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Power Magnetics Component Roundup

by David G. Morrison, Editor, How2Power.com

This article highlights the latest introductions of power magnetic components, presenting news about power inductors, transformers, wireless power coils, chokes and filters, and cores introduced over the past six months. While magnetics manufacturers continue to target automotive applications heavily with their new products, particularly those in EV designs, consumer products also are getting their due as in the past. Several of the recently introduced magnetic parts cite goods such as notebooks, smart phones, lighting applications, wearable devices and other popular products as their intended uses.

Meanwhile, mil/aerospace applications are receiving more attention in this latest roundup as one magnetics vendor has introduced multiple components for this market. These devices take operating temperature ranges beyond those of the automotive-grade parts, offering limits as high as 200°C.

As usual, more power inductors have been introduced than other component types. Nevertheless, common-mode chokes and other noise suppression devices have generated their share of news too, suggesting growing demand for these parts in automotive and other areas. Meanwhile, most of the inductors being introduced are shielded, likely reflecting the fact that EMI challenges are top of mind in many applications.

Planar-style magnetics are notable among the transformers reported here. These are helping to address requirements for high efficiency and lower profile/smaller size. But then smaller size is a claim of nearly all magnetic component introductions as component developers leverage all their tools—core materials, wire type and various construction techniques—to make inductors, chokes, transformers and other magnetic components smaller.

This article represents a follow-up to the Power Magnetics Component Roundup published in the December 2023 issue and earlier magnetics articles published in How2Power Today.

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Power Inductors

Automotive-Qualified Metal Inductor Offers Wide Range of Inductance Values

Sumida's CY0650AT125/DS automotive-grade SMD metal inductor, an addition to the CY****T125/DS series, is an AEC-Q200-qualified part that offers an absolute maximum voltage of 50 V across the inductor and operates over a -40°C to +125°C temperature range (including self heating). If offers inductance values ranging from 0.47 µH to 33.0 µH as shown in the table.

Magnetically shielded, members of this series measure 7.50 mm (l) x 6.80 mm (w) x 5.10 mm (h) max. Target applications include LED headlights, dc-dc converters in ECUs, and other high-reliability automotive applications. Units are available now in mass production. For more information see the website.

Part Name	Inductance [Within] (µH) ※1	D.C.R. at 25℃ (A) Max. (Typ.) (mΩ)	Saturation Current (A) Max.(Typ.) ※2	Temperature Rise Currrent (A) (Typ.) ※3
CY0650AT125DS-R47MC	0.47 ± 20%	3.50 (3.00)	21.40 (26.80)	18.00 (20.00)
CY0650AT125DS-R68MC	0.68 ± 20%	4.70 (4.10)	14.50 (18.00)	15.00 (17.00)
CY0650AT125DS-1R0MC	1.00 ± 20%	6.30 (5.40)	13.80 (17.00)	12.50 (14.50)
CY0650AT125DS-1R5MC	1.50 ± 20%	8.10 (7.00)	12.00 (14.60)	11.00 (13.00)
CY0650AT125DS-2R2MC	2.20 ± 20%	12.00 (10.50)	10.00 (12.20)	9.00 (10.40)
CY0650AT125DS-3R3MC	3.30 ± 20%	17.50 (15.00)	9.00 (11.50)	8.00 (9.10)
CY0650AT125DS-4R7MC	4.70 ± 20%	25.60 (22.20)	7.70 (9.70)	6.40 (7.30)
CY0650AT125DS-6R8MC	6.80 ± 20%	39.00 (34.00)	6.80 (8.50)	5.50 (6.20)
CY0650AT125DS-100MC	10.0 ± 20%	58.10 (50.50)	6.00 (7.80)	4.20 (4.80)
CY0650AT125DS-150MC	15.0 ± 20%	78.20 (68.00)	4.50 (5.60)	3.10 (3.90)
CY0650AT125DS-220MC	22.0 ± 20%	133.5 (116.0)	3.50 (4.20)	2.60 (2.90)
CY0650AT125DS-330MC	33.0 ± 20%	200.0 (173.0)	2.60 (3.30)	2.30 (2.60)

Compact Inductor Offers Shielding, Mechanical Strength

Sumida's CD40D16MB surface-mount ferrite-core power inductor features a compact magnetically shielded structure that measures 4.2 mm × 4.2 mm × 1.8 mm max. By filling the winding wire with resin containing magnetic material, the magnetic shield effect and the mechanical impact strength are significant. The company has also developed the CD40D26MB (4.2 mm x 4.2 mm x 2.8 mm) and the CD60D28MB (6.3 mm x 6.3 mm x 3.1 mm) with the same structure.

The inductor operates over a range of -40◦C to 125◦C (including the coil's self-temperature rise). Target applications include dc-dc converters for CPUs in notebook PCs, smartphones, LCD displays, HDDs, DVDs, SSDs, and others. For more information, see the CD40D16MB page.

Part Name	Inductance [Within] (μH) ※1	D.C.R. at 20℃ [within] (A) (mΩ)	Saturation Current (A) Max.(Typ.) ※2	Temperature Rise Currrent (A) (Typ.) ※3
CD40D16MBNP-R15NC	0.15 ± 30%	9.4 ± 30%	8.00 (10.00)	(6.40)
CD40D16MBNP-R33NC	0.33 ± 30%	13.00 ± 30%	5.30 (6.70)	(5.40)
CD40D16MBNP-R56NC	0.56 ± 30%	17.00 ± 30%	4.00 (5.00)	(4.40)
CD40D16MBNP-1R0NC	1.00 ± 30%	24.00 ± 30%	3.10 (3.90)	(4.00)
CD40D16MBNP-1R5NC	1.50 ± 30%	31.00 ± 30%	2.70 (3.40)	(3.40)
CD40D16MBNP-2R2MC	2.20 ± 20%	40.00 ± 30%	2.10 (2.70)	(3.00)
CD40D16MBNP-3R3MC	3.30 ± 20%	53.00 ± 30%	1.80 (2.30)	(2.70)
CD40D16MBNP-4R7MC	4.70 ± 20%	70.00 ± 30%	1.50 (1.90)	(2.30)
CD40D16MBNP-6R8MC	6.80 ± 20%	104 ± 30%	1.20 (1.60)	(1.90)
CD40D16MBNP-100MC	10.00 ± 20%	140 ± 30%	1.00 (1.30)	(1.60)
CD40D16MBNP-150MC	15.00 ± 20%	217 ± 30%	0.84 (1.10)	(1.30)

1. Measuring frequency inductance at 100 kHz, 1 V.
2. Saturation current: This indicates the value of the dc current when the inductance becomes 30% lower than its initial value.
3. Temperature rise current: the value of dc current when the temperature of coil increased ΔT = 40°C (Ta = 20°C) (The part is mounted on PCB to test.).

Inductors Target DC-DC Converters In Mil/Aerospace Applications

Vanguard Electronics, under the iNRCORE Family of Brands, is expanding their growing COTS+ product line of high-current power inductors with the addition of the HCPI040, HCPI050, HPCI060, HPCI100, and HCPI120 series. Key specs for the inductors are shown in the table.

"We developed this expanded product line of compact, low profile, high current inductors in direct response to customer demand for high reliability electronics," says Jason Finley, president and CEO of Vanguard Electronics. "These parts were specifically designed to maximize inductance while minimizing space and resistance. This allows resulting parts to be compact while offering superior inductor performance and efficiency compared to traditional designs. We will be expanding the ratings and sizes in the very near future."

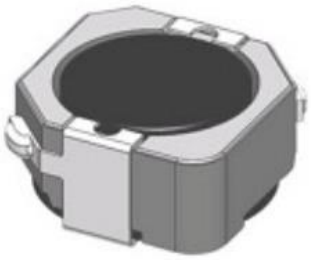
The expanded product line of high current indictors features magnetically shielded molded construction, a composite core, and tin-lead/RoHS terminations. With low DCR, they are capable of high current carrying capacity, perform with excellent efficiency, and maintain a superior ability to handle transients. The Vanguard line of high current inductors are designed to serve the military and avionics markets and are typically used in dc-dc converters commonly found in aircraft, ground vehicles, missiles, radios, and radar systems.

Each inductor in the line features a standard tolerance of 20%, a temperature rise at rated current of ≤40°C and an operating temperature range of -55°C to 125°C. Other electrical configurations and performance characteristics are available in various sizes and package types.

Table. Key specifications for the HCPI0x0 series of high-current inductors.

	Inductance Range (uH)	DCR (mOhms)	Current Rating (A)
HCPI020 Series	0.15 to 10	0.7 to 18.5	9.5 to 53
HCPI040 Series	0.047 to 10.00	3.25 to 440	1.2 to 13
HCPI050 Series	0.1 to 15	3.16 to 265	1.5 to 15.5
HCPI060 Series	15.0 to 0.1	1.5 to 290	1.8 to 32.5
HCPI100 Series	0.19 to 15	0.42 to 45	6 to 40

Inductors Are Tailored For DC-DC Converters In Portable Applications



Sumida's CRDH10D48RMN surface-mount power inductor is made with Mn-Zn and Ni-Zn core, which enable its current value to be more competitive, according to the vendor. Targeting use in dc-dc converters found in LCD drivers, DSCs/DVCs, notebook PCs and other applications, the magnetically shielded inductors offer values ranging from 10 µH to 330 µH and feature an operating temperature range of -40°C to 125°C including the coil's self-temperature rise. The inductors in this series measure 10.5 mm × 10.3 mm × 5.1mm max. For more information see the CDRH10D48RMN page.

Part Name	Inductance [Within] (μH) ※1	D.C.R. at 20℃ [within] (A) (mΩ)	Saturation Current (A) Max.(Typ.) ※2	Temperature Rise Currrent (A) (Typ.) ※3
CDRH10D48RMNNP-100PC	10.00 ± 25%	30.00 (23.10)	5.56 (6.90)	(4.90)
CDRH10D48RMNNP-150PC	15.00 ± 25%	41.00 (31.40)	4.44 (5.50)	(4.09)
CDRH10D48RMNNP-220PC	22.00 ± 25%	61.00 (47.40)	3.74 (4.60)	(3.25)
CDRH10D48RMNNP-330PC	33.00 ± 25%	86.00 (66.40)	2.95 (3.60)	(2.67)
CDRH10D48RMNNP-470PC	47.00 ± 25%	130 (100)	2.54 (3.10)	(2.39)
CDRH10D48RMNNP-680PC	68.00 ± 25%	201 (155)	2.13 (2.60)	(1.82)
CDRH10D48RMNNP-101PC	100 ± 25%	253 (195)	1.71 (2.10)	(1.49)
CDRH10D48RMNNP-151PC	150 ± 25%	370 (285)	1.38 (1.73)	(1.25)
CDRH10D48RMNNP-221PC	220 ± 25%	500 (398)	1.17 (1.46)	(1.10)
CDRH10D48RMNNP-331PC	330 ± 25%	700 (580)	0.99 (1.24)	(0.85)

1. Measuring frequency inductance at 100 kHz.
2. Saturation current: This indicates the value of the dc current when the inductance becomes 35% lower than its initial value.
3. Temperature rise current: the value of dc current when the temperature of coil increased ΔT = 40°C (Ta = 20°C).

Flat-Wire Inductors For High-Power Buck-Boost Converters And PFC In EVs

Sumida's CDPQ****/T150 series high-current inductors are AEC-Q200-qualified, flat-wire wound, ferrite-core-based high-power inductors for use in high-power buck-boost converters, and PFC chokes and filters for EV on-board chargers. The magnetically shielded components feature a guaranteed withstand voltage of 300 Vdc. For more information see the CDPQ2014/T150 page and the CDPQ2717/T150 page.

Part Name	Inductance Within (µH)	D.C.R. at 20°C (mΩ)		Saturation Current (A)				Temperature Rise Current (A)	
				20°C		150°C			
		Max.	(Typ.)	Max.	(Typ.)	Max.	(Typ.)	Max.	(Typ.)
CDPQ2014T150NP-1R0	1 ± 20%	1.7	(1.4)	80	(100)	48	(60)	N/A	(32)
CDPQ2014T150NP-2R2	2.2 ± 20%	1.7	(1.4)	43	(54)	28	(35)	N/A	(32)
CDPQ2014T150NP-3R3	3.3 ± 20%	1.7	(1.4)	27	(34)	16	(20)	N/A	(32)
CDPQ2717T150NP-2R2	2.2 ± 20%	1.74	(1.45)	76	(95)	42	(52)	N/A	(35)
CDPQ2717T150NP-3R3	3.3 ± 20%	1.74	(1.45)	50	(62)	36	(45)	N/A	(35)
CDPQ2717T150NP-4R7	4.7 ± 20%	1.74	(1.45)	36	(46)	24	(30)	N/A	(35)

Pin-Type Shielded Inductors Withstand 500 Vdc

Sumida's DPQ3535/T150 pin-type shielded high-power inductor is an AEC-Q200-qualified, flat-wire-wound, ferrite core-based high-power inductor with pin-type structure. Targeting applications such as high-power buck-boost converters and PFC chokes and filters for EV on-board chargers, the DPQ3535/T150 components feature a guaranteed withstand voltage of 500 Vdc

The magnetically shielded devices offer values ranging from 3.3 µH to 22 µH and max saturation currents from 28 A to 152 A. They also feature an operating temperature range of -40°C to 125°C including the coil's self-temperature rise. For more information, see the DPQ3535/T150 page.

Part Name	Inductance [Within] (µH) ※1	D.C.R. at 20°C [within] (A) (mΩ)	Saturation Current (A) Max.(Typ.) ※2		Temperature Rise Currrent (A) (Typ.) ※3
			20°C	150°C	
DPQ3535T150NP-3R3M	3.30 ± 20%	1.85 (1.55)	152 (190)	92.00 (115)	40.00 (46.00)
DPQ3535T150NP-6R8M	6.80 ± 20%	1.85 (1.55)	76.00 (95.00)	51.00 (65.00)	40.00 (46.00)
DPQ3535T150NP-100M	10.00 ± 20%	1.85 (1.55)	54.00 (68.00)	36.00 (45.00)	40.00 (46.00)
DPQ3535T150NP-120M	12.00 ± 20%	1.85 (1.55)	48.00 (60.00)	32.00 (40.00)	40.00 (46.00)
DPQ3535T150NP-220M	22.00 ± 20%	1.85 (1.55)	28.00 (35.00)	19.00 (24.00)	40.00 (46.00)

※1 MEASURING CONDITION AT 100kHz,1V.

1. Measuring frequency inductance at 100 kHz, 1 V.
2. Saturation current: The value of the dc current when the inductance is 20% lower than its initial value.
3. Temperature rise current: the actual value of dc current when temperature rise ΔT = 40°C (Ta = 20°C).

Dual-Winding TLVR Inductors Offer 100-nH To 200-nH Values

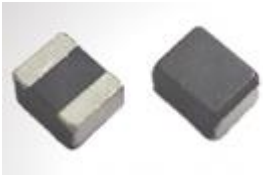
Pulse's PGL6380.XXXHLT dual-winding TLVR inductors come in a 12-mm x 6-mm x 11.15-mm package, with inductances ranging from 100 nH to 200 nH and saturation current ratings from of 117 A to 59 A.

Our latest product developments are specifically designed for use with the trans-inductor voltage regulator (TLVR) topology and leverage our existing high-volume automated manufacturing to ensure quality, reliability, and cost-effectiveness. The TLVR topology enables faster transient response and utilizes a dual-winding power bead inductor.

Pulse leverages decades of magnetics design experience as well as advanced simulation, testing, and relationships with core vendors to provide leading solutions for high power density and efficiency. Our automated manufacturing strategy allows for cost-effective magnetics with high reliability.

For a backgrounder on the TLVR topology, see the press release. For more information about the PGL6380.XXXHLT series see the datasheet. For more information, samples, quotes, additional inductance values or new design requests contact your local Pulse sales representative or distributor.

Inductor With L-Shaped Termination Benefits Wearable Devices



Pulse's BDCC and ADCC series of mini-molded power inductors feature a new L-shaped termination. The series dimensions range from 2.0 x 1.2 mm up to 2.5 x 2.0 mm, with various thicknesses ranging from 0.8 mm to 1.2 mm. The BDCC and ADCC series boast a wide inductance range from 110 nH to 2.2 µH. This series achieves great performance (lower dc resistance, higher saturation current, and lower core losses) by taking advantage of the special coil design and development of an improved magnetic powdered core material.

"The BDCC and ADCC power inductors are suitable for many applications and are highly suitable for point-of-load buck, boost, and buck-boost converters. For the commercial-grade BDCC series, the L-shaped termination style lends itself well in personal electronics and wearable devices that have strict size restrictions. This is also true for the ADCC series, which are the AEC-Q200 qualified, automotive equivalent parts suitable for ADAS and infotainment applications," says Alex Lin, technical product manager, Standard Power PBU, Pulse Electronics.

Lin adds, "For example, with the usage of PMICs for small camera modules in surround view systems, the ADCC series can help improve the system efficiency and achieve the small form factor despite multi-phased outputs. Moreso, this product is specially designed for customer's use-cases that don't utilize an external termination on the top of the inductor."

Pulse also considers the impact of a product's cost in the overall system BOM. Cost-effectiveness for the BDCC and ADCC products are realized by streamlining and integrating manufacturing systems for the wire winding and magnetic molding process. By improving the manufacturability of this series, the company says it can help customers to scale their solutions to be more competitive in the market. These miniature molded inductors will be released next year. For more information see the BDCC and ADCC datasheets.

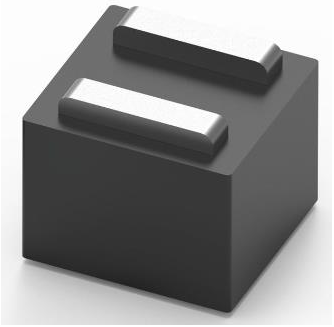
Dual-Winding TLVR Inductors Feature Saturation Current Ratings To 117 A

Pulse's PAL6373.XXXHLT series dual-winding TLVR inductors for server Vcore power offer inductance values ranging from 100 nH to 180 nH and saturation current ratings from 117 A to 65 A. These devices come in a 12-mm x 6-mm x 12-mm package.

"Trans-Inductor Voltage Regulators (TLVRs) are an exciting development that enables ultra-fast transient response in multi-phase voltage regulators and leverages our existing automated inductor infrastructure allowing us to quickly and effectively develop products for TLVR," says Damon Huang, product marketing, Specialized Power PBU, Pulse Electronics.

For more information on the PAL6373.XXXHL series, see the datasheet.

Flat-Wire Inductors Handle High-Current Transient Peaks



Würth Elektronik's WE-XHMA series AEC-Q200-certified surface-mount inductors feature a high-current capability of up to 50.6-A saturation current and the ability to handle high current transient peaks. Its flat wire coil and composite core material ensure low copper losses and stable behavior under temperature fluctuations.

The WE-XHMA is particularly suitable for use in dc-dc converters for high-current supply and FPGAs, as well as filter applications. It is particularly useful when used in switching power supplies. In contrast to conventional core materials, the compact coil shows hardly any temperature-dependent fluctuations in terms of inductance and saturation current, says the vendor. The higher energy density and the compact design due to the use of flat wire also make WE-XHMA interesting for switched-mode power supplies.

Flat wire also has the advantage that a larger cross-sectional area can be achieved with the same space requirement, thereby reducing resistance. Furthermore, it shows a lower skin effect at higher frequencies and the heat dissipation towards the circuit board is, because of the flat thermally conducting surface, also better than round wire.

The compact molded magnetically shielded coils have an operating temperature range of -40°C to +125°C. The WE-XHMA series is available from stock in SMT styles 6030, 6060, 8080, 1090, and 1510 and with saturation currents from 9.3 to 50.6 A. Free samples for developers are provided. For more information, see the WE-XHMA page.

Transformers

Forward Converter Transformers Provide Planar Benefits

Bourns' Model PLN0xx-ED21 series planar transformers offer the advanced features needed to meet today's high frequency, smaller space power conversion requirements. These forward converter transformers are designed to deliver outstanding high volumetric power density, low loss and exceptional efficiency in a compact, low-height profile design. The Model PLN0xx-ED21 series planar transformers also are designed for greater reliability due to their enhanced thermal conduction and heat dissipation properties.

Planar-style transformers offer efficiency and power density advantages over conventional wirewound transformer designs due to significantly reduced ac resistance losses. Providing from 48 W up to 70 W of output power in applications with input voltages ranging from 33 to 57 Vdc and a switching frequency of 250 kHz, these planar transformers have low leakage inductance from 0.29 µH to 0.60 µH and a volt-second time of 81.6 (V-µsec). The series also offers 33-V to 57-V input voltage and 5-V to 12-V output voltage at 4 to 14 A output with various turns ratios.

These features and their compact design make the PLN0xx-ED21 transformers well suited as power conversion solutions for high-density industrial power systems, low-profile SMPSs, LED lighting applications, battery management systems, PoE applications, and other forward transformer applications.

The transformers use standard PWB material for the windings, soldered to an SMT header to create a simple-to-use, surface-mount component that helps ease assembly. In addition, Bourns' custom magnetics product engineers are able to support many modification and customization requests for this planar transformer series.

The transformers are available now and are RoHS compliant. For more detailed information, see the Transformers - Planar page.

Auto Transformer Rectifier Units Save Space And Weight

From Vanguard Electronics, under the iNRCORE family of brands, the Auto Transformer Rectifier Unit, or ATRU series offers units rated from 2 kW to 10 kW and includes the TRU-12-2, TRU-12-5, TRU-18-5, TRU-18-10, TRU-30-5, and TRU-30-10 models.

Well suited for military applications and avionics where space and weight are at a premium, the ATRU series of increased efficiency transformers was created to achieve size and weight reductions while maintaining an efficiency rating of above 95% and low harmonic distortion (<3%) throughout the design. Individual ATRU models operate at 12, 18, and 30 pulses. Each is designed to operate in extreme environments, capable of being stored in temperatures between -60°C and +135°C while operating in temperatures from -55°C to +130°C.

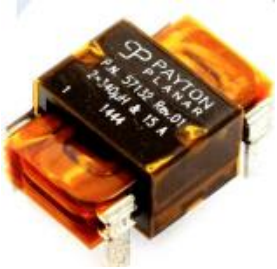
"There is an ever-growing and evolving need for smaller and lighter high-power electronics for current and future generations of aircraft and high energy systems," says Ryan Kooklan, vice president and COO of Vanguard Electronics. "The ATRU series meets those needs and represents a paradigm shift across all commercial and military applications. We coupled our high-reliability design capability with our unique approach to high-power magnetics to solve an industry need for higher efficiency, space-saving technology today and set a path toward the solutions of tomorrow."

Common applications include naval electronics, airborne electronics, military and commercial aircraft, avionic flight controls, and radar and sensor mechanisms.

	TRU-12-2	TRU-12-5	TRU-18-5	TRU-18-10	TRU-30-5	TRU-30-10
Characteristic	12 Pulse	12 Pulse	18 Pulse	18 Pulse	30 Pulse	30 Pulse
Input Voltage	230 V_{AC}	230 V_{AC}	115 V_{AC}	230 V_{AC}	115 V_{AC}	115 V_{AC}
Ouput Voltage	270 V_{DC}	270 V_{DC}	270 V_{DC}	540 V_{DC}	320 V_{DC}	320 V_{DC}
Power Rating	2 kW	5 kW	5 kW	10 kW	5 kW	10 kW
Total Harmonic Distortion	12%	11%	6%	6%	3%	3%
Ripple (Output)	5% V_{RMS}	5% V_{RMS}	1.5% V_{RMS}	1.5% V_{RMS}	1% V_{RMS}	1% V_{RMS}
Efficiency	95%	95%	96%	96%	96%	96%
Power Factor	0.98	0.98	0.99	0.99	0.99	0.99
Dimensions (max)	5" x 5" x 3"	6" x 5" x 4"	6" x 5" x 4"	7" x 6" x 5"	8" x 6" x 5"	10" x 7" x 5"
Weight (ref)	< 4 lbs.	< 7 lbs.	< 7 lbs.	< 7 lbs.	< 9.5 lbs.	< 13 lbs.

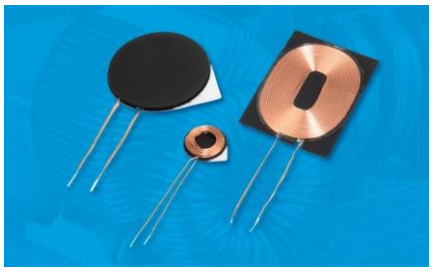
Custom Planar Transformers Span 5 W To 20 kW

Payton Planar offers custom planar transformer designs from 5 W to 20 kW. These devices offer low-profile, high efficiency and excellent repeatability. Examples can be found on the website.



Wireless Power Coils

Wireless Charging Coils Come In Circular Or Rectangular Formats



From Signal Transformer, a Bel group company, the WRSR and WRSC series coils support wireless charging applications. Signal's circular charging coil (WRSC) and rectangular charging coil (WRSR) series are wireless charging coils available in a single winding configuration. The WRSC and WRSR series allow power to be transmitted through an inductive coupling to charge an array of products including, but not limited to mobile phones, tablets and gaming controllers; digital cameras and consumer electronics; smart accessories and wearable devices; drones, toothbrushes, and robotic cleaners; and wireless charging devices.

By using inductive coupling, these wireless charging coils eliminate conductive connections and traditional wiring, seamlessly transferring data and power while avoiding mechanical abrasion, corrosion, and wearing-out of conductive contacts.

For more information on products in the WRSR series, see the WRSR-11R0K-16, WRSR-12R0K-13, and WRSR-16R7K-11 pages. For more on products in the WRSC series, see the WRSC-7R2K-32, WRSC-13R0K-26, WRSC-26R0K-11, and WRSC-47R0K-08 pages. Inventory is available from Digi-Key and Mouser.

Chokes And Filters

High-Current Common-Mode Chokes Feature Low-Profile Planar Construction

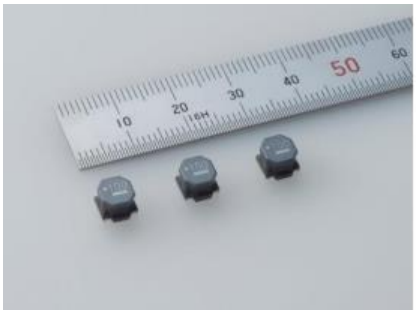
Pulse has expanded its range of automotive-grade IATF catalogue common-mode chokes with the introduction of the PM9407 series. Using Pulse's round-wire coil winding technology, horizontally mounted in a planar core, this series offers one of the lowest profiles, highest current, surface mount packages currently in the market, according to the vendor. The CMC offers inductances from 120 µH to 480 H in the ER19 platform having a footprint of 24.9 x 21.6 x 16.9 mm.

"With increasing power requirements, the need for high density low EMI systems, and the on-going conversion of high-power assemblies from through-hole to surface mount, the PM9407 is ideally suited for next generation designs. The recently launched PH9407 provides a footprint optimized solution with the implementation of our round wire coil technology in the EP core shape. This new series is the automotive version of that platform," said Shreyankh Krishnamurthy of the Power PBU at Pulse Electronics.

The horizontally mounted construction makes this product-line well suited for high-performance, high-reliability applications in data communications, computing, and industrial markets where available height is at a premium. Such a feature has also made this series attractive to the automotive market. The automotive version of the larger PH9408 series from the same family is scheduled to follow later this year.

For more information, see the PH9408 series datasheet.

Inductors Serve As Choke Coils And Filters In Automotive Powertrains



TAIYO YUDEN's AEC-Q200-qualified LAXH series of ferrite power inductors are designed for use as choke coils and noise filters for dc-dc converters as applied in automobile engines, transmissions, and other powertrain components. The LAXH series adopts a sleeveless structure with its advantageous compact size and high current capacity, and the upper limit of its operating temperature range has been raised to 150°C from that of the company's existing LCXH series (operating temperature range: -40°C to +125°C).

Furthermore, by applying the company's metal material technology and using metal material for the outer resin, the series delivers a large current capacity at a dc saturation allowable current of 13.5 A (inductance value of 1.0 µH), or twice that of Taiyo Yuden's existing LAYP series "LAYPH06045DL1R0NGA" (6.3 x 6.0 x 4.5 mm, inductance value of 1.0 µH, and dc saturation allowable current of 6.7 A) with an operating temperature limit of 150℃.

Production of the products commenced at the company's overseas subsidiary company, TAIYO YUDEN (PHILIPPINES) in January 2023, with a sample price of 150 yen per unit.

Recently, new vehicles have been equipped with an ever-greater number of electronic control units, typified by ADAS units. This requires a greater number of power supply circuits, which boosts the demand for power inductors used inside them. In particular, ECUs are increasingly being installed in high-temperature engine compartments, and the electronic components installed must be able to handle high temperatures.

In response to these needs, Taiyo Yuden has adopted a sleeveless structure with its advantageous compact size and high current capacity, and applied the metal materials technologies it has nurtured in its metal power inductors "MCOIL" to commercialize this LAXH series which delivers an operating temperature limit of 150℃, and large current capacity at a dc saturation allowable current of 13.5 A (inductance value of 1.0 µH).

For the detailed product lineup, see the website.

Table. Key specs for the LAXH series of ferrite power inductors.

Part number	Nominal inductance [µH]	Inductance tolerance [%]	Rated current*3 [A] max.		DC resistance [Ω] max.	Operating Temp. range [℃]
			Saturation current Idc1*1	Temperature rise current Idc2*2		
LAXHG6060YEL1R0NMR	1.0	±30	13.5	6.2	0.013	-40～+150
LAXHG6060YEL1R5NMR	1.5	±30	10	5.5	0.019	
LAXHG6060YEL2R2NMR	2.2	±30	8.5	4.4	0.023	
LAXHG6060YEL3R3MMR	3.3	±20	7	4	0.028	
LAXHG6060YEL4R7MMR	4.7	±20	6	3.6	0.036	
LAXHG6060YEL6R8MMR	6.8	±20	5.1	3.1	0.052	
LAXHG6060YEL100MMR	10	±20	4	2.6	0.06	
LAXHG6060YEL150MMR	15	±20	3.1	2.15	0.105	
LAXHG6060YEL220MMR	22	±20	2.5	1.8	0.132	
LAXHG6060YEL470MMR	47	±20	1.55	1.2	0.272	
LAXHG6060YEL680MMR	68	±20	1.2	1.05	0.385	
LAXHG6060YEL101MMR	100	±20	1.05	0.85	0.6	
LAXHG6060YEL151MMR	150	±20	0.83	0.76	0.816	
LAXHG6060YEL221MMR	220	±20	0.7	0.57	1.32	
LAXHG6060YEL331MMR	330	±20	0.55	0.45	1.872	
LAXHG6060YEL471MMR	470	±20	0.45	0.38	2.76	

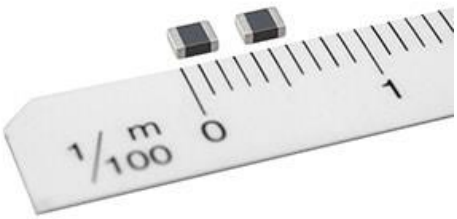
*1 The saturation current value (Idc1) is the dc current value having inductance decrease down to 30%. (at 20℃) *2 The temperature rise current value (Idc2) is the dc current value having temperature increase up to 40℃. (at 20℃) *3 The rated current is the dc current value that satisfies both the current value saturation current value and the temperature rise current value. *Derating of rated current is necessary depending on the ambient temperature.

High-Current Multilayer Chip Bead For Automotive Power Supply Lines

TDK's MPZ2520SPH series multilayer chip bead for automotive power supply lines is rated at 12 A yet measures only 2.5 x 2.0 x 0.85 mm (L x W x H). According to the vendor, it is not only the highest-rated current bead, but also compact. Mass production began in February 2023.

Compliant with AEC-Q200 Rev D, the high-performance chip bead is for automotive EMC components. The operating temperature range is from -55℃ to + 125℃. The MPZ2520SPH070ATD25 has an impedance of 7.0 ±3 Ω at 100 MHz and a dc resistance of 1.25 Ω.

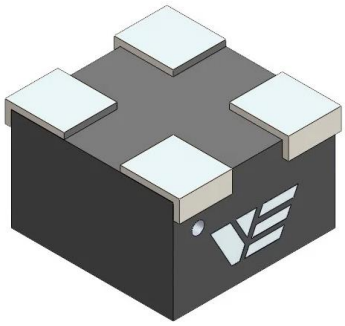
Currently, supporting large currents requires either much larger chip beads measuring at least 3.2 x 2.5 mm (L x W) or using multiple chip beads of less than 12 A in parallel, according to the vendor. Using a single MPZ2520SPH series bead instead saves mounting space. Furthermore, the serial configuration of a single product helps stabilize the applied current. TDK's original pattern configuration and the use of optimum materials achieve the highest rated current in the industry in a compact size, according to the company.



Recent years have seen a growing need for chip beads with high current capability for use in applications such as powertrain systems for electric vehicles. A similar need exists in industrial machinery and in the consumer sector, and TDK also began mass production of chip beads using the same high current specification for these fields.

Small Common-Mode Chokes Operate From -55°C To 200°C

From Vanguard Electronics, under the iNRCORE Family of Brands, the XTCMN5 series common-mode choke inductors are additions to Vanguard's growing High Temperature product line. The XTCMN5 inductors have been designed to operate in extreme environments—including a temp range of -55°C to 200°C—and work over frequency ranges from 100 kHz to 600 kHz and above, making them well suited for GaN-based power supplies as well as traditional switching supplies. These parts feature a compact low profile, which supports automated placement and as well as the ability to tolerate high shock and vibration levels. Different electrical values and termination finishes are available.



"Many of our high end industrial, military, and aerospace markets need high power densities in a smaller package" says Jason Finley, president of Vanguard Electronics. "Vanguard is continuing to meet these needs with this latest common-mode choke inductor series. Compared to the competition, the Vanguard XTCMN series provides better performance in a smaller package size. More sizes and ratings will be following this first series."

The XTCMN5 series has an inductance range of 110 µH to 4.9 µH and is able to handle 0.55 A to 4.9 A in a self-shielding nanocrystalline toroidal core. The inductor's overload current is one-and-a-half times its rated current. The inductors are designed to serve military, high end industrial, extreme temperatures, and aerospace markets as well as anywhere noise suppression is needed.

High-Value Inductors Block Low-Frequency Noise

Sumida's CDR**/T150 series unshielded, high-inductance-value inductors (470 to 10,000 µH) are AEC-Q200-qualified devices intended for use as filter inductors for blocking incoming low-frequency noise through the home power line. These devices operate over a temperature range of -40°C to 150°C including the coil's self-temperature rise. For more information, see the CDR106/T150 page.

Part Name	Inductance Within (µH)	D.C.R. at 20°C [Within](mΩ)	Saturation Current (A)				Temperature Rise Current (A)	
			20°C		150°C			
			Max.	(Typ.)	Max.	(Typ.)	Max.	(Typ.)
CDR76T150-471KC	470 ± 10%	1,220 ± 20%	0.32	(0.41)	N/A	(0.32)	0.35	(0.42)
CDR76T150-472KC	4,700 ± 10%	13,290 ± 20%	0.12	(0.15)	N/A	(0.1)	0.07	(0.1)
CDR76T150-103KC	10,000 ± 10%	28,520 ± 20%	0.088	(0.11)	N/A	(0.072)	0.032	(0.065)

CDR106T150NP-471KC	470 ± 10%	780 ± 20%	0.53	(0.67)	N/A	(0.49)	0.6	(0.7)
CDR106T150NP-472KC	4,700 ± 10%	7,510 ± 20%	0.18	(0.23)	N/A	(0.16)	0.16	(0.2)
CDR106T150NP-103KC	10,000 ± 10%	19,440 ± 20%	0.12	(0.15)	N/A	(0.11)	0.076	(0.1)

Common-Mode Chokes Now Come In IATF Versions

Pulse has introduced IATF versions of its SLIC and Shasta common-mode chokes with a selection of these products offering inductance values from 92 µH to 1.8 mH and current ratings from 2.8 A to 20 A, in platform sizes ranging from 9 mm x 9 mm x 3.8 mm to 31 mm × 25.4 mm × 12.7 mm.

These versatile SMD products have been optimized to provide a peak impedance profile in the low-megahertz frequency range, filtering noise with those critical harmonic frequencies of modern-day switching applications. The entire range of platforms are AEC-Q200 compliant based on prior qualification of the existing industrial-grade products, with PPAP documentation available for a selection of products that have already been launched to Pulse's IATF production line.

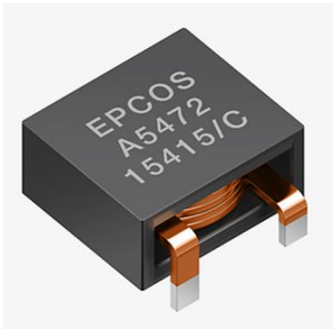
"The automotive market has been attracted to the pre-existing high volume, mature industrial-grade product line for several years now. This has motivated Pulse to complete the AEC-Q200 qualification of each of the platforms offered by this family and has led to the design-in of products into several automotive applications," said Gerard Healy, product marketing, Specialized Power PBU, Pulse Electronics.

Continuing, Healy said, "However, AEC-Q200 qualification is just one of the five Advanced Product Quality Planning (APQP) processes for an IATF product development so this alone does allow it to be categorized as an automotive-grade product. The development of this new family will follow each of [the] APQP processes, will be launched onto an IATF-certified manufacturing line, facilitating the completion of the PPAP documentation."

Contact Pulse Electronics if a part is selected for automotive application design to ensure APQP and PPAP delivery can be completed in accordance with project milestones. For more on the SLIC/Shasta series see this page.

Note that Pulse applies standard AEC-Q200 qualification. If a customer has a vibration requirement beyond this, Pulse may not be able to confirm that requirement with this family. The customer should then consider conducting their own qualification testing and/or glue the component to the PCB.

High-Current Chokes For Automotive And Industrial Applications



TDK's B82559A*A033 series of shielded EPCOS ERU33 high-current, through-hole-mounted chokes are designed for very high saturation currents from 32 A to 83 A at 100°C. The six types cover a range of inductance values from 3.2 µH to 10 µH. DC resistances are as low as 0.85 mΩ or 1.2 mΩ, depending on the type.

Thanks to the flat wire winding, the chokes have very compact dimensions of only 33 mm x 33 mm x 15 mm. By thermally connecting the flat-wire winding to the core, the large ferrite surface can be coupled to a heat sink for effective heat dissipation. In addition to the standard types, customized variants with other inductance values can also be realized.

The RoHS-compatible and AEC-Q200 REV D-qualified inductors are designed for operating temperatures from -40°C to +150°C. Typical automotive applications are buck-boost chokes for dc-dc converters (e.g. for 48-V on-board power supplies or differential-mode chokes in the input filter of onboard chargers.) In industrial electronics, they can be used as storage and output chokes in high-current supplies and PoL supplies. For more information, see the High Current Flat Wire Inductors page.

Cores

Custom Powder Core Blends Address Unique Requirements

Magnetics' custom powder core blends can satisfy requirements for unique properties in a powder core. For examples, custom core blends can be used to obtain more inductance stability under dc conditions, lower losses, or a nonstandard permeability. To create these custom cores, Magnetics draws on its wide range of current products. To discuss your specific powder core requirements, contact the company.

Nanocrystalline Cores For Current Transformers

Magnetics now offers nanocrystalline cores for use in current transformers. Nanocrystalline cores offer several advantages over traditional cores made of materials like amorphous alloys or laminated silicon steel. Their high permeability, excellent temperature stability, low losses, and compact size and weight allow for the design of accurate, efficient, and compact current transformers. To discuss your design requirements, contact the company.