

Figure 2

Part Number: 2944778102

Frequency Range: Broadband Frequencies 10-300 MHz (44 material)

Description: 44 PC BEAD

Application: Suppression Components

Where Used: Board Component

Part Type: PC Beads (Through Hole)

## Mechanical Specifications

Weight: 2.700 (g)

## Part Type Information

Multiple single turn or multi-turn printed circuit EMI suppression beads are available in two Fair-Rite materials. The broadband 44 material and in the high frequency 52 material grade.

-PC Beads can be supplied with lower component heights 'C'. Also, the wire length 'F' can be modified to specific requirements.

-Wires are oxygen free high conductivity copper with a lead-free tin coating. Wires on top of the beads are covered with a layer of epoxy.

-PC Beads are controlled for impedance only. The impedances listed are typical values. Minimum impedance values are specified for the + marked frequencies. The minimum guaranteed impedance is the listed impedance less 20%.

-The PC Beads in 44 material are measured on the 4193A Vector Impedance Analyzer. The 52 PC Beads are tested for impedance on the 4191A RF Impedance Analyzer.

-Recommended operating and storage temperature for the PC Beads is -55°C to +125°C.

-Explanation of Part Numbers: Digits 1&2 = product class, 3&4 = material grade and last digit 1 = standard wire length 2.4 mm (.095") minimum.



# Fair-Rite Products Corp.

## Your Signal Solution®

Ferrite Components for the Electronics Industry

Fair-Rite Products Corp. PO Box J, One Commercial Row, Wallkill, NY 12589-0288  
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Part Data Sheet, 2944778102  
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## Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	11.20	-0.50	0.430	-
B	5.75	-0.50	0.216	-
C	11.80	Max	0.464	Max
D	2.54	±0.10	0.100	-
E	2.54	±0.10	0.100	-
F	3.10	Min	0.122	Min
G	0.65	-	-	22 AWG
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

## Electrical Specifications

Typical Impedance ( $\Omega$ )	
10 MHz	115
25 MHz+	188
100 MHz+	288
250 MHz	305

## Electrical Properties

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## Land Patterns

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

## Winding Information

Turns	Wire	1st Wire	2nd Wire
Tested	Size	Length	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 .....	$10 \times 10^{-3}$ cal/sec/cm/°C
Coefficient of Linear Expansion .....	$8 - 10 \times 10^{-6}/^{\circ}\text{C}$
Tensile Strength .....	4.9 kgf/mm <sup>2</sup>
Compressive Strength .....	42 kgf/mm <sup>2</sup>
Young's Modulus .....	$15 \times 10^3$ kgf/mm <sup>2</sup>
Hardness (Knoop) .....	650
Specific Gravity .....	$\approx 4.7$ 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.



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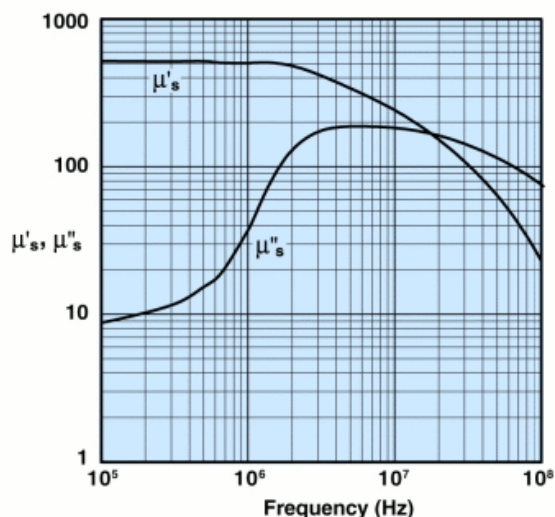
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### 44 Material Characteristics:

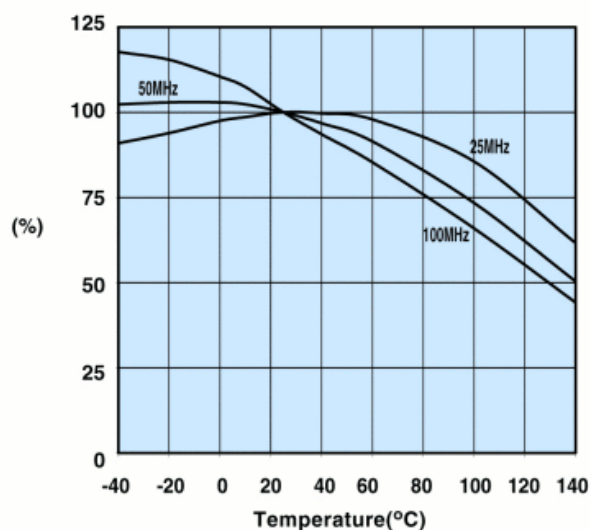
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	500
Flux Density @ Field Strength	gauss oersted	B H	3000 10
Residual Flux Density	gauss	$B_r$	1100
Coercive Force	oersted	$H_c$	0.45
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	125 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.75
Curie Temperature	°C	$T_c$	>160
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^9$

### Complex Permeability vs. Frequency



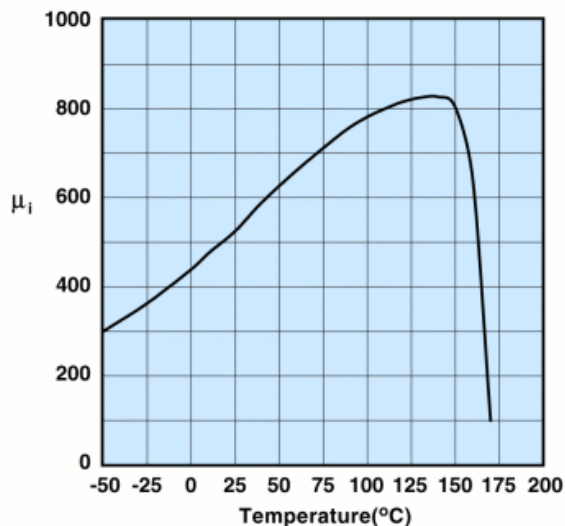
Measured on a 17/10/6mm toroid  
using the HP 4284A and the HP 4291A.

### Percent of Original Impedance vs. Temperature



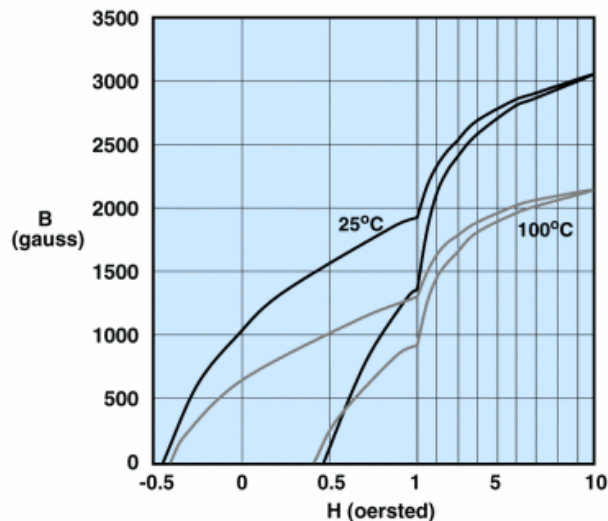
Measured on a 2644000301 using the HP4291A.

### 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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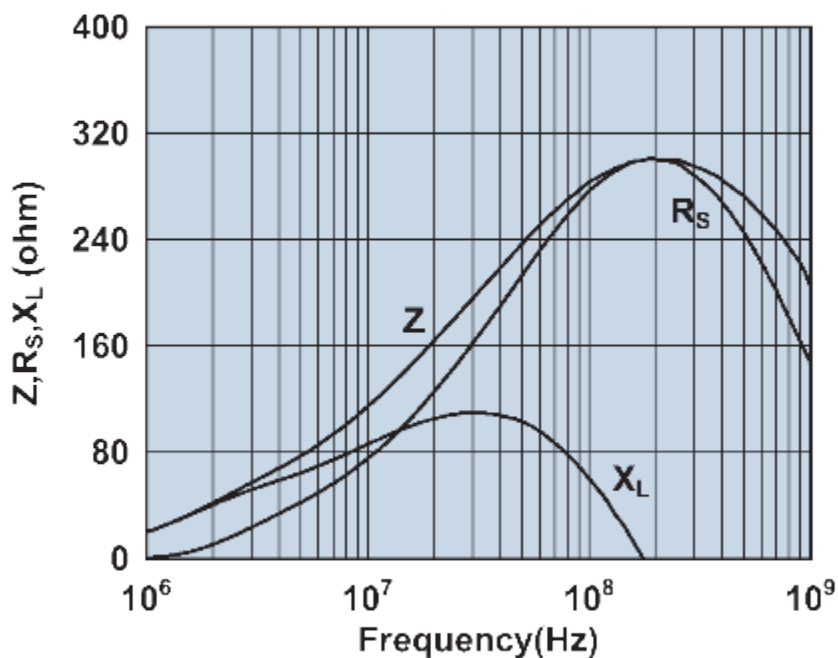
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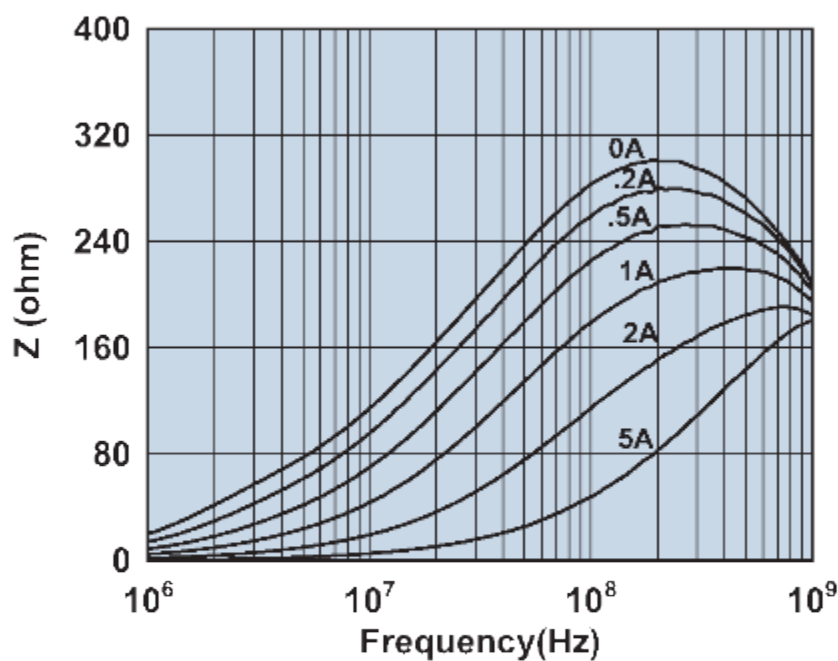
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### 2944778102



Impedance, reactance, and resistance vs. frequency.



Impedance vs. frequency with dc bias.

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