**Introduction**

Wide band target:
- Low frequency: high flux, high $\mu_r$
- High frequency: propagation in the winding
- Nanocrystalline material
- By chance possible to use common mode chokes

**Electrical properties given by the manufacturer**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test conditions</th>
<th>Value</th>
<th>Unit</th>
<th>Tol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductance</td>
<td>10 kHz 0.1 mA</td>
<td>L</td>
<td>$2 \times 3.0$</td>
<td>$\pm50%$/10%</td>
</tr>
<tr>
<td>Rated current</td>
<td>$\Phi$ 70°C</td>
<td>$I_q$</td>
<td>26.0 A</td>
<td>mA</td>
</tr>
<tr>
<td>DC Resistance</td>
<td>$\Phi$ 20°C</td>
<td>$R_{DC}$</td>
<td>$2 \times 4.5$</td>
<td>mΩ</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>50 Hz</td>
<td>$U_0$</td>
<td>250 V</td>
<td>V DC</td>
</tr>
<tr>
<td>Insulation test voltage</td>
<td>50 Hz 5 mA 2 sec</td>
<td>$U_T$</td>
<td>1500 V</td>
<td>V DC</td>
</tr>
</tbody>
</table>

**Common mode choke**

- **Strong points:**
  - Wide band: from 0.5 Hz up to 50 MHz is possible, ratio $10^8$.
  - Low phase shift in a wide frequency range.
  - Known limits of operation.
  - High current capability
  - Single pulse operation is possible

- **Weak points:**
  - No DC output, saturation at 2.2A DC at input;
  - Saturates early at low frequency
  - Low output voltage level

---

**Manufacturer data of insertion loss with a 50 ohm load**

**Operation limits**

Saturation, shunt temperature, eddy current

**Transfer using 10 times higher shunt resistance**

Real design goes to lower freq.

**PCB Lay-out**

**Conclusions**

**Strong points:**
- Wide band: from 0.5 Hz up to 50 MHz is possible, ratio $10^8$.
- Low phase shift in a wide frequency range.
- Known limits of operation.
- High current capability
- Single pulse operation is possible

**Weak points:**
- No DC output, saturation at 2.2A DC at input;
- Saturates early at low frequency
- Low output voltage level