FERROXCUBE
A YAGEO COMPANY

A new solution for high power inductors

FERROXCUBE moves forward along with the technology and expands its range of products with 3P1 set of cores for inductors in high power conversion systems. A true alternative to laminated steel and metal alloys.

Thanks to its very high saturation level (1.5T) and low power losses, 3P1 is perfectly suited for applications where high energy storage capability and efficiency are necessary. These features allow for a smaller core size, hence lower cost and lighter solution than using ferrites for the same function.

3P1 applications as boost and output choke in power conversion systems include fields like:

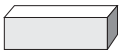
Industrial:

- ***Photovoltaic inverters***
- ***Wind mill inverters***
- ***Welding power supplies***
- ***General purpose inverters***
- ***Uninterruptible Power Supplies***
- ***Power Factor Corrector***

Automotive:

- ***HEV and EV inverter***
- ***EV fast charger***

Product range

Shape	Product reference	Length	Width	Height
Bricks 	BRK50/30/x-3P1M080	50.5	30	Adjustable (max 30)
	BRK60/30/x-3P1M080	60		
	BRK70/30/x-3P1M080	70.5		
	BRK80/30/x-3P1M080	80.5		
	BRK120/30/x-3P1M080	120.5		

Shape	Product reference	Diameter	Height
Cylinder 	ROD25/x-3P1M080	25	(max 25)

All the dimensions are in mm

Material specifications

SYMBOL	CONDITIONS	3P1	UNIT
μ	25 °C; 10 kHz; 0.25 mT	80	
μ_a	25 °C, 10 kHz, 100 mT	85	
Bsat	25 °C; 10 kHz	1.5	T
Pv	25 °C; 10 kHz; 100 mT	90	kW/m³
ρ	DC, 25 °C	> 1	Ω·m
Tc		> 700	°C
density		6300	kg/m³

The core loss formula an approximation of t power losses as a fun of frequency (f) and f density (B)

$P = 926.1 \cdot B(T)^{2.05} \cdot f(k$

If this is not enough...

We are permanently developing new products. Lower material permeabilities are on the way. Other shapes like toroids, or customized cores can be made upon request. Ask Ferroxcube's team for support and optimize your inductor design.

When designing an inductor for power conversion applications (such an inverter, or any other function), the choice of the material and the core size is dependent on several factors like: power requirements, circuit configuration, switching frequency, required efficiency, size constraints and cost.

New FERROXCUBE 3P1 range keeps all the advantages of conventional iron powder over other alternatives:

- high energy storage at low volume,
- moderate cost tooling,
- inexpensive raw material,

while providing:

- wide range of sizes (blocks up to 30mm in thickness),
- lower losses than traditional iron powder cores at the typical working frequencies (few kHz)
- absence of organic binder after the annealing process, therefore no thermal aging is possible.

3P1 range strengths for inductors' design

Efficiency

Power losses are optimal at typical switching frequencies of few kHz, therefore high efficiency may be achievable from the magnetics point of view

High energy storage capacity

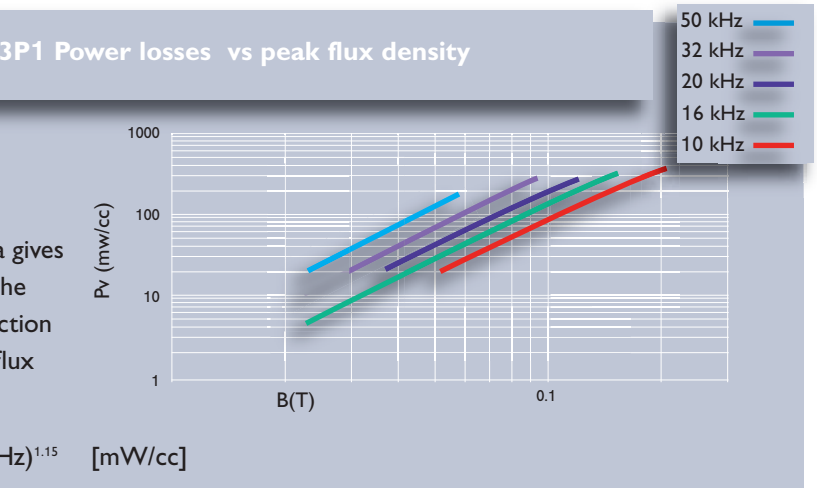
1.5T saturation allows for handling high currents present in boost inductors and output chokes

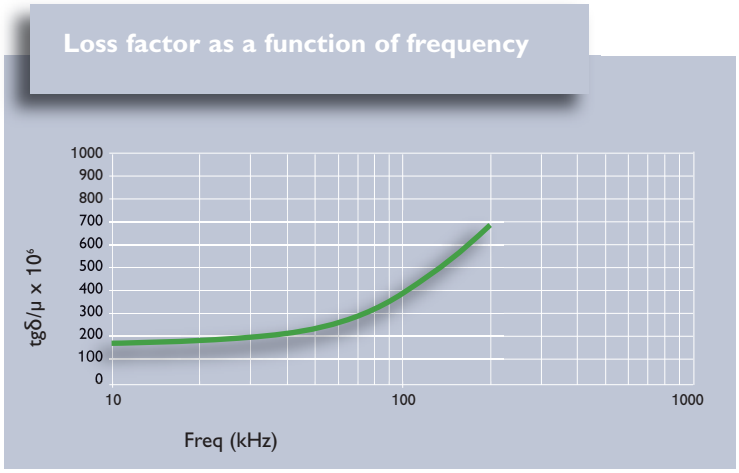
Stability

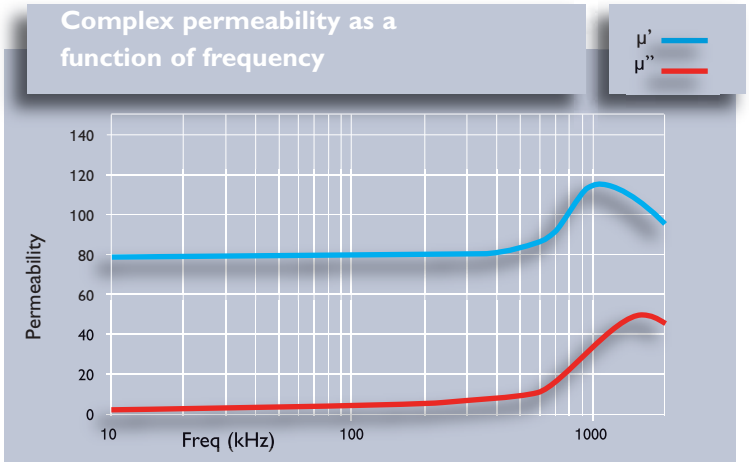
3P1 low permeability is very stable over temperature and with DC field. Inductance values will be under control regardless of the circuit conditions

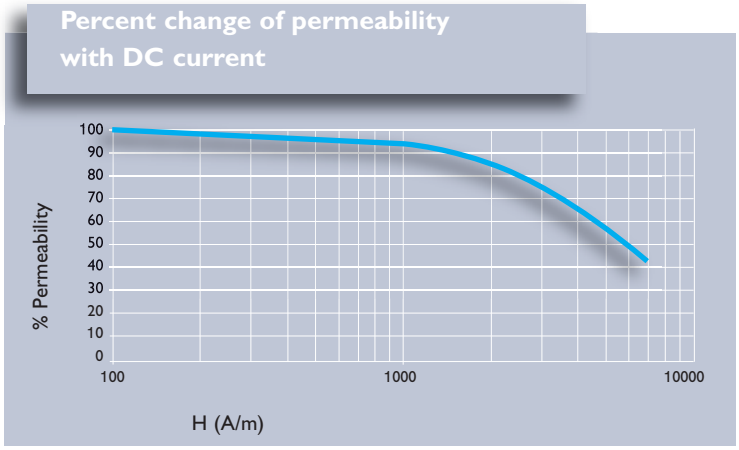
Flexibility

The type and variety of the shapes length and thickness which are available makes it possible to adapt the inductor to the design constraints in order to achieve optimal performance and ease of windings









www.ferroxcube.com

Australia: Contact Ferroxcube Taiwan
Tel. +886 3 599 5886, Fax: +886 3 599 5882

Austria: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Benelux: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Bosnia: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

Brazil: Richardson Electronics, Sao Paulo
Tel: +55 11 5186 9672, Fax: +55 11 5186 9678

Canada east: Contact Ferroxcube, USA
Tel: +1 (915) 599 2328, Fax: +1 (915) 599 2555

China: Ferroxcube South of China
Tel: +86 769 87382420, Fax: +86 769 87339561
Ferroxcube Suzhou
Tel: +86 512 68095048, Fax: +86 512 68097128

Colombia: Richardson Electronics
Tel: +57 1 636 1028, Fax: +57 1 636 1005

Croatia: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

Czech Republic: Contact Ferroxcube Poland
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Denmark: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Finland: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

France: Contact Ferroxcube Hispano Ferritas S.A., SPAIN
Tel: +34 949 247 153, Fax: +34 949 247 166

Germany: Ferroxcube Germany, HAMBURG
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Greece: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

Hungary: Contact Ferroxcube Poland
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Indonesia: Contact Ferroxcube Singapore
Tel: +65 6244 7815, Fax: +65 6449 0446

Ireland: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Israel: Arrow\Rapac Ltd., PETACH TIKVA
Tel: +972 3 9203480, Fax: +972 3 9203443

Italy: Ferroxcube Italy, CINISELLO BALSAMO (MI)
Tel: +39 02 660454 69, Fax: +39 02 612917 39

Korea: Contact Ferroxcube Taiwan
Tel: +886 3 599 5886, Fax: +886 3 599 5882

Malaysia: Contact Ferroxcube Singapore
Tel: +65 6244 7815, Fax: +65 6449 0446

Mexico: R.V. Componentes, Guadalajara, MX.
Tel: +52 (33) 3165-5570 Fax: +52 (33) 3165-4663

Montenegro: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

New Zealand: Contact Ferroxcube Taiwan
Tel: +886 3 599 5886, Fax: +886 3 599 5882

Norway: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Philippines: Contact Ferroxcube Singapore
Tel: +65 6244 7815, Fax: +65 6449 0446

Poland: Ferroxcube Polska, SKIERNIEWICE
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Portugal: Contact Ferroxcube Hispano Ferritas S.A., SPAIN
Tel: +34 949 247 153, Fax: +34 949 247 166

Romania: Contact Ferroxcube Poland
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Russia: Contact Ferroxcube Poland
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Serbia: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

Singapore: Ferroxcube Singapore, SINGAPORE
Tel: +65 6244 7815, Fax: +65 6449 0446

Slovak Republic: Contact Ferroxcube Poland
Tel: +48 46 834 00 07, Fax: +48 46 834 00 35

Slovenia: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

South-Africa: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Spain: Ferroxcube Hispano Ferritas, GUADALAJARA
Tel.: +34 (949) 247 153, Fax: + 34 (949) 247 166

Sweden: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Switzerland: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

Taiwan: Ferroxcube Taiwan, HSINCHU
Tel: +886 3 599 5886, Fax: +886 3 599 5882

Turkey: Contact Ferroxcube Italy
Tel: +39 02 660454 69, Fax: +39 02 612917 39

United Kingdom: Contact Ferroxcube Germany
Tel: +49 40 52728 302, Fax: +49 40 52728 308

United States: Ferroxcube USA, EL PASO (TX)
Tel: +1 915 599 2328/2533, Fax: +1 915 599 2555

For all other countries apply to closest regional sales office:

- HAMBURG, Germany
  Tel: +49 40 52728 302, Fax: +49 40 52728 308
  e-mail: saleseurope@ferroxcube.com

- EL PASO (TX), USA
  Tel: +1 915 599 2328/2533, Fax: +1 915 599 2555
  e-mail: salesusa@ferroxcube.com

- HSINCHU, Taiwan
  Tel: +886 3 599 5886, Fax: +886 3 599 5882
  e-mail: salesasia@ferroxcube.com

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