

Overview

The new surface-mounted power inductors from Monolithic Power Systems are designed for applications ranging from power supplies to power converters. The molded and semi-shielded series inductors include inductance ranges from 0.33 μ H to 22 μ H, and saturation current ranges from 0.8A to 64A.

Molded Inductors Series (MPL-AT/MPL-AY/MPL-AL)

This series includes molded, magnetic-shielded power inductors that offer soft saturation due to their molded design, delivering stable high-temperature behavior. Their molded construction decreases the audible noise generated from alternating currents and pulse wave frequencies.

The MPL-AT series offers a very low profile for applications where height is a design restriction. This series also offers low DCR/ACR and the ability to handle high currents.

The MPL-AY series offers low DCR/ACR and the ability to handle high currents.

The MPL-AL series offers low DCR/ACR and a flat wire construction, which provides even higher current ratings than round-wire molded inductors.

Semi-Shielded Inductors Series (MPL-SE)

The MPL-SE semi-shielded power inductors are shielded by an external magnetic epoxy resin for better magnetic characteristics. Their design offers a lower DCR and higher current capabilities.

Features

Molded Inductor Features:

- Start of Winding Indication
- Low DCR
- Soft Saturation
- High Saturation Current
- Stable Over Temperature
- Max Operating Temperature
125°C/155°C



MPL-AL Series (Low-Resistance Molded Inductors)

- Flat Wire Construction
- Low Resistance Series
- High Current Capabilities
- Sizes: 4020, 5030, 5050, 6050, and 6060



MPL-AT Series (Tiny Molded Inductors)

- Low-Profile Inductors
- Sizes: 2010, 2512, and 2514

MPL-AY Series (Molded Inductors)

- High Current Capabilities
- Sizes: 3020, 4020, 1050, and 1265

Semi-Shielded Inductor Features:

MPL-SE Series (Semi-Shielded Inductors)

- External Epoxy Resin for Better Magnetic Characteristics
- Magnetically Shielded
- Low DCR
- High Current Capabilities
- Max Operating Temperature 125°C
- Sizes: 2512, 4030, 5040, 6040



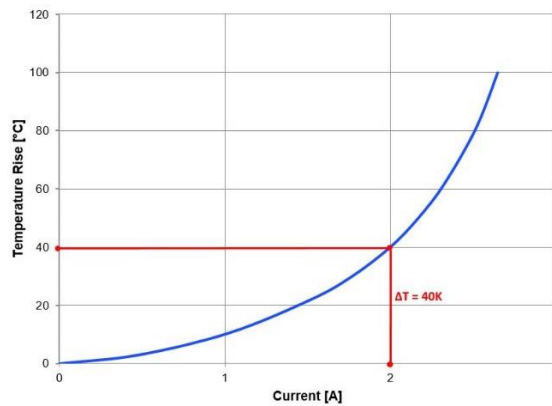
Applications:

- Integrated DC/DC Converters
- High-Efficiency Switching Controllers
- High-Current Power Supplies
- Portable, Embedded, and Battery-Powered Devices including Mobile Devices, Tablets, Cameras, Laptops, PCs, and More

Current Specifications

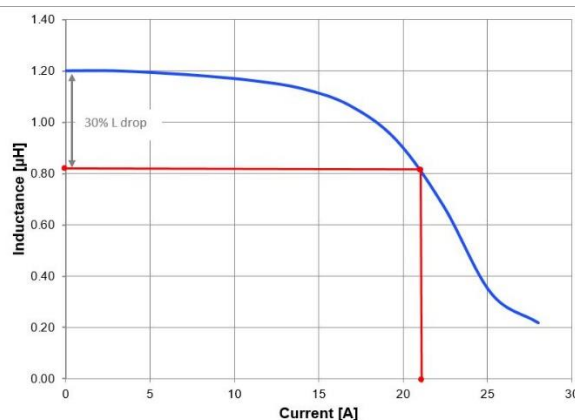
Rated Current

The rated current causes a coil temperature rise (ΔT) of 40K.



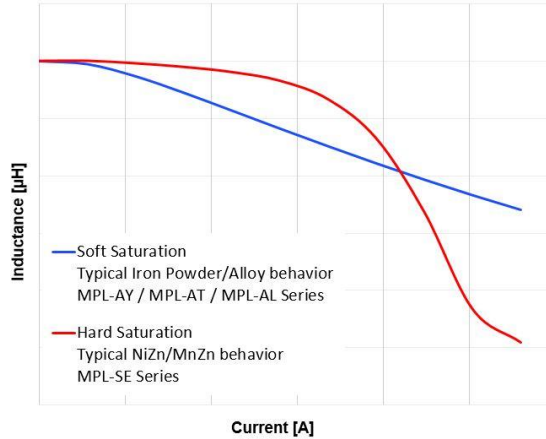
Saturation Current

The inductance decreases by increasing the current flowing through the inductor. MPS inductors' saturation current is defined by a 30% drop in inductance at the given saturation current.



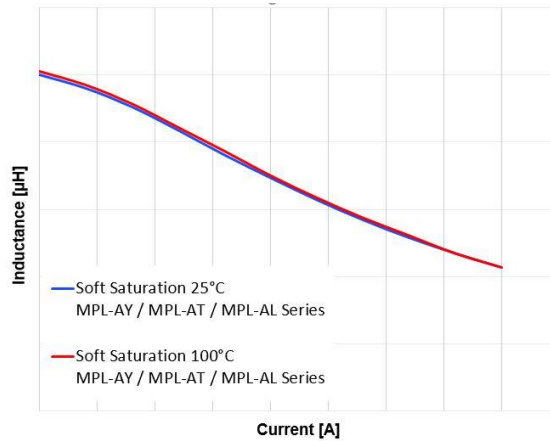
Hard Saturation vs. Soft Saturation

Depending on the material, structure, and specific construction of an inductor, the behavior of the saturation current can be classified as either soft or hard saturation. Hard saturation is a typical characteristic of ferrite materials, which are very commonly used in power inductors. Soft saturation is common on molded inductors (powder cores) with distributed gap materials. Hard saturation occurs when the inductance abruptly drops once the saturation current reaches the saturation point. Soft saturation is simply a gradual drop in inductance.



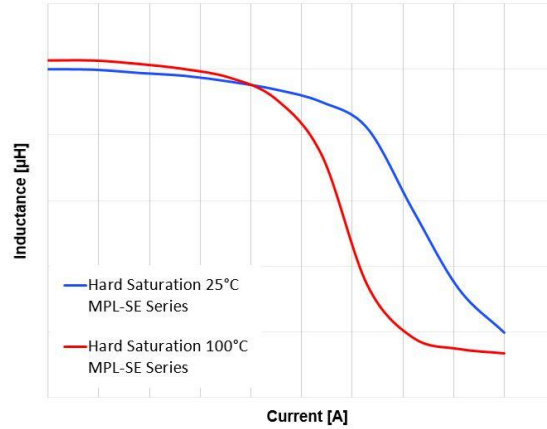
Saturation Current Behavior at Different Ambient Temperatures

The saturation curve from MPS molded inductors remains stable at currents up to several amperes.



Saturation Current for the MPL-AT/MPL-AY/MPL-AL Molded Inductor Series at 25°C and 100°C Ambient Temperatures

The saturation current from semi-shielded inductors may be more noticeably affected, depending on the temperature permeability relationship. Increasing the temperature leads to higher permeability, resulting in higher inductance values and the device reaching the saturation point earlier.



Saturation Current for the MPL-SE Semi-Shielded Inductor Series at 25°C and 100°C Ambient Temperatures

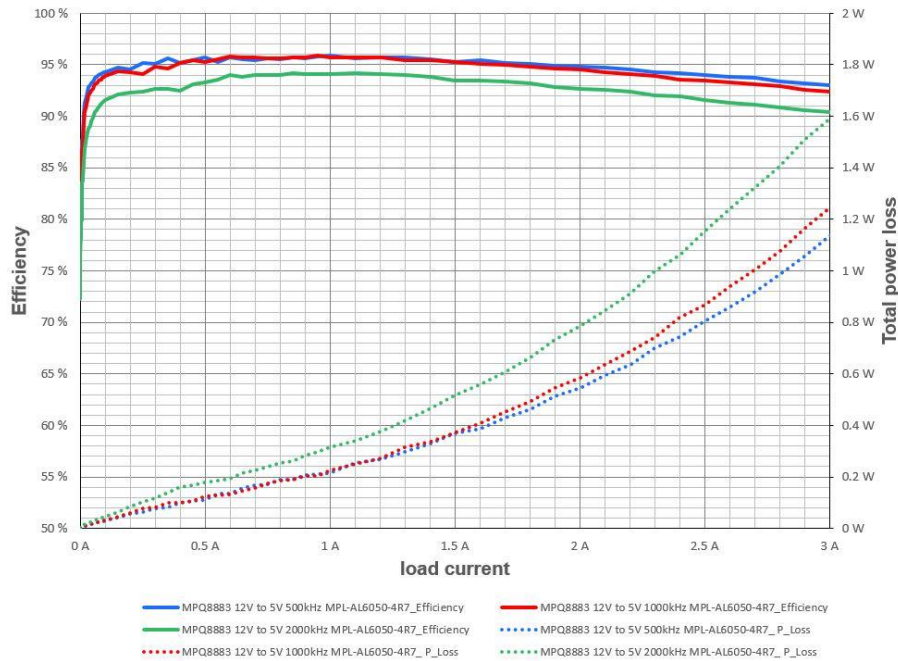
Easy Complete Power Solution

MPS inductors are optimized for MPS converters. They deliver top performance, cost, and efficiency, and can be used in countless power supply applications.

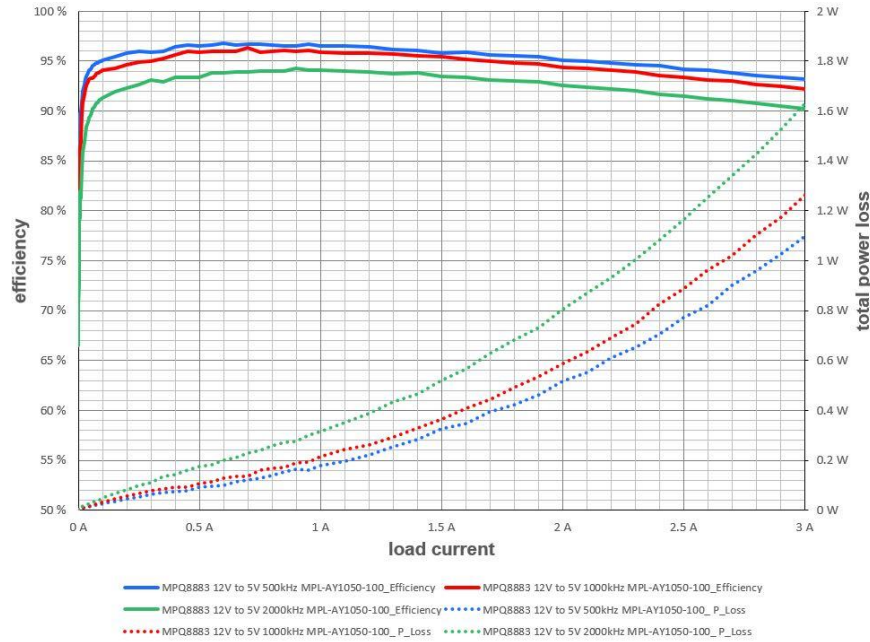
Performance from Molded and Semi-Shielded MPS Power Inductors

MPQ8883 - Synchronous Step-Down Converter at $V_{IN} = 12V$, $V_{OUT} = 5V$, $f_{sw} = 500kHz/1000kHz/2000kHz$.

Efficiency and Power Loss Using the MPL-AL6050-4R7 at $L = 4.7\mu H$.



MPQ8883 - Synchronous Step-Down Converter at $V_{IN} = 12V$, $V_{OUT} = 5V$, $f_{SW} = 500kHz/1000kHz/2000kHz$.
 Efficiency and Power Loss Using the MPL-AY1050-100 at $L = 10\mu H$.



MPQ8883 - Synchronous Step-Down Converter at $V_{IN} = 12V$, $V_{OUT} = 5V$, $f_{SW} = 500kHz/1000kHz/2000kHz$.
 Efficiency and Power Loss Using the MPL-SE6040-100 at $L = 10\mu H$.

