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## NANOCRYSTALLINE VITROPERM CORES IN PLASTIC CASING FOR COMMON MODE CHOKES

Common Mode Chokes with toroidal tape wound cores of VITROPERM® allow the effective attenuation of asymmetrical and conducted high frequency noise. The high permeability of the nanocrystalline core material achieves superior characteristics at low and middle frequencies, as well as in the high frequency range, when an optimized winding arrangement is chosen. In comparison to conventional ferrite, advantages over the entire frequency range are obtained. Further information is available in our application note → [EMC Products based on Nanocrystalline VITROPERM](#)

Our VITROPERM cores are available with different  $A_L$ -levels for many core sizes. Thus, saturation-resistant solutions are available for various fields of applications. If the common mode currents exceed the saturation currents ( $I_{cm}$ ) of the cores or chokes, cores with higher saturation resistance must be used. High  $A_L$  values (high  $\mu$ ) are more suitable for typical single-phase applications with low unbalanced current (e.g. switched-mode power supplies), while cores with lower  $A_L$  values are often used in 3-phase applications with high unbalanced currents (e.g. frequency converters with long motor cables).

The plastic cases are suitable for direct winding and offer good mechanical protection of the nanocrystalline core material. This enables the best magnetic properties and highest permeability levels to be maintained. Additional winding protection is optional for heavy wire windings, where there may be a danger of core damage. The plastic materials comply with the standards UL94-V0 (UL file number: E41871), class B (130 °C) and UL94-V0 (UL file number E41938), class F (155 °C).

Epoxy coated designs are listed in the table → [Nanocrystalline VITROPERM cores with epoxy coating](#).

We recommend to examine the theoretical calculations experimentally. For testing purposes VAC offers a special sample kit consisting of selected cores → [Core Sample Kit VITROPERM](#).

The main areas of application are:

- \_ EMC filters
- \_ Switched-mode power supplies (SMPS), Power supplies
- \_ Solar inverters
- \_ Uninterruptible power supplies (UPS)
- \_ Welding equipment
- \_ Wind generators
- \_ Frequency converters
- \_ Inductive cooking

VAC-product	nominal core dimensions	limiting dimensions (incl. case)			iron cross section	mean path length	weight	$A_L$ nominal		saturation current $I_{cm}^{**}$ , typical	
		OD	ID	H				10 kHz	100 kHz	10 kHz	100 kHz
	OD x ID x H	OD	ID	H	$A_{Fe}$	$l_{Fe}$	$m_{Fe}$	$\mu H$	$\mu H$	A	A
	mm x mm x mm	mm	mm	mm	cm <sup>2</sup>	cm	g				
<a href="#">T60006-L2009-W914</a>	9.8 x 6.5 x 4.5	11.2	5.1	5.8	0.06	2.6	1.1	25.5	6.4	0.14	0.3
<a href="#">T60006-L2012-W902</a>	12 x 8 x 4.5	14.1	6.6	6.3	0.07	3.1	1.7	28.0	6.8	0.15	0.31
<a href="#">T60006-L2012-W498</a>	12.5 x 10 x 5	14.3	8.5	7.0	0.05	3.5	1.3	10.0	3.6	0.3	0.56
<a href="#">T60006-L2014-V098</a>	14.4 x 11.4 x 3.2	16.5	9.6	5.0	0.04	4.1	1.1	10.5	2.6	0.21	0.44
<a href="#">T60006-L2015-W865</a>	15 x 10 x 4.5	17.1	7.9	6.5	0.09	3.9	2.6	27.0	6.7	0.2	0.41
<a href="#">T60006-L2016-W403</a>	16 x 10 x 6	17.9	8.1	8.1	0.14	4.1	4.0	43.0	10.1	0.2	0.41
<a href="#">T60006-L2016-W308</a>								11.7	6.5	1.2	1.7
<a href="#">T60006-L2016-V165</a>								2.1	2.0	5.4	5.7
<a href="#">T60006-L2017-W515</a>	17.5 x 12.6 x 6	19.2	10.9	8.1	0.12	4.7	4.1	30.0	6.9	0.23	0.48
<a href="#">T60006-L2019-V184</a>	19 x 15 x 5	21.2	13.0	7.3	0.08	5.3	3.1	18.0	4.4	0.26	0.54
<a href="#">T60006-L2019-W838</a>	19 x 15 x 10	21.2	13.0	12.3	0.16	5.3	6.3	36.1	8.8	0.26	0.54
<a href="#">T60006-L2020-W409</a>	20 x 12.5 x 8	22.6	10.3	10.2	0.24	5.1	9.0	55.2	13.6	0.25	0.51
<a href="#">T60006-L2020-W450</a>								14.3	9.1	1.5	2.2
<a href="#">T60006-L2025-W523</a>	25 x 20 x 10	27.6	17.4	12.8	0.20	7.1	10.0	28.4	7.3	0.41	0.84
<a href="#">T60006-L2025-W380</a>	25 x 16 x 10	27.9	13.6	12.5	0.4	6.4	17.0	67.0	15.5	0.32	0.65
<a href="#">T60006-L2025-W451</a>								17.1	11.5	1.8	2.7
<a href="#">T60006-L2025-V349</a>								8.6	7.6	3.6	4.1
<a href="#">T60006-L2025-W980</a>								3.2	3.1	9.3	9.6
<a href="#">T60006-L2030-W423</a>								59.3	14.0	0.5	1.0
<a href="#">T60006-L2030-W358</a>	30 x 20 x 10	32.8	17.6	12.5	0.40	7.9	23.0	15.5	11.1	2.1	3.1
<a href="#">T60006-L2030-W981</a>								2.9	2.8	11.4	11.8
<a href="#">T60006-L2030-W514</a>								88.0	20.0	0.38	0.79
<a href="#">T60006-L2030-V188</a>	30 x 20 x 15	32.8	17.5	17.8	0.57	7.9	33.0	26.9	16.2	1.8	2.8
<a href="#">T60006-L2030-V129</a>								15.7	14.1	3.1	3.9
<a href="#">T60006-L2040-W422</a>								48.0	11.3	0.55	1.1
<a href="#">T60006-L2040-V113</a>	40 x 32 x 15	43.1	28.7	18.5	0.46	11.3	38.0	13.0	8.4	3.0	4.6
<a href="#">T60006-L2040-W452</a>								10.2	7.9	3.8	5.2
<a href="#">T60006-L2040-W964</a>								2.3	2.2	17.0	17.0
<a href="#">T60006-L2040-W424</a>								99.0	23.1	0.5	1.0
<a href="#">T60006-L2040-W453</a>	40 x 25 x 15	43.1	22.5	18.5	0.9	10.2	64.0	25.0	28.2	2.9	4.4

<a href="#">T60006-L2040-V296</a>									12.8	11.3	5.7	6.5
<a href="#">T60006-L2045-V102</a>									87.6	20.0	0.59	1.2
<a href="#">T60006-L2045-V118</a>	45 x 30 x 15	48.3	26.4	18.2	0.86	11.8	74.0		24.3	15.8	3.0	4.6
<a href="#">T60006-L2045-V101</a>									15.7	14.1	4.6	5.9
<a href="#">T60006-L2050-W516</a>									45.0	13.5	1.0	2.0
<a href="#">T60006-L2050-W565</a>	50 x 40 x 20	53.5	36.3	23.4	0.76	14.1	79.0		18.0	10.0	3.6	5.5
<a href="#">T60006-L2050-V146</a>			36.6						11.7	10.0	5.5	7.1
<a href="#">T60006-L2050-V166</a>									3.1	3.0	20.0	21.0
<a href="#">T60006-L2054-V172</a>	54 x 40 x 20	57.5	37.7	24.1	1.06	14.8	115		87.0	19.9	0.72	1.5
<a href="#">T60006-L2054-V178</a>									24.0	15.7	3.7	5.8
<a href="#">T60006-L2063-W517</a>									59.0	17.5	1.2	2.5
<a href="#">T60006-L2063-V110</a>	63 x 50 x 25	67.3	46.5	28.6	1.2	17.8	161		23.3	13.8	4.5	6.9
<a href="#">T60006-L2063-V144</a>									15.1	13.5	6.9	8.9
<a href="#">T60006-L2063-V348</a>							163		10.6	9.3	9.9	11.0
<a href="#">T60006-L2063-W985</a>									3.3	3.2	30.0	31.0
<a href="#">T60006-L2080-V140</a>		85.8	44.6	25.5					94.0	28.0	1.4	2.8
<a href="#">T60006-L2080-W531</a>	80 x 50 x 20				2.3	20.4	342		35.0	24.0	5.5	8.4
<a href="#">T60006-L2080-V091</a>		86.0	44.7	25.7			347		9.6	9.2	26.0	28.0
<a href="#">T60006-L2090-W518</a>							395		81.0	25.1	1.7	3.3
<a href="#">T60006-L2090-V173</a>	90 x 60 x 20	95.4	54.7	24.7	2.3	23.6			32.5	21.1	5.9	9.1
<a href="#">T60006-L2090-W984</a>							400		4.6	4.5	41.0	42.0
<a href="#">T60006-L2100-V082</a>									56.3	16.9	2.0	3.9
<a href="#">T60006-L2100-V081</a>	100 x 80 x 25	105.5	75.0	29.6	1.9	28.3	379		14.6	13.1	11.0	14.0
<a href="#">T60006-L2102-W468</a>									55.0	21.6	2.7	4.9
<a href="#">T60006-L2102-V080</a>	102 x 76 x 25	108.1	70.0	30.3	2.5	28.0	508		19.1	17.2	11.0	14.0
<a href="#">T60006-L2063-V347</a>							515		13.5	11.9	16.0	18.0
<a href="#">T60006-L2102-W947</a>									4.3	4.2	48.0	49.0
<a href="#">T60006-L2160-V074</a>					2.7				28.0	14.0	8.5	14.0
<a href="#">T60006-L2160-V088</a>							917		20.0	13.1	11.0	18.0
<a href="#">T60006-L2160-V066</a>									13.0	11.7	18.0	23.0
<a href="#">T60006-L2160-V350</a>	160 x 130 x 25	166.9	123.9	30.5		45.6			9.5	8.4	26.0	29.0
<a href="#">T60006-L2160-W982</a>					2.9		970		3.0	2.9	80.0	82.0

$A_L$  = inductance for N = 1 (tolerance +45 % / -25 %)

$I_{cm}$  : the listed saturation currents are guidelines, only. They are calculated for nominal core dimensions at room temperature and for approx. 70 % saturation flux density.

Further information can be found here:

General information

→ [Application note \(brochure\)](#)

RoHS information

Nanocrystalline Cores

→ [Epoxy coated designs](#)

→ [Core Sample Kit VITROPERM](#)

→ [Core stack assemblies](#)

Common Mode Chokes

→ [Chokes](#)

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