

Introduction:

Micrometals Alloy Powder cores is pleased to introduce a new High Frequency Sendust Material (SH Material). This new material has high frequency losses that are 1/3 that of traditional Sendust material. The lower loss of High Frequency Sendust will enable it to be used with switching frequencies greater than 2 MHz. This new material was developed to meet the demands of the Power Conversion Industry’s switching to the latest in GaN and SiC switching technologies.

Background:

With the introduction of new switching technologies available with the use of GaN and SiC semiconductor materials, Power Conversion Engineers are pushing switching frequencies higher in an effort to reduce cost, minimize size, and increase efficiency of their devices. These switching frequencies are now moving higher than 1-2 MHz, with higher switching frequencies on the horizon.

Finding magnetic materials that perform well at frequencies greater than 1MHz is a challenge for power supply designers. Ferrites in the MnZn family typically have found application at 1MHz and lower. Above 1 MHz, MnZn ferrites have increased core loss, and the gap losses that exist at this higher frequency also add challenges to the design. Ferrites in the NiZn family can be used at frequencies significantly higher than 1MHz due to their higher bulk resistivity. NiZn ferrites have relatively low saturation flux density, and often require the use of a discrete air gap, which can contribute to excessive gap losses. The high cost and high hysteresis loss of NiZn also limit their application.

Sendust discrete gap materials have been used as core materials for inductive components for many years. The distributed gap structure eliminates the need for a discrete air gap, thus eliminating gap losses. The low core loss and low cost of Sendust have made it an excellent choice at applications working up to 500 kHz.

There exists a need in the power conversion industry for a distributed gap material with low losses at frequencies higher than 1 MHz.

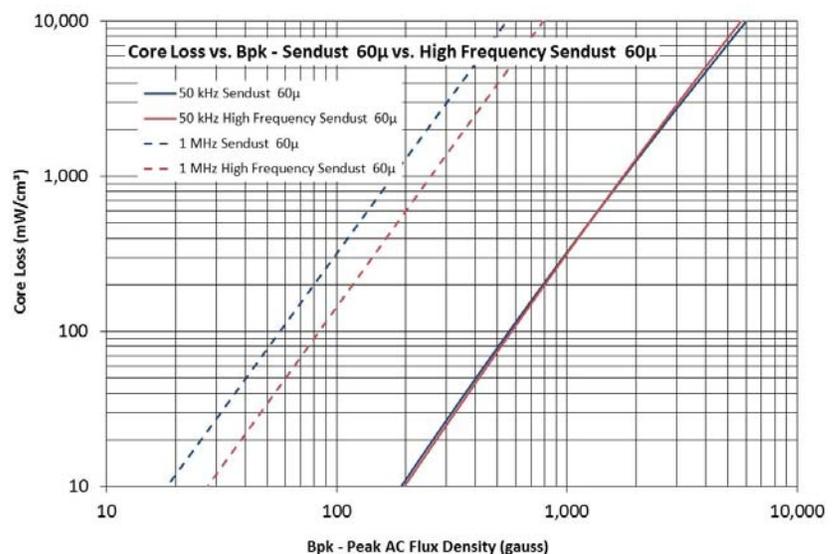


Figure 1

High Frequency Sendust (SH Material):

To meet the challenges of switching frequencies greater than 1 MHz, a new “High Frequency Sendust” (SH Material) has been introduced. High Frequency Sendust SH Material has high

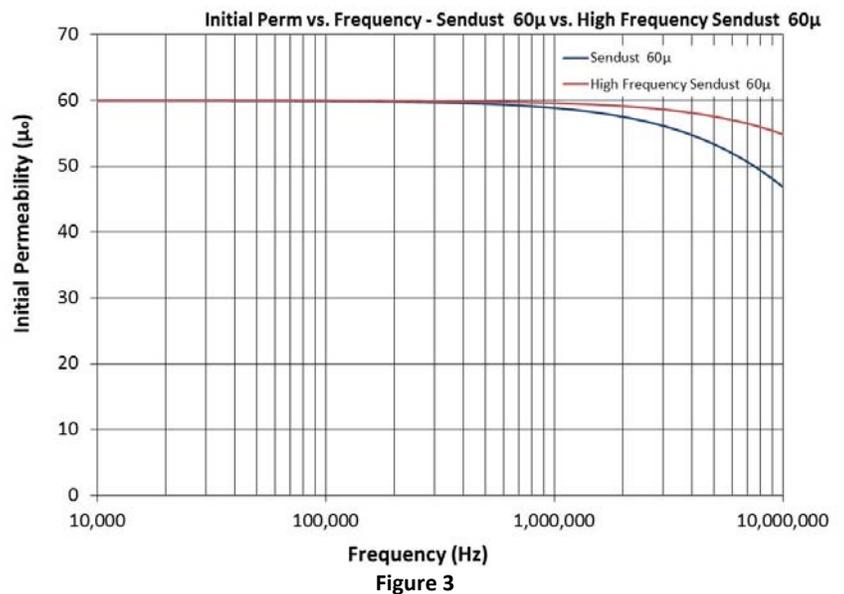
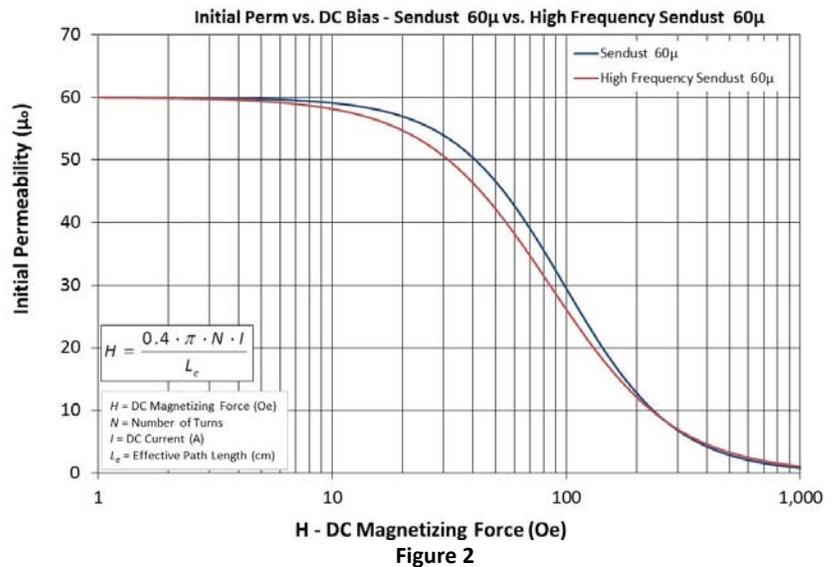
frequency losses that are about one third of the losses of traditional Sendust. High Frequency Sendust still maintains low frequency losses and DC Bias linearity that is comparable to traditional Sendust.

High Frequency Sendust is initially being offered in permeability levels of 26, 60 and 125 in toroidal geometries with outside diameter up to 100mm. Other geometries, permeabilities, and sizes are planned for introduction over the next several months.

To illustrate the performance improvement available with High Frequency Sendust, Figure 1 shows a comparison of the Core Loss performance of Sendust versus High Frequency Sendust at 50 kHz and 1 MHz. While the Core Loss at 50 kHz is quite similar between the two materials, the difference is dramatic at 1 MHz.

While the dramatic improvement in high frequency properties is achieved, very little compromise in other performance is needed. Figure 2 is a plot of the Performance with DC Bias.

As might be expected, the linearity of Permeability with Frequency is also improved, as shown in Figure 3 the Permeability versus Frequency comparison.



More Information:

Data Sheets for Part Numbers of the High Frequency Sendust can be found on:

www.MicrometalsAPC.com

The Part number structure will be similar to other materials offered by Micrometals Alloy Powder Cores. A typical part number for High Frequency Sendust would be SH-106060-2, as compared to a traditional Sendust part number of MS-106060-2.

This new material has been incorporated into our Online Design Software, which can be found at the following link: www.MicrometalsAPC.com/design-software

Please contact your local representative or distributor for samples and ordering information or email: Sales@Micrometals.com