Ferrites and accessories

RM 6, RM 6 LP
Cores and accessories

Series/Type: **B65807, B65808, B65821, B65659**

Date: September 2006/October 2007/January 2010/March 2010/June 2011

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B65808K1004D001	B65808P1004D001	2011-04-19		
B65808K1005D001	B65808P1005D001	2011-04-19		
B65808K1006D001	B65808P1006D001	2011-04-19		

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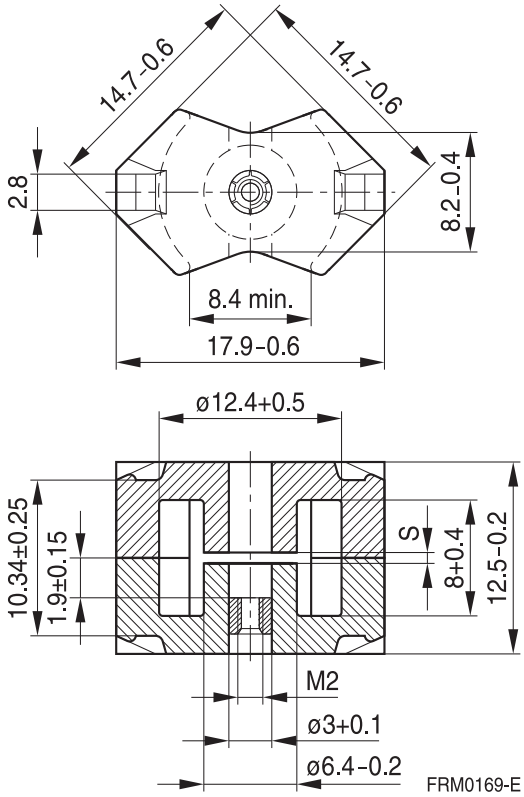
- To IEC 62317-4
- Core without center hole
  for transformer applications
- Delivery mode: sets



Magnetic characteristics (per set)

	with center hole	without center hole	
$\Sigma l/A$	0.86	0.78	mm^{-1}
l_e	26.9	28.6	mm
A_e	31.3	36.6	mm^2
A_{min}	—	31	mm^2
V_e	840	1050	mm^3

Approx. weight (per set)

m	4.9	5.1	g

Gapped

Material	A_L value nH	s approx. mm	μ_e	Ordering code[1)] -J without center hole -N with threaded sleeve -C with center hole
K1	40 ±3%	0.80	27.4	B65807+0040A001
M33	63 ±3% 100 ±3%	0.60 0.38	43.2 68.5	B65807+0063A033 B65807+0100A033
N48	160 ±3% 250 ±3% 315 ±3% 400 ±3%	0.22 0.12 0.08 0.05	109 171 215 274	B65807+0160A048 B65807+0250A048 B65807+0315A048 B65807+0400A048
N41	250 ±3%	0.17	155	B65807J0250A041

1) Replace the + by the code letter “C” or “N” for the required version. Standard version is “C”.

Ungapped

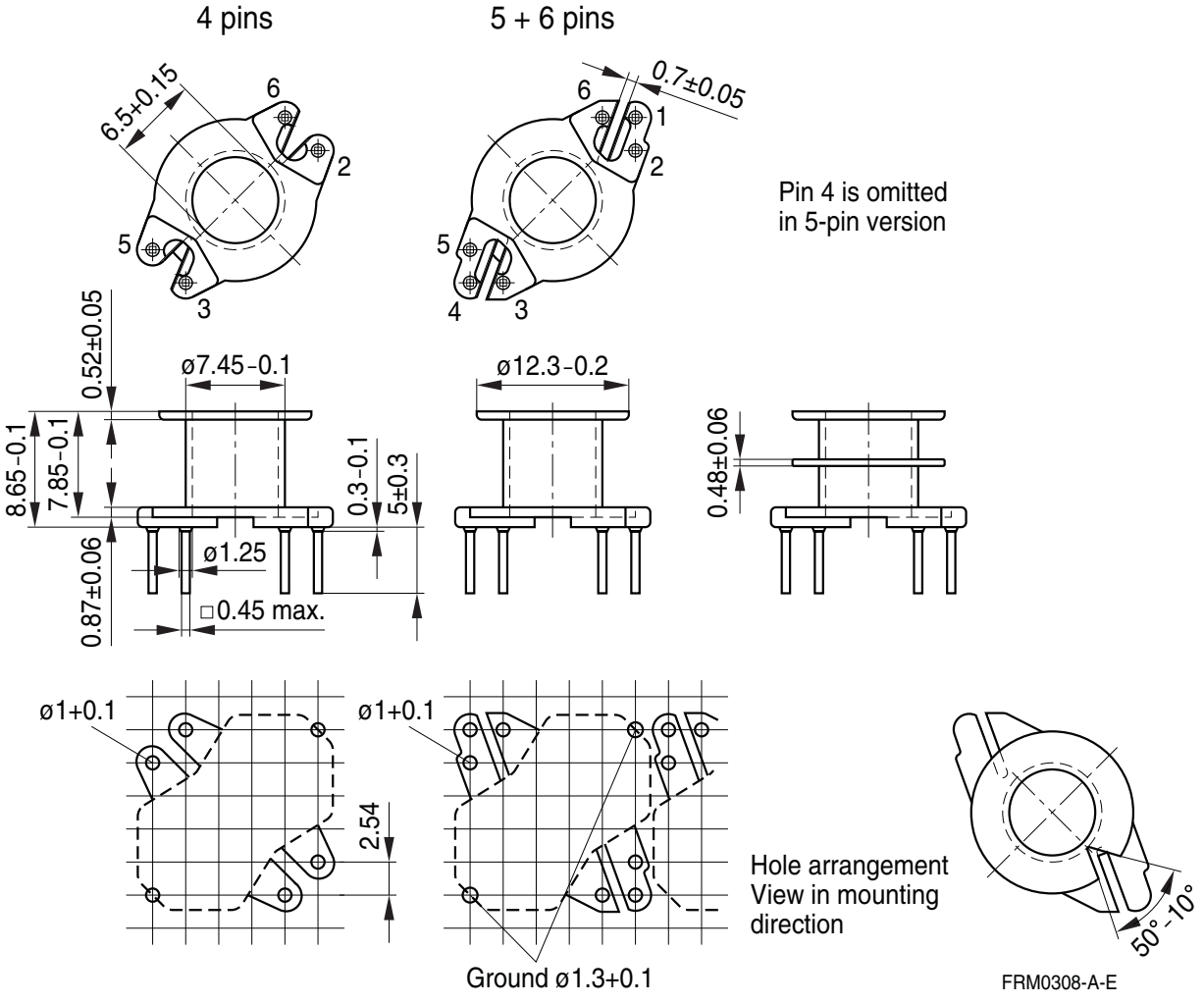
Material	A_L value nH	μ_e	P_V W/set	Ordering code -C with center hole -J without center hole
N48	2200 +30/–20%	1500		B65807C0000R048
N45	3500 +30/–20%	2180		B65807J0000R045
N30	4300 +30/–20%	2670		B65807J0000R030
T35	6200 +30/–20%	3860		B65807J0000R035
T38	8600 +40/–30%	5350		B65807J0000Y038
T66	12300 +40/–30%	7650		B65807J0000Y066
N49	1700 +30/–20%	1060	< 0.15 (50 mT, 500 kHz, 100 °C)	B65807J0000R049
N87	2400 +30/–20%	1490	< 0.51 (200 mT, 100 kHz, 100 °C)	B65807J0000R087
N97	2400 +30/–20%	1490	< 0.39 (200 mT, 100 kHz, 100 °C)	B65807J0000R097
N41	3100 +30/–20%	1930	< 0.16 (200 mT, 25 kHz, 100 °C)	B65807J0000R041

Coil former, squared pins

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085: H ≙ 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”

For matching clamp and insulating washers see page 8.

Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	Ordering code
1	15	30	69	4 5 6	B65808N1004D001 B65808N1005D001 B65808N1006D001
2	14	30	73	4 6	B65808N1004D002 B65808N1006D002



Coil former, pins squared in the start-of-winding area

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:
H ≙ max. operating temperature 180 °C), color code white
Bakelite UP 3420® [E61040 (M)], HEXION SPECIALTY CHEMICALS GMBH

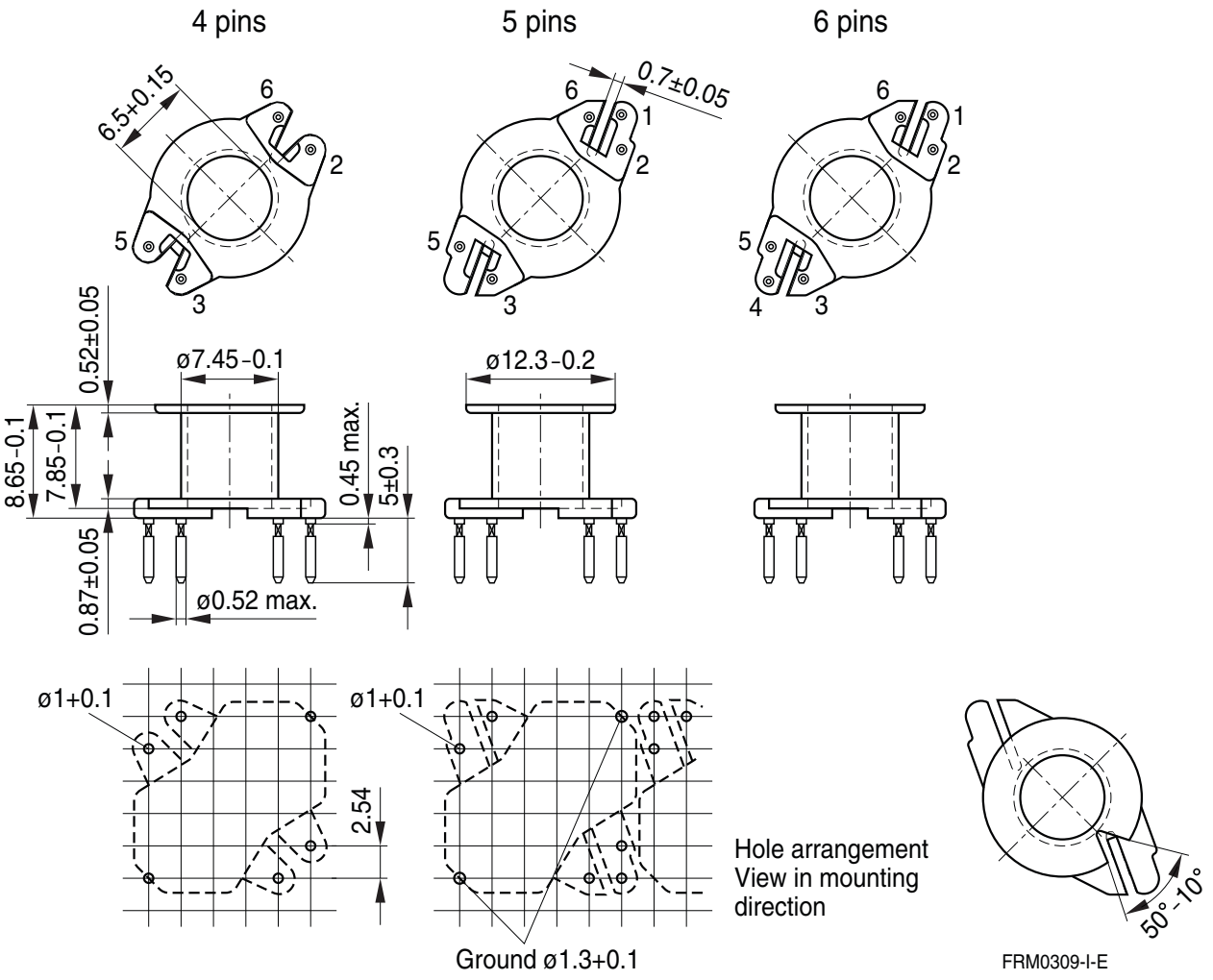
Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

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”

For matching clamp and insulating washers see page 8.

Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	Ordering code
1	15	30	69	4 5 6	B65808P1004D001 B65808P1005D001 B65808P1006D001



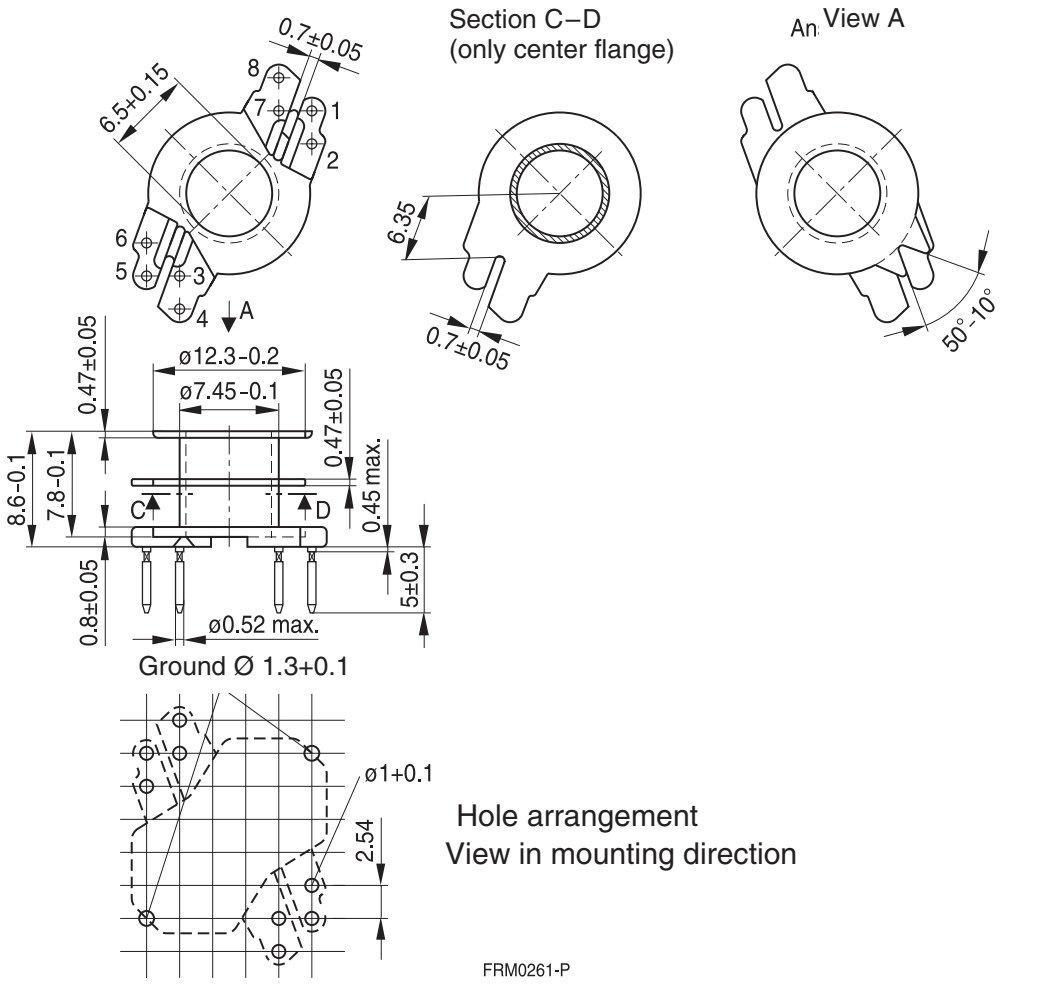
Coil former for SMPS transformers with line isolation

The creepage distances and clearances are designed such that the coil former is suitable for use in SMPS transformers with line isolation.

- Closed center flange with external wire guide
- Pins squared in the start-of-winding area
- Optimized for use with automatic winding machines

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:
F ≙ 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”

Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	Ordering code
2	14	30	73	8	B65808S1108D002

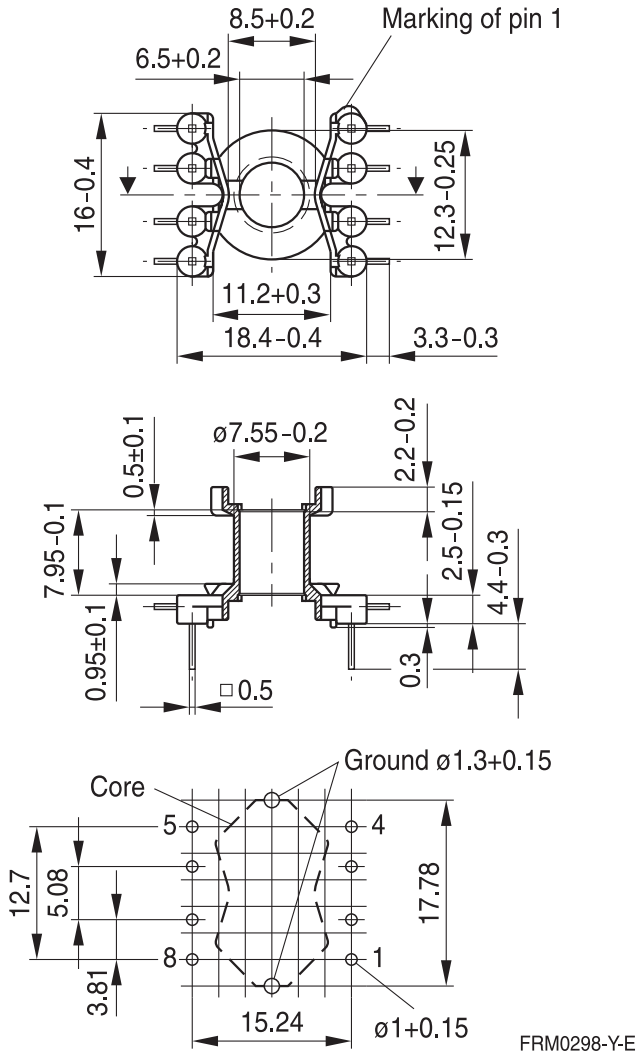


Coil former for power applications with angled pins

Optimized for automatic winding
Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085:
F ≙ max. operating temperature 155 °C), color code black
Valox 420-SE0® [E45329 (M)], GE PLASTICS BV
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”

For matching clamp and insulating washer 1 see page 8.

Sections	A_N mm²	l_N mm	A_R value μΩ	Pins	Ordering code
1	15	30	69	8	B65808E1508T001



Hole arrangement
View in mounting direction

Clamp

- With ground terminal, made of stainless spring steel (tinned), 0.4 mm thick
- Solderability to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s
- Also available as strip clamp on reels on request

Insulating washer 1 between core and coil former

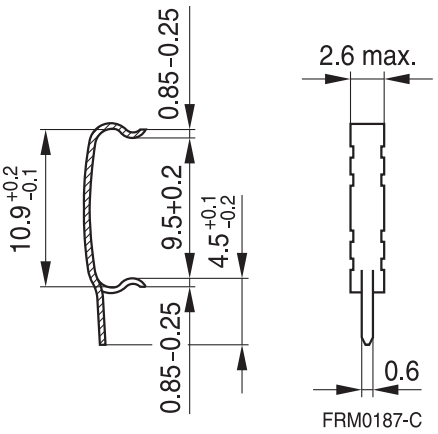
- For tolerance compensation and for insulation
- Made of polyarylate film (UL 94 V-0, insulation class to IEC 60085: E ≙ 120 °C), 0.08 mm thick Aryphan F685, [E167358 (M)], natural color, LOFO HIGH TECH FILM GMBH

Insulating washer 2 for double-clad PCBs

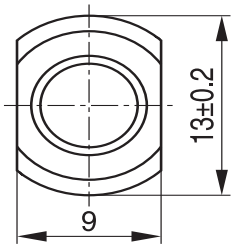
- Made of polycarbonate (UL 94 V-0, insulation class to IEC 60085: E ≙ 120 °C), 0.25 mm thick Makrofol FR, [E118859 (M)], natural color, BAYER MATERIALSCIENCE LLC

	Ordering code
Clamp (ordering code per piece, 2 are required)	B65808B2203X000
Insulating washer 1 (reel packing, PU = 1 reel)	B65808A5000X000
Insulating washer 2 (bulk)	B65808C2005X000

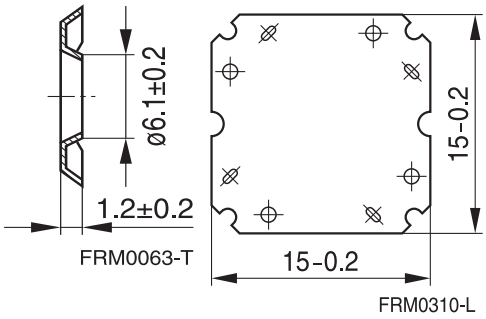
Clamp



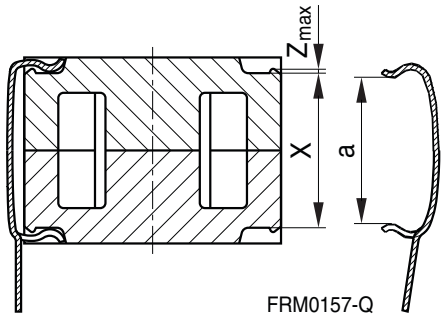
Insulating washer 1
(preliminary data)



Insulating washer 2



Clamping forces for RM 6



F_{min}: Extension of clamp from a to $a_2 = X_{min}$
F_{max}: Extension of clamp from a to $a_1 = X_{max}$

Clamp opening a (mm)		9.5 +0.2
Core nose Z_{max} (mm)		0.22
Height of core pair X (mm)	X_{min}	10.1
	X_{max}	10.6
Clamping force F (N)	F_{min}	7
	F_{max}	50

SMD

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
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

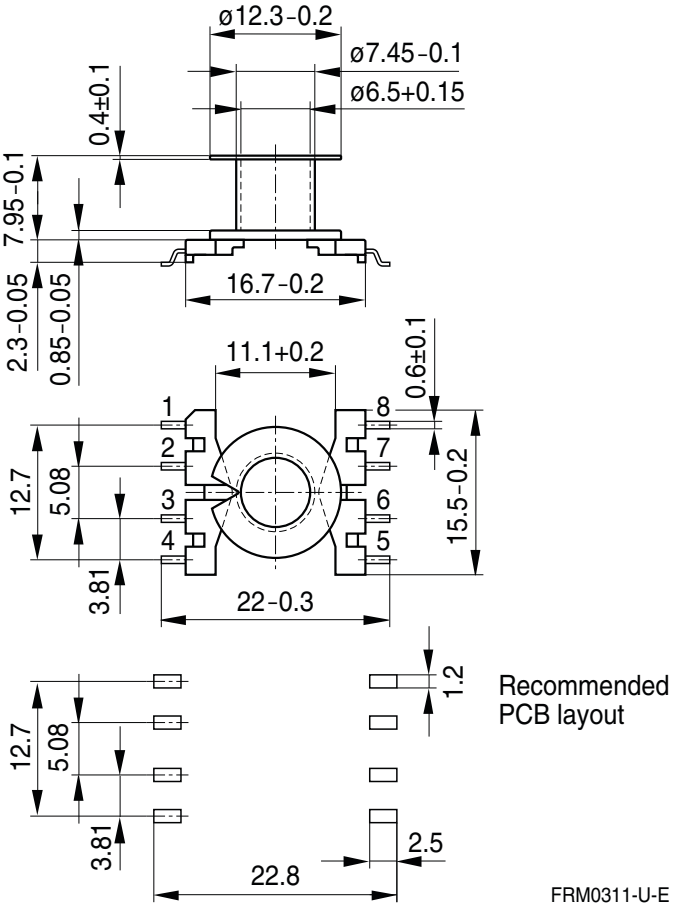
Winding: see Data Book 2007, chapter “Processing notes, 2.1”

Clamp

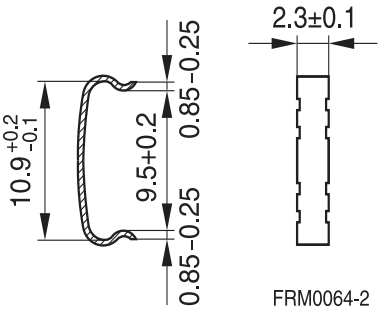
- Without ground terminal, made of stainless spring steel, 0.435 mm thick
- Also available as strip clamp on request

Sections	A_N mm²	l_N mm	A_R value μΩ	Terminals	Ordering code
1	16.2	31	66	8	B65821C1008T001
Clamp(ordering code per piece, 2 are required)					B65808J2204X000

Coil former



Clamp

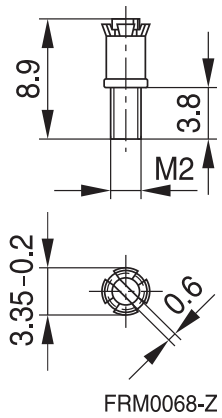


Adjusting screw

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

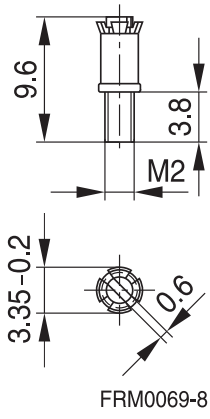
Figure	Tube core ∅ × length (mm)	Material	Color code	Ordering code
a	2.62 × 3.6	N22	red	B65659F0001X023
b	2.75 × 4.4	N22	black	B65659F0003X023
c	2.82 × 4.4	N22	yellow	B65659F0004X023

a



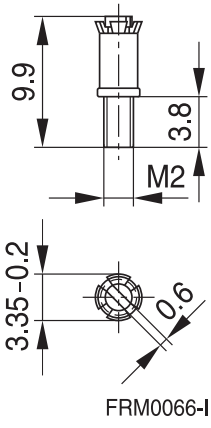
FRM0068-Z

b



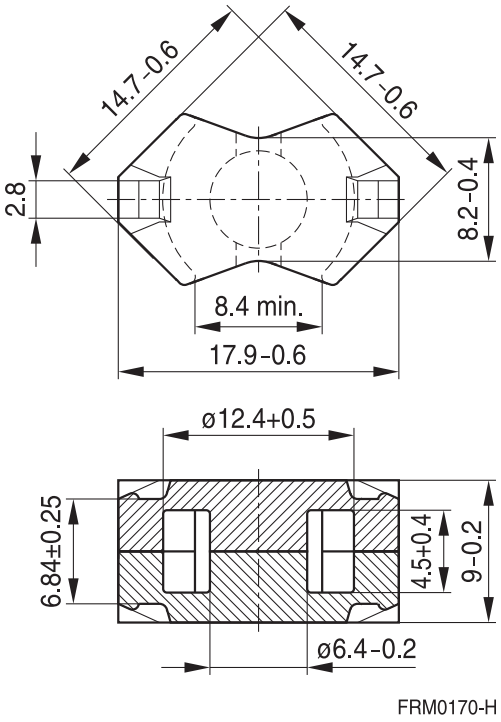
FRM0069-8

c



FRM0066-I

- To IEC 62317-4
- For compact transformers
- Without center hole
- Delivery mode: sets



FRM0170-H

Magnetic characteristics (per set)

$\Sigma l/A$ = 0.58 mm^{-1}
l_e = 21.8 mm
A_e = 37.5 mm^2
A_{min} = 31.2 mm^2
V_e = 820 mm^3

Approx. weight 4.0 g/set

Ungapped

Material	A_L value nH	μ_e	P_V W/set	Ordering code
T38	10500 +40/–30%	4860		B65807P0000Y038
N49	2200 +30/–20%	1020	< 0.14 (50 mT, 500 kHz, 100 °C)	B65807P0000R049
N92	2300 +30/–20%	1060	< 0.44 (200 mT, 100 kHz, 100 °C)	B65807P0000R092
N87	3000 +30/–20%	1390	< 0.40 (200 mT, 100 kHz, 100 °C)	B65807P0000R087

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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2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.

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