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How to use isolated MOSFET driver TLP250

BILAL 3 Years Ago 14 Comments

I have already posted article on MOSFET driver IR2110. **MOSFET driver IR2110** is used to drive n-channel or p-channel MOSFETs in high side and low side. To know more about how to use MOSFET driver IR2110 check following article.

How to use MOSFET driver IR2110

Page Contents

What is MOSFET driver?

Mosfet driver is main component of power electronics circuits. Mosfet drivers are dedicated integrated circuits which are used to drive Mosfets in low side and high side configuration. To know more about gate driver check following article:

> **What is MOSFET gate driver?**

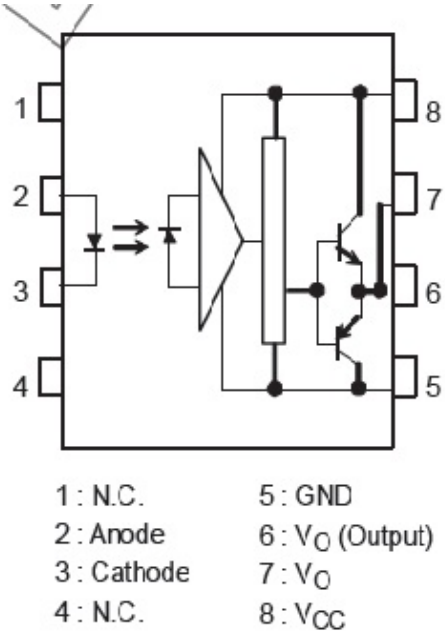
Isolated MOSFET driver TLP250 working

In this article I will discuss isolated Mosfet driver TLP250. Mosfet driver TL250 like other MOSFET drivers have input stage and output stage. It also have power supply configuration. TLP250 is more suitable for MOSFET and IGBT. The main difference between TLP250 and other MOSFET drivers is that TLP250 MOSFET driver is optically isolated. Its mean input and output of TLP250 mosfet driver is isolated from each other. Its works like a optocoupler. Input stage have a light emitting diode and output stage have photo diode. Whenever input stage LED light falls on output stage photo detector diode, output becomes high.

Pin configuation isolated mosfet driver TL250

Pin layout of TLP250 is given below. It is clearly shown in figure that led at input stage and photo detector diode at output stage is used to provide isolation between input and ouput. Pin number 1 and 4 are not connected to any point. Hence they are not in use. Pin 2 is anode point of input stage

light emitting diode and pin 3 is cathode point of input stage. Input is provided to pin number 2 and 3. Pin number 8 is for supply connection. Pin number 5 is for ground of power supply.



pin configuation of isolated MOSFET driver TLP250

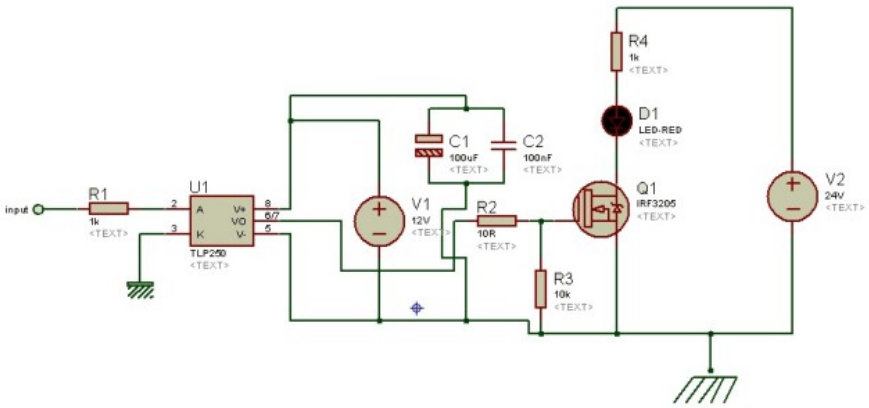
- Pin number one and four is not connected to any point physically. Therefore they are not in use.
- Pin number 8 is use to provide power supply to TLP250 and pin number 5 is ground pin which provides return path to power supply ground. Maximum power supply voltage between 15-30 volt dc can be given to TLP250. But it also depends on temperature of environment in which you are using TLP250.
- Pin number 2 and 3 are anode and cathode points of input stage LED. It works like a normal light emitting diode. It has similar characteristics of forward voltage and input current. Maximum input current is in the range of 7-10mA and forward voltage drop is about 0.8 volt. TLP250 provides output from low to high with minimum threshold current of 1.2mA and above.
- Pin number six and seven is internally connected to each other. Ouput can be taken from either pin number 6 and

7. Totem pole configuration of two transistor is used in TLP250. In case of high input , output becomes high with output voltage equal to supply voltage and in case of low input, output become low with output voltage level equal to ground.
- Mosfet driver TLP250 can be used up to 25khz frequency due to slow propagation delay.

This all about pin configuration and working of TLP250. Now i will talk about how to used isolated mosfet driver tlp250 as low side MOSFET driver and high side mosfet driver.

TLP250 as a low side MOSFET driver

Circuit diagram of low side mosfet driver using tlp250 is shown below. In this circuit diagram, tlp250 is used as non inverting low side mosfet driver. you should connect an electrolytic capacitor of value 0.47uf between power supply. It provide protection to tlp250 by providing stabilize voltage to IC.

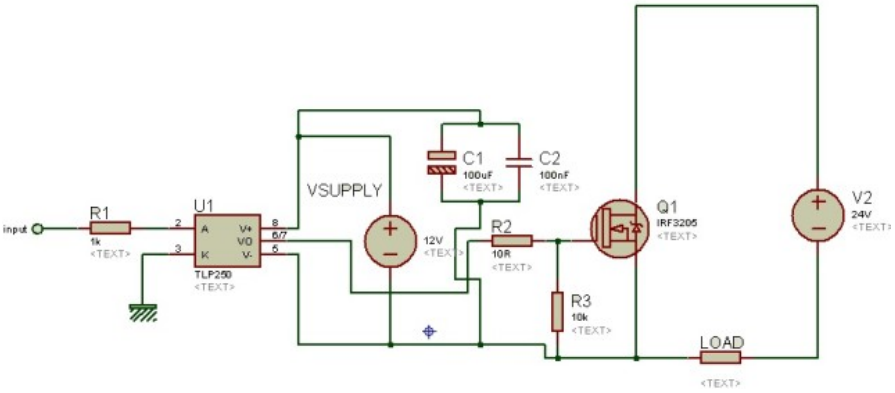


As shown in figure above input is drive signal that drives the output. Vin is according to signal ground. It should not be connected with supply ground and output ground. It is clearly shown in above figure TLP250 and load ground is referenced to the power ground and it is isolated from input signal reference ground. When input is high, MOSFET Q1 get high signal from TLP250 and it is driven by power supply and current flows through the load. When input is low, MOSFET Q1

get low signal from TLP250 output pin and mosfet Q1 remains off and there is no current flow to load. Value of supply voltage ranges between 10-15 volt. Input resistor at gate of MOSFET is used depend on amplitude of input signal. Usually input signal is provided through microcontroller and microcontroller input signal level is in the order of 5 volt. Capacitor C1 is used as decoupling capacitor.

TLP250 as a high side MOSFET driver

Circuit diagram of MOSFT driver tlp250 used as high side driver is shown below. It is used as non inverting high side mosfet driver. Because input signal ground is connected to cathode of input stage light emitting diode. Therefore it is used as a non inverting high side mosfet driver.



In high side configuration there are three grounds as shown in figure above. Ground of input signal, ground of supply voltage and ground of power supply voltage. Remember that while using TLP250 as high side MOSFET driver, all grounds should be isolated from each other.

Photo credit: **TLP250 data sheet**

ABOUT THE AUTHOR

BILAL

More from this Author »

I have been providing project services to students and industry from last 4 years .

Contact me if you want to hire me for your projects and engineering problems. Send me your project details at my email address: bilalmalikuet@gmail.com

14 COMMENTS

Kim January 19, 2016

Hello. Thank you for posting.
I have a question. How could I select the value of R2 and R3?
And in datasheet, they recommend to connect 0.1uF bypass capacitor between pin 8 and pin 5, but in your figure, C1 and C2 values are 100uF and 100nF respectively. which one is suggested?

Reply

Kim January 19, 2016

And one more question. How could I isolate the ground of supply voltage and power supply as High side mosfet driver. In figure, they are all connected in same point.

Reply

BILAL Malik Author January 19, 2016

just use them separately

Reply

BILAL Malik Author January 19, 2016

it doesn't matter in most applications

Reply

Showlin Author March 28, 2016

Sir, how do I provide 20kHz frequency to trigger a mosfet with this driver?

Reply

Logu February 5, 2016

Is it possible to switch a 220v dc supply to load using tlp250

Reply

muhammad anees February 8, 2016

sir what value of capacitors should be used to make proper operation of ir2104 driver..
thans in anticipation.

Reply

Bhavesh dave February 11, 2016

I have a problem of using tlp 250 is that i am not getting output from pin number 6…i have given pulse to pin num 2 through the Arduino…. nd at pin num 8 12 volt dc vol…

Reply

Johmy May 3, 2016

Hello sir I have also the same problem but i have given pulse to pin 2 through 555 timer plz reply if u get output from tlp250 at pin 6

Reply

kevin February 22, 2017

why tlp 250 gets damaged easily?

Reply

Aks April 7, 2017

Hey All I have 1 question.
Can I use ULN2003A instead of TLP250?

Reply

Aireche sofyane April 16, 2017

How can i add TLP 250 optocoupler to protoeus Isis to make a pcb ?? i need help plz
i will be tnankfull

Reply

jayateertha October 6, 2017

sir can we give constant dc supply to 2nd pin of tlp250 ic…

Reply

amjad November 22, 2017

Salam how can we calculate the value of resisters, capacitors

Reply

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