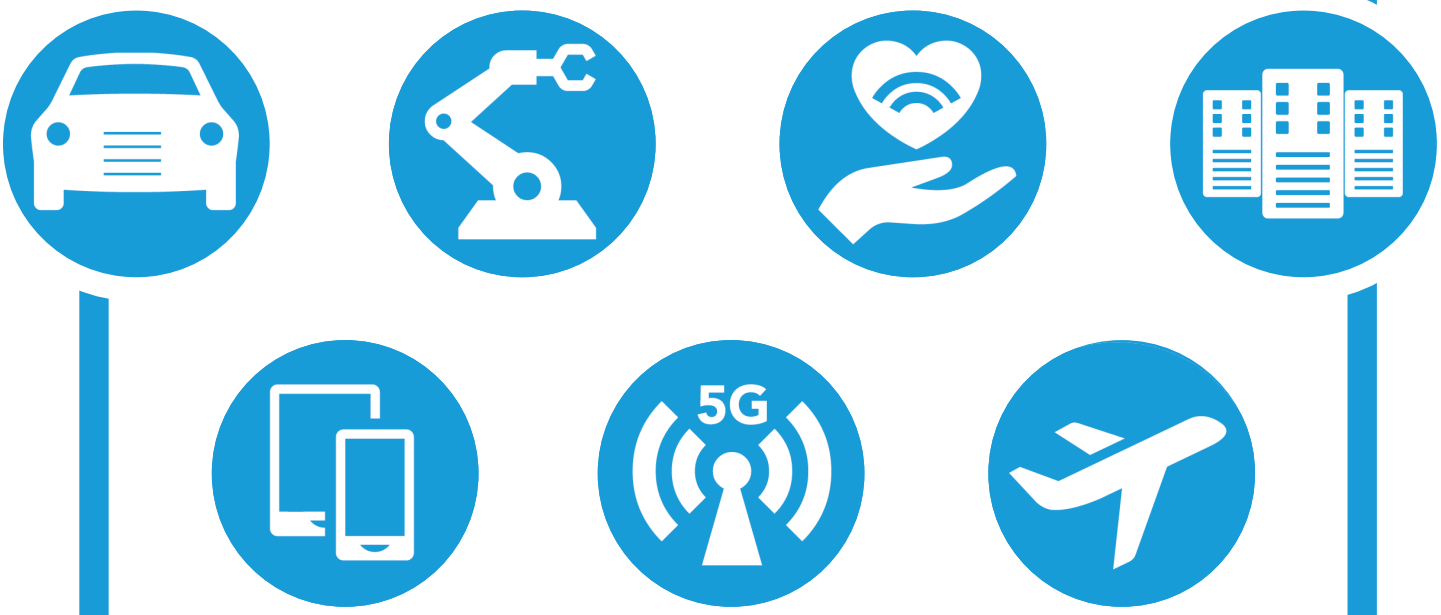
THERMAL INTERFACE MATERIALS & INDUCTIVE COMPONENTS

Solutions



Laird™

A DuPont Business

Thermal & Power: A Powerful Pairing

The sector of “Thermal & Power” combined is experiencing prominent growth in the industry, as it becomes increasingly clear how these areas go hand-in-hand. Today’s electronic devices are shrinking in size and growing in power demand, both of which result in hotter devices.

Laird is a world leader in thermal interface materials (TIMs) and TIM automated application solutions. Our thermal products fill in air gaps and microscopic irregularities, which significantly lowers thermal resistance and allows for better cooling and faster regulatory compliance.

Meanwhile, Laird™ Steward™ product designers deliver reliably high-performing inductive components that preserve signal integrity, ensuring greater power delivery.

As Thermal & Power continue to play closely-related, integral roles in overall device performance, it is beneficial to consider both types of component together when designing. We have therefore combined our TIMs and inductive component product lines into one convenient brochure.

An Overview of Laird Performance Materials

Laird enables high-performance electronics by creating advanced thermal and inductive solutions for electronic components and systems. World-leading technology brands rely on Laird for improved protection, higher performance and reliability, custom structural designs, and faster time-to-market.

With Laird-owned manufacturing sales and service offices throughout Europe, North America, China and Asia, we are able to provide thousands of custom and standard solutions for every major market in the electronics industry.

We solve design issues through innovative products such as EMI suppression or absorption materials, thermal interface materials, and inductors. This catalog will introduce you to some of our leading offerings in the latter two groups.

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Note: Automotive grade available upon request

All parts listed in this catalog are lead free and RoHS compliant.

NOTICE

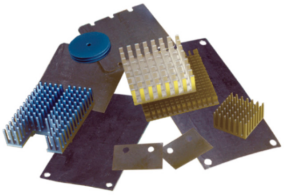
Laird products or subcomponents are not specifically designed or tested by Laird for use in any medical applications, surgical applications, medical device manufacturing, or any similar procedure or process requiring approval, testing, or certification by the United States food and drug administration or other similar Governmental entity. Applications with unusual environmental requirements such as military, medical, life- support or Life-sustaining equipment are specifically not recommended without additional testing for such application.

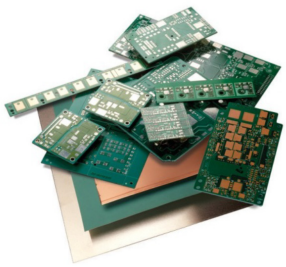
THERMAL INTERFACE MATERIALS

Solutions

Thermal Interface Solutions
As an industry leader in high-performance, cost-effective Thermal Interface Materials (TIMs) and technologies, Laird designs and manufactures thermal products such as gap fillers and putties, phase change materials, thermal grease, and thermally-conductive insulator materials. Even as device sizes grow smaller and power demands grow larger, you can rely on Laird to meet any application's demands.

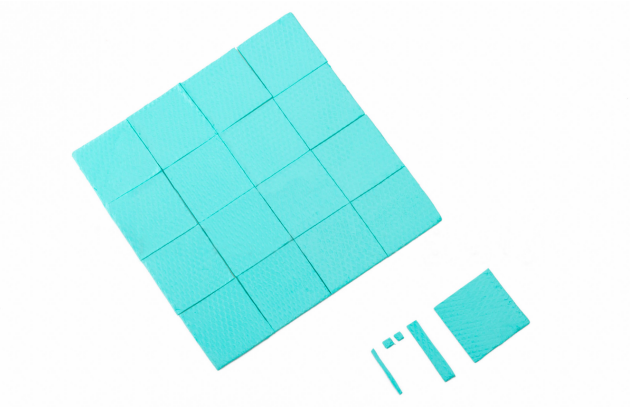
Laird's TIMs are designed to fill in air gaps and microscopic irregularities, resulting in dramatically lower thermal resistance. In addition, Laird provides phase change TIMs that soften and fill tiny gaps at operating temperature, as well as thermally conductive greases that conform to any surface irregularity.





Gap Fillers (Tflex™, Tpli™, Tputty™)

Laird gap fillers are used to bridge the interface between hot compone
and a chassis or heat sink assembly to increase the overall heat trans
from the system. The unique combination of thermal conductivity
and softness reduces mechanical stress while maintaining thermal
performance. Laird's extensive gap filler product lines includes
a wide range of performance capabilities, including ultra-thin
gap fillers, a high deflection series, and materials
that provide electrical isolation.



APPLICATIONS

- **Telecom/Datacom** – wireless infrastructure, routers, servers, memory modules, hard disk and solid-state drives
- **Consumer** – gaming systems, tablets, notebooks, smart home devices
- **Industrial** – LED lighting, automation, test instrumentation, motion control
- **Aerospace and military** – power supplies, controllers, drones, satellites
- **Automotive** – ADAS, infotainment, powertrain/ECU

Dispensable Gap Fillers (Tflex™ and Tputty™)

Laird dispensable gap fillers are used to bridge the interface between hot components and a chassis or heat sink assembly when elimination of mechanical stress or bulk automated dispensing are critical design considerations. These materials can be dispensed to fill large and uneven gaps in assemblies and due to their super compliant nature; little to no pressure is transferred between interfaces. Laird's dispensing product portfolio includes both one and two-part materials, as well as products specifically designed for vertical stability and consistent dispensing.

APPLICATIONS

- **Telecom/Datacom** – wireless infrastructure, routers, servers, memory modules, hard disk drives, solid state drives
- **Consumer** - gaming systems, portable devices, notebooks
- **Industrial** – power supplies, lighting ballasts, controllers, test & measurement
- **Aerospace and military** – power supplies, drones, satellites
- **Automotive** – ADAS, infotainment, wireless charging units, lighting

High-Performance Products (Tpcm™ and Tgrease™)

High-performance products are used in applications where mechanical tolerances and general design has been optimized for thermal performance.

The Tpcm phase change product line is used in applications where reliability, repeatability, and handling must be controlled to optimize the performance as part of the total thermal solution. The Tpcm product line is available in a screen printable formulation that offers the reliability and performance of a phase change material with the low-cost handling of thermal grease.

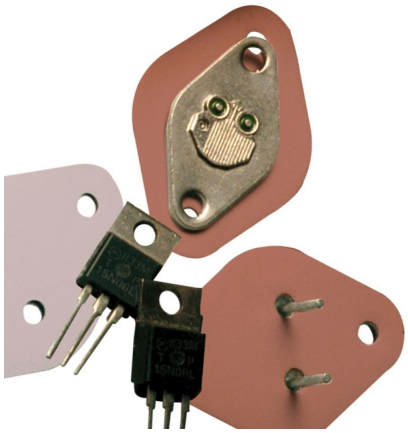
Tgrease is used in applications where a minimum bond line, constant pressure, and ease of screen printing are desired for optimal performance. Laird's high-performance Tgrease products are designed to maximize reliability by eliminating pump out in most applications.

APPLICATIONS

- **Telecom/Datacom** – servers, routers, wireless infrastructure
- **Consumer** – graphics cards, notebooks, PCs, tablets
- **Industrial** – DC/DC Converters, IGBTs
- **Aerospace and military** – power supplies, drones, satellites
- **Automotive** – LED lighting, radar, camera

Electrical Insulators (Tgard™)

Tgard thermally conductive electrical insulators are used where electrical isolation is a critical design consideration, along with reliability, cut-through resistance, and thermal conductivity. The Tgard product line has a wide variety of materials for the unique performance, handling, and assembly considerations required in electronics devices.



APPLICATIONS

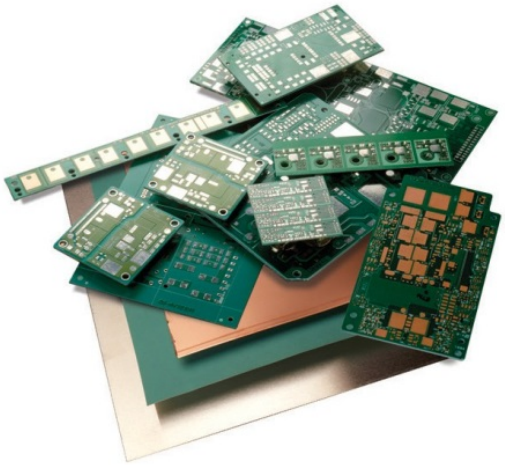
- **Telecom/Datacom** – wireless infrastructure, data servers
- **Consumer** – Audio and video components
- **Industrial** – LED lighting, power supplies, lighting ballasts, motor controls, and power converters
- **Aerospace and military** – power supplies, motion controllers
- **Automotive** – motor controls, lighting, electronics

Thermally Conductive Printed Circuit Board (Tlam™ and Tpreg™)

Tlam thermally conductive circuit boards are designed with Laird's unique dielectric materials 1KA and HTD. Tlam technology improves thermal performance while retaining good dielectric isolation.

The 1KA material offers high thermal conductivity for applications where a thick dielectric is required. The 1KA material is available as a freestanding Tpreg to facilitate multilayer and FR4 hybrid circuit boards.

The HTD material is used where high withstand voltage (>5000 V DC) and continuous use temperature of 150°C are required.



APPLICATIONS

- **Industrial** - LED lighting, architectural lighting and street/highway/ parking/signal lighting
- **Telecom** – DC/DC convertors and base stations
- **Automotive** – motor control systems, power steering modules, ABS braking systems, headlights, brake lights, and daytime running lights
- **Consumer** – LCD LED backlighting units
- **Industrial –** solar voltaic, industrial voltage regulators, and power supplies

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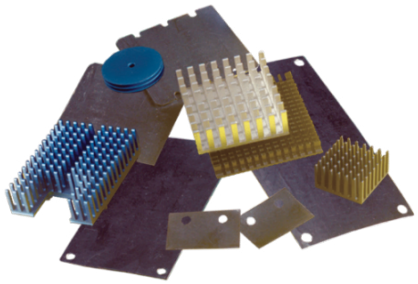
Graphite Materials (Tgon™)

Tgon 800 is a high-performance, cost-effective TIM that can be used where electrical isolation is not required. Tgon 800's unique grain-oriented graphite plate structure provides 5 W/mK through the Z axis.



APPLICATIONS

- **Telecom/DataCom** - Large telecommunications switching hardware
- **Consumer** - Handheld devices, notebooks, tablets
- **Industrial** – Power supplies, lighting, power conversion equipment

INDUCTIVE COMPONENTS
Solutions

Ferrite Products for High Frequency, Power and General Filtering or Transmitting
Laird™ Steward™ offers an extensive product lineup of ferrite cores, EMI noise filtering and wireless power transmitting components for EMI management in signal interfaces, clock and power lines.

Our ferrite-based product families preserve signal integrity by removing or filtering the 'EMI noises' generated by active components such as microprocessors, microcontrollers and System-on-Chip (SoC), couplings from DC power lines, broadcasting from the ambient environment, and other sources.

Here you'll find an introduction to our broad range of standardized and Ferrite Toroid and Balun Cores, Cable Cores, Chip Beads and Inductors, SMT Bead Assemblies, and more.

Ferrite Cable Cores

For Round, Ribbon & Flex Cables & Wiring

Laird produces an extensive line of ferrite products for cable harness assemblies, and flexible cable assemblies. These cable core products are mainly used for inductive and EMI filtering applications and are available in three (3) different types of materials (refer below) based on operating frequency ranges.

Available in 3 different materials:

- High Frequency | *HF – Part Series (300 MHz – 2 GHz)*
- Broadband | *28 – Part Series (30 MHz – 1 GHz)*
- Low Frequency | *LF – Part Series (300 KHz – 30 MHz)*

Split, Snap-On Cores In Plastic Cases

- 28A-, HFA-, 28S- Part Series

For retrofit and post assembly operations, Laird offer a selection of "split" cores. Similar in performance to Laird's one-piece core designs, these split ferrite cores provide excellent common and differential mode EMI suppression on round cable and wire assemblies. Black or white plastic snap-on cases provide secure closure of the split cores onto the cable.

BENEFITS TO CUSTOMER

Enable lighter and smaller designs

Broad band noise suppression

Ferrite Plates and Disks for EMI

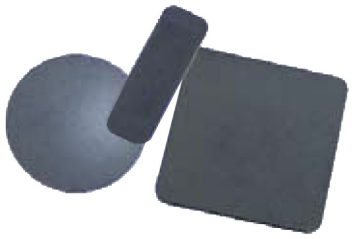
- MM-, MP- Part Series

Ferrite plates and disks can also be used as magnetic coupling and shielding for wireless charging applications based on magnetic induction technology. Magnetic flux is directed and concentrated from the wireless charging transmitter side to the receiver side with minimum power loss and electromagnetic field leakage.

BENEFITS TO CUSTOMER

Easy to install with good flatness

Broadband noise suppression



Ferrite Plate for Inductive Wireless Charging

MP & 33 Series

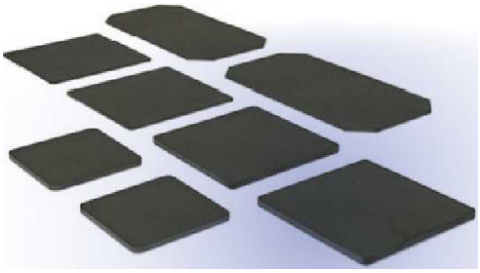
Features:

- Ferrite materials are Wireless Power Consortium (WPC) listed, recommended & certified for interoperability test
- Optimized for highest charging efficiency
- Precise dimension control and automotive grade available
- 40°C to 125°C operating temperature
- Available in wide range of size selection, custom shapes are also available

BENEFITS TO CUSTOMER

Maximize wireless charging efficiency

Reduce EMI leakage and reduce EMC cost



Ferrite Toroid and Balun Cores

Laird's extensive line of transformer and filter cores are primarily found in most Ethernet (10/100/1000/10G Base-T) and telecom applications. Available in a wide range of sizes, these toroid cores are also designed to carry DC bias of up to 8 mA for traditional Ethernet applications and up to 32 mA for PoE+ applications. They are also available for an extensive temperature (-40 to +85° C) range.

BENEFITS TO CUSTOMER

Broad band noise filtering

Higher current handling

Ferrite Rods

28M Series

Features:

- Standard 28mat optimized for superior EMI suppression
- Precise dimension control and automotive grade available
- -40°C to 85°C operating temperature
- Available in wide range of size selection, custom materials or shapes are also available upon request

BENEFITS TO CUSTOMER

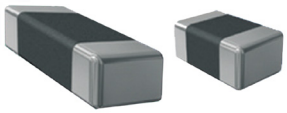
Enable lighter and smaller designs

Broadband noise filtering

Ferrite Chip Beads

Features:

- Up to 10 A (I MAX) continuous operation capability
- Monolithic construction, high reliability
- Broadband, low frequency and high frequency available.
- For power lines, general signal lines and high-speed signal lines



BENEFITS TO CUSTOMER

High operating current, enable higher power design

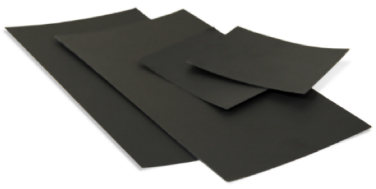
Superior performance for broadband noise absorption

Ferrite Sheets

MHLL/MSLL/MULL Series

Features:

- Flexible ferrite sheets for 13.56 MHz NFC, RFID application & wireless charging application
- Made by thin, high permeability sintered ferrite with PET film and adhesive tape
- Standard ferrite layer thickness 0.05mm, 0.1mm, 0.2mm & 0.3mm
- Custom size or thickness available upon request
- Operating temperature -40°C to +85°C



BENEFITS TO CUSTOMER

Flexible, easy to install

Super thin, save space

Lower loss, enabling better read distance

High Speed Serial Interface Common Mode Chokes

CM0805/1206, CF0504/0805 Series

Features:

- For USB, HDMI, 1394, DVI, S-ATA, LVDS applications
- Both surface mount monolithic and wire wound types are available

BENEFITS TO CUSTOMER

Broadband noise filtering

Easy to install and reduce assembly fail

Power Line Common Mode Chokes (Arrays)

Thru-Hole and Surface Mount Type

Features:

- Up to 75 Amp
- For servers, workstations, power adapter, medical equipment, automotive, industrial etc.

BENEFITS TO CUSTOMER

Enable higher power designs

Easy to install and reduce assembly fail

Reduce total EMC cost

Wire-Wound SMT Power Common Mode Chokes for Broad Band Frequency

CM7060 Series

Features:

- Common mode filter for large current up to 9A
- Excellent common mode impedance and noise suppression
- Compact size
- Operating temperature -40°C to 125°C (including self-heating)
- AEC-Q200 qualified

BENEFITS TO CUSTOMER

Enable higher power designs

Easy to install and reduce assembly fail

Reduce total EMC cost

Wire-Wound SMT Power Common Mode Chokes for Low Frequency

CMX1211 Series

Features:

- Small size with high current
- SMT type with less height
- Stable performance under load bias and high reliability
- High suppression of asymmetric interferences at both low and high frequencies

BENEFITS TO CUSTOMER

Enables higher power designs

Reduces total EMC cost

Wire-Wound DIP Power Common Mode Chokes for Low Frequency

CMX1616 Series

Features:

- Current rating up to 62 Amp
- Stable performance and high reliability
- High suppression of asymmetric interferences at both low and high frequency
- Operation temperature: -40°C to 125°C (including self-heating)
- Custom designs on request

BENEFITS TO CUSTOMER

Enables higher power designs

Reduces total EMC cost

High Current Power Line Common Mode Chokes

CM8663 Series

Features:

- Common mode choke for high current up to 65Adc
- Excellent common mode impedance and noise suppression
- Compact size & robust construction
- Operating temperature -40°C to 155°C (including self-heating)
- Through hole installation
- Very low DCR

BENEFITS TO CUSTOMER

Enables higher power designs

High reliability with high insulation

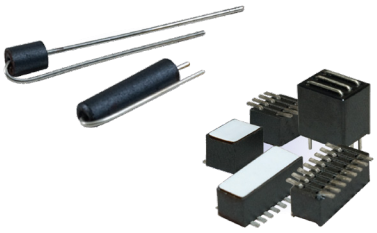
Saves board layout space

Reduces total EMC cost

Axial Lead Ferrite Bead / Ferrite Differential Mode Array

Features:

- Differential mode EMI filter, high current, thru-hole/surface mount type
- Up to 10 amps continuous operation
- For power line application for LCD-TV, automotive, industrial, medical, audio equipment.



BENEFITS TO CUSTOMER

Easy to install and reduce assembly fail

Reduce total EMC cost

SMT Ferrite Bead Assembly

Features:

- 10 Amps continuous operating current capability
- Very low DCR
- Broadband (28F) and (35F) parts available
- Lead free and RoHS compliant

BENEFITS TO CUSTOMER

Enable higher power designs

High reliability

Easy to install and reduce assembly fail

Reduce total EMC cost

Ferrite Bead for Automotive

Part Number 38F0126-0SR-1XXXX Custom Part Number

(A specific P/N suffix will be assigned upon request for particular customer)

Features:

- EMI filtering for High speed CAN-BUS in automotive
- Wire inserted bead enable highly automatic process
- Surface mount device
- Robust ferrite construction, high reliability and AECQ200 compliant

BENEFITS TO CUSTOMER

High reliability

Easy to install and reduce assembly fail

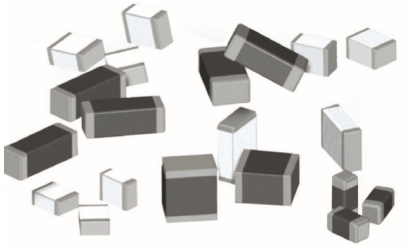
Reduce total EMC cost

Multilayer Inductors for General Circuits

IC0603/0805/1206 Series

Features:

- Monolithic construction, high reliability
- Broadband and high frequency available
- For RF and wireless communication, computers, telecommunications, automotive electronics etc.



BENEFITS TO CUSTOMER

Broadband filtering

Easy to install and reduce assembly fail

Reduce total EMC cost

Multilayer Power Inductors

CPI0805/0806/1008 Series

Features:

- Small size (EIA 0805, 0806 and 1008) with max 1.0 mm in thickness
- Stable low DC resistance performance in the class
- Lead-free product and support lead-free soldering

BENEFITS TO CUSTOMER

Enable higher power designs

Easy to install and reduce assembly fail

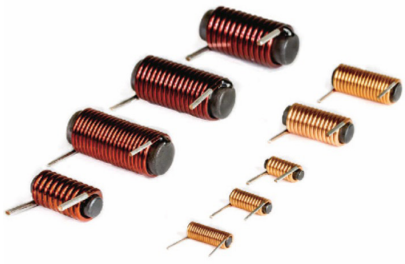
Reduce total EMC cost

Ferrite Rod Inductors

1XC Series

Features:

- Extremely low DC and AC resistance
- Multiple sizes offered
- Current up to 19A
- Operating temp up to 150°C



BENEFITS TO CUSTOMER

Enable higher power designs

Robust construction and high reliability

IP Series Power Inductors

Features:

- Ferrite shielded or unshielded structure
- Low DCR and high efficiency
- Low profile and small size
- Wide range of inductance selection up to mH


IPSD


IPSF


IPSH


IPSR


IPUD

BENEFITS TO CUSTOMER

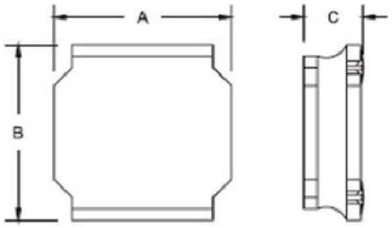
Enable lighter and smaller designs

Easy to install and reduce assembly fail

TYS Low Profile SMT Power Inductors

Features:

- Magnetic resin shield structure
- Low DCR and high efficiency
- Low profile and small size
- High reliability



BENEFITS TO CUSTOMER

Enable lower profile and more compact designs

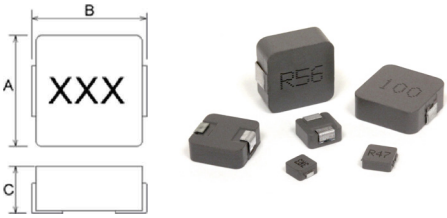
Easy to install and reduce assembly fail

Self-shielded and reduce EMC cost

MGV High Current Molded SMT Power Inductors

Features:

- Magnetic resin shield structure
- Low DCR and high efficiency
- Low profile and small size
- High reliability
- AEC-Q200 qualified



BENEFITS TO CUSTOMER

Enable higher power designs

Easy to install and reduce assembly fail

High reliability

Self-shielded and reduce EMC cost

WPC Wireless Charging Coil Assembly

Features:

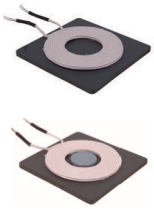
- Designed to meet WPC Qi standard, custom designs available upon request, Automotive grade available upon request
- Operating temperature -40°C to + 85°C
- Assembled with ferrite plate which is built with WPC listed ferrite material, high Q for maximum power transmission
- Integrated module available with pin connector and plastic frame for easy installation

BENEFITS TO CUSTOMER

Qi compliant

Easy to install and reduce assembly fail

Enable fast charging and minimize charging blind spots

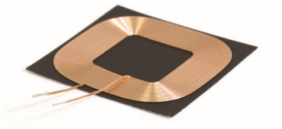


A1 Coil

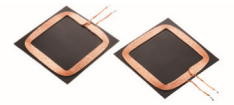
A6 Single Coil

A6 Multiple Coil

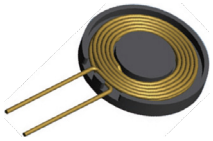
A11 Coil



RX Coil



15 Watt Coil



Litz Coil and 3D Shaped Ferrite Module

TX Coil

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