

COTS (“discrete”) Waveform Readout FEB – Update 7/1/2026

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today’s subtitle...

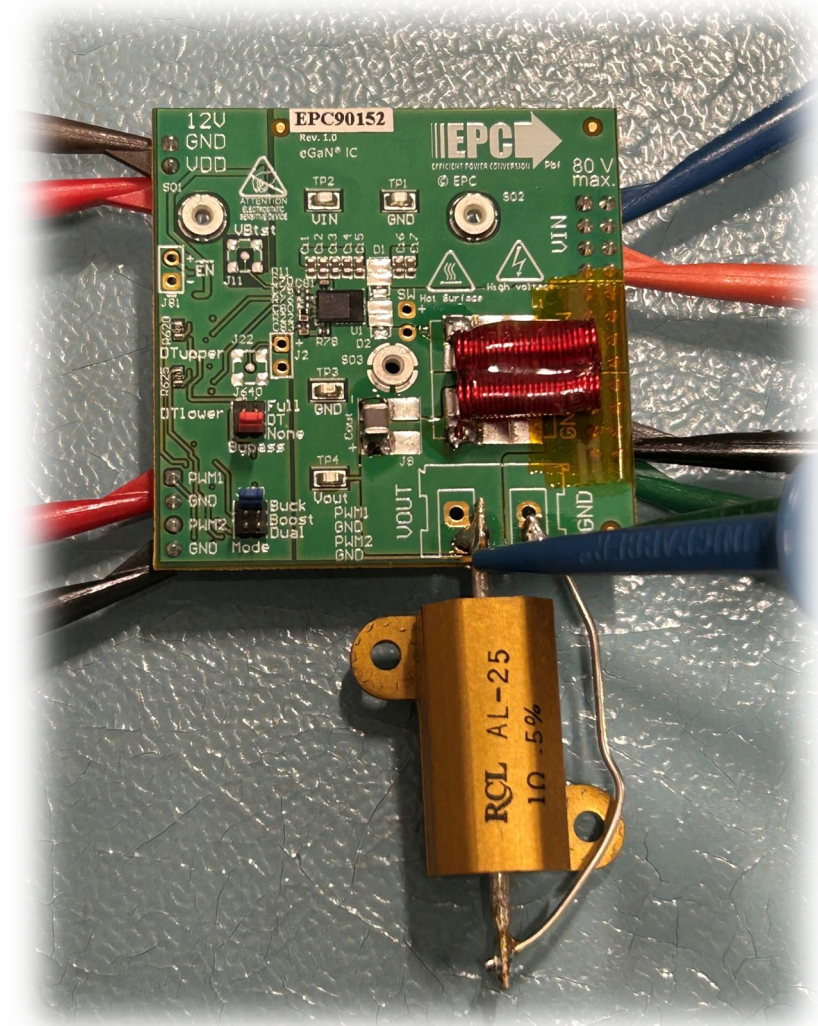
bPOL48 / EPC23104 development

There was a bit of a lull this spring while new (PED) funding established. 5/18/26 start date / account is active at IU.

(3/26/26 PR was submitted. _My fault_ that that wasn’t in January... Anyway – back in business!)

Activities this spring:

- bPOL48 testing, part 1 (foCAL module)
- power distribution planning (PD tree)
- EEEMC FDR
- EEEMC – working toward a feasible integration of SiPM and preamp boards; next meeting in ~1 week hope to converge w/ EEEMC mechanical engineer
- higher efficiency / higher voltage bPOL48 DC/DC for ePIC

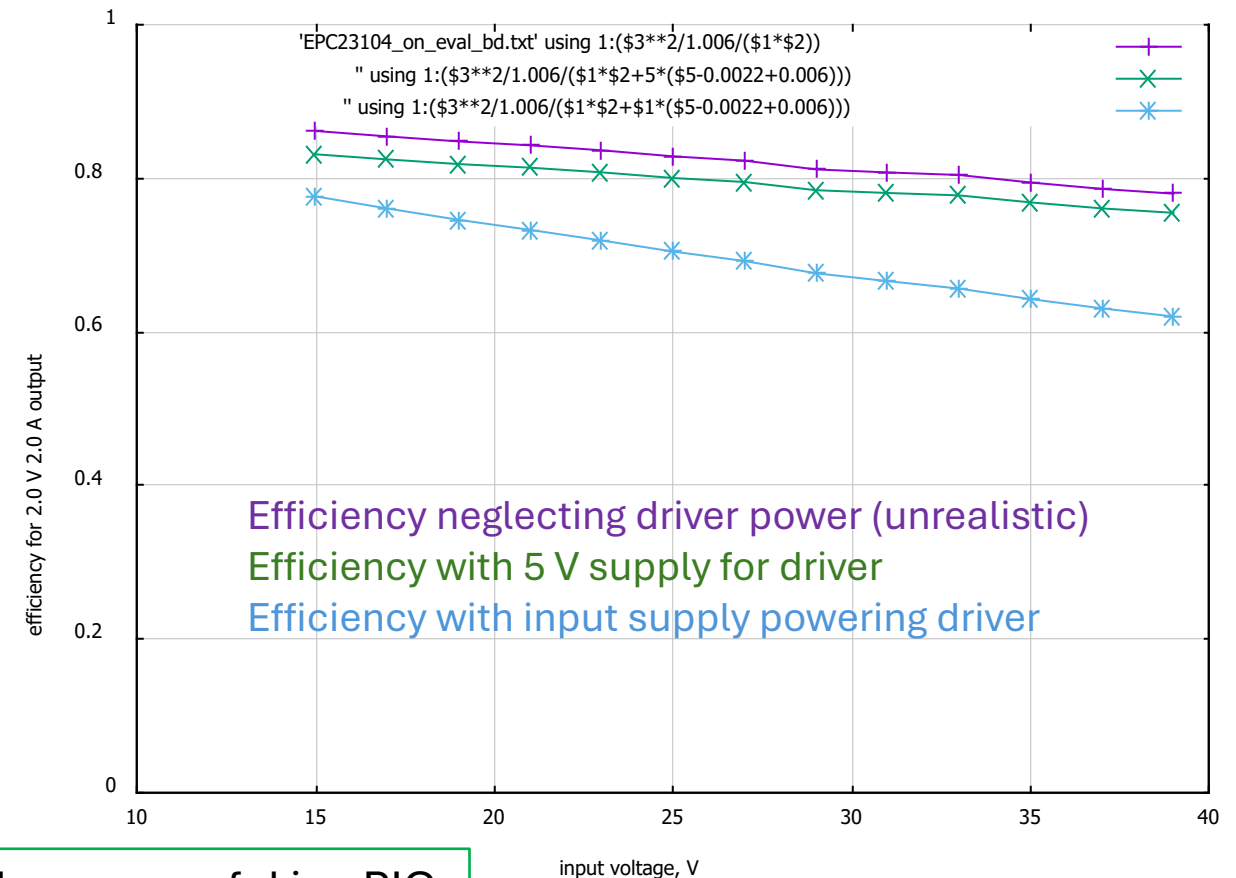


- bPOL48 is merely a controller chip, essentially no effect on efficiency (except for its 6 mA supply current)
- efficiency is a function of power stage only
- standard power stage for use with bPOL48 is EPC2152
- newer power stage EPC23104 is somewhat more efficient
 - especially at higher input voltages
 - relevant mainly at lower output power e.g. 5 W, which is the case for the waveform FEB
- EPC23104 can run from lower voltage, if you have it – that can be arranged

Procured EPC23104 evaluation board. Running open-loop PWM from function generator. That's sufficient for efficiency studies. Here 2.0 V output w/ 2 A load.

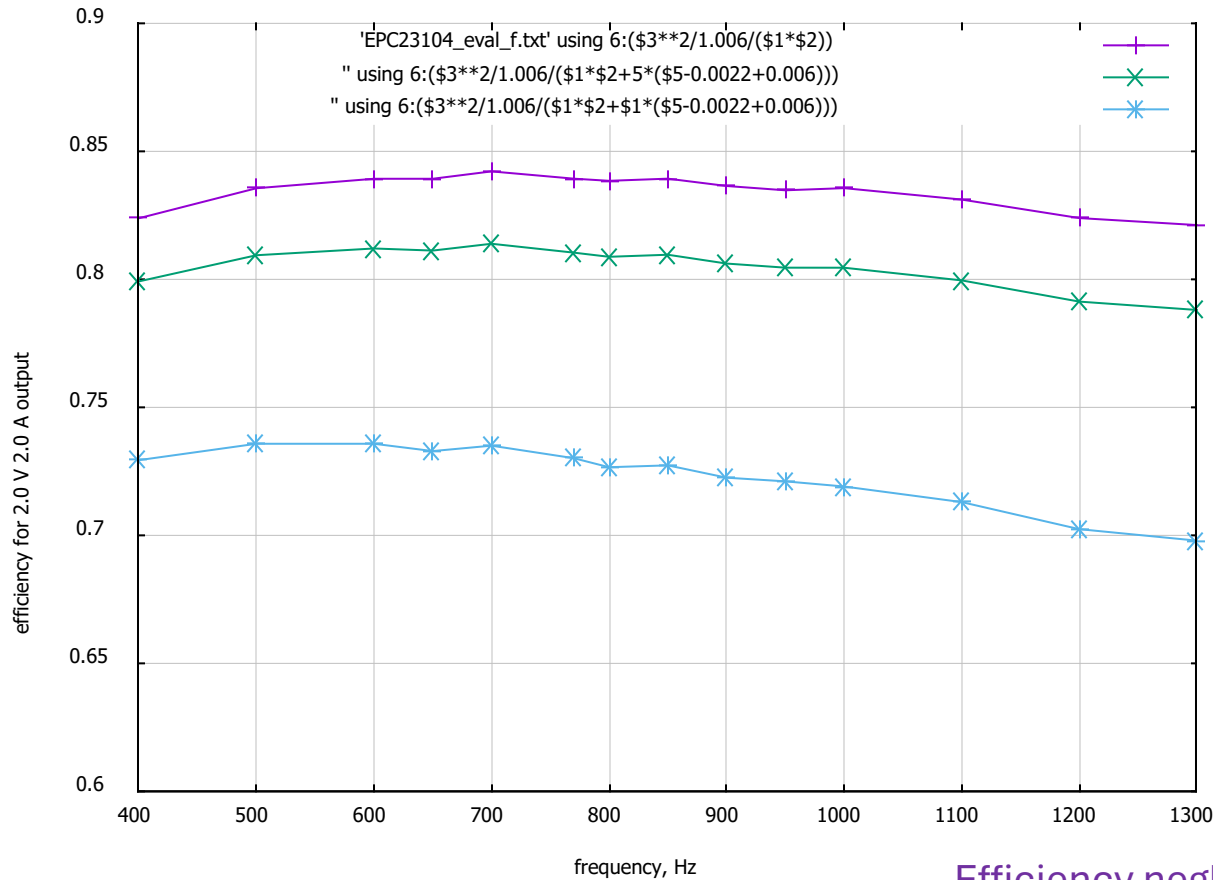
770 kHz operation, with my (previously reported) 1.2 μH 60 m Ω inductor

Next week: “Doubler” output prototyping to provide 5 V driver power from an ~ 3 V output. Looks feasible in LTSpice.

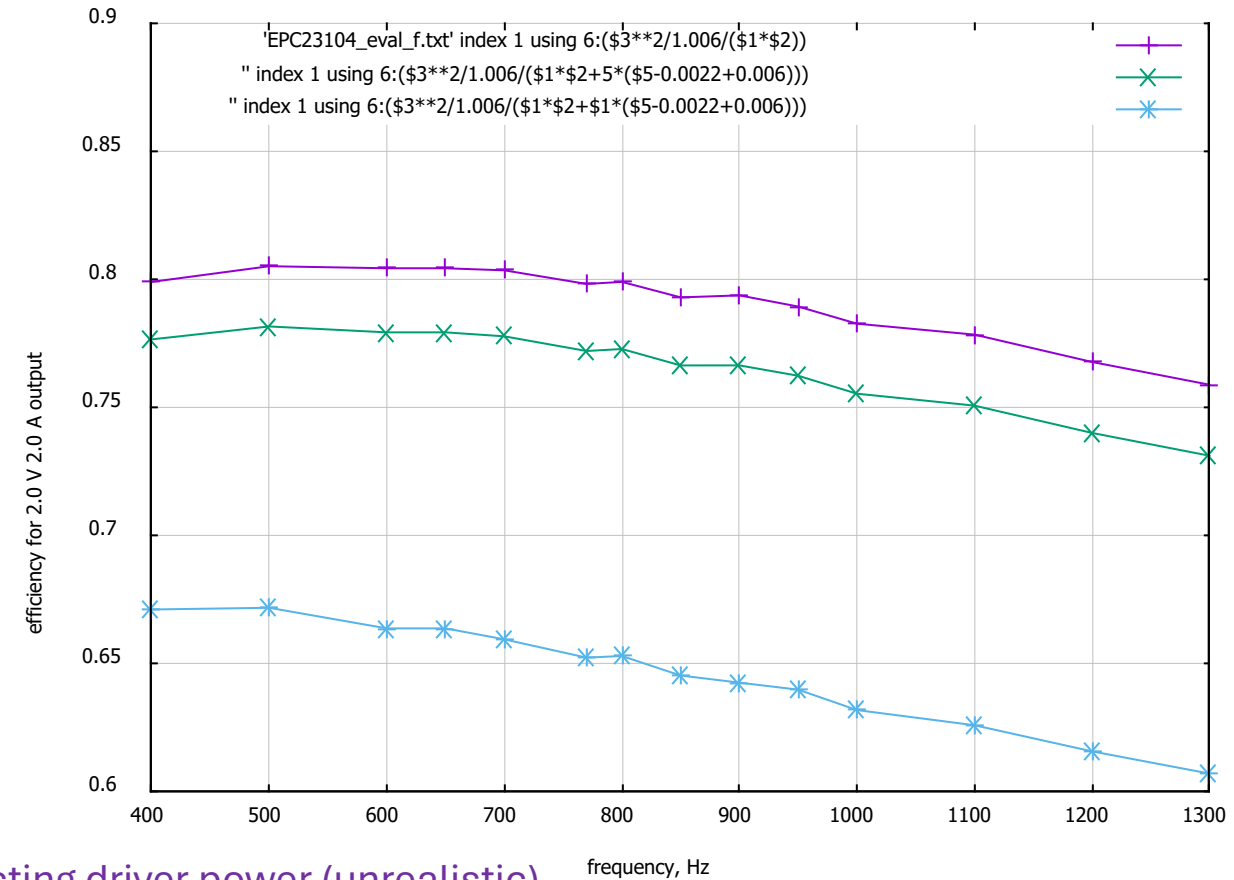


Potential $\sim 80\%$ efficiency with 25 V input could be very useful in ePIC

vs. frequency
@ 21 V input



@ 33 V input



Efficiency neglecting driver power (unrealistic)

Efficiency with 5 V supply for driver

Efficiency with input supply powering driver

Appears relatively flat over frequency, that is interesting.

AC losses (in air core coil) can remain ~constant by decreasing DCR and inductance.

That should I hope allow higher efficiency at higher load currents too. Not so important for waveform FEB DC/DC.

Will it be useful to develop an “ePIC standard” DC/DC module? (Too many conflicting requirements perhaps?)