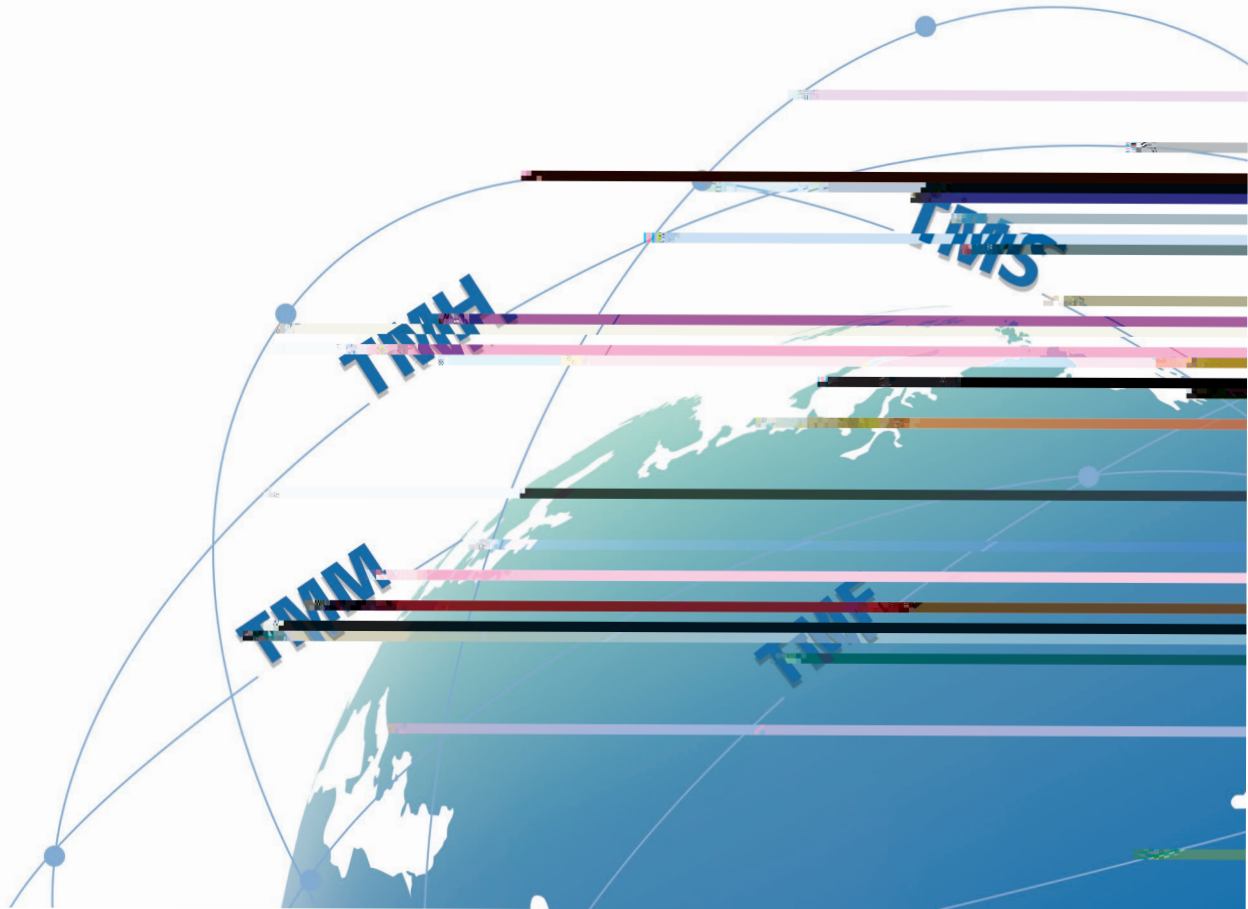
MAGNETIC POWDER CORES



Introduction

(:600330) 1984 2001

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2009

5G

Founded in 1984 and listed on the Shanghai Stock Exchange in 2001 (Stock Code: 600330), TDG Holding Co., Ltd is a high-tech enterprise in China and has a number of subsidiaries. TDG has formed four major business segments: electronic materials, electronic module, green energy and smart equipment, the business covers the entire industrial chain of electronic information materials.

TDG has been researching and developing magnetic powder cores since 2009, and owns magnetic powder cores industrial bases in Haining, Zhejiang and Lu'an, Anhui. TDG has developed and can mass produce Fe-Si-Al , Fe-Si, Fe-Ni, Fe-Ni-Mo and composite powder cores, the products are widely used in the field of electronic technology, such as new energy vehicles, PV and energy storage, 5G communication, data centers, servers, smart homes, medical care and consumer electronics.



Product Introduction

Magnetic powder cores are distributed-air-gap cores made from ferrous alloy powders for low loss at high frequencies and stable inductance and other performance over temperature. Small air gap distributed evenly throughout the cores increase the amount of DC (direct current) that can be passed through the winding before core saturation occurs. The magnetic powder cores mainly include Fe-Si-Al (Sendust), Fe-Si, Fe-Ni (High Flux), FeNi composite powder core and FeSi composite powder core.

The company's products are widely used in Solar inverter, energy storage, new energy vehicles, DC Charging station, uninterruptible power supply, communication server, high-e ciency switching power supply, high-end household appliances and other fields.

Material

/Material: TMS SERIES

Features

Al-Si-Fe

1.05T High saturation flux density (1.05T)

Low loss characteristics

Low magnetostriction

Good temperature & frequency stability

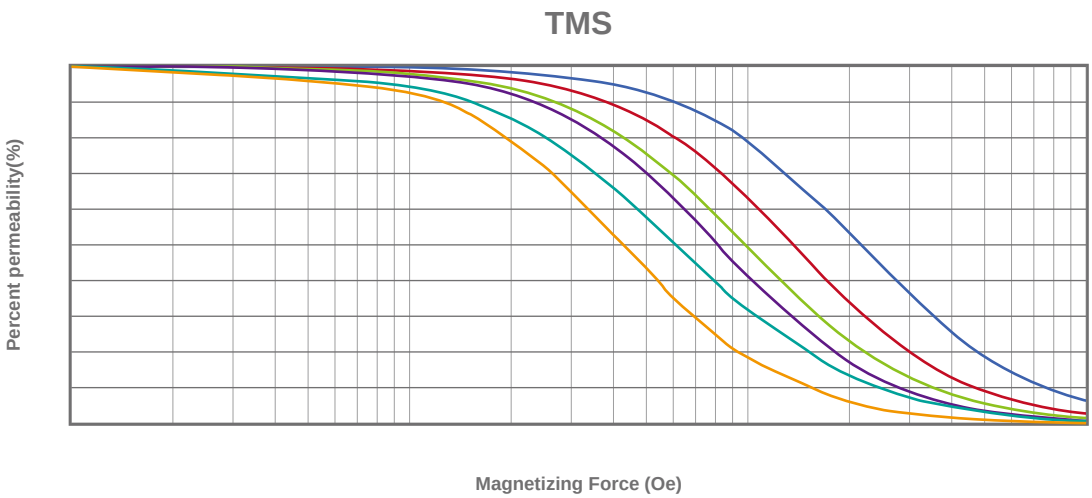
pplication

Power adapter

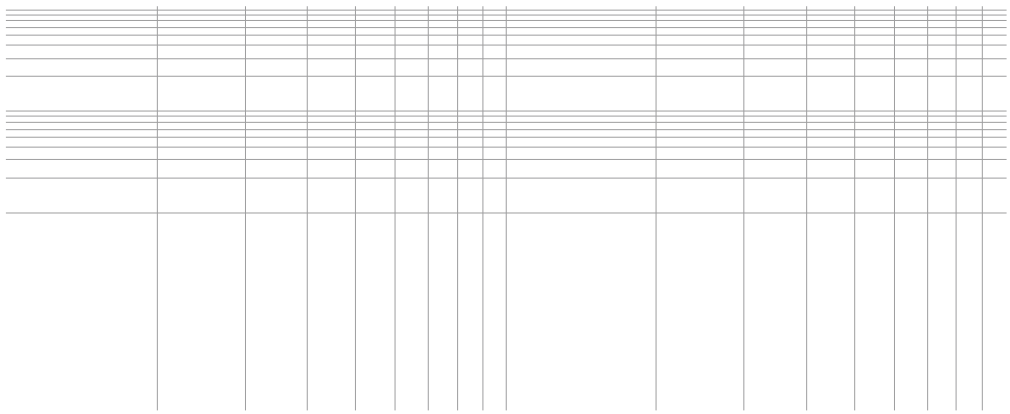
Boost choke for PV inverter

PC PC power supply

1.1 Permeability vs DC Bias Curves



1.2 Core Loss Properties Curves



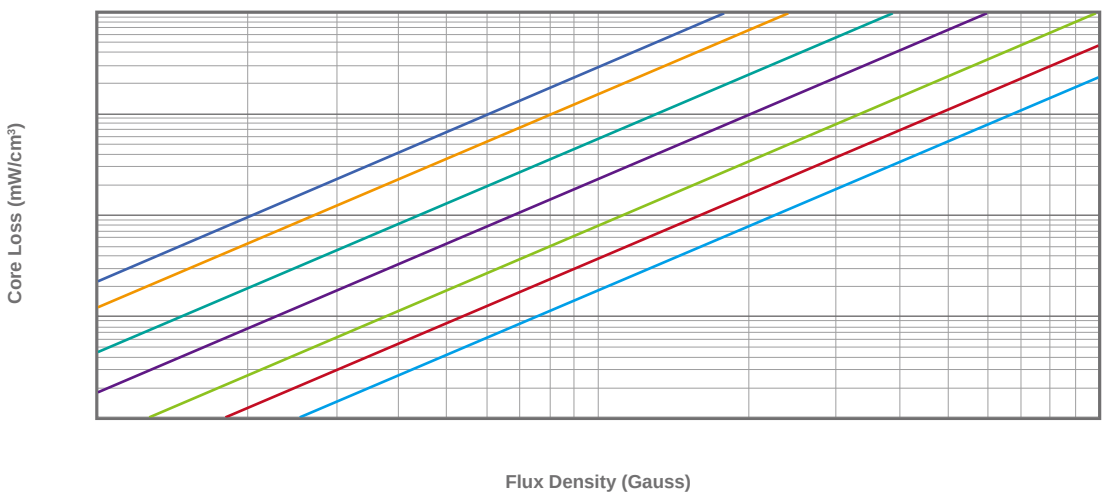
/Material: TMSA SERIES

Features

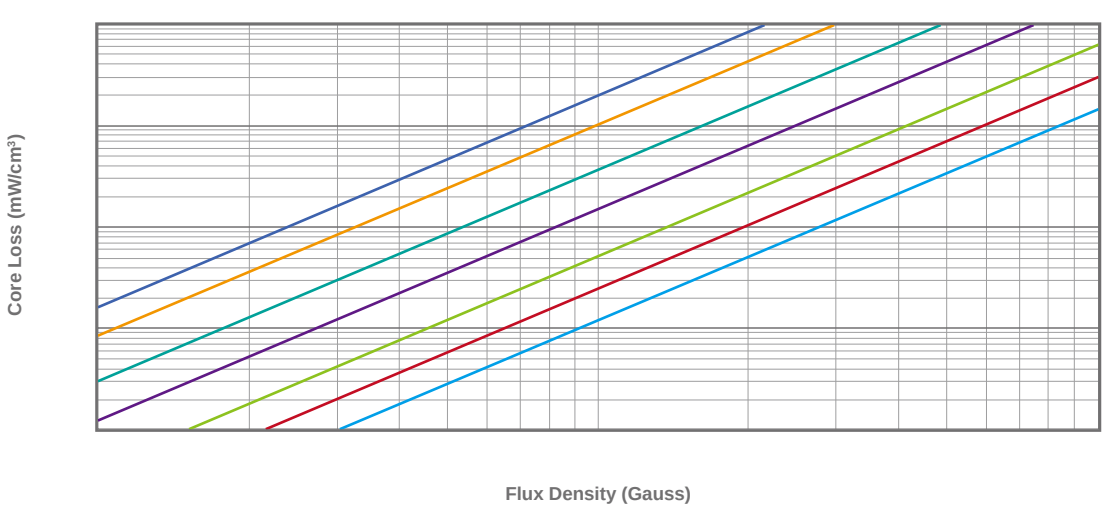
0.95T

1.2 Core Loss Properties Curves

TMSA



TMSA



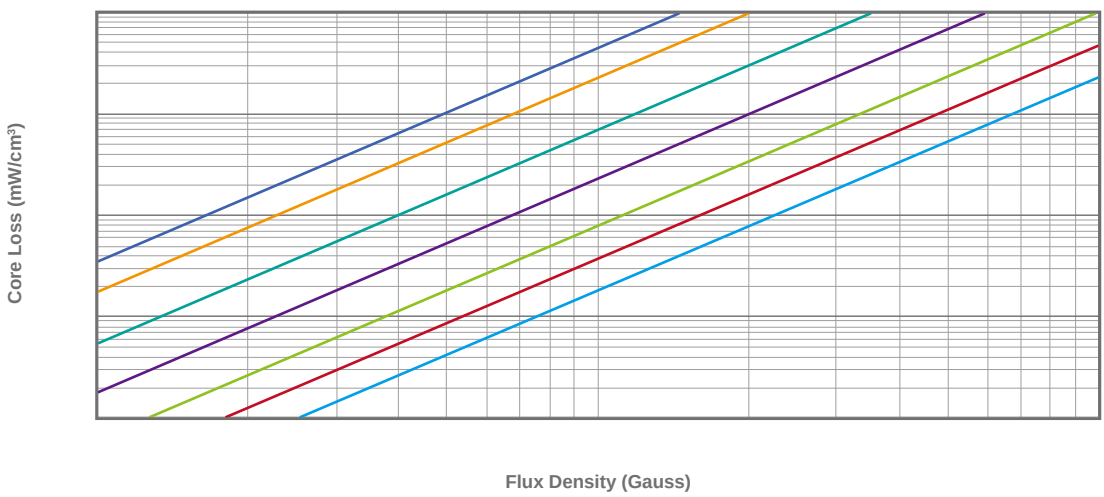
/Material: TMSB SERIES

Features

Excellent DC Bias performance R § H U R b i

([F H O O H Q W W H S H UI D W H U ‡ • ˜ U€• € pT€ € `V

TMSB



/Material: TMSG SERIES

Features

Ultra-low core loss

High saturation flux density

Near zero magnetostriction

Excellent temperature & frequency stability

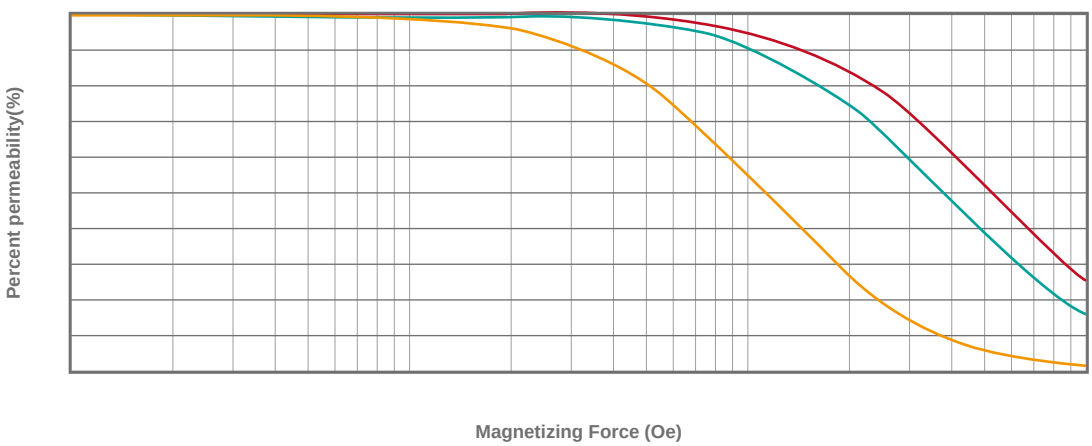
pplication

High frequency Inductor

Resonant inductor

Chip Inductor

1.1 Permeability vs DC Bias Curves

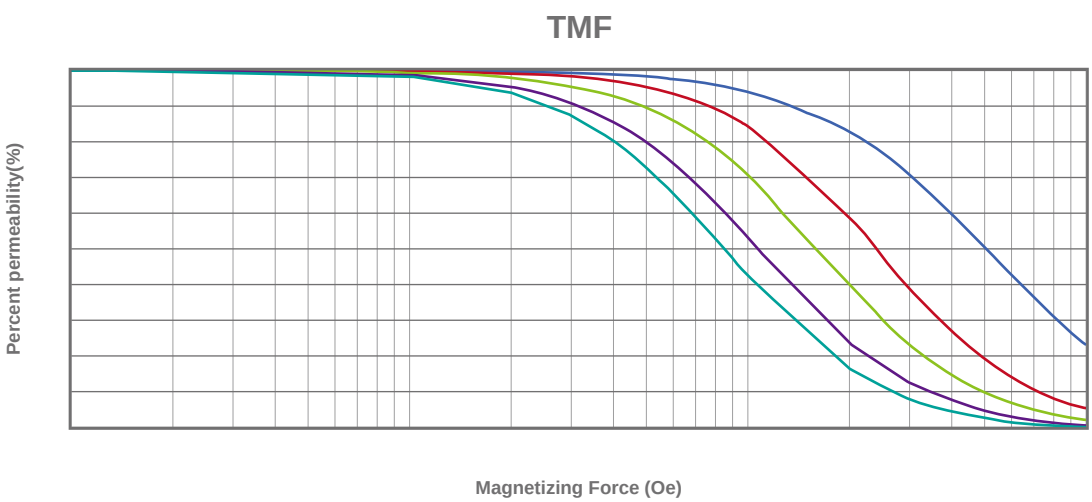


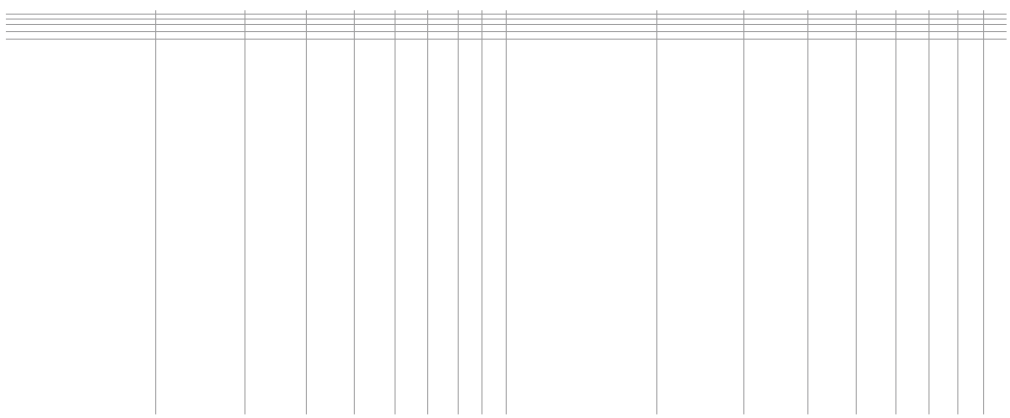
/Material: TMF SERIES

	Features
	Distributed air gap
1.6T	Very high saturation flux density (1.6T)
	High DC bias performance
	Low magnetostriction
	Good temperature & frequency stability

	pplication
	PV Inverter
	General industrial power supply
UPS	UPS power supply
	DC charging station

1.1 Permeability vs DC Bias Curves





/Material: TMFA SERIES

1.5T

TMF 30%

/Material: TMFB SERIES

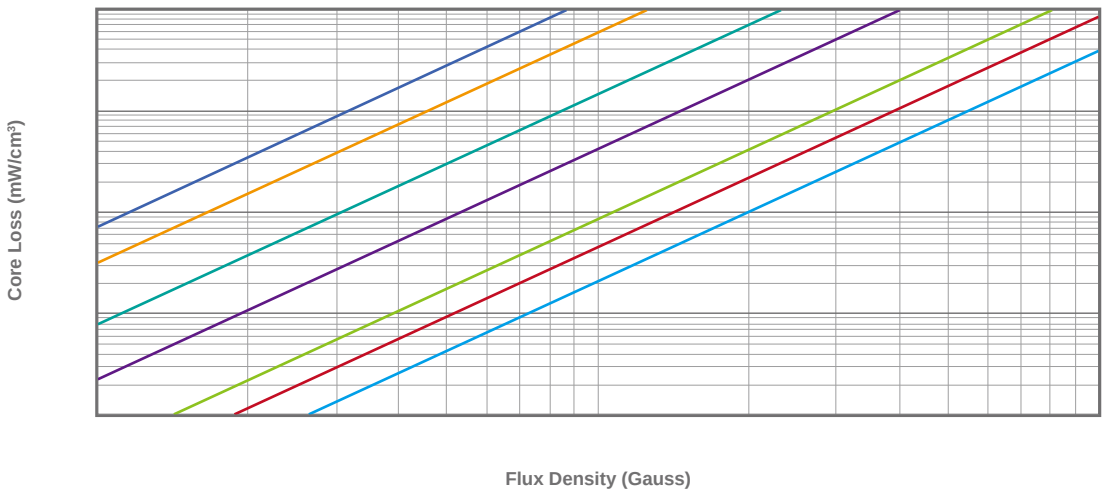
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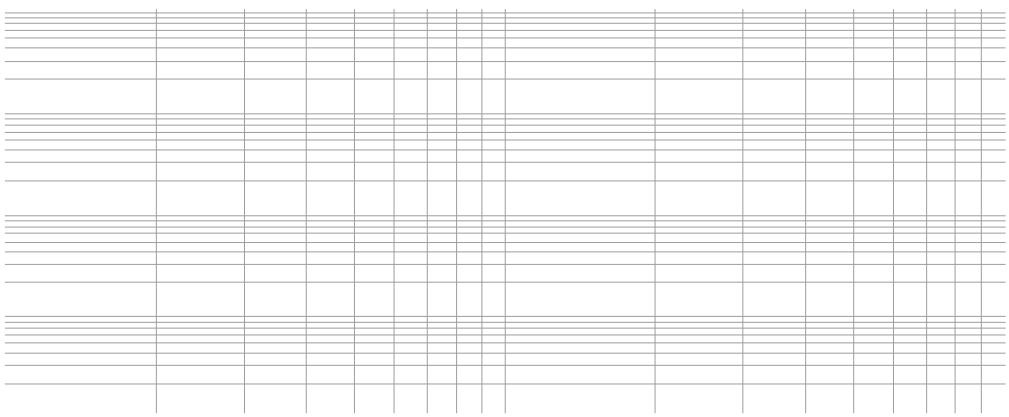
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6• À @Y 0 L D (? D ¤ L D (e L 8 ? ð•\

TMFB





/Material: TMFC SERIES

Features

Distributed air gap

1.1T Very high saturation flux density (1.1T)

Low core loss

Low magnetostriction

Good temperature & frequency stability

pplication

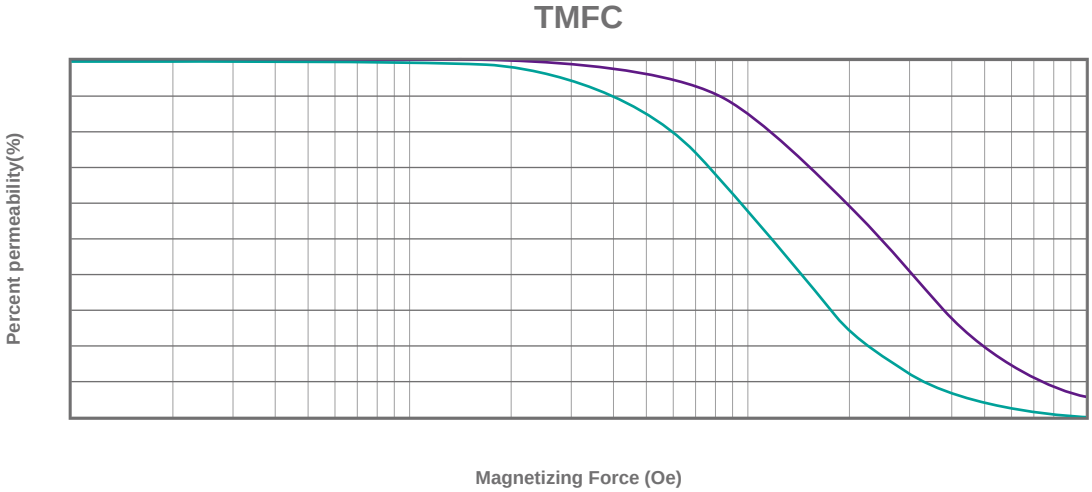
UPS

PV Inverter

New energy vehicle

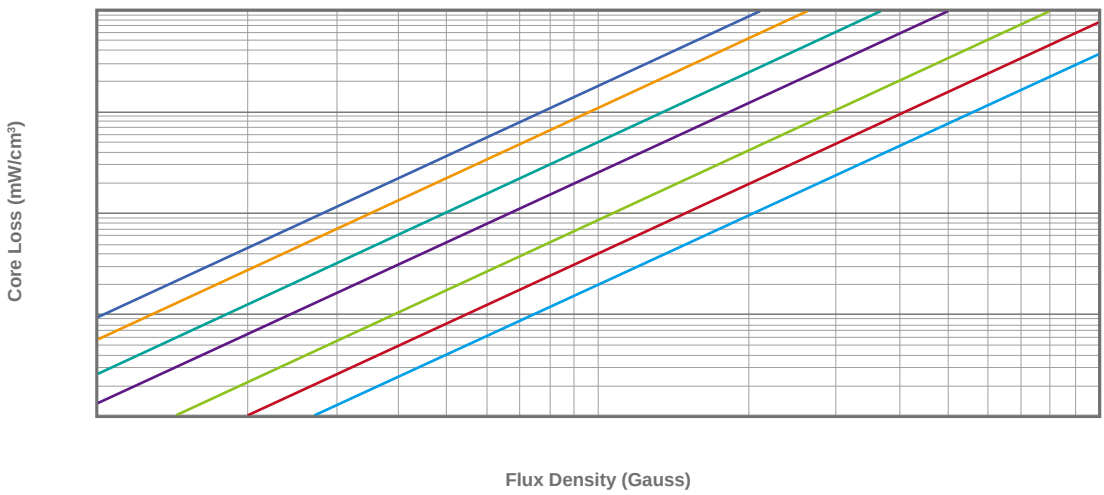
Server power supply

1.1 Permeability vs DC Bias Curves

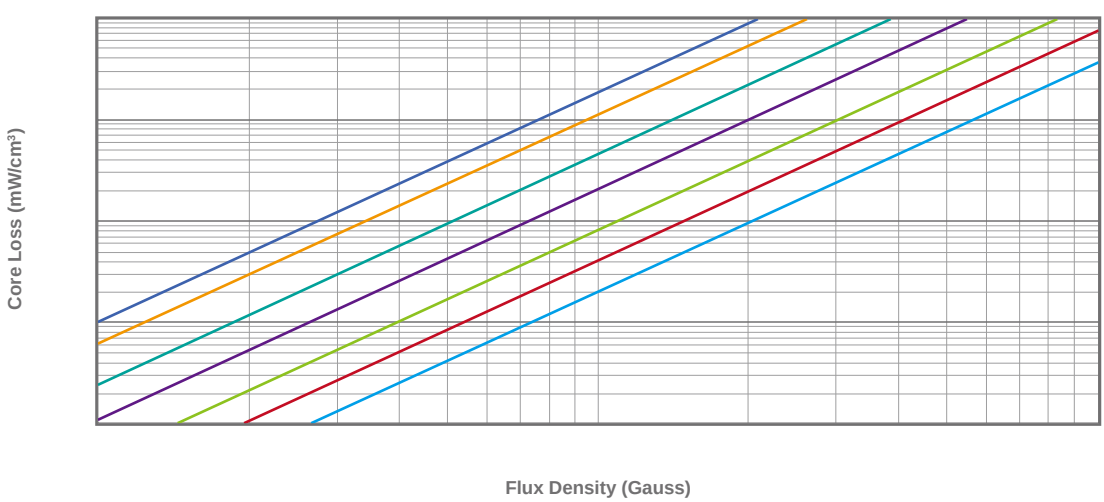


1.2 Core Loss Properties Curves

TMFC



TMFC



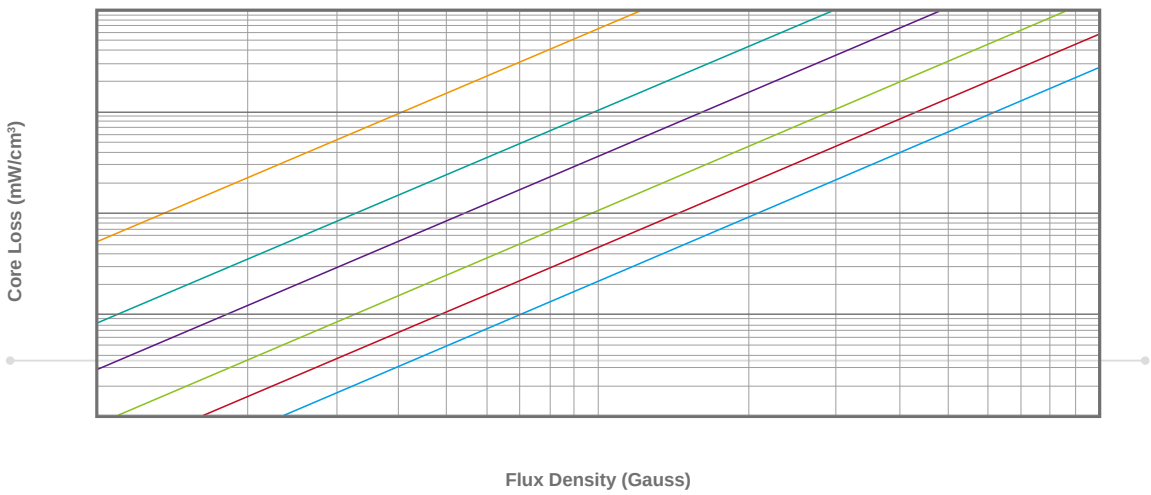
/Material: TMH SERIES

Features

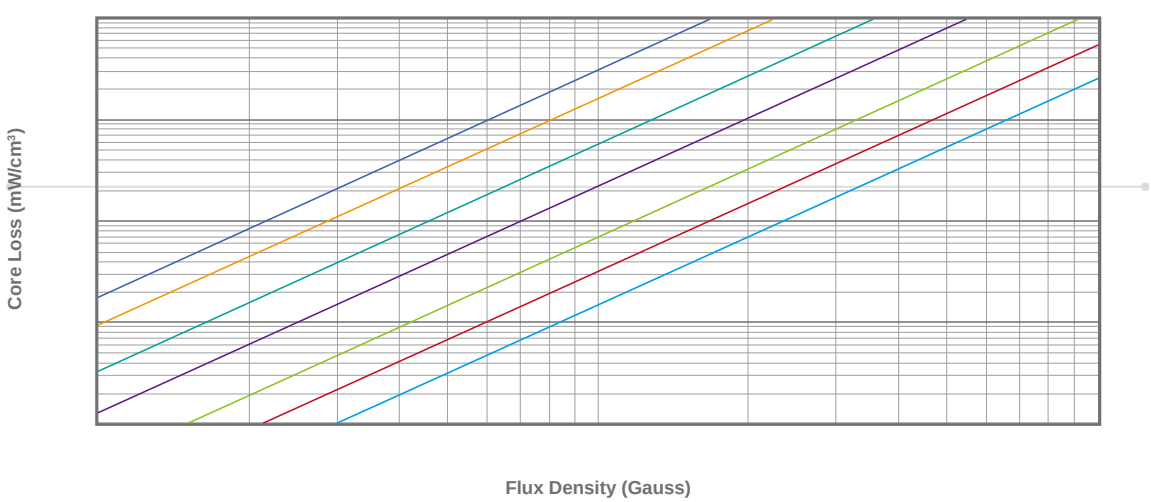
1.5T

1.2 Core Loss Properties Curves

TMH



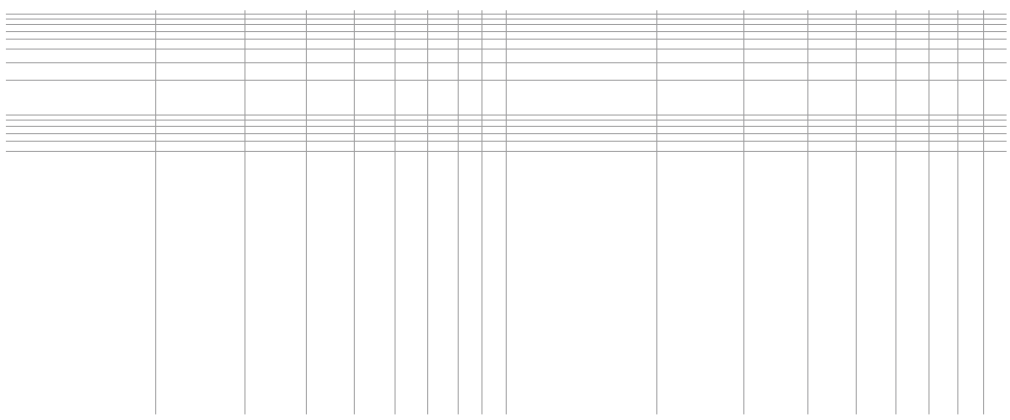
TMH



/Material:

TMHA SERIES

1.2T



/Material: TMHB SERIES

Features

Distributed air gap

1.3T Very high saturation flux density (1.3T)

Excellent DC bias performance

Low magnetostriction

Good temperature & frequency stability

pplication

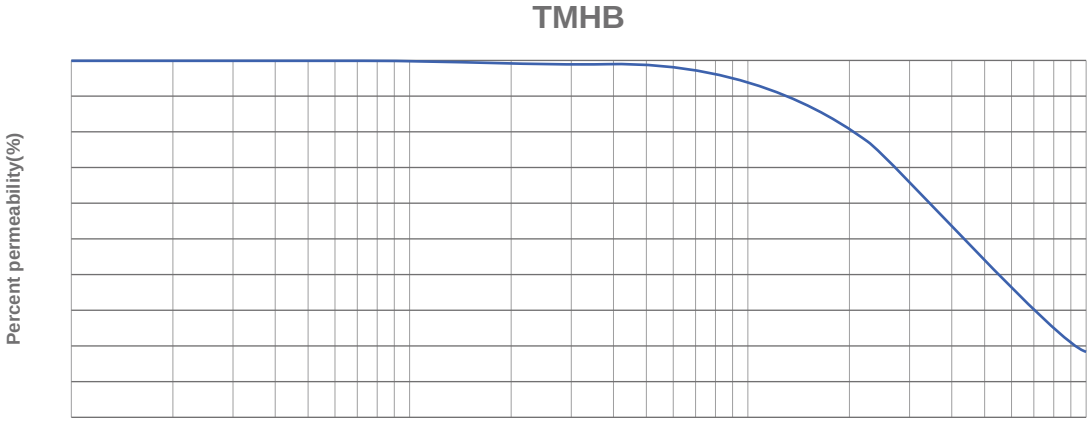
Industrial power supply

Communication power supply

New energy vehicle

Server power supply

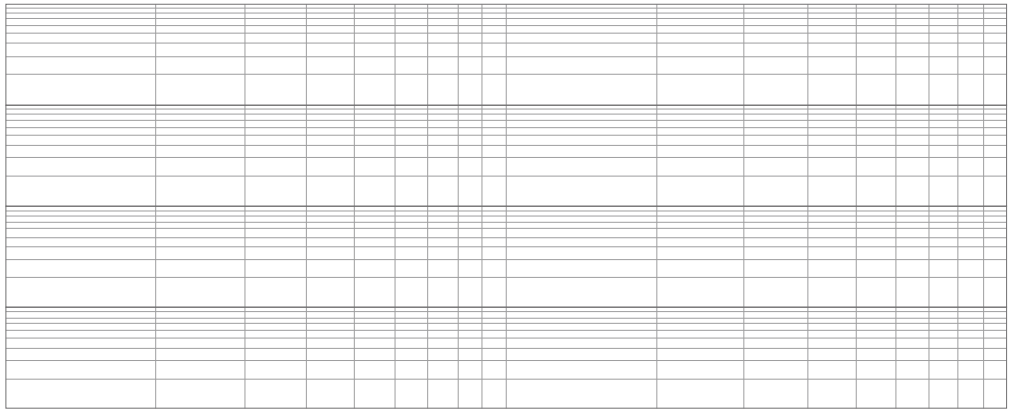
1.1 Permeability vs DC Bias Curves



TMHB



TMHB



/Material: TMM SERIES

Features

Distributed air gap

0.75T High saturation flux density (0.75T)

Very low core loss

Low magnetostriction

Good temperature & frequency stability

pplication

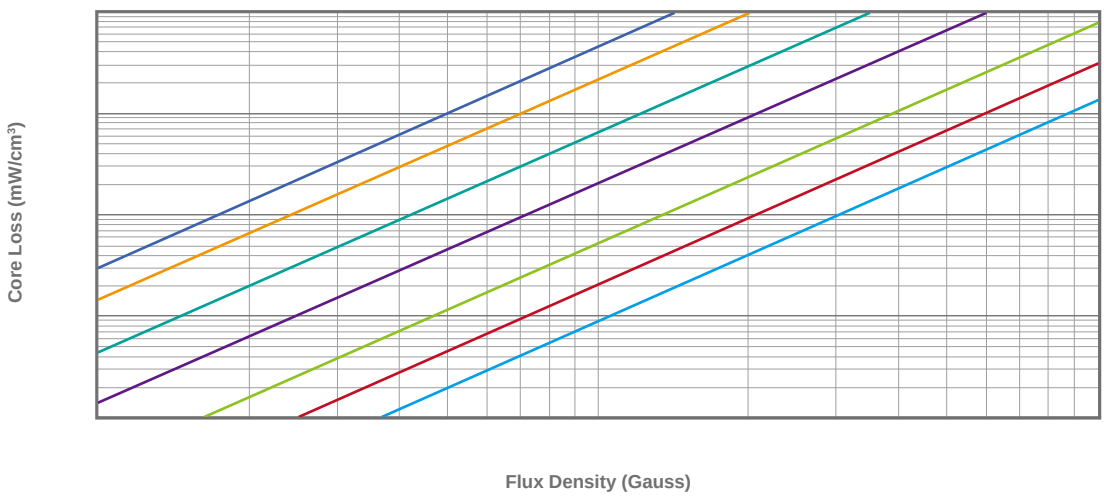
High e ciency server power supply

Communication power supply

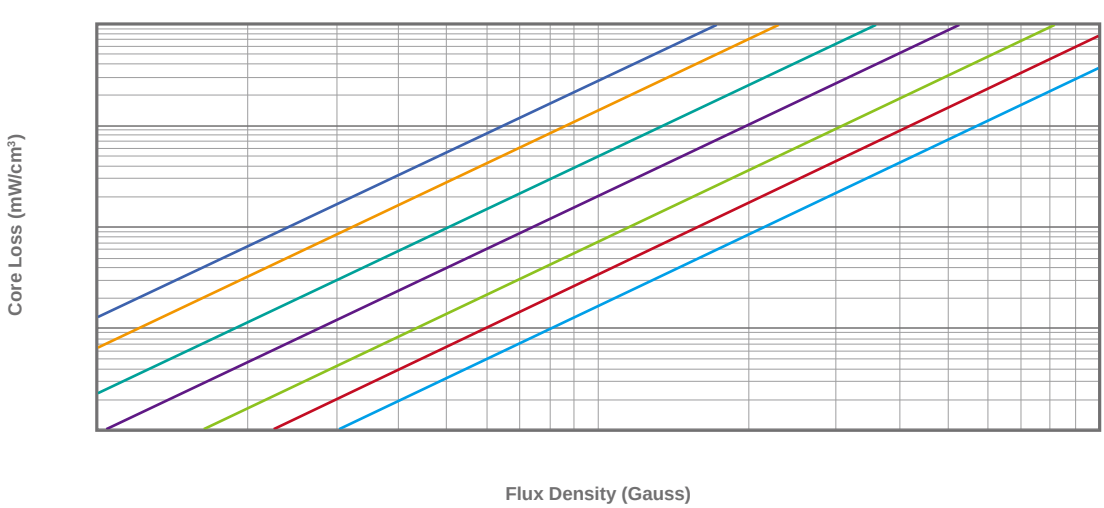
1.1 Permeability vs DC Bias Curves

1.2 Core Loss Properties Curves

TMM



TMM



OD6.35mm × ID2.79mm × Ht2.79mm > ŝ Ź Ļ Ż Ƥ ŝ

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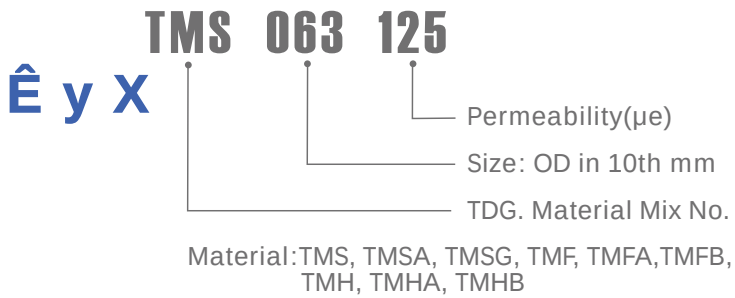
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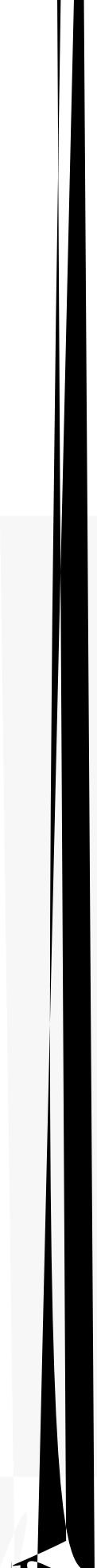
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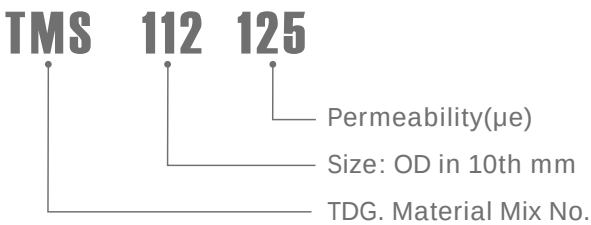


Material:TMS, TMSA, TMSG, TMF, TMFA,TMFB, TMH, TMHA, TMHB

Parameter	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	13.61 mm	4.7 mm^2	64 mm^3	4.12 mm^2
B.S.	0.536 in	0.007 in^2	0.004 in^3	0.006 in^2



OD11.2mm × ID6.35mm × Ht3.96mm



Material:TMS, TMSA, TMSG, TMF, TMFA,TMFB, TMH, TMHA, TMHB

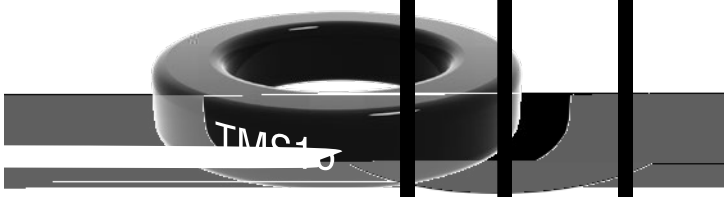
Parameter	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	26.90 mm	9.06 mm^2	243.70 mm^3	27.30 mm^2
B.S.	1.080 in	0.014 in^2	0.015 in^3	0.0423 in^2

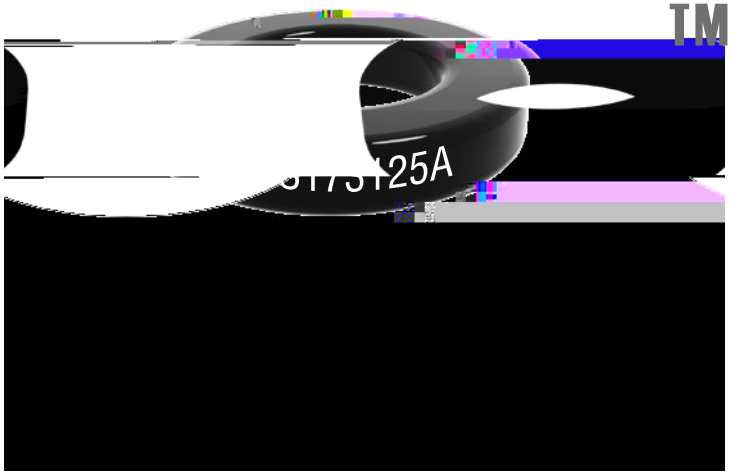
Dimensions Table and Reference Table

Material	TDG Par No.	μ	AL±8%	Dimensions(mm) OD(max)*ID(min)*HT(max)	
				Before coating	After coating
TMS	TMS112026	26	11	11.20*6.35*3.96	11.89*5.89*4.72
	TMS112060	60	26		
	TMS112090	90	38		
	TMS112125	125	53		
TMF	TMF112026	26	11	11.20*6.35*3.96	11.89*5.89*4.72
	TMF112040	40	17		
	TMF112060	60	26		
	TMF112075	75	32		
	TMF112090	90	38		
TMH	TMH112060	60	26	11.20*6.35*3.96	11.89*5.89*4.72
	TMH112125	125	53		

Material, shape and size can be customized

	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	31.20 mm	10.90 mm ^{2}	360.52 mm^3	38.30 mm^2
	1.229 in	0.018 in^2	0.022 in^3	0.059 in^2





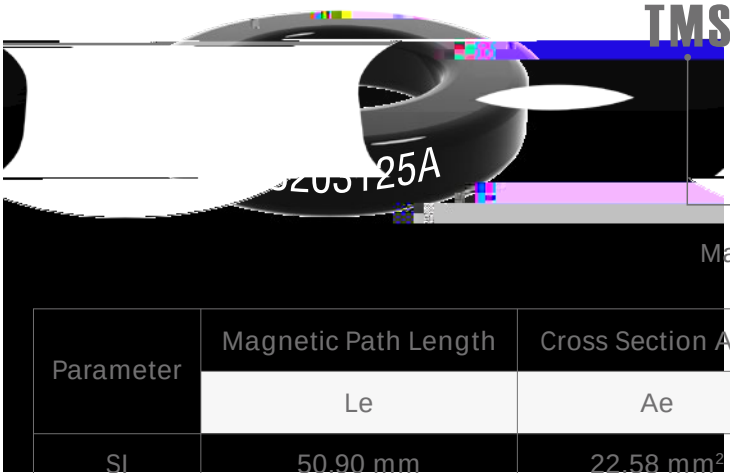
TMS 173 125

Permeability(μe)

Size: OD in 10th mm

TDG. Materei M ٢ T

OD20.3mm × ID12.7mm × Ht6.35mm



TMS 203 125

Permeability(μe)

Size: OD in 10th mm

TDG. Material Mix No.

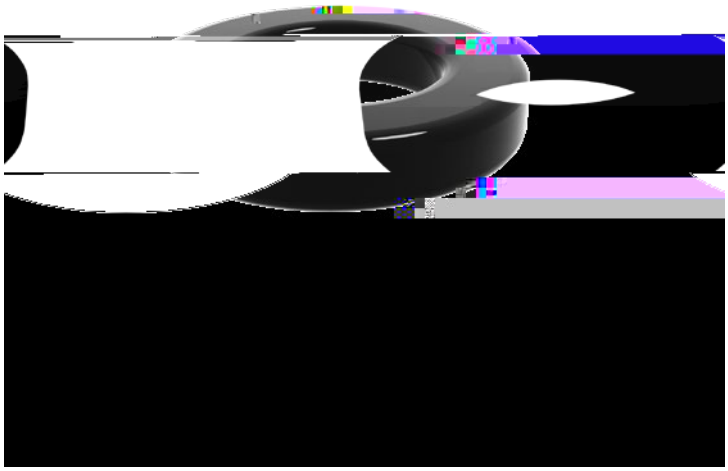
Material:TMS, TMSA, TMSG, TMF, TMFA,TMFB, TMH, TMHA, TMHB

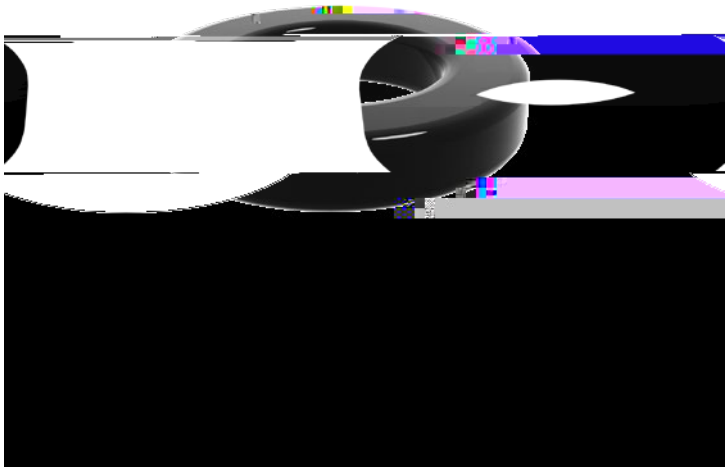
Parameter	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	50.90 mm	22.58 mm²	1150.00 mm³	114.00 mm²
B.S.	2.01 in	0.035 in²	0.070 in³	0.177 in²

Dimensions Table and Reference Table

Material	TDG Part No.	μ	AL±8%	Dimensions(mm) OD(max)*ID(min)*HT(max)	
				Before coating	After coating
TMS	TMS203026	26	14	20.30*12.70*6.35	21.10*12.07*7.11
	TMS203060	60	32		
	TMS203090	90	49		
	TMS203125	125	68		
TMF	TMF203026	26	14	20.30*12.70*6.35	21.10*12.07*7.11
	TMF203040	40	21		
	TMF203060	60	32		
	TMF203075	75	41		
	TMF203090	90	49		
TMH	TMH203060	60	32	20.30*12.70*6.35	21.10*12.07*7.11
	TMH203125	125	68		

Material, shape and size can be customized






TMS270

OD33.0mm × ID19.9mm × Ht10.7mm



TMS 330 125

- Permeability(μe)
- Size: OD in 10th mm
- TDG. Material Mix No.

Material:TMS, TMSA, TMSG, TMF, TMFA,TMFB, TMH, TMHA, TMHB

Parameter	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	81.50 mm	67.10 mm^2	5473.00 mm^3	293.00 mm^2
B.S.	3.21 in	0.104 in^2	0.334 in^3	0.454 in^2

Dimensions Table and Reference Table

Material	TDG Pa r No.	μ	AL±8%	Dimensions(mm) OD(max)*ID(min)*HT(max)	
				Before coating	After coating
TMS	TMS330026	26	28	33.00*19.90*10.70	33.83*19.30*11.61
	TMS330060	60	61		
	TMS330090	90	91		
	TMS330125	125	127		
TMF	TMF330026	26	28	33.00*19.90*10.70	33.83*19.30*11.61
	TMF330040	40	41		
	TMF330060	60	61		
	TMF330075	75	76		
	TMF330090	90	91		
TMH	TMH330060	60	61	33.00*19.90*10.70	33.83*19.30*11.61
	TMH330125	125	127		

Material, shape and size can be customized



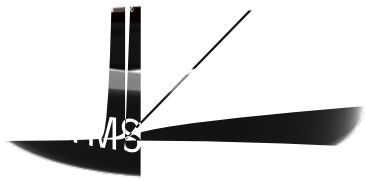


TMS 400 125

Permeability(μe)

Size: OD in 10th mm

TDG. Matere ^ א ` t




TM


TMS50


TMS57113


TMS6

OD77.8mm × ID49.2mm × Ht12.7mm



TMS 777 125

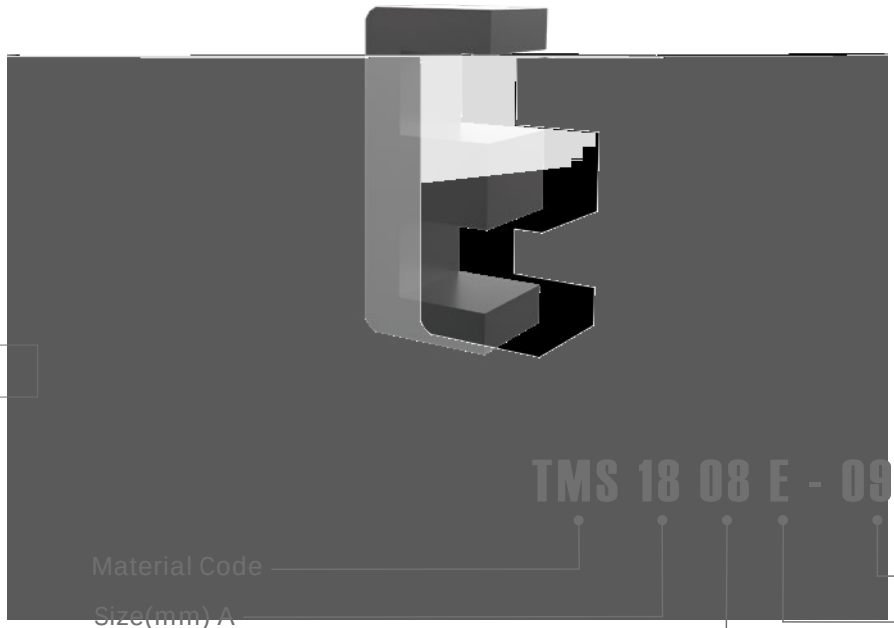
- Permeability(μe)
- Size: OD in 10th mm
- TDG. Material Mix No.

Material:TMS, TMSA, TMSG, TMF, TMFA,TMFB, TMH, TMHA, TMHB

Parameter	Magnetic Path Length	Cross Section Area	Core Volume	Window Area
	Le	Ae	V	W
SI	200.00 mm	177.00 mm^2	34700.00 mm^3	1799.00 mm^2
B.S.	7.720 in	0.274 in^2	2.118 in^3	2.788in^2



EE EE CORE



TMS 18 08 E - 090

Material Code

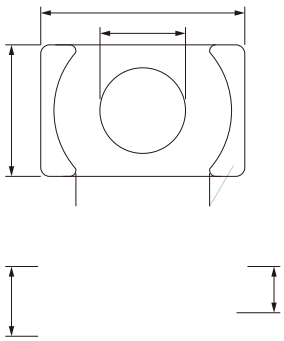
Size(mm) A

Size(mm) B

Permeability

E type Core

EQ EQ CORE



TMF060 - EQ 26.5 / 19.5 / 7.5

Material

EQ type Core

Size(mm) A

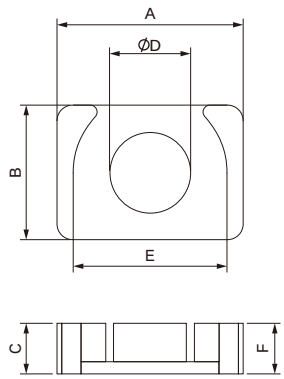
Size(mm) B

Size(mm) C

Dimensions Table and Reference Table

Material, shape and size can be customized

ER ER CORE



TMF060 - ER 50.6 / 32.0 / 13.5

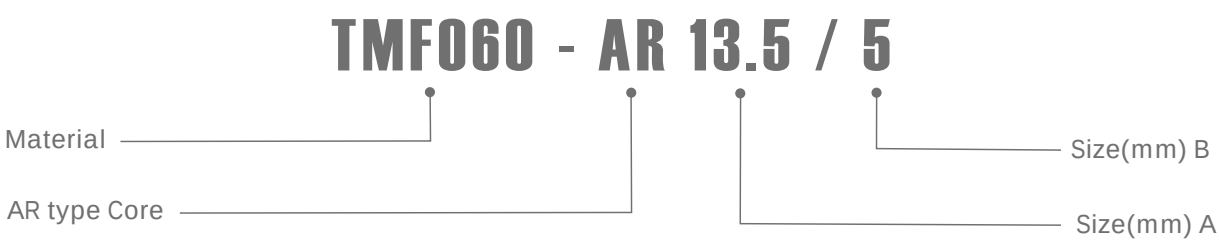
Material
EQ type Core
Size(mm) A
Size(mm) C
Size(mm) B

Dimensions Table and Reference Table

Par Number	Dimensions(mm)						Le (mm)	Ae (mm^2)	Ve (mm^3)	AL(nH/N2)±8%		
	A	B	C	D	E	F				26μ	40μ	60μ
ER50.6/32.0/13.5	50.6	32	13.5	19	7.9	41.3	74.7	312.3	23321.3	136	210	315
ER50.6/32.0/15.5	50.6	32	15.5	19	10.2	41.3	83.7	303.7	25419.7	118	182	273

Material, shape and size can be customized

AR AR CORE

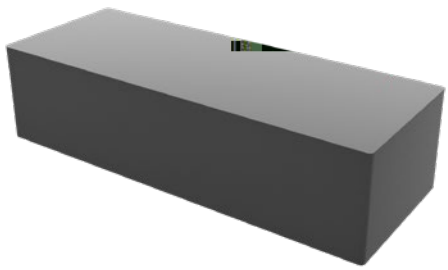


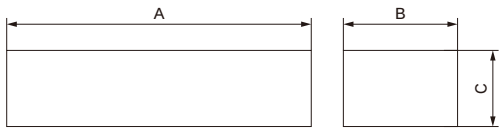
Dimensions Table and Reference Table

AR13.5/5		
AR21/5		
AR21/25		
AR25/5		
AR25/25		
AR28/5		
Par Number	A(mm)	
10 ±0.35	5.0±0.3	
60 ±0.35	5.0±0.3	
60 ±0.3	5.0±0.3	
5 ±0.3	5.0±0.3	
5 ±0.3	5.0±0.3	
18 ±0.3	5.0±0.3	
18 ±0.	5.0±0.3	

Par Number	A(mm)	B(mm3)
AR40/5	40.0±0.4	5.0±0.3
AR40/20	40.0±0.4	20.0±0.3
AR51/5	51.0±0.5	5.0±0.3
AR51/18	51.0±0.5	18.0±0.3
AR61/5	61.0±0.5	5.0±0.3
AR61/13	61.0±0.5	13±0.3
AR78/5	78.0±0.6	5.0±0.3
AR78/10	78.0±0.6	10.0±0.3
AR84/5	84.0±0.6	5.0±0.3
AR84/10	84.0±0.6	10.0±0.3

BLOCK CORE





TMS 50 30 15 B 060

Material
Size(mm) A
Size(mm) B
Size(mm) C
Block Core
Permeability

Dimensions Table and Reference Table

TDG Pa r No.	Dimensions(mm)		
	A	B	C
503015B	50	30	15
503020B	50	30	20
552820B	55	28	20
603015B	60	30	15
603020B	60	30	20
703015B	70	30	15
703020B	70	30	20
803015B	80	30	15
803020B	80	30	20

Material, shape and size can be customized

▶ Effective Permeability

μ_e E ective Permeability
B Flux Density Gauss
H Magnetizing Force Oe

▶ Inductance and Inductance Factor

$$A_L = \frac{L}{N^2}$$

L Inductance H
μ_e E ective Permeability
N Inductance Coe cien
A_L Inductance Coe cien
A_e E ective Area cm^2
l_e E ective length cm

▶ Magnetization Field

H Magnetizing force Oersteds
N Turn
I Current A
L_e E ective length cm

▶ R Winding DC Resistance

l Length of per turn cm/Ts
r Line resistivity $10^{-3}\ \Omega \cdot in^{-1}$
N Turn

▶ Quality Factor

$$Q = \frac{\omega L}{R_{dc} + R_{ac}}$$

Q Quality fator
L Inductance(H)
ω Angular velocity 2πf(Hz)
R_{dc} Winding resistivity(Ω)
R_{ac} Hysteresis losses resistivity(Ω)
R_{cd} Dielectric loss resistivity(Ω)

▶ Magnetic Flux Density

B_{max} Max flux density (Gauss)
E_{rms} Max volt (Volts)
N Turn
A_e E ective area (cm2)
f Frequency (Hz)

▶ Magnetic Core Loss

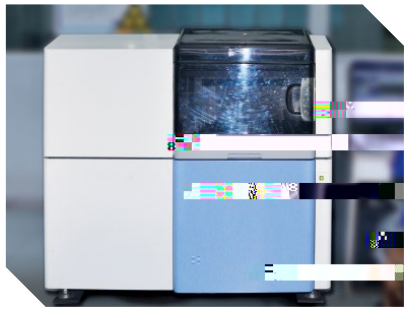
a= Hysteresis losses coe cient
c= Surplus losses coe cient
e= Eddy-current losses coe cient
f Frequency Hz
B_{max} Max flux density Gauss
L Inductance H
μ_e E ective Permeability

Under high frequency conditions, eddy current loss is the main loss.
Hysteresis loss is the main loss at low frequency.

RAW MATERIAL TEST



ICP
icp-oes



ICP
X fluorescence analyzer

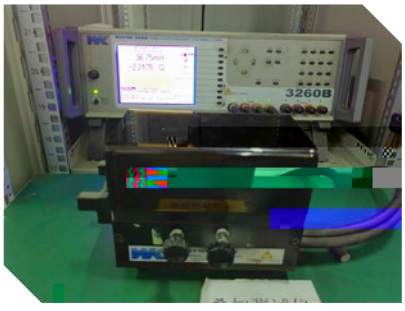
PERFORMANCE TEST



B-H
B-H analyzer



HP 4284A LCR
HP 4284A precision LCR tester



Network/spectrum/impedance analyzer



MATS
MATS Soft magnetic DC Tester

PERFORMANCE TEST

High-low
Temperature
Test Chamber



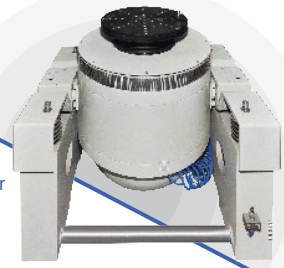
Metallographic
Microscope



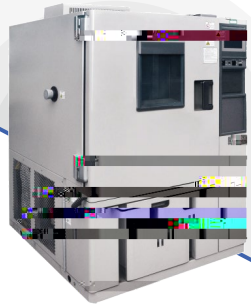
High and low
temperature test box



Electric Vibrator



High and low temperature
alternating test box



MAGNETIC POWDER CORES 2024 2024

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