Ferrites and accessories

RM 14, RM 14 LP
Cores and accessories

Series/Type:  B65887, B65888
Date:  September 2006
To IEC 62317-4
Optimized core cross section and increased thickness of base for power applications
Without center hole
Delivery mode: sets

Magnetic characteristics (per set)

\[ \frac{\Sigma l}{A} = 0.35 \text{ mm}^{-1} \]
\[ l_e = 70 \text{ mm} \]
\[ A_e = 200 \text{ mm}^2 \]
\[ A_{\text{min}} = 170 \text{ mm}^2 \]
\[ V_e = 14000 \text{ mm}^3 \]

Approx. weight 74 g/set

Gapped

<table>
<thead>
<tr>
<th>Material</th>
<th>( A_L ) value nH</th>
<th>( s ) approx. mm</th>
<th>( \mu_e )</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>N41</td>
<td>160 ±3%</td>
<td>1.90</td>
<td>45</td>
<td>B65887E0160A041</td>
</tr>
<tr>
<td></td>
<td>250 ±3%</td>
<td>1.00</td>
<td>70</td>
<td>B65887E0250A041</td>
</tr>
<tr>
<td></td>
<td>400 ±3%</td>
<td>0.50</td>
<td>111</td>
<td>B65887E0400A041</td>
</tr>
<tr>
<td></td>
<td>1000 ±5%</td>
<td>0.15</td>
<td>279</td>
<td>B65887E1000J041</td>
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</tbody>
</table>

Ungapped

<table>
<thead>
<tr>
<th>Material</th>
<th>( A_L ) value nH</th>
<th>( \mu_e )</th>
<th>( P_v ) W/set</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>N49</td>
<td>3900 +30/–20%</td>
<td>1090</td>
<td>&lt; 2.37 (50 mT, 500 kHz, 100 °C)</td>
<td>B65887E0000R049</td>
</tr>
<tr>
<td>N87</td>
<td>6000 +30/–20%</td>
<td>1670</td>
<td>&lt; 7.40 (200 mT, 100 kHz, 100 °C)</td>
<td>B65887E0000R087</td>
</tr>
<tr>
<td>N97</td>
<td>6000 +30/–20%</td>
<td>1670</td>
<td>&lt; 5.60 (200 mT, 100 kHz, 100 °C)</td>
<td>B65887E0000R097</td>
</tr>
<tr>
<td>N41</td>
<td>6800 +30/–20%</td>
<td>1890</td>
<td>&lt; 2.52 (200 mT, 25 kHz, 100 °C)</td>
<td>B65887E0000R041</td>
</tr>
</tbody>
</table>
Coil former

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”

Squared pins.
For matching clamp and insulating washer see page 5.

<table>
<thead>
<tr>
<th>Sections</th>
<th>(A_N) mm(^2)</th>
<th>(I_N) mm</th>
<th>(A_R) value (\mu\Omega)</th>
<th>Pins</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>107</td>
<td>71.5</td>
<td>23</td>
<td>10</td>
<td>B65888N1010D001</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>B65888N1012D001</td>
</tr>
</tbody>
</table>

10 pins
12 pins

Ground Ø 1.6+0.1
Hole arrangement
View in mounting direction
Coil former for power applications

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 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”

For matching clamp and insulating washer see page 5.

<table>
<thead>
<tr>
<th>Sections</th>
<th>$A_N$ mm²</th>
<th>$I_N$ mm</th>
<th>$R$ value µΩ</th>
<th>Pins</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>106</td>
<td>71.5</td>
<td>23</td>
<td>12</td>
<td>B65888C1512T001</td>
</tr>
</tbody>
</table>

Hole arrangement
View in mounting direction
(Note half pitch!)

Please read Cautions and warnings and Important notes at the end of this document.
Clamp

- With ground terminal, made of stainless spring steel (tinned), 0.5 mm thick
- Solderability to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Insulating washer for double-clad PCBs

- Made of polycarbonate (UL 94 V-0, insulation class to IEC 60085: E ≥ 120 °C), 0.3 mm thick
  Makrofol DPF 5026, [E41613 (M)], natural color, BAYER MATERIALSCEINE AG

<table>
<thead>
<tr>
<th>Component</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp (ordering code per piece, 2 are required)</td>
<td>B65888A2002X000</td>
</tr>
<tr>
<td>Insulating washer (bulk)</td>
<td>B65888B2005X000</td>
</tr>
</tbody>
</table>

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

Magnetic characteristics (per set)
\[ \frac{\Sigma I}{A} = 0.25 \text{ mm}^{-1} \]
\[ l_e = 50.9 \text{ mm} \]
\[ A_e = 201 \text{ mm}^2 \]
\[ A_{\text{min}} = 170 \text{ mm}^2 \]
\[ V_e = 10230 \text{ mm}^3 \]

Approx. weight 55 g/set

Ungapped

<table>
<thead>
<tr>
<th>Material</th>
<th>( A_L ) value</th>
<th>( \mu_e )</th>
<th>( P_V )</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>N49</td>
<td>5100 +30/–20%</td>
<td>1030</td>
<td>&lt; 2.0 ( 50 mT, 500 kHz, 100 °C)</td>
<td>B65887P0000R049</td>
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<tr>
<td>N92</td>
<td>5400 +30/–20%</td>
<td>1090</td>
<td>&lt; 6.1 (200 mT, 100 kHz, 100 °C)</td>
<td>B65887P0000R092</td>
</tr>
<tr>
<td>N87</td>
<td>7100 +30/–20%</td>
<td>1430</td>
<td>&lt; 5.5 (200 mT, 100 kHz, 100 °C)</td>
<td>B65887P0000R087</td>
</tr>
</tbody>
</table>
Ferrites and accessories
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 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 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 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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