Ferrites and accessories

ETD 29/16/10
Core and accessories

Series/Type: **B66358, B66359**
Date: September 2006, December 2008, December 2009

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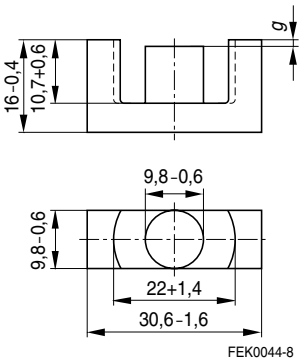
- To IEC 61185
- For SMPS transformers with optimum weight/performance ratio at small volume
- Delivery mode: single units



Magnetic characteristics (per set)

$\Sigma l/A$ = 0.93 mm^{-1}
l_e = 70.4 mm
A_e = 76.0 mm^2
A_{min} = 71.0 mm^2
V_e = 5350 mm^3

Approx. weight 28 g/set

Ungapped

Material	A_L value nH	μ_e	P_V W/set	Ordering code
N27	2000 +30/–20%	1470	< 1.04 (200 mT, 25 kHz, 100 °C)	B66358G0000X127
N87	2200 +30/–20%	1610	< 2.80 (200 mT, 100 kHz, 100 °C)	B66358G0000X187
N97	2250 +30/–20%	1670	< 2.40 (200 mT, 100 kHz, 100 °C)	B66358G0000X197

Gapped

Material	g mm	A_L value approx. nH	μ_e	Ordering code ** = 27 (N27) = 87 (N87)
N27, N87	0.10 ±0.02	621	457	B66358G0100X1**
	0.20 ±0.02	383	281	B66358G0200X1**
	0.50 ±0.05	201	148	B66358G0500X1**
	1.00 ±0.05	124	91	B66358G1000X1**

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	124	–0.7	195	–0.847	181	–0.865
N87	124	–0.7	192	–0.796	176	–0.873

Validity range: K1, K2: 0.10 mm < s < 2.00 mm
K3, K4: 70 nH < A_L < 680 nH

Coil former (magnetic axis horizontal)

Material: GFR polyterephthalate, UL 94 V-0, insulation class to IEC 60085:
B66359A/B: F ≙ max. operating temperature 155 °C, color code black
Valox 420-SE0® [E45329 (M)], SABIC INNOVATIVE PLASTICS
B66359W: H ≙ max. operating temperature 180 °C, color code black
Rynite FR 530® [E41938 (M)], E I DUPONT DE NEMOURS & CO INC
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.

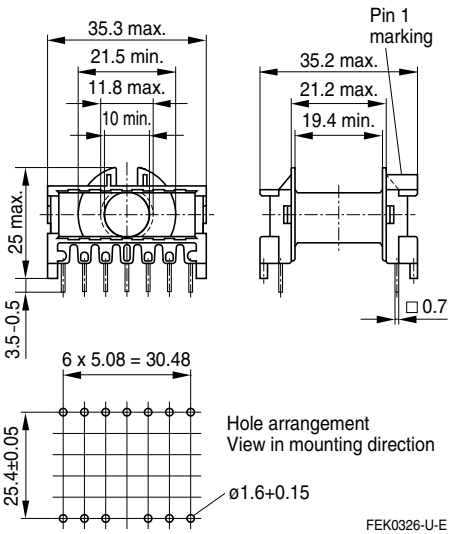
Yoke

Material: Stainless spring steel (0.3 mm)

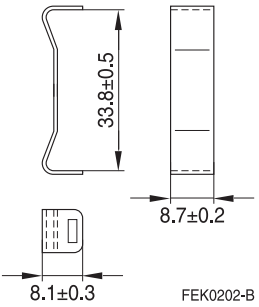
Coil former					Ordering code
Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	
1	97	52.8	18.7	13	B66359A1013T001[1)] B66359B1013T001 B66359W1013T001
Yoke (ordering code per piece, 2 are required)					B66359S2000X000

1) Molded-in pins

Coil former



Yoke



Coil former (magnetic axis vertical)

Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085: H ≙ max. operating temperature 180 °C), color code black Rynite FR 530® [E41938 (M)], E I DUPONT DE NEMOURS & CO INC

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”

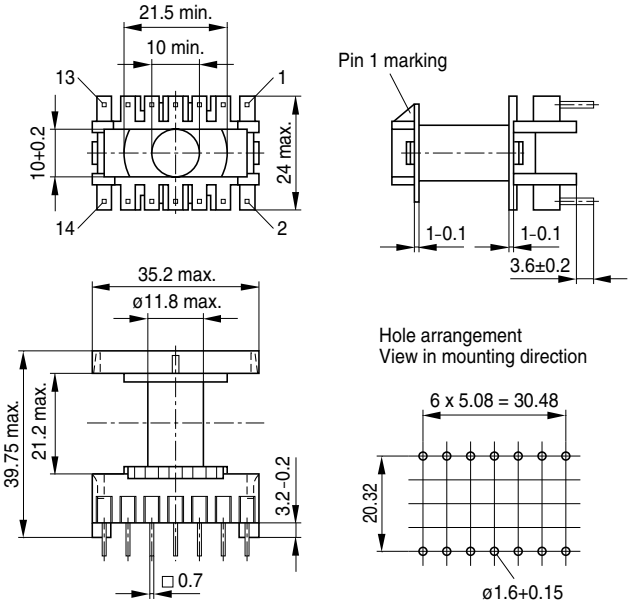
Squared pins.

Yoke

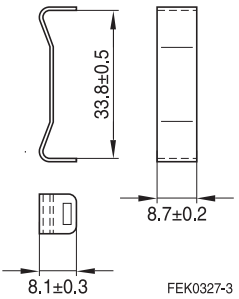
Material: Stainless spring steel (0.3 mm)

Coil former					Ordering code
Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	
1	97	52.8	18.7	14	B66359X1014T001
Yoke (ordering code per piece, 2 are required)					B66359S2000X000

Coil former



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 their special behavior under mechanical load.

Just like any ceramic material, ferrite cores are brittle and sensitive to any shock, fast changing or tensile load. Especially fast cooling rates under ultrasonic cleaning, high static and 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 the value for the initial permeability. Thus, the embedding medium should offer 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 irreversibly when exposed to strong magnetic fields.

Processing notes

– The start of the winding process should be soft. Otherwise, the flanges may be destroyed.
– Excessive winding forces may damage the flanges or squeeze the tube so that the cores can no longer be mounted.
– Excessive soldering time at high temperature (>300 °C) may affect 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 contamination with tin oxide (SnO) from the tin bath or burned insulation from the wire. For detailed information see Data Book 2007, chapter "Processing notes, 2.2".
– The dimensions of the pin hole arrangement are fixed and should be understood as an ideal recommendation for drilling the printed circuit board. In order to avoid problems when mounting the transformer, customers should make allowances for manufacturing tolerances in the drilling and pick-and-place processes by increasing the diameter of the pin holes.

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