

DATA SHEET

3B1 Material specification

Supersedes data of September 2004

2008 Sep 01

Material specification

3B1

3B1 SPECIFICATIONS

Medium permeability MnZn ferrite for use in wideband EMI-suppression (10 - 100 MHz) as well as RF tuning, wideband and balun transformers.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	900 $\pm 20\%$	
B	25 °C; 10 kHz; 1200 A/m 100 °C; 10 kHz; 1200 A/m	≈ 380 ≈ 230	mT
$\tan\delta/\mu_i$	25 °C; 450 kHz; 0.25 mT	$\leq 50 \times 10^{-6}$	
ρ	DC; 25 °C	≈ 0.2	Ωm
T_C		≥ 150	°C
density		≈ 4800	kg/m ³

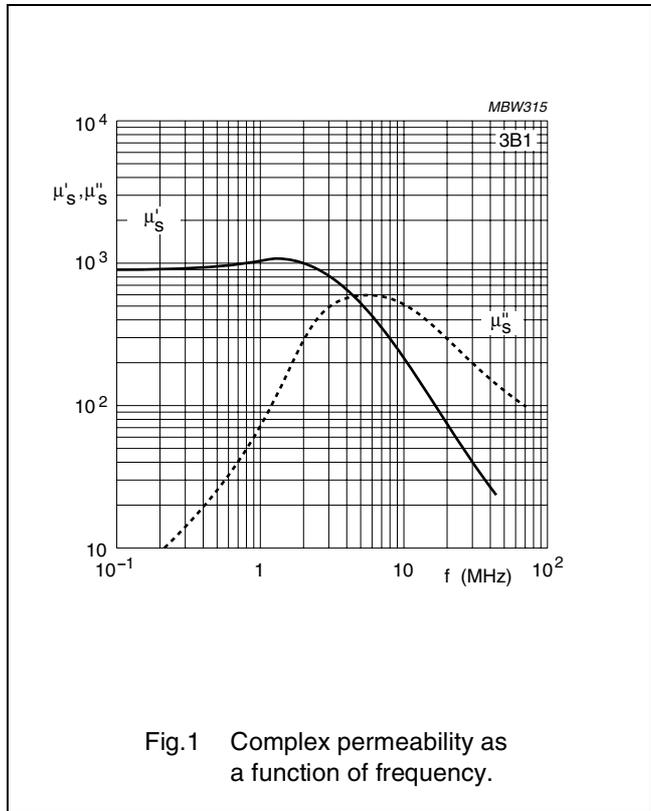


Fig.1 Complex permeability as a function of frequency.

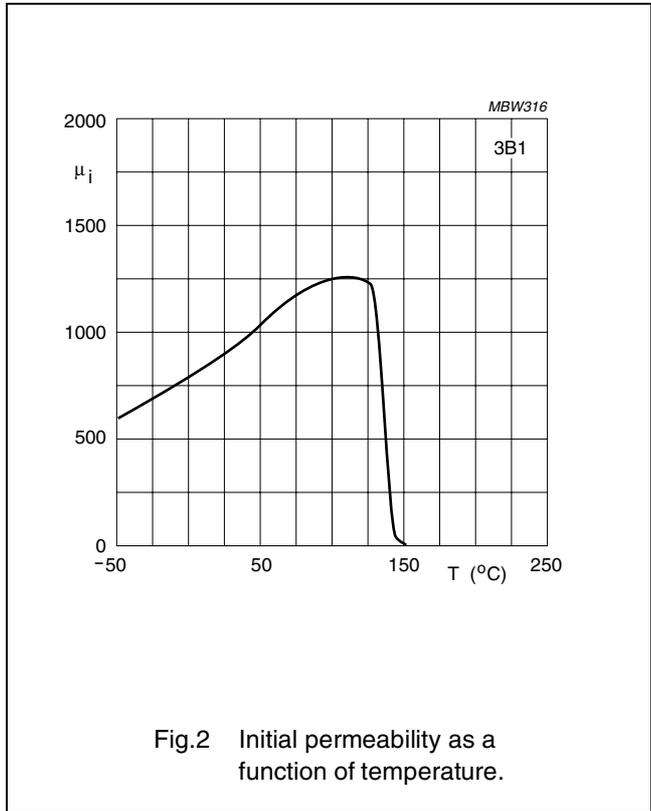


Fig.2 Initial permeability as a function of temperature.

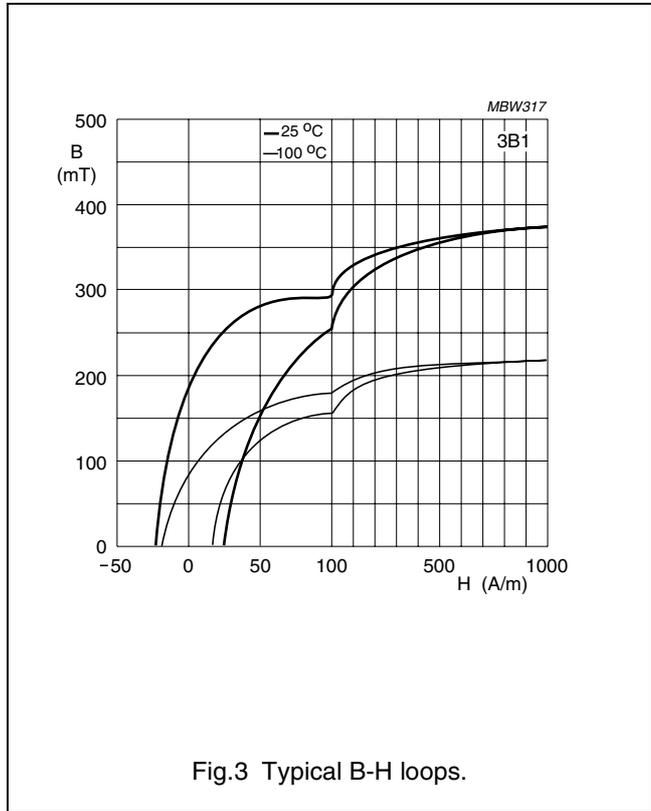


Fig.3 Typical B-H loops.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

3S1 Material specification

Supersedes data of September 2004

2008 Sep 01

Material specification

3S1

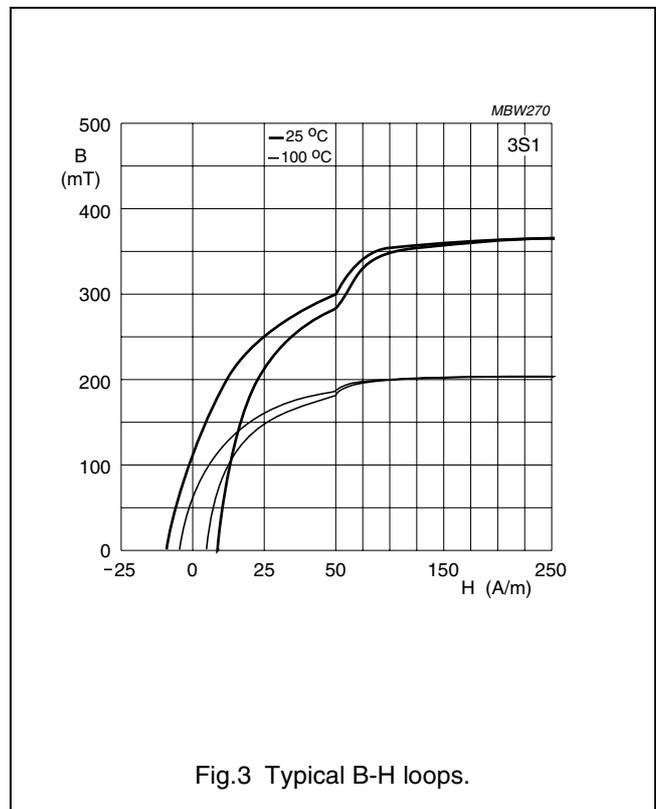
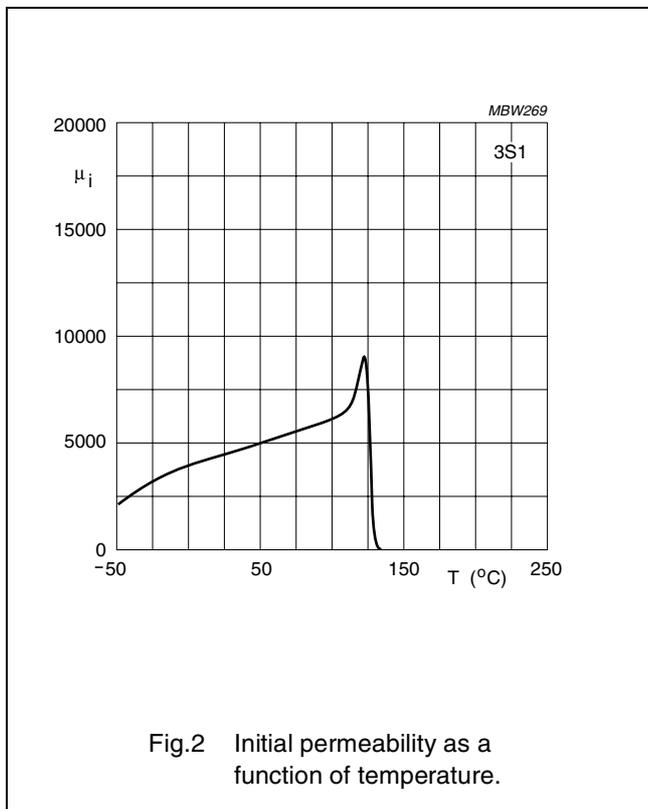
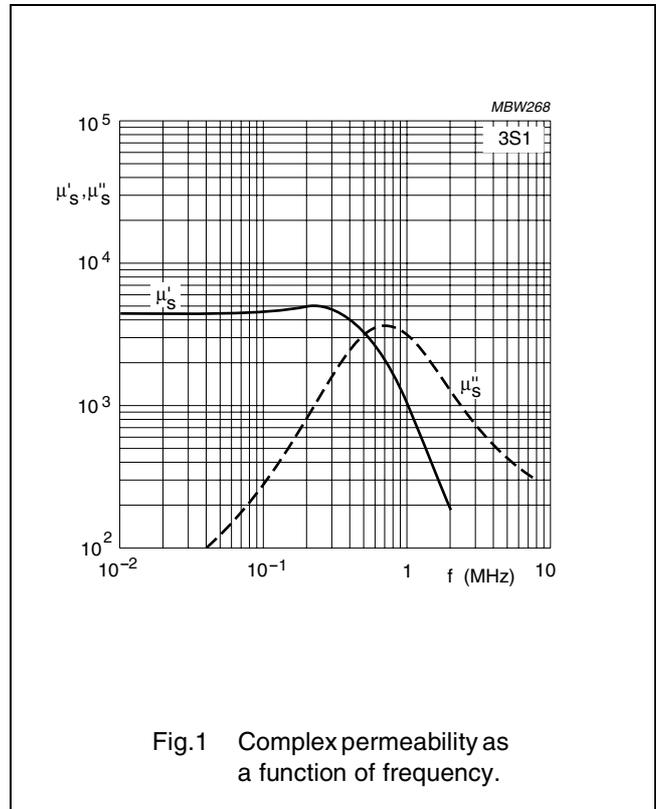
3S1 SPECIFICATIONS

A low frequency EMI-suppression material specified on impedance and optimized for frequencies up to 30 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	≈ 4000	
B	25 °C; 10 kHz; 1200 A/m 100 °C; 10 kHz; 1200 A/m	≈ 400 ≈ 230	mT
$ Z ^{(1)}$	25 °C; 1 MHz 25 °C; 10 MHz	≥ 30 ≥ 60	Ω
ρ	DC; 25 °C	≈ 1	Ωm
T_C		≥ 125	°C
density		≈ 4900	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.



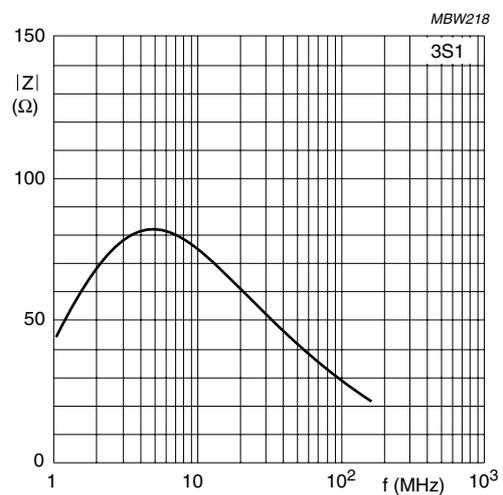


Fig.3 Impedance as a function of frequency, measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

3S3

Material specification

Supersedes data of September 2004

2008 Sep 01

Material specification

3S3

3S3 SPECIFICATIONS

This wideband EMI-suppression material is specified on impedance and optimized for frequencies from 30 to 1000 MHz in applications with high bias currents at elevated temperatures (e.g. rods for chokes in commutation motors).

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	≈ 350	
B	25 °C; 10 kHz; 1200 A/m 100 °C; 10 kHz; 1200 A/m	≈ 320 ≈ 270	mT
$ Z ^{(1)}$	25 °C; 30 MHz 25 °C; 100 MHz 25 °C; 300 MHz	≥ 25 ≥ 60 ≥ 100	Ω
ρ	DC; 25 °C	$\approx 10^4$	Ωm
T_C		≥ 225	°C
density		≈ 4800	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

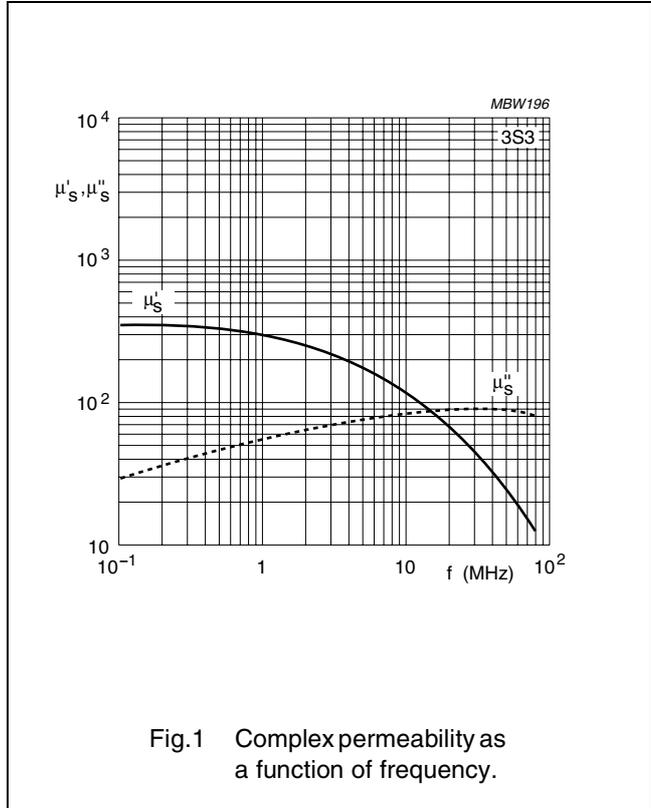


Fig.1 Complex permeability as a function of frequency.

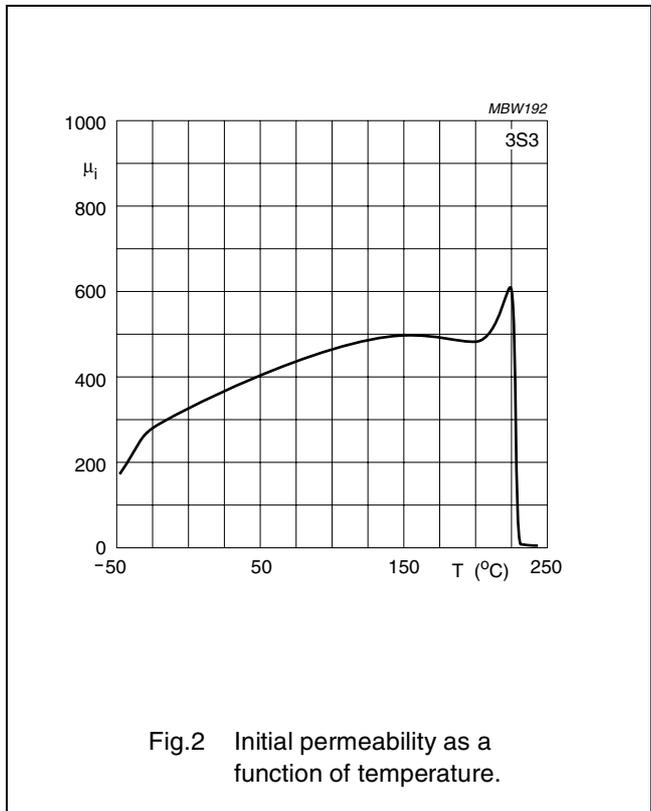


Fig.2 Initial permeability as a function of temperature.

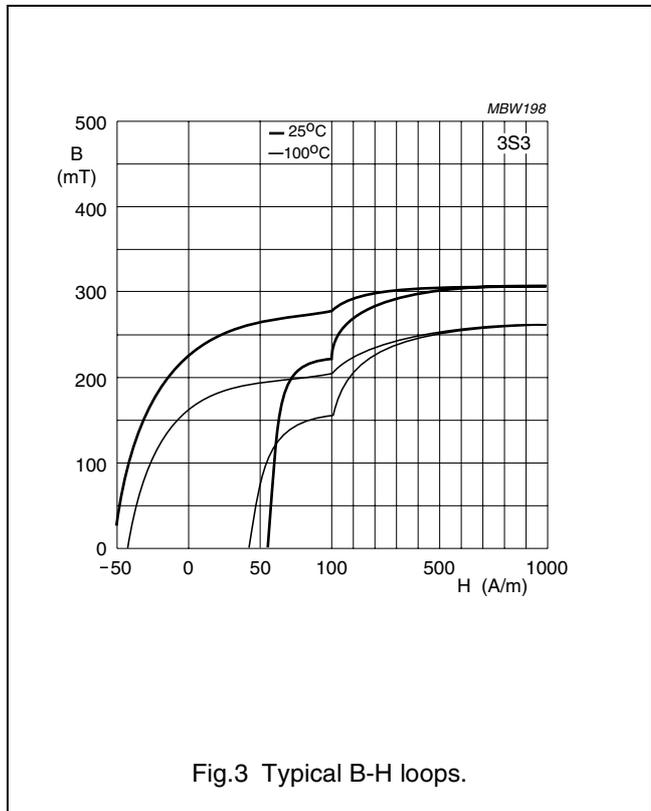


Fig.3 Typical B-H loops.

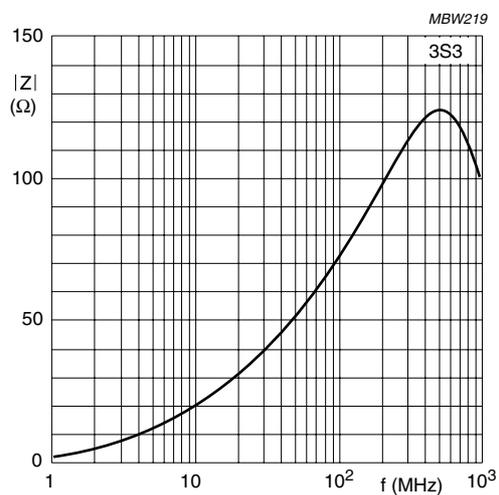


Fig.4 Impedance as a function of frequency measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

3S4 Material specification

Supersedes data of September 2004

2008 Sep 01

3S4 SPECIFICATIONS

Wideband EMI-suppression material specified on impedance and optimized for frequencies from 10 to 300 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	≈ 1700	
B	25 °C; 10 kHz; 1200 A/m 100 °C; 10 kHz; 1200 A/m	≈ 320 ≈ 170	mT
$ Z ^{(1)}$	25 °C; 3 MHz 25 °C; 30 MHz 25 °C; 100 MHz 25 °C; 300 MHz	≥ 25 ≥ 60 ≥ 80 ≥ 90	Ω
ρ	DC; 25 °C	$\approx 10^{-3}$	Ωm
T_C		≥ 110	$^{\circ}\text{C}$
density		≈ 4800	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

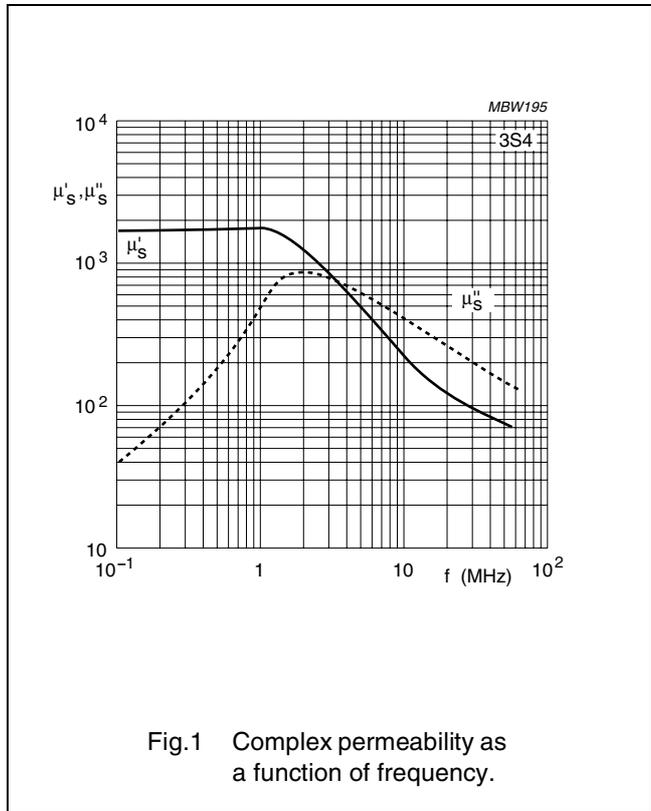


Fig.1 Complex permeability as a function of frequency.

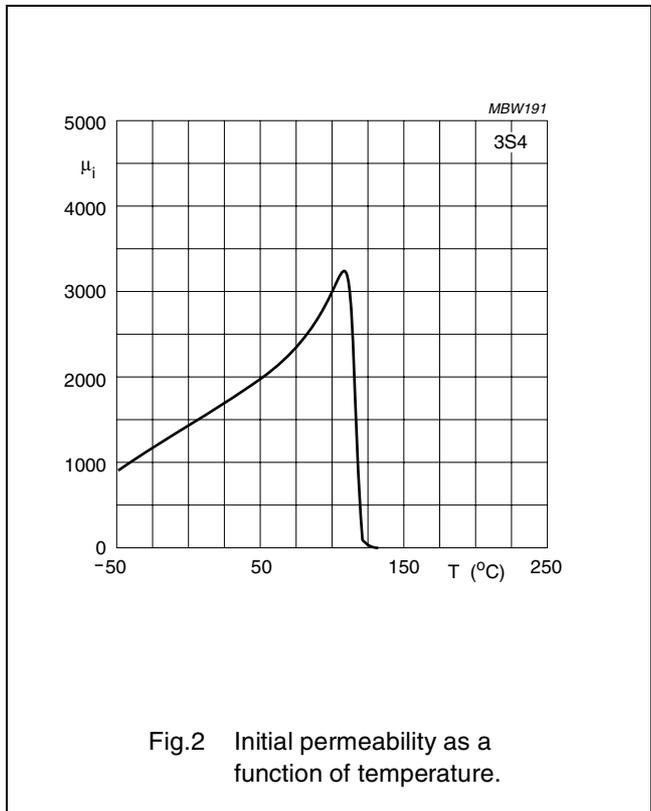


Fig.2 Initial permeability as a function of temperature.

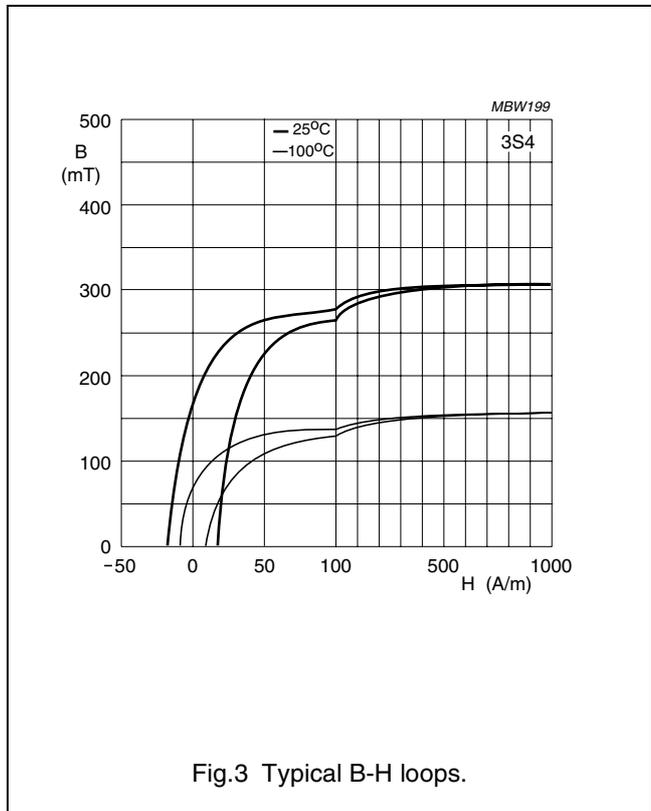


Fig.3 Typical B-H loops.

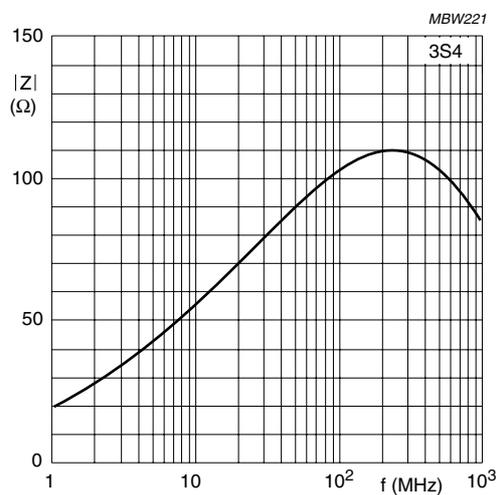


Fig.4 Impedance as a function of frequency measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

3S5

Material specification

Supersedes data of September 2004

2008 Sep 01

3S5 SPECIFICATIONS

A low frequency EMI-suppression material specified on impedance and optimized for frequencies up to 30 MHz in applications with high bias currents at elevated temperatures (e.g. automotive and industrial).

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	$3800 \pm 20\%$	
B	25 °C; 10 kHz; 1200 A/m 100 °C; 10 kHz; 1200 A/m	≈ 545 ≈ 435	mT
$ Z ^{(1)}$	25 °C; 1 MHz 25 °C; 10 MHz	≥ 20 ≥ 40	Ω
ρ	DC; 25 °C	≈ 10	Ωm
T_c		≥ 255	$^{\circ}\text{C}$
density		≈ 4800	kg/m^3

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

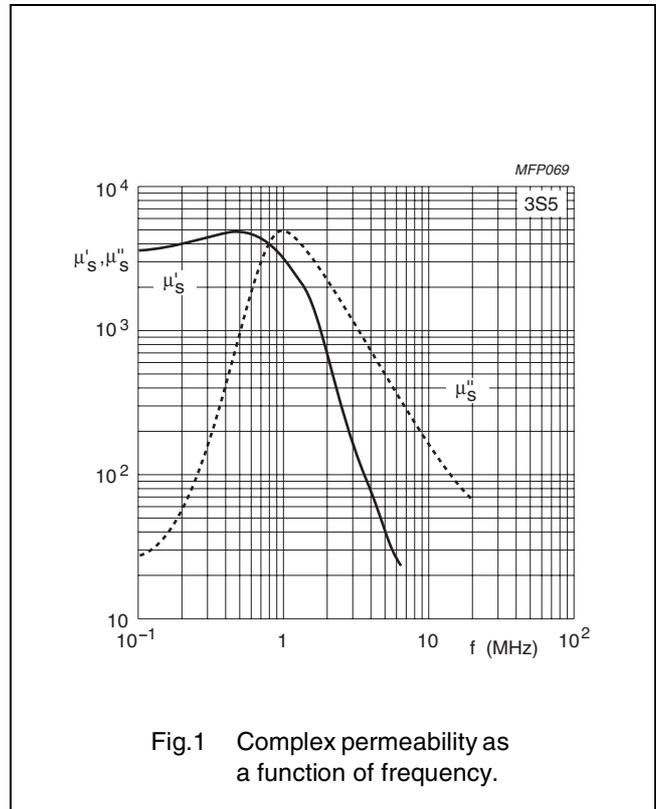


Fig.1 Complex permeability as a function of frequency.

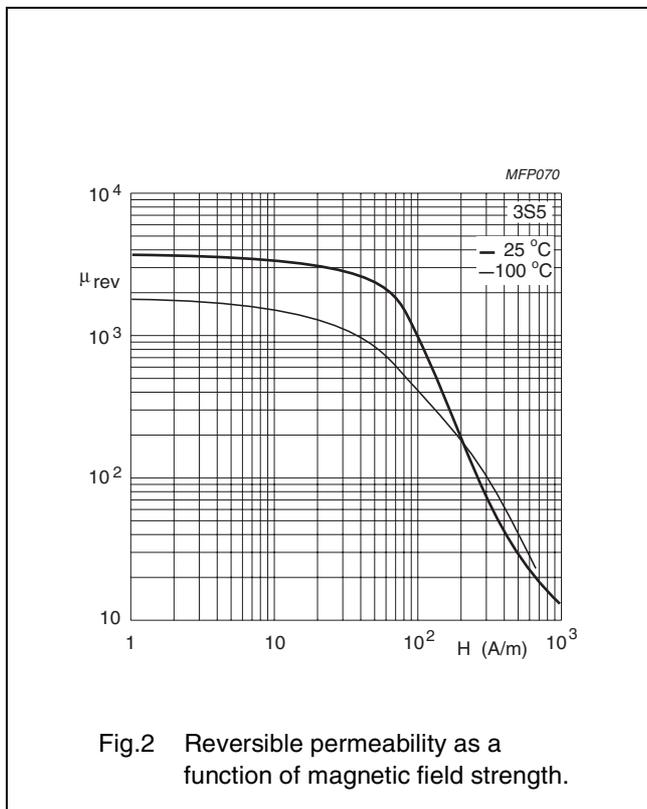


Fig.2 Reversible permeability as a function of magnetic field strength.

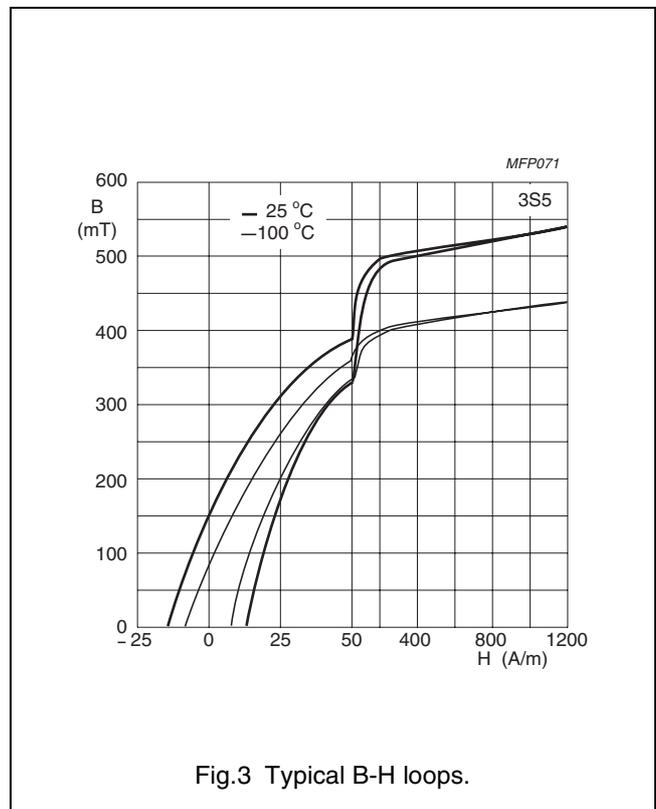


Fig.3 Typical B-H loops.

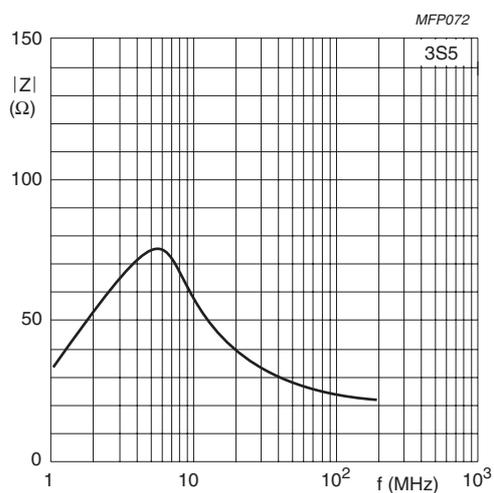


Fig.4 Impedance as a function of frequency.
measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

4B1 Material specification

Supersedes data of September 2004

2008 Sep 01

Material specification

4B1

4B1 SPECIFICATIONS

Medium permeability NiZn ferrite for use in wideband EMI-suppression (30 - 1000 MHz) as well as RF tuning, wideband and balun transformers.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	250 $\pm 20\%$	
B	25 °C; 10 kHz; 3000 A/m 100 °C; 10 kHz; 3000 A/m	≈ 360 ≈ 310	mT
$\tan\delta/\mu_i$	25 °C; 1 MHz; 0.25 mT 25 °C; 3 MHz; 0.25 mT	$\leq 90 \times 10^{-6}$ $\leq 300 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥ 250	°C
density		≈ 4600	kg/m ³

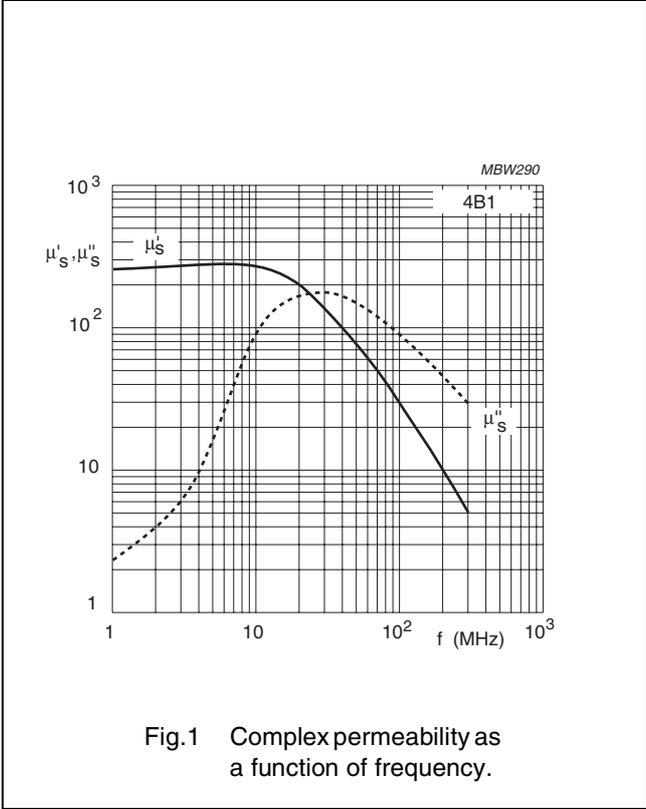


Fig.1 Complex permeability as a function of frequency.

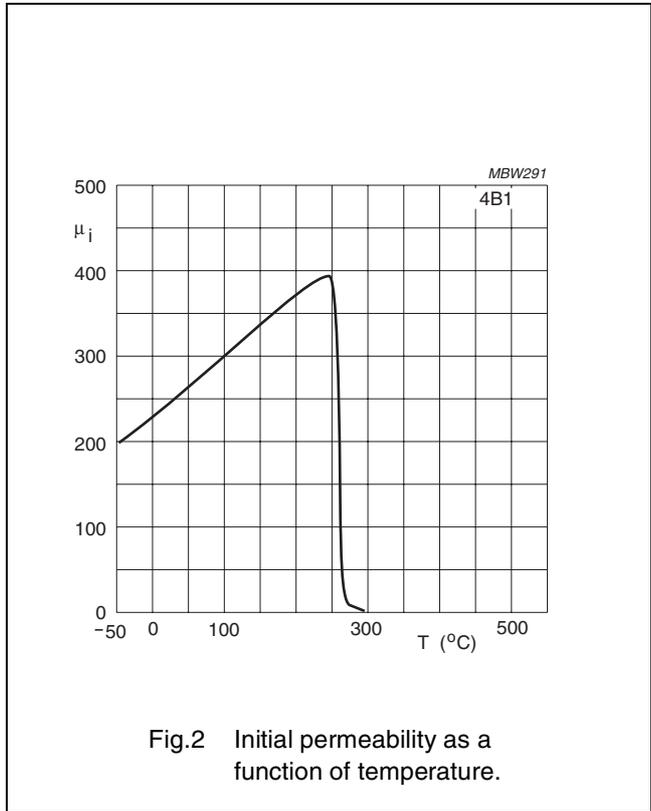


Fig.2 Initial permeability as a function of temperature.

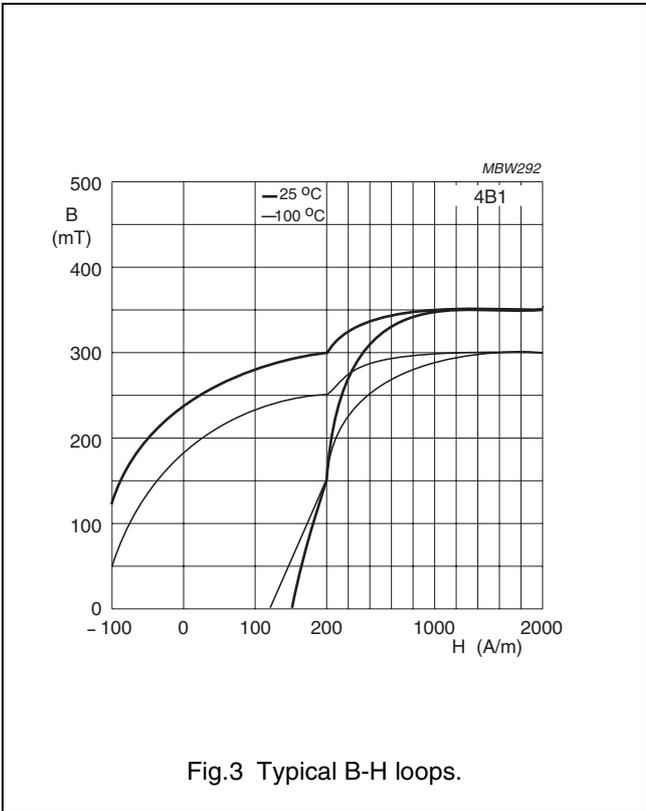


Fig.3 Typical B-H loops.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

4S2

Material specification

Supersedes data of September 2008

2013 Sep 11

4S2 SPECIFICATIONS

Wideband EMI-suppression material specified on impedance and optimized for frequencies from 30 to 1000 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	≈ 850	
B	25 °C; 10 kHz; 1200 A/m	≈ 340	mT
	100 °C; 10 kHz; 1200 A/m	≈ 230	
$ Z ^{(1)}$	25 °C; 30 MHz	≥ 50	Ω
	25 °C; 300 MHz	≥ 90	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥ 150	°C
density		≈ 5000	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

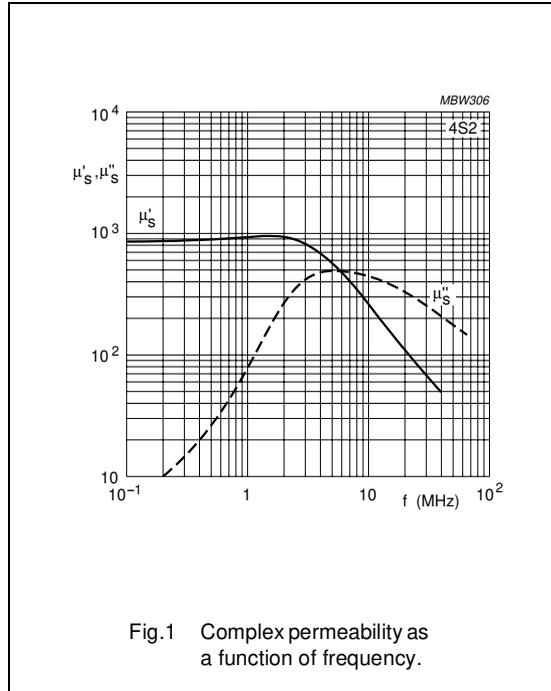


Fig.1 Complex permeability as a function of frequency.

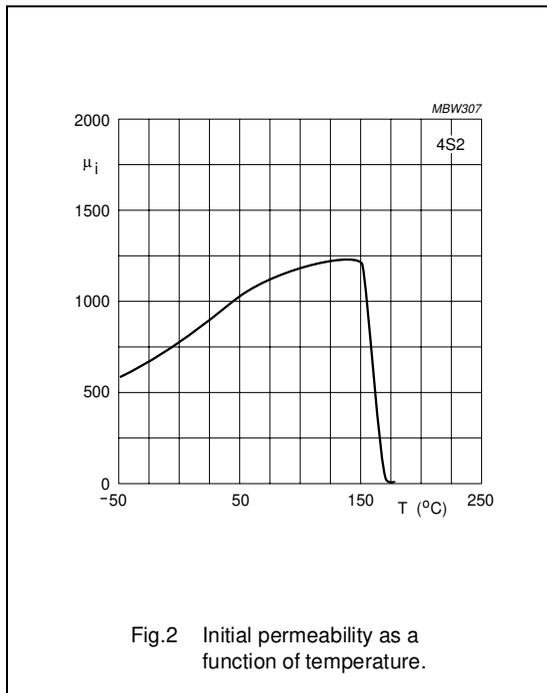


Fig.2 Initial permeability as a function of temperature.

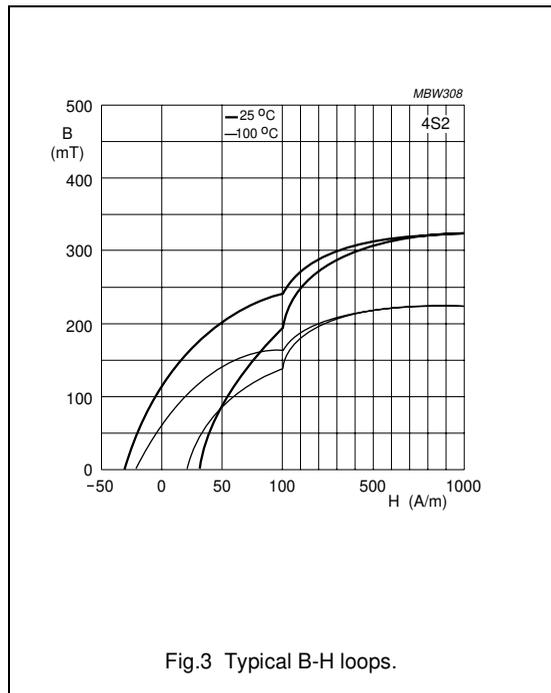


Fig.3 Typical B-H loops.

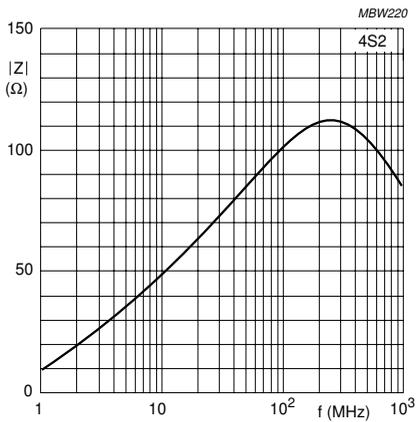


Fig.4 Impedance as a function of frequency, measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

4S2F
Material specification

2013 June 15

4S2F SPECIFICATIONS

Wideband EMI-suppression material specified on impedance and optimized for frequencies from 30 to 1000 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	≈ 700	
B	25 °C; 10 kHz; 1200 A/m	≈ 290	mT
	100 °C; 10 kHz; 1200 A/m	≈ 170	
$ Z ^{(1)}$	25 °C; 30 MHz	≥ 50	Ω
	25 °C; 300 MHz	≥ 85	
ρ	DC; 25 °C	$\approx 10^4$	Ωm
T_C		≥ 120	$^{\circ}\text{C}$
density		≈ 4800	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

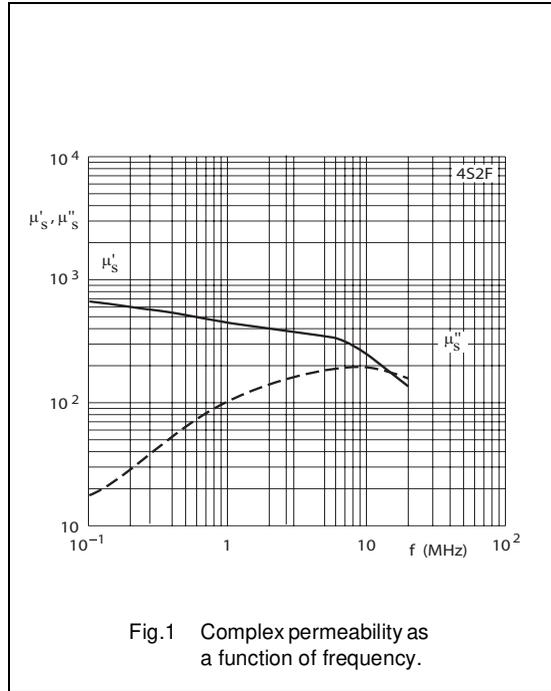


Fig.1 Complex permeability as a function of frequency.

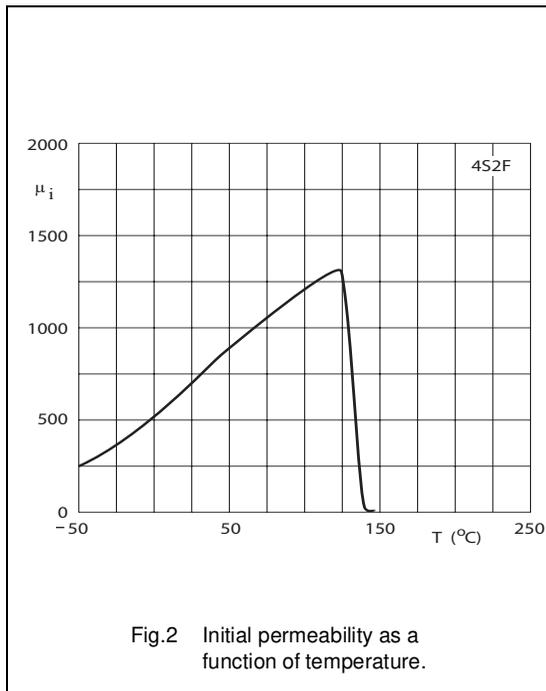


Fig.2 Initial permeability as a function of temperature.

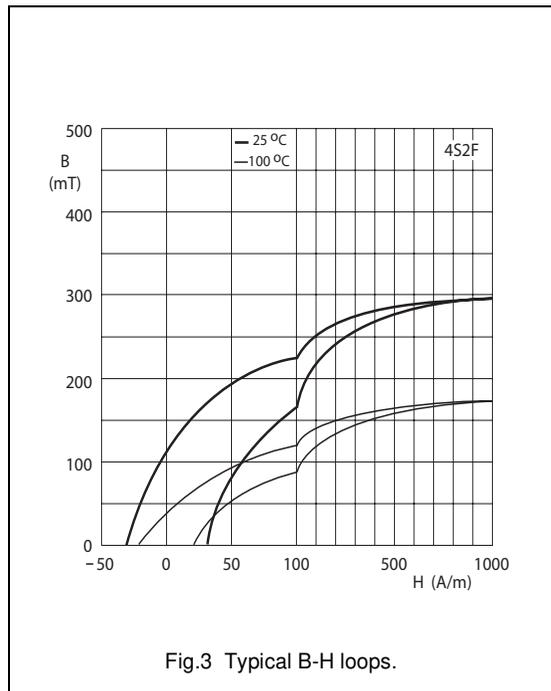


Fig.3 Typical B-H loops.

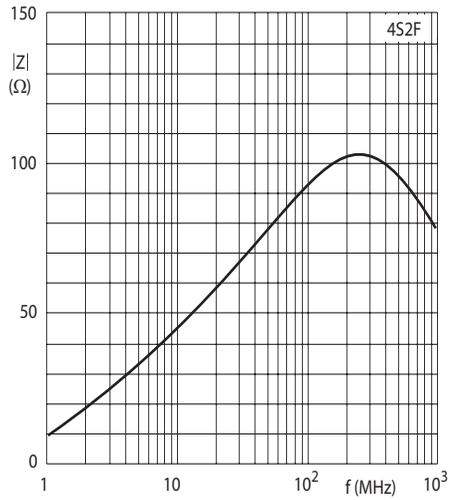


Fig.4 Impedance as a function of frequency, measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

4S3 Material specification

New data

2008 Sep 01

4S3 SPECIFICATIONS

Wideband EMI-suppression material specified on impedance and optimized for frequencies from 30 to 1000 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	$250 \pm 20 \%$	
B	25 °C; 10 kHz; 3000 A/m 100 °C; 10 kHz; 3000 A/m	≈ 360 ≈ 310	mT
$ Z ^{(1)}$	25 °C; 30 MHz 25 °C; 50 MHz 25 °C; 200 MHz 25 °C; 500 MHz	≥ 10 ≥ 40 ≥ 200 ≥ 250	Ω
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥ 250	°C
density		≈ 4600	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

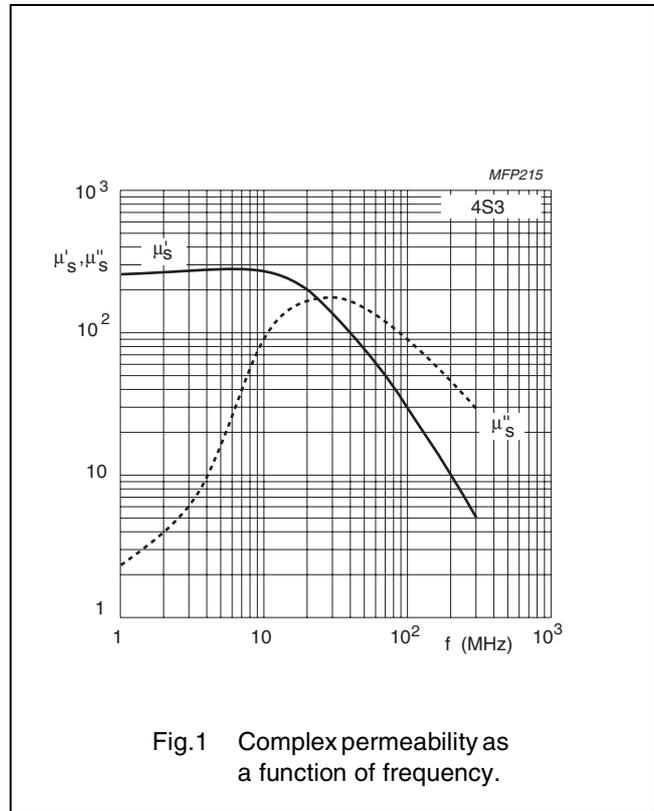


Fig.1 Complex permeability as a function of frequency.

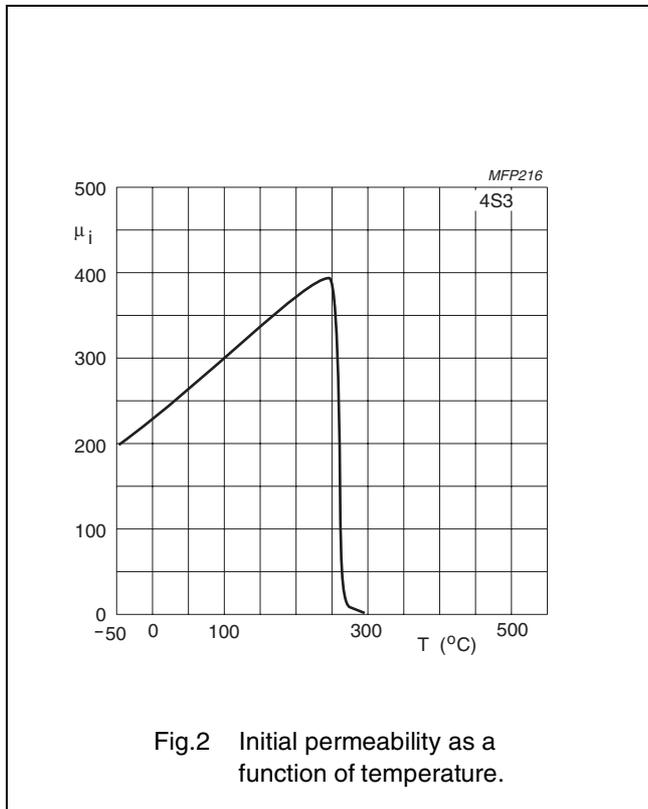


Fig.2 Initial permeability as a function of temperature.

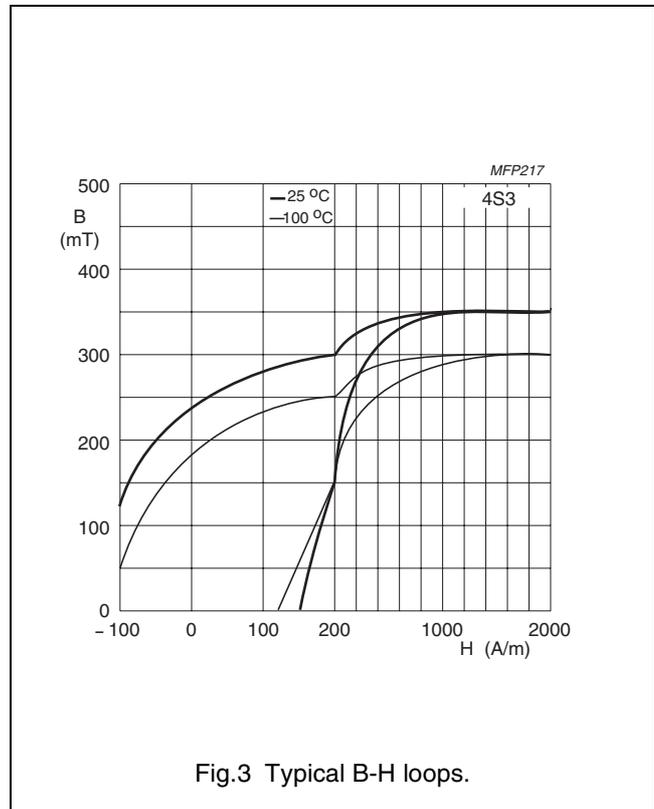


Fig.3 Typical B-H loops.

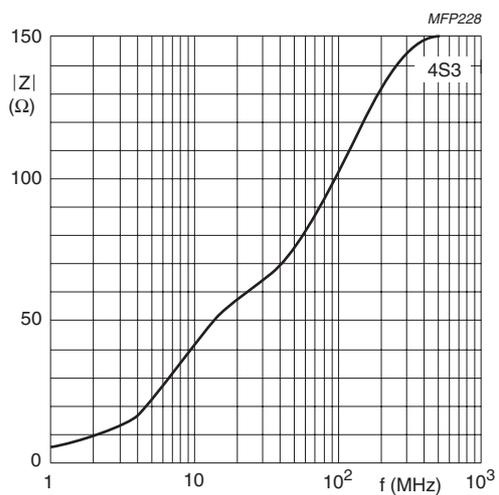


Fig.4 Impedance as a function of frequency, measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

DATA SHEET

4S60 Material specification

Supersedes data of September 2004

2008 Sep 01

4S60 SPECIFICATIONS

High permeability specialty NiZn ferrite only used in absorber tiles for anechoic chambers operating at frequencies up to 1000 MHz.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤ 10 kHz; 0.25 mT	$2000 \pm 20 \%$	
B	25 °C; 10 kHz; 1200 A/m 80 °C; 10 kHz; 1200 A/m	≈ 260 ≈ 150	mT
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥ 100	°C
density		≈ 5000	kg/m^3

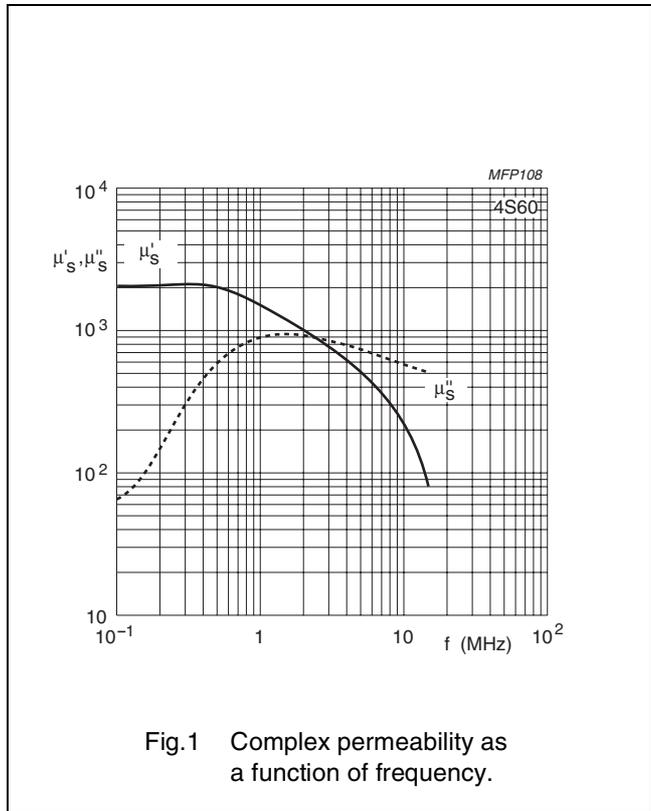


Fig.1 Complex permeability as a function of frequency.

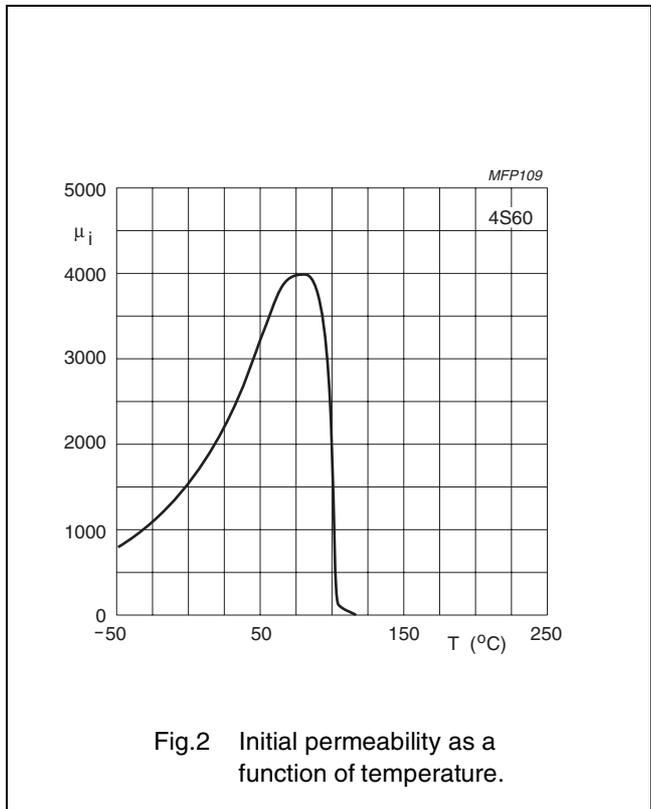


Fig.2 Initial permeability as a function of temperature.

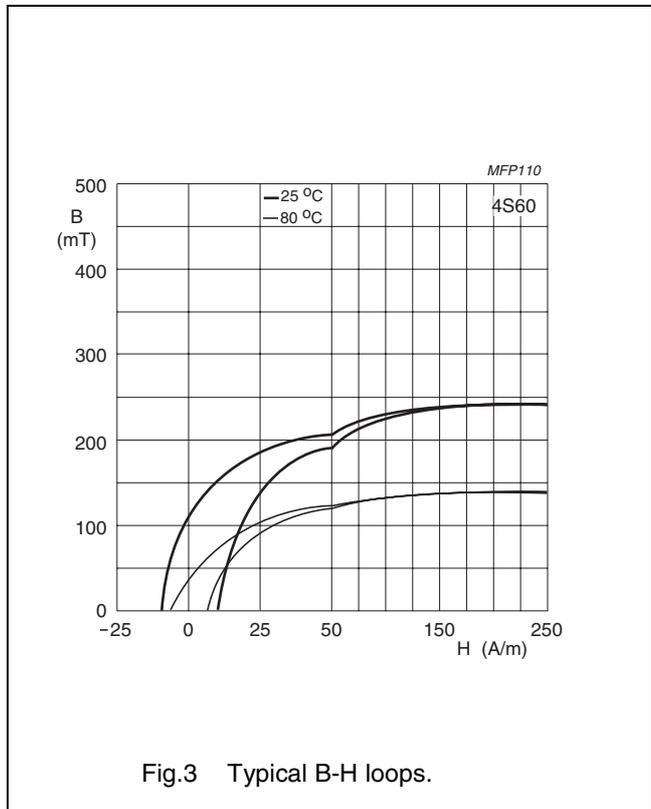


Fig.3 Typical B-H loops.

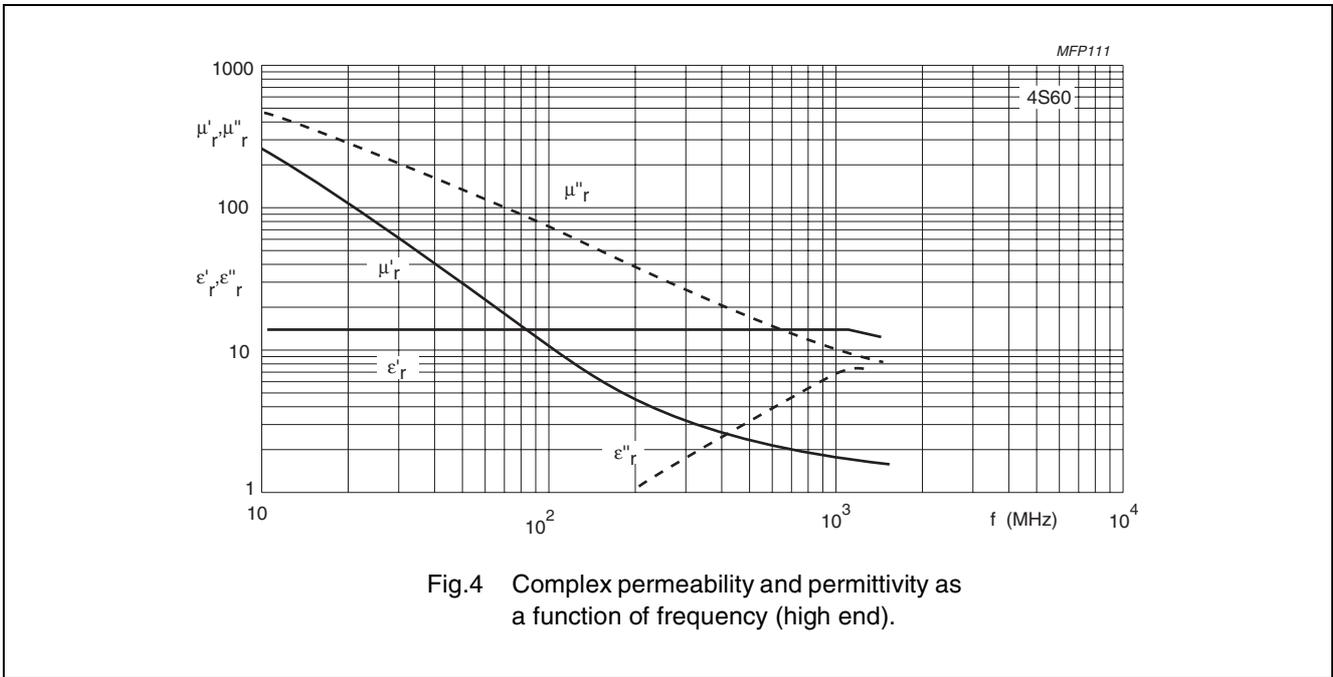


Fig.4 Complex permeability and permittivity as a function of frequency (high end).



Fig.5 Reflectivity at normal incidence as a function of frequency.

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.