

P 22 × 13 Core and accessories

Series/Type: B65661, B65662, B65665, B65812

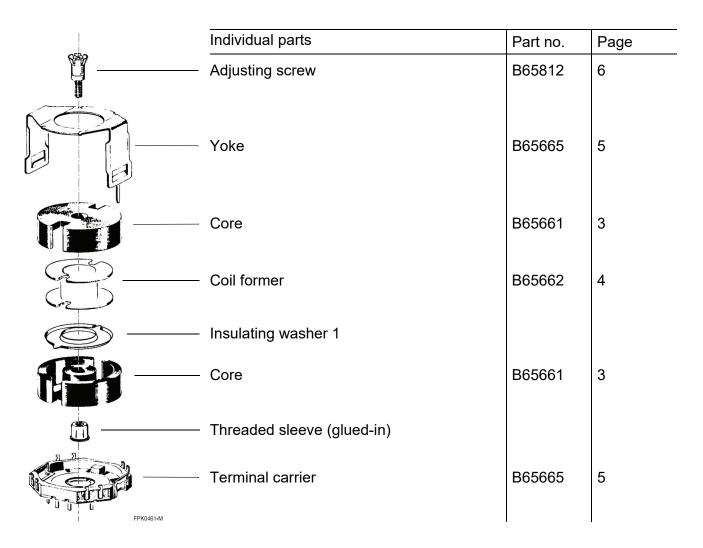
Date: May 2017

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Core and accessories



Example of an assembly set for printed circuit boards



Core B65661

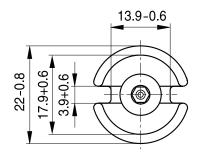
To IEC 62317-2Delivery mode: sets

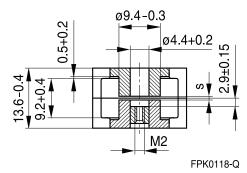
Magnetic characteristics (per set)

	with center hole	without center hole	
ΣΙ/Α	0.5	0.46	mm ⁻¹
l _e	31.6	33.2	mm
l _e Α _e Δ	63	72.6	mm ²
A _{min}	_	58.1	mm ²
V _e	1990	2410	mm ³

Approx. weight (per set)

m	13	14	g





Gapped (A_L values/air gaps examples)

Material	A _L value	s approx.	μ_{e}	Ordering code ¹⁾ -D with center hole
	nH	mm		-N with threaded sleeve
N48	160 ± 3%	0.50	64	B65661+0160A048
	250 ± 3%	0.26	100	B65661+0250A048
	315 ± 3%	0.22	126	B65661+0315A048
	630 ± 3%	0.10	251	B65661+0630A048
	1250 ±10%	0.05	499	B65661D1250K048

Ungapped

Material	A _L value	μ_{e}	P _V	Ordering code -D with center hole
	nH		W/set	-W without center hole
K1	220 +30/–20%	88		B65661D0000R001
M33	1600 +30/–20%	640		B65661D0000R033
N48	3800 +30/–20%	1520		B65661D0000R048
N30	8300 +30/–20%	3020		B65661W0000R030
T38	16000 +40/–30%	5820		B65661W0000Y038
N87	4400 +30/–20%	1600	< 1.1 (200 mT, 100 kHz, 100 °C)	B65661W0000R087

Other A_L values/air gaps and materials available on request – see Processing remarks on page 7.

¹⁾ Replace the + by the code letter "D" or "N" for the required version.



Accessories B65662

Coil former

Standard: to IEC 62317-2

Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085:

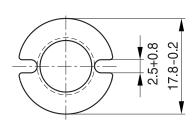
F ≙ max. operating temperature 155 °C), color code black

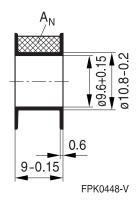
Valox 420-SE0 [E207780 (M)] SABIC JAPAN L L C

Winding: see Processing notes, 2.1

Coil former				Ordering code
Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	
1	23.4	44	67	B65662B0000T001

Coil former







Accessories B65665

Mounting assembly for printed circuit boards

■ The set comprises a terminal carrier and a yoke

■ For snap-in connection

Terminal carrier

Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085:

F

max. operating temperature 155 °C), color code black,

Pocan B4235 [E245249 (M)], LANXESS AG

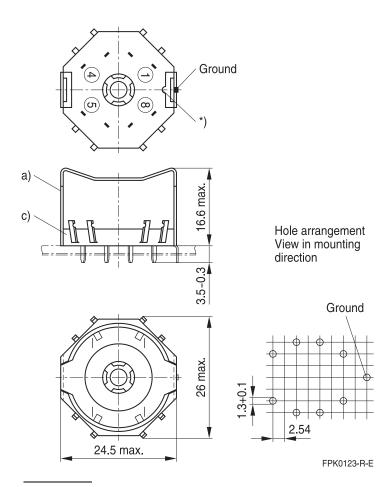
Solderability: IEC60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Resistance to soldering heat: to IEC60068-2-20, test Tb, method 1b: 350 °C, 3.5 s

Yoke

Spring yoke, made of tinned nickel silver (0.3 mm), with ground terminal

	Ordering code
Complete mounting assembly (8 solder terminals)	B65665C0004X000



- *) This recess must be on the side of the grounding pin to ensure that the yoke locks in position.
- a) Yoke
- c) Terminal carrier with 8 solder terminals

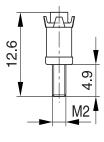


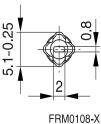
Accessories B65812

Adjusting screw

■ Tube core with thread and core brake made of GFR polyterephthalate Pocan B3235® [E245249 (M)], LANXESS AG

Tube core			Ordering code
$\emptyset \times$ length (mm)	Material	Color code	
3.85×5.0	N22	gray	B65812B3003X022







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 temperature 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 data book, chapter "General - Definitions, 8.1".

Effects of core combination on A_I 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 data book, chapter "General - Definitions, 8.1".

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.

Ferrite Accessories

EPCOS ferrite accessories have been designed and evaluated only in combination with EPCOS ferrite cores. EPCOS explicitly points out that EPCOS ferrite accessories or EPCOS ferrite cores may not be compatible with those of other manufacturers. Any such combination requires prior testing by the customer and will be at the customer's own risk.

EPCOS assumes no warranty or reliability for the combination of EPCOS ferrite accessories with cores and other accessories from any other manufacturer.

Processing remarks

The start of the winding process should be soft. Else the flanges may be destroyed.

- Too strong winding forces may blast the flanges or squeeze the tube that the cores can not be mounted any more.
- Too 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 oxyde of the tin bath or burned insulation of the wire. For detailed information see chapter "Processing notes", section 2.2.
- 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.



Cautions and warnings

Display of ordering codes for EPCOS products

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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
ΔB	Flux density deviation	Vs/m ² , mT
Â	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	
E_a	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
R _s	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	
$tan \delta_l$	Loss factor of coil	
$tan \delta_r$	(Residual) loss factor at H \rightarrow 0	
$\tan \delta_{\rm e}$	Relative loss factor	
$\tan \delta_{\rm h}$	Hysteresis loss factor	
$\tan \delta_{\rm h}$ tan $\delta/\mu_{\rm i}$	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
v _e Z	Complex impedance	Ω
	Normalized impedance $ Z _n = Z / N^2 \times \varepsilon (I_e/A_e)$	Ω/mm
Z_n	INOTHIALIZED IMPEDIATION LIN - X C (Ie/Ae)	22/11111



Symbols and terms

Symbol	Meaning	Unit
α	Temperature coefficient (TK)	1/K
α_{F}	Relative temperature coefficient of material	1/K
α_{e}	Temperature coefficient of effective permeability	1/K
ε_{r}	Relative permittivity	
Φ	Magnetic flux	Vs
η	Efficiency of a transformer	
η _B	Hysteresis material constant	mT-1
η _i	Hysteresis core constant	$A^{-1}H^{-1/2}$
λ_{s}	Magnetostriction at saturation magnetization	
ı	Relative complex permeability	
$\mathfrak{1}_0$	Magnetic field constant	Vs/Am
la	Relative amplitude permeability	
l _{app}	Relative apparent permeability	
le	Relative effective permeability	
l _i	Relative initial permeability	
ι _p '	Relative real (inductive) component of $\overline{\mu}$ (for parallel components)	
ւ _թ "	Relative imaginary (loss) component of $\overline{\mu}$ (for parallel components)	
ι_{r}	Relative permeability	
ι_{rev}	Relative reversible permeability	
ι _s '	Relative real (inductive) component of $\overline{\mu}$ (for series components)	
ι _s "	Relative imaginary (loss) component of $\overline{\mu}$ (for series components)	
ι_{tot}	Relative total permeability	
	derived from the static magnetization curve	
)	Resistivity	Ω m ⁻¹
ΣΙ/Α	Magnetic form factor	mm ⁻¹
r _{Cu}	DC time constant $\tau_{Cu} = L/R_{Cu} = A_L/A_R$	S
ω	Angular frequency; ω = 2 Π f	s ⁻¹

All dimensions are given in mm.





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