

Re: Can somebody take a look at this circuit for me?

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Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-05/msg01823.html>

- *From:* Mac <foo@xxxxxxx>
 - *Date:* Fri, 13 May 2005 06:05:36 GMT
-

On Thu, 12 May 2005 21:18:07 +0000, Michael Noone wrote:

> Pooh Bear <rabbitsfriendsandrelations@xxxxxxxxxxxx> wrote in
> news:4282E7DF.FCF30727@xxxxxxxxxxxx:
>
>> Are you really sure that your active load (U\$2) is meant to be
>> configured like that ?
>>
>> Oh – it's just the way you drew it that's confusing. How *do* you
>> generate such odd component references btw ?
>
> What do you mean odd component references? The names are all auto generated
> by Eagle.
>
>> It's quite likely unstable. Try using sensible feedback Rs for
>> starters like 1M (watch the wattage) and 1k
>
> The size of the resistors used in the voltage divider circuit will affect
> the performance of the circuit? I chose those high values as I figured
> they'd be fairly easy to obtain and not consume much power – but I
> definitely can change to a smaller set of resistors if needed.
>
>> You can protect the op–amp by adding clamp diodes to its supply rails
>> btw.
>>
>> Graham
>
> Can you elaborate on this? I'm afraid I'm not familiar with the term "clamp
> diode" – and googling it turned up many results relating to things like
> relays, (where I am familiar with the use of diodes to dissipate the
> inductive energy stored in the coil).
>

You would put the diode between the pin you want to protect, and the positive supply rail in such a way that it is normally reverse biased. Only if the voltage at the protected pin goes above the supply Voltage does the diode experience forward bias. Is that clear enough?

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Something like this: (Use courier or other fixed-width font for ASCII art schematic)

```
VCC
|
+-----+
||
|--- clamp
|/\ diode
\|-----
|\|
|\|
|\|
|\-----+-----> To dangerous load
|/|
|/--- clamp
|/\ diode
|/|-----
||
+-----+
|
GND
```

> Thanks!
>
> -Michael

In your circuit, you might want to protect the non-inverting input pin and the output pin.

I agree with the others who say that the upper FET definitely needs Zener protection. Might as well add it for the lower one, too. You would use maybe a 10 V Zener in such a way that it Zeners when V_{gs} is > 10 V.

Like this: (Use courier or other fixed-width font)

```
1kV
----
|
----+ Drain
||
gate ----+----|| N-channel MOSFET
||
~ ----+ Source
Zener /\ |
diode ----- |
||
+-----+----- Vout
```

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I also have to point out that you are operating a 1000 Volt transistor with, potentially, 1000 Volts across it. Normally, I would not recommend designing with zero margin.

--Mac

• **References:**

- ◆ **[Can somebody take a look at this circuit for me?](#)**
 ◇ From: Michael Noone
- ◆ **[Re: Can somebody take a look at this circuit for me?](#)**
 ◇ From: Pooh Bear
- ◆ **[Re: Can somebody take a look at this circuit for me?](#)**
 ◇ From: Michael Noone

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