



Figure 1

Part Number: 4077296011
Frequency Range: Medium Permeability, 77 ($\mu_i=2000$) & 78 ($\mu_i=2300$) materials
Description: 77 SOLID ROD
Application: Inductive Components
Where Used: Open Magnetic Circuit
Part Type: Rods

Mechanical Specifications

Weight: 4.800 (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 | 6.35 | ±0.25 | 0.250 | - |
| B | - | - | - | - |
| C | 31.75 | ±0.75 | 1.250 | - |
| D | - | - | - | - |
| E | - | - | - | - |
| F | - | - | - | - |
| G | - | - | - | - |
| H | - | - | - | - |
| J | - | - | - | - |
| K | - | - | - | - |

Electrical Specifications

| Typical Impedance (Ω) | |
|--------------------------------|--|
| | |
| Electrical Properties | |
| | |

Land Patterns

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

Winding Information

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

Reel Information

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

Σ 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 | 3.5 - 4.5 mW/cm - °C |
| Coefficient of Linear Expansion | 8 - 10x10 ⁻⁶ /°C |
| Tensile Strength | 4.9 kgf/mm ² |
| Compressive Strength | 42 kgf/mm ² |
| Young's Modulus | 15x10 ³ kgf/mm ² |
| Hardness (Knoop) | 650 |
| Specific Gravity | ≈ 4.7 g/cm ³ |

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

See next page for further material specifications.



77 Material Characteristics:

| Property | Unit | Symbol | Value |
|--|------------------|---------------------|-----------------|
| Initial Permeability @ B < 10 gauss | | μ_i | 2000 |
| Flux Density @ Field Strength | gauss oersted | B H | 4900 5 |
| Residual Flux Density | gauss | B_r | 1800 |
| Coercive Force | oersted | H_c | 0.30 |
| Loss Factor @ Frequency | 10^{-6} MHz | $\tan \delta \mu_i$ | 15 0.1 |
| Temperature Coefficient of Initial Permeability (20 -70°C) | %/°C | | 0.7 |
| Curie Temperature | °C | T_c | >200 |
| Resistivity | Ω cm | ρ | 1×10^2 |

Complex Permeability vs. Frequency



Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

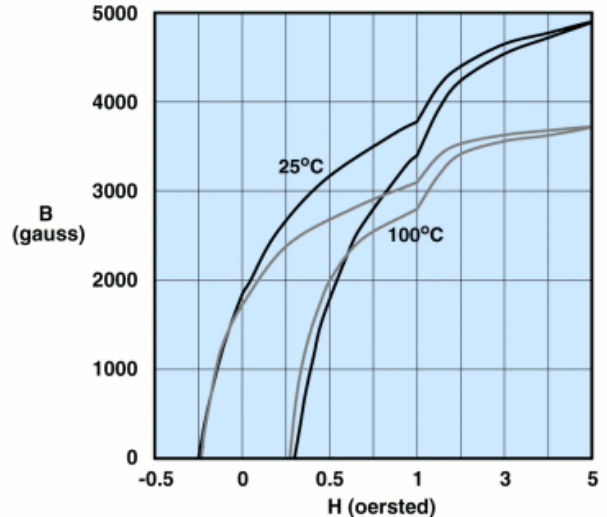


Initial Permeability vs. Temperature



Measured on an 18/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on an 18/10/6mm toroid at 10kHz.



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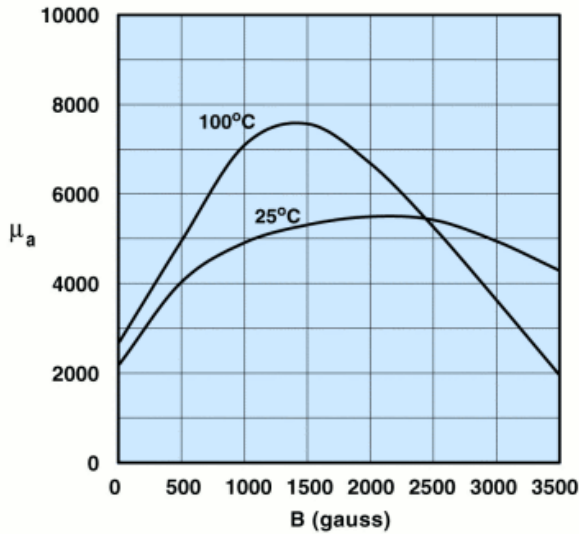
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Part Data Sheet, 4077296011
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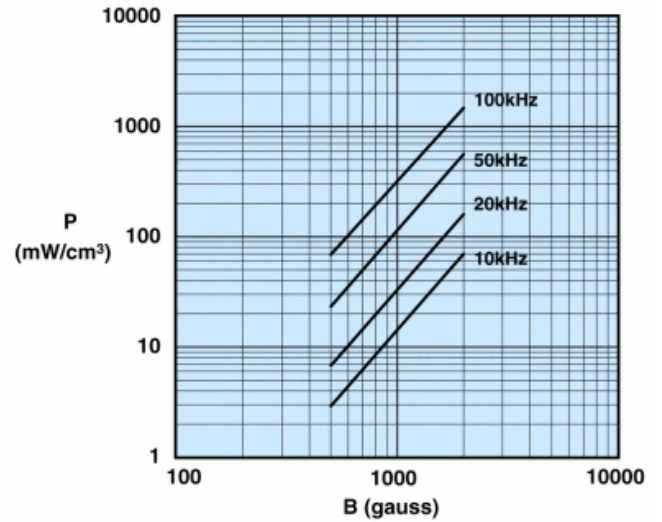


Amplitude Permeability vs. Flux Density



Measured on an 18/10/6mm toroid at 10kHz.

Power Loss Density vs. Flux Density



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

Power Loss Density vs. Temperature



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW.

Flux Density vs. Temperature



Measured on an 18/10/6mm toroid at 10kHz and H=5 oersted.

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