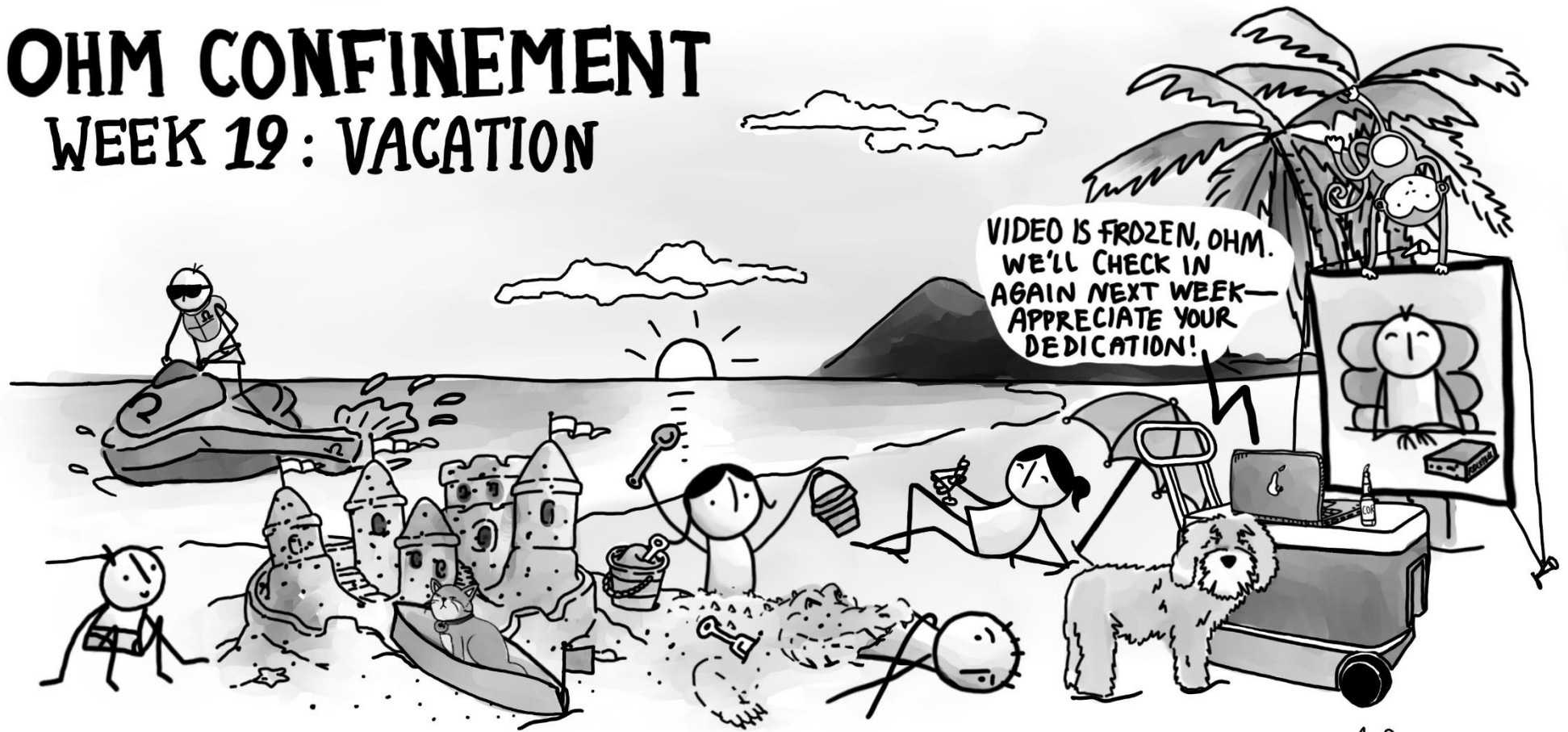


OHM CONFINEMENT WEEK 19 : VACATION



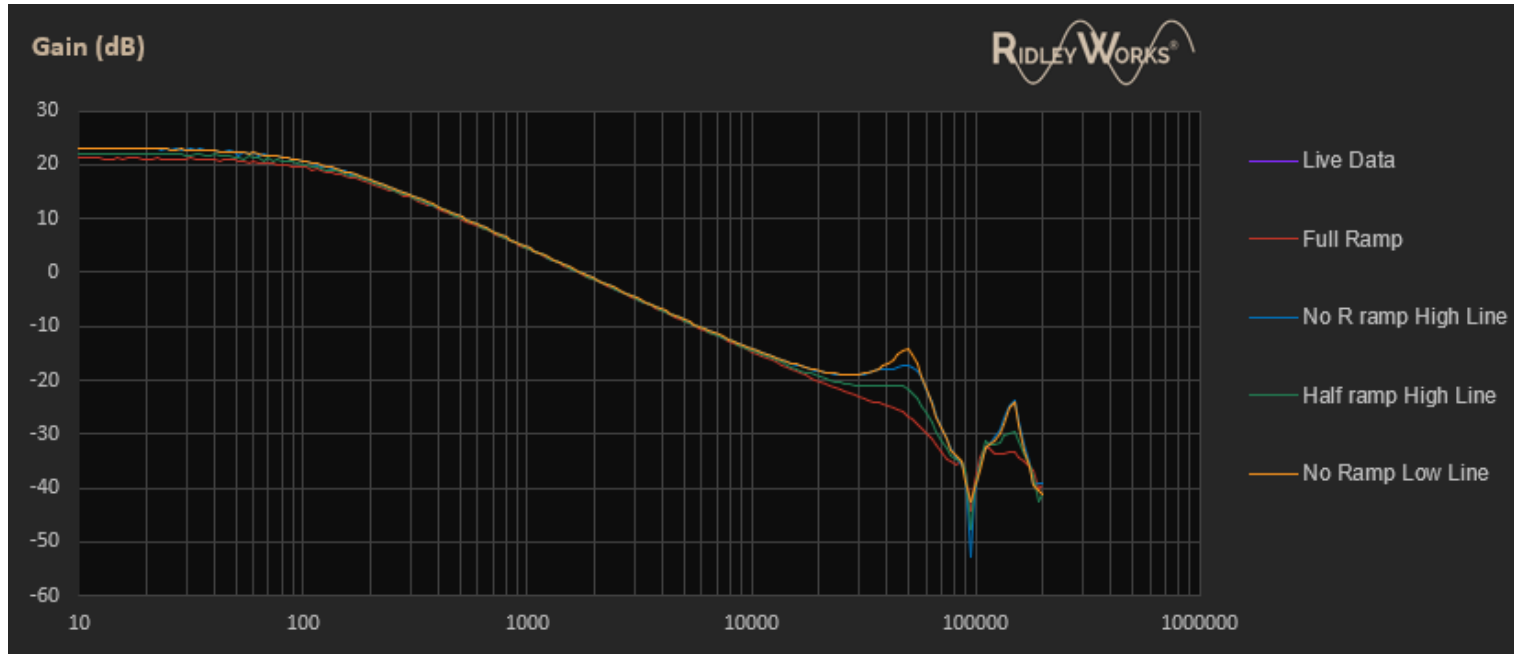
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AyaS.
6/6/20

[Ohm Cartoon Series in our Design Center](#)

Webinar Notes Download [CurrentModeDesign.pdf](#)

7 Secrets of Current-Mode Control



Webinar Friday July 31, 2020 10:00 am PCT

Dr. Ray Ridley Ridley Engineering

Download [CurrentModeDesign.pdf](#)

Secret Number 1:

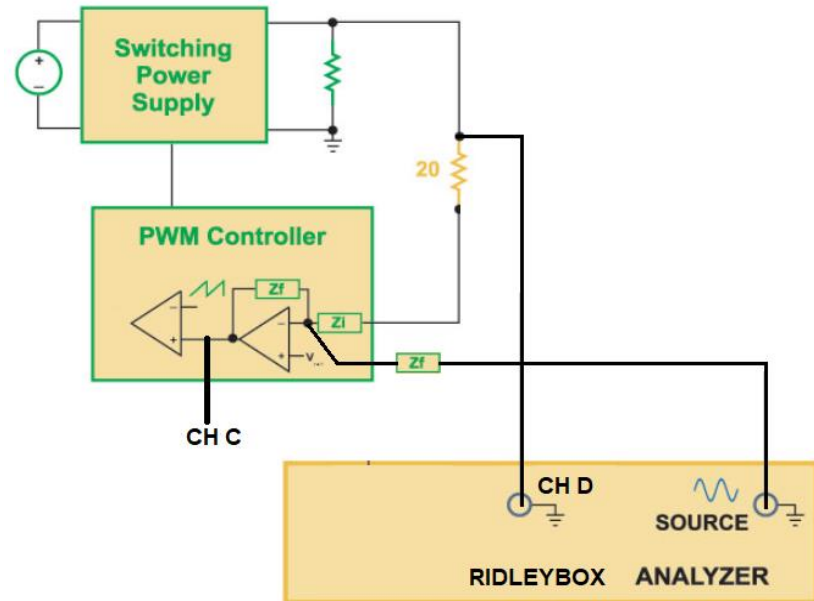
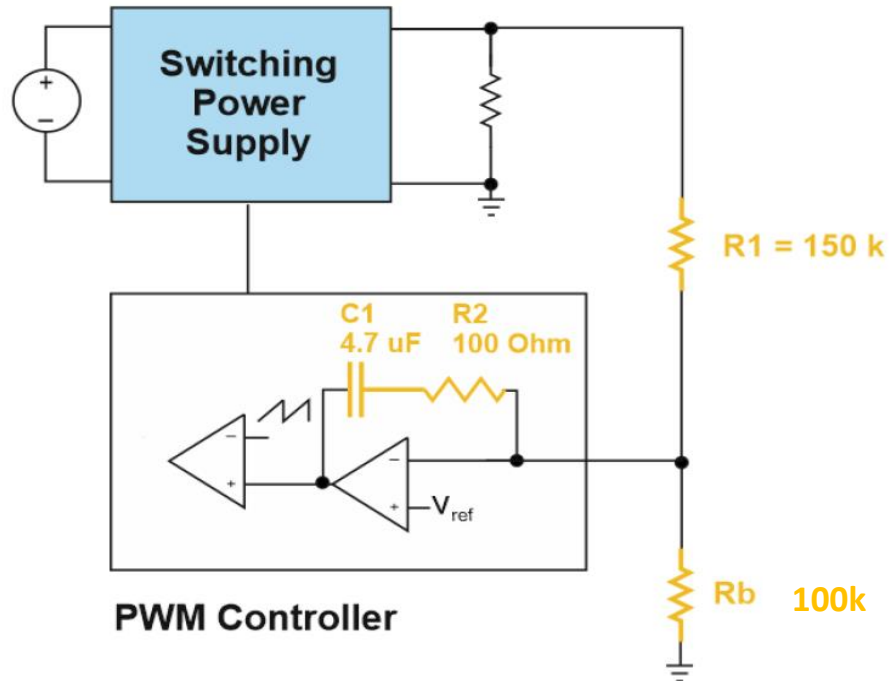
You should always use it – it is never worse

[**View Current-Mode or Voltage-Mode Webinar**](#)

Current-Mode Design Process

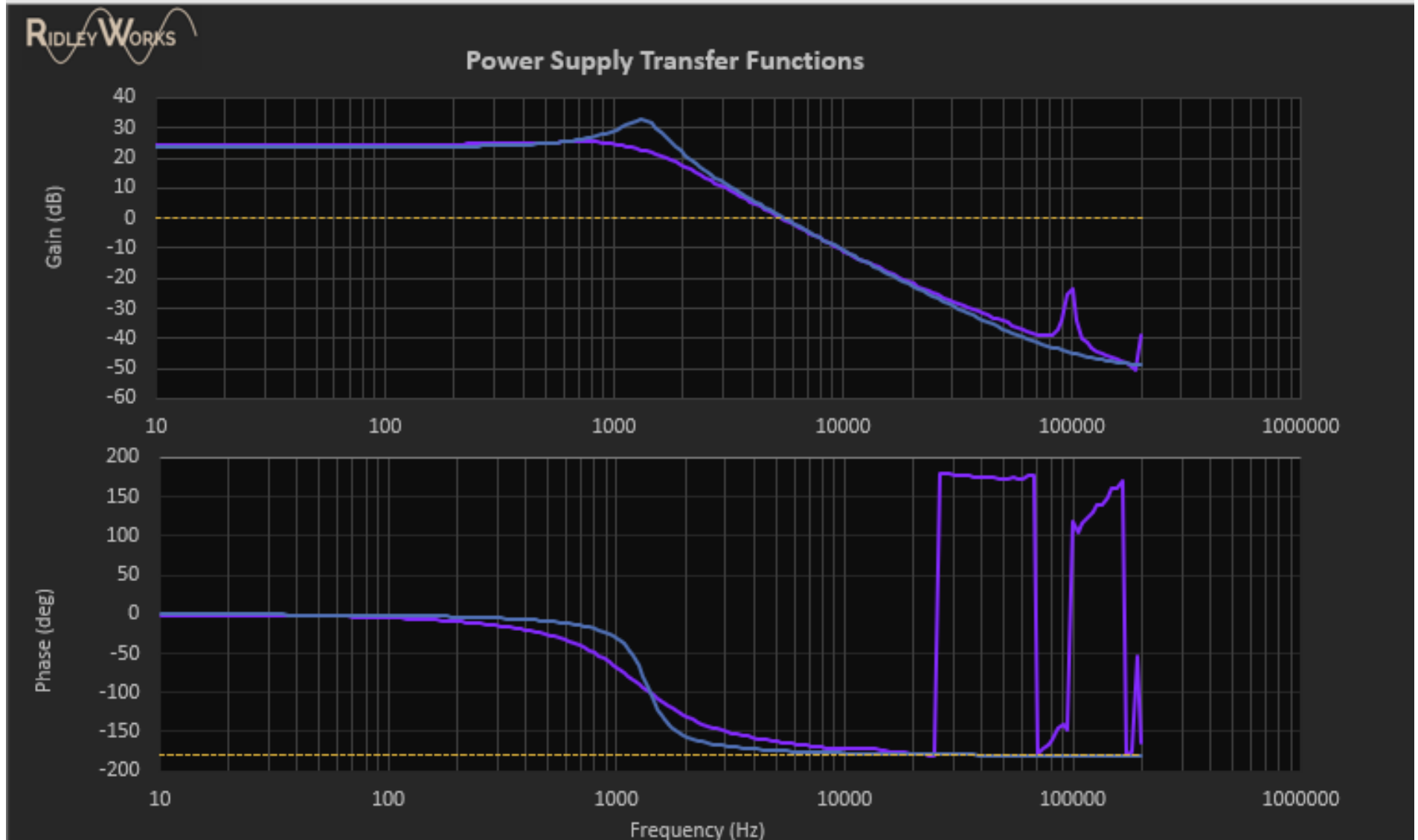
1. Build Power Stage
2. Measure the power stage without current-mode (verify filter design)
3. Look at current on scope – keep it clean
4. Measure “new” power stage with current loop closed
5. Design and implement compensating ramp
6. Verify ramp control of double poles
7. Design and implement compensator
8. Measure outer loop gain of system

Step 2 – Measure just the power stage, no current loop

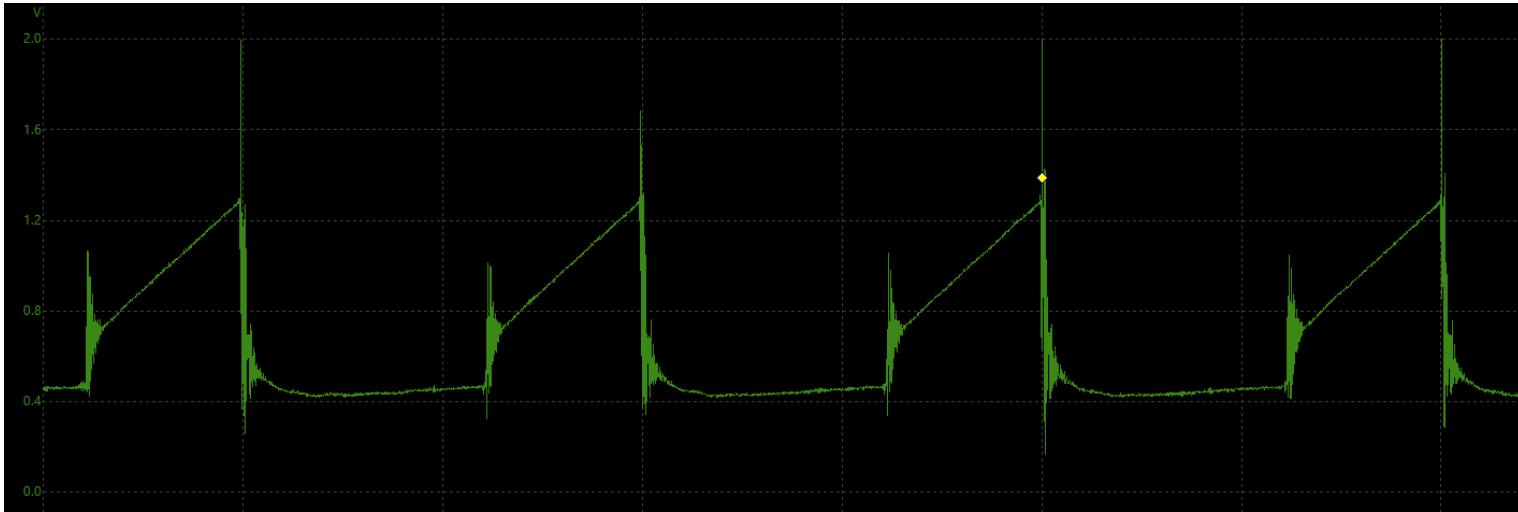


Signal Injection for Power Stage Measurement

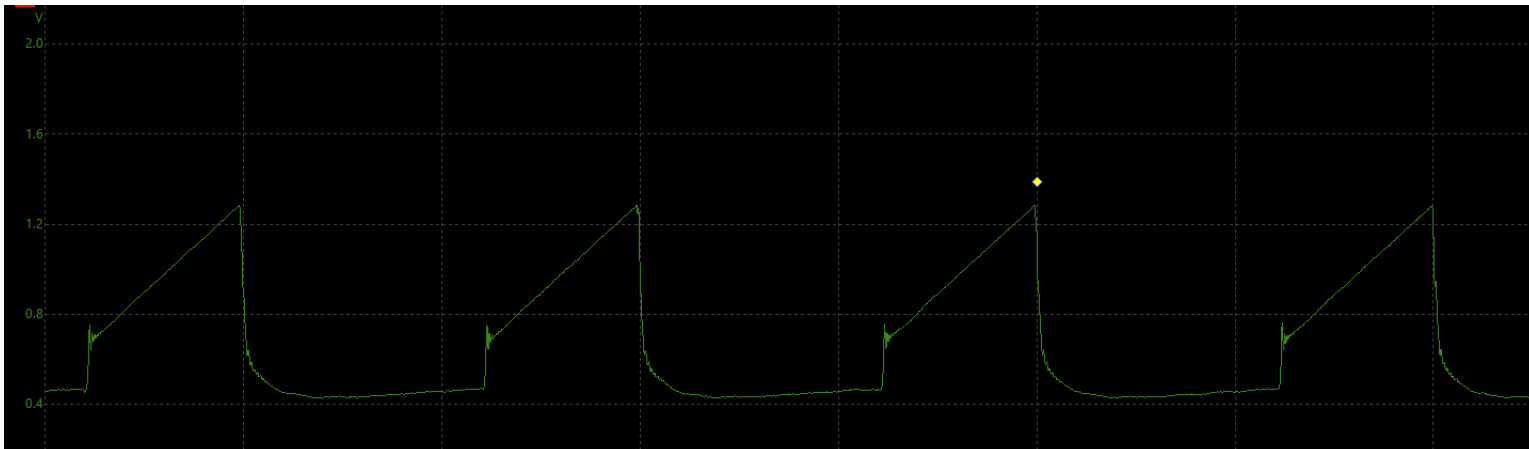
Step 2 - Power Stage Measurement vs Theory



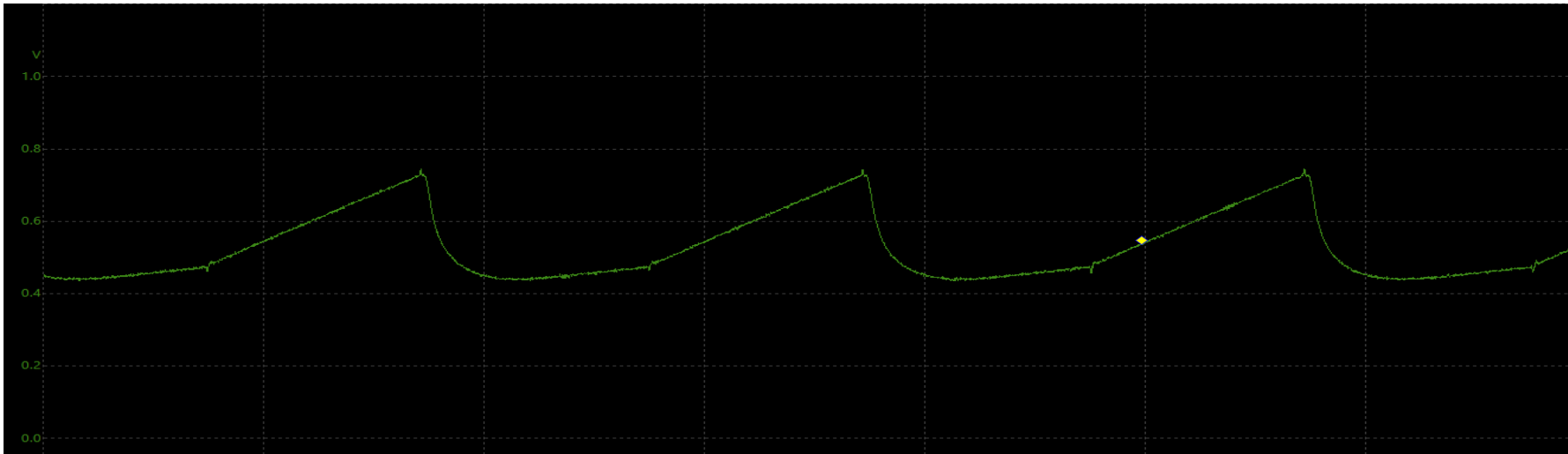
Step 3 – Look at the Current Waveform



Secret #2: Sense the Current Cleanly

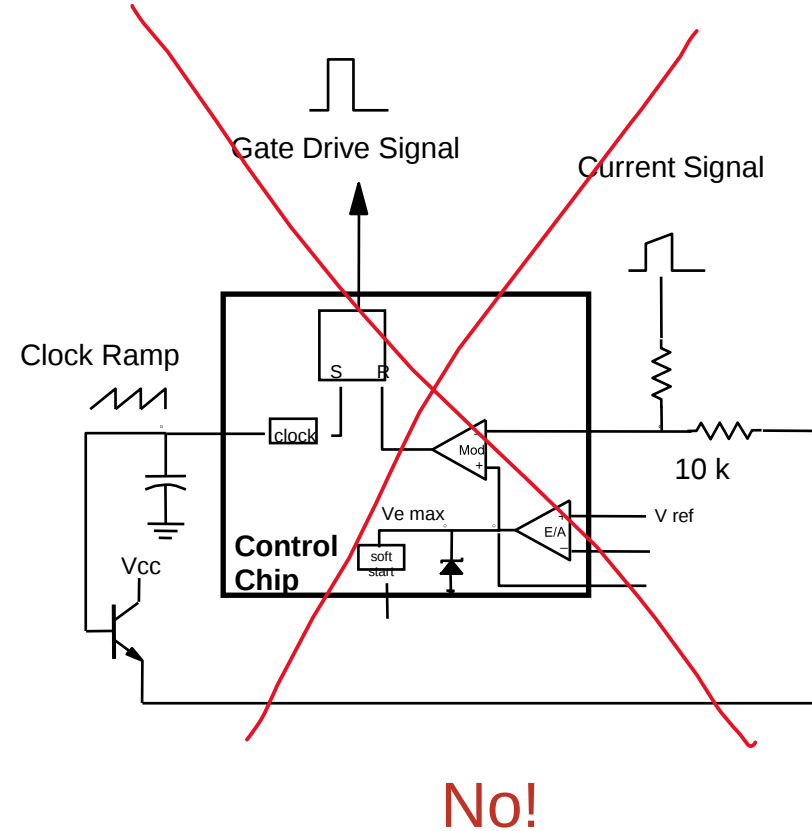
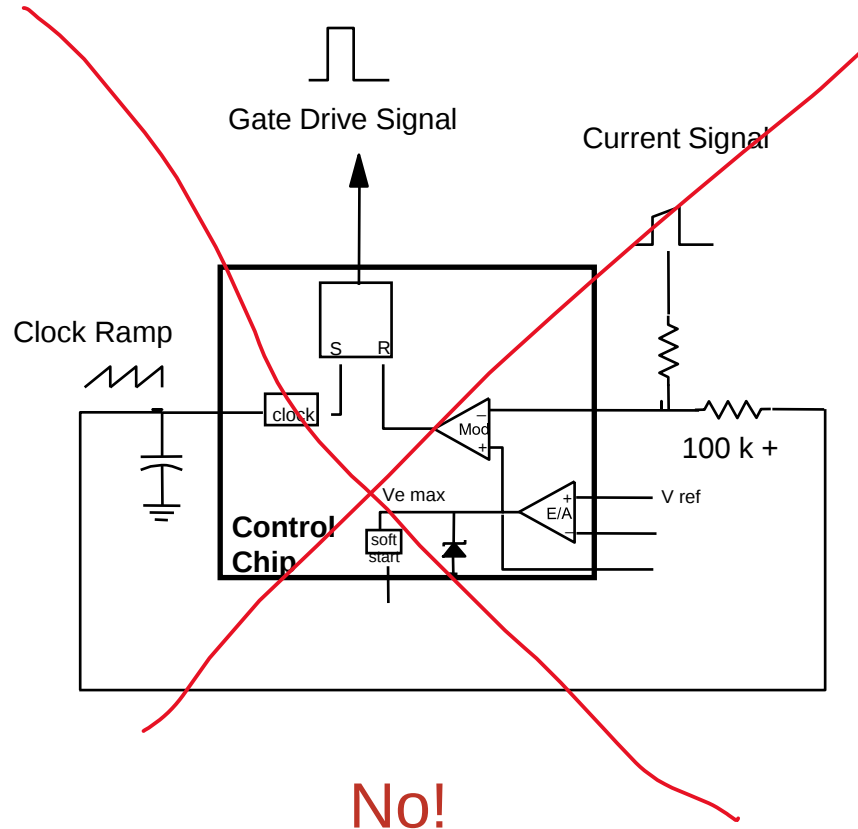


Step 5 – Add a Compensating Ramp

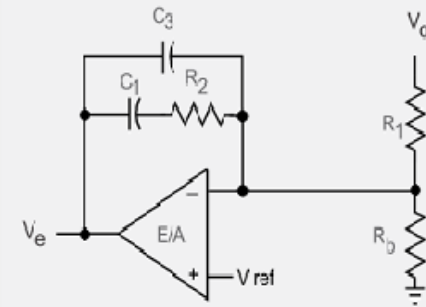


Secret #4: Control double poles with a Compensating Ramp - *Even below 50%*

Secret #5: Don't use the clock ramp. Even if the app notes tell you to do it.



Step 6 – Design the Compensator



COMPENSATION COMPONENTS

R2	1	kΩ	50	kΩ	Default
Update					
R1	9.181	kΩ	9.181	kΩ	Default
Rb	6.786	kΩ	6.786	kΩ	Default
C1	3.183	nF	3.183	nF	Default
C3	0.06496	nF	0.06496	nF	Default

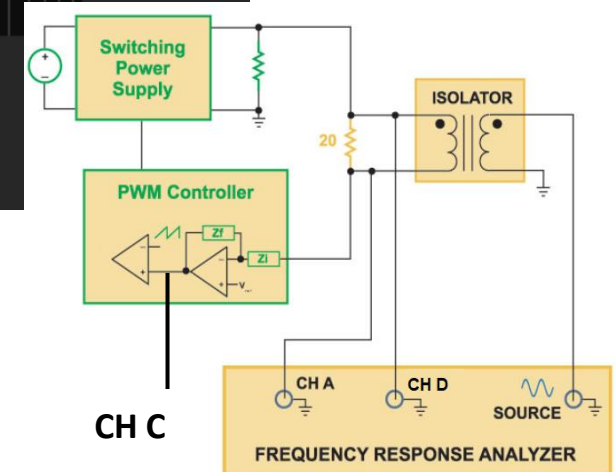
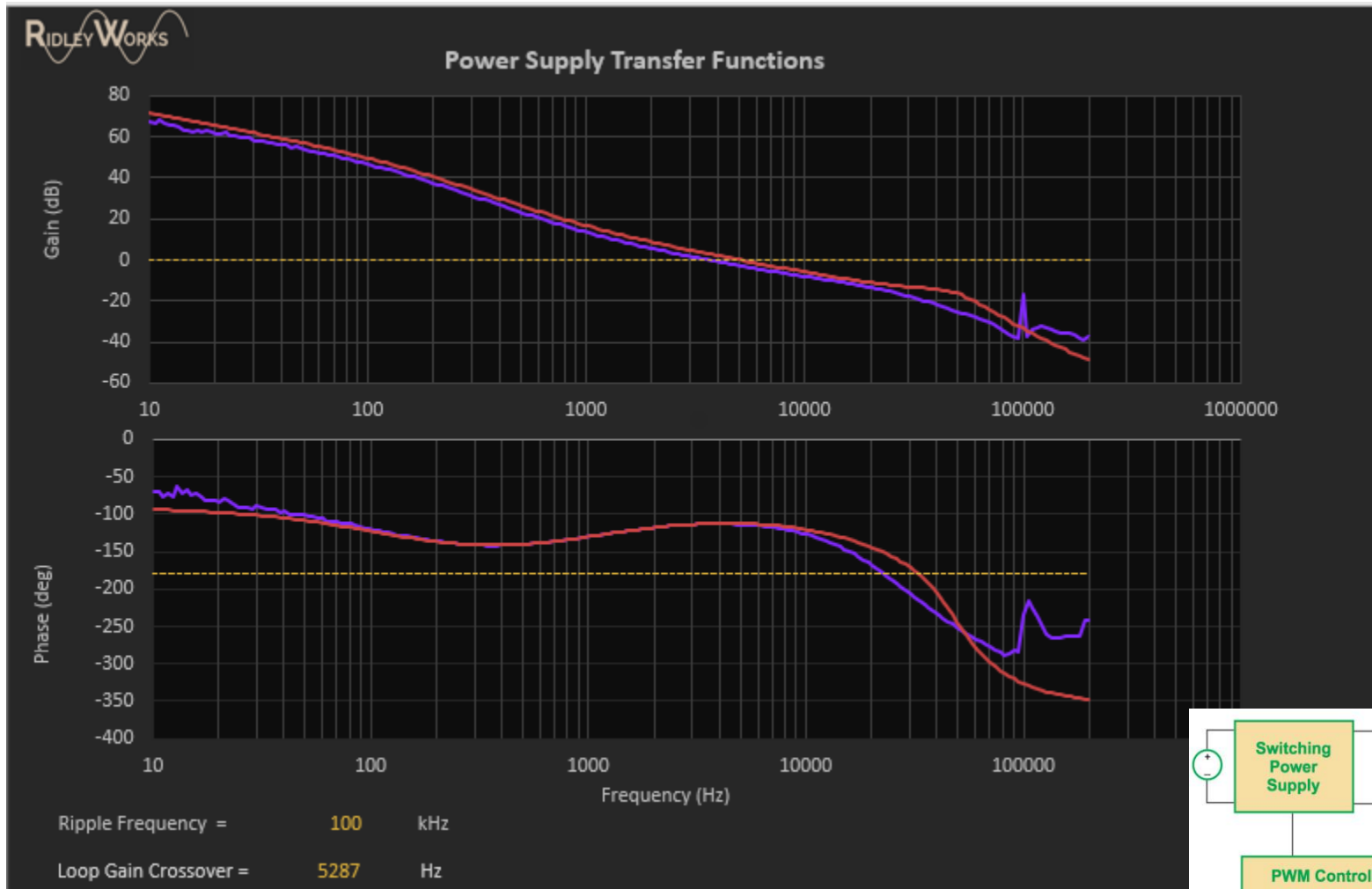
Transconductance Amplifier

Output Voltage Set Point:
(determined by R1, Rb) 11.99 V

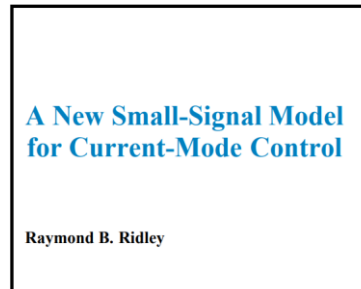
Divider Power Dissipation:
(increase R2 for lower dissipation) 0.009 W



Step 7– Loop Measurement vs Theory



Secret #6: Use the right model - Ridley or Vorpérian.
Nothing new has happened for current-mode since 1990
Much of the literature is WRONG and continues to be written.



**Free
Book**

Secret #7: Measure the system - current mode is easy!

How to Learn More



Email info@ridleyengineering.com
For full demo



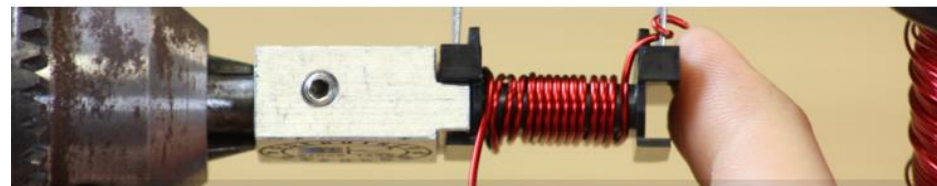
Frequency Response Analyzers



A New Small-Signal Model for Current-Mode Control

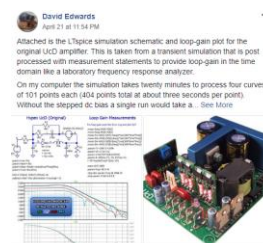
Raymond B. Ridley

Free
Book



> Education > Power Design Workshop > Intro

POWER SUPPLY DESIGN WORKSHOPS



Power Supply Design Center Facebook Group

Power Supply Design Center Articles

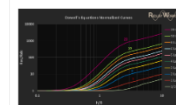
[113] THE ADVENTURES OF 'OHM

This custom-designed comic strip is for all the electrical engineers who are suddenly working from home.



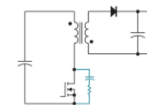
[112] THE POWER OF DOWELL'S EQUATIONS AND CURVES

The standardized curves of Dowell's equations are a superb tool for designing better high-frequency magnetics. A careful balance of layer count and wire or foil count is needed to reach an optimum design.



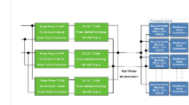
[A24] FLYBACK CONVERTER SNUBBER DESIGN

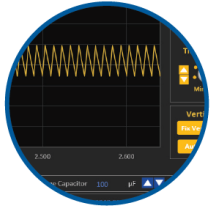
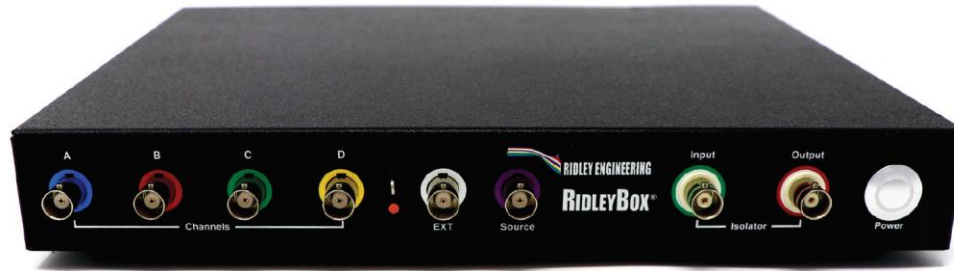
In this article, we will talk about practical design techniques for the most commonly used snubber and clamp circuits for the flyback converter.



[111] ZVS FULL-BRIDGE CONVERTER EMPLOYING AN ACTIVE SNUBBER

The ZVS full bridge converter can be enhanced greatly by implementing an active snubber on the secondary side of the transformer.

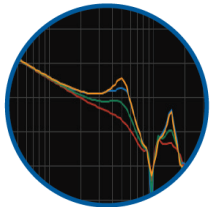




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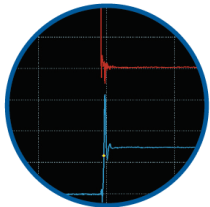
Power Stage Designer
Power Stage Waveforms
Magnetics Designer
Transfer Function Bode Plots

Closed Loop Design
Automated FRA Control
LTspice® Automated Link
PSIM® Automated Link



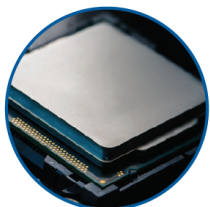
4-Channel Frequency Response Analyzer

Frequency Range 1 Hz - 20 MHz
Source Control from 1 mV - 4 V P-P
Built-In Injection Isolator
Bandwidth 1 Hz - 1 kHz
Automated Setup from RidleyWorks®
Direct Data Flow into RidleyWorks®



4-Channel 200 MHz Oscilloscope

Picoscope® 5444D 4-Channel Oscilloscope
200 MHz Bandwidth
1 GS/s at 8-bit res; 62.5 MS/s at 16-bit res
Signal Generator up to 20 MHz
Computer Controlled



Embedded Computer

Intel® Computer with 32 GB RAM, 256 GB SSD
Intel® HD Graphics 620
Integrated Dual Band Wireless, Bluetooth 4.2
Dual HDMI and USB Ports, Ethernet