



AUTOMOTIVE PRODUCTS
WÜRTH ELEKTRONIK

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

NEW MOBILITY

General Situation

„The Future vehicle will be ...“

Electrified



- Drive further
- Charge faster
- Low Emission

Connected



- Machine 2 machine
- Human 2 machine
- Machine 2 human

Autonomous



- Sensors and actuators replacing human interaction

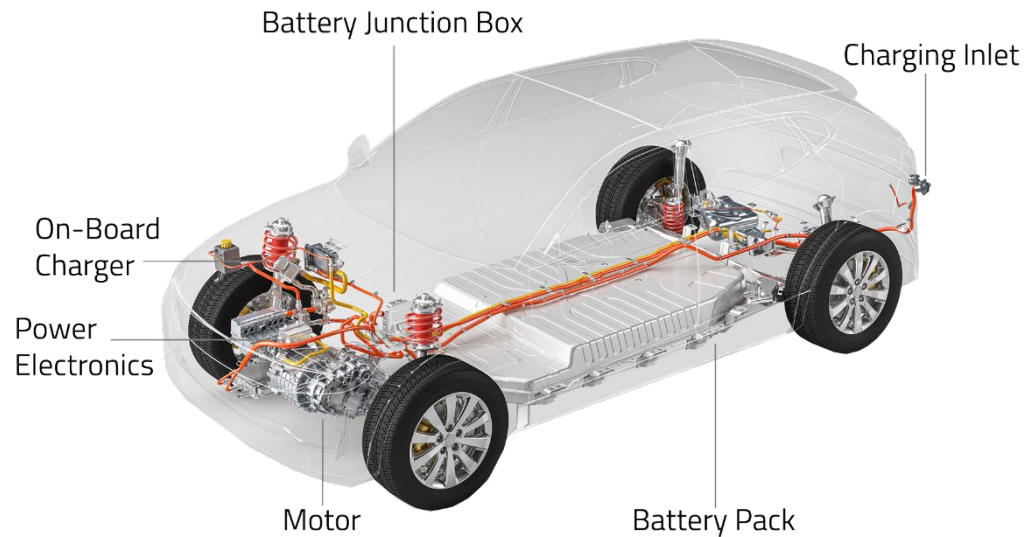
Shared



- Full availability without ownership
- Bigger mileages/lifetimes

EV EMI SUPPRESSION

EMC noise cancellation for new EV & HEV applications



The rising electrification of motor vehicles is inevitably accompanied by an increase in electromagnetic interference. The use of cable ferrites can significantly reduce these in electric and hybrid vehicles, whether interference signals on lines or electromagnetic field coupling effects. High-performance inductive materials in cable ferrites significantly improve EMC performance. Standard ferrite cable core suppression elements in axial as well in toroidal form are suitable for a wide range of applications with medium and high frequencies. For higher frequencies, these contain a magnesium component. A very wide frequency range is covered by cable ferrites with a new nanocrystalline material (NC).

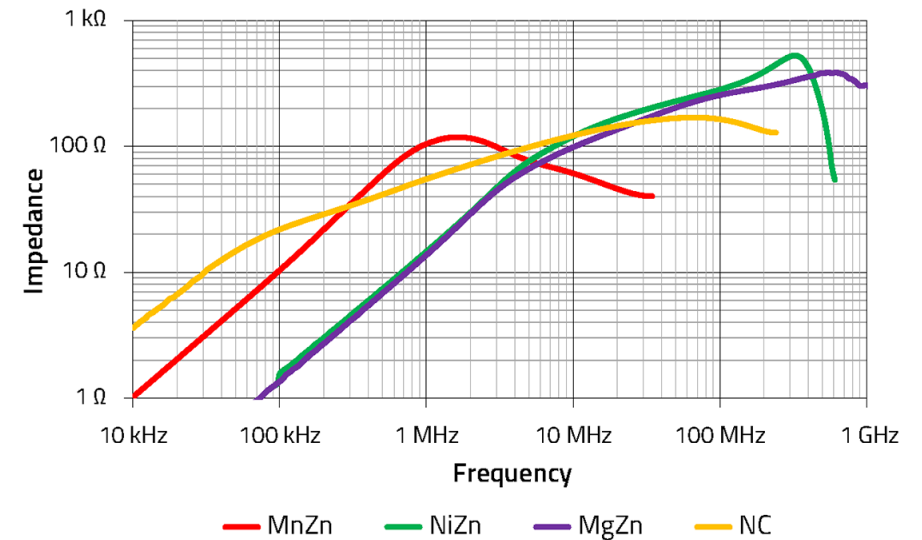
WE OFFER THE COMPLETE FREQUENCY RANGE

Applications matrix

Würth Elektronik cable ferrites are designed to work in all different frequency ranges with best attenuation.

It is essential for the following automotive applications:

- In EMI suppression against Inverter spikes
- Attenuate EMI noise induced by the rotor of the electric motor
- Minimize NVH (Noise vibrations harshness) in the EMC spectrum at power train
- Special EMI suppression for the junction box interconnections



CABLE FERRITE FOR ALL DIFFERENT EMI SUPPRESSION SCENARIOS



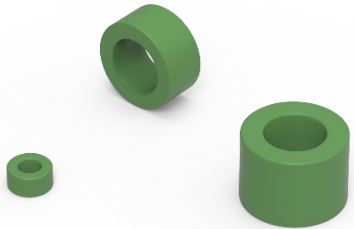
EMI suppression for medium-high freq. range

WE-AEFA ring core is an EMC cable ferrite suppressor in an axial as well in toroidal form, special designed for many kinds of applications. The special spectrum suppression is for medium and high frequency noise. Also available in larger designs.



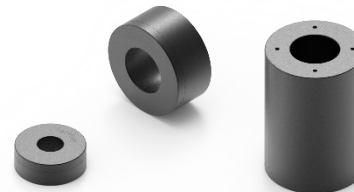
EMI suppression for higher freq. range

[WE-TEFA](#) ring core is an EMC cable ferrite suppressor with a component of Mg, the Impedance supports a higher frequency than a standard type



EMI suppression for medium-low freq. range

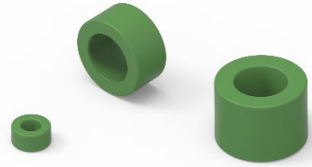
WE-TEMA ring core is an EMC cable ferrite suppressor specially designed for the medium frequency range with very high suppression.



EMI suppression for a wide-band spectrum

WE-AENA cable ferrites with the latest NC core (nanocrystalline) material technology to provide noise suppression across a very wide frequency range. Available in many different standard sizes.

FERRITES FOR CABLE ASSEMBLY



WE-TEMA

Toroidal EMI MnZn Suppression Ferrite

Characteristics

- Core made of MnZn, good option for EMI suppression
- UL coated
- High permeability
- Operating temperature: -50 °C up to +150 °C
- AEC-Q200

Applications

- Automotive wiring harness
- Data and signal lines
- Multimedia cable interfaces



WE-TEFA

Toroidal EMI Suppression Ferrite

Characteristics

- Ferrite core made of MgZn, a material which works in a wider frequency range than NiZn
- Many different types for the best possible interference suppression in Automotive applications
- Operating temperature: -55°C up to 140 °C

Applications

- In General for: Wires, Coaxial cables, Wire-wrapping cables, Multiconductor wires
- Data and signal lines
- On board power supply line
- Multimedia cable interfaces
- Various, other cable interfaces



WE-AEFA

Axial EMI Suppression Ferrite

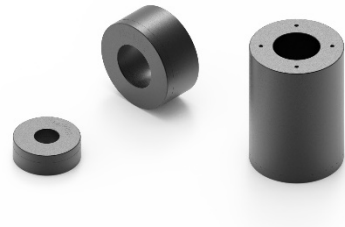
Characteristics

- Ferrite core made of NiZn, a material which works in a wide frequency range
- Many different types for the best possible interference suppression
- Operating temperature: -55°C up to +150°C

Applications

- In general for: wires, coaxial cables, wire-wrapping cables, multiconductor wires
- Data and signal lines
- On board power supply line
- Multimedia cable interfaces
- Various, other cable interfaces

FERRITES FOR CABLE ASSEMBLY



WE-AENA

Axial EMI Suppression Nanocrystalline

Characteristics

- Core made of Nanocrystalline, a material which works in a wider frequency range than NiZn
- Many different types for the best possible interference suppression in Automotive applications
- Operating temperature: -40 °C up to 125 °C
- AEC-Q200

Applications

- In General for: Wires, Coaxial cables, Wire-wrapping cables, Multiconductor wires
- Data and signal lines
- On board power supply line
- Multimedia cable interfaces



WE-CAR-TEC

Snap Ferrite

Characteristics

- Pre-fixing cable system facilitates the assembly process
- Cable clamping protection
- Internal security locking system with patented key technology (WE-STAR-KEY PN: 74271) prevents unauthorized removing from the cable
- One key in each packaging unit
- Classification of the plastic housing: UL94 V0
- Operating temperature: from -50 °C up to +105 °C
- Core material: NiZn
- AEC-Q200

Applications

- EMC ferrite for EMI suppression in the frequency range from 1 MHz up to 1 GHz
- Fastening round cables with diameter from 3.5 mm up to 8.5 mm or if winded more turns through the ferrite
- Reusable because of the STAR-KEY technology therefore perfect for test and measuring purposes in EMC labs

FERRITES FOR PCB ASSEMBLY



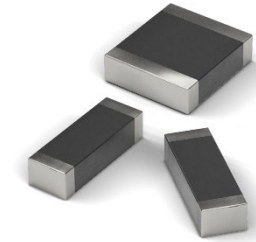
WE-CBA SMT EMI
Suppression Ferrite Bead

Characteristics

- Reliable Ni-Sn electrodes
- High rated current up to 5 A
- Operating temperature: -55 °C to +125 °C

Applications

- Perfect as data line filter and for uncoupling of distribution voltage
- This special SMT chip bead ferrites can be put directly on the printed circuit board. They offer excellent anti-EMI properties and low DC-resistance. Placed very close next to the interference source even with smallest size 0402, maximal impedance at 1000 Ω can be reached.



WE-MPSA EMI
Multilayer Power Suppression Bead

Characteristics

- Specified peak current capability
- Ultra low RDC
- High rated current up to 10 A
- Operating temperature: - 55 °C to +125 °C
- AEC-Q200 certified

Applications

- Filter with high inrush current peaks
- Applications for noise reduction at power-trains, body control and infotainment systems
- Motor interference suppression
- Battery management systems, DC/DC converters, audio, etc.
- Broadband suppression

FILTER CHOKES



WE-RCIT

Rod Core Inductor THT

Characteristics

- High Current capability
- Very reliable mechanical design
- Very high magnetic saturation
- Operating temperature up to +150°C

Applications

- Standard filter applications
- EMC Suppression in motor drive systems
- In over all application in Infotainment systems



WE-RCIS

Rod Core Inductor SMT

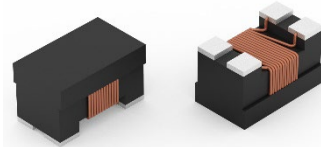
Characteristics

- High Current capability
- Very high saturation performance
- High insertion loss at FM band
- Broadband suppression
- Robust mechanical design
- Packaging: tape & reel / pick & place
- Operating temperature up to +150°C

Applications

- Integrated DC/DC converters
- EMC suppression in motor drive systems
- Infotainment Systems

COMMON MODE CHOKES FOR LOW VOLTAGE AND DATA LINES



WE-CNSA SMD

Common Mode Line Filter

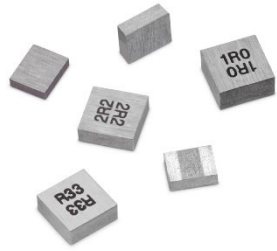
Characteristics

- Current compensated data line filter
- High common mode noise suppression at high frequencies
- Low RDC design
- AEC-Q200

Applications

- Car infotainment
- Flex ray
- High speed data lines
- IEEE 1394 (Firewire)
- LVDS
- USB 2.0 & 3.0

SINGEL COIL POWER INDUCTORS



WE-MAIA

SMT Power Inductor

Characteristics

- Magnetic iron alloy allows high rated currents
- Compact design
- Magnetically shielded
- High current capability and handles high transient current spikes
- No acoustic noise and no leakage flux noise
- Operating temperature range: -40°C up to +125°C

Applications

- Power supplies for mobile devices
- DC/DC-converter for high current power supplies
- DC/DC-converter for Field Programmable Gate Array (FPGA)
- POL-converters
- Microcontroller
- Portable as well as battery-driven devices
- Wireless communication devices



WE-PDA SMT

Shielded Power Inductor

Characteristics

- Magnetically shielded version which results in a low leakage field High storage capacity
- High Saturation currents up to 23 A
- Very low self-losses at high switching frequency's
- Wide inductance spectrum available at all sizes
- Operating Temperature -40 °C up to +125 °C
- Core Material: NiZn
- Wire connection: welding technology

Applications

- Multimedia applications
- Switching regulators with low operating voltages
- Integrated DC/DC-converter
- Perfect suitable for switching regulators with extremely high efficiency (> 86 %)
- Plastic base: Because of the one piece construction these are more suitable for high vibration or shock applications



WE-PD SMT

Power Inductor

Characteristics

- Ultra low R_{DC} and R_{AC}
- Core Material: NiZn
- Operating temperature: -40 °C to +125 °C
- AEC-Q 200 qualified

Applications

- Air conditioning, climate control units, ventilation, fan controls
- Small motor drivers & wiper control systems
- Car infotainment
- Switching regulators and DC/DC converter with extremely high efficiency (>95%)

SINGEL COIL POWER INDUCTORS



WE-CHSA SMT
High Current Inductor

Characteristics

- Magnetically shielded rod core inductor
- Operating temperature: -55°C to +150°C
- Current capability up to 28A
- Ideal coplanarity due to embedded solder pads

Applications

- Filter choke for motor electronics
- Car infotainment
- Multimedia applications



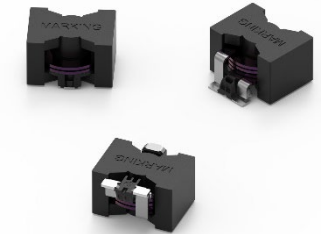
WE-CHSA P
Performance SMT High Current Inductor

Characteristics

- Magnetically shielded rod core inductor
- Operating temperature: -55 °C up to +150 °C
- Saturation current up to 48.5 A
- Iron alloy core leads to soft saturation
- AEC-Q200
- Excellent coplanarity due to the plastic base

Applications

- Filter choke for motor electronics
- Car infotainment
- DC/DC converter
- Multimedia applications
- Microprocessor filtering



WE-HCFA
High Current Flat Wire Inductor

Characteristics

- Flat wire design
- Magnetically shielded
- High rated current up to 50 A
- High saturation performance
- Excellent planarity
- Optimized for DC/DC converters
- Wide range operating temperature from -40 to +150°C
- AECQ-200

Applications

- Storage inductor for high efficiency automotive DC/DC converters
- Single and polyphase buck and boost converters
- Filter for infotainment and audio applications

SINGEL COIL POWER INDUCTORS



WE-HCIT THT
High Current Inductor

Characteristics

- AECQ200 Qualification
- THT design for better stability against vibration
- High current capability up to 28A
- Very low RDC (0.44-0.88Ω)
- Wide range operating temperature from -40 to +150°C -> AECQ 200 Grade 1
- Soft saturation behavior

Applications

- DC-DC converter for infotainment/communication systems
- EMI suppression for motors (Seating / Electrical mirrors / Windshield)
- Power applications / Battery management systems



WE-PD2SA
SMT Power Inductor

Characteristics

- Magnetic shielded version from the WE-PD2A, which results in a low leakage field
- Pad compatible with the WE-PD2A size 7850
- High saturation current due to the self-centering shielding ring construction
- Operating temperature: -50°C up to +150°C

Applications

- Switching regulators with low operating voltage
- Multimedia applications



WE-PD2A SMT
Power Inductor

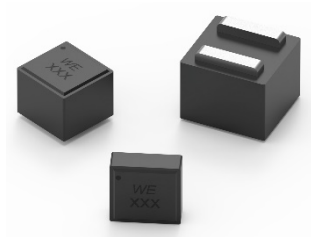
Characteristics

- Open size / unshielded
- Saturation currents up to 15 A
- Low tolerances at high inductance values
- Operating temperature: -40°C to +125°C

Applications

- Integrated DC/DC-converter
- Switching regulators with low operating voltage
- Perfectly suitable for switching regulators with extremely high efficiency
- Optimal attenuation in MHz frequency range

SINGEL COIL POWER INDUCTORS



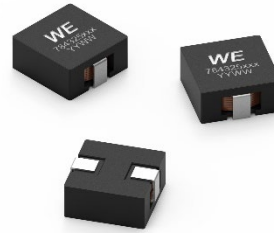
WE-XHMA SMD
Power Inductor

Characteristics

- Flat wire coil for low copper losses
- Composite core material allows high saturation currents
- Compact design
- Magnetically shielded
- High current capability and handles high transient current spikes
- Low leakage flux noise
- Operating temperature: -40°C up to +125°C
- AEC-Q200

Applications

- DC/DC-converter for high current power supplies
- Power supplies for mobile devices
- POL-converters
- Mainboards/graphic cards
- Battery powered devices
- Wireless communication devices



WE-HCIA SMD
Flat Wire High Current Inductor

Characteristics

- Magnetically shielded
- Flat wire coil for low losses
- Low stray field
- Operating temperature: -55 °C up to +150 °C
- Current capability up to 36 A
- AEC-Q200

Applications

- Filter choke for motor electronics
- Car infotainment
- Multimedia applications



WE-LQSA SMD
Semi-Shielded Power Inductor

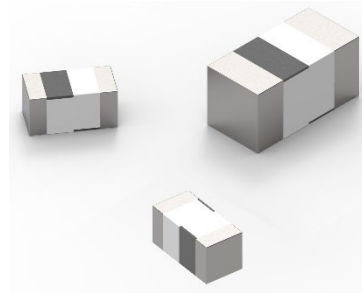
Characteristics

- Shielded construction with magnetic glue
- Compact design compared to standard power inductors for high density mounting
- Similar sizes and land pattern as WE-LQS
- Robust design qualified with AEC-Q200 Grade 0
- Operating temperature: -50 °C up to +150 °C

Applications

- LED Headlights (DC/DC-Converter, Control system)
- Electric Vehicle (Battery Management System, Inverter, DC/DC)
- Car Navigation Systems
- Keyless Entry Systems

RF INDUCTORS



WE-MCI

Multilayer Ceramic SMT Inductor

Characteristics

- Multilayer inductor with ceramic body
- Operating temperature range: -55 °C up to +125 °C
- Double side polarity marking
- Inductive tolerances of 5%; 0,3 nH
- AEC-Q200

Applications

- Infotainment
- Key-less entry
- Filter circuits
- High frequency circuits
- Bluetooth

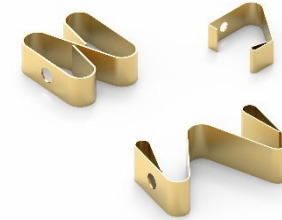
ASSEMBLY



WA-SMSA SMT
Spacer Studs Automotive

Applications

- Assembling of PCBs to housing and to other PCBs
- For distances from 1 to 15 mm
- Full automation for fast and precise process
- High holding forces and torques
- Highest process reliability
- Instant removable polyimide tape



WE-SCFA
Soldered Contact Finger Automotive

Characteristics

- Suitable for pick & place
- Material: copper-beryllium (CuBe) gold-plated (Au)
- Different types and sizes available
- Corrosion-resistant
- Wear-resistant
- High temperatures and compression have no influence on the excellent connection properties
- Reliable solderability

Applications

- Contact PCBs to ground and housing
- Grounding of cooling units for high frequencies
- Connection of signal and power supply of two PCBs on track
- Connection between PCBs and external elements