Introduction to Power Inductors - Application and Advantages of MGT Power Inductors

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Application of Power Inductors

- DC to DC Power Design for **High Inductance Design**

Boost Converter

\[
L = \frac{V_o \times ESR_C \times (1/F_{sw} - \text{Dutymax})}{V_{ripple}}
\]
Application of Power Inductors

- DC to DC Power Design for **Low Inductance Design**

Buck Converter

\[
\begin{align*}
\text{Input Voltage: } V_i &\rightarrow Q & L &\rightarrow \text{Output Current: } I_o \\
\text{Input Current: } I_i &\rightarrow D & C &\rightarrow V_o \\
\end{align*}
\]
Application of Power inductors

On Board DC/DC Power
A Selection of our THT Inductor Range

THT Type:

From high current (low inductance value) to low current (high inductance value)
A Selection of our SMD Type Range

SMD Type:

From high current (low inductance value) to low current (high inductance value)
High Current Power Bead (1µH Max.)

Applications:
- Mainboard
- VGA (Video Graphic Array)
- Servers
- Network Communications
- Automotive Low Voltage Power Supply

Advantages:
- Low DCR design
- Low Core loss with Ferrite Mn-Zn material design
- Highly reliable design with no short/open circuits and no material aging

Further Info.
Coiltronic
Pulse
How MGT makes High Current Power Beads

VRM Input Choke

Sendust Molding
Advantages:

- Achieves cost effective and better performance by using automatic production compared to the traditional hand wiring.
- Flexible in using Ferrite & Powder core.

Applications:

- Mainboard
- Industrial Computers
- Network Communication
- Power Supply
- Automotive Low Voltage Power Supply
How MGT Makes High Current Power Cubes

[Diagram showing the process of making high current power cubes]
Molded Power Inductor (47µH Max)

Applications:
- Laptops
- Network Communication
- LCD
- Automotive Low Voltage Power Supply

Advantages:
- Achieves lower DCR by using Air Core Coil.
- Allows higher current and temperature by using high saturation Sendus Powder.

S6
S7

Further Info.
Vishay
How MGT Makes Molded Power Inductors

SMALLER SIZE DESIGN
SMD Power Inductor (47mH Max)

Applications:
- 手持式系統,
- LCD Panel Products
- Network Communications
- Power Supply

Advantages:
- Achieves cost effective and better performance by using automatic production compared to the traditional hand wiring
- Allows higher current with easy shielded

Further Info.
Role of Inductors in Power Supply

AC input → PFC (75W) → Transformer
   - Flyback
   - LLC
   - Full Bridge
   - Half Bridge
   - Forward

DC/DC → Output
Power Supply: Type I - Flyback

AC input

Uses

Common Mode choke

PFC (75W)

Replaced By

AI

Transformer

Flyback ( P<120W)
Power Supply: Type III – Full/Half Bridges & Forward

AC input

PFC (75W)

Transformer
  Full Bridge
  Half Bridge
  Forward

Transformer

Output

APCDF

APCDR

DC/DC

Common Mode choke

AH

Uses

Replaced By

Uses

Uses
PFC Boost: Alternative Choice

- CCM - Continuous Mode > 250W
- DCM - Discontinuous Mode < 250W
- CRM - Critical Mode < 250W

Power PFC Choke

NEW

AI

AE

Replaced By
Overview of AI Series (10µH min)

Applications:
- Differential mode filter
- PFC Choke
- Resonant Inductor
- Output choke

Ferrite Mn-Zn material
Sendust powder core
AE: Litz wire air coil without bobbin.
Overview of AB Series (100µH max)

- Using flat wire to reduce copper loss

Application

- Output choke

Ferrite Mn-Zn material

Sendust powder core
Overview of D3 Series (47µH min)

Magictec:
Powder Shielding Process (PSP)
Overview of SD Series (22µH min)