

# NCS29001DGEVB

## NCS29001 Evaluation Board User's Manual



ON Semiconductor®

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### EVAL BOARD USER'S MANUAL

#### Introduction

This document gives a detailed description of the NCS29001 Evaluation Board (SOIC-14 package) with the bill of materials, and board schematic. The appropriate lab test setups are also provided.

The NCS29001 Evaluation Board has been designed for a quick evaluation of the NCS29001 LCD backlight driver. Among its main characteristics, this evaluation board has been constructed to boost an input voltage of 24 V to drive an output LED string of 76 V at 200 mA.

This document must be used with the NCS29001 datasheet available on [www.onsemi.com](http://www.onsemi.com). The datasheet contains full technical details about the NCS29001 specifications and operation. The board is implemented in two metal layers with FR-4 dielectric. The top and bottom layers have thicknesses of 35  $\mu\text{m}$ . The total PCB thickness is 1.62 mm with dimensions of 95.4 mm by 63.5 mm.

This evaluation board can be used to evaluate the device performance and it allows the user to place the NCS29001 device in a real application environment. While the intention is to evaluate the device according to datasheet specifications, it is important to take into account the additional circuitry inherent to the setup which can affect performance.



Figure 1. Evaluation Board (not to scale)

#### EQUIPMENT

The following table details the equipment used in the context of this application note manual.

Table 1. EQUIPMENT

Description	Main Features	Example of Equipment	Qty.
Regulated Power Supply	25 V / 5 A capability or greater	Chroma 62012P-600-8	1
Multimeter	-	Agilent 34401A	1
Oscilloscope	-	Tektronix MSO2024	1
Current probe	-	Tektronix TCP202	1
Waveform generator	-	Tektronix AFG3102	1

#### Get Started...

- Attach output LED string (76 V total VF)
- Set  $V_{IN} = 12\text{ V}$  and  $V_{inductor} = 24\text{ V}$
- Bring device out of standby by applying high to low transition on STBY pin
- Turn on device by applying PWM signal to PWMIn pin (between 100 Hz and 300 Hz with 10% to 100% duty cycle)
- Turning on the device from standby will trigger soft-start power up with smooth LED current ramp up
- LED brightness can be varied by adjusting duty cycle on the PWM signal
- Maximum LED current is set to 200 mA for this application

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## SCHEMATIC

Figure 2 shows the NCS29001 in circuit as it is implemented on the evaluation board.

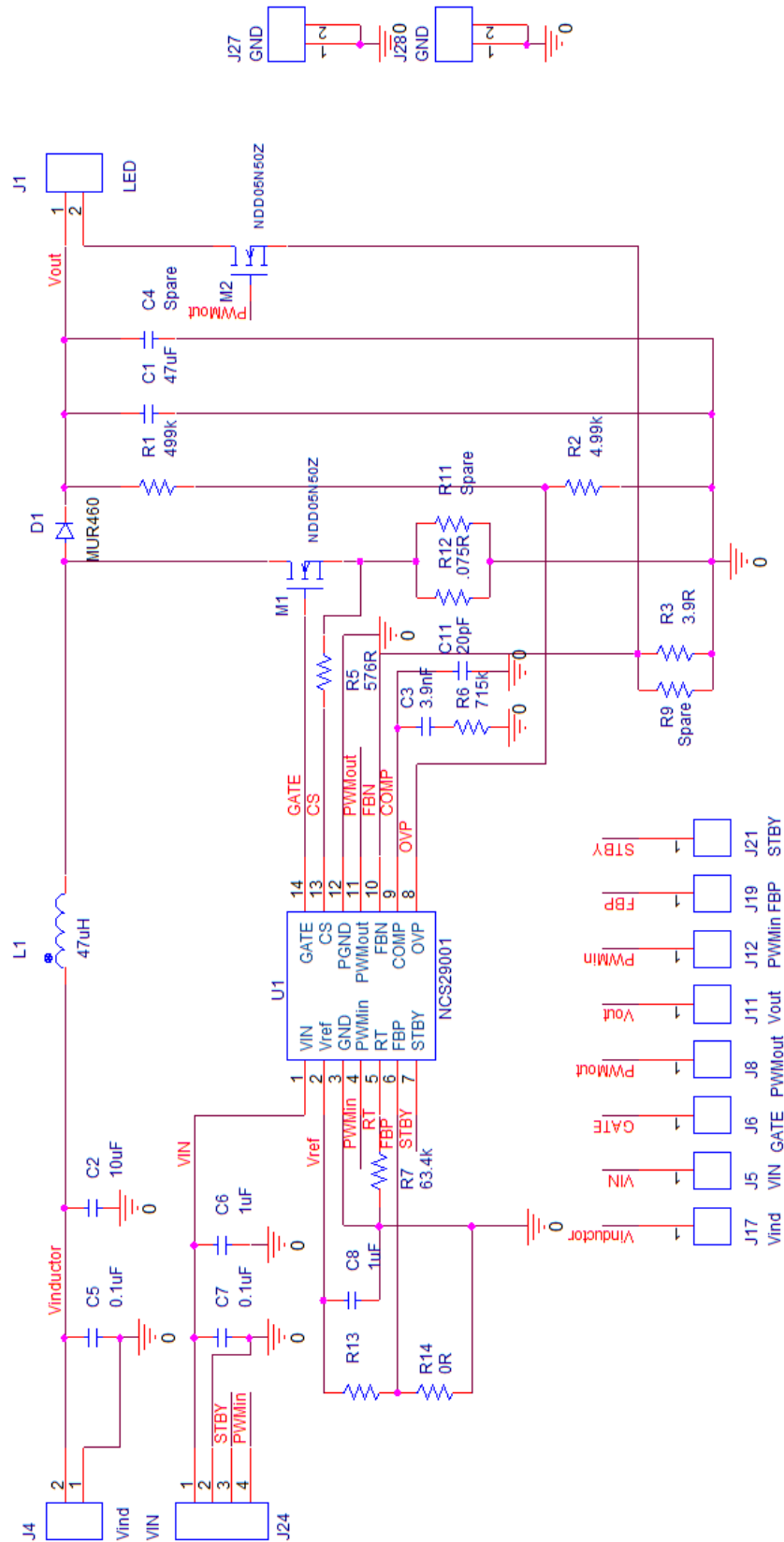


Figure 2. Evaluation Board Schematic

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## BILL OF MATERIAL

Table 2. BILL OF MATERIAL

Designator	Qty	Description	Value	Tolerance	Footprint	Manufacturer	Manufacturer Part Number	Substitution Allowed	Lead Free
C1	1	Aluminum Electrolytic Capacitor	47 $\mu$ F	20%	16 mm diameter	Panasonic	EEV-EB2C470SM	Yes	Yes
C2	1	Ceramic Chip Capacitor	10 $\mu$ F	10%	1206	TDK	C3216X5R1H106K160AB	Yes	Yes
C5, C7	2	Ceramic Chip Capacitor	0.1 $\mu$ F	10%	1206	TDK	C3216X7R1H104K	Yes	Yes
C6, C8	2	Ceramic Chip Capacitor	1 $\mu$ F	20%	1206	TDK	C3216X7R1C105M	Yes	Yes
C4	1	Aluminum Electrolytic Capacitor	Open	–	5 mm lead spacing	–	–	–	–
C3	1	Ceramic Chip Capacitor	3.9 nF	5%	0805	TDK	C2012C0G1H392J060AA	Yes	Yes
C11	1	Ceramic Chip Capacitor	20 pF	5%	0805	AVX	08051A200JAT2A	Yes	Yes
L1	1	High Current Inductor	47 $\mu$ H	15%	14.1 mm x 13.1 mm	Cooper Bussman	HCR-470-R	Yes	Yes
R1	1	Through Hole Resistor	499 k	1%	1 mm lead spacing	Yageo	MFR-25FBF52-499k	Yes	Yes
R2	1	Chip Resistor	4.99 k	1%	0805	Panasonic	ERJ-6ENF4991V	Yes	Yes
R3	1	Chip Resistor	3.9 R	1%	1206	Panasonic	ERJ-8RQF3R9V	Yes	Yes
R5	1	Chip Resistor	576 R	1%	0805	Panasonic	ERJ-6ENF5760V	Yes	Yes
R6	1	Chip Resistor	715 k	1%	0805	Panasonic	ERJ-6ENF7153V	Yes	Yes
R7	1	Chip Resistor	63.4 k	1%	0805	Panasonic	ERJ-6ENF6342V	Yes	Yes
R9, R11	2	Chip Resistor	Open	–	1210	–	–	–	–
R12	1	Chip Resistor	0.075 R	1%	1206	Panasonic	ERJ-L08UF75MV	Yes	Yes
R13	1	Chip Resistor	Open	–	0805	–	–	–	–
R14	1	Chip Resistor	0	1%	0805	Panasonic	ERJ-6GEY0R00V	Yes	Yes
M1, M2	2	Power MOSFET N-Channel	–	–	DPAK	ON Semiconductor	NDD05N50Z	Yes	Yes
D1	1	Ultra-Fast Power Rectifier	–	–	Axial Lead-2	ON Semiconductor	MUR460G	Yes	Yes
J5, J6, J8, J11, J12, J17, J19, J21	8	PCB Test Terminal, Red	–	–	Hole diameter 1.7 mm	Keystone	5005	Yes	Yes
J1, J4	2	Header 2 pin, 0.1 inch spacing	–	–	0.100 x 2	TE Connectivity	647676-2	Yes	Yes
J24	1	Header 4 pin, 0.1 inch spacing	–	–	0.100 x 4	TE Connectivity	647676-4	Yes	Yes
J27, J28	2	PCB Shorting Link	–	–	GND_Strap	Harwin	D3082-46	Yes	Yes
U1	1	NCS29001	–	–	SOIC14	ON Semiconductor	NCS29001DR2G	No	Yes

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