# NCV7755 Evaluation Board User's Manual

# EVBUM2809/D

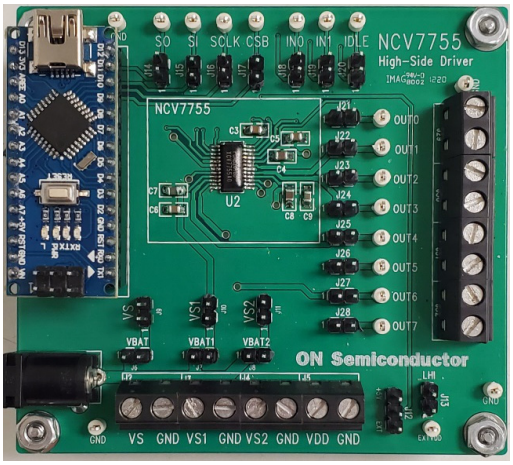



**Figure 1. NCV7755 Evaluation Board**

## 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 though 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.

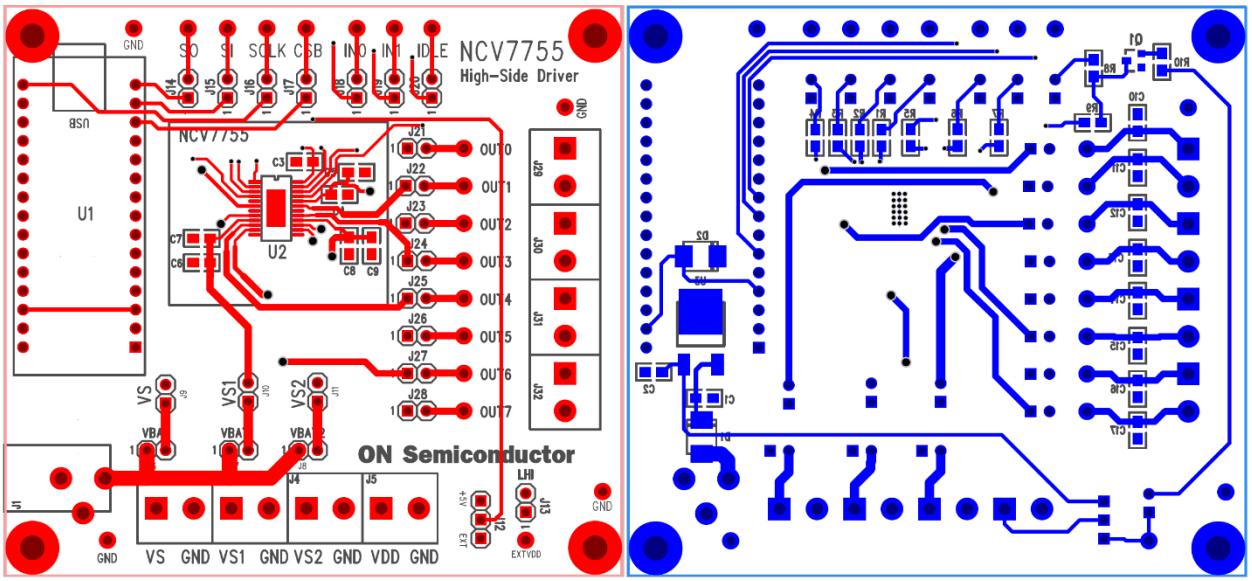
This document should be used with the NCV7755 datasheet available on www.onsemi.com. The evaluation board follows the application diagram; however, the datasheet contains full technical details about the NCV7755 specification, features, timing, and other operations.

## 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

| QTY | REFERENCE | DESCRIPTION | DIGI-KEY P/N | MANUFACTURER | MANUFACTURER P/N |
|---|---|---|---|---|---|
| 5 | R1,R2,R3,R4,R5 | 510 Ohms ±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 ±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 ±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 ±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 | 0.33µF ±10% 50V Ceramic Capacitor X7R 0805 (2012 Metric) | 490-8045-1-ND | Murata Electronics | GCM219R71H334KA55D |
| 1 | C2 | 1µF ±10% 16V Ceramic Capacitor X7R 0805 (2012 Metric) | 1276-6471-1-ND | Samsung Electro-Mechanics | CL21B105KOFNNNG |
| 3 | C4,C7,C8 | 10µF ±20% 50V Ceramic Capacitor X5R 0805 (2012 Metric) | 490-18664-1-ND | Murata Electronics | GRM21BR61H106ME43L |
| 4 | C3,C5,C6,C9 | 0.1µF ±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 ±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,TP 12,TP13,TP14,TP15,TP16,T P17,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,J2 1,J22,J23,J24,J25,J26,J27,J 28 | 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**




(Top Layer) (Bottom Layer)

**Figure 3. Layout**

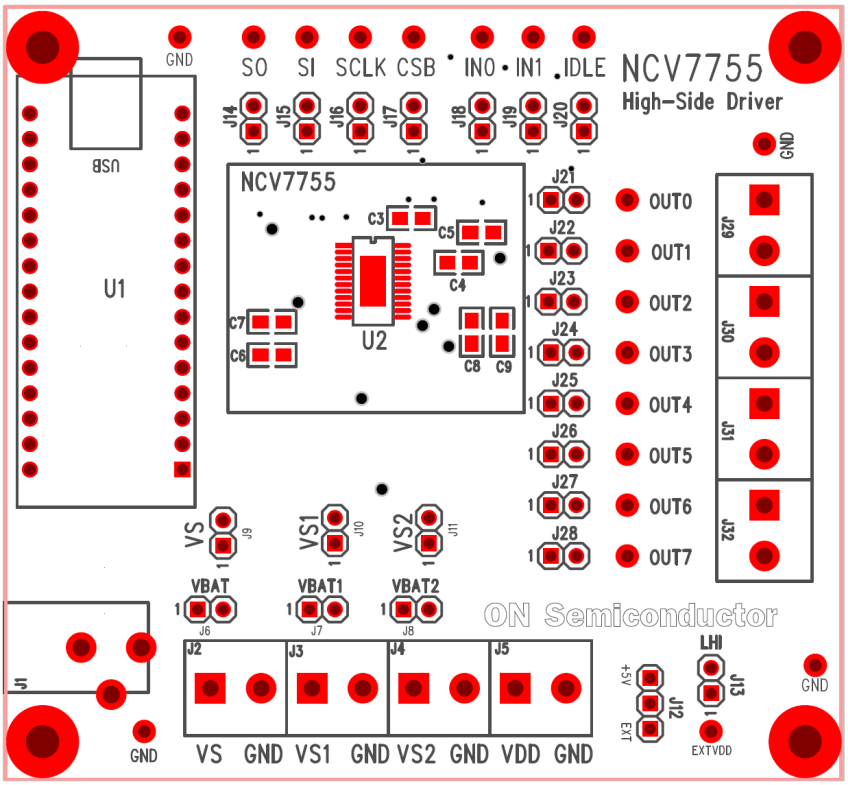



**Figure 4. Layout No Traces**

**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.

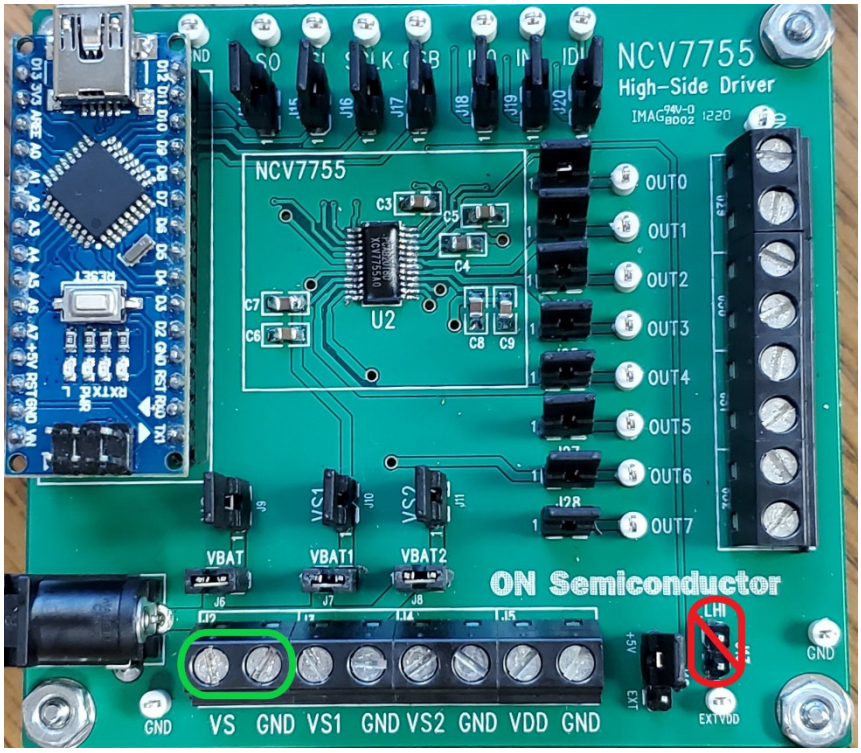



**Figure 5. Board with Jumpers Indicated**

### 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.

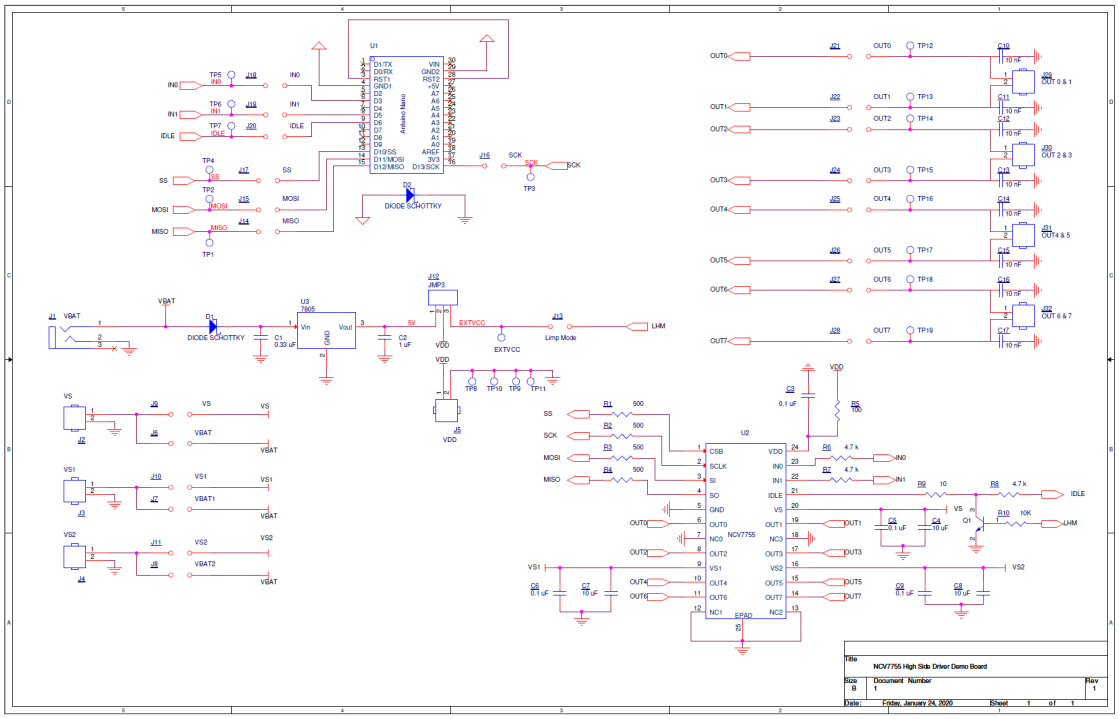



**Figure 6. Evaluation Board Schematic**

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

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