Tahmid's blog

Microcontroller and Power Electronics

2,571,410

Tuesday, April 30, 2013

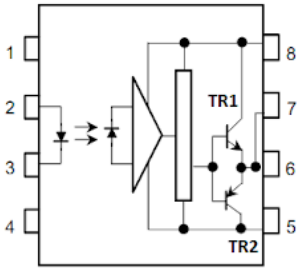
Using the TLP250 Isolated MOSFET Driver - Explanation and Example Circuits

I've already shown how to drive an N-channel MOSFET (or even an IGBT) in both high-side and low-side configurations in a multitude of ways. I've also explained the principles of driving the MOSFETs in these configurations. The dedicated drivers I've shown so far are the TC427 and IR2110. Some people have requested me to write up on MOSFET drive using the very popular TLP250. And I'll explain that here.

The TLP250, like any driver, has an input stage, an output stage and a power supply connection. What's special about the TLP250 is that the TLP250 is an optically isolated driver, meaning that the input and output are "optically isolated". The isolation is optical – the input stage is an LED and the receiving output stage is light sensitive (think "photodetector").

Before delving any further, let's look at the pin configuration and the truth table.

Pin Configuration



1 : N.C.
2 : Anode
3 : Cathode
4 : N.C.
5 : GND
6 : V_O (Output)
7 : V_O
8 : V_{CC}

Fig. 1 - TLP250 Pin Configuration

Truth Table

		Tr1	Tr2
Input LED	On	On	Off
	Off	Off	On

Fig. 2 - TLP250 Truth Table

Fig. 1 clearly shows the input LED side and the receiving photodetector as well as the totem-pole driver stage. Pins 1 and 4 are not internally connected to anything, and hence are labeled N.C. meaning no connection.

Pin 8 is VCC – the positive supply. Pin 5 is GND – the ground supply or the return path for the driving power supply. The supply voltage must be at least 10V. The maximum voltage is dependent on the operating temperature. If the temperature is lower than 70°C, up to 30V can be used. For temperatures between 70°C and 85°C, up to 20V can be used. However, there shouldn't be a need to use higher than 20V anyways. In most cases, you'll be using 12V or 15V or perhaps in some cases 18V.

Pins 2 and 3 are the inputs to the LED, anode and cathode respectively. Like regular LEDs, it has an input forward voltage and a peak forward current. The forward voltage will typically be between 1.6V and 1.8V. The forward current should be less than 20mA. The threshold input current for output transition from low to high is typically 1.2mA, but may be as high as 5mA. Thus, 10mA current should be good.

Even though pins 6 and 7 are shown to be internally connected, the output should be taken from pin 6 as the image - datasheet - shows pin 6 labeled as Vo (Output). Output voltage will tend to rise to supply voltage when high (it will actually be slightly lower) and fall to ground level when low.

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explanation and plenty c

The TLP250, being an optically isolated driver, has relatively slow propagation delays (not to say that optically isolated drivers can't be fast; there are optically isolated drivers faster than TLP250). The propagation delay time will typically lie between 0.15µs and 0.5µs. An important thing to remember is that the datasheet specifies the maximum operating frequency to be 25kHz. I've used the TLP250 for frequencies up to about 16kHz.

That covers the different parameters related to TLP250. Now let's go to the design stage and look at a few circuits. One thing you MUST remember to do when designing circuits with TLP250 is that, a 0.1µF bypass capacitor (ceramic capacitor) should be connected between V+ (pin 8) and V- (pin 5). This capacitor stabilizes the operation of the high gain linear amplifier in the TLP250. Failure to provide this capacitor may impair the switching property. The capacitor should be placed as close to the TLP250 as possible. The closer, the better.

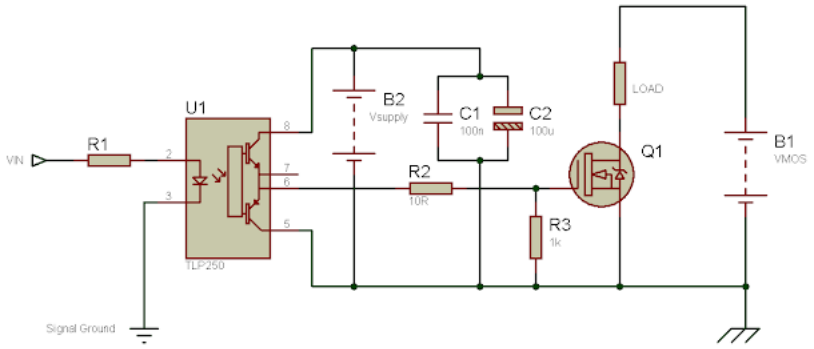


Fig. 3 - Non-Inverting Isolated Low-Side MOSFET Driver

Fig. 3 shows a typical circuit for using the TLP250 as a MOSFET driver. VIN is the input drive signal that dictates the output state. Remember that VIN is referenced to Signal Ground. And that the TLP250 ground and load ground are referenced to the power ground, ie Vsupply and VMOS share the same reference ground as can clearly be seen from the circuit diagram and this ground is separate from Signal Ground. This clearly illustrates the isolation in MOSFET drive as the driving signal is isolated from the load supply.

When VIN = 1, Q1 is driven from the supply voltage (Vsupply) – the gate is pulled up to Vsupply level. Q1 turns on and current flows through the load – the load is driven from VMOS via the MOSFET.

When VIN = 0, Q1 is driven low – the gate is pulled down to its source level. Q1 turns off and the load is off.

Vsupply could be between 10V and 15V – 12V being a very common level used. R1 should be calculated by you depending on the amplitude of the input signal. I'll give an example to clearly show you how (if you don't know that already).

I've said above that 10mA (= 0.01A) for the forward current for the LED is a good value to use. So I'll take that. Let's say that the TLP250 is being driven from a microcontroller and the amplitude for the signal is 5V. I've said above that the forward voltage for the LED would typically be between 1.6V and 1.8V – I'll take it to be 1.8V for this example.

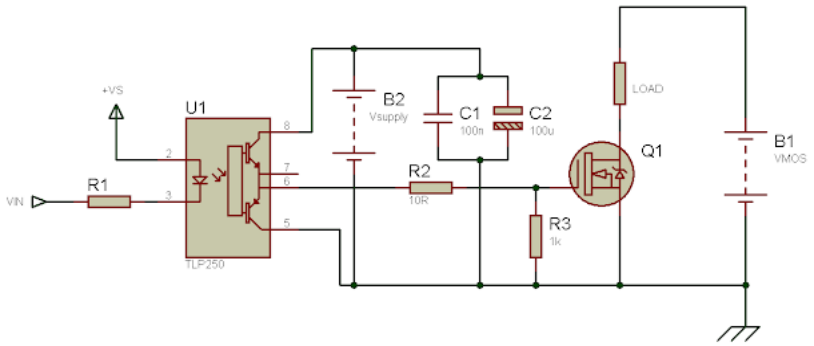
So, V = (5.0 – 1.8)V = 3.2V
V = IR
R = V/I = 3.2V/(0.01A) = 320Ω

R2 is the gate resistor. If you're curious about why I used R3, read here:

http://tahmidmc.blogspot.com/2012/10/magic-of-knowledge.html

C1 is the decoupling capacitor I talked about above. This MUST always be used and MUST not be omitted. I've added C2 for filtering/smoothing, as a bulk capacitor.

Let's look at a few more circuits:



circuits
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Tahn

I am Sye Mahbub, Banglad August 1 Electronics is my passio V, I have been learning learnt and worked mostl power electronics, micro integration of microcontr SMPS and power electr PIC and AVR microcontr 12F, 16F, 18F, 24F, dsPI PIC32, ATmega and ATt them with various SMPS electronics circuits. I hav Bachelor's degree from University (Class of 201 York, USA, majoring in E Computer Engineering (member of the forum www.edaboard.com, wh "Advanced Member Lev level attainable) and als allaboutcircuits.com, wh "Senior Member". I post electronics-related probl engineers and engineeri from all over the world. I and playing cricket and t and listening to music. I hardware engineer at Ap Valley, California, USA.

Fig. 4 - Inverting Isolated Low-Side MOSFET Driver

This circuit in Fig. 4 is similar to the above circuit in Fig. 3, with the difference being that the circuit in Fig. 3 shows a non-inverting driver (VIN = 1 drives the MOSFET on and VIN = 0 drives the MOSFET off) whereas Fig. 4 shows an inverting driver (VIN = 0 drives the MOSFET on and VIN = 1 drives the MOSFET off). How this has been configured to be an inverting driver is extremely simple to understand – the LED now turns on when VIN = 0 and turns off when VIN = 1. Like Fig. 3, Fig. 4 also shows an isolated driver: +VS is isolated from Vsupply and VMOS.

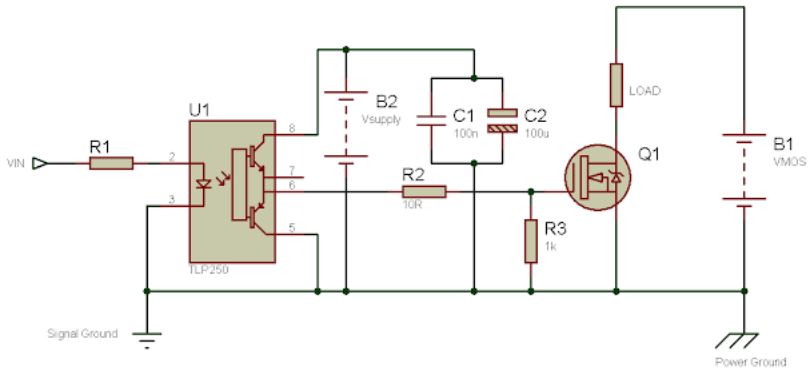

Fig. 5 - Non-Inverting Non-Isolated Low-Side MOSFET Driver

Fig. 5 shows a non-inverting non-isolated driver. By shorting Signal Ground and Power Ground, isolation has been gotten rid of. Vsupply and VMOS share the same ground as the signal ground to which VIN is referenced.

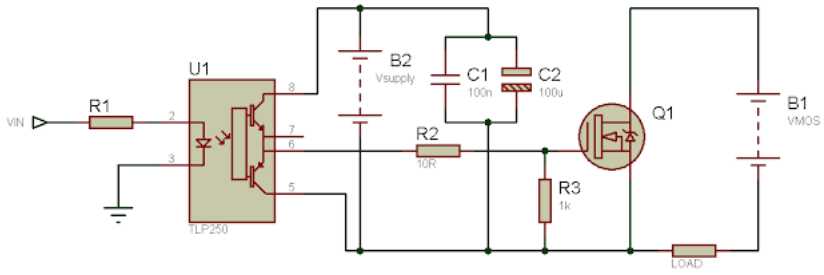

Fig. 6 - Non-Inverting Isolated High-Side MOSFET Driver

Fig. 6 shows the TLP250 being used as a high-side driver. Here in this circuit, there are 3 “grounds” – that of the signal ground to which VIN is referenced, that of Vsupply and that of VMOS.

When VIN = 1, Q1 gate is pulled up to the level of Vsupply (with respect to source). Since this is above the level of the source (which is connected to Vsupply return/ground), the MOSFET turns on and there is a current from VMOS through Q1 through the load, turning the load on.

When VIN = 0, Q1 gate is pulled down to the level of source and Q1 is turned off. There is no current through the load and the load is off.

By having the MOSFET source share the same ground as the TLP250 drive section and keeping this ground separate from the VMOS ground, Vsupply is easily used by the TLP250 to drive the MOSFET operating as a high-side switch.

And that’s it. The TLP250 is a useful little chip, making isolated MOSFET drive extremely simple. One last note is that while I've shown the circuits for MOSFET drive, they can easily be used (with the same circuit) for IGBT drive (of course, you replace the MOSFET with the IGBT).

I hope that my explanation of the application of the TLP250 and the circuit examples I provided help you in designing your own circuits using the TLP250 for optically isolated MOSFET (or IGBT) drive. Feel free to post your comments, feedback and suggestions!

Posted by Tahmid at 2:48 PM

94 comments:

Anonymous May 1, 2013 at 1:43 PM

hi thanks for very helpful imformation.....get i get ur email please, cause i wanna show u the circuit of buck converter based on pwm and optocoupler....i got problem with my circuit, when give supply, the output is not come out...but if i short it with vcc at output of optocoupler it working....

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► July (2)
► June (2)
► May (1)
▼ April (1)
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► March (1)
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► January (2)
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Reply

Replies

Tahmid May 2, 2013 at 5:52 AM

You may email me at inferno-rage (at) hotmail (dot) com.

Regards,
Tahmid.

Anonymous May 3, 2013 at 11:44 AM

thanks i already email u.....

Reply

Anonymous May 2, 2013 at 12:13 AM

Dear Tahmid
I fabricated the 5 level inverter circuit using opto-coupler the input to opto is sine pwm but the output I got from the opto-coupler was normal square wave. What is wrong in my circuit.

Regards
Veera...!

Reply

Replies

Tahmid May 2, 2013 at 5:51 AM

The drive signals from the driver are supposed to be square wave. By driving the MOSFETs/IGBTs with square wave signals with variable duty cycles (varying sinusoidally - as required for sine wave approximation) and then filtering the output, a sine wave is obtained.

Regards,
Tahmid.

VIJAY AJ March 25, 2016 at 9:56 AM

Sir, shall I use this tlp250 for my MOSFET switching in buck boost converter circuit. My dsp30f2010 is producing a pwm in the range of 1my kHz. Weather this circuit work for me

Reply

Anonymous May 4, 2013 at 8:14 AM

Dear Tahmid

Thanks...!
Regards
Veera...!

Reply

Anonymous May 9, 2013 at 7:13 AM

hi,
i am doing a circuit of openloop boost converter using sg3524.. generated pulses at 50khz. but getting problem in the next part.. i have used the circuit given shown by you for isolation using tlp250. i am getting 50kHz pulses on the otherside of tlp which is fine... but i connected th tlp output to Mosfet with power circuit off. to gate n drain.. on cro when i see the pulses suddenly disappear to show it is getting shorted.. thin spike kind of lines appear between tlp output terminals.. please help me with ur valuable suggestions

Reply

Anonymous May 27, 2013 at 7:55 AM

hi, i'm planning on using the TLP250 for my IGBT inverter circuit using the proteus simulator. TLP250 is not available on the simulator. pls can u suggest the suitable driver i could use. i am designing a drive for a 0.5hp, 415v, 3 phase induction motor.

Reply

Replies

Tahmid August 8, 2013 at 6:15 PM

You can get the TLP250 model from here:

http://320volt.com/en/proteus-isis-smps-pwm-entegre-modelleri-library-dosyalari/

Regards,
Tahmid.

Reply

akeem2203 June 26, 2013 at 2:10 AM

Please, can explain to me on how to use TLP250 to drive 24v supply and shut down when voltage is 18v or using TLP352 that has 15v minimum input voltage.

Reply

akeem2203 June 28, 2013 at 2:41 AM

Is it possible for me to use LM350 to supply 15v to TLP250 for 24v inverter so that when voltage from the battery is 17.9v,there will be no output from the regulator to the inverter and the inverter will shut down.

Reply

Replies

Tahmid August 8, 2013 at 6:12 PM

You can use a 12V regulator. That will be enough for driving MOSFETs and gives a lot of headroom at battery low voltage.

Regards,
Tahmid.

Reply

Anonymous July 25, 2013 at 1:47 AM

an HCPL3120 has similar delay time, but is an IGBT / MOSFET driver up to much higher frequencies (<500 ns switching speed)

Regards

Reply

Replies

Tahmid August 8, 2013 at 6:10 PM

Thanks for the input. You can also look at TLP350.

Regards,
Tahmid.

Reply

Anonymous July 31, 2013 at 5:26 AM

Dear tahmid,
I have designed the dc switching relay using IGBT,the driver is tlp 250,the part of IGBT is AP30G120SW.THE problem is with vce its greater than 3V,but according to the datasheet VCE saturation is 3V,so how to reduce that drop.otherwise please send the circuit, using IGBT and tlp 250.

Reply

Replies

Tahmid August 8, 2013 at 5:44 PM

The datasheet mentions VCE(sat) at a given temperature. Also remember that this is the drop if you drive the IGBT to saturation. Did you use sufficient drive current? How much larger is VCE than 3V?

Reply

許志偉 August 28, 2013 at 12:02 PM

Dear Tahmid:
I have designed a switching circuit using the "Non-Inverting Non-Isolated Low-Side MOSFET Driver" pattern you mentioned above. In order to test its function, I input a square function into the TLP250. Furthermore, I set the frequency to be very low(i.e. 2HZ), then I discovered something really strange: Vmos was scaled down by about 0.5V. I'm eager to find out whether it was a loss or it was because of operation under low frequency?? BTW, I really found your info above helpful!! Thanks for your great job and your willing to share :)

Reply

Anonymous August 30, 2013 at 11:15 AM

Dear Tahmid,

I've designed a full-bridge inverter using TLP250. I have the trouble in high-side mosfet. The both high-side mosfet heat-up in a few second. Let me ask you a couple question?
1. Each supply for TLP250 (for 4 set) must be separated from the other ?
2. How to use the "Bootstrap" for High-side Mosfet by TLP250 ?

Thank you so much.
Song

Reply

Replies

Tahmid October 22, 2013 at 3:31 PM

1) The 2 high side TLP250's must have separate supplies, separate from each other and from circuit supply and low-side drive supply. The 2 low-side TLP250's must have supplies separate from the high side supplies, but they may share the same supply?

2) The bootstrap method relies on charging a capacitor to a specified voltage above the drive voltage (while the high-side MOSFET is off), and then relying on this voltage to drive the high-side MOSFET when on. See here: http://tahmidmc.blogspot.com/2013/02/n-channel-mosfet-high-side-drive-when.html

You should consider using dedicated high-low side drivers, such as IR2110, L6385E, etc. Take a look here: http://tahmidmc.blogspot.com/2013/01/using-high-low-side-driver-ir2110-with.html

Regards,
Tahmid.

Reply

Anonymous September 19, 2013 at 6:30 AM

Can VMOS and VSupply be the same 12V power source?

Reply

Replies

Tahmid September 21, 2013 at 9:00 PM

Only if you're using one of the non-isolated drive circuits, and if your load drive circuit works with 12V.

Regards,
Tahmid.

Reply

Sanson October 8, 2013 at 3:46 PM

Hi Tahmid, this is a DC MOTOR controller TLP 250 circuit.

http://img196.imagevenue.com/img.php?image=108102761_Image1a_122_98lo.jpg

Can you guess the 2 transistors TO 220 package in the right upperside near the MUR 1660 power diode (its numbers are erased).

Thanks.

Reply

Replies

Tahmid October 22, 2013 at 3:28 PM

It's not possible to just guess without further information.

Further information such as DC motor rating, controller specifications, control type, etc are required.

Those may be BJTs or Power MOSFETs. The specific part number would depend on circuit parameters such as voltage, current, efficiency, drive mechanism, etc

Regards,
Tahmid.

Reply

Claudio Sanhueza Muñoz November 13, 2013 at 3:48 PM

This comment has been removed by the author.

Reply

Claudio Sanhueza Muñoz November 13, 2013 at 3:50 PM

do you have the hcpl3120 library for proteus?

Reply

Replies

Tahmid January 24, 2014 at 11:33 AM

No I don't.

Reply

Παντελής November 25, 2013 at 11:24 AM

Well done! What an excellent article!
I landed here while I was looking for some info; In my setup, B1 is a bridge /cap combination directly from the mains supply ~310v. Is it possible to omit B2 and just use a voltage divider from 310v to feed ~15v to TLP250 ? Is IR2110 a better choice for that purpose?

Thanks

Reply

Replies

Tahmid January 24, 2014 at 11:32 AM

Which diagram are you referring to?

If you're talking about a low-side driver, then you can use a non-isolated power supply to provide the 15V. A voltage divider just won't have the current drive capacity. If it does (low resistances, or transistor follower), it'll have way too much power dissipation and heat, with abysmal efficiency.

If you're talking about a high-side driver, you'll need to use an isolated power supply.

Even if you choose to use an IR2110 (which would be for only a high/high-low side configuration), you'd need a separate low voltage power supply.

Regards,
Tahmid.

Παντελής February 23, 2014 at 3:36 AM

This comment has been removed by the author.

Reply

Anonymous November 26, 2013 at 7:36 PM

Thank you, very helpful (but, please consider how hard it is for some people to read white text on a black background).

Reply

Anonymous January 23, 2014 at 11:18 PM

Hi tahmid, i wanna ask value of R2 from your circuit. Is it 10 ohm or 10 kohm ?

Reply

Replies

Tahmid January 24, 2014 at 11:29 AM

It's 10 ohms.

Regards,
Tahmid.

Reply

ehab ul haq February 20, 2014 at 10:41 AM

hi tahmid, i really appreciate ur blog, well done sir
my question is why is R2 used ?? is it ok not using it?? and how its value is calculated??
regards
ehab

Reply

Replies

Tahmid February 22, 2014 at 12:25 AM

You should use R2. Don't omit it. It's value isn't too critical. Think of it as a current limiter for driving the MOSFET gate. The critical thing is not to choose too large a resistance such that it prevents driving the MOSFET completely (fully on). 10R should be good for up to relatively high frequencies (about 100kHz).

Regards,
Tahmid.

Reply

La Vie February 21, 2014 at 3:13 AM

Hi, Tahmid
Your blog is so awesome with great information.
I also followed your hints with this tutor, but something is wrong. can you suggest me some tips to solve my problems.
In my case, load is AC and I try to fire MosFET by TLP250 but not success. Could you help me, please?

Reply

Replies

Tahmid February 22, 2014 at 12:23 AM

Could you give a schematic of your setup? That would help me better understand the situation.

For driving AC loads with MOSFET, use the circuit as shown in Figure 6. Take a look at this as well:

http://tahmidmc.blogspot.com/2012/11/controlling-ac-load-with-mosfet.html

Regards,
Tahmid.

La Vie February 26, 2014 at 12:45 AM

Hi Tahmid,
I am sorry for late response because recently I am very busy.
In my case, I also followed your recommend schematic to control ac load, Rg approximately 100ohm and Rgs about 10kohm. My MOSFET I use in this application is FQP6N80C and be controlled by TLP250. I tried several times but still not success. I think the output current of TLP250 is not enough to open FET(with maximum about 1.5A)? or maybe iam wrong some point of view?
Thank you so much
Sincerely
Lavie

La Vie February 26, 2014 at 3:45 AM

https://www.dropbox.com/s/eyybmf4fqykb27a/20140226_165526.jpg
this is my schematic. was I wrong something?

Reply

zeeshan ul haq March 6, 2014 at 6:43 AM

Hello Sir,

i have a scenario like in Fig. 6 - Non-Inverting Isolated High-Side MOSFET Driver. but i have a common ground supply for the microcontroller and gate driver. so the isolation in gate driver will be no more. and i think i should use a isolated supply for that and there is no other solution. could you please update it with flyback converter design.

regards
Zeeshan

Reply

Fatima Khalid April 10, 2014 at 3:13 PM

Hello, love your work, you're an accomplished young man

Of all the low side gate driver ICs which would be best to use if I am making a boost converter at PWM frequency 30-50k Hz? to give a double

boost.
Thank you in advance

Reply

Replies

Tahmid October 12, 2014 at 5:37 AM

I would recommend using a dedicated low-side driver. The TC427 is one for example - take a look at the TC429 if you need higher drive current.

Reply

Tareq May 14, 2014 at 9:20 PM

Dear Tahmid, I have a buck boost converter, I designed the controller for outer voltage loop with an PI and the inductor current is being controlled by Slope compensation.I simulated that all in PSIm, and it works all ok as calculateed and expected, now I want to Implement it in Multisim, The Mosfet driver is giving me problem. The parameters are; Vin =30Vdc Vout is 60 V, L=100u, say C= 697u or 680u, equivalent load resistance is = 8 Ohms. and The converter works in CCM, with Switching frequency of at least 100kHz. I was using Mosfet IRCZ44, if you need I can send you some of my simulation results, but How. I am Tareq , and from Bangladesh. If you can help me , I appreciate it.

Reply

Anonymous September 7, 2014 at 6:29 AM

Dear Tamid, or to anyone who could help, on the case of the TLP250, used for an inverter. My question is: if mosfets blows up, would the optoisolator blows too. Pls help: u can post the answer here or reply me on richiereigns@gmail.com

Reply

Anonymous September 7, 2014 at 6:41 AM

Dear Tamid, or to anyone who could help, on the case of the TLP250, used for an inverter. My question is: if mosfets blows up, would the optoisolator blows too. Pls help: u can post the answer here or reply me on richiereigns@gmail.com

Reply

Replies

Tahmid October 12, 2014 at 5:36 AM

I can't say for sure. Depends on why the MOSFET blows. For example, if the gate gets shorted to drain for example, the optoisolator is going to be gone.

Reply

Anonymous September 20, 2014 at 9:51 PM

I want to ask about multi mosfet. we want to use 4 parralel mosfet (for share the power) and can we use only one tlp250?

Reply

Replies

Tahmid October 12, 2014 at 5:35 AM

Depends on which circuit you're using and the frequency. For low side drive, at low frequencies (50Hz for example), you can use one TLP250.

Reply

Oladipo Segun October 17, 2014 at 12:03 PM

Hello Tahmid, thanks for the earlier help. i am designing an smps inverter which i have been able to finish but i now intend to create another design which would have multiple ferrite transformers of the same type driven by their separate mosfets and tlp250. i want to be able to shutdown each dc to dc converter without shutting it down from the sg3525. can i design a shutdown function for tlp 250

Reply

Anonymous October 24, 2014 at 8:55 AM

Hi tahmid can I replace 350 with 250

Reply

Kevin George November 21, 2014 at 1:24 PM

CAN U GIVE THE PROTEUS LIBRARY FOR TLP250

Reply

Anonymous December 8, 2014 at 9:47 AM

GREAT WORK :) .. I NEED UR HELP TO DESIGN CIRCUIT FOR JUST SWITCHING DC MOTOR (BOMBER CAR IN FUN LAND) ..BUT I NEED HIGH SIDE SWITCH . (MOTOR RATING 100VDC . 15A) . THE SUPPLY VOLTAGE BETWEEN 75~100 VDC FROM RECTIFIER. I USED DC DC SSR . IT WORKS GOOOD BUT IT DAMAGED EASILY FOR ANY SHORT CIRCUIT AND IT IS EXPENSIVE .. I NEED DESIGN OTHER CIRCUIT using tlp250 DO LIKE SSR WITH LOW COST AND MAKE SOME PROTECTION

PLZ HELP ME MY EMAIL : ESSAMYOWAKIM@GMAIL.COM

Reply

Umar Malik February 6, 2015 at 2:22 PM

Dear Tahmid,
I have to use TLP250 in my Proteus design. It is not available in Proteus. How i can add it.

Reply

Anonymous March 10, 2015 at 6:38 AM

It's really a mind blowing project!!! Very well explained in this video

https://www.youtube.com/watch?v=fOyZuAd3NIM&feature=youtube_gdata_player

Reply

anjali das March 17, 2015 at 6:07 AM

Hi Tamid,
Can you please share us about TLP350.I need the designing of resistors and capacitors.It is really urgent.

Reply

babu April 1, 2015 at 6:19 PM

Dear Tahmid,
can you help me about tlp250. actually i want to design dc to ac converter using arduino .in my design i m getting an error (input current is outside specified range) and the error is happened when i connect tlp250 with arduino. now can you tell me how can i solve this problem.my email id is (smartsinger.mds@gmail.com) please mail me some idea about tlp250..

Reply

Anonymous April 28, 2015 at 10:17 PM

hello,
im using a h bridge comprising of 4 n channel mosfets (IRF540N). Im using hcpl 3120 to drive each of the mosfets from seperate supplies and the circuit is similar to the one uve posted. my hcpl has a supply of 12V and my inverter works at 30V and a switching frequency of 40kHz. Should i be worried about the high side switching?? im not using any bootstrap circuit.

Reply

jn September 11, 2015 at 1:01 AM

Hello,
I am looking for high side High Voltage switching and the Fig 6 configuration looks the best for me. Am using isolated 12V DC DC Converter for supply B2. Can I use another isolated DC DC converter of 1500V as Supply B1?
Please reply. How can I send you my circuit for reference?
Thanks

Reply

USComponent September 30, 2015 at 6:18 AM

Nice! This is very helpful.

Reply

emad ghonem November 19, 2015 at 6:28 PM

Dear Tahmid
can i use your circuit diagram with arduino or pic micro controller pwm to control 24 v dc proportional solenoid valve
regards

Reply

emad ghonem November 22, 2015 at 1:19 PM

Dear Tahmid
can i use your circuit diagram with arduino or pic micro controller pwm to control 24 v dc proportional solenoid valve
regards

Reply

Unknown December 23, 2015 at 12:14 PM

Hi tahmid
Can we drive ac motors like inverter i mean with this configuration withing range of 1kw

Reply

Sanjeev Pandey January 11, 2016 at 8:50 AM

Hello! This is Sanjeev Pandey from India. Your blog is really helping me for my understanding about dc-dc converters. Currently, I am working on buck converter and my switching frequency is 100kHz. Please suggest me a MOSFET driver IC. I know only two driver IC TLP250 and 350. And these are not going to help me in this application.

Reply

ulywae February 2, 2016 at 9:51 PM

Sir If I only use tantalum capacitor if it could for driving high side?

Reply

PRABAKARAN R February 4, 2016 at 1:44 AM

we have two circuits one is sg3524 and ir2101 but we cannot connect grounds together. if we connect its become short circuit. Actually we are doing full brige inverter circuit which is converter ac to dc .

Reply

kamalesh logu February 5, 2016 at 3:49 AM

VIN to TLP250 is pwm input or direct dc volt?

Reply

umar February 29, 2016 at 3:33 AM

HCPL3120 LIB FILE...IF ANYONE HAVE KINDLY SEND IT TO ME THANKS

Reply

Saeed Ahmed March 1, 2016 at 5:13 AM

Hi,
I have a very common question that if I want to use bjt or fet the base/gate voltage should be equal to the collector/drain voltage to get the same at the emitter/source.so how tlp 250 in H bridge configuration in high side switch transfer the same(310v)or any high voltage than tlp250 supply voltage to load while we are using 12/15 volt gate drive supply voltage.

Reply

M.ESWAR Sasi March 21, 2016 at 2:11 AM

i have given all the above connections for isolated high side driver but still i am getting no response in output..please help me

Reply

boo balan April 27, 2016 at 2:14 AM

Hello sir... can you pls explain the difference between MCT2E and TLP250 driver circuit. which one is the best..how?

Reply

Shruheti Vaghasiya May 26, 2016 at 12:40 PM

Is there any full form of TLP in tlp250 ??

Reply

Unknown July 2, 2016 at 8:40 AM

Very helpful... Thanks!

Reply

Anonymous July 23, 2016 at 12:30 AM

Can I made H bridge inverter gate driver circuit using single battery or supply instead of using 4 for each MOSFET???

Reply

pavel August 14, 2016 at 5:24 PM

For convert 24 volt dc to dc to 5.2 volt dc to dc what type tlp will be used?

Reply

pavel August 14, 2016 at 5:24 PM

This comment has been removed by the author.

Reply

dhiaul falah September 27, 2016 at 12:19 AM

Do you have library of eagle cadsoft for tlp250?
thank you

Reply

Anonymous December 6, 2016 at 4:37 AM

Hey Can anybody sign me up the real TypeNr of Mosfet to use? For example de FQP6N80C is the only one listed in the forum below. I only need a Typenr for a mosfet that can sink 10A or a littlebit More. As seen in:

Fig. 5 - Non-Inverting Non-Isolated Low-Side MOSFET Driver

With friendly greets, and please rather refer to: woutervanwegen@mijnplinq.nl

Reply

Unknown March 4, 2017 at 1:29 AM

Hi... Hamid. Thank you so much for providing these information. I am weak in electronics and I need your help for my Mtech mini-project. My topic is a new quadratic buck converter. I am using a low Gte Charge HEXFET Power MOSFET IRF540. I want to know how to connect TLP250 and IRF540>

Reply

Replies

Anonymous March 9, 2017 at 10:23 AM

I think this will be helpful for you.Visit this
ttp://acudayanga.blogspot.com/2017/03/igbtmosfet-gate-driver-with-isolated.html

Reply

Anonymous March 9, 2017 at 10:21 AM

Hi guys, Visit this for PCB layout and Schematic Using TLP250 http://acudayanga.blogspot.com/2017/03/igbtmosfet-gate-driver-with-isolated.html

Reply

Anonymous March 16, 2017 at 6:21 PM

Dear tahmid if possible you create a simple circuit pwm using by sg3525 and (lm324 or 2902) operated by tlp250 opto 10khz to 20khz feq adjustable..... Finally drive igbt module.. Simple in... Create igbt module driver using by sg3525 and tlp250 circuit diagram

Reply

Anonymous March 16, 2017 at 6:28 PM

Sir tahmid my same question to uper question.... Create schematic and diagram pwm to c.t coil master volume current control and adjustable frequency use sg3525 or tlp250 make igbt module mean 2 insulate gate transistor module.... Plz create

Reply

Anonymous March 23, 2017 at 8:24 AM

What are the value of R1 and R2 ? (how can we choose them?)

Reply

sribit May 5, 2017 at 11:23 AM

Dear Tahmid, I'm trying to design a 20kHz inverter using Four N-Channel Mosfets. I have use IR2110 for driving MOSFETS. I excited circuit with AC-DC rectifier which is fed by auto transformer. As the supply is switched on, transformer is producing humming noise. So, could you please tell me what could be the problem.

Reply

Lucky Pipi May 20, 2017 at 9:39 PM

Hi Thamid,

I always have a question with isolated gate driver performance.

I had designed the simple buck, boost and buck-boost. I realised that isolated driver always have issues with higher switching turn off spike, when I operate in high current situation.

However, if I used IR2101 to design any type of power converter always I can get the nice results of the switching pwm signal without any turn on/off spike.

I used different type of isolated driver before such as HCPL-3120 and TI UCC21250. For those driver cannot generate a pwm signal without turn on or off spike.

Do you have any experience about the problem for turn off and on spike in the practical case? I can share you the picture from my experimental results. If you are interested.

I'm hoping you will be able to reply my message. Thanks thamid.

Reply

Remya Nambiar June 11, 2017 at 1:46 PM

Hi Thamid,
First of all thanks for providing intricacies involved in designing gate drive cct.
I am designing a Boost converter (22v to 110v) for my two stage solar inverter. Initially i was directly the TLP250 to the gate of mosfet IRF840 and the TLP was blowing out after 2min. I implemented your model and used a 0.25W 10ohm resistance between gate and tlp. Now the resistance is blowing. I increased the resistance to 10k and the TLP is not heating and I am getting 12v pulses at the gate of mosfet. However, the switch is not giving any output.
Can you please tell me where i am wrong.

I have mailed you the circuit to inferno-rage@hotmail.com

Regards

Remya

Reply

Used PC Dealer August 9, 2017 at 8:43 AM

Nice Blog Post !

Reply

Hüseyin Bakışlı August 23, 2017 at 9:43 AM

I have a question about Fig. 6 - Non-Inverting Isolated High-Side MOSFET Driver.. What happens if we connect all 3 grounds to eachother? Does it still continue to work? i'm charging a battery with mosfets and feeding the controller circuit from the same battery.. That's why i'm asking..

Reply

Setiawan Putra Hendratno October 18, 2017 at 5:49 AM

Hello. I read the datasheet that isolation voltage is 2500 vrms. But, I still doubt with this driver to power the gate in h-bridge inverter. Have I decrease the voltage to use this gate driver, or using optoisolator for h-bridge inverter?

Reply

deepak Verma November 6, 2017 at 4:22 AM

is the driver using ir2110 and tlp250 useful for all ratings of mosfet say fir mosfet of current rating 400 amp and 100 v .

Reply

Anonymous January 18, 2018 at 6:59 AM

Dear Sir

I intend to use HCPL-3120 as a N-Mosfet (High Side)driver, with Bootstrap circuit to drive a asynchronous Buck convertor:

My Input voltage=12V, Output Voltage=6V, Load=6 Ohm, Buck Inductor=100uH, Buck Capacitor=100uF,Rg(Gate Resistance)=10 ohm, Rgs(Gate-source resistance)=1kohm, Switching frequency=31.37kHz, Duty Cycle=50%, PWM pulse is given from Arduino Uno.

I have the following queries

1.Is HCPL-3120 capable to be used in Bootstrap circuitry(I intend to use the same 12V input drive Buck Convertor Load and the Bootstrap Capacitor)?

2.Can you please explain what path will the bootstrap capacitor take to charge while N-Mosfet is switched-off?

3.Also can you please state out how to go about selecting the bootstrap capacitance value?

Your kind help in this regard is eagerly awaited, as I am new to Power Electronics.

Regards

Reply

Ismael Veras February 4, 2018 at 10:23 AM

Can I made H bridge inverter gate driver circuit using single battery or supply instead of using 4 for each MOSFET??? ...i need know it please

Reply

EDNER DI SESSA April 5, 2018 at 8:44 PM

Hello thamid !!! I'm building a dual forward source with two mosfets irfp 460 being triggered at the same time with only one of the outputs of sg3524, and I'm using tlp 250 as driver, I'm feeding the high and low part with two independent isolated sources for each tlp; I would like to know if it supports in the high part the 312vcc voltage of vmos, because it does not have the terminal vs ir2110; I'm afraid to blow up the top thank you for understanding, thank you for all your teaching

Reply

Hanif Fakhruddin April 18, 2018 at 6:30 AM

Hello Thamid
I'm using TLP 250 for IGBT, the problem is teh nomninal Vout from TLP250 is cut to half from its source. I use 15V as source and the voltage output of tlp250 is on 7.5V, how do i solve this problem

thank yoy

Reply

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