

## Re: eliminating CMRR problems -- was, 3 dB bandwidth

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- *From:* Mike Monett <no@xxxxxxxxxxx>
  - *Date:* Tue, 12 Jul 2005 09:53:09 -0400
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Winfield Hill wrote:

[...]

- > One finds much higher-voltage N-type FETs than P-types, so I've
- > been using all NMOS strings, in a totem-pole push-pull circuit.
- > With a Darlington BJT to drive it at the bottom, for higher
- > transconductance and predictable  $V_{be}$ .
  
- > I gather your setup is the common NMOS + PMOS follower circuit? If
- > so, what PMOS parts are you using and what is their voltage
- > rating? Also, how are you getting the 5KHz 1,900V p-p sine wave to
- > drive the two NMOS and PMOS push-pull output with?
  
- > Are your measurements real, or \*Ahem\* Are they just spice
- > measurements?
  
- > If so, did you bench-vet your MOSFET's subthreshold model? The
- > standard models are completely masssively defective, but in a way
- > that makes the FET's transconductance appear to be very high at
- > low currents, say under 100mA, which improperly wipes out much of
- > their high Ciss problem, which can then make linear circuits
- > appear to work much better than in real life.
  
- > Thanks, - Win

Win,

Everything is in SPICE to evaluate different configurations. Parts selection comes later when I am pretty sure it will work. The basic configuration is the floating op amp driving an inverting stage as you suggested earlier.

So far the complimentary NPN/PNP bipolar follower has the best AC performance, but it is difficult to protect against overload. A plain NMOS/PMOS follower with multiple mosfets has extremely poor bandwidth and large turnon transients due to the high gate resistance. The resistance is across the supply voltage of 1KV, so a

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low value would waste power.

Driving the mosfet gates with complimentary bipolar followers seems to eliminate this problem. Adding small (30pF) caps across the bias resistors seems to allow much higher bias resistance and still keep good ac response.

I searched google groups and downloaded most of the threads on high voltage amplifiers, so I am familiar with your discussions about mosfet subthreshold characteristics.

In this case, the device is being used as a follower, so I b