

Demonstration Note for NCV8502

Adding Additional Current Capability to the NCV8502 (Adjustable Output Voltage Option)



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DEMONSTRATION NOTE

Description

The NCV8502A High Current Demo board highlights the procedure for increasing the output current capability of the NCV8502. This is accomplished by adding a discrete driver to the application with the adjustable version of the NCV8502. The combination of the NCV8502 and the MJD31C will supply greater than 1.0 A of current to the user programmable output voltage.

It is intended for the user to make use of the flexibility of the parts output voltage using a discrete resistor feedback divider. In this demonstration board, a potentiometer has been added to display the parts' output availability in fixed output voltages from 2.5 V to 10 V. The capability of the output voltage has an absolute maximum voltage of 20 V on the IC, and must be maintained below this level. This demo board uses a 16 V capacitor on the output limiting its use to 16 V. The NCV8502's capability extends up to 60 V, but should be avoided here to prevent damage to the capacitor.

Connection to the parts Flag/Monitor function has been made available via two external posts on the board. The intention of this function is to provide an early warning signal to the microprocessor that there is an impending reset that will occur, and the microprocessor should finish its current instruction. This comparator may also be used as a general use comparator. The positive input terminal is connected to the parts temperature stable reference (refer to the NCV8502/D data sheet for details).

This demonstration board is also a valid evaluation constituent for evaluation of the NCV8501 series of parts.

Features

- Automotive Grade
- User Selectable Output Voltage
- 1.0 A Capability
- Early Warning through Flag/Monitor Function



Figure 1. NCV8502A High Current Demonstration Board

NCV8502DEMO/D

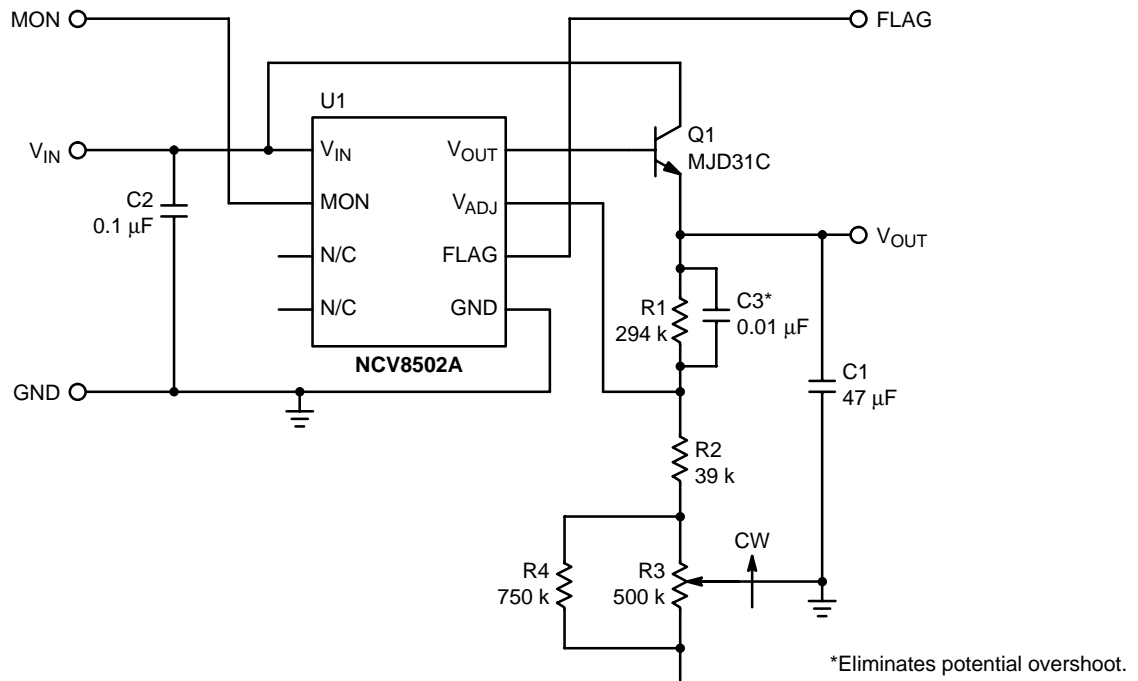


Figure 2. Demonstration Circuit Schematic

OPERATION GUIDELINES

- There is no current limiting for the MJD31C. Do not overstress the device.
- Consider your power dissipation before running tests.
- The V_{ADJ} reference voltage is typically 1.20 V. Design your output voltage around that voltage.
- Thermal effects will affect the potentiometer at a different rate than the discrete surface mount resistors.
- The output capacitor C1 is rated at 16 V. Maintain operation below this level.
- A minimum 10 mA load is required for this board for stability considerations. Your output capacitor value may differ depending on board layout and loading. Your capacitor value may actually decrease with the removal of the trim potentiometer.
- R4 is mounted under the board across the potentiometer. Alternatively, R3 and R4 may be replaced by a single 250 k potentiometer, but doing so may not show the full range of output voltage.

BOARD USE

Simply connect a power supply from V_{IN} to ground in addition to your load (10 mA minimum) on V_{OUT} to ground. Turning the adjustment screw of the potentiometer will move your output voltage to the voltage extremes of 2.5 V and 10 V.

Using the flag/monitor function will require a pull-up resistor on the FLAG output as it is an open collector output. Switching of the FLAG output will occur as the voltage threshold on the monitor (MON) input is crossed at about 1.20 V.

NCV8502DEMO/D

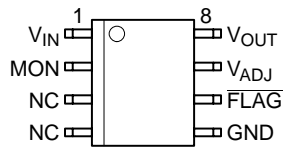


Figure 3. Pin Connections, SO-8

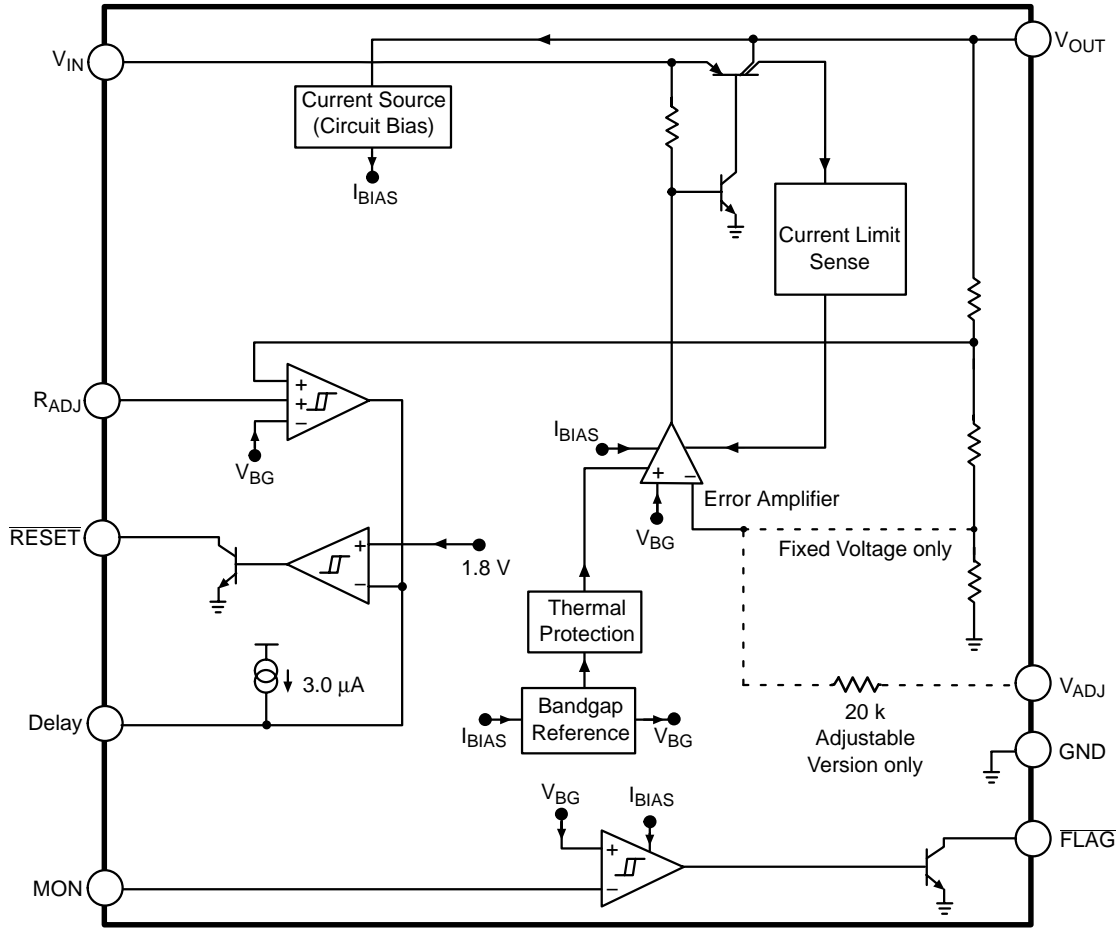


Figure 4. Block Diagram

BILL OF MATERIALS

Item	Qty	Reference	Part	Mfg. & P/N	Distributor
1	1	C1	47 μ F, 16 V, SMT, Tantalum	Kemet	Digikey, 800-344-4539
2	1	C2	0.1 μ F, 50 V, 1206, Ceramic	Kemet	Digikey, 800-344-4539
3	1	C3	0.01 μ F, 50 V, 1206, Ceramic	Kemet	Digikey, 800-344-4539
4	1	Q1	NPN Power Transistor	ON Semiconductor, MJD31C	ON Semiconductor, 800-282-9855
5	1	R1	Resistor 1206, Surface Mount	Panasonic, 294 k, 1%	Digikey, 800-344-4539
6	1	R2	Resistor 1206, Surface Mount	Panasonic, 39 k, 1%	Digikey, 800-344-4539
7	1	R3	Resistor Potentiometer	Bournes Trimpot, 3006P-1-504	Mouser, 800-346-6873
8	1	R4	Resistor, Carbon Composition	Ohmite, 750 k, 1/4 W, 5%	Digikey, 800-344-4539
9	1	U1	150 mA Linear Regulator	ON Semiconductor, NCV8502DADJ	ON Semiconductor, 800-282-9855

NCV8502DEMO/D

PRINT CIRCUIT BOARD LAYOUT

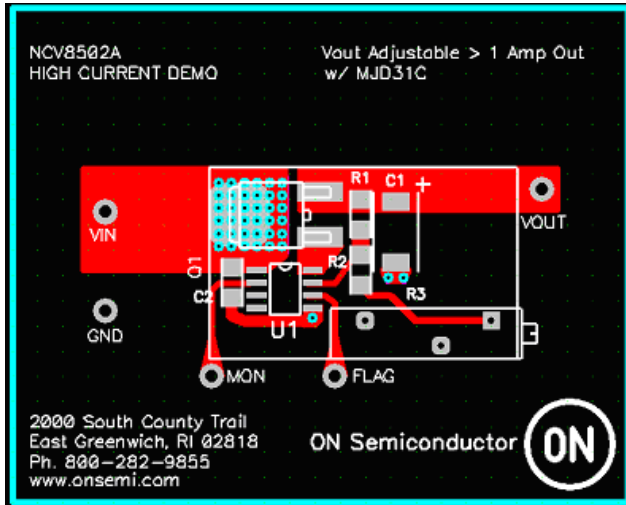


Figure 5. Top Layer and Top Silk

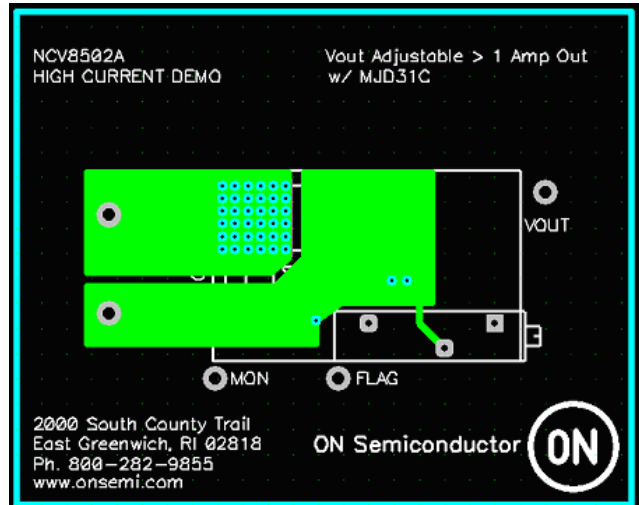



Figure 6. Bottom Layer Shown from Top Perspective with Top Silk

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