

IAR- Transimpedance Amplifier REPORT

Date: 30/05/2023

TIA Characterization:

The Transimpedance amplifier TLV2404IDR was tested and characterized for all 4 channels.

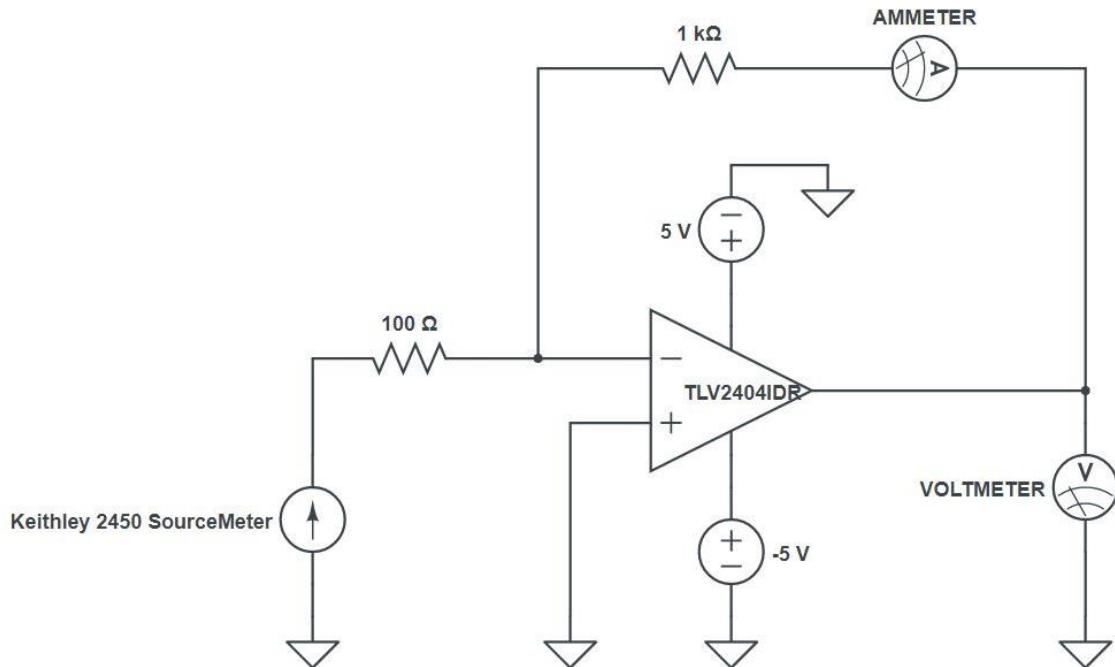
Setup:

A voltage regulator of $-5V$ and $+5V$ was connected to the supply pins of op amp.

The input current was provided through SMU to the inverting terminal.

Non-inverting terminal is connected to ground. Current provided ranges from $-400\mu A$ to $400\mu A$ with fixed gain of $1k\Omega$.

The output voltage was measured through the multimeter.



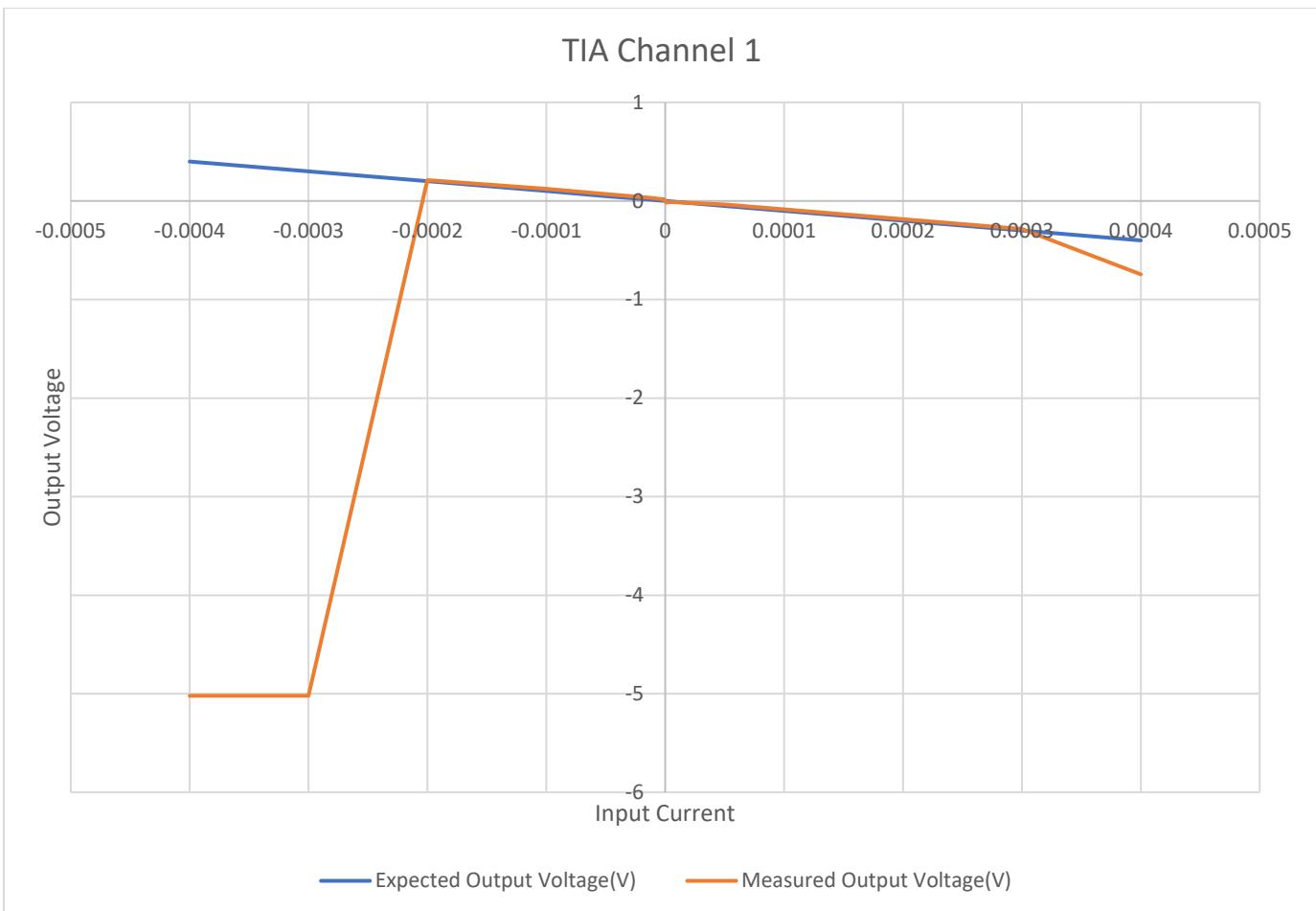
Procedure:

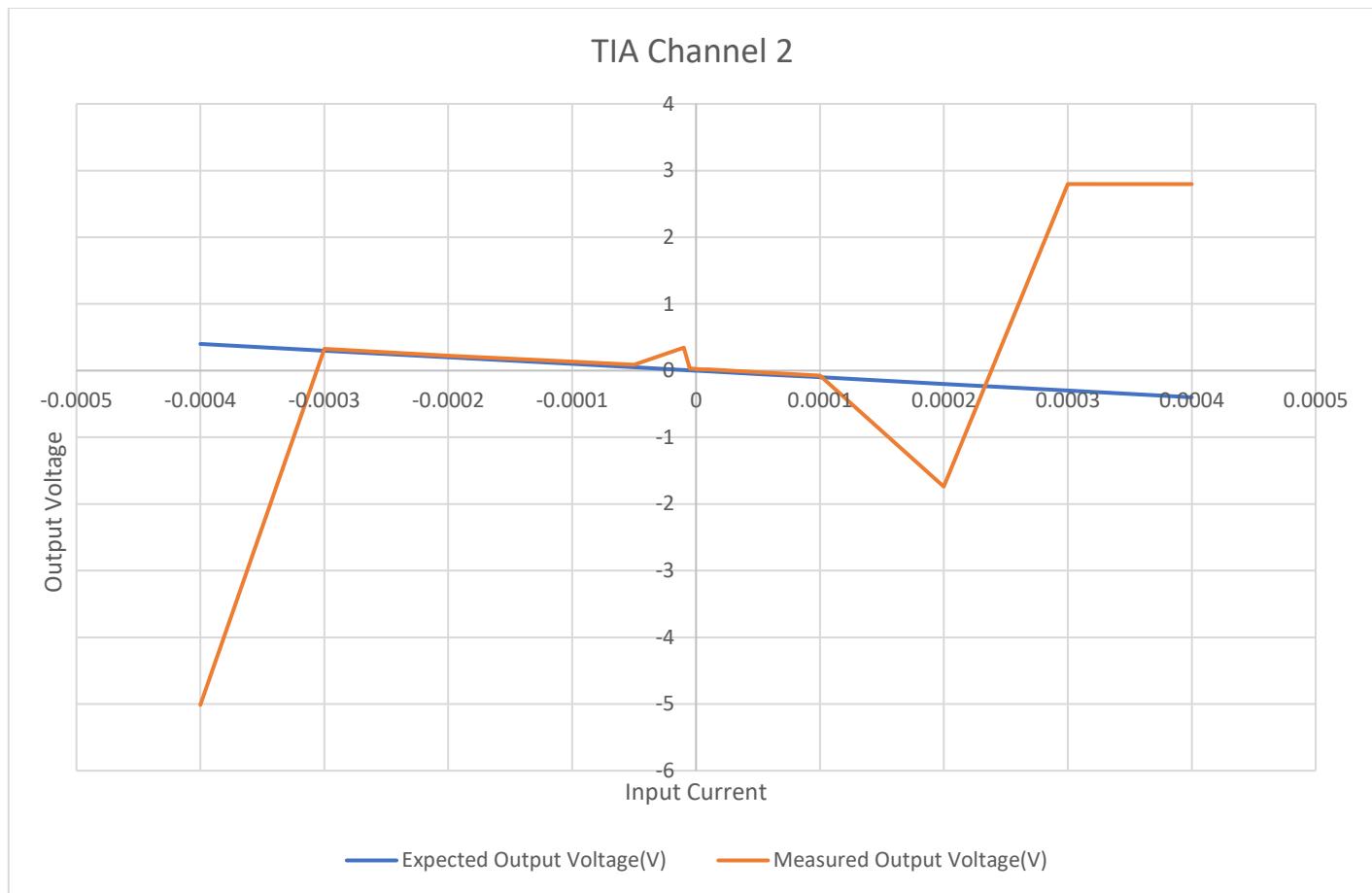
- Make the necessary connections.
- Supply the input current to the inverting terminal of opamp.
- Measure the voltage through multimeter.
- Change the input current and measure output voltage again.

Output:

Gain Resistor, $R_f = 1k\Omega$; Bias Voltage, $V_{bias} = 0V$;

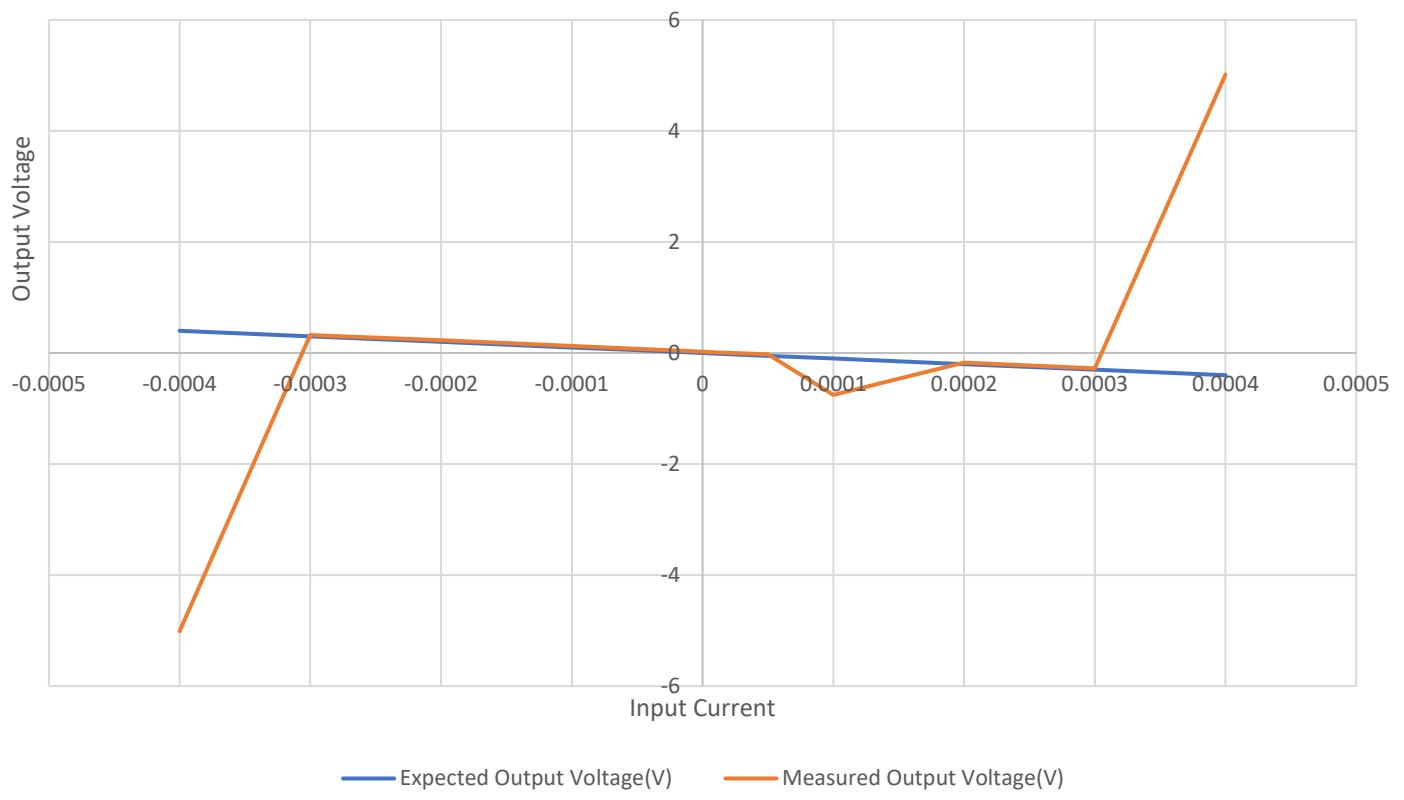
TIA Channel 1				TIA Channel 2		
Current(mA)	Expected Output Voltage(V)	Measured Output Voltage(V)		Current(mA)	Expected Output Voltage(V)	Measured Output Voltage(V)
-0.4	0.4	-5.0204		-0.4	0.4	-5.0131
-0.3	0.3	-5.0204		-0.3	0.3	0.3253
-0.2	0.2	0.2115		-0.2	0.2	0.2234
-0.1	0.1	0.1226		-0.1	0.1	0.1334
-0.05	0.05	0.0717		-0.05	0.05	0.0878
-0.01	0.01	0.0303		-0.01	0.01	0.3461
-0.005	0.005	0.0218		-0.005	0.005	0.0297
-0.001	0.001	0.0183		-0.001	0.001	0.0264
0.001	-0.001	-0.0153		0.001	-0.001	0.0241
0.005	-0.005	-0.0109		0.005	-0.005	0.0197
0.01	-0.01	-0.0151		0.01	-0.01	0.0167
0.05	-0.05	-0.0346		0.05	-0.05	-0.0245
0.1	-0.1	-0.0845		0.1	-0.1	-0.0741
0.2	-0.2	-0.1844		0.2	-0.2	-1.7414
0.3	-0.3	-0.2843		0.3	-0.3	2.7961
0.4	-0.4	-0.744		0.4	-0.4	2.7963



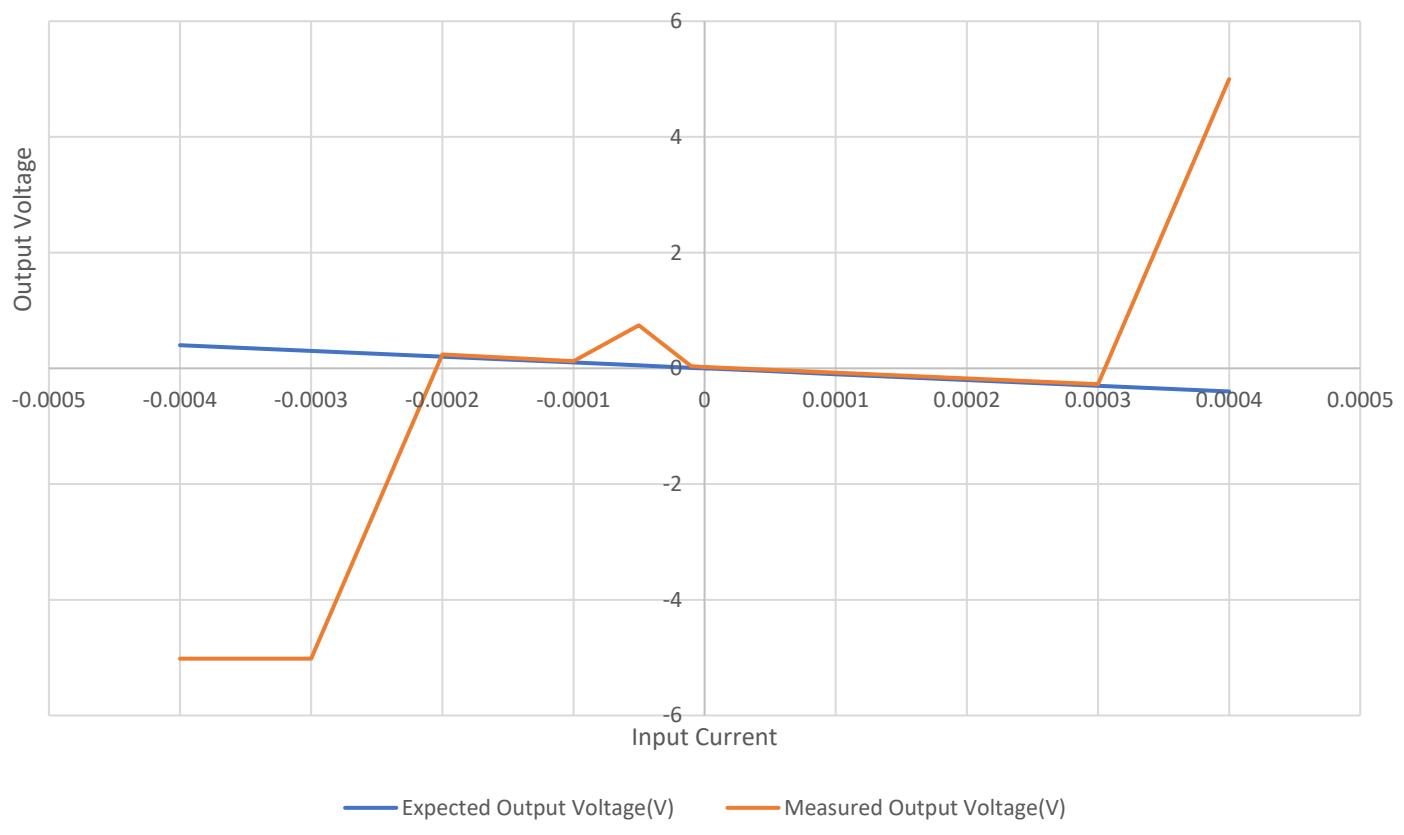


TIA Channel 3				TIA Channel 4		
Current(mA)	Expected Output Voltage(V)	Measured Output Voltage(V)		Current(mA)	Expected Output Voltage(V)	Measured Output Voltage(V)
-0.4	0.4	-5.0112		-0.4	0.4	-5.0182
-0.3	0.3	0.3221		-0.3	0.3	-5.0182
-0.2	0.2	0.2283		-0.2	0.2	0.2415
-0.1	0.1	0.1242		-0.1	0.1	0.1251
-0.05	0.05	0.0741		-0.05	0.05	0.7417
-0.01	0.01	0.0341		-0.01	0.01	0.0333
-0.005	0.005	0.0292		-0.005	0.005	0.0285
-0.001	0.001	0.0256		-0.001	0.001	0.0248
0.001	-0.001	0.0233		0.001	-0.001	0.0231
0.005	-0.005	0.0191		0.005	-0.005	0.0189
0.01	-0.01	0.0141		0.01	-0.01	0.0133
0.05	-0.05	-0.0252		0.05	-0.05	-0.0258
0.1	-0.1	-0.7555		0.1	-0.1	-0.0756
0.2	-0.2	-0.1748		0.2	-0.2	-0.1755
0.3	-0.3	-0.2745		0.3	-0.3	-0.2751
0.4	-0.4	5.0151		0.4	-0.4	4.9982

TIA Channel 3



TIA Channel 4



Summary:- 1) With a Feedback Resistor of 1K Ohm the response of any of the 4 channels is non-linear.

2) Between +/-300uA to 400uA the Opamp Saturates to 5V & Expected Voltage should be +/- 0.3V to +/-0.4V.

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