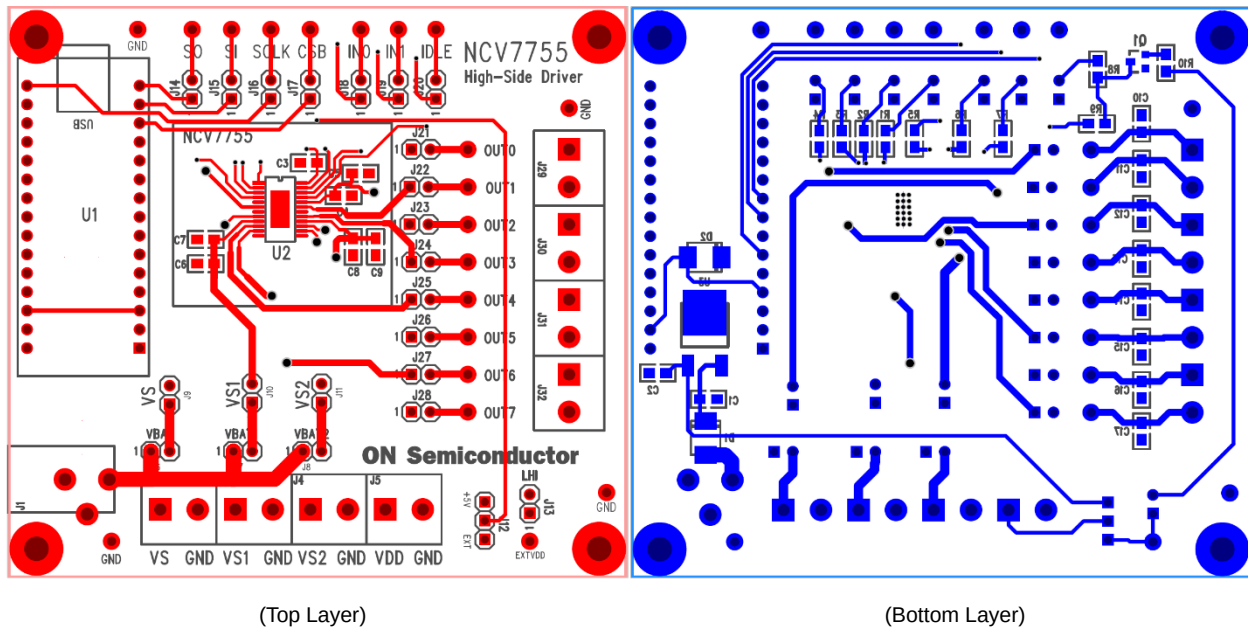


Figure 3. Layout

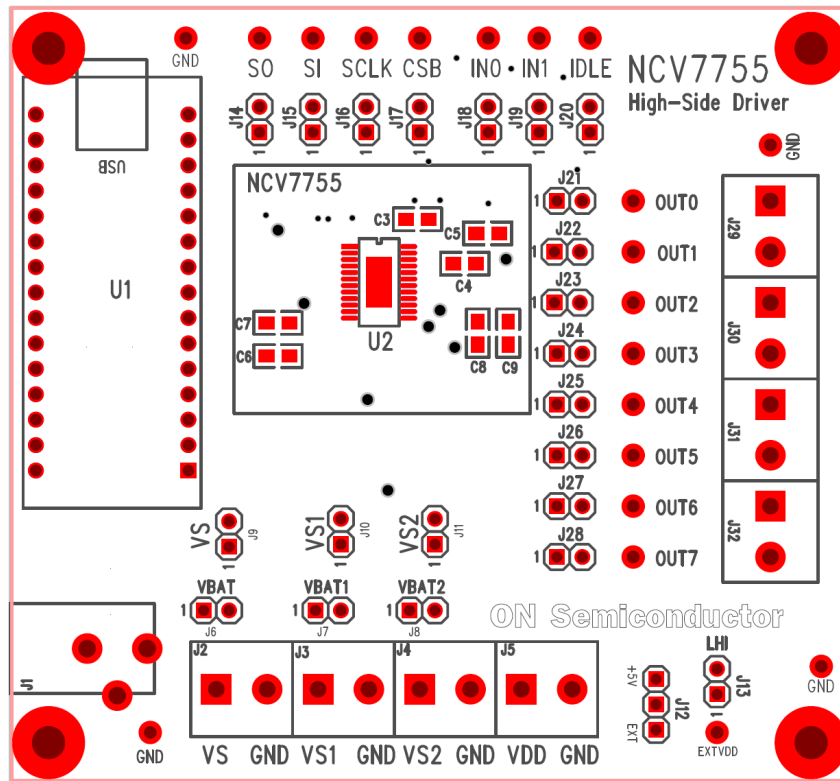


Figure 4. Layout No Traces

Table 1. JUMPER DEFINITIONS

VBAT, VBAT1, VBAT2	Used to connect supply inputs, also connects input to On-Board 5 V regulator. At least 1 must be shorted for 5 V regulator to be on.
VS, VS1, VS2	Used to connects the respectively named supply input to the NCV7755 itself.
J12	Used to select where VDD shall come from. Middle terminal connects to NCV7755 and VDD screw terminal. Remove if using screw terminal to input a VDD voltage.
J13	Used exclusively with the EXTVDD test point to control a transistor that will pull IDLE pin low if 5 V is inputted into EXTVDD when this jumper is shorted.
J14-J20	Used to connect U1 to the NCV7755 for SPI communication. Should be removed if using external MCU.
J21-J28	Used to connect the NCV7755 to the respective screw terminal output, to the right in Figure 4.

INSTRUCTIONS

One Supply Setup

Power Supply

The NCV7755EVB requires at least one external power supply if VBAT jumpers are in.

By default the jumpers are in and each power supply input are linked together.

At least 1 VBAT jumper must shorted to have the 5 V regulator on.

User should begin by shorting all the jumpers other than J13 and have J12 shorted to the middle pin and the 5 V pin. Connect a 4–18 VDC power supply to one of the VS screw terminals and ground. The NCV7755 will now be powered. The user can attach their load to the evaluation board by using the screw terminals on the right of the board. The screw terminal outputs are labelled for each output.

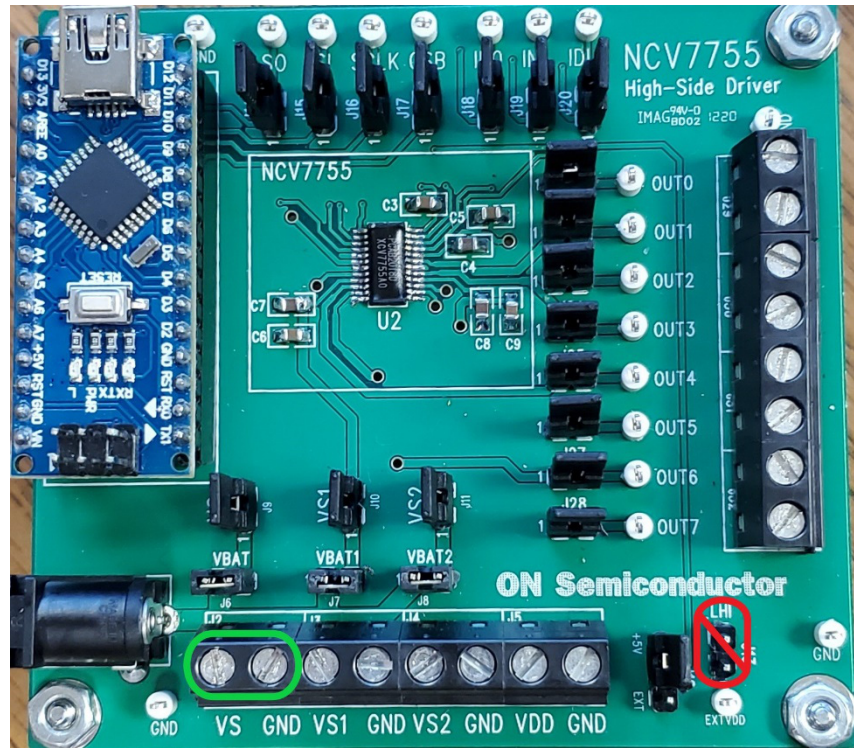


Figure 5. Board with Jumpers Indicated

Operation with Arduino Nano

The evaluation board has a location, U1, with female headers that gives the option for a user to put an Arduino Nano into the evaluation board. With the proper jumpers and programming the Arduino Nano will communicate with the NCV7755 via SPI communication and has PWM control for logic pins, IN0, IN1, and IDLE. With the Arduino the user has the option of using the Evaluation Board Demonstration Software.

Using the provided software gives the user an interface with easy manual control of the NCV7755 and the internal registers it has. The software gives the user a way to test the many different functions the NCV7755 contains.

Operation without Arduino Nano

The evaluation board can be operated without the Arduino using the test points at the top of the board. In the case that Arduino is still in the evaluation board the user should remove the jumpers for J14–J20 to disconnect the Arduino from the NCV7755. The user can now connect their MCU to the NCV7755 through the SO, SI, SCLK, CSB test points and the IN0, IN1, and IDLE test points. These test points directly connect to the NCV7755 and provide a way for an external MCU to be used to control the IC.

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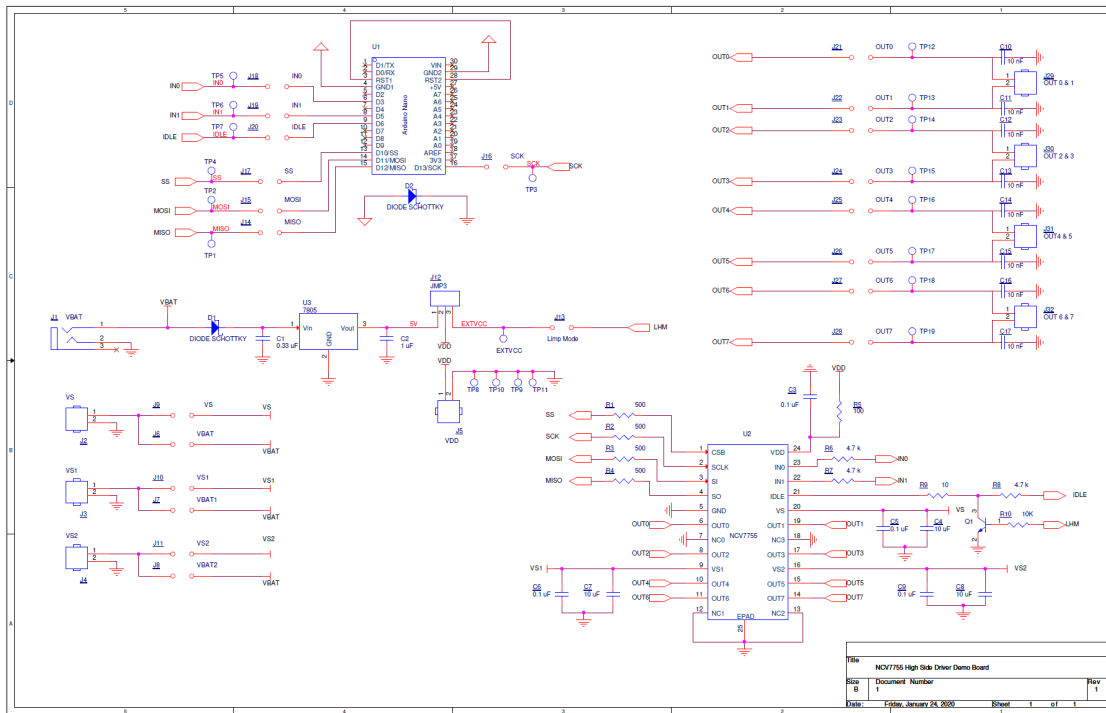


Figure 6. Evaluation Board Schematic

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