2002-05-15

ELFA

PRODUKTINFORMATION

Vi reserverar oss mot fel samt förbehåller oss rätten till ändringar utan föregående meddelande

ELFA artikelnr

58-758-85	**Toroid 3R1 23x14x7 mm**	**TN23/14/7-3R1**
58-766-51	**Toroid 4C65 23x14x7 mm**	**TN23/14/7-4C65**

DATA SHEET

TN23/14/7
Ferrite toroids

Supersedes data of November 2000

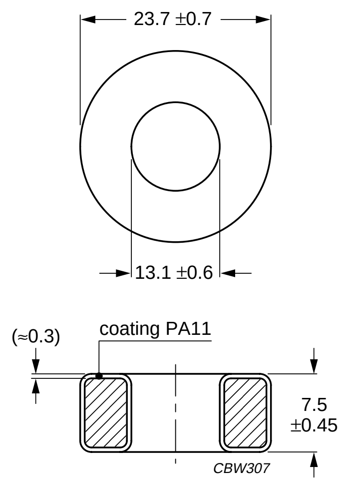
2002 Feb 01

FERROXCUBE
A YAGEO COMPANY

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
Σ(I/A)	core factor (C1)	1.81	mm^{-1}
V_e	effective volume	1722	mm^3
l_e	effective length	55.8	mm
A_e	effective area	30.9	mm^2
m	mass of core	≈ 8.4	g



Dimensions in mm.

Fig.1 TN23/14/7 ring core.

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*; UL file number E 45228 (M).

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65	87 ± 25%	≈ 125	violet	TN23/14/7-4C65
4A11	485 ± 25%	≈ 700	pink	TN23/14/7-4A11
3R1(1)	–	≈ 800	black	TN23/14/7-3R1
3F3	1250 ± 25%	≈ 1800	blue	TN23/14/7-3F3
3C90 des	1600 ± 25%	≈ 2300	ultramarine	TN23/14/7-3C90
3C11	3000 ± 25%	≈ 4300	white	TN23/14/7-3C11
3E25	3820 ± 25%	≈ 5500	orange	TN23/14/7-3E25

Note

1. Due to the rectangular BH-loop of 3R1, inductance values strongly depend on the magnetic state of the ring core and measuring conditions. Therefore no A_L value is specified. For the application in magnetic amplifiers A_L is not a critical parameter.

WARNING
Do not use 3R1 cores close to their mechanical resonant frequency. For more information refer to *"3R1"* material specification in this data handbook.

Ferrite toroids TN23/14/7

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	**f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C**	**f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C**	**f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C**
3C90	≥320	≤ 0.19	≤ 0.19	
3F3	≥320		≤ 0.19	≤ 0.33

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DATA SHEET

3R1
Material specification

Supersedes data of November 2000

2002 Feb 01

3R1 SPECIFICATIONS

MnZn ferrite with a nearly rectangular hysteresis loop for use in magnetic regulators/amplifiers.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	800 ±20%	
B	25 °C; 10 kHz; 250 A/ m 100 °C; 10 kHz; 250 A/ m	≥ 360 ≥ 285	mT
B_r	from 1 kA/m; 25 °C from 1 kA/m; 100 °C	≥ 310 ≥ 220	mT
H_c	from 1 kA/m; 25 °C from 1 kA/m; 100 °C	≤ 52 ≤ 23	A/m
ρ	DC; 25 °C	≈ 10^3	Ωm
T_C		≥ 230	°C
density		≈ 4700	kg/m^3

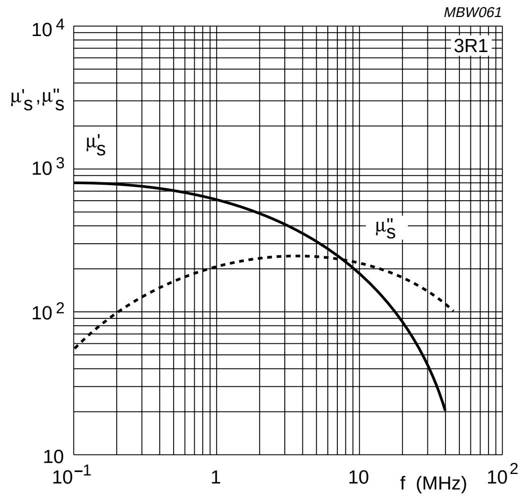

Fig.1 Complex permeability as a function of frequency.

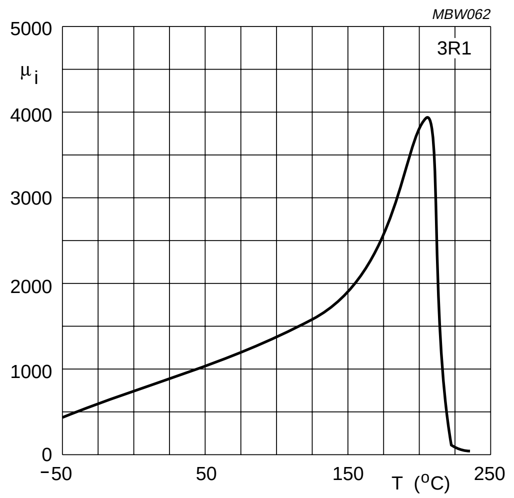

Fig.2 Initial permeability as a function of temperature.

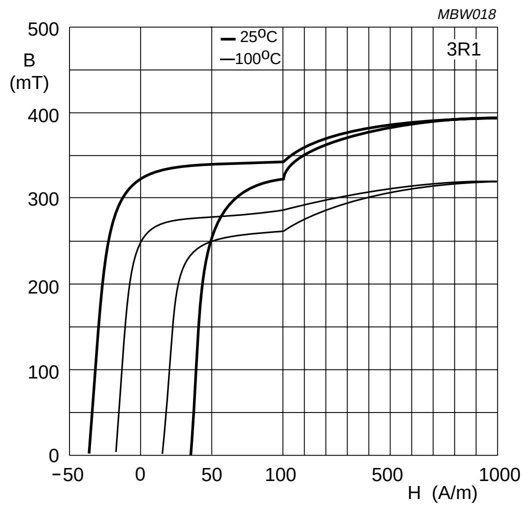

Fig.3 Typical B-H loops.

Material specification 3R1

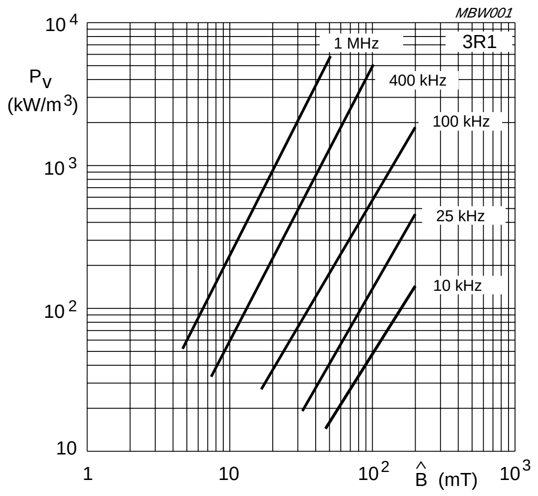

Fig.4 Specific power loss as a function of peak flux density with frequency as a parameter.

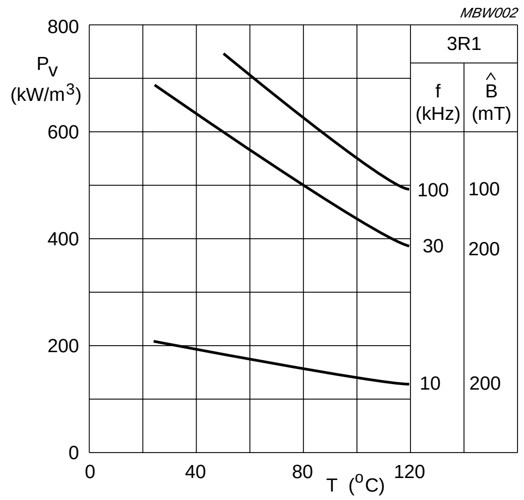

Fig.5 Specific power loss for several frequency/flux density combinations as a function of temperature.

Remark:

When 3R1 ring cores are driven exactly at their natural mechanical resonant frequencies a magneto-elastic resonance will occur. With large flux excursions and no mechanical damping, amplitudes can become so high that the maximum tensile stress of the ferrite is exceeded. Cracks or even breakage of the ring core could be the result. It is advised not to drive the toroidal cores at their radial resonant frequencies or even subharmonics (e.g. half this resonant frequency).

Resonant frequencies can be calculated for any ring core with the following simple formula:

$$f_r = \frac{5700}{\pi\left(\frac{D_o + D_i}{2}\right)} \text{ kHz}$$

where:

f = radial resonant frequency (kHz)

D_o = outside diameter (mm)

D_i = inside diameter (mm).

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DATA SHEET

4C65

Material specification

Supersedes data of November 2000

2002 Feb 01

FERROXCUBE
A YAGEO COMPANY

4C65 SPECIFICATIONS

Low permeability NiZn ferrite for use in RF tuning, wideband and balun transformers.

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	125 ±20%	
B	25 °C; 10 kHz; 250 A/m	≈ 300	mT
	100 °C; 10 kHz; 250 A/m	≈ 250	
$\tan\delta/\mu_i$	25 °C; 3 MHz; 0.1 mT	$\leq 80 \times 10^{-6}$	
	25 °C; 10 MHz; 0.1 mT	$\leq 130 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥ 350	°C
density		≈ 4500	kg/m^3

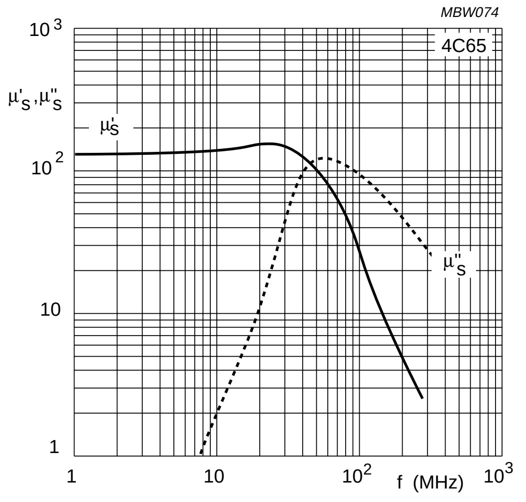

Fig.1 Complex permeability as a function of frequency.

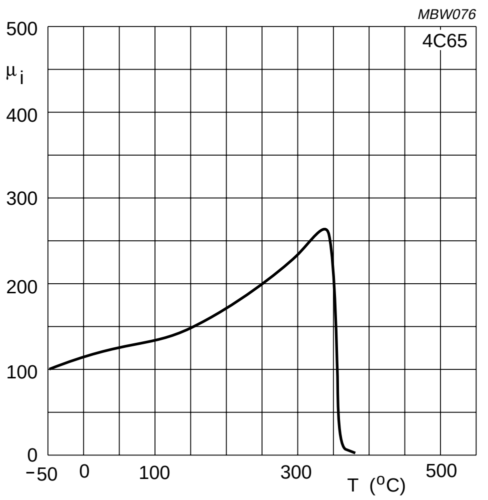

Fig.2 Initial permeability as a function of temperature.

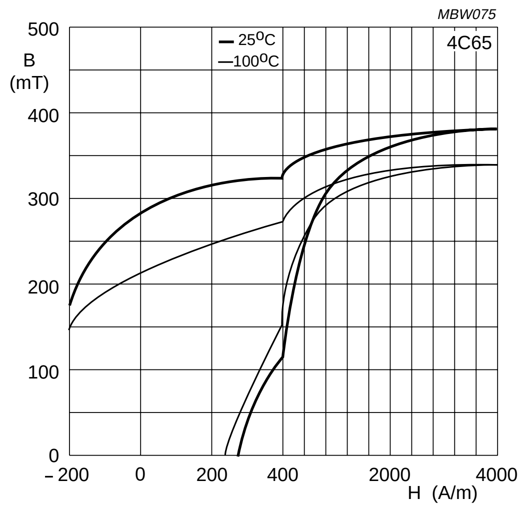

Fig.3 Typical B-H loops.

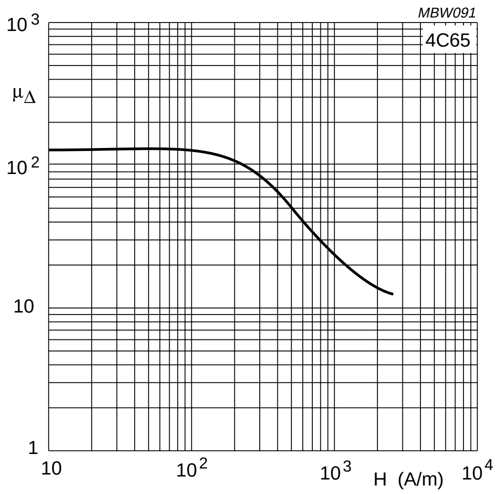

Fig.4 Incremental permeability as a function of magnetic field strength.

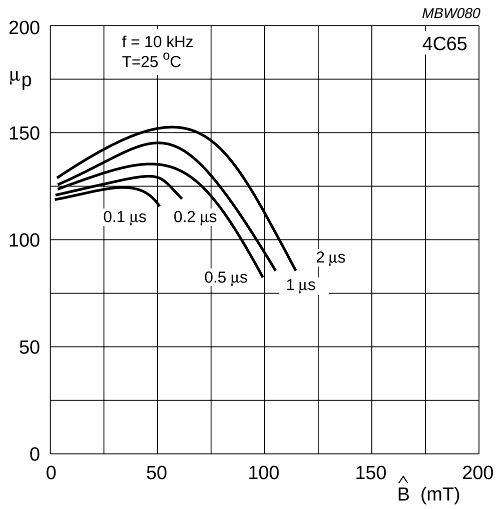

Fig.5 Pulse characteristics (unipolar pulses).

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