

NCV7450V1GEVB

NCV7450 System Basis Chip Evaluation Board User's Manual



ON Semiconductor®

www.onsemi.com

Introduction

This document describes the evaluation board for the ON Semiconductor system basis chip (SBC) NCV7450, which contains a CAN-FD transceiver, 5 V / 250 mA LDO regulator and HS driver. The board provides basic connections for a device evaluation.

Evaluation Board Features

- One-row pin header providing access to all the device pins, enables easy insertion of the evaluation board into a more complex application setup
- Separated supply path for VS1 and VS2
- Standard CAN termination
- Position for optional ESD protection
- LED for RSTN signal activity indication
- Jumpers for enable signals

EVAL BOARD USER'S MANUAL

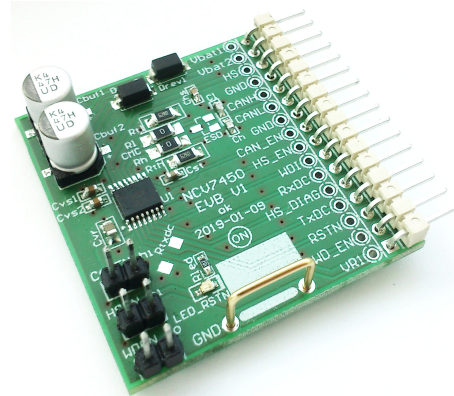


Figure 1. NCV7450V1GEVB Evaluation Board

SCHEMATIC

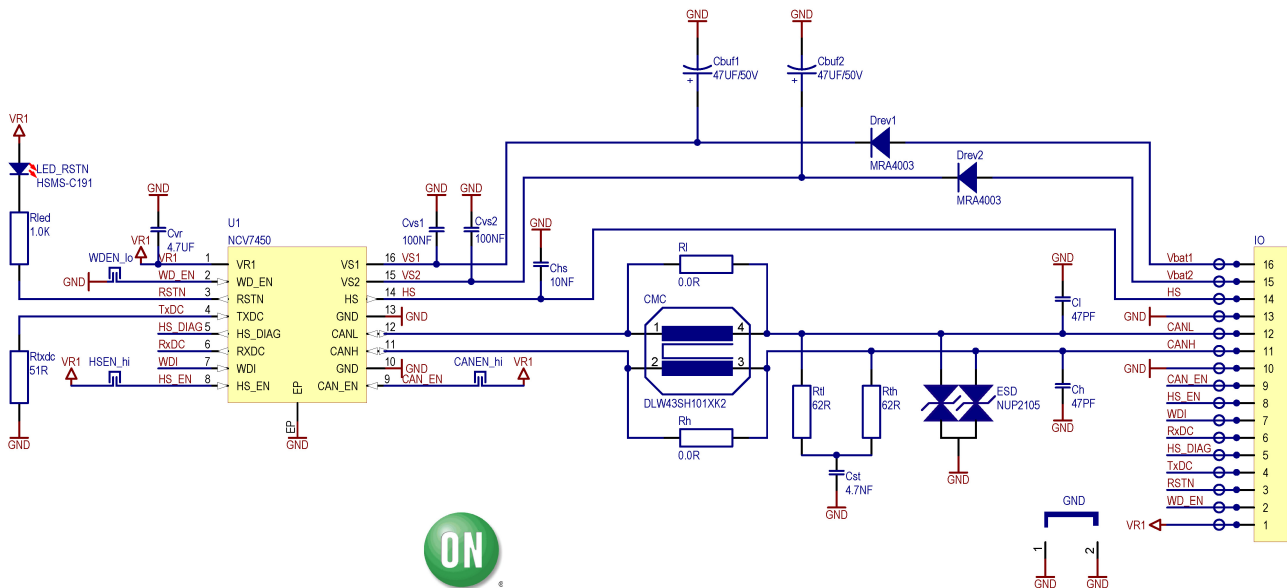


Figure 2. NCV7450 Evaluation Board Schematic

NCV7450V1GEVB

Table 1. ABSOLUTE MAXIMUM RATINGS

Rating	Pins	Min	Max	Unit
Battery supply voltage	Vbat1, Vbat2	-40	40	V
LDO Regulator output voltage	VR1	-0.3	6 or VS1 + 0.5 V (whichever is lower)	V
Digital inputs/outputs voltage	TxDC, RxDC, EN_WD, EN_CAN, EN_HS, HS_DIAG, WDI, RSTN	-0.3	VR1 + 0.3 V	V
CAN bus line voltage	CANH, CANL	-40	40	V
HS Driver output voltage	HS - with Cbuf2 - without Cbuf2	-0.3 -0.3	Vbat2 40	V V
NCV7450 junction temperature		-40	+150	°C
Board temperature		-40	+125	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 2. RECOMMENDED BOARD OPERATING CONDITIONS

Rating	Pins	Min	Max	Unit
Battery supply voltage	Vbat1, Vbat2	6	18	V
LDO Regulator output current (thermally limited)	VR1	-0.1	250	mA
Digital inputs/outputs voltage	TxDC, RxDC, EN_WD, EN_CAN, EN_HS, HS_DIAG, WDI, RSTN	0	5	V
CAN bus line voltage	CANH, CANL	0	5	V
HS Driver output voltage	HS	0	VS2	V
HS Driver output current	HS	0	1.7	A
NCV7450 junction temperature		-40	+150	°C
Board temperature		-40	+125	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

NCV7450V1GEVB

OPERATIONAL GUIDELINES

NCV7450 evaluation board allows easy evaluation of NCV7450 system basis chip. It provides connection to all the device's pins as well as positions for all the necessary CAN bus external components.

Configurations and assembly options are listed in Table 3. For more information please check [NCV7450](http://www.onsemi.com) transceiver datasheet at www.onsemi.com.

Table 3. ASSEMBLY OPTIONS AND CONFIGURATIONS

Component	Default	Function
Rth, Rtl, Cst	2x 62R, 4.7nF	CAN bus termination
ESD	- (optional)	Position for optional NUP2105 ESD protection
Ch, Cl	47 pF	ESD capacitors. Should be selected per application needs and ESD used
CMC	-	Optional common-mode choke
Rl, Rh	0R	Bypass of CMC
Rtxdc	-	Not used
Cbuf2	- (optional 47 μF)	HS driver supply buffer capacitor for, optional <ul style="list-style-type: none"> • Should be used for HS driver PWM operation • Should not be used if short to voltage higher than Vbat2 can occur
CANEN_hi	-	CAN_EN pin connection Open = CAN_EN weak internal pull-down = CAN transceiver disabled Closed = CAN_EN connected to VR1 = CAN transceiver enabled
HSEN_hi	-	HS_EN pin connection Open = HSN_EN weak internal pull-down = HS driver disabled Closed = HSN_EN connected to VR1 = HS driver enabled
WDEN_lo	-	WD_EN pin connection Open = WD_EN weak internal pull-up current source (periodically activated) = watchdog enabled Closed = WD_EN shorted to GND = watchdog disabled

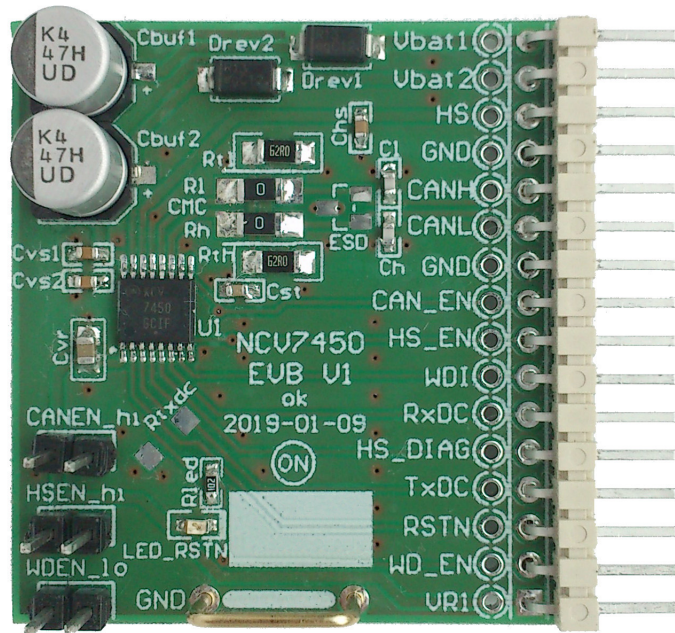


Figure 3. NCV7450 Evaluation Board Picture, Top Side

NCV7450V1GEVB

PCB DRAWINGS

Composite Drawings

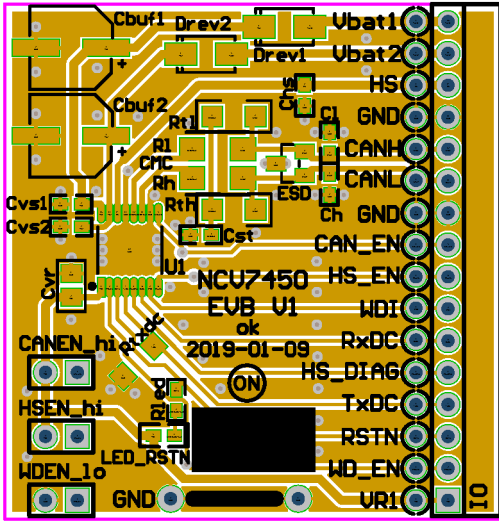


Figure 4. NCV7450 EVB PCB Top Drawing

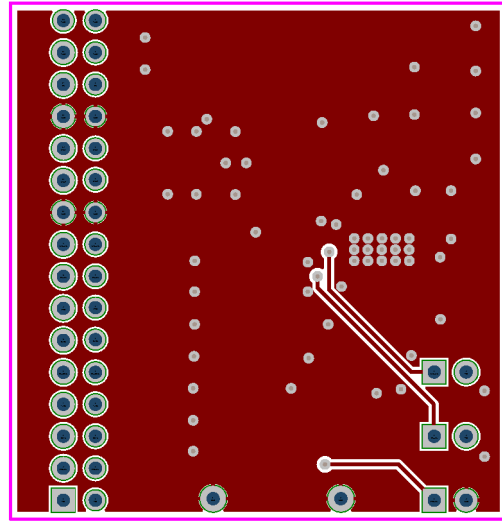


Figure 5. NCV7450 EVB PCB Bottom Drawing (Bottom View)

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

The evaluation board/kit (research and development board/kit) (hereinafter the "board") is not a finished product and is not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and will only be used in laboratory/development areas by persons with an engineering/technical training and familiar with the risks associated with handling electrical/mechanical components, systems and subsystems. This person assumes full responsibility/liability for proper and safe handling. Any other use, resale or redistribution for any other purpose is strictly prohibited.

THE BOARD IS PROVIDED BY ONSEMI TO YOU "AS IS" AND WITHOUT ANY REPRESENTATIONS OR WARRANTIES WHATSOEVER. WITHOUT LIMITING THE FOREGOING, ONSEMI (AND ITS LICENSORS/SUPPLIERS) HEREBY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES IN RELATION TO THE BOARD, ANY MODIFICATIONS, OR THIS AGREEMENT, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY AND ALL REPRESENTATIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON-INFRINGEMENT, AND THOSE ARISING FROM A COURSE OF DEALING, TRADE USAGE, TRADE CUSTOM OR TRADE PRACTICE.

onsemi reserves the right to make changes without further notice to any board.

You are responsible for determining whether the board will be suitable for your intended use or application or will achieve your intended results. Prior to using or distributing any systems that have been evaluated, designed or tested using the board, you agree to test and validate your design to confirm the functionality for your application. Any technical, applications or design information or advice, quality characterization, reliability data or other services provided by **onsemi** shall not constitute any representation or warranty by **onsemi**, and no additional obligations or liabilities shall arise from **onsemi** having provided such information or services.

onsemi products including the boards are not designed, intended, or authorized for use in life support systems, or any FDA Class 3 medical devices or medical devices with a similar or equivalent classification in a foreign jurisdiction, or any devices intended for implantation in the human body. You agree to indemnify, defend and hold harmless **onsemi**, its directors, officers, employees, representatives, agents, subsidiaries, affiliates, distributors, and assigns, against any and all liabilities, losses, costs, damages, judgments, and expenses, arising out of any claim, demand, investigation, lawsuit, regulatory action or cause of action arising out of or associated with any unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of any products and/or the board.

This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and may not meet the technical requirements of these or other related directives.

FCC WARNING – This evaluation board/kit is intended for use for engineering development, demonstration, or evaluation purposes only and is not considered by **onsemi** to be a finished end product fit for general consumer use. It may generate, use, or radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment may cause interference with radio communications, in which case the user shall be responsible, at its expense, to take whatever measures may be required to correct this interference.

onsemi does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: **onsemi** shall not be liable for any special, consequential, incidental, indirect or punitive damages, including, but not limited to the costs of requalification, delay, loss of profits or goodwill, arising out of or in connection with the board, even if **onsemi** is advised of the possibility of such damages. In no event shall **onsemi**'s aggregate liability from any obligation arising out of or in connection with the board, under any theory of liability, exceed the purchase price paid for the board, if any.

The board is provided to you subject to the license and other terms per **onsemi**'s standard terms and conditions of sale. For more information and documentation, please visit www.onsemi.com.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales