INDUCTANCE-TURNS CHART, FERRITE TOROIDS

MATERIAL #43

turns count > core number		A_L*	10	20	30	40	50	60	70	80	90	100
						Inductance in millihenries						
FT-23	-43	158	.018	.075	.169	.300	.470	.677	.921	1.20	1.52	1.88
FT-37	-43	350	.042	.168	.378	.672	1.050	1.510	2.060	2.69	3.40	4.20
FT-50	-43	440	.052	.209	.471	.836	1.300	1.880	2.560	3.35	4.24	5.23
FT-50A	-43	480	.057	.228	.513	.912	1.430	2.050	2.790	3.65	4.62	5.70
FT-50B	-43	965	.110	.456	1.030	1.820	2.850	4.100	5.590	7.30	9.23	11.4
FT-82	-43	470	.056	.224	.503	.894	1.400	2.010	2.740	3.58	4.53	5.59
FT-114	-43	510	.060	.241	.543	.965	1.510	2.170	2.950	3.86	4.88	6.03
FT-140	-43	885	.095	.380	.857	1.520	2.380	3.430	4.660	6.09	7.71	9.52
FT-240	-43	1075	.123	.494	1.110	1.970	3.090	4.440	6.050	7.90	9.96	12.3

MATERIAL #61

turns count > core number		A_L*	10	20	30	40	50	60	70	80	90	100
						Inductance in millihenries						
FT-23	-61	24.8	.002	.010	.022	.040	.063	.089	.122	.159	.201	.248
FT-37	-61	55.3	.006	.022	.050	.088	.138	.199	.271	.354	.448	.553
FT-50	-61	68.8	.007	.028	.062	.110	.172	.248	.337	.440	.557	.688
FT-50A	-61	75.0	.008	.030	.068	.120	.186	.270	.366	.480	.608	.750
FT-50B	-61	150.0	.015	.060	.135	.240	.375	.540	.735	.960	1.220	1.500
FT-82	-61	73.3	.007	.029	.066	.117	.183	.264	.359	.469	.594	.733
FT-114	-61	79.3	.008	.032	.071	.127	.198	.285	.389	.508	.642	.793
FT-114A	-61	146.0	.015	.058	.131	.233	.365	.526	.715	.934	1.180	1.460
FT-140	-61	140.0	.014	.056	.126	.224	.350	.504	.686	.896	1.130	1.400
FT-240	-61	171.0	.017	.068	.154	.274	.428	.616	.838	1.090	1.390	1.710

MATERIAL #67

turns count > core number		A_L*	10	20	30	40	50	60	70	80	90	100
						Inductance in millihenries						
FT-23	-67	7.9	—	.003	.007	.013	.020	.028	.038	.051	.064	.079
FT-37	-67	19.7	.002	.008	.018	.032	.049	.071	.097	.126	.160	.197
FT-50	-67	22.0	.002	.009	.020	.035	.055	.079	.108	.141	.178	.220
FT-50A	-67	24.0	.002	.020	.033	.038	.060	.086	.112	.154	.194	.240
FT-50B	-67	48.0	.005	.019	.043	.077	.120	.173	.235	.307	.389	.480
FT-82	-67	22.4	.002	.009	.020	.036	.056	.081	.110	.143	.181	.224
FT-114	-67	25.4	.003	.010	.023	.041	.064	.091	.124	.163	.206	.254
FT-140	-67	45.0	.005	.018	.041	.072	.118	.162	.220	.288	.365	.450
FT-240	-67	53.0	.005	.021	.048	.084	.133	.199	.260	.339	.430	.530

MATERIAL #68

turns count > core number		A_L*	10	20	30	40	50	60	70	80	90	100
						Inductance in millihenries						
FT-23	-67	7.9	—	.003	.007	.013	.020	.028	.038	.051	.064	.079
FT-23	-68	4.0	—	.002	.004	.006	.010	.014	.020	.026	.032	.040
FT-37	-68	8.8	—	.006	.008	.014	.022	.032	.043	.056	.071	.088
FT-50	-68	11.0	.001	.004	.010	.018	.028	.040	.054	.070	.089	.110
FT-50A	-68	12.0	.001	.005	.011	.019	.030	.043	.059	.077	.097	.117
FT-82	-68	11.7	.001	.005	.011	.019	.029	.042	.057	.075	.095	.117
FT-114	-68	12.7	.001	.005	.011	.020	.032	.046	.062	.081	.123	.127

* A_L value in mh/1000 turns

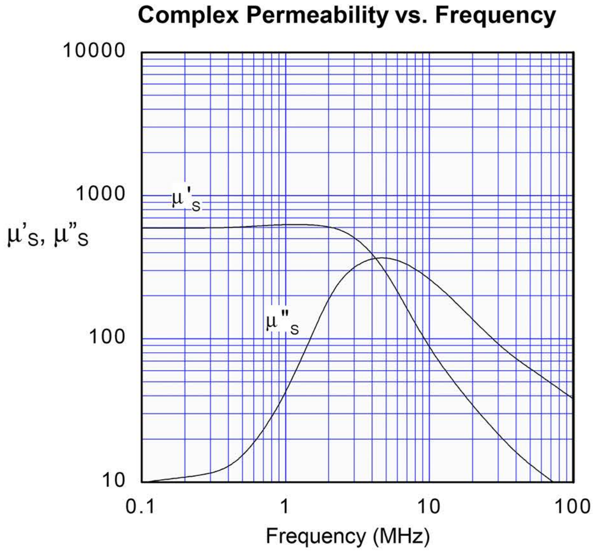
33 Material

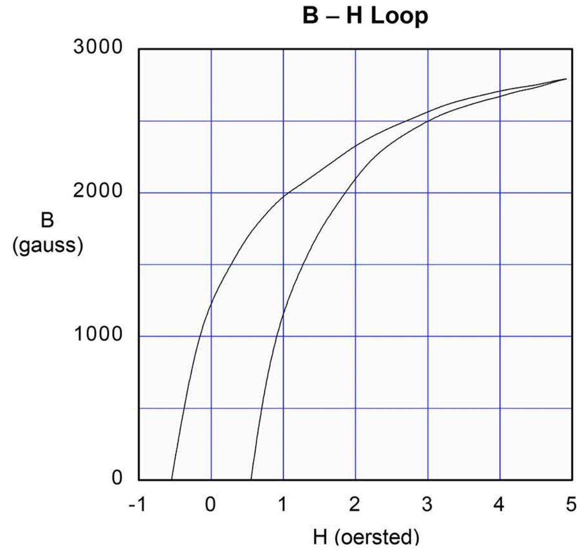
An MnZn ferrite designed for open circuit applications such as inductors and antennas for frequencies up to 3 MHz.

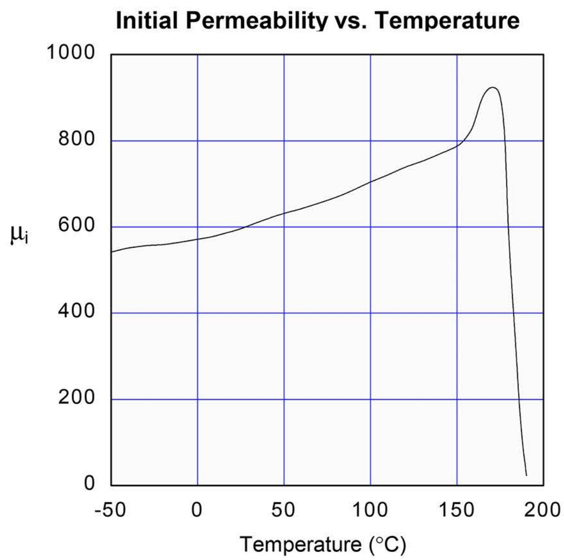
Specifications

Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	≈ 600 ± 20%
Saturation Flux Density	gauss	B_S	H=5 oersted	≈ 2800
Residual Flux Density	gauss	B_r		≈ 1200
Coercive Force	oersted	H_C		≈ 0.6
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=0.2 MHz; B=1 gauss	≤ 25
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.1
Volume Resistivity	Ω cm	ρ		≈ 10^2
Curie Temperature	°C	T_C		≥ 150

Note: values are typical and based on measurements of a standard toroid at 25 °C







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43
Material

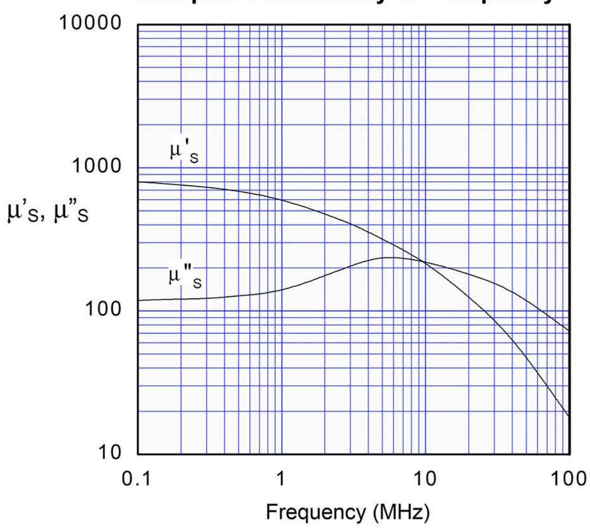
A NiZn ferrite designed for EMI suppression from 20 MHz to 250 MHz, as well as for inductive applications including high frequency common-mode chokes.

Specifications

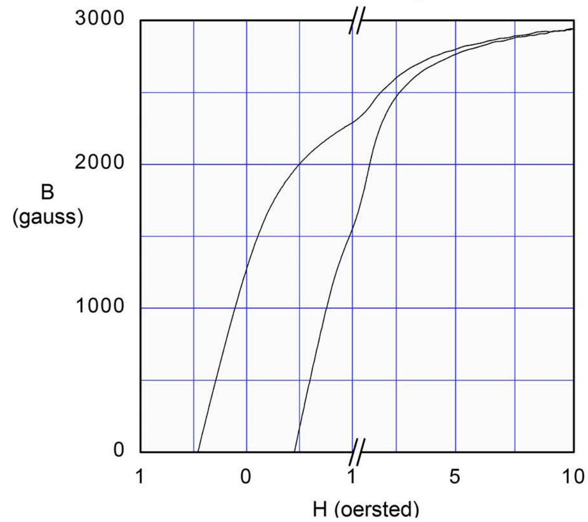
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	850 ± 20%
Saturation Flux Density	gauss	B_S	H=10 oersted	≈ 2950
Residual Flux Density	gauss	B_r		≈ 1300
Coercive Force	oersted	H_C		≈ 0.45
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=1 MHz; B=1 gauss	≤ 250
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 1.25
Volume Resistivity	Ω cm	ρ		≈ 10^5
Curie Temperature	°C	T_C		≥ 135

Note: values are typical and based on measurements of a standard toroid at 25 °C

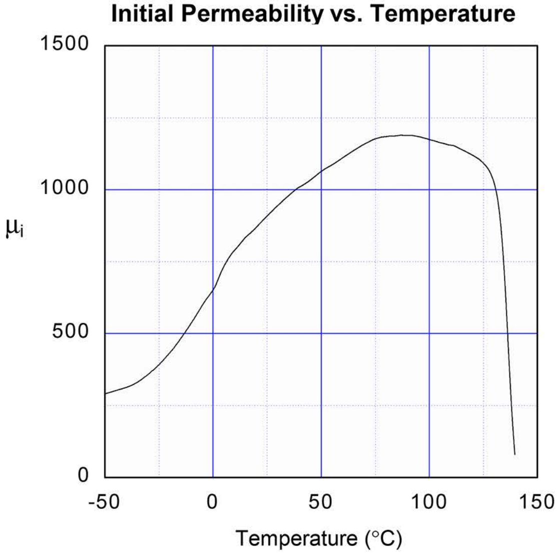
Complex Permeability vs. Frequency



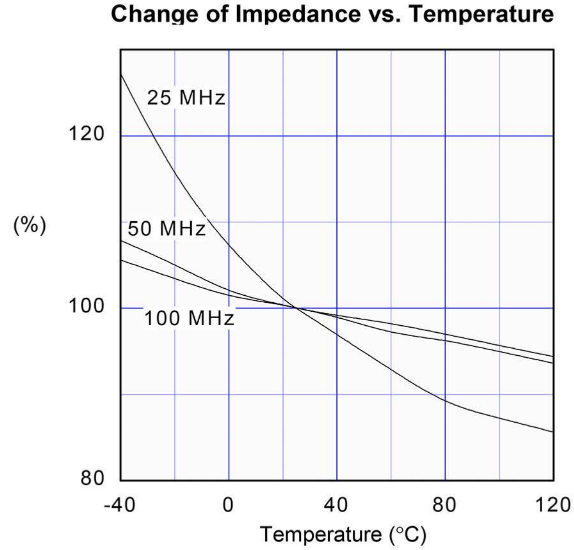
B – H Loop



Initial Permeability vs. Temperature



Change of Impedance vs. Temperature



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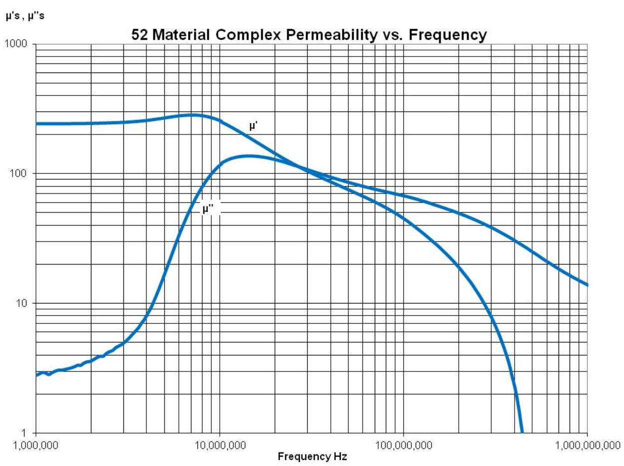
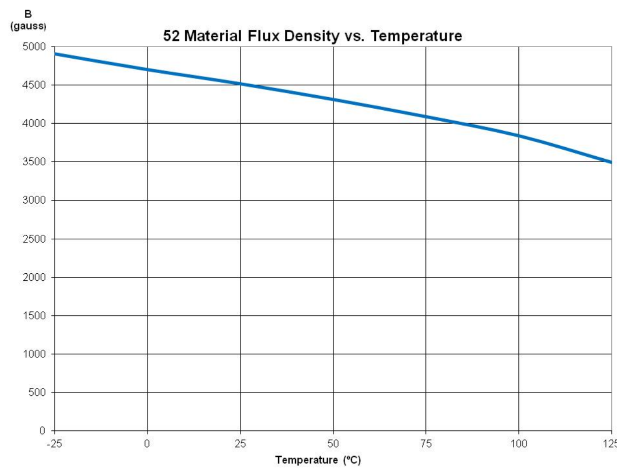
52

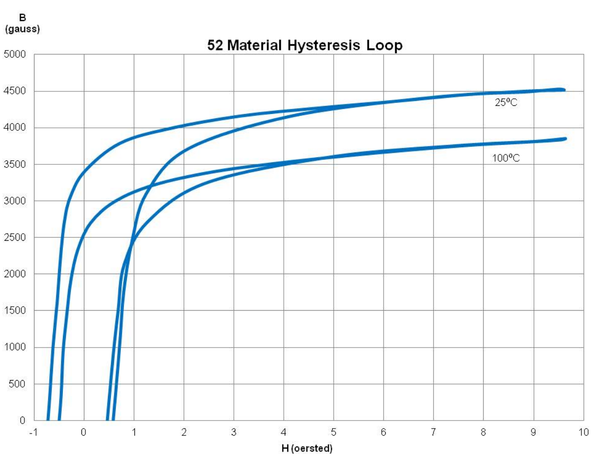
MATERIAL

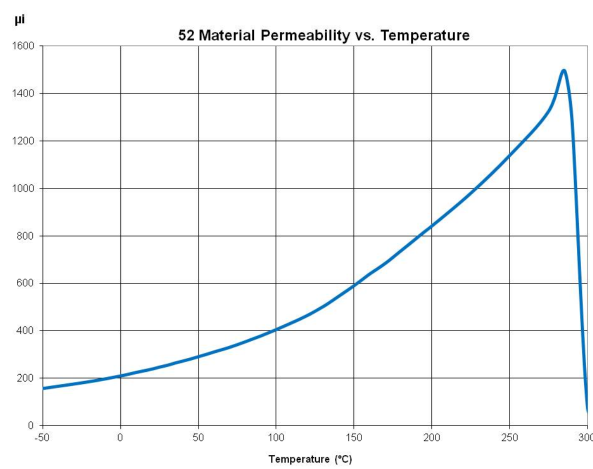
A new high frequency NiZn ferrite material that combines a high saturation flux density and a high Curie temperature.

Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		µi	250
Flux Density @ Field Strength	Gauss Oersted	B H	4200 10
Residual Flux Density	Gauss	Br	3300
Coercive Force	Oersted	Hc	0.60
Loss Factor @ Frequency	10 -6 MHz	Tan δ/ µi	45 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.75
Curie Temperature	°C	Tc	>250
Resistivity	ohm-cm	ρ	1×109









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61 Material

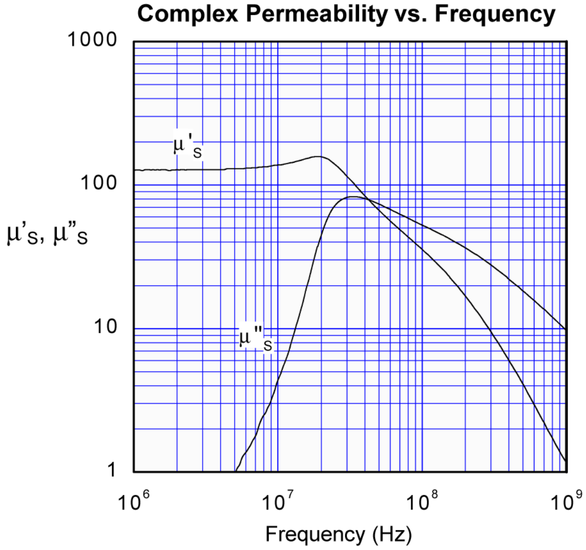
A high frequency perminvar NiZn ferrite designed for a range of inductive applications up to 25 MHz where low loses are required. It is also used in EMI noise suppression applications for frequencies above 200 MHz.

Specifications

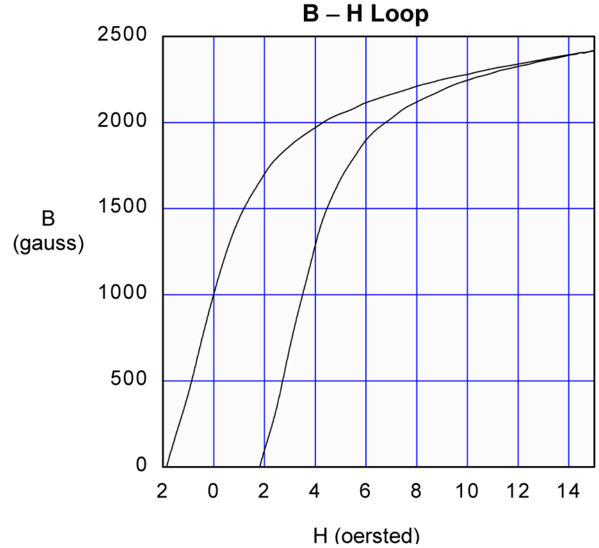
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	125 ± 20%
Saturation Flux Density	gauss	B_S	H =15 oersted	≈ 2400
Residual Flux Density	gauss	B_r		≈ 1000
Coercive Force	oersted	H_C		≈ 1.9
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=2.5 MHz; B=1 gauss	≤ 40
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.10
Volume Resistivity	Ω cm	ρ		≈ 1×10^7
Curie Temperature	°C	T_C		≥ 350

Note: values are typical and based on measurements of a standard toroid at 25 °C

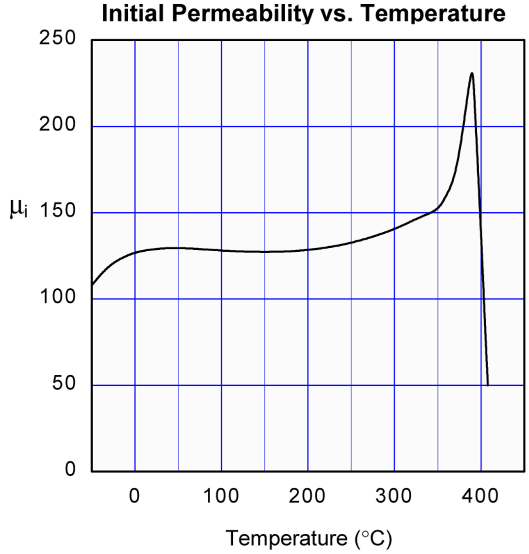
Complex Permeability vs. Frequency



B – H Loop



Initial Permeability vs. Temperature



67 Material

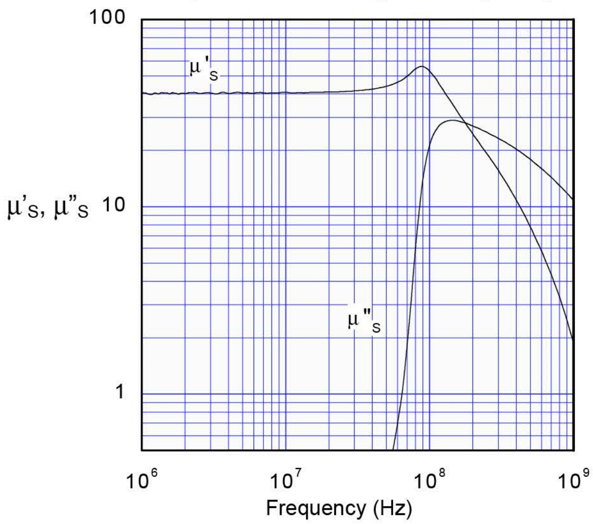
A perminvar NiZn ferrite designed for high frequency applications (up to 50 MHz) including broadband transformers, antennas and high frequency, high Q inductors.

Specifications

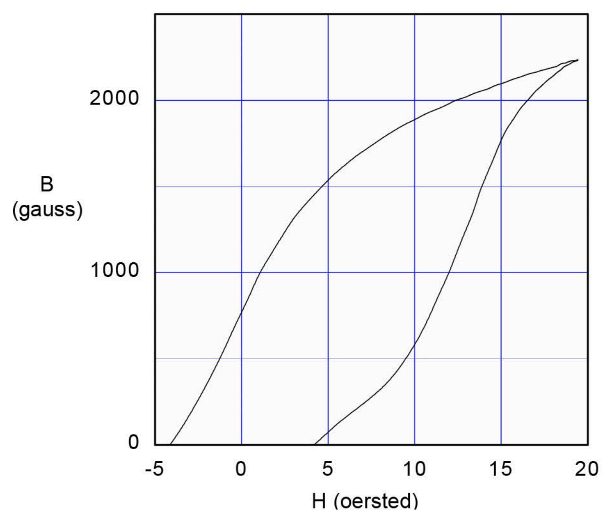
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	40 ± 20%
Saturation Flux Density	gauss	B_S	H=20 oersted	≈ 2300
Residual Flux Density	gauss	B_r		≈ 800
Coercive Force	oersted	H_C		≈ 4
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=50 MHz; B=1 gauss	≤ 150
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.05
Volume Resistivity	Ω cm	ρ		≈ 10^7
Curie Temperature	°C	T_C		≥ 450

Note: values are typical and based on measurements of a standard toroid at 25 °C

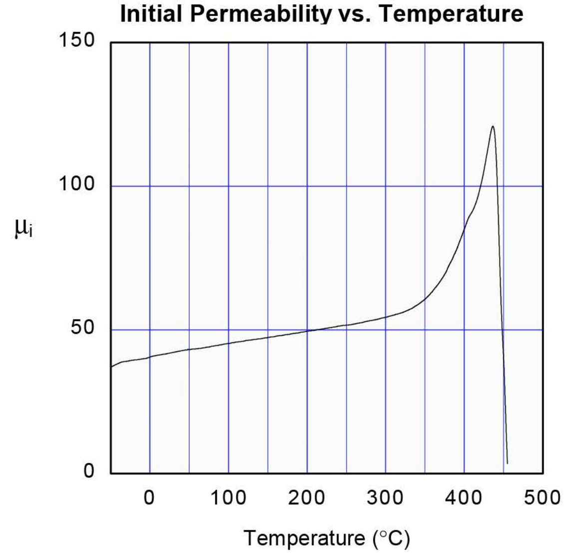
Complex Permeability vs. Frequency



B – H Loop



Initial Permeability vs. Temperature



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68 Material

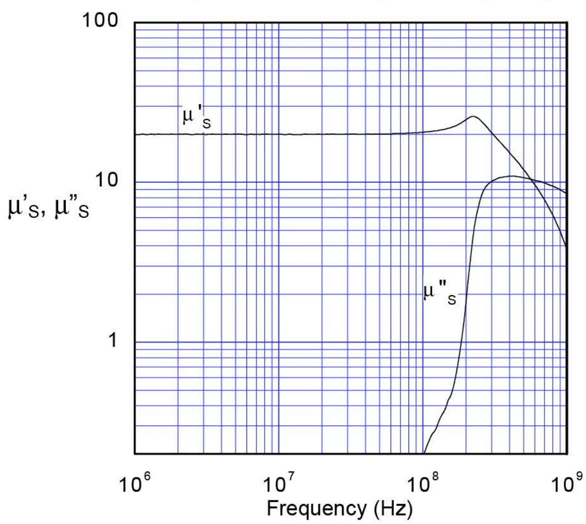
A perminvar NiZn ferrite designed for high frequency applications (up to 100 MHz) including broadband transformers, antennas and high Q inductors.

Specifications

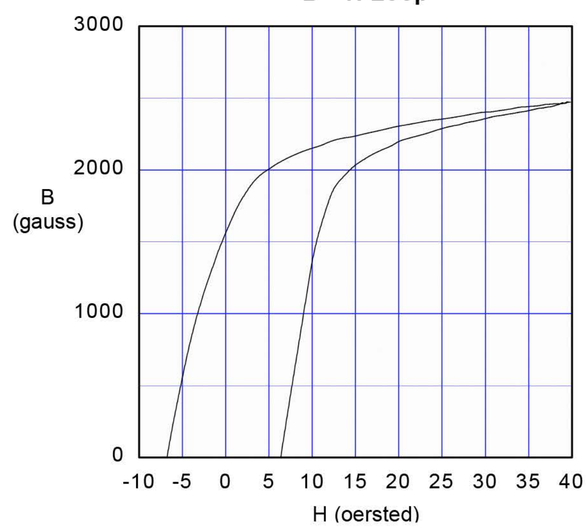
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	$20 \pm 20\%$
Saturation Flux Density	gauss	B_S	H=40 oersted	≈ 2500
Residual Flux Density	gauss	B_r		≈ 700
Coercive Force	oersted	H_C		≈ 7
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=100 MHz; B=1gauss	≤ 500
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.15
Volume Resistivity	Ω cm	ρ		$\approx 10^7$
Curie Temperature	°C	T_C		> 500

Note: values are typical and based on measurements of a standard toroid at 25 °C

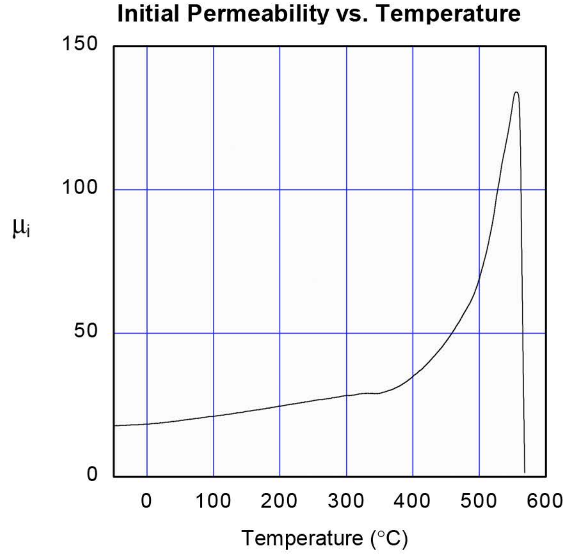
Complex Permeability vs. Frequency



B – H Loop



Initial Permeability vs. Temperature



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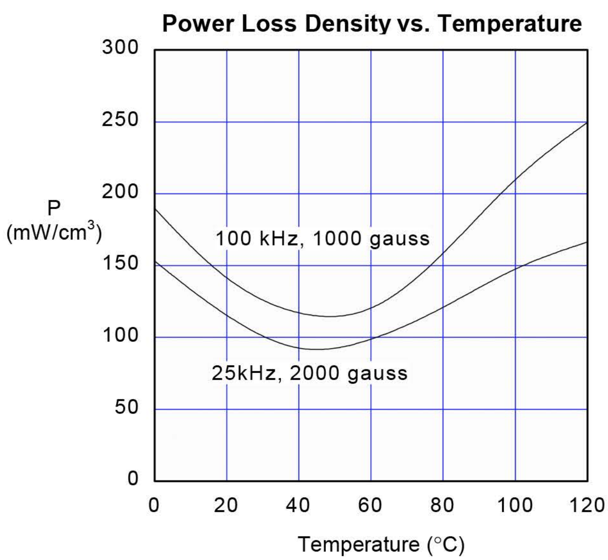
77 Material

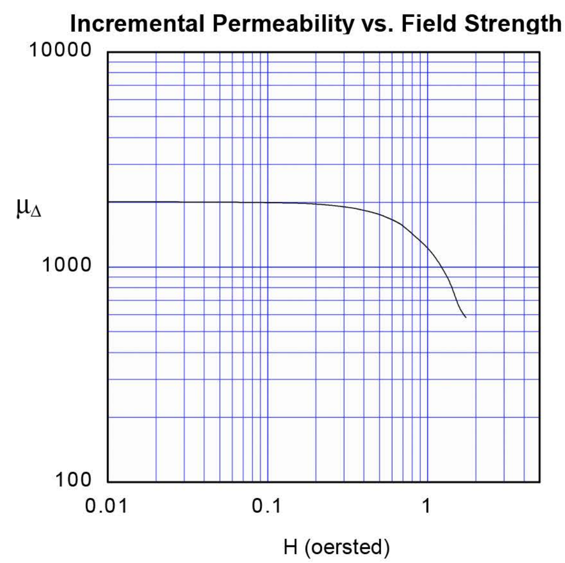
An MnZn ferrite with high saturation for high flux power applications for frequencies up to 200 kHz and also for inductive applications, including RFID transponders.

Specifications

Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	2000 ± 20%
Saturation Flux Density	gauss	B_S	H=10 oersted	≈ 4900
Residual Flux Density	gauss	B_r		≈ 1500
Coercive Force	oersted	H_C		≈ 0.2
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=0.1 MHz; B=1 gauss	≤ 15
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.7
Volume Resistivity	Ω cm	ρ		≈ 10^2
Curie Temperature	°C	T_C		≥ 190

Note: values are typical and based on measurements of a standard toroid at 25 °C





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F Material

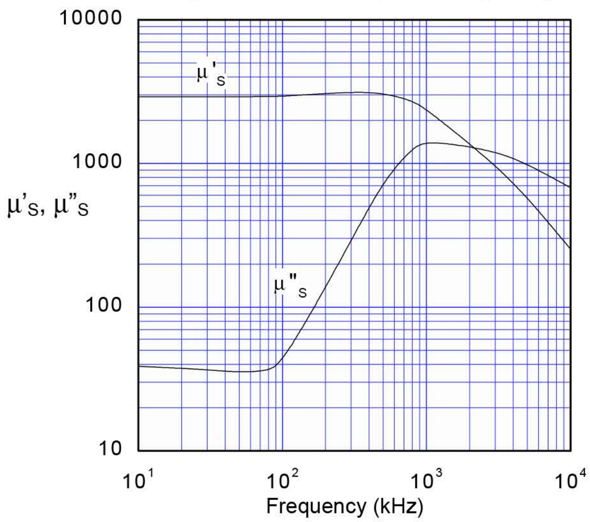
A MnZn ferrite specifically designed for power applications operating in frequencies up to 2 MHz.

Specifications

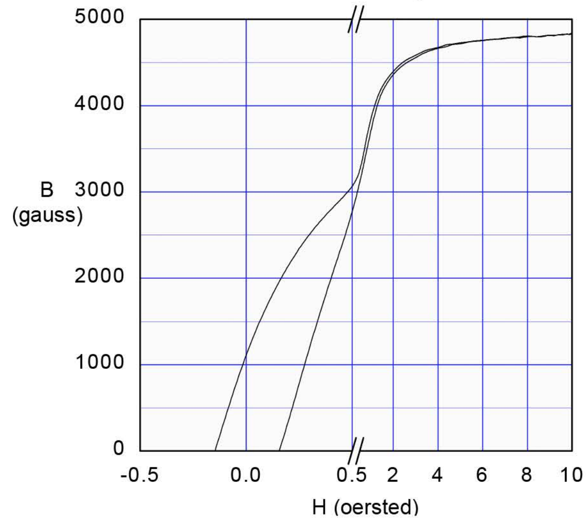
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	2900 ± 20%
Saturation Flux Density	gauss	B_S	H=10 oersted	≈ 4700
Residual Flux Density	gauss	B_r		≈ 1000
Coercive Force	oersted	H_C		≈ 0.18
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=0.1 MHz; B=1 gauss	≤ 5
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.7
Volume Resistivity	Ω cm	ρ		≈ 10^3
Curie Temperature	°C	T_C		≥ 185

Note: values are typical and based on measurements of a standard toroid at 25 °C

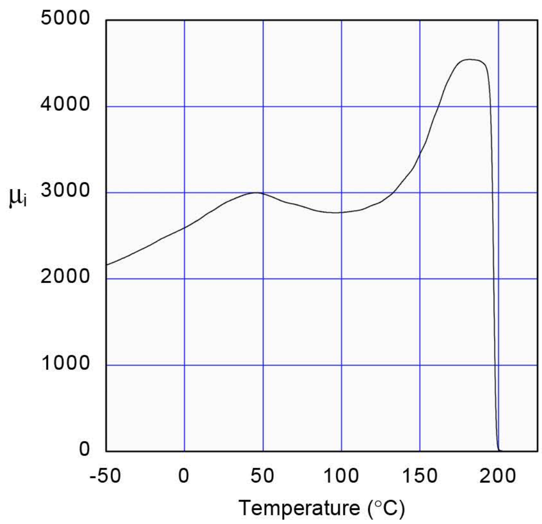
Complex Permeability vs. Frequency



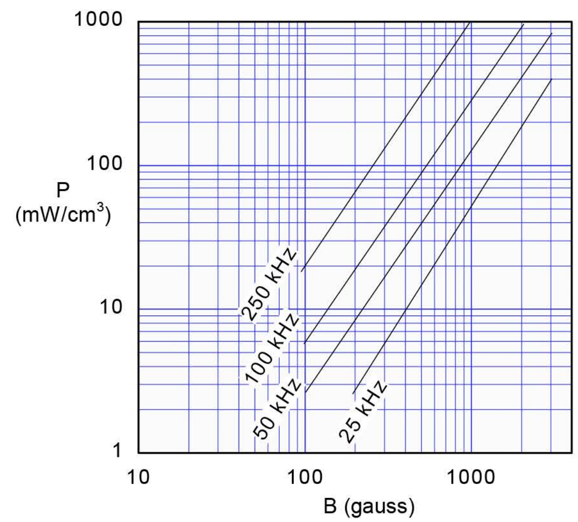
B – H Loop



Initial Permeability vs. Temperature



Power Loss Density vs. Flux Density



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J Material

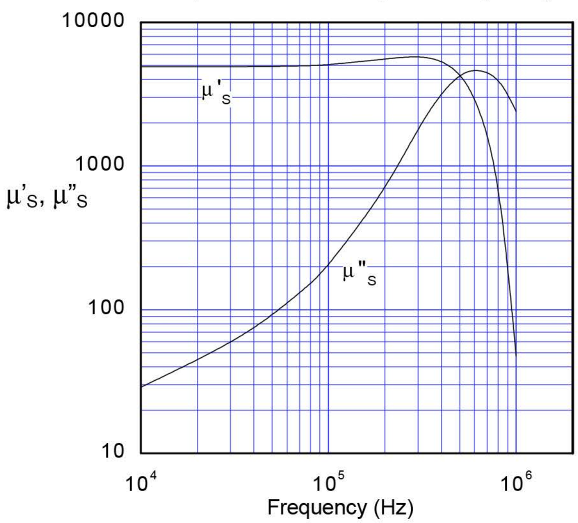
A high permeability, low loss MnZn ferrite designed for a range of applications including broadband and pulse transformer and filtering applications.

Specifications

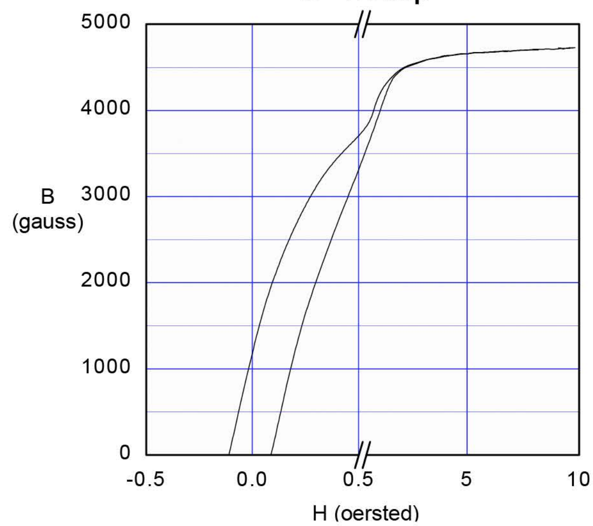
Property	Unit	Symbol	Standard Test Conditions	Value
Initial Permeability		μ_i	Frequency=10 kHz; B<10 gauss	5000 ± 30%
Saturation Flux Density	gauss	B_S	H=10 oersted	≈ 4700
Residual Flux Density	gauss	B_r		≈ 1200
Coercive Force	oersted	H_C		≈ 0.1
Loss Factor	10^{-6}	$\tan\delta/\mu_i$	Frequency=0.1 MHz; B=1 gauss	≤15
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C			≤ 0.5
Volume Resistivity	Ω cm	ρ		≈ 200
Curie Temperature	°C	T_C		≥ 175

Note: values are typical and based on measurements of a standard toroid at 25 °C

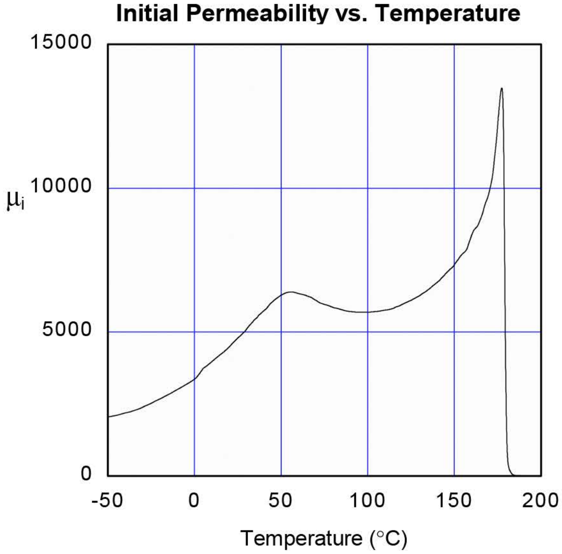
Complex Permeability vs. Frequency



B – H Loop



Initial Permeability vs. Temperature



Incremental Permeability vs. Field Strength