

## **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, chokes, transformers, current sensors and wireless power coils introduced over the past six months. Magnetics vendors continue to introduce power inductors for use in board-level dc-dc conversion in a range of applications with automotive systems driving many of the new product developments. Consequently AEC-Q200 compliance and wide operating temperature ranges remain quite common.

While providing higher current ratings in smaller case sizes seems always to be the dominant trend among new inductors and chokes, among the latest product introductions, improved shielding and an ability to withstand shock and vibration are also notable characteristics.

Fewer in number and tending to be application specific, the recently introduced transformers typically feature high isolation. One flyback transformer is notable for being designed specifically for driving SiC power switches. Other new magnetics products include high-current current sensors and transformers, and wireless power coils with an integrated NFC antenna.

This article represents a follow-up to the Power Magnetics Component Roundup published in the December 2021 issue and earlier [magnetics articles](#) published in How2Power Today.

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**Power Inductors**

**High-Current Inductors For Server Vcore Power**

Pulse’s PG2289.XXXHLT, PG2292.XXXHLT, PGL6076.XXXAHLT and PGL6189.XXXHLT are families of high-current, low-DCR inductors meant for use in single-phase PoL and multi-phase buck converters to power processors, memory modules, FPGAs and ASICs in servers, datacenters, networking systems and graphics cards. These inductor families provide lower core loss using the latest high-frequency materials, reduced DCR, and higher current ratings in different footprints.



These four new series are available in multiple sizes, inductances, and current ratings. See the table.

“With voltage regulator transient response and load line requirements constantly becoming more strict and demanding, there is significant pressure to reduce losses and increase current ratings while continuing to reduce inductor footprint. Pulse is able to leverage our relationships with our magnetic material suppliers and Power IC partners along with advanced design capabilities to provide optimal magnetic solutions,” said Damon Huang, product marketing, Power PBU, Pulse Electronics.

Table. Key specifications of Pulse’s high-current, low-DCR inductors.

Part Number	DCR (mΩ)	Length (mm)	Width (mm)	Height (mm)	Inductance (nH)	Current (A <sub>pk</sub> )
<a href="#">PG2289.XXXHLT</a>	0.105	4.7	4.5	4.5	100	16
<a href="#">PG2292.XXXHLT</a>	0.09	6.1	6	7	50 to 70	84
<a href="#">PGL6076.XXXAHLT</a>	0.155	8.3	7.6	12	90 to 320	137
<a href="#">PGL6189.XXXHLT</a>	0.04	10	8.3	8	50	148

For more information, see the data sheets linked to in the table. For samples, quotes, additional inductance values or new design requests reach out to your local Pulse sales [representative](#) or distributor.

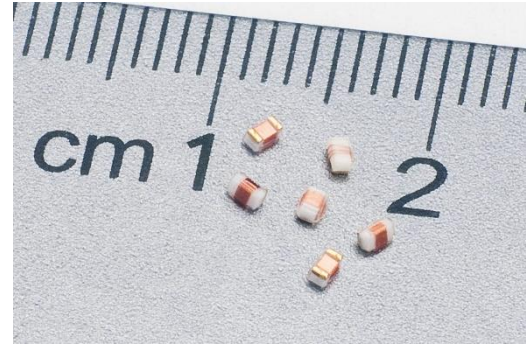
**Low-Profile Inductors Enable High-Frequency Operation**

Sumida’s 0603CDWLF/DS and 0805CDWLF/DS small and low-profile inductors achieve high-current and high-frequency operation. These magnetically shielded inductors operate over a temperature range of ~40°C to +105°C including the coil’s self-temperature rise. The 0603CDWLF/DS measures 1.8 x 1.2 x 1.0 mm max, while the 0805CDWLF/DS measures 2.4 x 1.73 x 1.4 mm max. Applications include LCD displays, STBs, LCD monitors/TVs, smart meters, tablet PCs and other portable devices and dc-dc converters. For more information, see the [website](#).

**Rugged Chip Inductors For Power And RF Applications**

Gowanda Electronics’ SMP0603 is the company’s first ceramic core chip inductor series for power applications. This series is well suited for use in test and measurement, industrial control and automotive sectors. These high-performance chip inductors can also be used in RF applications in commercial, medical and military markets.

Unlike devices from other chip manufacturers, Gowanda’s chip inductors utilize co-fired terminations and fully encapsulated designs to address the market need for chemical resistance, vibration/shear resistance, electrical and mechanical integrity, durability during handling/processing and implantable device components (human body).



The performance range provided by the 37 discrete parts within the SMP0603 series includes inductance values from 1.8 nH to 27 nH, DCR values from 0.010 to 0.040  $\Omega$  and current ratings from 1750 to 3400 mA dc (see the table). All of Gowanda’s chip inductors, including this series, meet a TML (Total Mass Loss) outgassing requirement of 1.0% maximum when tested in accordance with ASTM E595. Standard terminations are gold-plated nickel and RoHS-compliant.

Table. Key specifications of the SMP0603 ceramic core chip inductor series.

PART NUMBER	L nH	TEST FREQ MHZ	Q NOM	Q TEST FREQ MHZ	SRF MHZ REF	DCR $\Omega$ NOM	CURRENT RATING mA DC
<b>CERAMIC CORE</b>							
SMP0603-0018K	1.8	250	15	250	6000	0.010	3400
SMP0603-0036J	3.6	250	25	250	6000	0.010	3400
SMP0603-0039J	3.9	250	29	250	6000	0.010	3400
SMP0603-0047J	4.7	250	30	250	5400	0.010	3400
SMP0603-0068J	6.8	250	33	250	4600	0.010	3400
SMP0603-010J	10	250	39	250	4000	0.015	2800
SMP0603-012G	12	250	39	250	3200	0.020	2450
SMP0603-015G	15	250	40	250	3100	0.025	2200
SMP0603-018G	18	250	40	250	2600	0.025	2200
SMP0603-022G	22	250	42	250	2400	0.030	2000
SMP0603-027G	27	250	42	250	2400	0.040	1750

This product line expansion leverages the company’s similarly-sized ceramic chip RF inductor series (CC0603) which has been optimized for higher current handling in order to make the SMP0603 series suitable for power applications.

The SMP0603 inductors are designed with a flat top cover for pick and place assembly and they are suitable for reflow soldering. Operating temperature range for this power series is -40°C to +125°C. More technical information is available on the [SMP0603 series page](#) including the [SMP0603 Datasheet](#), [SMP0603 Dimensional Specification](#) and other information.

### Shielded Power Inductors Withstand 30-G Peak Vibrations

[Bourns’](#) Model SRP1038WA and SRP1265WA automotive-grade high-current shielded power inductors offer enhanced mechanical strength for harsh vibration application environments. The inductors are designed with a wider side terminal leadframe capable of withstanding 15-G typical or 30-G peak vibrations, therefore exceeding the 5 G demanded by the AEC-Q200 standard by a factor of three and six times, respectively. Vibration testing was conducted according to MIL-STD-202 Method 204.



The two series also feature a compact package, high saturation current, low dc resistance, low buzz noise and excellent temperature stability over a wide temperature range of -55°C to +165°C. Such features make these automotive grade, AEC-Q200 compliant power inductors well suited for power management and EMI filtering in a wide range of consumer, vehicle, industrial and telecom electronics applications.

The two series add advanced capabilities to Bourns’ shielded power inductor portfolio by increasing the width of the side terminal frame by more than 50% compared to existing Bourns models without increasing the package

size or required printed circuit board area. Bourns employs a uniquely-formulated metal alloy powder core and bonding agent and uses a molded construction manufacturing process where the magnetic shielded design allows for low radiation while the metal alloy powder core provides high saturation current.

The high temperature-grade materials used enable a wide operating temperature range suitable for many types of harsh environment applications. The maximum operating temperature of +165°C for the SRP1038WA and SRP1265WA models is 10% higher than standard Bourns Model SRP-A power inductors and these models provide more headroom to maintain the rated operating current even under challenging environmental conditions.

The SRP1038WA and SRP1265WA power inductors are available now. For more detailed product information, see the Power Inductors - SMD Shielded [page](#).

### **Semi-Shielded Power Inductors Feature High Operating Temperatures**

[Bourns'](#) Model SRN3030HA, SRN4030HA, and SRN5030HA are AEC-200-compliant semi-shielded power inductors designed with high current capacity, compact size and low loss as well as high operating frequency and high operating temperature capabilities. The high temperature-graded materials employed in all three series provide a wide operating temperature range of -55°C to +150°C. These features and capabilities make Bourns' latest power inductors well suited as high reliability power conversion solutions for EMI filtering, dc-dc converters and power supplies in consumer, industrial and telecom electronics.



A magnetic-silica-based coating applied to the perimeter of the inductor winding enhances the inductors' shielding and reduces magnetic field radiation compared to non-shielded options. Additionally, semi-shielded construction contributes to a lower component cost compared to similarly-sized conventional ferrite-shielded inductors.

Each series offers different heating current ratings with saturation currents from 5 A to 10 A. Both Model SRN3040HA and SRN4030HA series have inductance ranges of 1 to 100  $\mu$ H, while the SRN5030HA has a range of 0.47 to 100  $\mu$ H. High Q values of 13 to 33 are possible in these compact power inductors, which provide high impedance at resonance frequency in combination with low-loss operation.

The SRN3030HA, SRN4030HA, and SRN5030HA power inductors are available now. For more detailed information, see the [SRN3030HA](#), [SRN4030HA](#), and [SRN5030HA](#) datasheets.

### **Integrated E-Field Shield Inductors Come In 2020 Cases**

[Vishay Intertechnology](#) has expanded its IHLE series of low-profile, high-current inductors featuring integrated E-field shields for the reduction of EMI, adding commercial- and automotive-grade devices in the 5-mm x 5-mm x 3.4-mm 2020 case size. The smallest such devices on the market, according to the company, the Vishay Dale IHLE-2020CD-51 and IHLE-2020CD-5A lower costs and save board space by eliminating the need for separate board-level Faraday shielding.



These devices contain the electric and B field associated with EMI in a tin-plated copper integrated shield, providing up to -20 dB of electric field reduction at 1 cm (above the center of the inductor) when the integrated shield is connected to ground. Featuring high temperature operation to +155°C and coplanarity of their four terminals within  $\leq 100 \mu$ m, the inductors are optimized for energy storage in dc-dc

converters up to 3 MHz and provide excellent attenuation of noise in high-current filtering applications up to the SRF of the inductor.

Applications for the IHLE-2020CD-51 will include servers and desktop PCs; notebooks; high-current POL converters; low-profile, high-current power supplies; FPGAs; and battery-powered devices. The AEC-Q200-qualified IHLE-2020CD-5A will be used in automotive engine and transmission control units; entertainment and navigation systems; LED drivers; instrumentation panels; ADAS devices and sensors; and noise suppression for PWM-controlled motors.



Packaged in a shielded, composite construction that reduces buzz noise to ultra low levels, the inductors offer high resistance to thermal shock, moisture, and mechanical shock and handle high transient current spikes without saturation.

Table. Key device specifications of the IHLE-2020CD-51 and IHLE-2020CD-5A.

Part number	IHLE-2020CD-51 / IHLE-2020CD-5A
Case size	2020
Inductance at 100 kHz ( $\mu\text{H}$ )	0.22 to 15
DCR typ. at 25 °C ( $\text{m}\Omega$ )	3.95 to 195.0
DCR max. at 25 °C ( $\text{m}\Omega$ )	4.23 to 208.0
Heat rating current typ. (A)	2.4 to 18.0 <sup>(1)</sup>
Saturation current typ. (A)	1.6 to 11.0 <sup>(2)</sup>
SRF typ. (MHz)	14.1 to 190.0

<sup>(1)</sup> DC current (A) that will cause an approximate  $\Delta T$  of 40°C

<sup>(2)</sup> DC current (A) that will cause  $L_0$  to drop approximately 20%

Samples and production quantities of the IHLE devices are available now, with lead times of 12 weeks. Pricing for U.S. delivery only starts at \$0.49 per piece in 2,000-piece quantities. For more information, see the [IHLE-2020CD-51](#) and [IHLE-2020CD-5A](#) pages.

### Power Inductors Offer Saturation Currents Up To 80 A

TDK's PCM120T series of shielded SMT power inductors is optimized for high saturation currents and low dc resistances. The PCM120T product family includes 14 inductance values between 0.4  $\mu\text{H}$  and 10  $\mu\text{H}$ , whereby saturation currents of up to 80 A are reached depending on the L value. Optimal saturation properties are achieved through the use of an iron alloy core.



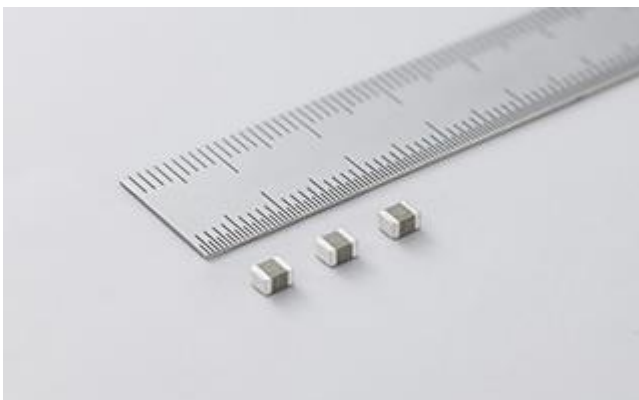
Meanwhile, flat wire windings are used to keep losses as low as possible. This results in low ohmic resistance values (DCR) of 0.72  $\text{m}\Omega$  (0.4  $\mu\text{H}$ ) to 9  $\text{m}\Omega$  (10  $\mu\text{H}$ ).

The inductors also have outstanding EMC performance due to use of a closed housing made of ferrite material without an external gap. They are well suited for automatic solder joint inspection (AOI) and achieve a coplanarity of <0.1 mm due to their lead frame structure. The product's metal cores provide resistance against high-voltage pulses in accordance with ISO 7636.

Typical applications include primary dc-dc converters in automotive applications such as ADAS, power supplies for servers and base stations, and various types of dc-dc converters. The PCM120T components are also well suited for interference suppression, such as that required for electric motors in vehicles.

The components' dimensions are 12.7 x 15.8 x 11.5 mm (W x L x H). The inductors are designed for a wide temperature range from -55°C to +165°C and are certified according to AEC-Q200.

For more information, see the SMT Power Inductors [page](#) or the [datasheet](#).



### Metal Power Inductors Offer Improved $I_{\text{sat}}$ And DCR

Murata's DFE32CAH\_R0 series metal power inductors suit high-temperature applications of up to 150°C. Intended for use in dc-dc converters and power management circuitry for automotive applications, these components are supplied in 1210 inch size (3.2 mm x 2.5 mm) metal cores.

Covering a wide inductance value range, the components are suitable for in-vehicle applications beyond infotainment systems to the powertrain and advanced driver assistance systems (ADASs). Meeting demands for

high currents and the downsizing of system designs, the DFE32CAH\_R0 series delivers a dc superimposed current rating ( $I_{sat}$ ) of 8.7 A, which is the world's best for a 1210-inch size product with an inductance of 0.47  $\mu$ H, according to the vendor.

The DFE32CAHR47MR0L has a 0.47  $\mu$ H inductance value, with a DCR of 14 m $\Omega$  (max) and an  $I_{sat}$  of 8.7 A (max). For the DFE32CAHR68MR0L, the main values are 0.68  $\mu$ H for inductance, 17 m $\Omega$  (max) for DCR and 7.0 A (max) for  $I_{sat}$ . The 1.0  $\mu$ H-rated DFE32CAH1R0MR0L and 1.5  $\mu$ H-rated DFE32CAH1R5MR0L have respective DCR values of 22 m $\Omega$  and 30 m $\Omega$ , with  $I_{sat}$  figures of 5.9 A and 4.8 A.

The DFE32CAH-2R2/3R3/4R7-MR0L inductors have respective inductance ratings of 2.2  $\mu$ H, 3.3  $\mu$ H, and 4.7  $\mu$ H with DCR figures of 43 m $\Omega$ , 67 m $\Omega$  and 101 m $\Omega$  and  $I_{sat}$  values of 4.0 A, 3.3 A, and 2.8 A. For additional details, see the data sheet.

"These new products support large currents by optimizing the internal coil structure design and utilizing original metal materials," said Tomohiro Yao, general manager of Marketing & Promotion for the EMI Division at Murata. "Thanks to these technological advances, we have succeeded in delivering a series of small metal power inductors that have a highly reliable design for a more diverse range of automotive applications, including the powertrain and ADAS that require support for temperatures up to 150°C and demand large current flows."

For more information about the metal power inductors, see the [product details page](#).

### Shielded Inductors Leverage Metal Alloy Powder Core Process

[Bourns'](#) SRP2010TMA, SRP2012TMA, SRP2510TMA, SRP2512TMA and SRP3212A series of high-current shielded power inductors are designed using the company's advanced metal powder core and manufacturing processes, delivering the benefits of magnetically shielded construction for low radiation, high saturation current, high heating current and low dc resistance. The power inductors are AEC-Q200 compliant and offered in a miniature, low profile 0.8-mm x 1-mm design.



Well suited for power conversion and EMI filtering in consumer, industrial and a variety of other electronics applications, this inductor series is constructed with high-temperature-graded materials providing excellent temperature stability and an operating temperature of up to +150 °C. In addition, according to the company, the inductors' flat wire construction helps significantly reduce DCR compared to other similar-sized devices constructed with traditional wire while also making them highly efficient.

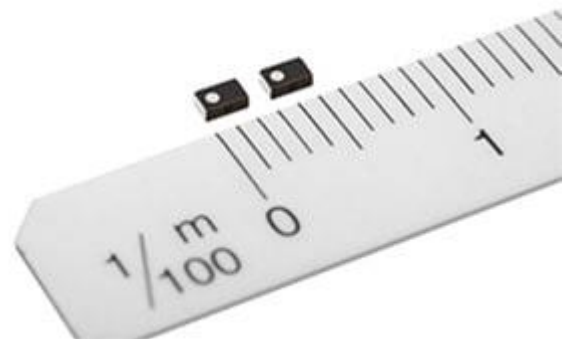
These power inductor series are available now. For more information, see the Power Inductors - SMD High Current, Shielded [page](#) or see the [SRP2010TMA](#), [SRP2012TMA](#), [SRP2510TMA](#), [SRP2512TMA](#) and [SRP3212A](#) datasheets.

### Compact Inductors Enhanced For Smartphone Power Circuits

[TDK's](#) TFM201208BLE series inductors are optimized for space-constrained smartphone power circuits. The parts are available in 0.24-, 0.33- and 0.47- $\mu$ H versions.

Each supplied in a 2.0 (L) x 1.2 (W) x 0.8 mm (H) form factor, the inductors in the TFM201208BLE series feature significantly better electrical properties than the previous TFM201208BLD products in terms of their current and resistance levels. A 10% higher rated current of 5.5 A ( $I_{sat}$ ), plus a 22% lower dc resistance of 25 m $\Omega$  than conventional products have been attained, according to the vendor.

The company adds that these parameters are the best in the industry for inductors of this size. The major boost in performance has been achieved through TDK's innovative metallic magnetic material technology and structural design.



SoCs with elevated arithmetic throughput will be required as smartphone performance further progresses, and the accompanying passive components must exhibit higher current characteristics. In addition, integration of ever more functionality into smartphone designs is increasing the number of power circuits involved. Consequently, the inductors employed must have low resistance and contribute minimal losses to extend battery life. The TFM201208BLE series offer the much-needed value to smartphone OEMs delivering the necessary high current and low resistance.

Table. Key specs for the TFM201208BLE series.

Model	Inductance (μH)	Dc resistance (mΩ) max.	I <sub>sat</sub> (A) max.	I <sub>temp</sub> (A) max.	Rated voltage (V)
TFM201208BLE-R24MTCF	0.24 ± 20 %	20	6.5	5.0	20
TFM201208BLE-R33MTCF	0.33 ± 20 %	25	5.5	4.2	20

Mass production will begin this month (June 2022).

## Chokes

### Automotive Common-Mode Chokes Offer High Current Ratings In Small Size

Pulse's PMC9539 series common-mode chokes are new members of the company's automotive-grade IATF catalogue chokes. Using Pulse's round-wire coil-winding technology, the series is built with a very small form-factor of 19.6 mm x 17.8 mm x 15.5 mm and uses the highly popular EP core shape construction. With inductance values ranging from 90 μH to 250 μH and a current rating up to 25 A, these products are specially designed for EMI filtering for automotive electrification but are suitable for other applications.



Designed as a through-hole component, the PMC9539 is suitable for high-vibration environments and has a maximum isolation capability of 1000 Vdc between the windings. A high-permeability ferrite material is used to minimize the number of turns and enable low dc resistance (less than 3 mΩ). The parts offer a much higher current rating than other similarly sized common mode chokes in the market, says the vendor.

"We have been delighted with the market interest towards our PH940x, PAC6006, and the PA514x series, and the range of applications which they have been

designed into. This product offering responds to the feedback we received regarding automotive-grade components in the round-wire coil construction. Compared to existing products on the market that occupy a similar footprint, the compact construction of the PMC9539 provides more than twice the current rating for a given inductance, along with it being completely AEC-Q200 qualified and IATF launched," said Shreyankh Krishnamurthy, product marketing, Power PBU, Pulse Electronics.

With the winding of the round wire coil being fully automated, this product is well suited for high-performance, high-reliability applications in the automotive, data communications, computing, and industrial markets which also require a price competitive solution. For more information, see the PMC9539 [datasheet](#).

### Automotive Bar Core Choke Features Excellent Saturation Behavior

Würth Elektronik's WE-CHSA Performance is a magnetically shielded bar core choke that represents an extension to the proven WE-CHSA series and differs from it only by a newly developed core material. As a result, WE-CHSA P—"P" as in performance—achieves the best saturation behavior among comparable components on the market, according to the vendor. The choke has a current carrying capacity of up to 28 A and an operating temperature range of 55°C to +150°C.

The WE-CHSA bar core choke series is available in sizes 1011, 1212 and 8090 and features a special product design with an air gap. This improves component tolerance, while the recessed solder pads ensure optimum coplanarity. The new core material enables extremely high saturation currents up to over 48.5 A ( $\Delta L = 10\%$ ).



The AEC-Q200-qualified high-current inductors are suitable, for example, for use as input filter chokes in engine control systems or in infotainment systems. A design kit and free samples are available for the product group.

WE-CHSA P and WE-CHSA can be ordered immediately from stock with different inductance values from 0.22 to 15  $\mu\text{H}$  without minimum order quantity. For more information, see the [website](#).

### Common-Mode Chokes Deliver Higher Current Density With EP13 Core Shape

[Pulse's](#) PAC6034 series common-mode chokes are said to double the current density of existing industry solutions of similar size. The PAC6034 complements the company's higher-power PA5140/41 series and expands on the PAC6006 family of high-current CM chokes. The new product uses the low-cost EP13 core shape to introduce a smaller platform size (17.5 x 13.5 x 12.45 mm) with inductance values from 1 mH to 3 mH and a current rating of up to 2.2 A.

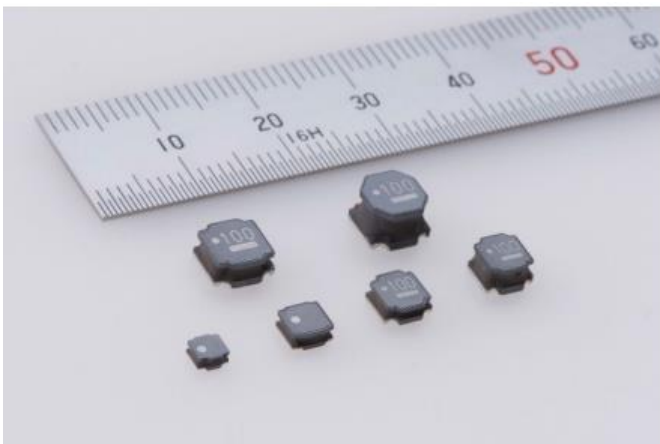


Care is taken during winding to minimize winding self-capacitance to enable a wider impedance peak, creating a more useful filter choke. With self-resonant frequencies (SRF) in the 1- to 3-MHz range, useable frequencies beyond 10 MHz, and impedances exceeding 25 k $\Omega$  these products are well suited for the filtering requirements of many modern applications that require moderate input currents.

"We are excited to continue releasing new parts with an emphasis on expanding on what is available in the market and simplifying the job for design engineers. The PAC6034 family offers a high impedance profile while minimizing component size and maximizing the rated current enabling a more effective common-mode filter in a smaller footprint," said David Wiest, product marketing, Power PBU, Pulse Electronics

Samples are available through the web portal [here](#) or via the Pulse distribution network. For more information, see the [datasheet](#).

### Automotive Wirewound Ferrite Inductors Offer Wide Selection, Optical Inspection



[Taiyo Yuden's](#) LCXH series of AEC-Q200-qualified wirewound ferrite power inductors consists of 64 devices in six sizes including the LCXHF3030QK. These power inductors are designed for use as choke coils or noise filters in power supply circuits for automotive body systems and information systems such as infotainment ECUs.

The LCXH series has the same sleeveless structure as the LCXP and LCXN series (former product name: NR series S-type), which have been used in consumer and automotive products markets. The materials technology and structural design that the company has nurtured have both been further refined, and the electrodes are structured such that improved flatness can be achieved when mounted and automated optical

inspection (AOI) can be carried out during manufacturing processes.

Production of the products commenced at the company's overseas subsidiary company, Taiyo Yuden (Philippines), in March 2022, with a sample price of 50 to 100 yen per unit.



The LCXH series comprises 64 models in total, with a wide selection of characteristics, ranging from 3-mm to 6-mm square in size, to satisfy demand for use in various applications.

Table. Key specs for the LCXH series of AEC-Q200-qualified wire-wound ferrite power inductors.

■Characteristics

Part Number *1	Size (LxW) [mm]	H [mm, MAX.]	Inductance [μH]	Temp. [°C]	Sample Price [yen per unit]
LCXHF3030QKT****NR	3.0x3.0	1.5	0.47~100	-40~ +125	50
LCXHF4040WKT****NR	4.0x4.0	2.0	1~220		60
LCXHF5050WBT****MR	5.0x5.0	2.2	0.47~100		80
LCXHF5050XAT****MR	5.0x5.0	3.1	0.47~470		80
LCXHF6060XKL****MR	6.0x6.0	3.0	1~100		100
LCXHF6060YEL****MR	6.0x6.0	4.5	1~470		100

For product inquiries, see the [website](#).

**CM Choke Offers Low Profile, High Shock And Vibration Resistance**

From [Vishay Intertechnology](#), the Vishay Custom Magnetics IHCM-2321AA-10 is a new IHCM common-mode choke for high-current commercial applications up to 35 A. Available with a low-profile surface-mount construction, the choke is more robust than bulky toroid-based devices, while delivering superior performance across temperature ranges to +155 °C.

With its low profile, the IHCM-2321AA-10 offers a reduced size and volume, making it more resistant to shock and vibration, while the enhanced core design extends current saturation out to as much as 35 A. The part is surface-mountable and compatible with automated pick-and-place assembly for increased flexibility in board layouts.

Along with excellent saturation characteristics, low DCR losses, and a 1500-Vdc dielectric withstand voltage between coils, the IHCM-2321AA-10 is well suited for commercial-grade dc-dc converters, EMI filters, and high-current filters for noise suppression in motor control and other circuitry in industrial and telecom applications.

In addition to the standard surface-mount configuration, the IHCM-2321AA-10 offers customizable inductance, impedance, DCR, and current ratings, along with through-hole mounting options. Samples and production quantities of the inductor are available now, with lead times of 12 weeks. For more information, see the product [page](#).



Table. Key device specifications.

Part number	IHCM-2321AA-10
Inductance	90 μH to 480 μH
Common mode impedance (typ.)	380 Ω to 1200 Ω
DC resistance (max.)	0.0015 Ω to 0.0125 Ω
Heat rating current (typ.) <sup>(1)</sup>	8 Adc to 31 Adc
Saturation current (typ.) <sup>(2)</sup>	13 Adc to 35 Adc
Leakage (max.)	2.5 μH to 14.0 μH

(1) Dc current (A) that will cause an approximate ΔT of 40°C. (2) Dc current (A) that will cause L<sub>0</sub> to drop approximately 30%.

## Transformers

### Power Transformers Tout High Isolation In Compact Footprint

[Pulse's](#) PGT646xNL series is an addition to the company's EFD15 power transformers, known for their versatility in dc-dc converter applications. The platform uses an innovative bobbin design to extend the pin-to-core creepage distance to a minimum of 5.1 mm with minimal impact on sizing and employs a first of its class 5+5 pin SMD platform design (22.0 × 16.5 × 11 mm).



Two transformers differentiated by their input voltage range and withstand voltage specification are introduced—the PGT6466NL fulfills the 3000-Vdc application isolation requirement for low voltage input. The high-input-voltage PGT6465NL utilizes the full isolation capability of the extended creepage platform with a 4000-Vrms isolation specification.

“We have been delighted with the market interest in our standard EFD15 platforms and the range of applications into which they have been designed. Unlike the existing transformers in the market where the proximity of the pins to the

core have limited their application to functionally insulated dc-dc conversion, our PGT646x series responds to the ever-present expectation of high isolation needs in applications where board space is at a premium” said Damon Huang, product marketing, Power PBU, Pulse Electronics.

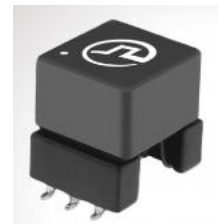
The bobbin design and wire selection allow for winding automation, making this product well suited for high-performance and high reliability applications such as data communications, industrial, and automotive markets that also require a price-competitive solution. For more information, see the PGT646x [datasheet](#).

### Automotive-Grade Flyback Transformer For SiC Device Switching

[Pulse's](#) PM9595NL is the company's first IATF flyback transformer specifically designed for SiC device switching. The 3-W flyback transformer provides a +20 V for device switch-on as well as a -5.5 V for robust switch-off. The extended creepage distance EP7 platform provides 4.3-kV dc withstand voltage in a compact (13-mm x 10-mm x 14-mm) SMD platform. Fully insulated wire (FIW) is utilized for full winding automation to fulfil the requirements of high reliability in automotive applications.

Designed for inverter motor drive circuits driven by high-voltage batteries, this platform satisfies the 8-mm min creepage typical of this application. It complies with IEC 61558-1/2-16 for basic insulation for a working voltage up to 800 V. The wire insulation also complies with reinforced insulation for a working voltage up to 390 V.

“This EP7 platform is already popular in automotive applications, with the PM2190 push-pull series in particular providing isolated power solutions in areas such as a battery management and communications interfaces between different ground planes. A natural evolution of this is to provide the flyback drive power on this platform for the inverter circuit. This AEC-Q200 qualified platform continues to be a trusted solution for the most demanding of applications” said Gerard Healy, product marketing, Specialized Power PBU, Pulse Electronics.



The PM9595NL is compatible with many IC flyback controllers such as the ADI 8301/2, which is also popular in SiC drive applications. As different SiC devices have different voltage and power requirements, contact your Pulse Electronics representative for requirements in this platform as well as solutions on other platforms. Or for more information, see the PM9595NL [page](#).

### Transformer For Battery Management Provides 4300-Vdc Isolation

[Würth Elektronik](#) has added to its product families in the areas of inductors, power transformers, RF components and signal transformers, optoelectronics, as well as MagI<sup>3</sup>C power modules. A transformer for battery management systems is among the highlights.

The WE-BMS transformer for battery management systems is well suited for use in energy storage systems, e-bikes or e-scooters thanks to its galvanic isolation of 4300 VDC for 1 min., high operating voltage of up to 1000 VDC and integrated filter chokes.

The additions also include new sizes in the WE-XHMI storage choke series. For more information, see the [website](#).

## Current Sensors

### Smaller Current Transducers Feature Up To 2-MHz Bandwidth And 200-A Primary Current



[Danisense's](#) DT series current transducers feature ultra-stable, high-precision (ppm class) fluxgate technology and are intended for isolated dc and ac current measurement up to 200 Arms. Benefiting from a considerably reduced size with 60% less volume compared with the previous product generation, the devices feature a large frequency bandwidth of up to 2 MHz and a primary current ranging from 50 A up to 200 A.

DT series current transducers use Danisense's Fluxgate, closed-loop compensated technology with fixed excitation frequency and second harmonic zero flux detection for best-in-class accuracy and stability, according to the vendor. They also feature excellent linearity (better than 2 ppm), an industry-standard DSUB 9-pin connection, a green diode for normal operation indication and a large aperture with a diameter of 20.7 mm for cables and bus bars.

DT series current transducers are well suited for applications such as high precision power supplies for laboratories, accelerators and medical equipment where size is a key factor as designs for such power supplies are getting smaller and smaller to increase power density and reduce costs. Size is also very important for the embedded power measurement application in cars where placing the transducers in a compact motor and inverters environment is always a challenge. The large frequency bandwidth of the DT series is another advantage for such power measurement applications.

For more details of the DT series current transducers, see the [product matrix](#).

### 50-A Current Sense Transformer Suits Kilowatt-Plus Power Supplies

[Pulse's](#) PAS6322 series of current-sense transformers supports current measurement of up to 50 Arms. According to the vendor, the innovative extended ER11.5 bobbin allows for an ultra-low profile and the smallest reinforced insulation, 10-mm creepage solution on the market. The platform measures 12.8 x 20.5 x 7.0 mm and has secondary winding options from 30 T and 0.4 mH up to 200 T and 12 mH, and is capable of effectively measuring frequencies as low as 20 kHz. The part is designed to comply with UL 62368 and is therefore suitable for applications where safety isolation is required.

"We are excited to announce the release of this low-profile current-sense transformer. Our integrated single-turn design simplifies current sensing and reduces complexity of hand placing a bus wire during PCB assembly while still allowing for up to 50 Arms. The low-profile, 5-kVdc isolation, reinforced insulation and capability of up to 10-mm creepage make this part ideal for use in kilowatt-plus LLC and PSFB converters," said David Wiest, product marketing, Power PBU, Pulse Electronics.

Samples are available through the web portal [here](#) or via the Pulse distribution network. For more information, see the PAS6322 [datasheet](#).



## Wireless Power Coils

### Wireless Power Coils Support High Power Levels And High Data Rates

[Würth Elektronik's](#) WE-WPCC WPT/NFC are wireless power coils with an integrated NFC antenna. This range has now been expanded to five models, with receiver coils for transmission powers of up to 30 W, 40 W and 50 W, and transmitters for 100 W and 120 W. The transmitters can be used according to the Qi (5 W and 15 W) and

Air Fuel Alliance standards for charging consumer electronics such as smartphones, smartwatches, wearables, digital cameras or tablets, while also transmitting data for identification or payment applications. At the same time, these coils enable proprietary industrial solutions with higher performance.



Wireless power transmission is particularly interesting when mobile devices are to be encapsulated—for example in medical technology. For this reason, the wireless power coils are designed so that they can also be used outside the above-mentioned standards for consumer electronics. While Würth Elektronik had already introduced a method for transmitting small amounts of data with the inductive field modulation technique, this solution now offers the possibility of transferring data rates of up to 848 kbit/s by combining it with an NFC antenna.

The coils are very efficient at transmitting energy thanks to litz wire and high-quality ferrite material. The high permeability of the shielding concentrates the magnetic field and protects sensitive electronics or batteries from interference signals.

The wireless power coils with NFC antenna are now available from stock with no minimum order quantity. Free samples can be requested. Numerous instructions and tutorials are available on the [product family websites](#).