



## **Ferrites and accessories**

E 13/7/4 (EF 12.6)  
Core and accessories

**Series/Type:** B66305, B66202, B66306, B66414  
**Date:** September 2006

- To IEC 61246
- For miniature transformers
- Available with SMD coil former
- E cores with high permeability for common-mode chokes and broadband applications
- Delivery mode: single units

**Magnetic characteristics (per set)**

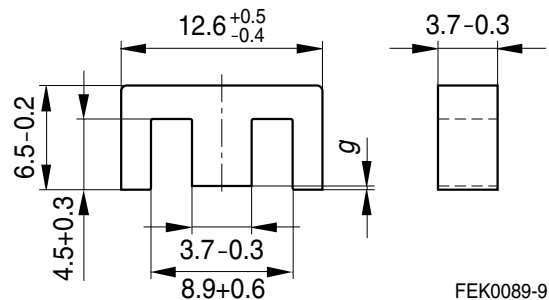
$$\Sigma l/A = 2.39 \text{ mm}^{-1}$$

$$l_e = 29.6 \text{ mm}$$

$$A_e = 12.4 \text{ mm}^2$$

$$A_{\min} = 12.2 \text{ mm}^2$$

$$V_e = 367 \text{ mm}^3$$

**Approx. weight 2 g/set**


FEK0089-9

**Ungapped**

Material	$A_L$ value nH	$\mu_e$	$P_V$ W/set	Ordering code
N30	1000 +30/-20%	1900		B66305G0000X130
T46	3600 $\pm$ 30%	6839		B66305F0000X146
N27	800 +30/-20%	1510	< 0.40 (200 mT, 100 kHz, 100 °C)	B66305G0000X127
N87	850 +30/-20%	1620	< 0.20 (200 mT, 100 kHz, 100 °C)	B66305G0000X187

**Gapped**

Material	g mm	$A_L$ value approx. nH	$\mu_e$	Ordering code
N27	0.04 $\pm$ 0.01	250	454	B66305G0040X127

The  $A_L$  value in the table applies to a core set comprising one ungapped core (dimension  $g = 0$ ) and one gapped core (dimension  $g > 0$ ).

**Calculation factors** (for formulas, see “*E cores: general information*”)

Material	Relationship between air gap – $A_L$ value		Calculation of saturation current			
	K1 (25 °C)	K2 (25 °C)	K3 (25 °C)	K4 (25 °C)	K3 (100 °C)	K4 (100 °C)
N27	28.4	-0.676	36.5	-0.847	33.2	-0.865
N87	28.4	-0.676	37.5	-0.796	32.1	-0.873

Validity range:      K1, K2: 0.03 mm < s < 1.00 mm  
                              K3, K4: 30 nH <  $A_L$  < 260 nH

**Coil former (magnetic axis horizontal or vertical)**

Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085:  
 $F \triangleq$  max. operating temperature 155 °C), color code black  
 Valox 420-SE0® [E45329 (M)], GE PLASTICS B V

Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Resistance to soldering heat: to IEC 60068-2-20, test Tb, method 1B: 350 °C, 3.5 s

Winding: see Data Book 2007, chapter “Processing notes, 2.1”

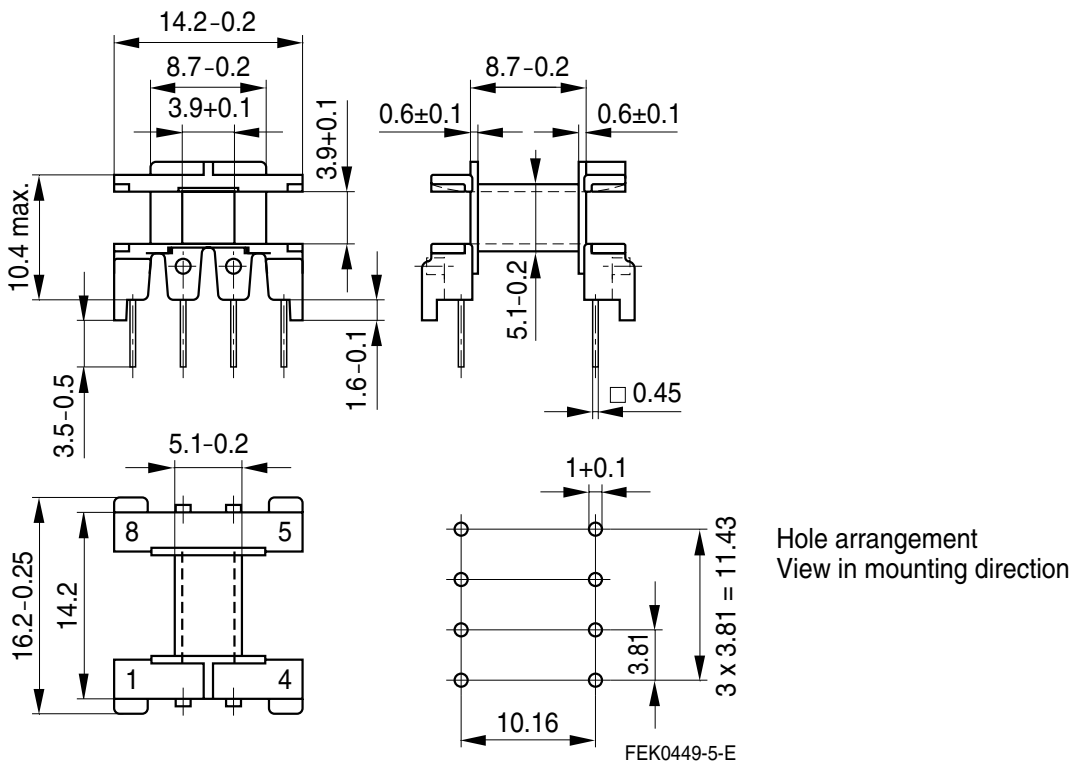
Squared pins.

**Yoke**

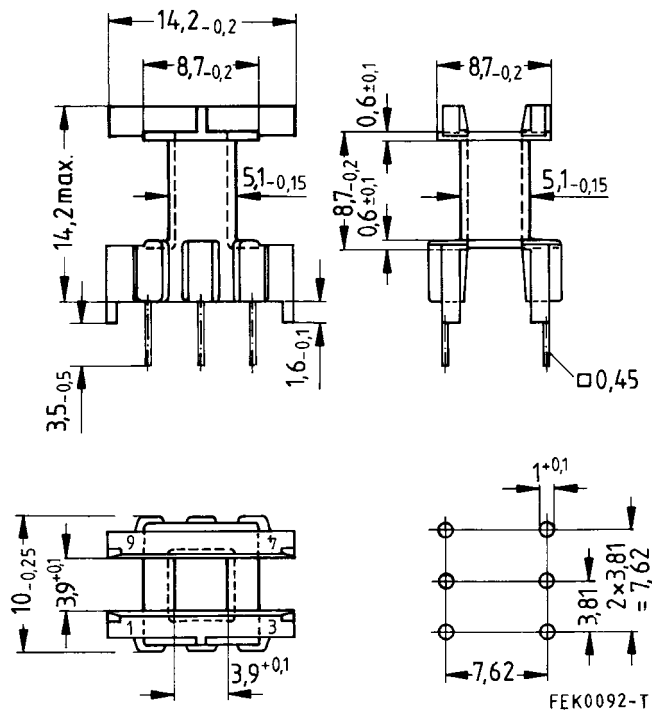
Material: Stainless spring steel (0.2 mm)

Coil former						Ordering code
Version	Sections	$A_N$ mm <sup>2</sup>	$l_N$ mm	$A_R$ value $\mu\Omega$	Pins	
Horizontal	1	11.6	27.2	80.6	8	B66202A1108T001
Vertical	1	11.6	27.2	80.6	6	B66202J1106T001
Yoke (ordering code per piece, 2 are required)						B66202A2010X000

**Horizontal version**

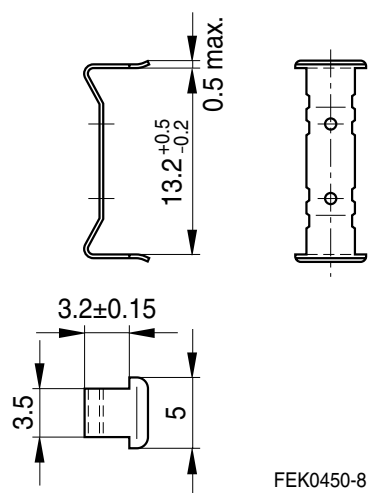


Vertical version



Hole arrangement  
View in mounting direction

Yoke



**SMD**

**SMD coil former with gullwing terminals**

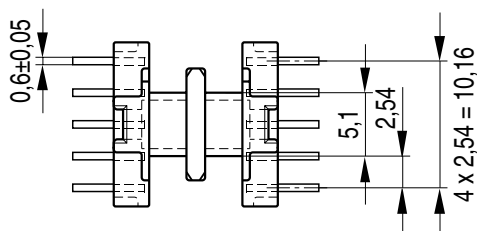
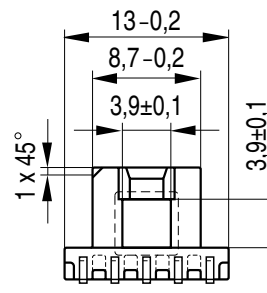
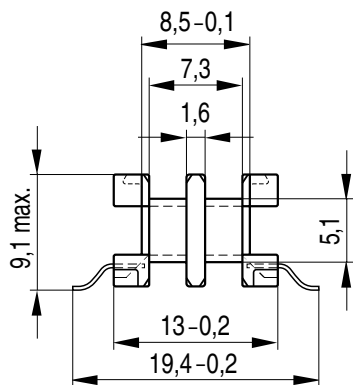
Material: GFR liquid crystal polymer (UL 94 V-0, insulation class to IEC 60085:  
 $F \triangleq$  max. operating temperature 155 °C), color code black  
 Vectra C 130 [E83005 (M)], TICONA

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

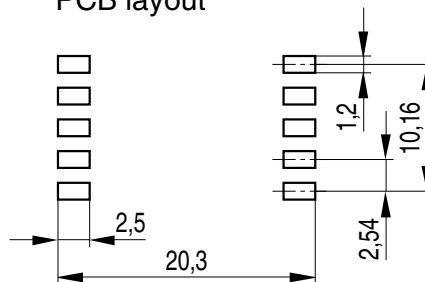
Resistance to soldering heat: to IEC 60068-2-58, test Td, method 6 (Group 3): 255 °C, 10 s  
 permissible soldering temperature for wire-wrap connection on coil former: 400 °C, 1 s

Winding: see Data Book 2007, chapter "Processing notes, 2.1"

Sections	$A_N$ mm <sup>2</sup>	$l_N$ mm	$A_R$ value $\mu\Omega$	Terminals	Ordering code
1	13.0	27	71	10	B66306C1010T001
2	10.2	27	91	10	B66306C1010T002



Recommended PCB layout

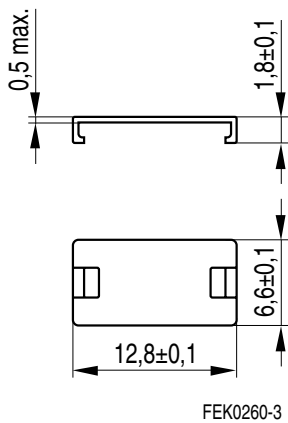


FEK0291-X

**Cover plate**

- For stamping and for improved processing on assembly machines
- See under SMD coil former for material and resistance to soldering heat

	Ordering code
Cover plate	B66414A7000X000



### **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 Data Book 2007, chapter “General – Definitions, 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 Data Book 2007, chapter “General – Definitions, 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 destroyed.
- 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 Data Book 2007, chapter “Processing notes, 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.



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