Versatile Planar Transformer

**FEATURES**
- Patent No 99 00241
- Designed for switch mode power supply applications (transformer and choke inductor)
- End user configures the transformer by using a software supplied
- Frequency range: 50 kHz to 400 kHz
- Suitable for surface mount or through hole
- UL 94 V-0 material
- High power up to 220 W
- Operating temperature: -55 °C to +125 °C

**QUICK REFERENCE DATA**

<table>
<thead>
<tr>
<th>Type</th>
<th>Transformer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (L x W x H)</td>
<td>40 mm x 35 mm x 12 mm</td>
</tr>
<tr>
<td>Terminals</td>
<td>SMD or through holes</td>
</tr>
<tr>
<td>Power</td>
<td>Up to 220 W</td>
</tr>
<tr>
<td>Frequency range</td>
<td>50 kHz to 400 kHz</td>
</tr>
<tr>
<td>Inductance range</td>
<td>5.2 μH to 4032 μH</td>
</tr>
</tbody>
</table>

**DIMENSIONS** in millimeters (± 0.5)

**SMD Version**

Recommended PCB Layout

| Weight: 35 g |

**Through-Hole Version**

Recommended PCB Layout

| Weight: 35 g |
APPLICATIONS: DC/DC POWER SUPPLY

• Switching mode power supplies
• DC/DC converters

TECHNOLOGY

PLAC 100 is a highly flexible planar transformer. Inhouse the design engineer can adapt the different combinations of serial and parallel configurations of the windings to give a substantial number of ratio and current possibilities via the supplied software.

The transformer is one of the first critical components in the design of power supply and converters. PLAC 100 allows a great versatility for many power supply topologies: forward, flyback, half-bridge, bridge ...

Thanks to this adaptability it enables user to reduce and optimize times during the development and the production of power supplies.

PRINCIPLE OF USE

Available windings:
• 6 windings with 1 turn
• 6 windings with 3 turns

The user determines their own configuration of the windings via the PCB layout - software provided PLAC 100 SOFT.

TECHNICAL DATA ALLOWING CONCEPTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$B_{sat}$</td>
<td>Saturation flux density: $&lt; 300 \text{ mT &amp; 100 } \text{°C}$</td>
</tr>
<tr>
<td>$A_e$</td>
<td>Effective cross-sectional area of a core: $113 \text{ mm}^2$</td>
</tr>
<tr>
<td>$V_e$</td>
<td>Effective volume of a core: $4234 \text{ mm}^3$</td>
</tr>
<tr>
<td>$R_{th}$</td>
<td>Thermal resistance: $22 \text{ °C/W}$</td>
</tr>
</tbody>
</table>
| $P_c$              | Core power loss: f: 50 kHz to 200 kHz (excluded)
|                    | f: 200 kHz (included) to 400 kHz |

$$P_c = 5.8 \times 10^{-6} f \left(\frac{B_{peak}}{T}\right)^{2.94}$$

$$P_c = 11 \times 10^{-9} f \left(\frac{B_{peak}}{T}\right)^{2.55}$$

f: Frequency; B: Peak-peak flux density

STANDARD ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>INDUCTANCE $\mu$H</th>
<th>POWER RANGE W</th>
<th>FREQUENCY kHz</th>
<th>POWER SUPPLY TOPOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAC 100</td>
<td>7 to 63 up to 220</td>
<td>50 to 400</td>
<td>Flyback; forward; push-pull; bridge; half-bridge</td>
<td></td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS at 25 °C

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 turn coil (13 to 24) Inductance without air gap (0.1 V, 10 kHz)</td>
<td>$63 \mu$H ± 25 %</td>
</tr>
<tr>
<td>1 turn coil (1 to 12) Inductance without air gap (0.1 V, 10 kHz)</td>
<td>$7 \mu$H ± 25 %</td>
</tr>
<tr>
<td>$A_l$ (nH) without air gap (UG)</td>
<td>7000</td>
</tr>
<tr>
<td>$A_l$ (nH) expendable</td>
<td>100; 160; 250; 400; 630</td>
</tr>
<tr>
<td>$R_{DC}$ 1 turn coil (1 to 12) (typical value)</td>
<td>3 m$\Omega$</td>
</tr>
<tr>
<td>$R_{DC}$ 3 turn coil (13 to 24) (typical value)</td>
<td>35 m$\Omega$</td>
</tr>
<tr>
<td>Hipot between 1 turn winding/3 turns winding with if &lt; 100 $\mu$A</td>
<td>1000 $V_{AC}$</td>
</tr>
<tr>
<td>Hipot between 1 turn winding with if &lt; 100 $\mu$A</td>
<td>300 $V_{AC}$</td>
</tr>
<tr>
<td>Hipot between 3 turn winding with if &lt; 100 $\mu$A</td>
<td>300 $V_{AC}$</td>
</tr>
<tr>
<td>Hipot between winding and ground with if &lt; 100 $\mu$A</td>
<td>800 $V_{AC}$</td>
</tr>
</tbody>
</table>

For technical questions, contact: sferaztronics@vishay.com

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Revision: 10-May-17

Document Number: 59054

www.vishay.com
FORWARD: $P_{out\,\text{max}}$; Duty cycle = 0.45

$V_{in}$ (V)

$P_{out}$ (W)

f = 400 kHz
f = 350 kHz
f = 300 kHz
f = 250 kHz
f = 200 kHz
f = 150 kHz

FLYBACK: $P_{out\,\text{max}}$; Duty cycle = 0.45

$V_{in}$ (V)

$P_{out}$ (W)

f = 400 kHz
f = 350 kHz
f = 300 kHz
f = 250 kHz
f = 200 kHz
f = 150 kHz

MARKING
- Vishay trademark
- Part number
- Manufacturing date

TERMINALS FINISH
- 3 = Pure tin

PACKAGING
- Box of 15 pieces

KIT WITH SOFTWARE FOR DESIGN SUPPORT ON PLAC 100 TRANSFORMER
**FEATURES OF SOFTWARE**

- Interactive
- Directly executable
- Compatible with all versions of WINDOWS
- Available on USB key
- English and French languages
- Designed solutions on PDF format
- Kit includes
  - Software in USB key
  - One part of each type (through hole)
  - 12 female headers

**HARDWARE REQUIREMENTS**

- PC compatible, WINDOWS 2000, XP and VISTA
- Minimum processor Intel P3 or equivalent
- RAM 128 Mo minimum
- Screen resolution 1024 x 768 minimum
- Directly executable, no installation required

**WARNING:** This software is a support to technical designers. User is responsible to validate the solution in its own configuration.
**INPUT DATA**

Type of power supply:
- Flyback
- Forward
- Push-pull
- Bridge
- Half-bridge

Electrical data:
- Input voltage (V)
- Output voltage (V)
- Power (W)
- Frequency (kHz)

**OUTPUT DATA**

PCB layout
Electrical data:
- Maximum duty cycle
- Ratio
- Primary inductance (μH)
- Input and output current (A)
- Balance of power losses (W)
- Winding resistance (Ω)
- Difference between temperature inside PLAC 100 and ambient temperature

The software allows to calculate all data for the choke inductance when power supply structure needs it.

**Note**
- See also Application Note: [www.vishay.com/doc?59057](http://www.vishay.com/doc?59057)
### SAP PART NUMBERING

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FORMAT</th>
<th>STYLE</th>
<th>TYPE</th>
<th>SPECIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>L</td>
<td>A</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>100</td>
<td>S = SMD</td>
<td>P = Pin through hole</td>
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<tr>
<td>0</td>
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<td></td>
<td></td>
<td>(if applicable)</td>
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<tr>
<td>0</td>
<td></td>
<td></td>
<td>UG = ungapped</td>
<td>Given by Vishay for custom design</td>
</tr>
<tr>
<td>S</td>
<td>2</td>
<td>250</td>
<td>100</td>
<td>100 = AL 100</td>
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<tr>
<td>2</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160 = AL 160</td>
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<tr>
<td>5</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250 = AL 250</td>
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<td>400</td>
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<td>400 = AL 400</td>
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<td>630</td>
<td>630</td>
<td>630</td>
<td>630 = AL 630</td>
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<td></td>
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<td>KIT</td>
<td>one of each type (style P); one USB key with software; 12 female headers</td>
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Given by Vishay for custom design

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