



## Ferrites and accessories

EFD 30/15/9  
Core and accessories

**Series/Type:** B66423, B66424  
**Date:** September 2006

- E core with flattened, lower center leg for especially flat transformer design
- For DC/DC converters
- Delivery mode: single units

### Magnetic characteristics (per set)

$$\Sigma l/A = 0.99 \text{ mm}^{-1}$$

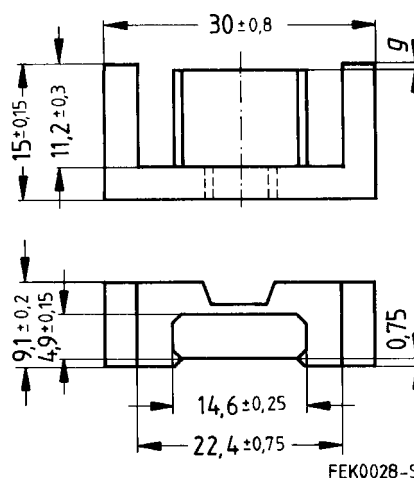
$$l_e = 68 \text{ mm}$$

$$A_e = 69 \text{ mm}^2$$

$$A_{\min} = 69 \text{ mm}^2$$

$$V_e = 4690 \text{ mm}^3$$

Approx. weight 24 g/set



### Ungapped

| Material | $A_L$ value<br>nH | $\mu_e$ | $P_V$<br>W/set                  | Ordering code   |
|----------|-------------------|---------|---------------------------------|-----------------|
| N87      | 2050 +30/-20%     | 1610    | < 2.6 (200 mT, 100 kHz, 100 °C) | B66423G0000X187 |
| N97      | 2150 +30/-20%     | 1690    | < 2.2 (200 mT, 100 kHz, 100 °C) | B66423G0000X197 |

### Gapped

| Material | $A_L$ value<br>nH | $\mu_e$ | g<br>approx. mm | Ordering code   |
|----------|-------------------|---------|-----------------|-----------------|
| N87      | 160 ±10%          | 125     | 0.71            | B66423U0160K187 |
|          | 250 ±10%          | 196     | 0.38            | B66423U0250K187 |
|          | 315 ±10%          | 246     | 0.27            | B66423U0315K187 |

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<br>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) |
| N87      | 125                                           | -0.712     | 176                               | -0.796     | 161         | -0.873      |

Validity range: K1, K2:  $0.10 \text{ mm} < s < 2.00 \text{ mm}$   
K3, K4:  $70 \text{ nH} < A_L < 630 \text{ nH}$

## Coil former

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:  
 $H \triangleq$  max. operating temperature 180 °C), color code black  
Sumikon PM 9630® [E41429 (M)], SUMITOMO BAKELITE CO LTD

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"

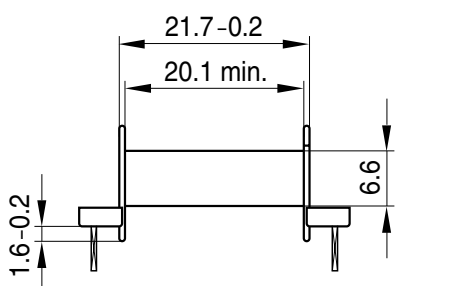
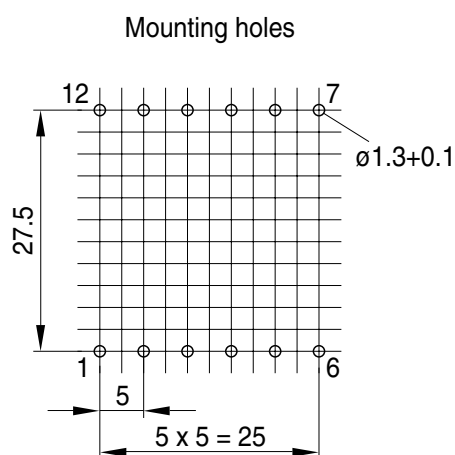
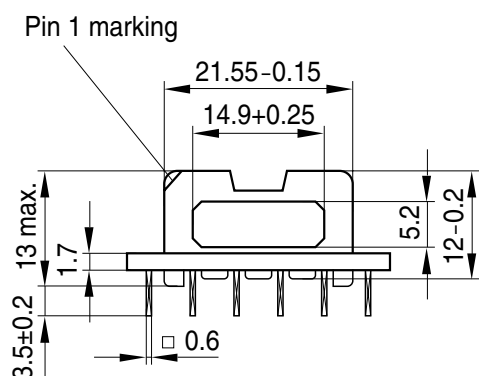
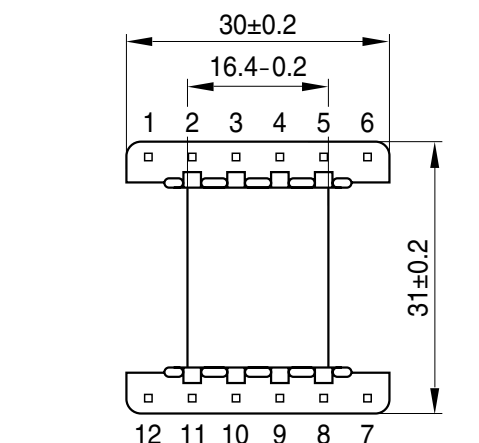
Squared pins.

## Yoke

Material: Stainless spring steel (0.45 mm)

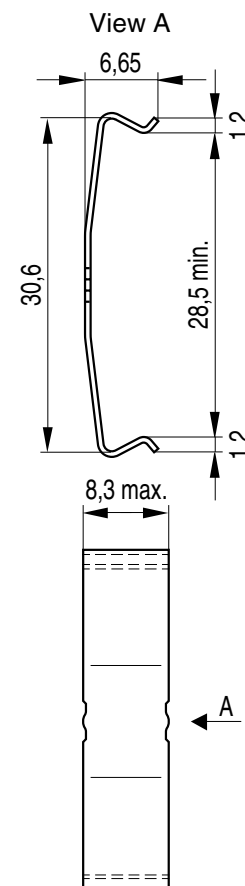
| Coil former                                    |                          |             |                            |      | Ordering code   |
|------------------------------------------------|--------------------------|-------------|----------------------------|------|-----------------|
| Sections                                       | $A_N$<br>mm <sup>2</sup> | $l_N$<br>mm | $A_R$ value<br>$\mu\Omega$ | Pins |                 |
| 1                                              | 52.3                     | 56.7        | 37.3                       | 12   | B66424W1012D001 |
| Yoke (ordering code per piece, 2 are required) |                          |             |                            |      | B66424B2000X000 |

## Coil former



FEK0212-I-E

## Yoke



**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 ( $>300\text{ }^{\circ}\text{C}$ ) 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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