

P 47×28 Core

Series/Type: B65631
Date: June 2013



P 47 × 28

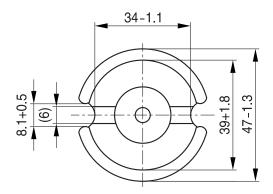
Core B65631

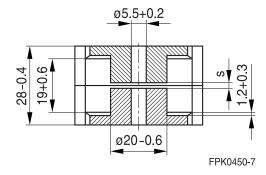
■ Delivery mode: sets

Magnetic characteristics (per set)

 $\begin{array}{ll} \Sigma \text{I/A} &= 0.22 \text{ mm}^{-1} \\ \text{I}_e &= 69.1 \text{ mm} \\ \text{A}_e &= 310 \text{ mm}^2 \\ \text{A}_{min} &= 263 \text{ mm}^2 \\ \text{V}_e &= 21428 \text{ mm}^3 \end{array}$

Approx. weight 125 g/set





Gapped

Material	A _L value	s approx. mm	μ _e	Ordering code -J with center hole
N48	100 ±3%	3.9	18	B65631J0100A048
	250 ±3%	1.5	44	B65631J0250A048

Ungapped

Material	A _L value nH	μ _e	Ordering code -J with center hole
N48	9500 +30/–20%	1690	B65631J0000R048



Cautions and warnings

Mechanical stress and mounting

Ferrite cores have to meet mechanical requirements during assembling and for a growing number of applications. Since ferrites are ceramic materials one has to be aware of the special behavior under mechanical load.

As valid for any ceramic material, ferrite cores are brittle and sensitive to any shock, fast changing or tensile load. Especially high cooling rates under ultrasonic cleaning and high static or cyclic loads can cause cracks or failure of the ferrite cores.

For detailed information see chapter "Definitions", section 8.1.

Effects of core combination on A_L value

Stresses in the core affect not only the mechanical but also the magnetic properties. It is apparent that the initial permeability is dependent on the stress state of the core. The higher the stresses are in the core, the lower is the value for the initial permeability. Thus the embedding medium should have the greatest possible elasticity.

For detailed information see chapter "Definitions", section 8.2.

Heating up

Ferrites can run hot during operation at higher flux densities and higher frequencies.

NiZn-materials

The magnetic properties of NiZn-materials can change irreversible in high magnetic fields.

Processing notes

- The start of the winding process should be soft. Else the flanges may be destroid.
- To strong winding forces may blast the flanges or squeeze the tube that the cores can no more be mount.
- To long soldering time at high temperature (>300 °C) may effect coplanarity or pin arrangement.
- Not following the processing notes for soldering of the J-leg terminals may cause solderability problems at the transformer because of pollution with Sn oxyd of the tin bath or burned insulation of the wire. For detailed information see chapter "Processing notes", section 8.2.
- The dimensions of the hole arrangement have fixed values and should be understood as a recommendation for drilling the printed circuit board. For dimensioning the pins, the group of holes can only be seen under certain conditions, as they fit into the given hole arrangement. To avoid problems when mounting the transformer, the manufacturing tolerances for positioning the customers' drilling process must be considered by increasing the hole diameter.



Symbols and terms

Symbol	Meaning	Unit
A	Cross section of coil	mm ²
A_{e}	Effective magnetic cross section	mm ²
A_L	Inductance factor; $A_L = L/N^2$	nH
A_{L1}	Minimum inductance at defined high saturation ($\triangleq \mu_a$)	nH
A_{min}	Minimum core cross section	mm ²
A _N	Winding cross section	mm ²
A_R	Resistance factor; $A_R = R_{Cu}/N^2$	$\mu\Omega = 10^{-6} \Omega$
В	RMS value of magnetic flux density	Vs/m ² , mT
ΔΒ	Flux density deviation	Vs/m ² , mT
Ê	Peak value of magnetic flux density	Vs/m ² , mT
ΔÂ	Peak value of flux density deviation	Vs/m ² , mT
B_{DC}	DC magnetic flux density	Vs/m ² , mT
B _R	Remanent flux density	Vs/m ² , mT
B_S	Saturation magnetization	Vs/m ² , mT
C_0	Winding capacitance	F = As/V
CDF	Core distortion factor	mm ^{-4.5}
DF	Relative disaccommodation coefficient DF = d/μ_i	
d	Disaccommodation coefficient	
Ea	Activation energy	J
f	Frequency	s−1, Hz
f _{cutoff}	Cut-off frequency	s−1, Hz
f _{max}	Upper frequency limit	s−1, Hz
f _{min}	Lower frequency limit	s−1, Hz
f _r	Resonance frequency	s−1, Hz
f _{Cu}	Copper filling factor	·
g	Air gap	mm
Н	RMS value of magnetic field strength	A/m
Ĥ	Peak value of magnetic field strength	A/m
H _{DC}	DC field strength	A/m
H _c	Coercive field strength	A/m
h	Hysteresis coefficient of material	10 ⁻⁶ cm/A
h/μ_i^2	Relative hysteresis coefficient	10 ⁻⁶ cm/A
1	RMS value of current	Α
I _{DC}	Direct current	Α
Î	Peak value of current	Α
J	Polarization	Vs/m ²
k	Boltzmann constant	J/K
k ₃	Third harmonic distortion	
k _{3c}	Circuit third harmonic distortion	
L	Inductance	H = Vs/A



Symbols and terms

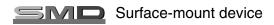
Symbol	Meaning	Unit
Δ L/L	Relative inductance change	Н
L_0	Inductance of coil without core	Н
L _H	Main inductance	Н
L_p	Parallel inductance	Н
L _{rev}	Reversible inductance	Н
L _s	Series inductance	Н
l _e	Effective magnetic path length	mm
I _N	Average length of turn	mm
N	Number of turns	
P_{Cu}	Copper (winding) losses	W
P _{trans}	Transferrable power	W
P _V	Relative core losses	mW/g
PF	Performance factor	
Q	Quality factor (Q = $\omega L/R_s$ = 1/tan δ_L)	
R	Resistance	Ω
R_{Cu}	Copper (winding) resistance (f = 0)	Ω
R _h	Hysteresis loss resistance of a core	Ω
ΔR_h	R _h change	Ω
R _i	Internal resistance	Ω
R _p	Parallel loss resistance of a core	Ω
Rs	Series loss resistance of a core	Ω
R_{th}	Thermal resistance	K/W
R _V	Effective loss resistance of a core	Ω
S	Total air gap	mm
Т	Temperature	°C
ΔT	Temperature difference	K
T_{C}	Curie temperature	°C
t	Time	s
t_{v}	Pulse duty factor	
tan δ	Loss factor	
tan δ_L	Loss factor of coil	
$tan \delta_r$	(Residual) loss factor at $H \rightarrow 0$	
$tan \delta_e$	Relative loss factor	
tan δ_h	Hysteresis loss factor	
tan δ/μ_i	Relative loss factor of material at H \rightarrow 0	
U	RMS value of voltage	V
Û	Peak value of voltage	V
V _e	Effective magnetic volume	mm ³
Z	Complex impedance	Ω
Z _n	Normalized impedance $ Z _n = Z /N^2 \times \varepsilon (l_e/A_e)$	Ω/mm



Symbols and terms

Symbol	Meaning		
α	Temperature coefficient (TK)	1/K	
α_{F}	Relative temperature coefficient of material		
α_{e}	Temperature coefficient of effective permeability	1/K	
^E r	Relative permittivity		
Ф	Magnetic flux	Vs	
1	Efficiency of a transformer		
lΒ	Hysteresis material constant	mT ⁻¹	
li	Hysteresis core constant		
\s	Magnetostriction at saturation magnetization		
ι	Relative complex permeability		
ι ₀	Magnetic field constant	Vs/Am	
^l a	Relative amplitude permeability		
l _{app}	Relative apparent permeability		
l _e	Relative effective permeability		
ι _i	Relative initial permeability		
$\iota_{p}^{'}$	Relative real (inductive) component of $\overline{\mu}$ (for parallel components)		
ι _p "	Relative imaginary (loss) component of $\overline{\mu}$ (for parallel components)		
I _r	Relative permeability		
^l rev	Relative reversible permeability		
ι _s '	Relative real (inductive) component of $\overline{\mu}$ (for series components)		
ls"	Relative imaginary (loss) component of $\overline{\mu}$ (for series components)		
l _{tot}	Relative total permeability		
	derived from the static magnetization curve		
)	Resistivity	Ω m $^{-1}$	
ZI/A	Magnetic form factor	mm ⁻¹	
Cu	DC time constant $\tau_{Cu} = L/R_{Cu} = A_L/A_R$	S	
O .	Angular frequency; $\omega = 2 \Pi f$	s ⁻¹	

All dimensions are given in mm.





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