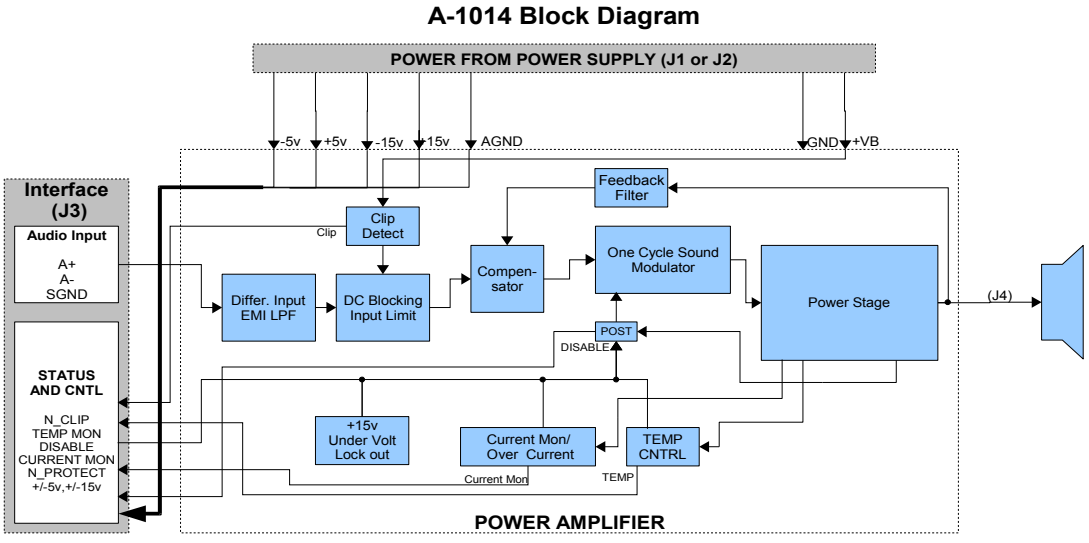
Features

- Proprietary "One Cycle Sound™" Control
- Rated Power: 1000 Watts @ 4 Ohms
- 117dBA dynamic Range
- THD+N < 0.05%, 0.1W to Rated Power
- Amplifier Efficiency 96%
- Damping Factor > 400 @ 100Hz 4 Ohms
- DC offset < 25mV
- Remote Disable
- Compatible with P1000-120PFC Pwr Supply
- Small Footprint 4 x 4 Inch (103 x 97 mm)
- Output Feedback
- Over Current Protection: Short to Ground
- Over Current Protection: Shorted Load
- Output current monitor
- Temperature Protection and Monitor
- Indicator Drivers: Power, Clip, Protection
- Power Supply Under Voltage Lockout
- Clickless Turn-on

Product Description:

Based on the PowerPhysics proprietary "One Cycle Sound" control method, the A-1014 provides 1000 Watts of full-bandwidth audio into 4 ohm speakers. The amplifier output is fully protected using fast cycle-by-cycle circuitry against any type of output short or speaker fault to provide robust, long term operation. On board temperature protection with hysteresis keeps the output MOSFET junctions cool. Monitors of output current and temperature are provided for off board analysis in preamplifier limiting circuits, etc.



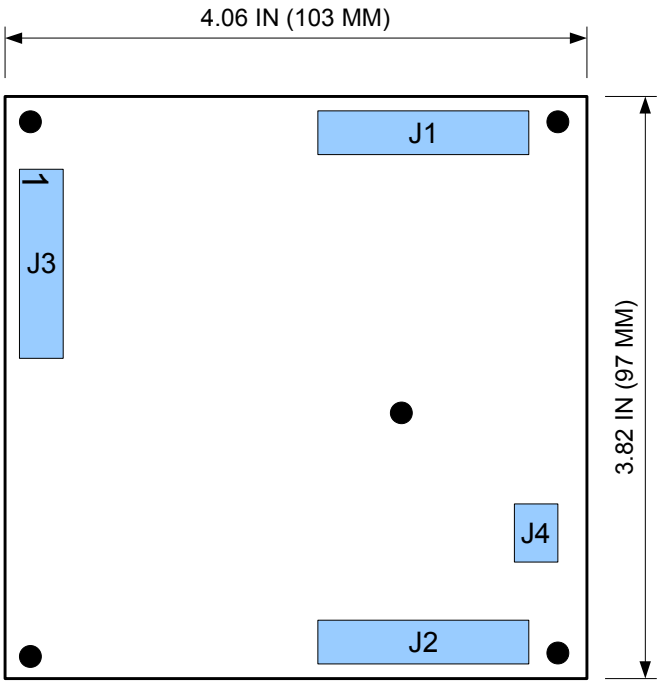


Figure 1: Amplifier PCBA Outline & Mounting Hole Locations

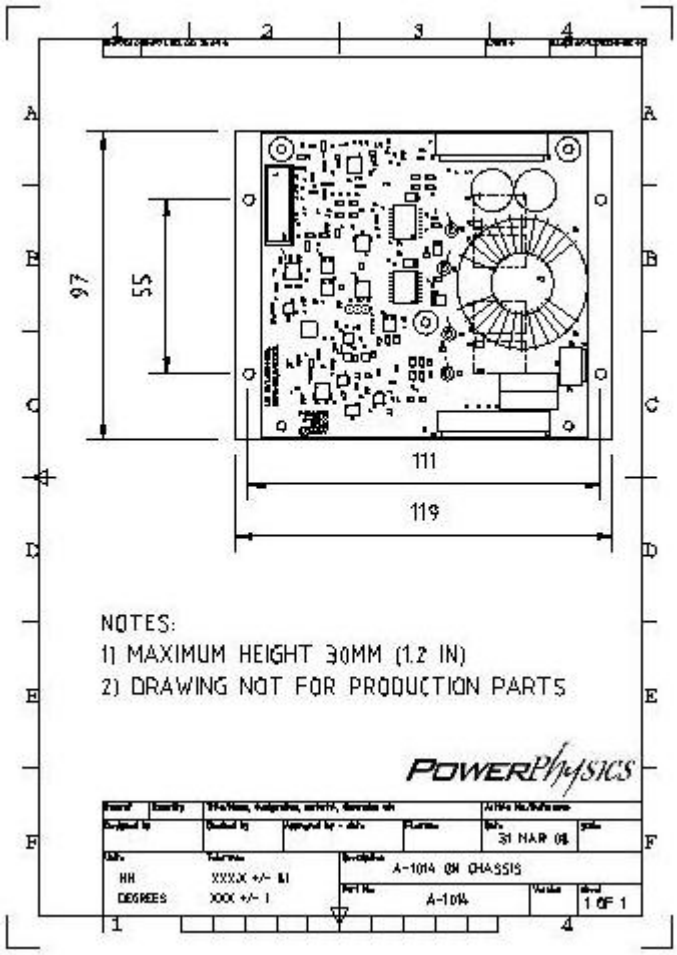


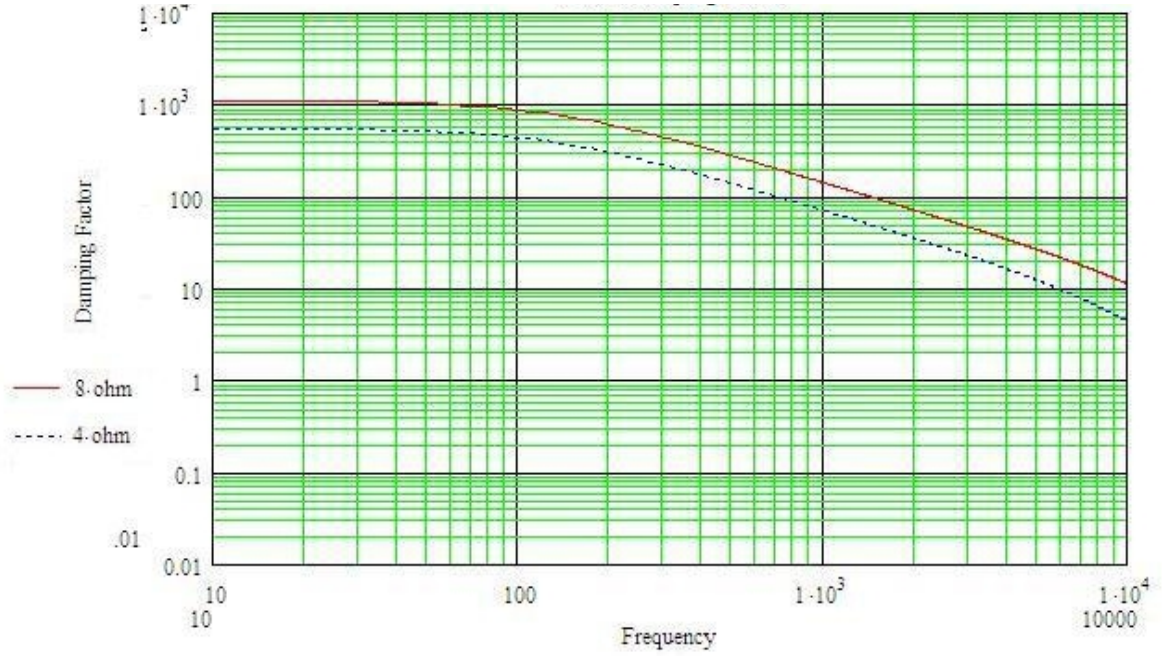
Figure 2: A-1014 ON CHASSIS

A-1014 Amplifier specifications:

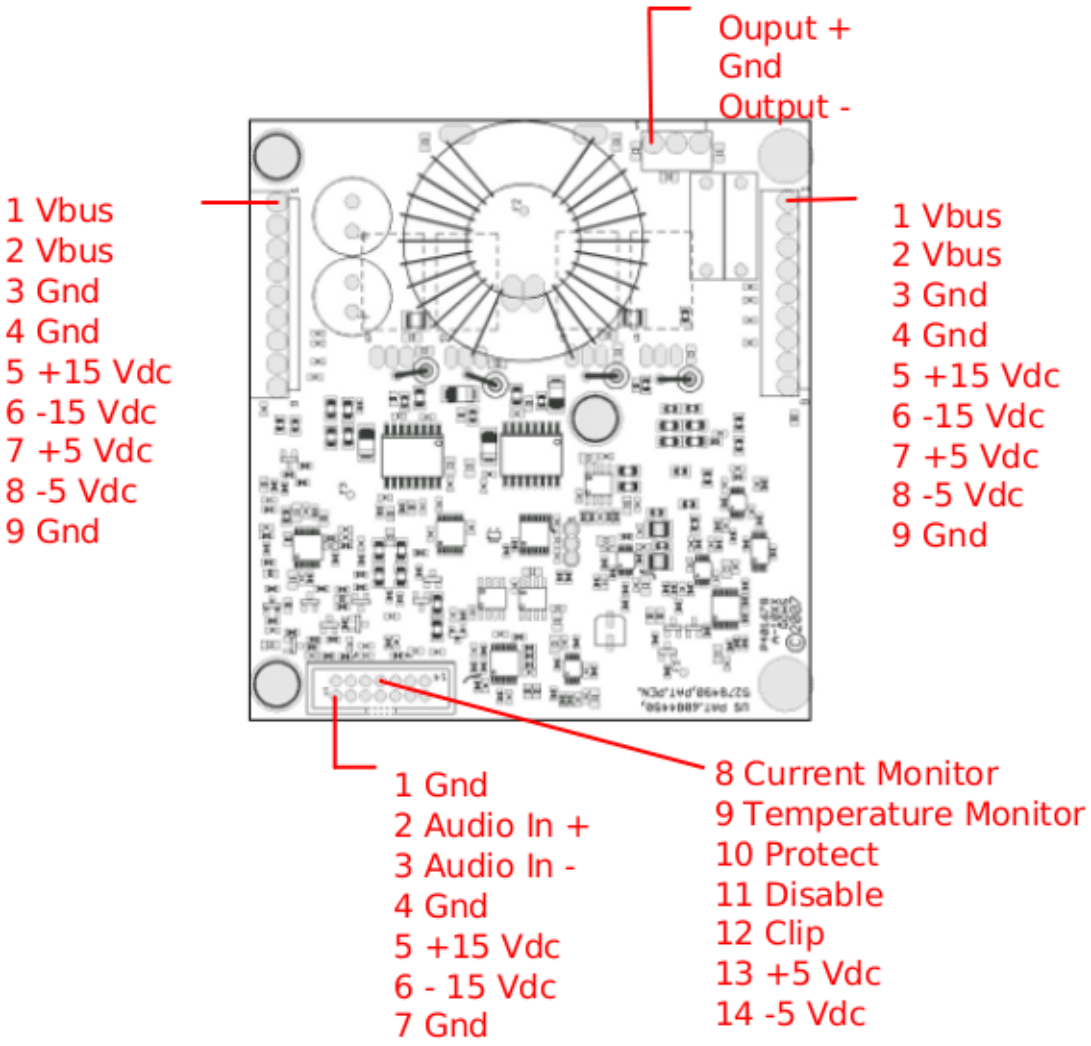
Unless otherwise specified, f = 1kHz, R_L=8Ω, Ta=25 ºC Vbus=120v

Parameters	*Symbols*	*Test Condition/ Comment*	*Min*	*Typ*	*Max*	*Unit*
Load Resistance	R_L		2.5	-	-	Ω
Output Power	P_{max}	f=20Hz-20KHz, (1% THD)		1300	-	W
Output Power	P	f=20Hz-20KHz,(0.1% THD)		1000	-	W
Sensitivity	V_{sen}	Input Single to P_{max}	-	3.5	-	Vrms
Gain	A		24.85	25.1	25.25	dB
Mute Gain	A_{mute}	Disable Pin pulled low.	-45	-	-	dB
Distortion	THD+N	10Hz< f <20kHz, 100mW< Po < P_{max}	-	.03	.08	%
Freq. Response	f	20Hz-20kHz	-	+/- 0.5	-	dB
Noise Floor	V_{NF}	Input Shorted, A-weighted	-	110	120	µV
Maximum Current	I_{max}		32	35	40	A
Damping Factor	DF	R_L = 8 ohms @ 100 Hz	-	900	-	Ω/Ω
Power Bandwidth	BW_{pw}	Output Power: P_{max}	-	40k	-	Hz
Small Signal Bandwidth	BW_{sm}	Output Power: 1Watt	-	70k	-	Hz
Signal to Noise Ratio	SNR		117	-	-	dB
Turn off threshold for the +15v input	UVLO		-	11	-	V
Turn on threshold for the +15v input	V_{on_15}	Above this level, the amp will start operating	-	14.23	-	V
P.O.S.T. Duration	T_{post}		2	-	3	Sec
Bus Voltage	V_{bus}		50		140	V

Damping Factor:



Connector pinout:



Audio Interface Connector (J3: 2x7 pin .1" Header 3M 30314-6002HB)

Pin	SIGNAL
1	GND
2	Audio +
3	Audio -
4	GND
5	+15
6	-15
7	GND
8	CURRENT MON
9	TEMP MON
10	N_PROTECT
11	DISABLE
12	N_CLIP
13	+5v
14	-5v

Power Connector (J1,J2: 1x9 pin JST B9P-VH. Only one connector is need, the other can be used for as a pass through for multiple amplifiers)

Pin	SIGNAL
1	+160v
2	+160v
3	POWER GND
4	POWER GND
5	+15v
6	-15v
7	+5v
8	-5v
9	AGND

Speaker Output (J4 (1x3 JST B3P-VH)

Pin	SIGNAL
1	OUT +
2	GND
3	OUT-

Amplifier Operation:

CLIP INDICATOR:

The N_CLIP pin is active pull down signals that indicated when the amplifier is being clipped. The clip level is set so that the distortion of the amplifier is approximately 0.1% or higher. To sense this signal , an external 10k ohm pull up resistor to 5v is needed (Figure 3).

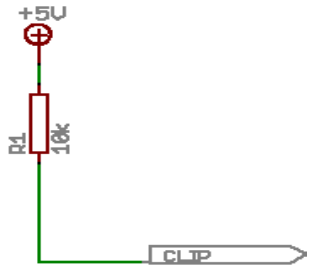


Figure 3: Clip Signal External Pull Resistor

PROTECT INDICATOR:

The N_PROTECT pin is an active pull down signal that indicates when the amplifier is being placed in Protect Mode. This occurs during the Power On Self Test (POST) and if the amplifier has reached over temperature or over current limits. This signal is also pulled low when the amplifier is being disabled externally by pulling the TEMP signals low (see below). To sense this signal , an external 10k ohm pull up resistor to 5v is needed (see Figure 3).

DISABLING THE AMPIFIER:

The amplifier can be disabled by pulling up the disable pin. When this signal is released, the amplifier will turn on after the POST (see below).

OVER CURRENT OPERATION:

If the amplifier hits its over current limit threshold (I_{max}), it will disable the output stage and trigger the power on self test (POST). Assuming the amplifier passes the POST and a short does not remain between one of the output pins to ground, the unit will restart.

CURRENT MONITORING OPERATION:

The output current is monitored by the CURRENT MON pin. The voltage on the CURRENT MON pin represents the output current by the following equation:

$$V_{currentmonitor} = 0.1I_{out} + Fs_{NOISE}$$

The voltage on the CURRENT MON pin is a differential signal (+5v to -5v max range) that also contains a certain amount of switching frequency noise. While this switching frequency noise is a small percentage of the full range signal, It can be a substantial amount of the signal when measuring low current applications and additional filtering may be required (see Figure 4 and Figure 5) below .

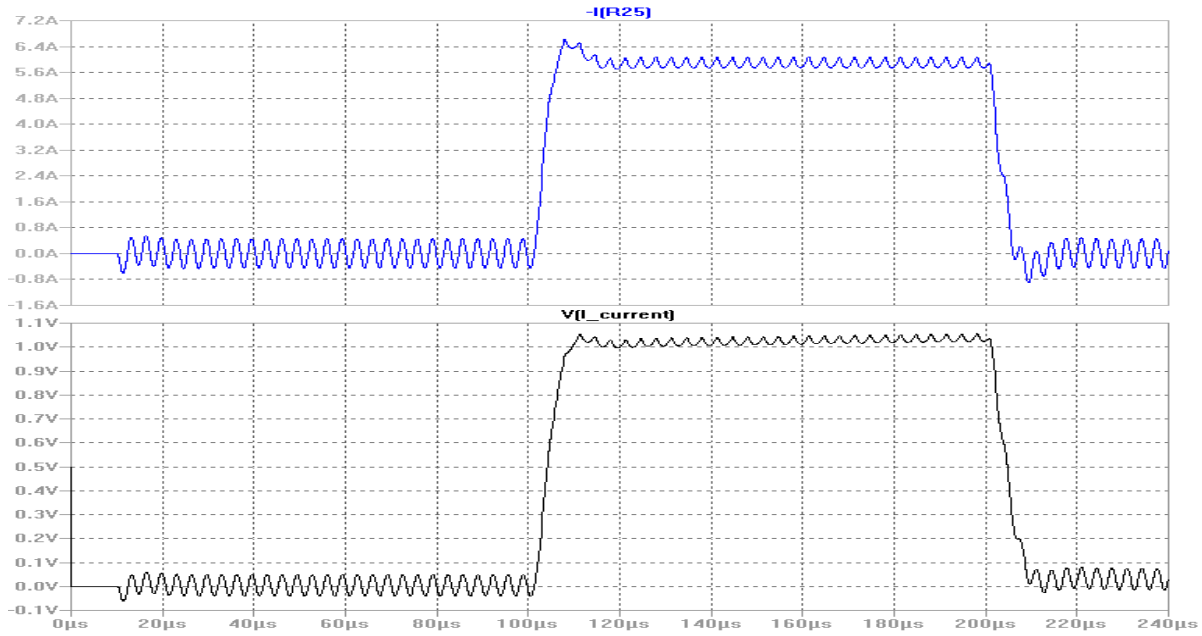


Figure 4: V(L_current) = Current Monitor Voltage; -I(R25) = Output Current

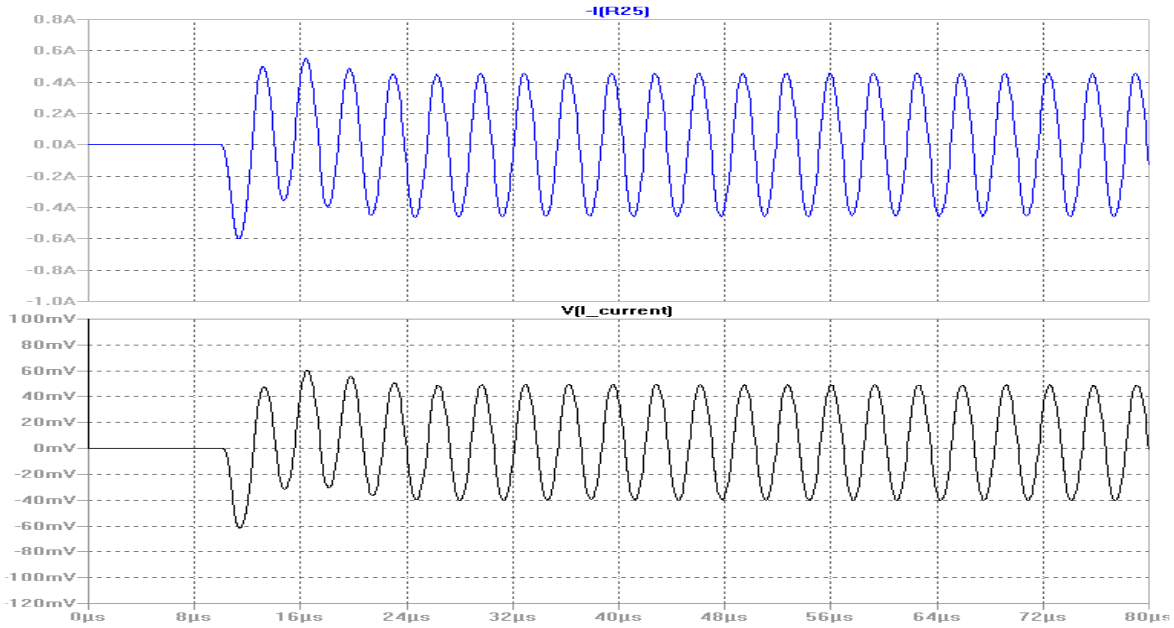


Figure 5: Zoom Showing Switching frequency Noise: V(L_current) = Current Monitor.

POWER ON SELF TEST (POST):

At startup of the amplifier, it will go through a POWER ON SELF TEST (POST) for no less than 2 seconds. This test will monitor the power MOSFET devices to determine if they are damaged or if one of the output leads is shorted to ground. In addition, the N_PROTECT and N_CLIP pins will be pulled low during this test. If the power MOSFETS are damaged or an short is present between either output pin and ground, the unit will latch off and the N_PROTECT pin will be pulled low. A cycling of the +15v supply will be needed to restart amplifier and the POST.

UNDER VOLTAGE LOCK OUT (UVLO):

At initial power up, the amplifier will not start until the +15v is above its minimum threshold level (V_{start}). Before this level, once the +/-5v are within regulation, the POST will be initiated. However, Above this voltage, it will remain operating until the +15v drops below the UVLO threshold.

TEMPERATURE MONITORING:

Each amplifier has a temperature monitoring output (Temp) that represents the power MOSFET temperatures. The Temp voltage versus temperature is shown below (TEMP(T) curve). The amplifier will go into PROTECT mode and will shutdown the amplifier if the sensed temperature goes above the maximum permissable MOSFET operating temperature. If the amplifier goes into protect mode, it will remain off until the Sensed temperature drops below 84% of the maximum permisable temperature (See HYST(T) Curve). The temperature pin is directly connected to the amplifier thermistor circuitry. Any sensing of this pin must be high in impedance (i.e. Greater than 100k) or the temperature monitoring circuit will be effected.

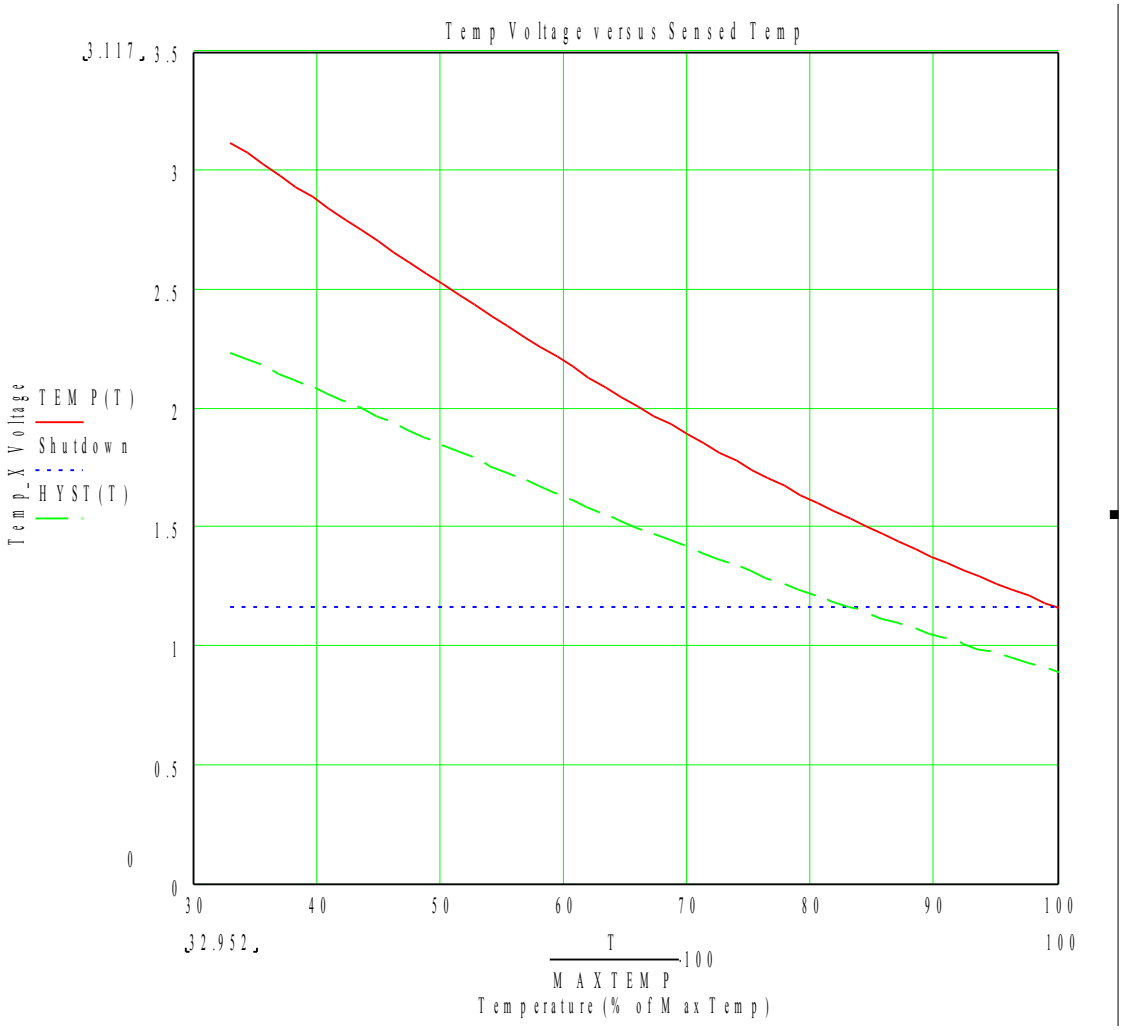


Figure 6: Voltage versus Sensed Temperature