VRTS 1.5 Demo Board

Description

The circuit is a discrete BJT voltage regulator with a 7-10V input and a 3.3V output. The BJT is controlled by a TL431 shunt regulator. C1 and R5 provide frequency compensation, R2 is the injection transformer terminating resistor and R3 and R4 are the output voltage sense divider. Two different output capacitors can be selected using S1-1 and S1-2. One capacitor, an aluminum electrolytic capacitor provides excellent phase margin while the other results in approximately 40 degrees phase margin. A blue LED is powered by the output, providing a visual indication of power on and also a load of approximately 20mA. An additional 25mA of load current can be switched on or off using S1-3.

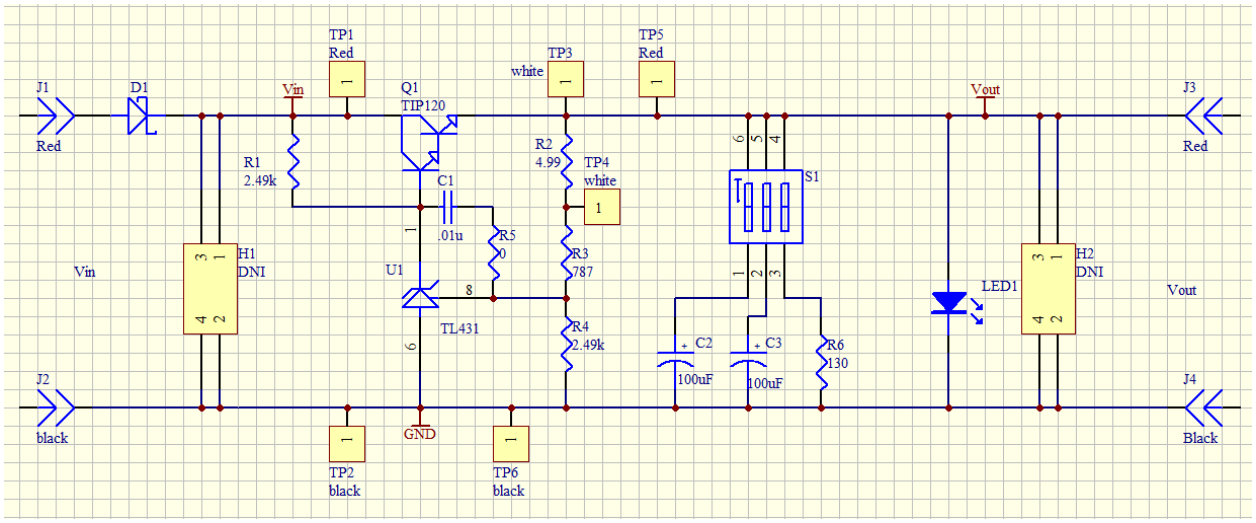

Figure 1 Demonstration Board.

Powering the Board

Step 1: Connect banana jacks from a 7-10V power supply to the VRTS board using the correct polarity. The maximum load 100mA.

Test Points

- TP1 - Input voltage meter or probe
- TP2 - Ground for meter or probe
- TP3 - Bode injection
- TP4 - Bode injection
- TP5 - Output voltage meter or probe
- TP6 - Ground for meter or probe

Supported Measurements

The VRTS 1.5 supports the following measurements:

TEST	SIGNAL INJECTORS NEEDED
PSRR	J2120A or J2111A
Reverse Transfer	
Bode Plot	J2100
Non-invasive Stability	See Impedance Table 2
Load Step	J2111A
Noise Density	

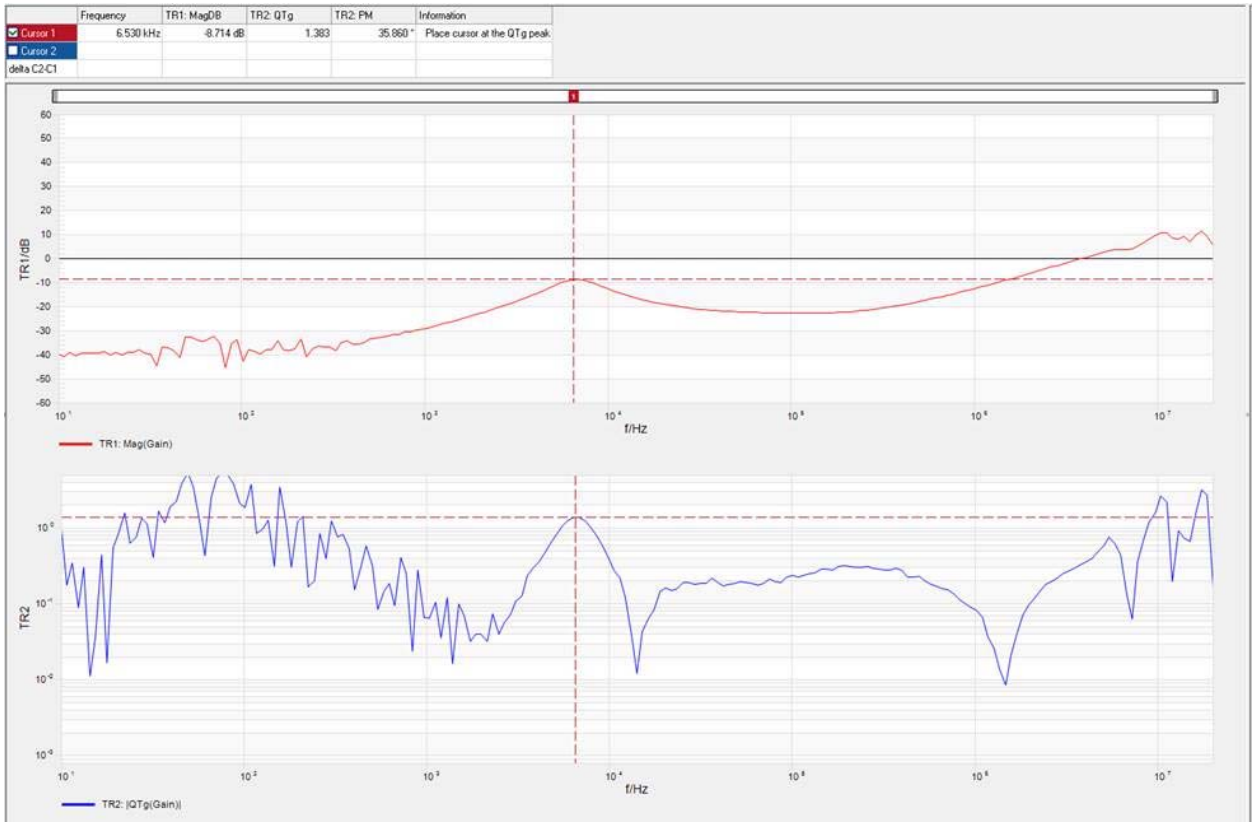

Figure 2, The Bode plot for the regulator.

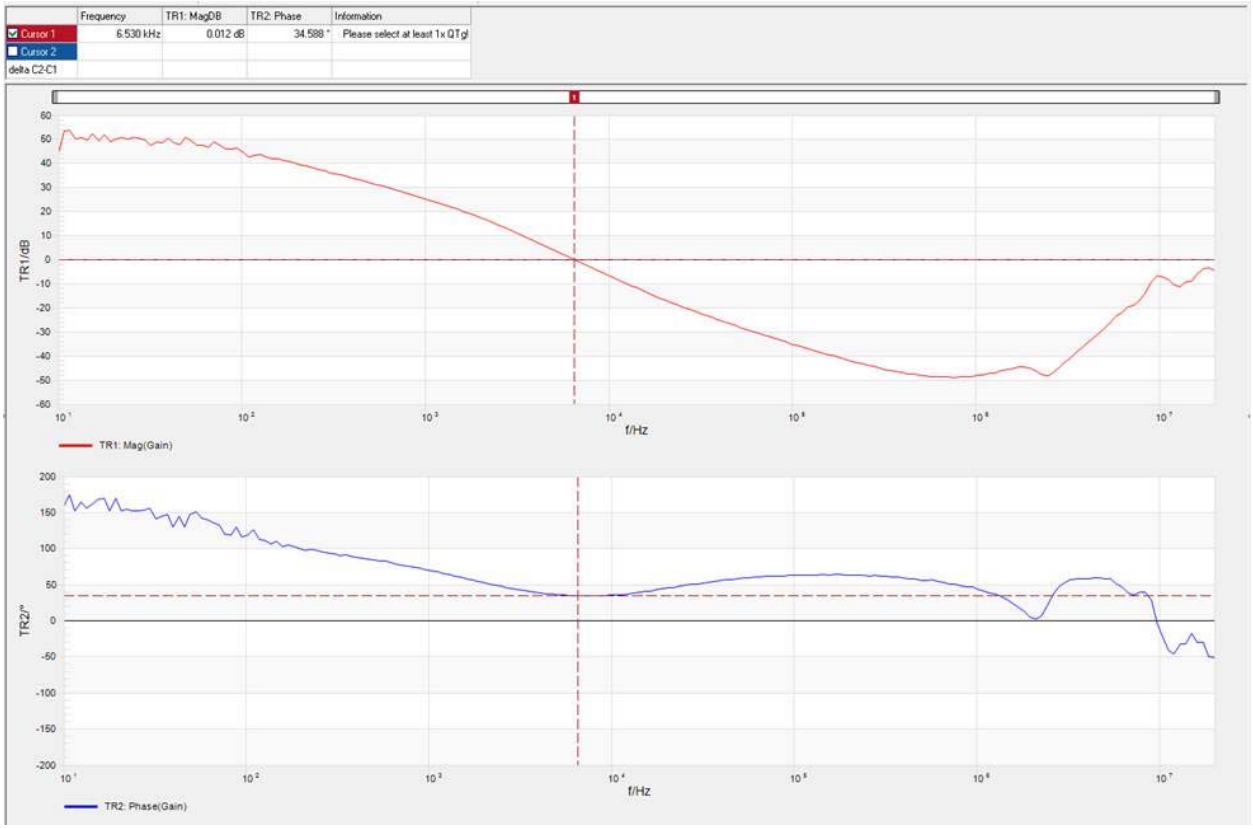

Figure 3, The Non-Invasive stability measurement for the regulator.

Table 1 Picotest Product Applicability Impedance Matrix

Measurement	PDN Probes	Current Injector	Pre-amplifier	DC Blocker	Current Probe	Common Mode Transformer	Impedance Fixture
1-port reflection 0.5Ω-2.5kΩ	**X**						
2-port shunt thru 25uΩ-25Ω	**X**		**X**			**X**	
2-port series thru 25Ω-1MΩ	**X**						
3-port voltage/current 1mΩ-2kΩ	**X**	**X**	**X**		**X**	**X**	
Impedance adapters 0.1 Ω-400kΩ							**X**
1-port TDR 10mΩ-1kΩ	**X**			**X**			
2-port TDT 10mΩ-1kΩ	**X**			**X**		**X**	
Transient extraction mΩ-1kΩ	**X**	**X**	**X**	**X**		**X**	

Switches are used to allow various configuration settings for many of the circuits. A summary of the switches is included in Table 2.

Table 2 Switch Functions

POSITION	ON	OFF
S1		
1	C2 - Aluminum capacitor, excellent phase margin – too high for Non-invasive Stability Measurement ('NISM')	
2	C3 - Tantalum capacitor, poor phase margin – ~40deg can be measured with NISM	
3	130Ω load resistor for an additional 25mA load	

BOM

Table 3 Bill of Materials

REF-DES	DIGIKEY	FOOTPRINT
C1	TBD	805
C2	P15086CT-ND	0.209" SQ
C3	478-17771-1-ND	7343
H1	609-3461-ND	100MIL 3 POS
H1 short	S9341-ND	NA
J1, J3	J109-ND	.052" 400MIL SPACE
J2, J4	J110-ND	.052" 400MIL SPACE
Q1	TIP110-ND	TO220
R1, R4	P2.49KCCT-ND	805
R2	311-4.99CRCT-ND	805
R3	311-787CRCT-ND	805
R5	TBD	805
R6	P130VCT-ND	1210
S1	679-1840-ND	SPDT_SLIDE
TP1, TP5	5010K-ND	TESTPOINT_large
TP2, TP6	5011K-ND	TESTPOINT_large
TP3, TP4	5012K-ND	TESTPOINT_large
U1	296-17329-1-ND	SOT-23-3