NCP5612GEVB

NCP5612GEVB Evaluation Board User's Manual

ON Semiconductor®

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EVAL BOARD USER'S MANUAL

Description

The NCP5612 product is a dual output LED driver dedicated to the LCD display backlighting. The built-in DC-DC converter is based on a high efficient charge pump structure with operating mode 1x and 1.5x.It provides a peak 87% efficiency together with a 0.2% LED to LED matching.

This evaluation board manual contains:

- Bill of Materials
- NCP5612 Demo Board V1.0 schematic diagram
- NCP5612 Demo Board V1.0 GERBER views
- Manufacturers' web addresses

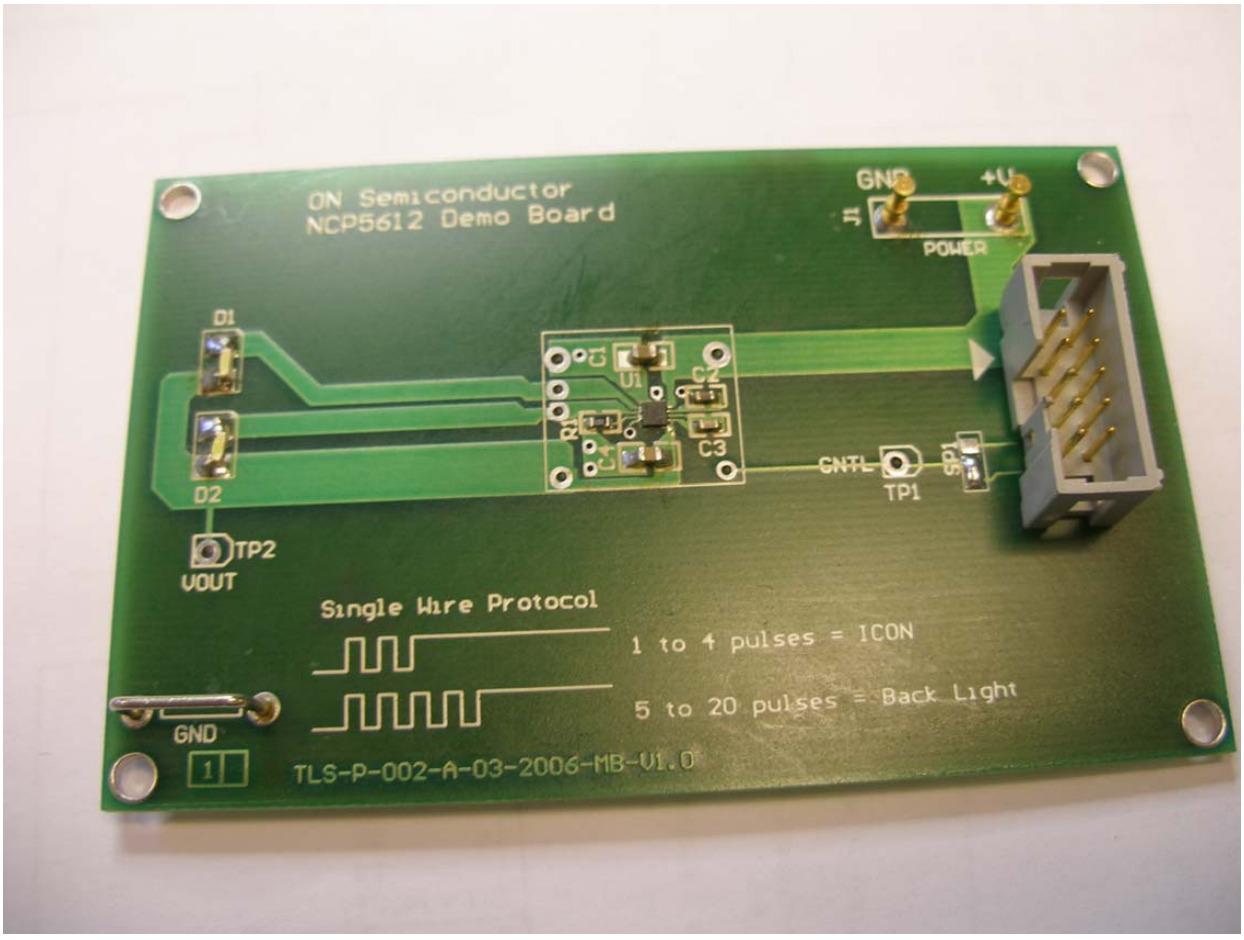

Figure 1. NCP5612GEVB Evaluation Board – Details of the Input Power Supply Pins & Digital Control Socket

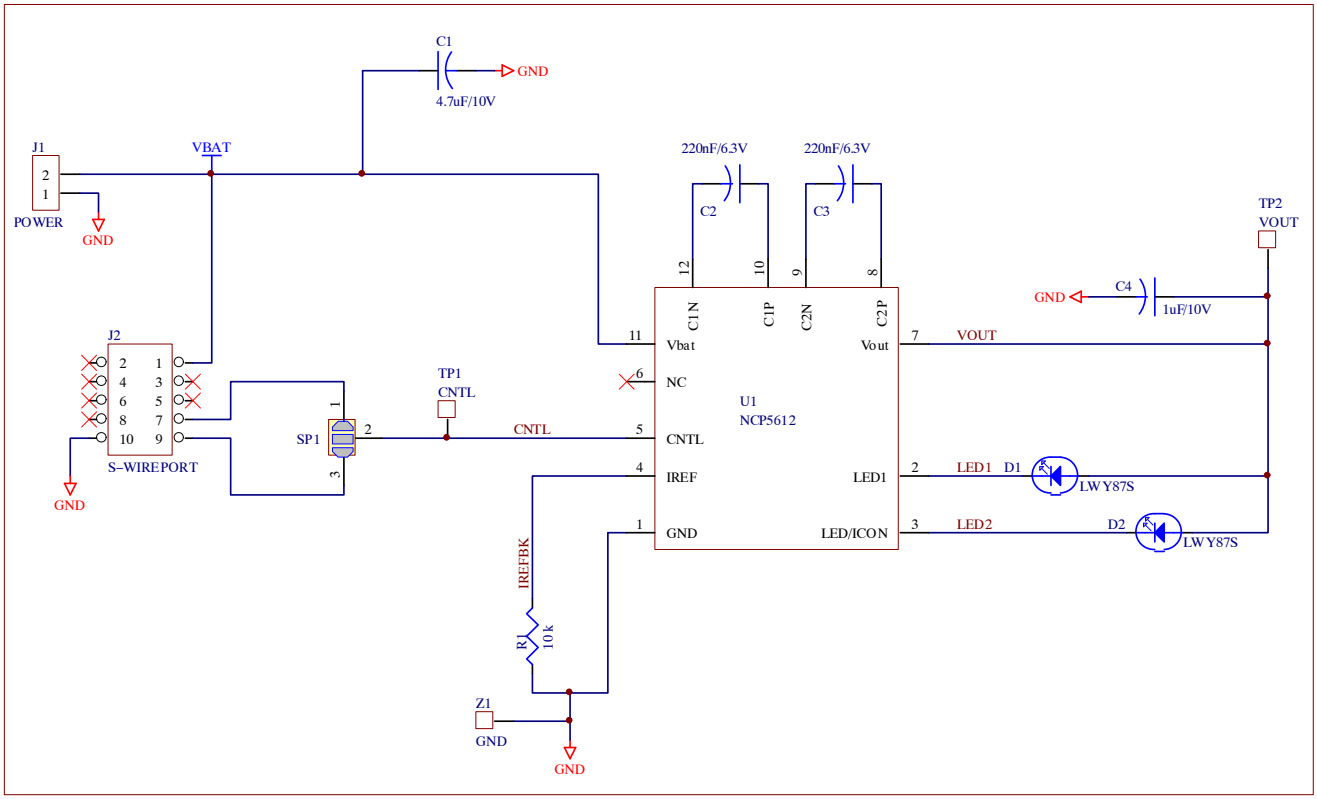

Figure 2. NCP5612GEVB Evaluation Board Schematic

Table 1. Bill of Materials

QTY	Designator	Description	Footprint	Manufacturer	Part Number	Comments
1	R1	10 kΩ	0603	Vishay Draloric		Any other suppliers possible
2	C2, C3	220 nF / 10 V	0603	TDK	C1005X5R1C224MT	Reference design
1	C1	4.7 μF / 10 V	0805	TDK	C2012X5R1C475MT	Reference design
1	C4	1 μF / 10 V	0805	TDK	C2012X5R1C105MT	Reference design
1	U1	NCP5612	LLGA12	ON Semiconductor	NCP5612	Reference design
2	D1, D2	LWY87S	OSRAM_LED	OSRAM	LWY87S	Reference design
2	TP1, TP2	Test Point	TEST_POINT	KEYSTONE	5005 (THM)	RS = 203−4910 **Do not assemble**
1	J2	Control Port	IDC10	3M Electronique	2510−6002 UG	RS = 120−7230
				ANSLEY	4−1437044−3	RS = 461−742
1	J1	Connector	RAD0.4	KONTEK COMATEL	3110014000500	RS = 305−0907 (J2 is built with two pins as depicted in the photo)
1	Z1	GROUND	GND_TEST	HARWIN	D3082−01 (tin) D3082−05 (gold)	RS = 160−3745 (tin)

1. **RS = Radio Spares**
2. any resistors with same footprint, tolerance up to ±5% together with TC < 500 ppm and +1055°C operating temperature range can fit the application.
3. using X5R type ceramic capacitor is preferred. Using X7R brings extended operating temperature range. Using Y5R material shall be avoided due to the wide tolerance spread over the temperature range. Using smaller foot print capacitor is discouraged to avoid audible noise issue with the ceramic.

ASSEMBLY

Note: the here attached photos are used as a visual reference:

1. Assemble the NCP5612 (LLGA12 package) , Hot Air Flow Process mandatory
2. Assemble all the passive parts
3. Assemble all the White LED
4. Assemble the GROUND reference point
5. Assemble the control port IDC10 connector, make sure the connector is properly oriented: the white triangle, on the PCB, is the pin 1 reference
6. Assemble the power supply pins.

At this point, the system is ready to operate.

TEST CONDITIONS

Power Supply: Connect a DC power supp ly , with 500 mA output current capability, across the two pins built with connector J2. Make sure the polarity is properly respected: **reverse polarity will destroy the NCP5612.**

Set up the power polarity to 3.6 V. Although the supply voltage can be adjusted between 2.85 V – 5.5 V for engineering purpose, the associated MCU test board is limited to 3.6 V: double check the power supply before to turn ON the supply.

Manufacturing Final Test:

1. Connect the IDC10/J1 connector to the external MCU board with the ribbon cable. Double check the power supply is set up at 3.6 V, **maximum rating is 3.8 V.**
2. The MCU board is powered by the same external DC supply once the ribbon cable ia attached on both boards.
3. Turn ON the power supply: LED D1 on the MCU board shall turn ON. Reset the MCU if necessary by pushing the RESET button S7
4. Push control button F3: the ICON mode shall be activated, LED 2 being ON with a low current. At this point, the current absorbed by the system shall be in the 4 mA range.
5. Push control button F1: the two LED shall be activated and the brightness can be increased by pushing the F1 control.
6. Push control button F2: the two LED shall be dimmed toward zero with consecutive pushes on the F2 command.
7. Push command F3: the ICON mode shall be activated, same as #4

Since bounces are generated by the manual push buttons, non linear operation can happen during the test. This is normal and the part shall NOT be rejected for such a reason. The final test is complete when all the steps #4 to #7 are proven OK. It is not necessary to cover all the sixteen steps to ramp up/ down the brightness: the system is fully debugged if the four tests mentioned above are successful.

Digital Control: it is possible to drive the NCP5612 by means of an external controller, leaving aside the MCU test package. In this case, one shall connect an external pulse generator to connect J1 /IDC10. The external controller shall send the data according to the SWIRE protocol depicted into the NCP5612 data sheet. The chip is capable to support a 100 kHz transfer rate.

System Operation:

1. Double check the power supply is set up between 3.0 V to 5.5 V, **make sure the external MCU can support the same power supply range.**
2. Turn ON the power supply
3. Send the appropriate data frame to control the two LED

Note: the MCU board is reserved for manufacturing only and is NOT provided with the NCP5612 evaluation board

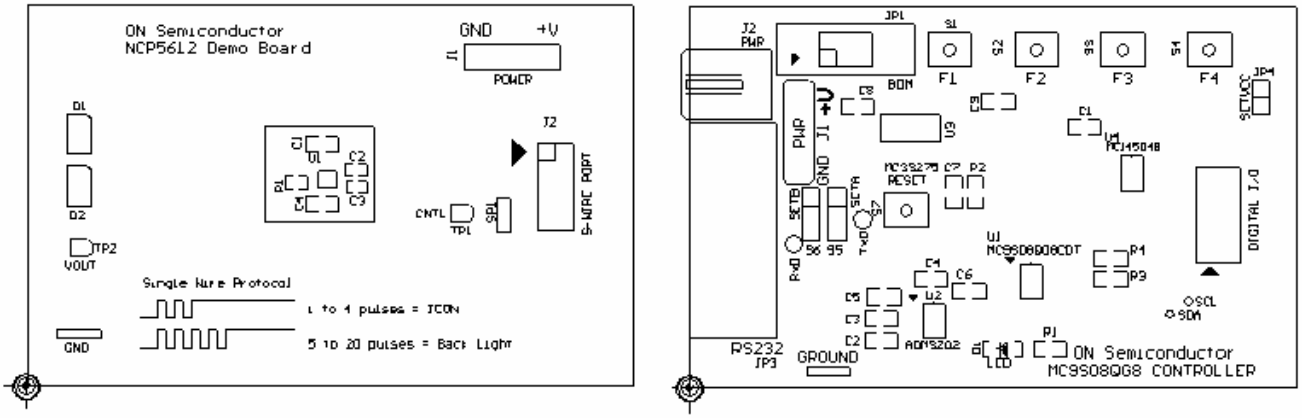

Figure 3. NCP5612GEVB Evaluation Board & MCU Controller Silk Views

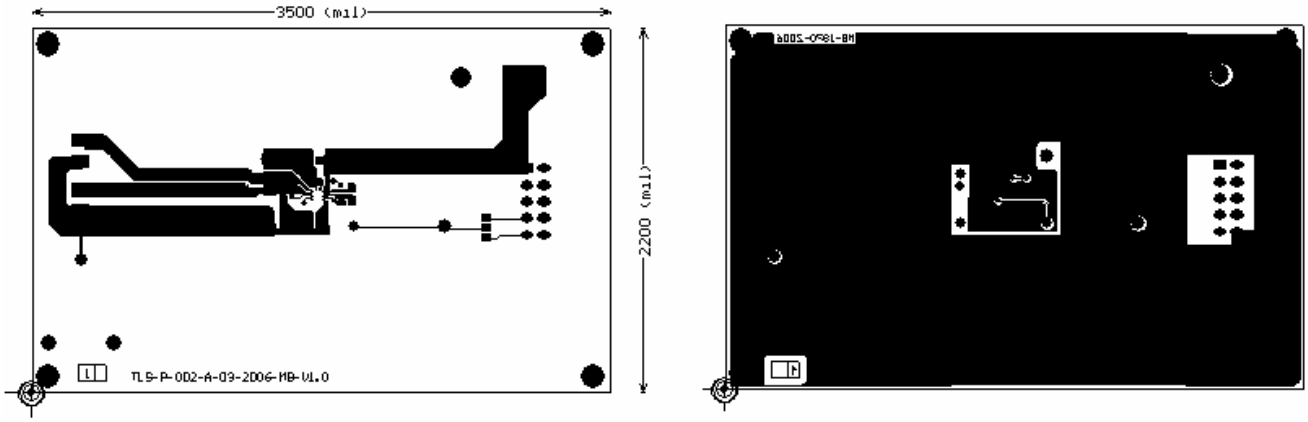

Figure 4. NCP5612GEVB Evaluation Board: TOP & BOTTOM Views

COMPONENT MANUFACTURERS

Vishay – Draloric	http://www.vishay.com/resistors−discrete/
TDK	http://www.component.tdk.com/
BC Components	http://bccomponents.com/
Radio Spares: in the USA, see	ALLIED ELECTRONICS Inc. 7410, Pebble Drive Forth Worth / Texas / 76118−6997 Phone: 817−595−3500

ADDITIONAL INFORMATION

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