



Part Number: 5978008001
 Frequency Range: Medium Permeability, 77 (ui=2000) & 78 (ui=2300) materials
 Description: 78 TOROID
 Application: Inductive Components
 Where Used: Closed Magnetic Circuit
 Part Type: Toroids

Mechanical Specifications

Weight: 1240.00(g)

Part Type Information

A ring configuration provides the ultimate utilization of the intrinsic ferrite material properties. Toroidal cores are used in a wide variety of applications such as power input filters, ground-fault interrupters, common-mode filters and in pulse and broadband transformers.

-Toroids are listed by initial permeability classes and increasing dimension of the inside diameter.

-All toroidal cores are supplied burnished to break sharp edges.

-Toroids are tested for AL values at 10 kHz.

-Toroids with an outside diameter of 9.5mm (.375") or smaller can be supplied Parylene C coated. The Parylene coating will increase the 'A' and 'C' dimensions and decrease the 'B' dimension a maximum of 0.038mm (.0015"). The ninth digit of a Parylene coated toroid part number is a '1'. See the material characteristics of Parylene C in our online catalog.

-Toroids with an outside diameter of 9.5mm (.375") or larger can be supplied with a uniform coating of thermo-set plastic coating. This coating will increase the 'A' and 'C' dimensions and decrease the 'B' dimension a maximum of 0.5mm (.020"). The 9th digit of the thermo-set plastic coated toroid part number is a '2'. Thermo-set plastic coating is RoHS compliant.

-Thermo-set plastic coated parts can withstand a minimum breakdown voltage of 1000 Vrms, uniformly applied across the 'C' dimension of the toroid.

-The "C" dimension may be modified to suit specific applications.

-For any toroidal core requirement not listed in the catalog, please contact our customer service department for availability and pricing.

-Explanation of Part Numbers: Digits 1&2 = product class, 3&4 = material grade, 9th digit 1 = Parylene coating, 2 = thermo-set plastic coating.

Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	154.20	±3.81	6.070	-
B	69.40	±1.73	2.732	-
C	19.05	±0.50	0.750	-
D	-	-	-	-
E	-	-	-	-
F	-	-	-	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

Electrical Specifications

Typical Impedance (Ω)	

Electrical Properties	
A_L (nH)	7000 ±25%
A_e (cm ²)	7.60000
$\sum I/A$ (cm ⁻¹)	4.10
l_e (cm)	31.30
V_e (cm ³)	237.00000

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.

$\sum I/A$ - 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.



78 Material Characteristics:

Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		μ_i	2300
Flux Density @ Field Strength	gauss oersted	B H	4800 5
Residual Flux Density	gauss	B_r	1500
Coercive Force	oersted	H_c	0.20
Loss Factor @ Frequency	10^{-6} MHz	$\tan \delta \mu_i$	4.5 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.0
Curie Temperature	°C	T_c	>200
Resistivity	Ω cm	ρ	2×10^2

Complex Permeability vs. Frequency

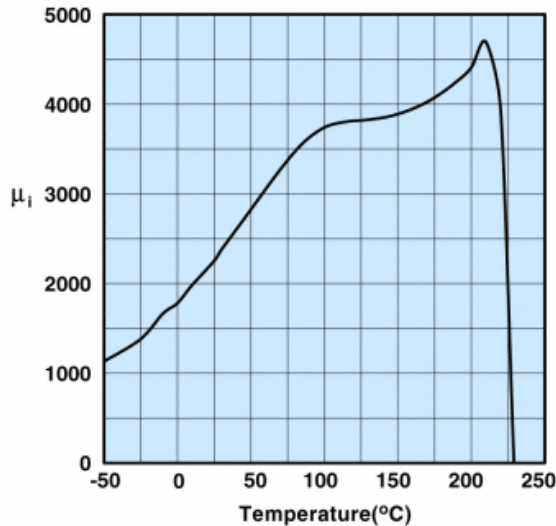


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

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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Amplitude Permeability vs. Flux Density



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

Power Loss Density vs. Flux Density



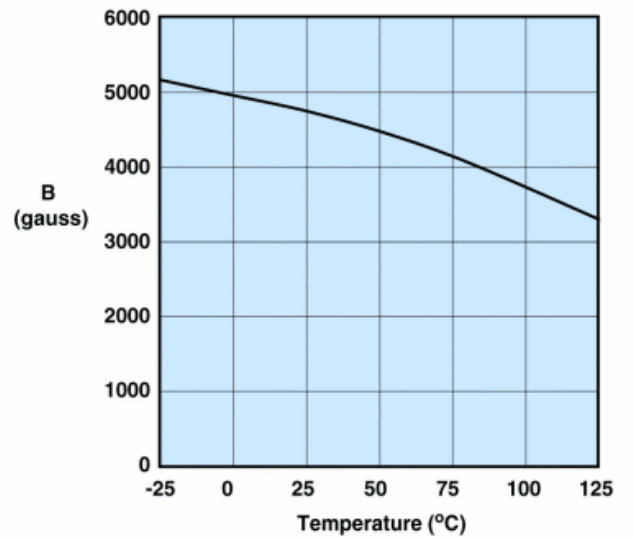
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

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