



Figure 1

Part Number: 4052098411  
Frequency Range: Low Permeability, High Saturation 52 ( $\mu_i=250$ ) material  
Description: 52 ROD  
Application: Inductive Components  
Where Used: Open Magnetic Circuit  
Part Type: Rods

## Mechanical Specifications

Weight: .360 (g)

## Part Type Information

Pressed Fair-Rite rods are used extensively in high-energy storage designs. These rods can also be used for inductive components that require temperature stability or have to accommodate large dc bias requirements.

- The 'A' dimension can be centerless ground to tighter tolerances.
- Figure 2 rods have a 0.6 mm (.024") maximum chamfer on the end faces.
- For frequency tuned rod designs see section Antenna/RFID Rods.
- For any rod requirement not listed here, feel free to contact our customer service group for availability and pricing.



## Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	2.50	±0.13	0.098	-
B	-	-	-	-
C	15.00	±0.45	0.591	-
D	-	-	-	-
E	-	-	-	-
F	-	-	-	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

## Electrical Specifications

Typical Impedance ( $\Omega$ )	
Electrical Properties	

## Land Patterns

V	W ref	X	Y	Z
-	-	-	-	-
-	-	-	-	-

## Winding Information

Turns Tested	Wire Size	1st Wire Length	2nd Wire Length
-	-	-	-

## Reel Information

Tape Width mm	Pitch mm	Parts 7 " Reel	Parts 13 " Reel	Parts 14 " Reel
-	-	-	-	-

## Package Size

Pkg Size
- (-)

## Connector Plate

# Holes	# Rows
-	-

### Legend

+ Test frequency

Preferred parts, the suggested choice for new designs, have shorter lead times and are more readily available.

The column H(Oe) gives for each bead the calculated dc bias field in oersted for 1 turn and 1 ampere direct current. The actual dc H field in the application is this value of H times the actual NI (ampere-turn) product. For the effect of the dc bias on the impedance of the bead material, see figures 18-23 in the application note How to choose Ferrite Components for EMI Suppression.

A ½ turn is defined as a single pass through a hole.

$\Sigma$ l/A - Core Constant

$A_e$  - Effective Cross-Sectional Area

$A_L$  - Inductance Factor ( $\frac{L}{N^2}$ )

N/AWG - Number of Turns/Wire Size for Test Coil

$l_e$  - Effective Path Length

$V_e$  - Effective Core Volume

NI - Value of dc Ampere-turns



## Ferrite Material Constants

Specific Heat .....	0.25 cal/g/°C
Thermal Conductivity .....	<b>3.5 - 4.5 mW/cm - °C</b>
Coefficient of Linear Expansion .....	8 - 10x10 <sup>-6</sup> /°C
Tensile Strength .....	4.9 kgf/mm <sup>2</sup>
Compressive Strength .....	42 kgf/mm <sup>2</sup>
Young's Modulus .....	15x10 <sup>3</sup> kgf/mm <sup>2</sup>
Hardness (Knoop) .....	650
Specific Gravity .....	≈ 4.7 g/cm <sup>3</sup>

*The above quoted properties are typical for Fair-Rite MnZn and NiZn ferrites.*

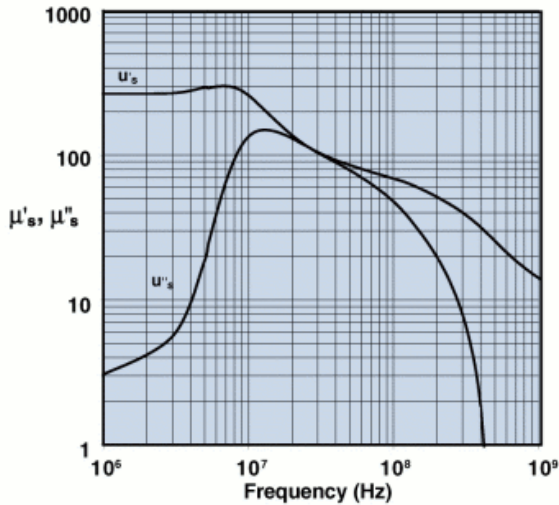
See next page for further material specifications.



### 52 Material Specifications:

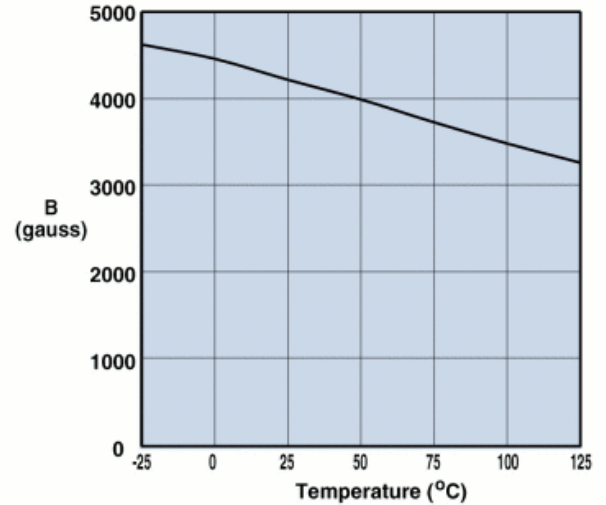
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	250
Flux Density @ Field Strength	gauss oersted	B H	4200 10
Residual Flux Density	gauss	$B_r$	2900
Coercive Force	oersted	$H_c$	0.60
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	45 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.0
Curie Temperature	°C	$T_c$	>250
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^9$

**Complex Permeability vs. Frequency**



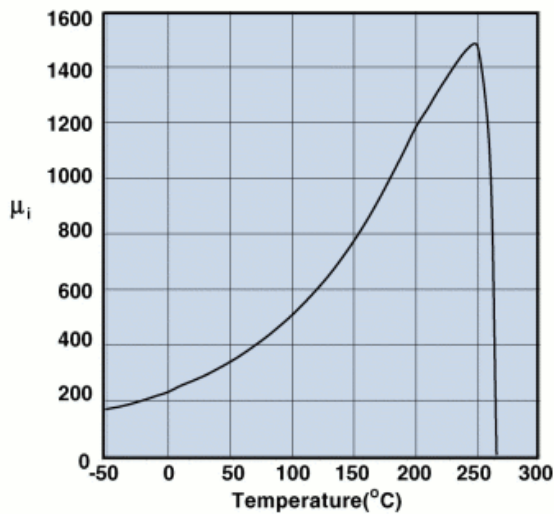
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

**Flux Density vs. Temperature**



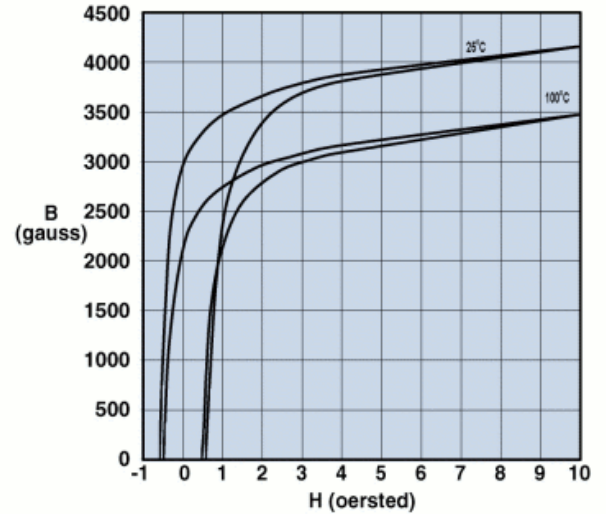
Measured on a 17/10/6mm toroid at 10kHz. and H=10 oersted.

**Initial Permeability vs. Temperature**



Measured on a 17/10/6mm toroid at 100kHz.

**Hysteresis Loop**



Measured on a 17/10/6mm toroid at 10kHz.

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