## Experiments using TN 36/23/15 MnZn Ferrite Cores

Using the 22AWG high temperature magnet wire it should be possible to wind two 100 turn coils. The wire will fill most of the core 23mm dia window. If you have no experience of square BH curve cores it will be worth spending time playing with one to get the feel. Switching from negative saturation to positive saturation the inductance will be quite high, in this case something like 0.3H with the 100 turns. This requires a long voltage pulse of perhaps tens of milliseconds. Towards the end of the pulse the inductance reduces drastically to something like 20 uH so the pulse voltage is pulled down to almost zero, then at the tail end of the pulse you get a narrow negative spike. For a continuous pulse train all further pulses see that low inductance so you just get positive and negative spikes at the leading edge and trailing edges (see waveforms below). If you don't have the facility to capture that first pulse, then all you will observe are those spikes.

At high temperatures the core will move into a regime that has not been well explored where the remanent magnetization will fall between pulses, so the spikiness will now change as each pulse is now re-magnetizing the core. This change should be observable (see below), and it should be possible to make a judgement on the extent of the demagnifying and remagnifying by adjusting the repetition rate. It is suggested that the temperature is held at the position where a repetition frequency of about 100Hz shows almost full demagnification between pulses. This gets close to the relaxation time SEMP quoted.

The core requires H = 1200 A/m to fully magnetize and that is met with 1 amp so the system could be designed for that pulse current as a maximum. However it is likely the system could run with much less peak current as the BH curve moves towards saturation at much lower H values, and at high temperatures even lower H values.