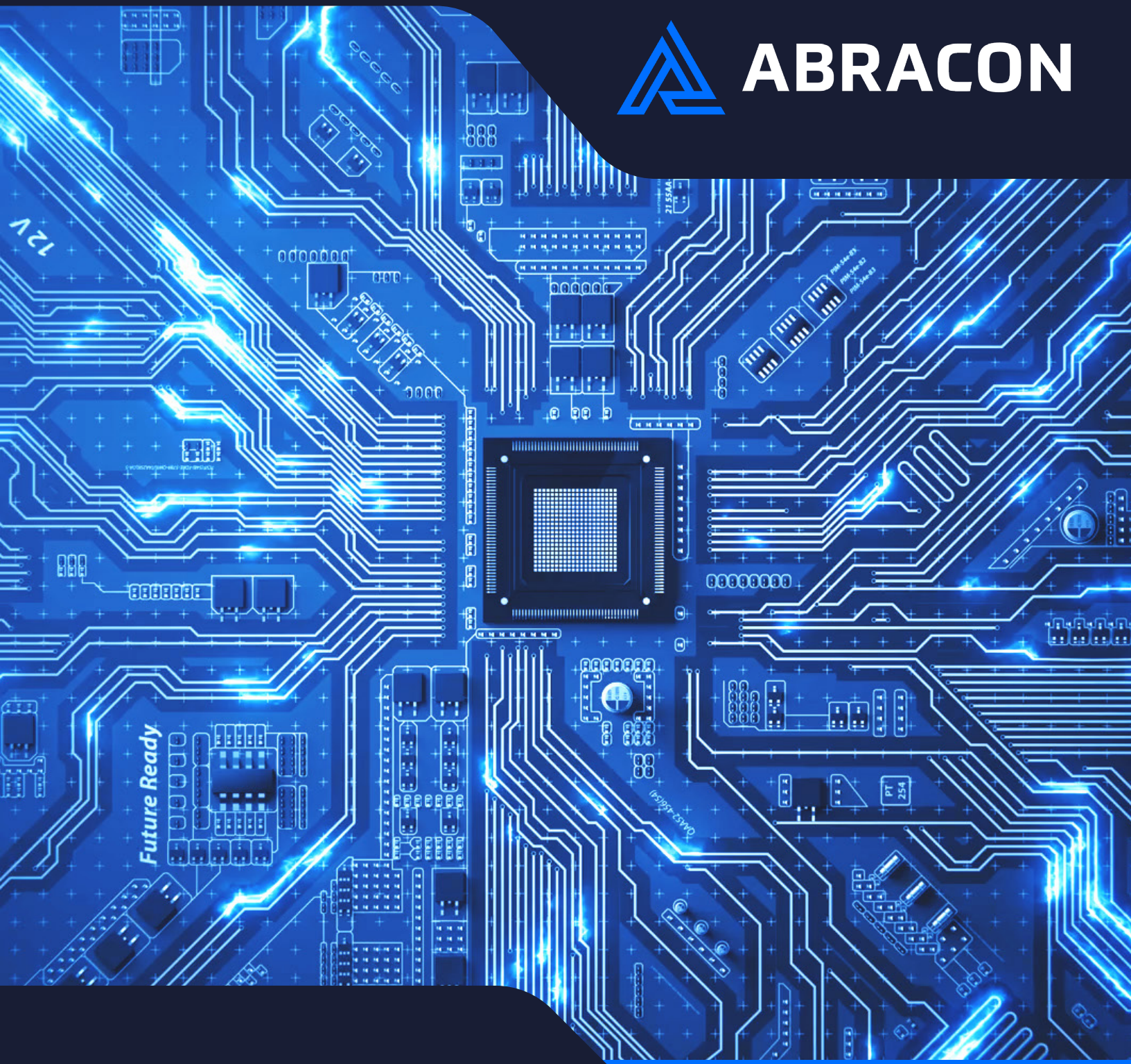
ABRACON



2020

Inductor Catalog

RF | Power

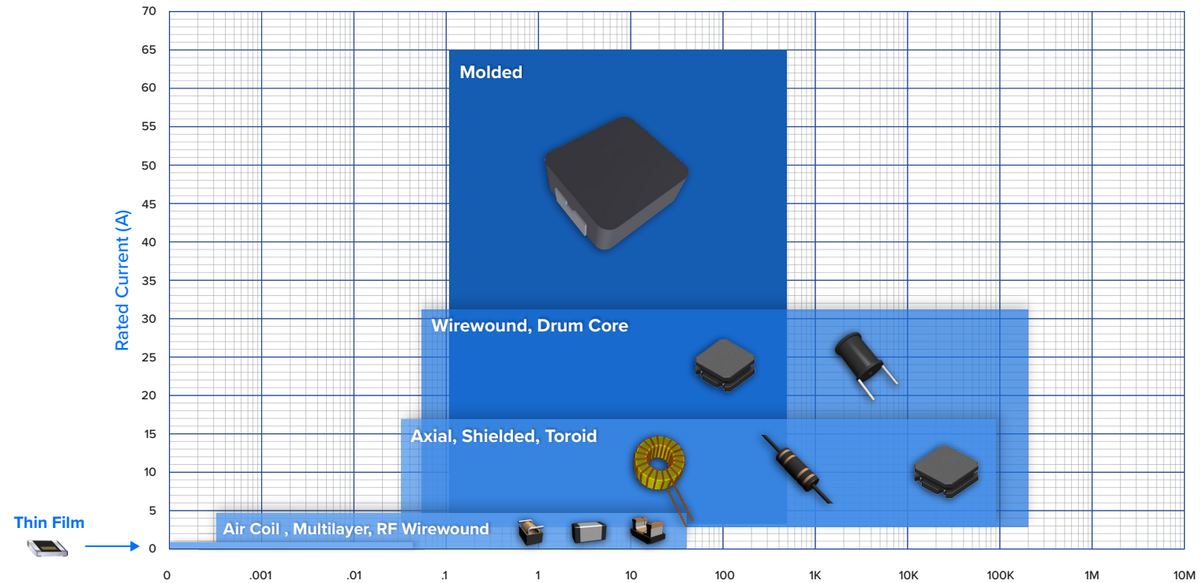
Automotive | Industrial | Commercial

ABRACON

About Abracon

Abracon is a leading global manufacturer of passive and electromechanical timing, synchronization, power, connectivity and RF solutions. Abracon helps engineers transform their ideas into products that meet the opportunities of tomorrow through a broad portfolio of quartz crystals, crystal and MEMS oscillators, real time clocks, power inductors, IoT antennas and more.

INDUCTOR CHART



Abracon Power Inductor Families

SMD				THROUGH-HOLE		
MOLDED	MULTILAYER	WIREWOUND	SHIELDED	AXIAL	DRUM CORE	TOROIDAL
ASPIAIG-F AMPLA AMDLA AMELA ASPIAIG-FLR ASPIAIG-Q ASPIAIG-QLR	AIMC AIML ASMPL ASMPH ASMPM	ASPI	ASPI ASPIAIG-S	AIAM AIAP AIAS	AIRD AISR AIUR	ATCA

Abracon RF Inductor Families

AIR COIL	RF WIREWOUND	THIN FILM
AIAC	AISC AISM	ATFC

ABRACON

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AUTOMOTIVE INDUSTRIES

AUTOMOTIVE INDUSTRIES

- Metal Alloy
- Resin Shielded

METAL ALLOY INDUCTORS

The automotive grade metal alloy inductors support AEC-Q200 grade 0 or 1 (-55°C to +155°C or -40°C to +125°C), PPAP level 3 and TS-16949 qualified manufacturing. A molded inductor is a coil pressed and encapsulated by different types of iron powder mixes. In contrast to traditional wirewound inductors, the molded inductor's magnetic powder material is pressed into a mold around a coil of wire. Molded inductors offer better efficiency, shielding, and power density when compared to all other inductors. A key factor contributing to the increased performance is the complete encapsulation of the core, achieved by using the powder materials to fill in the air gaps around the coils of wire. The encapsulation and material selection provide for superior current capacity and efficiency. Additionally, most molded powders are a metal alloy mix as opposed to ferrite. This allows for much softer inductor saturation.

APPLICATIONS

• **Automotive**: in-dash infotainment system, ADAS, keyless entry, HID/LED exterior lighting (head/tail lights), in-cabin lighting, stereo systems, HVAC controls, battery management systems, on-board diagnostic systems, distance controllers - LIDAR/radar systems, seat heating/cooling

MOLDED FLAT WIRE

MOLDED ROUND WIRE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
							L	W	H
Molded Flat Wire									
ASPIAIG-F4020	0.1-2.2	5.6-18	2.4-38.7	9.6	14.6	-40°C to +125°C	4.1	4.1	1.9
ASPIAIG-FLR4020	0.47-4.7	3.5-12.5	6.8-57.2	8.0	11.7	-40°C to +125°C	4.1	4.1	1.9
ASPIAIG-Q4020	0.1-2.2	5.6-18	2.4-38.7	9.6	14.6	-55°C to +155°C	4.1	4.1	1.9
ASPIAIG-QLR4020	0.47-4.7	3.5-12.5	6.8-57.2	8.0	11.7	-55°C to +155°C	4.1	4.1	1.9
ASPIAIG-F5020	0.15-1.5	8.8-18.8	4.6-18.7	10.5	13.8	-40°C to +125°C	5.5	5.3	1.9
ASPIAIG-F5030	0.15-4.7	5.9-22.2	2.3-36.3	12.2	7.6	-40°C to +125°C	5.5	5.3	2.9
ASPIAIG-F6030	0.18-4.5	7-32	1.8-25.3	18.0	6.1	-40°C to +125°C	6.6	6.4	2.8
ASPIAIG-F6050	1.0-4.7	8-18	4.5-18.4	18.0	4.5	-40°C to +125°C	6.6	6.4	4.8
ASPIAIG-F7020	0.27-1	11-21	3.5-10.8	11.0	10.8	-40°C to +125°C	7.8	7.6	1.9
ASPIAIG-F7030	0.6-8.2	5.9-23	3.2-48.7	21.8	5.0	-40°C to +125°C	7.8	7.6	2.9
Molded Round Wire									
AMDLA3010Q	0.15-10	0.9-8	12-430	2.8	48.0	-55°C to +125°C	3.4	3.0	1.0
AMDLA3020Q	0.22-10	1.3-10	10-260	5.0	30.0	-55°C to +125°C	3.4	3.0	2.0
AMDLA4010Q	0.22-10	1.1-11	12-312	4.2	42.0	-55°C to +125°C	4.4	4.0	1.0
AMDLA4012Q	0.33-4.7	2.2-10	14.5-143	5.2	43.0	-55°C to +125°C	4.4	4.0	1.2
AMDLA4020Q	0.12-22	1.2-15	4.2-320	6.5	20.0	-55°C to +125°C	4.4	4.0	2.0

METAL ALLOY INDUCTORS

The automotive grade metal alloy inductors support AEC-Q200 grade 0 or 1 (-55°C to +155°C or -40°C to +125°C), PPAP level 3 and TS-16949 qualified manufacturing.

APPLICATIONS (CONT.)

• **Automotive**: transmission shifting controllers, drive motors (automated mirrors, windshield wiper controller, window), oil/fuel/water pumps, in-car charging
• **Consumer electronics**: drones, electronic cigarettes, digital cameras
• **Communications**: base stations, set top boxes, modems, servers, routers
• **Healthcare**: wearable medical monitoring equipment, respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizers, EKG machines
• **Industrial**: smart meters, LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, heavy construction equipment, asset tracking
• **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

MOLDED FLAT WIRE

MOLDED ROUND WIRE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ) @ 1µH	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Molded Round Wire									
AMPLA4012Q	0.1-22	0.8-11.5	5.5-1050	4.0	47.0	-55°C to +125°C	4.5	4.1	1.2
AMPLA4020Q	0.1-22	1.2-13.5	4.0-500	5.0	27.0	-55°C to +125°C	4.5	4.1	2.0
AMDLA4530Q	0.1-4.7	4-32	2.1-52	8.5	13.8	-55°C to +155°C	4.9	4.7	3.0
AMPLA5030Q	0.15-22	1.7-18	2.7-250	7.0	14.0	-55°C to +125°C	5.7	5.2	3.0
AMPLA7012Q	0.1-10	1.8-16	4.0-290	6.0	30.0	-55°C to +125°C	7.0	6.6	1.2
AMDLA7030Q	0.15-33	1.8-25	2.1-258	11.0	7.4	-55°C to +155°C	7.3	6.6	3.0
AMPLA7030Q	0.1-47	1.75-32.5	1.7-363	11.0	10.0	-55°C to +125°C	7.3	6.6	3.0
AMPLA7050Q	0.4-22	2.5-23	3.7-170	15.0	6.5	-55°C to +125°C	7.3	6.6	5.0
ASPIAIG-F1040	0.15-82	1.5-43	0.6-320	18.0	3.3	-55°C to +125°C	11.0	10.0	3.8
AMDLA1004Q	0.15-100	2-44	0.6-310	20.0	3.3	-55°C to +155°C	11.0	10.0	4.0
ASPIAIG-F1265	0.15-47	6.5-55	0.6-90	30.0	2.3	-55°C to +125°C	13.5	12.5	6.2
AMDLA1306Q	0.1-100	3.8-60	0.25-161	29.0	1.8	-55°C to +155°C	13.5	12.6	6.5
AMPLA1707Q	0.45-100	5.3-62	0.96-118	52.0	2.0	-55°C to +125°C	17.6	16.9	7.0
AMDLA1707Q	0.47-82	6.5-60	0.9-83	46.0	1.3	-55°C to +155°C	17.8	16.9	6.7
AMDLA2213Q	1.5-100	7.5-48	1.15-40	48.0	1.2	-55°C to +155°C	23.5	22.0	13.0

RESIN SHIELDED INDUCTORS

The automotive grade resin shielded inductors support AEC-Q200 grade 0 or 1 (-55°C to +155°C or -40°C to +125°C), PPAP level 3 and TS-16949 qualified manufacturing. Resin shielded inductors are classified as a partially shielded SMD inductor. A magnetic liquid coats the wirewound wrapped magnetic core. The magnetic liquid is then hardened during a special baking process. Resin shielded inductors are in between shielded and unshielded wirewound inductors in terms of performance and cost. Resin shielded inductors are a good choice for automotive, industrial, medical, and IoT applications requiring compact power conversion with tight budget constraints.

APPLICATIONS

• **Audio/Video**: stereos/speakers, televisions, gaming consoles, virtual reality systems, projectors, amplifiers
• **Consumer electronics**: docking stations, drones, credit card payment systems, E-cigarettes, digital cameras, robotic vacuums, cell phones
• **Communications**: base stations, set top boxes, modems, servers, routers
• **Healthcare**: wearable medical monitoring equipment (blood sugar – glucose, thermometers, finger pulse oximeters), respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizer, EKG machines, LED lighting, rotary mixing machines, vacuum pumps, CT scanners, x-ray machines, electric beds
• **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, heavy construction equipment, asset tracking
• **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

8 SIDED RESIN SHIELDED

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ) @ 1µH	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
8 Sided Resin Shielded									
ASPIAIG-S4035	1.0-150	0.5-4.5	24-2280	4.5	24.0	-40°C to +125°C	4.0	4.0	3.5
ASPIAIG-S6055	3.3-330	0.6-4.6	26-1603	4.6	26.0	-40°C to +125°C	6.0	6.0	5.5
ASPIAIG-S8050	1.0-470	0.6-7.2	10-1540	7.2	10.0	-40°C to +125°C	8.0	8.0	5.0

SMD POWER INDUCTORS

SMD POWER INDUCTORS

- Multilayer
- Plastic Molded
- Metal Alloy
- Resin Shielded
- Sleeve Shielded
- Unshielded

MULTILAYER INDUCTORS

The name multilayer references the construction process of the inductor where layers of ferrite materials are laminated together. Lamination, terminal finish and conductive patterns can vary to optimize for self-resonant frequency (SRF), Q values and DCR specifications. In power applications, the multilayer inductor is used for power conversion in miniaturized devices.

APPLICATIONS

- **Automotive**: tire pressure monitoring systems, electronic throttle control systems (ETC)
- **Consumer electronics**: Bluetooth speakers, E-cigarettes, drones, portable gaming consoles, digital cameras, handheld GPS devices
- **Healthcare**: wearable medical monitoring equipment (blood sugar – glucose, thermometers, finger pulse/oximeters)
- **Wearables**: smart watches, fitness trackers, smart diving watches, exercise wearables

FERRITE MULTILAYER

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A)	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
				@ 1µH			L	W	H
Ferrite Multilayer									
AIML-0402	1-2.7	0.01-0.015	900-2000	0.02	900	-55°C to +125°C	1.0	0.5	0.5
ASMPL-0603	0.22-1	0.8-1.2	150-400	0.80	400	-40°C to +85°C	1.6	0.8	0.5
AIML-0603HC	3.3-4.7	0.06-0.08	400-500	0.08	400	-55°C to +125°C	1.6	0.8	0.8
AIML-0603	0.068-27	0.001-0.05	300-2750	0.03	600	-40°C to +85°C	1.6	0.8	0.8
ASMPH-0603	0.22-4.7	0.065-1.25	130-500	0.80	250	-55°C to +125°C	1.6	0.8	0.8
ASMCI-0603	0.1-10	0.05-0.7	140-900	0.19	200	-40°C to +85°C	1.6	0.8	0.8
ASMPL-0805	0.22-2.2	0.35-1.35	88-400	0.70	238	-40°C to +85°C	2.0	1.3	0.5
AIML-0805	0.047-39	0.004-0.3	200-1500	0.05	400	-55°C to +125°C	2.0	1.3	0.9

MULTILAYER INDUCTORS

The name multilayer references the construction process of the inductor where layers of ferrite materials are laminated together. Lamination, terminal finish and conductive patterns can vary to optimize for self-resonant frequency (SRF), Q values and DCR specifications. In power applications, the multilayer inductor is used for power conversion in miniaturized devices.

APPLICATIONS

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- **Wearables**: smart watches, fitness trackers, smart diving watches, exercise wearables

FERRITE MULTILAYER

METAL ALLOY MULTILAYER

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Ferrite Multilayer									
ASMCI-0805	0.1-10	0.06-1	70-500	0.30	200	-40°C to +85°C	2.0	1.3	1.3
ASMPH-0806	0.47-4.7	0.22-1.6	80-140	1.20	90	-40°C to +85°C	2.0	1.6	0.9
AIML-1008HC	1-4.7	1.1-1.6	85-120	1.60	85	-40°C to +85°C	2.5	2.0	0.9
ASMPH-1008	0.47-4.7	0.32-1.5	40-110	1.40	60	-55°C to +125°C	2.5	2.0	0.9
AIML-1206	0.047-47	0.005-0.3	150-3400	0.10	400	-40°C to +85°C	3.2	1.6	1.1
Metal Alloy Multilayer									
AIML-0805HC	1-10	0.8-1.3	110-300	1.30	110	-40°C to +85°C	2.0	1.3	0.9
ASMPH-0805	0.47-4.7	0.28-1.2	80-250	1.15	110	-40°C to +85°C	2.0	1.3	0.9
ASMPM-0806	0.47-4.7	0.95-3.1	40-360	2.20	70	-40°C to +125°C	2.0	1.6	1.0

PLASTIC MOLDED INDUCTORS

A plastic molded inductor is a wirewound coil encapsulated by a plastic mold. In contrast to traditional wirewound inductors, the molded inductor's plastic material is pressed into a mold around a coil of wire. Plastic molded inductors are a cost competitive alternative to the mixed metal alloy molded inductors. Additionally, they offer superior current capacity and efficiency when compared to unshielded inductors.

APPLICATIONS

- **Audio/Video**: speakers, televisions, gaming consoles, virtual reality systems, projectors
- **Consumer electronics**: drones, E-cigarettes, digital cameras, robotic vacuums, cell phones, tablets
- **Communications**: base stations, set top boxes, modems, servers, routers
- **Healthcare**: wearable medical monitoring equipment (blood sugar – glucose, thermometers, finger pulse/oximeters), respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizer, EKG machines, LED lighting, rotary mixing machines, vacuum pumps, CT scanners, x-ray machines, electric beds
- **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, asset tracking
- **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

MOLDED PLASTIC WIREWOUND

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Plastic Molded Wirewound									
AISM-1008	0.01-100	0.06-0.530	260-21000	0.2	1100	-40°C to +105°C	2.5	2.0	1.8
AISM-1210	0.01-330	0.04-0.45	130-34000	0.4	700	-40°C to +85°C	3.2	2.5	2.2
AISM-1812H	1-330	0.09-1.05	110-13000	1.1	110	-40°C to +125°C	4.5	3.2	3.2
AISM-1812	0.1-820	0.03-0.8	200-43000	0.5	500	-40°C to +85°C	4.8	3.5	3.5
AISM-2220	1-1000	0.085-1.8	30-15000	1.8	30	-25°C to +85°C	5.9	5.3	5.3

METAL ALLOY INDUCTORS

A molded inductor is a coil pressed and encapsulated by different types of iron powder mixes. In contrast to traditional wirewound inductors, the molded inductor's magnetic powder material is pressed into a mold around a coil of wire. Molded inductors offer better efficiency, shielding, and power density when compared to all other inductors. A key factor contributing to the increased performance is the complete encapsulation of the core, achieved by using the powder materials to fill in the air gaps around the coils of wire. The encapsulation and material selection provide for superior current capacity and efficiency. Additionally, most molded powders are a metal alloy mix as opposed to ferrite. This allows for much softer inductor saturation.

APPLICATIONS

- **Audio/Video**: speakers, televisions, gaming consoles, virtual reality systems, projectors
- **Consumer electronics**: drones, E-cigarettes, digital cameras, robotic vacuums, cell phones, tablets

MOLDED FLAT WIRE

MOLDED ROUND WIRE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Molded Flat Wire									
AMELA2010S	0.22-2.2	2-6.5	17-105	3.4	53.0	-55°C to +125°C	2.5	2.0	1.0
AMELA2012S	0.22-2.2	2.4-8.5	13-90	3.7	45.0	-55°C to +125°C	2.5	2.0	1.2
Molded Round Wire									
ASPI-3012HI	0.22-220	0.23-3.5	19-8000	2.6	42.0	-40°C to +85°C	3.0	3.0	1.3
AMDLA3010S	0.15-10	0.9-8	12-430	2.8	48.0	-55°C to +155°C	3.4	3.0	1.0
AMDLA3020S	0.22-10	1.3-10	10-260	5.0	30.0	-55°C to +155°C	3.4	3.0	2.0
ASPI-4020HI	0.47-6.8	2.4-7.5	14-175	6.0	27.0	-55°C to +125°C	4.2	4.4	2.0
AMDLA4010S	0.22-10	1.1-11	12-312	4.2	42.0	-55°C to +155°C	4.4	4.0	1.0
AMDLA4012S	0.33-4.7	2.2-10	14.5-143	5.2	43.0	-55°C to +155°C	4.4	4.0	1.2
AMDLA4020S	0.12-22	1.2-15	4.2-320	6.5	20.0	-55°C to +155°C	4.4	4.0	2.0
AMPLA4012S	0.1-22	0.8-11.5	5.5-1050	4.0	47.0	-55°C to +125°C	4.5	4.1	1.2
AMPLA4020S	0.1-22	1.2-13.5	4-500	5.0	27.0	-55°C to +125°C	4.5	4.1	2.0

METAL ALLOY INDUCTORS

APPLICATIONS (CONT.)

- **Communications**: base stations, set top boxes, modems, servers, routers
- **Healthcare**: wearable medical monitoring equipment (blood sugar – glucose, thermometers, finger pulse oximeters), respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizer, EKG machines, LED lighting, rotary mixing machines, vacuum pumps, CT scanners, x-ray machines, electric beds
- **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, asset tracking
- **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

MOLDED FLAT WIRE

MOLDED ROUND WIRE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Molded Round Wire									
AMDLA4530S	0.1-4.7	4-32	2.1-52	8.5	13.8	-55°C to +155°C	4.9	4.7	3.0
ASPI-0520LR	1-5.6	3.5-7.5	18.5-75	7.5	18.5	-55°C to +125°C	5.6	5.2	2.0
ASPI-0530LR	1.5-5.6	4-7	20-65	7.0	20.0	-55°C to +125°C	5.6	5.2	3.0
ASPI-0530HI	1-2.2	5.5-7	14-35	7.0	14.0	-55°C to +125°C	5.6	5.2	3.0
AMPLA5030S	0.15-22	1.7-18	2.7-250	7.0	14.0	-55°C to +125°C	5.7	5.2	3.0
AMPLA7012S	0.1-10	1.8-16	4-290	6.0	30.0	-55°C to +125°C	7.0	6.6	1.2
ASPI-0630HI	1-10	3-11	10-105	11.0	10.0	-55°C to +125°C	7.2	6.7	3.0
ASPI-0630LR	0.47-22	2.5-18	4.1-167	12.0	9.0	-55°C to +125°C	7.2	6.7	3.0
AMDLA7030S	0.15-33	1.8-25	2.1-258	11.0	7.4	-55°C to +155°C	7.3	6.6	3.0
AMPLA7030S	0.1-47	1.75-32.5	1.7-363	11.0	10.0	-55°C to +125°C	7.3	6.6	3.0
AMPLA7050S	0.4-22	2.5-23	3.7-170	15.0	6.5	-55°C to +125°C	7.3	6.6	5.0

METAL ALLOY INDUCTORS

APPLICATIONS

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MOLDED FLAT WIRE

MOLDED ROUND WIRE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Molded Round Wire									
ASPI-7318	0.1-22	2-30	1.7-230	11.0	10.0	-55°C to +125°C	7.3	6.8	3.0
AMDLA1004S	0.15-100	2-44	0.6-310	20.0	3.3	-55°C to +155°C	11.0	10.0	4.0
AMPLA1004S	0.15-68	2-43	0.6-240	18.0	3.3	-55°C to +125°C	11.0	10.0	4.0
ASPI-1040AHI	0.16-10	7.5-40	0.65-30	18.0	3.3	-55°C to +125°C	11.2	10.0	4.0
ASPI-1040HI	0.22-68	2.5-35	1-195	19.0	3.3	-55°C to +125°C	11.5	10.0	4.0
ASPI-1367	0.1-10	10-60	0.5-18.5	0.0	1.5	-40°C to +125°C	12.9	14.0	6.7
AMPLA1306S	0.15-100	2.5-55	0.6-200	30.0	2.3	-55°C to +125°C	13.5	12.5	6.5
AMDLA1306S	0.1-100	3.8-60	0.25-161	29.0	1.8	-55°C to +155°C	13.5	12.6	6.5
AMPLA1707S	0.45-100	5.3-62	0.96-118	52.0	2.0	-55°C to +125°C	17.6	16.9	7.0
AMDLA1707S	0.47-82	6.5-60	0.9-83	46.0	1.3	-55°C to +155°C	17.8	16.9	6.7
AMDLA2213S	1.5-100	7.5-48	1.15-40	48.0	1.2	-55°C to +155°C	23.5	22.0	13.0

RESIN SHIELDED INDUCTORS

Resin shielded inductors are classified as a partially shielded SMD inductor. A magnetic liquid coats the wirewound wrapped magnetic core. The magnetic liquid is then hardened during a special baking process. Resin shielded inductors are in between shielded and unshielded wirewound inductors in terms of performance and cost. Resin shielded inductors are a good choice for applications requiring compact power conversion with tight budget constraints.

APPLICATIONS

• **Audio/Video**: speakers, televisions, gaming consoles, virtual reality systems, projectors, amplifiers, stereos
• **Consumer electronics**: docking stations, drones, smart home devices/control units, credit card payment systems, E-cigarettes, digital cameras, robotic vacuums, cell phones

12 SIDED RESIN SHIELDED

SQUARE RESIN SHIELDED
ROUND RESIN SHIELDED
8 SIDED RESIN SHIELDED

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Square Resin Shielded									
ASPI-U201610	0.12-4.7	1.25-5.6	15-288	2.6	60	-40°C to +125°C	2.0	1.6	1.0
ASPI-U252010	0.16-4.7	1.4-5	20-240	3.1	50	-40°C to +125°C	2.5	2.0	1.0
ASPI-M3015	0.47-10	1.5-5	27-270	3.8	42	-40°C to +125°C	3.0	3.0	1.5
ASPI-0425	1-220	0.2-3	12-2300	3.0	12	-25°C to +120°C	4.0	4.0	2.5
ASPI-0615FS	0.5-47	0.8-5.2	9-370	4.1	12	-25°C to +120°C	6.0	6.0	2.0
ASPI-0628	0.9-100	0.66-4.6	13-600	4.6	13	-25°C to +120°C	6.0	6.0	2.8
Round Resin Shielded									
ASPI-0645	1-220	0.5-6.5	10-920	6.5	10	-25°C to +120°C	6.0	6.0	4.5
ASPI-0840	0.5-220	0.75-8	6-630	7.9	7	-40°C to +85°C	8.0	8.0	4.0
8 Sided Resin Shielded									
ASPI-0310FS	1-47	0.28-2.3	50-1600	2.3	50	-25°C to +120°C	3.0	3.0	1.0
ASPI-0410FS	1-22	0.36-1.8	100-870	1.8	100	-40°C to +85°C	4.0	4.0	1.0
ASPI-0412FS	0.82-100	0.25-1.65	65-2873	1.7	65	-25°C to +125°C	4.0	4.0	1.2

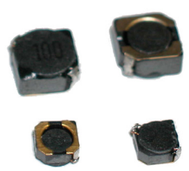
RESIN SHIELDED INDUCTORS

Resin shielded inductors are classified as a partially shielded SMD inductor. A magnetic liquid coats the wirewound wrapped magnetic core. The magnetic liquid is then hardened during a special baking process. Resin shielded inductors are in between shielded and unshielded wirewound inductors in terms of performance and cost. Resin shielded inductors are a good choice for applications requiring compact power conversion with tight budget constraints.

APPLICATIONS (CONT.)

• **Communications**: base stations, set top boxes, modems, servers, routers

• **Healthcare**: wearable medical monitoring equipment (blood sugar – glucose, thermometers, finger pulse/oximeters), respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizer, EKG machines, LED lighting, rotary mixing machines, vacuum pumps, CT scanners, x-ray machines, electric beds



12 SIDED RESIN SHIELDED

SQUARE RESIN SHIELDED
ROUND RESIN SHIELDED
8 SIDED RESIN SHIELDED

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
8 Sided Resin Shielded									
ASPI-0520	1-33	0.9-3.6	21-430	3.6	21	-25°C to +120°C	5.0	5.0	2.0
ASPI-0540	1.5-100	0.65-3.6	20-620	3.6	20	-25°C to +120°C	5.0	5.0	4.0
ASPI-5040S	1.5-47	0.9-3.6	24-372	3.6	24	-25°C to +120°C	5.0	5.0	4.0
ASPI-0612FS	2.5-47	0.46-1.73	90-1050	1.7	90	-25°C to +120°C	6.0	6.0	1.2
ASPI-6045S	0.8-330	0.57-5.9	8-1700	5.1	14	-40°C to +125°C	6.0	6.0	4.5
12 Sided Resin Shielded									
ASPI-2010HC	0.24-10	0.65-3	40-826	2.0	90	-40°C to +125°C	2.0	1.6	1.0
ASPI-2010	0.47-6.8	0.58-2.6	59-816	1.6	114	-40°C to +125°C	2.0	1.6	1.0
ASPI-2012	0.16-33	0.33-2.75	31-2160	1.7	88	-40°C to +125°C	2.0	2.0	1.2
ASPI-2410	0.68-22	0.4-2.5	60-1470	1.9	70	-25°C to +120°C	2.4	2.4	1.0
ASPI-2510	0.47-10	0.56-2.5	38-712	1.8	70	-25°C to +120°C	2.5	2.0	1.0

RESIN SHIELDED INDUCTORS

Resin shielded inductors are classified as a partially shielded SMD inductor. A magnetic liquid coats the wirewound wrapped magnetic core. The magnetic liquid is then hardened during a special baking process. Resin shielded inductors are in between shielded and unshielded wirewound inductors in terms of performance and cost. Resin shielded inductors are a good choice for applications requiring compact power conversion with tight budget constraints.

APPLICATIONS (CONT.)

• **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, asset tracking

• **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

12 SIDED RESIN SHIELDED

SQUARE RESIN SHIELDED
ROUND RESIN SHIELDED
8 SIDED RESIN SHIELDED

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
12 Sided Resin Shielded									
ASPI-2512	0.47-10	0.59-2.15	47-630	1.7	73	-25°C to +120°C	2.5	2.0	1.2
ASPI-M2512	0.24-10	1-4.1	23-480	3.0	48	-40°C to +125°C	2.5	2.0	1.2
ASPI-2515	0.47-10	0.75-2.8	35-445	2.2	49	-25°C to +120°C	2.5	2.0	1.2
ASPI-0312FS	1-47	0.25-1.5	50-1450	1.5	50	-25°C to +120°C	3.0	3.0	1.2
ASPI-3012S	0.82-100	0.17-2.22	30-2860	1.9	40	-40°C to +125°C	3.0	3.0	1.2
ASPI-0315FS	1-100	0.25-2.3	28-2100	2.3	28	-25°C to +120°C	3.0	3.0	1.5
ASPI-0418FS	0.82-220	0.28-4	16-2960	3.7	19	-25°C to +120°C	4.0	4.0	1.8
ASPI-4020S	1-100	0.31-2.15	29-1550	2.2	29	-40°C to +125°C	4.0	4.0	2.0
ASPI-4030S	0.91-120	0.42-4.15	13-1350	4.2	14	-40°C to +125°C	4.0	4.0	3.0
ASPI-8040S	0.82-330	0.64-6.3	10-1156	6.3	10	-40°C to +125°C	8.0	8.0	4.2

SLEEVE SHIELDED INDUCTORS

SLEEVE SHIELDED INDUCTORS

SMD Power Inductors

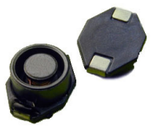
Shielded wirewound inductors come in several different forms of SMD inductors. This inductor type uses a magnetic sleeve to cover the wirewound wrapped magnetic core. This sleeve limits the radiation of magnetic fields resulting from induced current. Shielding is essential to meet FCC and other national emission standards as the industry moves to higher current requiring loads. The shielded sleeve is also important for reducing EMI and limiting the effect of power electronics on nearby sensitive circuitry. The shielded sleeve increases the performance of the inductor in more ways than one. Additional magnetic material around the wire adds higher current density and higher inductance per turn. This allows for a reduction in wire material per inductance. In turn, this decreases the DCR and increases the current handling capabilities. The shielded sleeve inductor delivers a higher performance than unshielded wirewound inductors at a slightly higher cost. Abracon's Type A Sleeve Shielded inductors have electrodes sourced from two sides of the component and Type B Shielded inductors have electrodes sourced from opposite corners of the component.

APPLICATIONS

• **Audio/Video**: speakers, televisions, gaming consoles, virtual reality systems, projectors, amplifiers, stereos

SHIELDED TYPE A WIREWOUND

SHIELDED TYPE B WIREWOUND



TRADITIONAL SHIELDED WIREWOUND

ROUND SHIELDED WIREWOUND

SHIELDED INDUCTOR WITH RESIN SEALING

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Shielded Type A Wirewound									
ASPI-0428S	1.2-180	0.22-2.56	23.6-1540	2.6	23.6	-40°C to +85°C	4.7	4.7	3.0
ASPI-104S	0.56-1000	0.32-10	8-3250	10.0	8.0	-40°C to +125°C	10.4	10.4	4.0
Shielded Type B Wirewound									
ASPI-2D09	1.2-10	0.28-0.8	97.5-537.5	0.8	97.5	-30°C to +100°C	3.2	3.2	1.0
ASPI-2D11	1.5-10	0.35-0.9	68-400	0.9	68.0	-30°C to +100°C	3.2	3.2	1.2
ASPI-2D14	1.5-12	0.62-1.8	63-394	1.8	63.0	-30°C to +100°C	3.2	3.2	1.6
ASPI-2D18L	2.2-47	0.2-0.85	41-660	0.9	41.0	-30°C to +100°C	3.2	3.2	2.0
ASPI-2D18H	1.7-15	0.7-1.85	44-345	1.9	44.0	-30°C to +100°C	3.2	3.2	2.0
ASPI-3D18	1.5-220	0.13-1.55	56-4770	1.6	56.0	-40°C to +85°C	3.8	3.8	1.8
ASPI-4D18	1-180	0.14-1.72	45-4000	1.7	45.0	-40°C to +85°C	4.7	4.7	2.0
ASPI-4D22	1.5-150	0.21-2	18-1350	2.0	18.0	-40°C to +85°C	4.7	4.7	2.4
ASPI-4D28	1.2-180	0.22-2.56	24-1540	2.6	24.0	-40°C to +85°C	4.7	4.7	3.0
ASPI-5D18	4.1-470	0.18-1.95	57-6560	2.0	57.0	-40°C to +85°C	5.7	5.7	2.0
ASPI-5D28	2.2-100	0.42-2.6	18-520	2.6	18.0	-40°C to +85°C	5.7	5.7	3.0
ASPI-6D28	1-330	0.35-6.15	12-2000	6.2	12.0	-40°C to +85°C	6.7	6.7	3.0

APPLICATIONS

• **Consumer electronics**: docking stations, consumer electronics, drones, credit card payment systems, E-cigarettes, digital cameras, robotic vacuums, cell phones

• **Communications**: base stations, set top boxes, modems, servers, routers

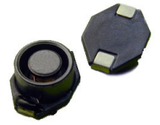
• **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, asset tracking

• **IoT**: industrial IoT, wearables, portable devices, switch mode power supplies (low and high power), Bluetooth speakers, smart home devices/control units, security cameras

• **White Goods**: air conditioners, freezers/refrigerators, washers/dryers, microwave ovens, coffee machines

SHIELDED TYPE A WIREWOUND

SHIELDED TYPE B WIREWOUND



TRADITIONAL SHIELDED WIREWOUND

ROUND SHIELDED WIREWOUND

SHIELDED INDUCTOR WITH RESIN SEALING

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Shielded Type B Wirewound									
ASPI-6D38	3.3-330	0.39-3.5	20-1250	3.5	20.0	-40°C to +85°C	6.7	6.7	4.0
ASPI-8D28	2.5-100	0.78-5.4	27-895	5.4	27.0	-40°C to +85°C	8.3	8.3	3.0
Traditional Shielded Wirewound									
ASPI-0403S	1-6800	0.04-3	40-25000	3.0	40.0	-40°C to +85°C	6.6	4.5	2.9
ASPI-0804TS	1-1000	0.14-8	25-1450	8.0	25.0	-40°C to +85°C	13.0	9.0	5.1
ASPI-1306S	10-1000	0.53-3.9	40-2010	3.9	40.0	-40°C to +85°C	18.5	15.2	7.6
Round Shielded Wirewound									
ASPI-0602S	3-100	0.54-3	24-535	3.0	24.0	-40°C to +85°C	6.7	6.7	3.0
ASPI-0703C	3.3-1000	0.13-1.9	42-6960	1.9	42.0	-20°C to +85°C	7.0	7.0	3.2
Shielded Inductor with Resin Sealing									
ASPI-0703S	2.2-1000	0.16-3.2	32-9440	3.2	32.0	-40°C to +85°C	7.3	7.3	3.2
ASPI-0704S	2.2-1000	0.18-5	28-6000	5.0	28.0	-40°C to +125°C	7.3	7.3	4.5
ASPI-1205S	1.3-1000	0.4-8	12-1530	8.0	12.0	-40°C to +85°C	12.0	12.0	6.0
ASPI-1207S	1-1000	0.7-14	6-1500	14.0	6.0	-40°C to +85°C	12.0	12.0	8.0
ASPI-125B	10-1000	0.4-4	25-1800	4.0	25.0	-30°C to +100°C	12.5	12.5	3.2
ASPI-1204S	3.3-330	0.5-6.5	15-990	6.5	15.0	-40°C to +85°C	12.5	12.5	4.5

UNSHIELDED INDUCTORS

Unshielded wirewound inductors consist of a copper wire wrapped around an SMD magnetic core. This inductor type does not include added shielding properties or increased inductance of added magnetic material around the wire. For this reason, the performance is lower when compared to shielded wirewound inductors. They offer an affordable option for general power conversion applications.

APPLICATIONS

- **Audio/Video**: speakers, televisions, gaming consoles, virtual reality systems, projectors
- **Communications**: base stations, set top boxes, modems, servers, routers
- **Industrial**: smart meters, LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools
- **White Goods**: air conditioners, freezers/refrigerators, washers/dryers, microwave ovens, coffee machines

TRADITIONAL UNSHIELDED WIREWOUND

ROUND UNSHIELDED WIREWOUND INDUCTOR SHIELDED INDUCTOR WITH RESIN SEALING

SQUARE UNSHIELDED WIREWOUND

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 1µH	DCR (mΩ)	OPERATING TEMPERATURE	DIMENSIONS (mm) L	W	H
Traditional Unshielded Wirewound									
ASPI-0810T	22-330	0.6-3	50-700	3.0	50.0	-40°C to +85°C	13.5	9.5	11.5
ASPI-0402T	1-1000	0.07-2.9	50-13800	2.9	50.0	-40°C to +85°C	6.6	4.5	2.9
ASPI-0802T	1-1000	0.1-5.15	24-8400	5.2	24.0	-40°C to +125°C	13.0	9.4	3.0
ASPI-0804T	0.68-2200	0.24-11	8-8200	9.0	9.0	-40°C to +125°C	13.0	9.4	5.2
ASPI-1306T	2.2-1000	0.56-15	14-1800	15.0	14.0	-40°C to +85°C	18.5	15.4	7.5
Round Unshielded Wirewound Inductor									
ASPI-0403H	1-82	0.3-3.8	33-1200	3.8	33.0	-40°C to +125°C	4.5	4.0	3.2
ASPI-0503H	2.2-330	0.28-3.5	30-3200	3.5	30.0	-40°C to +125°C	5.8	5.2	3.2
ASPI-0703	10-330	0.28-1.44	81-1495	1.4	81.0	-40°C to +85°C	7.8	7.0	3.5
ASPI-0705	10-470	0.34-2.3	70-1960	2.3	70.0	-40°C to +85°C	7.8	7.0	5.0
ASPI-1004	10-560	0.32-2.38	53-1904	2.4	53.0	-40°C to +85°C	10.0	9.0	4.0
ASPI-1005	10-1000	0.22-2.6	60-2750	2.6	60.0	-40°C to +85°C	10.0	9.0	5.4
Square Unshielded Wirewound									
AISC-1206H	0.045-100	0.045-1	27-8450	0.2	150.0	-40°C to +85°C	3.2	1.6	1.8
AISC-2220H	0.12-10000	0.05-6	9.8-140000	4.0	27.0	-40°C to +85°C	5.7	5.0	4.7
Shielded Inductor with Resin Sealing									
ASPI-0302	4.7-390	0.115-1.03	230-7800	1.0	230.0	-40°C to +85°C	3.5	3.0	2.3
ASPI-0403	1-68	0.37-2.56	48.7-1117	2.6	48.7	-40°C to +85°C	4.5	4.0	3.2
ASPI-0504	4.7-1000	0.15-3.5	40-14400	3.5	40.0	-40°C to +85°C	5.8	5.2	4.5

RF INDUCTORS

RF INDUCTORS

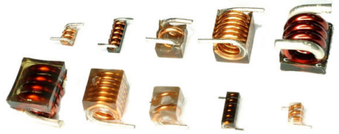
- Air Coil
- Multilayer
- RF Wirewound
- Thin Film

AIR COIL INDUCTORS

Air coils do not have a magnetic core. Most inductors utilize magnetic materials to increase the inductance value per wire winding by increasing magnetic flux densities. Magnetic flux is not always necessary since RF applications require low inductance values for high frequencies. The air coil handles higher current than other RF inductors, such as the multilayer and wirewound types. The rated current is based on the heating of the wire alone since the current is not dependent on the magnetic saturation. The nature of the air coil is thick wire with spaced out windings creating low DCR and low capacitance parasitics. This results in a high Q product useful for RF applications requiring high current.

APPLICATIONS

- **Audio**: audio equipment, amplifiers, stereos/speakers
- **Communications**: telecommunication devices, high frequency communication equipment
- **Other**: proximity sensors, metal sensors, noise suppression for RF power supply, RF filtering, impedance matching



AIR COIL

SERIES	SERIES INDUCTANCE (nH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	SERIES SRF (MHz)	RATED CURRENT (A)	DCR (mΩ)	SRF (MHz)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
					@ 10nH				L	W	H
Air Coil											
AIAC-0805C	3.9-68	0.3-1.2	2.6-42.2	1300-3000	0.9	5.4	3000	-40°C to +125°C	2.9	1.8	2.1
AIAC-1008C	6.8-120	0.3-1.2	4.0-63.4	950-3000	1.0	6.0	3000	-40°C to +125°C	3.2	1.9	2.2
AIAC-1512C	2.5-18.5	4.0-4.8	0.8-3.9	2500-3000	4.2	2.7	3000	-40°C to +125°C	3.3	2.5	2.6
AIAC-1606C	5.6-7.2	1.6-1.6	9.0-10.0	6000-6500	1.6	11.5	5200	-40°C to +125°C	4.0	1.4	1.4
AIAC-1812	22-120	2.2-3.5	4.6-11.1	1100-3200	3.4	3.8	4000	-40°C to +125°C	5.0	6.4	4.2
AIAC-2712C	17.5-43.5	2.5-3.5	4.5-6.7	1000-2200	4.2	3.8	2400	-40°C to +125°C	6.0	2.5	2.6
AIAC-4125C	90-538	2.0-3.5	9.5-42.0	400-1000				-40°C to +125°C	9.0	4.4	4.6

MULTILAYER INDUCTORS

The name multilayer references the construction process of the inductor where layers of ceramic materials are laminated together. Lamination, terminal finish and conductive patterns can vary to optimize for self-resonant frequency (SRF), Q value and DCR specifications. In RF applications, multilayer inductors support higher current ratings and inductance values.

APPLICATIONS

- **Audio/Video**: audio equipment, amplifiers, stereos/speakers, monitors
- **Automotive**: electronic throttle control systems (ETC), tire pressure monitoring systems
- **Consumer electronics**: Bluetooth speakers, E-cigarettes, drones, portable gaming consoles, digital cameras, handheld GPS devices
- **Communications**: telecommunication devices, wireless LAN, cable modems
- **Medical**: medical monitoring devices: blood sugar – glucose, thermometers, finger pulse/oximeters
- **Wearables**: smart watches, fitness trackers, smart diving watches, exercise wearables
- **White goods**: small appliances, coffee machines

CERAMIC MULTILAYER

SERIES	SERIES INDUCTANCE (nH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	SERIES SRF (MHz)	RATED CURRENT (A)	DCR (mΩ)	SRF (MHz)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
					@ 10nH				L	W	H
Ceramic Multilayer											
AIMC-0201	1.5-47	0.05-0.3	240-3600	1600-11000	0.2	800	5500	-55°C to +125°C	0.6	0.3	0.3
AIMC-0402	1.5-120	0.2-0.3	100-2800	600-6000	0.3	420	3200	-55°C to +125°C	1.0	0.5	0.5
AIMC-0402HQ	1.0-15	0.4-1.0	50-220	4000-6000	0.5	180	4500	-55°C to +125°C	1.0	0.6	0.5
AIMC-0603	1.0-270	0.2-0.5	50-2600	350-10000	0.3	260	3400	-40°C to +85°C	1.6	0.8	0.8
AIMC-0805	2.2-220	0.05-0.1	100-2100	350-6000	0.1	300	2100	-40°C to +85°C	2.0	1.3	0.9

RF WIREWOUND INDUCTORS

RF wirewound inductors are recommended for applications that require low cost solutions in a compact package size. RF wirewound inductors offer greater performance in Q value, DCR and current rating over other RF inductors, such as thin film and multilayer types. RF wirewound inductors feature a copper wire wrapped around a core material, typically ceramic or ferrite. Ceramic is a nonmagnetic material with a low expansion thermal coefficient. This allows for superior inductance stability across the operating temperature range. Ferrite core RF wirewound inductors are an affordable option for general power conversion applications. Ferrite wirewound inductors are a good option for high frequency applications requiring high Q values, low DCR values, and minimal core losses.

APPLICATIONS

- **Audio/Video**: audio equipment, amplifiers, stereos/speakers, monitors
- **Automotive**: electronic throttle control systems (ETC), tire pressure monitoring systems
- **Communications**: telecommunication devices, wireless LAN, cable modems
- **White goods**: small appliances, coffee machines
- **Other**: antenna matching, RF matching, RF transceivers

CERAMIC RF WIREWOUND

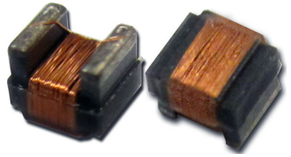
SERIES	SERIES INDUCTANCE (nH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	SERIES SRF (MHz)	RATED CURRENT (A)	DCR (mΩ)	SRF (MHz)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
					@ 10nH				L	W	H
Ceramic RF Wirewound											
AISC-0402HP	2.0-68	0.3-2.1	38-950	1840-8500	1.3	85	4700	-40°C to +125°C	1.0	0.5	0.5
AISC-0402	1.0-150	0.4-1.4	45-2900	1200-12700	0.5	200	3900	-40°C to +125°C	1.2	0.6	0.7
AISC-0603	3.3-560	0.1-0.9	59-8100	650-6000	0.6	130	6000	-40°C to +125°C	1.8	1.1	1.0
AISC-0603HC	1.6-24	1.8-2.4	30-105	2400-12500	2.0	71	3700	-40°C to +125°C	1.8	1.1	1.0
AISC-0603HP	1.7-390	0.2-2.1	33-3800	700-8500	1.4	60	4800	-40°C to +125°C	1.8	1.1	1.0
AISC-0805HQ	2.5-51	1.0-1.6	20-120	1400-6000	1.6	60	3000	-40°C to +125°C	2.3	1.7	1.5
AISC-0805	2.2-1000	0.2-0.6	80-2500	200-6000	0.6	170	4000	-40°C to +125°C	2.3	1.7	1.6
AISC-1008HQ	3.0-100	1.0-1.6	40-160	820-8100	1.3	80	3600	-40°C to +125°C	2.6	2.1	1.7
AISC-1008	4.7-8200	0.2-1.0	80-10700	30-6000	1.0	80	4100	-40°C to +125°C	2.9	2.8	2.3
AISC-1206	3.3-1200	0.3-1.0	70-3200	380-6200	1.0	90	4000	-40°C to +125°C	3.6	2.2	1.5
AISC-1210	3.9-8600	0.2-1.0	50-9000	40-6000	1.0	80	4000	-40°C to +125°C	3.7	3.0	2.7

RF WIREWOUND INDUCTORS

RF wirewound inductors are recommended for applications that require low cost solutions in a compact package size. RF wirewound inductors offer greater performance in Q value, DCR and current rating over other RF inductors, such as thin film and multilayer types. RF wirewound inductors feature a copper wire wrapped around a core material, typically ceramic or ferrite. Ceramic is a nonmagnetic material with a low expansion thermal coefficient. This allows for superior inductance stability across the operating temperature range. Ferrite core RF wirewound inductors are an affordable option for general power conversion applications. Ferrite wirewound inductors are a good option for high frequency applications requiring high Q values, low DCR values, and minimal core losses.

APPLICATIONS

- **Audio/Video**: audio equipment, amplifiers, stereos/speakers, monitors
- **Automotive**: electronic throttle control systems (ETC), tire pressure monitoring systems
- **Communications**: telecommunication devices, wireless LAN, cable modems
- **White goods**: small appliances, coffee machines
- **Other**: antenna matching, RF matching, RF transceivers



FERRITE RF WIREWOUND

SERIES	SERIES INDUCTANCE (nH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	SERIES SRF (MHz)	RATED CURRENT (A)	DCR (mΩ)	SRF (MHz)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
					@ 10nH				L	W	H
Ferrite RF Wirewound											
AISC-0402F	18-200	0.39-1.4	46-470	800-3000				-40°C to +85°C	1.1	0.6	0.6
AISC-0603F	47-22000	0.07-1.2	60-11400	20-2350	0.3	940	410	-40°C to +85°C	1.6	1.0	1.0
AISC-0805F	270-68000	0.04-0.35	600-17500	11-550	0.2	1200	63	-40°C to +125°C	2.3	1.7	1.6
AISC-1008F	330-10000	0.3-0.7	170-3300	40-600	0.4	1800	270	-40°C to +125°C	2.9	2.8	2.3
AISC-1210HS	2200-33000	0.22-0.8	500-5000	20-150	0.7	450	200	-40°C to +85°C	3.2	2.5	1.3

THIN FILM INDUCTORS

Thin-film inductors are manufactured using photolithography similar to the silicon fabrication process. This creates highly precise inductors with low tolerance and high SRF. Thin-film inductors are the preferred choice for RF circuitry such as oscillation circuits, antenna impedance matching and high frequency filtering. The most popular applications for this inductor type include wireless LAN, Bluetooth, GPS, and GSM.

APPLICATIONS

- **Audio**: amplifiers
- **Consumer electronics**: notebooks/laptops, printer/copy/fax machines, digital cameras, headphones, tablets
- **Communications**: wireless LAN, Bluetooth, GPS, cell phones, set top boxes, RF blocking, RF filtering, EMI filtering
- **White goods**: refrigerators, coffee machines
- **Other**: power supplies, voltage-controlled oscillators

THIN FILM

SERIES	SERIES INDUCTANCE (nH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	SERIES SRF (MHz)	RATED CURRENT (A)	DCR (mΩ)	SRF (MHz)	OPERATING TEMPERATURE	DIMENSIONS (mm)		
					@ 10nH				L	W	H
Thin Film											
ATFC-0201	0.1-10	0.08-0.4	200-3500	2000-9000	0.1	3500	2000	-25°C to +85°C	0.6	0.3	0.23
ATFC-0201HQ	0.1-4	0.35-0.85	50-400	6000				-40°C to +85°C	0.6	0.3	0.23
ATFC-0402	0.2-33	0.075-0.8	100-4500	2500-14000	0.2	1350	4500	-40°C to +85°C	1.0	0.5	0.32
ATFC-0402HQ	1.3-4.7	0.33-0.73	120-500	7000				-40°C to +85°C	1.0	0.5	0.32

LEADED POWER INDUCTORS

LEADED POWER INDUCTORS

- Axial
- Drum Core
- Toroid

AXIAL INDUCTORS

The name axial describes the lead locations on the inductor. Copper wire is wrapped around a ferrite magnetic core and the leads are located at opposite ends of the inductor rather than together from the same end. The axial inductors include a coat of epoxy to increase durability and performance. The color bands printed on the exterior of the inductor help identify the inductance value. Axial inductors support high current ratings and a wide range of inductance values making them suitable for both RF and power applications. Axial inductors are a recommended cost-competitive solution for applications with loose performance requirements.

APPLICATIONS

- **Audio**: amplifiers, speakers, audio equipment
- **Consumer electronics**: wearables and other small personal devices
- **Communications**: telecommunication devices
- **IoT**: smart lighting, smart metering, smart appliances
- **White goods**: small appliances, microwaves, toaster ovens, coffee machines
- **Other**: low power switch mode power supplies, DC/DC converters

CONFORMAL COATED AXIAL

EPOXY COATED AXIAL

MOLDED AXIAL

UL SHRINK WRAP AXIAL

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (Ω)	RATED CURRENT (A) @ 100µH	DCR (Ω)	OPERATING TEMPERATURE	DIMENSIONS (mm) DIAMETER	DIMENSIONS (mm) H
Conformal Coated Axial								
AICC-00	0.22-220	0.04-0.40	0.40-20	0.04	12000	-25°C to +105°C	2.5	4.1
AICC-01	0.22-1000	0.04-0.40	0.40-33	0.09	7000	-25°C to +105°C	3.1	7.1
AICC-02	0.27-1000	0.06-1.11	0.08-26	0.17	3800	-25°C to +105°C	2.8	6.2
AICC-03	0.22-1000	0.10-0.98	0.17-14	0.28	1800	-25°C to +105°C	3.3	9.5
AICC-04	0.1-1000	0.01-1.38	0.08-27.4	0.08	4100	-25°C to +105°C	3.0	7.6
Epoxy Coated Axial								
AIAP-01	1.0-10000	0.05-3.30	0.02-85	0.55	670	-40°C to +105°C	3.3	9.1
Molded Axial								
AIAM-01	0.022-1000	0.03-2.40	0.03-72	0.08	8000	-55°C to +105°C	2.4	6.4
AIAS-03	100-100000	0.01-0.12	3.12-678	0.12	3120	-55°C to +125°C	4.1	10.4
UL Shrink Wrap Axial								
AIAP-02	3.9-18000	0.09-7.30	0.02-48.3	1.20	208	-40°C to +85°C	6.4	14.0
AIAP-05	3.9-18000	0.04-1.28	0.02-48.3	0.63	208	-55°C to +130°C	6.4	17.8
AIAP-03	3.9-120000	0.07-15.50	0.01-71.7	2.79	90	-55°C to +125°C	11.4	22.9

DRUM CORE INDUCTORS

The drum core inductor is a wirewound, through-hole component with visual characteristics of a traditional drum. These inductors come unshielded, shielded or in heat shrink tubing. The drum core is designed for high inductance filtering or power conversion at frequencies below 100KHz. These types are generally larger and taller than a SMD product because of the number of turns needed to achieve high inductance values. The leads of the inductor reduce the risk of vibrations or handling from demounting the product which could happen in high inductance SMD product. This product will be found closer to the power line side of electronics.

APPLICATIONS

- **Audio/Video**: speakers, televisions, stereos, amplifiers, projectors
- **Consumer electronics**: drones, E-cigarettes, robotic vacuums
- **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, commercial/industrial lighting
- **White goods**: Air conditioners, freezers/refrigerators, washers/dryers, microwave ovens, coffee machines

UNSHIELDED WIREWOUND DRUM CORE

UNSHIELDED WIREWOUND DRUM CORE 4 PIN

UL SHRINK WRAP DRUM CORE

UL SHRINK WRAP DRUM CORE 4 PIN

MOLDED DRUM CORE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (Ω)	RATED CURRENT (A) @ 100µH	DCR (Ω)	OPERATING TEMPERATURE	DIMENSIONS (mm) DIAMETER	DIMENSIONS (mm) H
Unshielded Wirewound Drum Core								
AIUR-07	10-1000	0.10-1.05	0.1-6.3	0.39	660	-55°C to +125°C	6.0	4.6
AIUR-10	5.6-10000	0.10-2.45	0.08-25	0.77	440	-55°C to +125°C	8.0	7.5
AIUR-15	22-1000	1.0-5.7	0.03-0.71	3.20	82	-25°C to +85°C	18.0	20.0
Unshielded Wirewound Drum Core 4 pin								
AIUR-09	10-1000	0.36-3.6	0.044-3.3	1.30	360	-55°C to +125°C	10.0	6.0
UL Shrink Wrap Drum Core								
AIUR-16	3.9-33000	0.03-1.3	0.02-100	0.49	270	-25°C to +85°C	7.0	9.5
AIUR-12	10-4700	0.07-1.5	0.07-18	0.66	500	-25°C to +85°C	7.2	10.5
AIUR-01	100-15000	0.02-0.2	2-80	0.20	2000	-25°C to +85°C	8.5	7.5
AIUR-05	2.2-1500	0.15-3	0.012-3.5	0.59	230	-25°C to +85°C	8.5	9.0
AIUR-04	100-27000	0.30-0.20	2-80	0.20	2000	-25°C to +85°C	8.5	11.2
AIUR-02H	1-2200	0.10-3.5	0.021-3	0.72	210	-25°C to +85°C	8.5	12.0
AIUR-03	1-1000	0.22-3.5	0.013-2.9	0.72	280	-25°C to +85°C	9.0	12.0
AIUR-11	3.9-68000	0.04-1.6	0.022-115	1.00	180	-40°C to +85°C	9.5	11.4

DRUM CORE INDUCTORS

The drum core inductor is a wirewound, through-hole component with visual characteristics of a traditional drum. These inductors come unshielded, shielded or in heat shrink tubing. The drum core is designed for high inductance filtering or power conversion at frequencies below 100KHz. These types are generally larger and taller than a SMD product because of the number of turns needed to achieve high inductance values. The leads of the inductor reduce the risk of vibrations or handling from demounting the product which could happen in high inductance SMD product. This product will be found closer to the power line side of electronics.

APPLICATIONS

• **Audio/Video**: speakers, televisions, stereos, amplifiers, projectors

• **Consumer electronics**: drones, E-cigarettes, robotic vacuums

• **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, commercial/industrial lighting

• **White goods**: Air conditioners, freezers/refrigerators, washers/dryers, microwave ovens, coffee machines

UNSHIELDED WIREWOUND DRUM CORE

UNSHIELDED WIREWOUND DRUM CORE 4 PIN

UL SHRINK WRAP DRUM CORE

UL SHRINK WRAP DRUM CORE 4 PIN

MOLDED DRUM CORE

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (Ω)	RATED CURRENT (A) @ 100µH	DCR (Ω) @ 100µH	OPERATING TEMPERATURE	DIMENSIONS (mm) DIAMETER	DIMENSIONS (mm) H
UL Shrink Wrap Drum Core								
AIUR-06	3.9-15000	0.10-6.5	0.016-20.5	2.10	108	-25°C to +85°C	13.0	18.0
AIRD-01	1-680	0.80-9	0.003-0.7	2.80	95	-25°C to +85°C	16.5	21.0
AIRD-02	1-2200	0.80-11.4	0.003-1.54	4.00	80	-25°C to +85°C	21.0	21.0
AIRD-06	1-2200	0.80-11.4	0.003-1.54	4.00	80	-25°C to +85°C	21.0	21.0
AIRD-03	1-19000	0.50-21	0.003-9	9.00	34	-25°C to +85°C	28.0	21.0
UL Shrink Wrap Drum Core 4 pin								
AIUR-08	10-1000	0.53-5.3	0.023-1.7	1.70	160	-25°C to +85°C	11.0	11.0
Molded Drum Core								
AISR-875	10-10000	0.08-2.9	0.05-33	0.89	280	-55°C to +125°C	7.8	7.5
AISR-01	1000-120000	0.01-0.09	3.4-97	N/A	N/A	-25°C to +85°C	10.5	10.5
AISR-04	10-1000	0.01-0.0039	0.02-1.5	0.00	190	-25°C to +85°C	10.5	10.5

TOROID INDUCTORS

Toroidal inductors use toroid shaped magnetic cores with copper windings. Although it is wirewound, it is not categorized as such because of its distinguishable shape. This inductor is often referred to as shielded because the shape of the core. It results in minimized magnetic leakage similar to that of a shielded wirewound inductor. These through-hole components work best for high inductance applications at low frequencies such as switching regulators, refrigerators and medical devices. There are inherent difficulties in the production of this product that results in cost disadvantages. Drum core inductors are often used as a substitute when applicable.

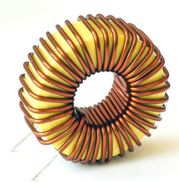
APPLICATIONS

• **Audio/Video**: high end audio equipment, amplifiers, wired headphones, digital mixing boards, sound board mixers, televisions

• **Industrial**: agricultural/utility/resource monitoring (smart meters), LED drivers, manufacturing line robotics, fuel/oil/water pumps, motor controllers, machine/power tools, vending machines, solar inverters, drones, heavy construction equipment, commercial/industrial lighting

• **Medical**: respiratory ventilators, surgical machines, electric wheelchairs, exercise equipment, equipment sterilizer, EKG machines, medical LED lighting, rotary mixing machines, vacuum pumps, CT scanners, x-ray machines, electric beds

• **White goods**: Air conditioners, freezers/refrigerators, washers/dryers, microwave ovens, coffee machines, robotic vacuums



TOROID

SERIES	SERIES INDUCTANCE (µH)	SERIES CURRENT RATING (A)	SERIES DCR (mΩ)	RATED CURRENT (A) @ 100µH	DCR (mΩ) @ 100µH	OPERATING TEMPERATURE	DIMENSIONS (mm) DIAMETER	DIMENSIONS (mm) H
Toroid								
ATCA-01	0.02-220	1-3	21-190	2.00	81	-40°C to +105°C	18.0	11.5
ATCA-02	22-470	1-5	14-286	2.50	57	-40°C to +105°C	22.0	12.5
ATCA-03	25-230	1-5	16-159	3.50	46	-40°C to +105°C	24.0	11.5
ATCA-04	50-960	1-5	22-438	5.00	33	-40°C to +105°C	27.0	13.5
ATCA-05	90-1800	1-5	34-680	4.20	39	-40°C to +105°C	30.0	17.0
ATCA-06	82-1300	1-5	33-585	4.00	42	-40°C to +105°C	32.0	16.0
ATCA-07	30-850	2-10	9-211	5.00	36	-40°C to +105°C	36.0	19.5
ATCA-08	75-680	5-10	14-105	8.50	22	-40°C to +105°C	36.0	19.5

INDUCTOR APPLICATION NOTE
INDUCTOR TYPES

OVERVIEW

Inductors are available in a variety of package sizes and construction types. The materials and processes used in the construction of an inductor can give the component certain properties, such as package size, electrical performance or cost, that can be advantageous or required for certain applications. Abracon's available inductor types are outlined below. Inductor type is an essential consideration when selecting the appropriate component for an application.

Air Coil

Air coils do not have a magnetic core. Most inductors utilize magnetic materials to increase the inductance value per wire winding by increasing magnetic flux densities. Magnetic flux is not always necessary since RF applications require low inductance values for high frequencies. The air coil handles higher current than other RF inductors, such as the multilayer and wirewound types. The rated current is based on the heating of the wire alone since the current is not dependent on the magnetic saturation. The nature of the air coil is thick wire with spaced out windings creating low DCR and low capacitance parasitics. This results in a high Q product useful for RF applications requiring high current.

Axial

The name axial describes the lead locations on the inductor. Copper wire is wrapped around a ferrite magnetic core and the leads are located at opposite ends of the inductor rather than together from the same end. The axial inductors include a coat of epoxy to increase durability and performance. The color bands printed on the exterior of the inductor help identify the inductance value. Axial inductors support high current ratings and a wide range of inductance values making them suitable for both RF and power applications. Axial inductors are a recommended cost-competitive solution for applications with loose performance requirements.

Drum Core

The drum core inductor is a wirewound, through-hole component with visual characteristics of a traditional drum. These inductors come unshielded, shielded or in heat shrink tubing. The drum core is designed for high inductance filtering or power conversion at frequencies below 100KHz. These types are generally larger and taller than a SMD product because of the number of turns needed to achieve high inductance values. The leads of the inductor reduce the risk of vibrations or handling from demounting the product which could happen in high inductance SMD product. This product will be found closer to the power line side of electronics.

INDUCTOR APPLICATION NOTE
INDUCTOR TYPES

Multilayer

The name multilayer references the construction process of the inductor where layers of ceramic materials are laminated together. Lamination, terminal finish and conductive patterns can vary to optimize for self-resonant frequency (SRF), Q value and DCR specifications. In RF applications, multilayer inductors support higher current ratings and inductance values. In power applications, the multilayer inductor is used for power conversion in miniaturized devices.

Plastic Molded

A plastic molded inductor is a wirewound coil encapsulated by a plastic mold. In contrast to traditional wirewound inductors, the molded inductor's plastic material is pressed into a mold around a coil of wire. Plastic molded inductors are a cost competitive alternative to the metal alloy mixed molded inductors. Additionally, they offer superior current capacity and efficiency when compared to unshielded inductors.

Metal Alloy

A molded inductor is a coil pressed and encapsulated by different types of iron powder mixes. In contrast to traditional wirewound inductors, the molded inductor's magnetic powder material is pressed into a mold around a coil of wire. Molded inductors offer better efficiency, shielding, and power density when compared to all other inductors. A key factor contributing to the increased performance is the complete encapsulation of the core, achieved by using the powder materials to fill in the air gaps around the coils of wire,. The encapsulation and material selection provide for superior current capacity and efficiency. Additionally, most molded powders are a metal alloy mix as opposed to ferrite. This allows for much softer inductor saturation.

Resin Shielded

Resin shielded inductors are classified as a partially shielded SMD inductor. A magnetic liquid coats the wire wound wrapped magnetic core. The magnetic liquid is then hardened during a special baking process. Resin shielded inductors are in between shielded and unshielded wirewound inductors in terms of performance and cost. Resin shielded inductors are a good choice for applications requiring compact power conversion with tight budget constraints.

RF Wirewound

RF wirewound inductors are recommended for applications that require low cost solutions in a compact package size. RF wirewound inductors offer greater performance in Q value, DCR and current rating over other RF inductors, such as thin film and multilayer types. RF wirewound inductors feature a copper wire wrapped around a core material, typically ceramic or ferrite. Ceramic is a nonmagnetic material with a low expansion thermal coefficient. This allows for superior inductance stability across the operating temperature range. Ferrite core RF wirewound inductors are an affordable option for general power conversion applications. Ceramic wirewound inductors are a good option for high frequency applications requiring high Q values, low DCR values, and minimal core losses.

INDUCTOR APPLICATION NOTE

INDUCTOR TYPES

Sleeve Shielded

Shielded wirewound inductors come in several different forms of SMD inductors. This inductor type uses a magnetic sleeve to cover the wirewound wrapped magnetic core. This sleeve limits the radiation of magnetic fields resulting from induced current. Shielding is essential to meet FCC and other national emission standards as the industry moves to higher current requiring loads. The shielded sleeve is also important for reducing EMI and limiting the effect of power electronics on nearby sensitive circuitry. The shielded sleeve increases the performance of the inductor in more ways than one. Additional magnetic material around the wire adds higher current density and higher inductance per turn. This allows for a reduction in wire material per inductance. In turn, this decreases the DCR and increases the current handling capabilities. The shielded sleeve inductor delivers a higher performance than unshielded wirewound inductors at a slightly higher cost.

Thin Film

Thin-film inductors are manufactured using photolithography similar to the silicon fabrication process. This creates highly precise inductors with low tolerance and high SRF. Thin-film inductors are the preferred choice for RF circuitry such as oscillation circuits, antenna impedance matching and high frequency filtering. The most popular applications for this inductor type include wireless LAN, Bluetooth, GPS, and GSM.

Toroidal

Toroidal inductors use toroid shaped magnetic cores with copper windings. Although it is wirewound, it is not categorized as such because of its distinguishable shape. This inductor is often referred to as shielded because the shape of the core. It results in minimized magnetic leakage similar to that of a shielded wirewound inductor. These through-hole components work best for high inductance applications at low frequencies such as switching regulators, refrigerators and medical devices. There are inherent difficulties in the production of this product that results in cost disadvantages. Drum core inductors are often used as a substitute when applicable.

Unshielded

Unshielded wirewound inductors consist of a copper wire wrapped around an SMD magnetic core. This inductor type does not include added shielding properties or increased inductance of added magnetic material around the wire. For this reason, the performance is lower when compared to shielded wirewound inductors. They offer an affordable option for general power conversion applications.

To read the full white paper, visit abracon.com

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KEY MARKET SEGMENTS AND APPLICATIONS

Automotive · Communications · IoT · Wearables · Industrial · Data Center · Medical · Test & Measurement

Why Abracon?

Abracon is the critical link connecting high-quality factories, a global network of electronic component distributors, and 25,000 end customers requiring highly engineered solutions and design input. An in-house engineering team, a technology-leadership focus and a unique solution-selling approach provide ongoing benefits across the channel. Abracon's carefully developed long-term NPI strategy focuses on designing and launching revolutionary and proprietary new products.

A technical approach results in strong demand generation through early design involvement with OEMs, often gaining print on reference design positions and products that are "spec'd in."

- Strategic Factory Partner Relationship
- Superior Product Breadth
- Unmatched Channel Access
- Leading Engineering and Design Capabilities

Timing & Synchronization

Quartz Crystals (XTAL)
MHz or kHz, SMD or through-hole

Quartz Oscillators (XO)
MHz or 32.768kHz, SMD or through-hole

Real Time Clock (RTC)
Lowest power, highly integrated & accurate

MEMS Oscillators
General purpose or high performance

Precision Quartz (XO/VCXO/TCXO/OCXO)
Accurate temp compensation, low jitter/ noise

Power & Energy

Low Profile Shielded Inductors
Medium to high power, high temperature

Molded Inductors
High current, high efficiency, low profile

High Power Toroid
Inherent immunity to EMI, high temperature

Drum Core Inductors
Ideal for high power applications

Chip Inductors
Low profile and compact, saves space with high current carrying capability

Wireless Charging Coils
Reliable, efficient, eliminates power connectors

RF & Connectivity

Chip Antennas
Improve RF range, sensitivity compared to PCB antennas

Patch Antennas
Best sensitivity vs size compromise

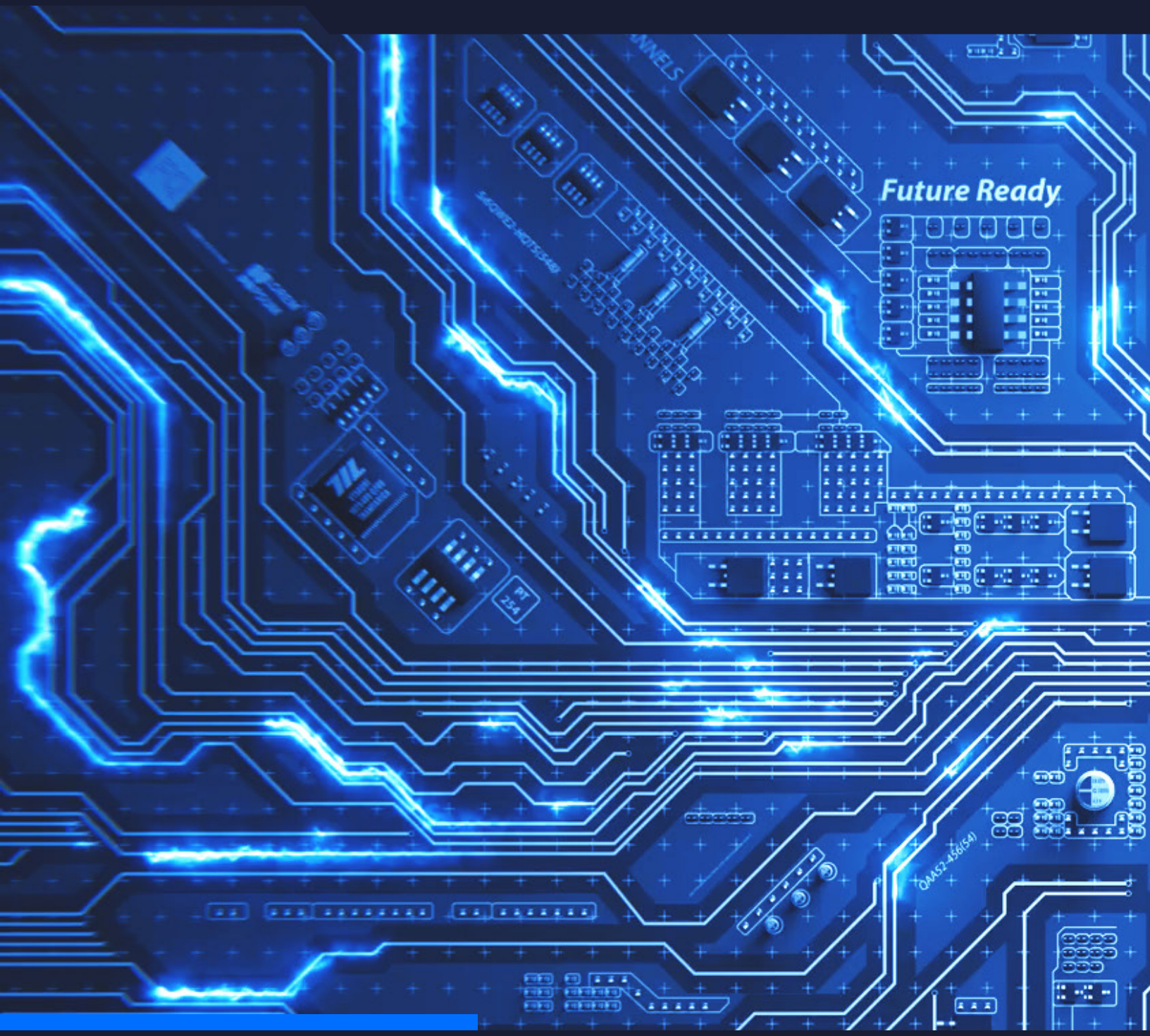
External Antennas
Best sensitivity and range performance

Flexible Antennas
Low profile, multi-band, easy installation

RJ45
With integrated magnetics
PoE, 10G to 100Mbps, SMD/PIH

RFID
Antennas and fully integrated tags

25,000+	300 Million	70,000+	27
Active Customers	Parts Shipped Annually	SKUs	Distributors



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