

ER 11/5
Planar core and accessories

Series/Type: B65525, B65526

Date: June 2013

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## ER 11/5

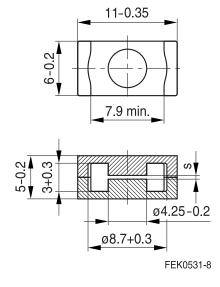
### Planar core B65525

- To IEC 62317-9
- For transformers featuring high inductance and low overall height
- Delivery mode: sets

## Magnetic characteristics (per set)

 $\Sigma I/A = 1.1 \text{ mm}^{-1}$   $I_e = 14.1 \text{ mm}$   $A_e = 12.4 \text{ mm}^2$  $V_e = 174 \text{ mm}^3$ 

Approx. weight 0.85 g/set



## **Ungapped**

Material	A <sub>L</sub> value nH	$\mu_{e}$	Ordering code
N49	800 +30/–20%	715	B65525J0000R049
N87	1200 +30/–20%	1050	B65525J0000R087
N92	900 +30/–20%	814	B65525J0000R092
N97	1200 +30/–20%	1086	B65525J0000R097
T38	6400 +40/–30%	5600	B65525J0000Y038

### Gapped

Material	A <sub>L</sub> value	s approx. mm	$\mu_{e}$	Ordering code
N87	160 ±3%	0.08	140	B65525J0160A087



### ER 11/5

### Accessories B65526



### SMD coil former with gullwing terminals

Material: GFR liquid crystal polymer (UL 94 V-0, insulation class to IEC 60085:

F 

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

Zenite 7130<sup>®</sup> [E344082 (M)], TICONA

Solderability: to IEC 60068-2-58, test Td, method 6 (Group 3): 245 °C, 3 s

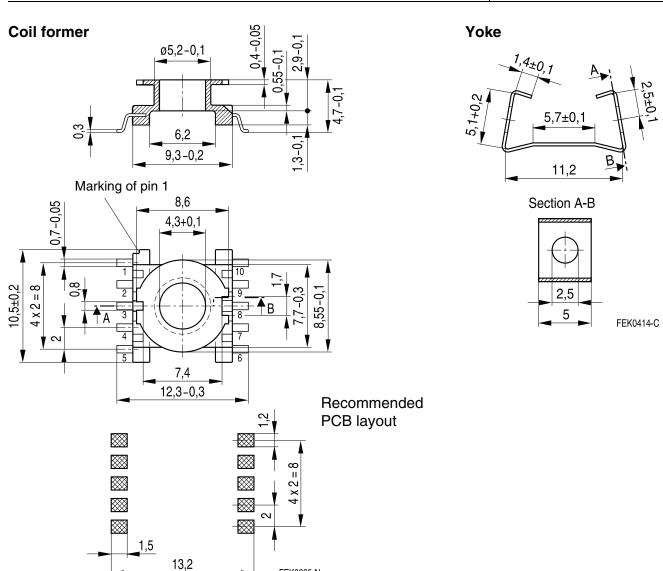
Resistance to soldering heat: to IEC 60068-2-58, test Td, method 6 (Group 3): 255 °C, 10 s

permissible soldering temperature for wire-wrap connection on coil former: 400 °C, 1 s

Winding: see Data Book 2013, chapter "Processing notes, 2.1"

Yoke Material: Stainless spring steel (0.15 mm)

Coil former				Ordering code	
Sections	A <sub>N</sub> mm <sup>2</sup>	I <sub>N</sub> mm	$A_R$ value $\mu\Omega$	Terminals	
1	3.3	21.6	225	10	B65526B1010T001
Yoke					B65526A2000X000



FEK0285-N



#### 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<sub>I</sub> 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 <sup>2</sup>
$A_{e}$	Effective magnetic cross section	mm <sup>2</sup>
$A_L$	Inductance factor; $A_L = L/N^2$	nH
$A_{L1}$	Minimum inductance at defined high saturation ( $= μ_a$ )	nH
A <sub>min</sub>	Minimum core cross section	mm <sup>2</sup>
A <sub>N</sub>	Winding cross section	mm <sup>2</sup>
$A_R$	Resistance factor; $A_R = R_{Cu}/N^2$	$\mu\Omega = 10^{-6} \Omega$
В	RMS value of magnetic flux density	Vs/m², mT
ΔΒ	Flux density deviation	Vs/m², mT
Ê	Peak value of magnetic flux density	Vs/m², mT
ΔÂ	Peak value of flux density deviation	Vs/m², mT
$B_DC$	DC magnetic flux density	Vs/m², mT
$B_R$	Remanent flux density	Vs/m², mT
$B_S$	Saturation magnetization	Vs/m², mT
$C_0$	Winding capacitance	F = As/V
CDF	Core distortion factor	mm <sup>-4.5</sup>
DF	Relative disaccommodation coefficient DF = $d/\mu_i$	
d	Disaccommodation coefficient	
$E_a$	Activation energy	J
f	Frequency	s−1, Hz
f <sub>cutoff</sub>	Cut-off frequency	s <sup>−1</sup> , Hz
f <sub>max</sub>	Upper frequency limit	s−1, Hz
$f_{min}$	Lower frequency limit	s <sup>−1</sup> , Hz
f <sub>r</sub>	Resonance frequency	s <sup>−1</sup> , 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 <sup>-6</sup> cm/A
$h/\mu_i^2$	Relative hysteresis coefficient	10 <sup>-6</sup> cm/A
I	RMS value of current	Α
$I_{DC}$	Direct current	Α
Î	Peak value of current	Α
J	Polarization	Vs/m <sup>2</sup>
k	Boltzmann constant	J/K
$k_3$	Third harmonic distortion	
k <sub>3c</sub>	Circuit third harmonic distortion	
L	Inductance	H = Vs/A



## Symbols and terms

Symbol	Meaning	Unit
ΔL/L	Relative inductance change	Н
L <sub>0</sub>	Inductance of coil without core	Н
L <sub>H</sub>	Main inductance	Н
L <sub>p</sub>	Parallel inductance	Н
L <sub>rev</sub>	Reversible inductance	Н
L <sub>s</sub>	Series inductance	Н
l <sub>e</sub>	Effective magnetic path length	mm
I <sub>N</sub>	Average length of turn	mm
N	Number of turns	
$P_Cu$	Copper (winding) losses	W
P <sub>trans</sub>	Transferrable power	W
P <sub>V</sub>	Relative core losses	mW/g
PF	Performance factor	
Q	Quality factor (Q = $\omega L/R_s$ = 1/tan $\delta_L$ )	
R	Resistance	$\Omega$
$R_{Cu}$	Copper (winding) resistance (f = 0)	$\Omega$
R <sub>h</sub>	Hysteresis loss resistance of a core	$\Omega$
ΔR <sub>h</sub>	R <sub>h</sub> change	$\Omega$
R <sub>i</sub>	Internal resistance	Ω
R <sub>p</sub>	Parallel loss resistance of a core	Ω
$R_s^r$	Series loss resistance of a core	Ω
R <sub>th</sub>	Thermal resistance	K/W
R <sub>V</sub>	Effective loss resistance of a core	Ω
S	Total air gap	mm
Т	Temperature	°C
ΔΤ	Temperature difference	K
T <sub>C</sub>	Curie temperature	°C
t	Time	s
t <sub>v</sub>	Pulse duty factor	
tan $\delta$	Loss factor	
tan $\delta_L$	Loss factor of coil	
tan $\delta_r$	(Residual) loss factor at $H \rightarrow 0$	
tan $\delta_{\mathbf{e}}$	Relative loss factor	
tan $\delta_{h}$	Hysteresis loss factor	
tan δ/μ <sub>i</sub>	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 <sup>3</sup>
Z	Complex impedance	$\Omega$
Z <sub>n</sub>	Normalized impedance $ Z _n =  Z /N^2 \times \varepsilon ( I_e/A_e)$	$\Omega$ /mm

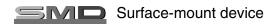
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## Symbols and terms

Symbol	Meaning	Unit
α	Temperature coefficient (TK)	
$\alpha_{F}$	Relative temperature coefficient of material	
$\alpha_{e}$	Temperature coefficient of effective permeability	1/K
r	Relative permittivity	
Þ	Magnetic flux	Vs
1	Efficiency of a transformer	
В	Hysteresis material constant	mT-1
li	Hysteresis core constant	$A^{-1}H^{-1/2}$
'S	Magnetostriction at saturation magnetization	
,	Relative complex permeability	
0	Magnetic field constant	
a	Relative amplitude permeability	
app	Relative apparent permeability	
е	Relative effective permeability	
i	Relative initial permeability	
p	Relative real (inductive) component of $\overline{\mu}$ (for parallel components)	
p	Relative imaginary (loss) component of $\overline{\mu}$ (for parallel components)	
r	Relative permeability	
rev	Relative reversible permeability	
S S	Relative real (inductive) component of $\overline{\mu}$ (for series components)	
s S	Relative imaginary (loss) component of $\overline{\mu}$ (for series components)	
tot	Relative total permeability	
	derived from the static magnetization curve	
	Resistivity	$\Omega$ m $^{-1}$
I/A	Magnetic form factor	mm <sup>-1</sup>
Cu	DC time constant $\tau_{Cu} = L/R_{Cu} = A_L/A_R$	s
)	Angular frequency; $\omega = 2 \Pi f$	s <sup>-1</sup>

All dimensions are given in mm.





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