



2023 Q3 QBR Magnetics-Standard Power Product Report

Jems&Arvin

謙虛，熱情，專業效率，協同合作

Humility , Enthusiasm, Professionalism & Efficiency, Collaboration

YAGEO
Group

2023/06

AGENDA

- ◆ New product introduction
- ◆ Magnetics-Standard Power Product Overview
- ◆ Product Roadmap
- ◆ Capacity Overview
- ◆ 2023 Growth Engines



New product introduction (Mini-Molding)

BEBE Series

- Size: 1.4x1.2 mm – 3.0x3.0 mm
- Height 0.65mm-1.2mm
- Inductance 0.11 μ H – 2.2 μ H
- RDC 12 m Ω - 90 m Ω
- Isat up to 9A, Irms upto 8A
- Patent Pending



BEBE1412 approved by Qualcomm (Y2020/2)
BEBE1412 design in MTK (Y2021)
BEBE2012 design in CPU chipset (Y2022/3)

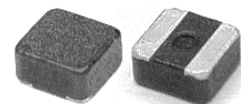
Applications:

- Smartphone, Tablet, NB
- Wearable device,
- 5G/Wi-Fi Module

BESP- DDR5 Power Inductors

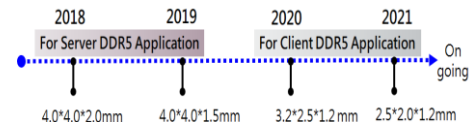
- Size 2.5x2.0 mm – 4.0x4.0mm
- Inductance 0.47 μ H-1.5 μ H
- Low RDC 4.5 m Ω - 32 m Ω
- Isat upto 9.2A, Irms upto 10.5A
- Low AC/DC losses
- Meet JEDEC specifications

JEDEC



Applications:

- DDR5 power for Server/Client
- Desktop PC, NB, Tablet, Mobile



BDCC/BDQQ - Current Inductors

- Size 1.4x1.2mm – 2.5x2.0mm
- Height from 0.65mm
- Inductance 0.24 μ H-2.2 μ H
- RDC 22m Ω - 29 m Ω
- Isat upto 5.5A, Irms upto 4.2A
- Half L-shape & Bottom terminations
- Automotive Grade



Applications:

- Smartphones, Tablet, Notebook
- Wearable devices
- DC-DC modules

BQJM – Thin Film Power Inductors

- Size: 1.0x0.5 mm – 2.0x1.2mm
- Height 0.55 mm - 1.0 mm
- Inductance 0.005 μ H – 2.2 μ H
- RDC 1.5 m Ω - 310 m Ω
- Isat up to 12 A, Irms up to 7.4 A
- Low Profile, Small size



Applications:

- Wearable Device
- PMIC/ power module
- mmWave Antenna Modules

New product introduction (Large-Molding)

BMBx / BMEx Low RDC Inductors

- Size: 4x4 mm – 10x10mm
- Inductance 0.1 μ H – 8.2 μ H
- RDC 1 m Ω - 78 m Ω
- Flat wire winding
- Isat upto 37A, Irms upto 40A
- **Automotive version AFSI series**



BMBx Series

BMEx Series

Applications:

- High efficiency DCDC
- High Power density

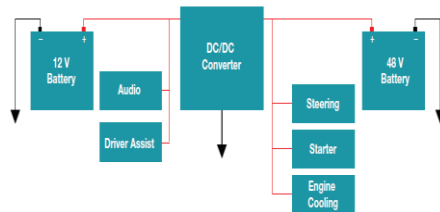
AMHP - High Voltage Inductors

- Size 6x6mm
- Inductance 0.68 μ H – 4.7 μ H
- RDC 5.7 m Ω - 31.9 m Ω
- Isat up to 20A, Irms up to 13 A
- **High Temp to 155C**
- **Withstand Voltage 70V**



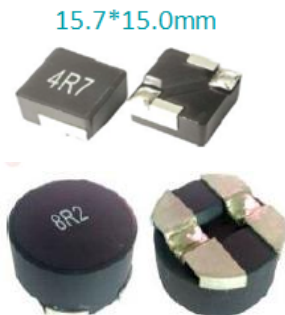
Applications:

- Mild Hybrid
- Automotive LED lighting
- High Vin DCDC



AP3Y - Ultra High Current Inductors

- Size 15x15 – 30x30mm
- Height 1.0-18mm
- Inductance 1uH-68uH
- RDC 1.8m Ω - 61 m Ω
- Isat upto 100A, Irms upto 40A
- Extremely Low RDC



15.7*15.0mm

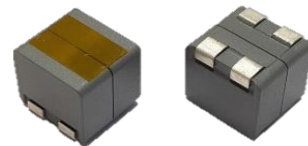
29.5*29.5mm

Applications:

- High Power DCDC
- Automotive
- THT Toroidal Choke replacement

AMDU - Dual Inductors in single package

- Size: 6.9 x 7.7 mm , 10.2 x 9.4 mm
- Height 7.3 mm , 10.85 mm
- Inductance 10 μ H – 22 μ H
- RDC 24 m Ω - 134 m Ω
- Isat up to 7.5 A, Irms up to 4.8 A
- Space saving, High reliability



Applications:

- Class D Audio Amp
- High Power density DCDC

New product introduction (Large-Molding2)

Description

Low profile & High inductance
molded power inductor

Features

Inductance up to 10 μ H
1.0/1.2mm height

Available part

4 x 4 x 1mm, 4 x 4 x 1.2mm,
4.7 μ H-10 μ H



Application - DC/DC converter for CPU in Notebook PC

- Thin type on-board power supply module for exchanger
- Voltage Regulator Module (VRM)
- Boost converter of LED driver

Advantages: (1) Flat wire design and self-developed powder, get better characteristic in molded inductors.
(2) Better capacity and delivery speed. (250KK/M capacity in 4*4 $\uparrow$ series)

Part number	L*W(mm*mm)	H(mm)	L0(μ H) $\pm 20\%$	DCR(m Ω)		I _{rms} (A)		I _{sat} (A)	
				Typ	Max	Typ	Max	Typ	Max
BMNI000404104R7MQX	4.1*4.1	1.0	4.7	135	160	2.6	2.3	2.5	2.1
BMNI000404106R8MQX	4.1*4.1	1.0	6.8	210	255	2	1.8	2.3	1.85
BMNI00040410100MQX	4.1*4.1	1.0	10	280	336	1.75	1.5	1.85	1.65
BMNI000404124R7MEX	4.1*4.1	1.2	4.7	94	113	2.9	2.6	2.5	2.2
BMNI00040412100MEX	4.1*4.1	1.2	10	200	240	1.8	1.6	1.6	1.4
BMME000404124R7MEX	4.4*4.2	1.2	4.7	124	145	2.4	2.1	3.2	2.8
BMME000404126R8MEX	4.4*4.2	1.2	6.8	300	355	1.7	1.5	2.7	2.3



VRM



LED driver

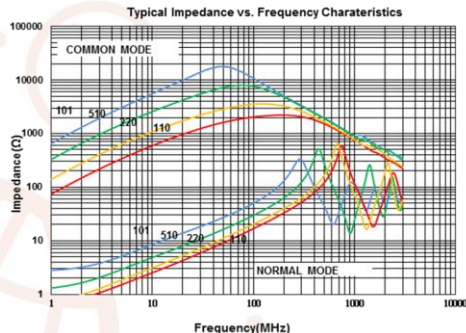
Common Mode Choke Products (Signals)

CMC for CAN Bus - AWCU332523_XG0 Series

- Size 3.3x2.5x2.5mm
- Inductance 11uH-100uH
- Meets IEC62228-3 Class I
- Meets AEC-Q200 standards
- Operating temp -50C to 150C

Applications:

- Automotive
- Industrial systems
- High Power Systems



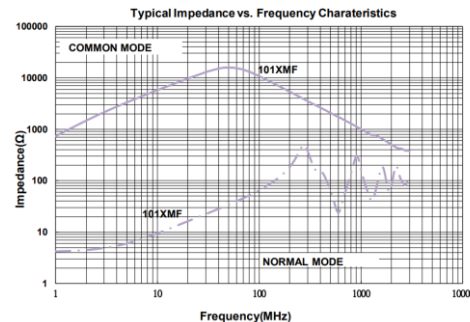
CMC for CAN-FD DCMR Class3

AWCU00332523-MF Series

- Size 3.3 x 2.5mm
- Inductance 100uH
- Irms upto 115mA
- Temp -40C to 125C

Applications:

- Automotive
- Industrial systems
- High Power Systems



CMC for Automotive Ethernet (100BASE-T)

- Size: 3.3x2.5x2.5 (AWCU3325-TE Series)
- Size: 4.5x3.5x2.8 (AWCU4532- TE Series)
- Inductance 200uH @100KHz
- Operating temp -50C to 150C
- Compliance to Open Alliance specs
- AEC-Q200



Applications:

- Automotive Ethernet 100 BASE-T
- Signal line for Automotive powertrain/safety



Common Mode Choke for PoC

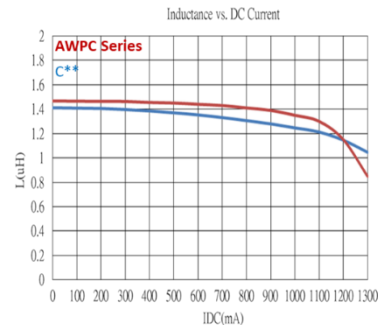
AWPC Series

- Size 2.0*1.2mm, 3.2x2.5mm
- Impedance 50 Ω – 2200 Ω
- RDC 0.01 mΩ – 0.9 mΩ
- Irms upto 3000mA



Applications:

- Automotive PoC
- Flat panel display link III(FPD-LINK III)



Pulse – Standard Power PBU



Standard
Power

High Volume Standard
Magnetic Components
for Commercial and
Automotive Markets

Mini Molded
Inductors



Large Molded
Inductors



Resin Shielded
Inductors



Drum Core
Inductors



RF Inductors and Ferrite
Bead



Common Mode Choke



Specialized
Power

Design and manufacture
specialized power
magnetics, coils for
AC/DC & DC/DC switch-
mode power systems

Power
Inductors



Power
Transformers



Isolation
Transformers



Common Mode
Chokes



Current Sense
Magnetics



Ignition
Coils



Cable
Systems



Motor
Coils



Solenoids, Actuators
& Power Supplies



Wired
Comm

Ethernet Magnetics &
Connector Modules,
Automotive Ethernet
CMC & CO Splitters,
Filters and Connectors

Discrete
Communication
Magnetics - LAN



Integrated
Connector Modules
(ICMs) - LAN



Connectors
& Cages



Discrete
Communication
Magnetics - WAN



Communication
Magnetics -
Automotive



Wireless
Comm

Design, engineering and
production of
antennas & antenna
modules for wireless
devices

Embedded



3D Antennas



Internal



External



Outdoor



IPD RF Components
(LTCC)



Vehicular



Cables & Mounts



Total Solution for Power / RF / EMI

Core Formation

In-house Powder
Core Technology

Powder Formula

Molded

(Soft Saturation, High Power Density)



Power Inductor

- 3.0x3.0 - 30x30 mm
T: 1.0 mm (min.)
- Up to 100A
- Fully Shielded
- For Automotive, Notebook



Power Inductor

- From 1.4 x 1.2 mm size
T: 0.65 mm (min.)
- New process for advanced performance
- For Mobile, wearable, IoT, DDR5
- Notebook, Tablet



Wire Wound

(High Inductance, Galvanic Isolation)



Power Inductor

- Variable structure with round/flat wire
- High saturation current
- For Automotive, Server, ECU
- Telecom, Industrial, network



RF Inductor

- 0.6 x 0.3 – 4.5 x 3.2
- High SRF & High-Q
- For Mobile, Network



EMI - Common Mode Choke

- 1.2x1.0 - 15x13 mm
- Power & Signal Lines Noise filter
- CAN FD IEC 62228-3 compatible
- 100BASE-T1 OPEN Alliance
- For Automotive CAN, USB, HDMI



Multi-Layer

(Small Size, Save Space)



Power Inductor

- 1.6x0.8 - 2.5x2.0 mm
T: 0.6 mm (min.)
- 0.24μH ~ 4.7H, up to 4A
- For Mobile, Ultrabook



RF Inductor

- 0.6x0.3 - 3.2x1.6 mm
- For Communications, Mobile
- Ultrabook, Network



EMI - Bead

- 0603 - 4532 mm
- Low RDC, High speed
- For Automotive ADAS, Infotainment
- Notebook, Mobile, communication



Thin Film

(Low Profile)

NEW

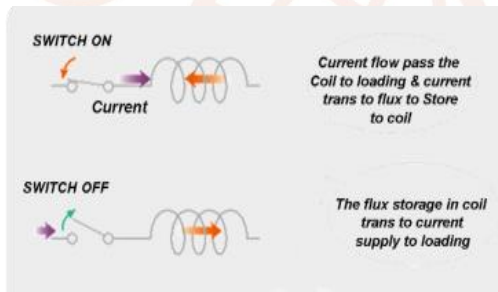
Power Inductor

- 1.0 x 05 – 2.0 x 1.2 mm
T: 0.5 mm (min.)
- 5nH - 470nH, up to 9A
- Photolithography Process
- Super low profile
- For PMIC Module, Mobile, Ultrabook

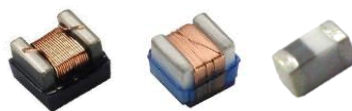
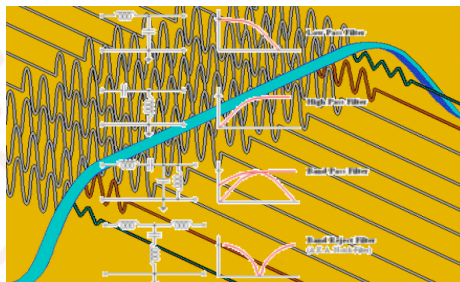


Comprehensive Product Portfolio

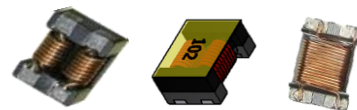
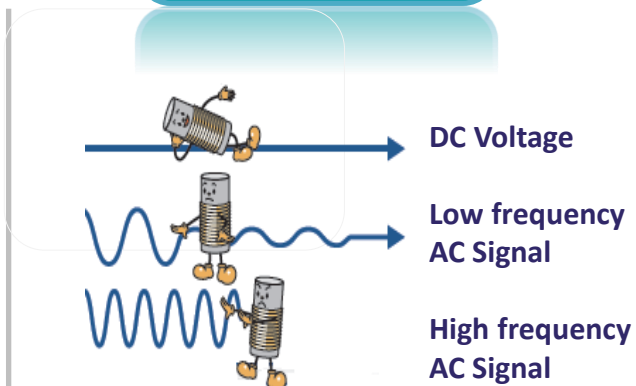
Power Inductor



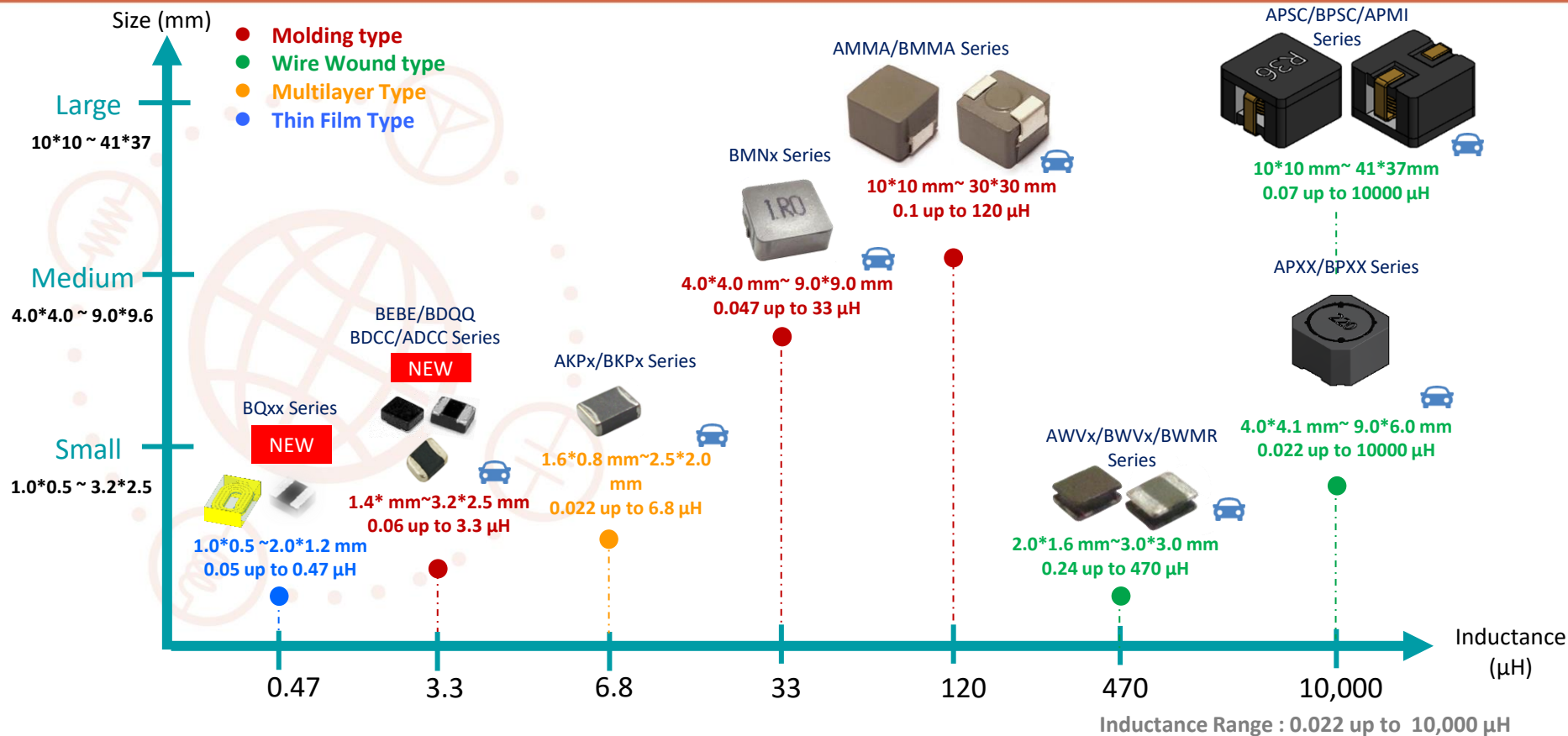
RF Inductor



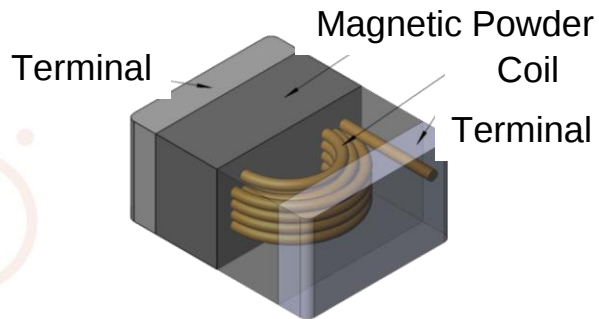
EMI Filter



Power – Inductor Tech



Mini-Molding Products



Features:

Size : Standard 1.6 x 0.8 – 3.2 x 2.5 mm

Bottom Terminal 1.4x1.2- 3.2x2.5 mm

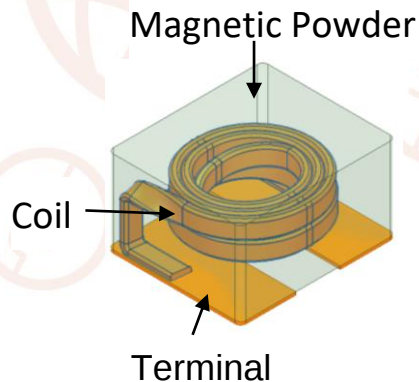
Height: 0.6 – 1.2mm

Inductance: 0.1 – 2.2 μ H

Max. rating current: 10A

Max. saturation current: 14A

~ 1,600 part numbers available



Features:

Size : Bottom Terminal 1.4x1.2- 3.2x2.5 mm

Height: 0.65 – 1.2mm

Inductance: 0.11 – 2.2 μ H

Max. rating current: 8A

Max. saturation current: 9A

Rdc 12 m Ω - 90 m Ω

Mini-Molding Products

Product
Series

BDHH, BDHE

BEBE, BESP, BDQQ

BDBD

Applications

Mobile, Tablet, Wearable, Power module, Networking

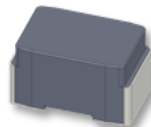
Feature



5 side terminal plated

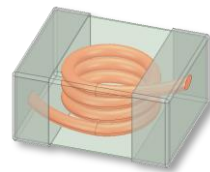
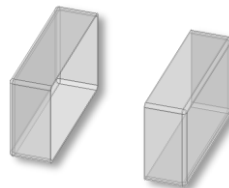
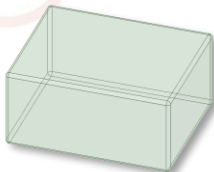


Bottom terminal plated



L-shape terminal plated

Round wire winding, Alloy powder core high saturation current, Super small size(1608 – 3225)



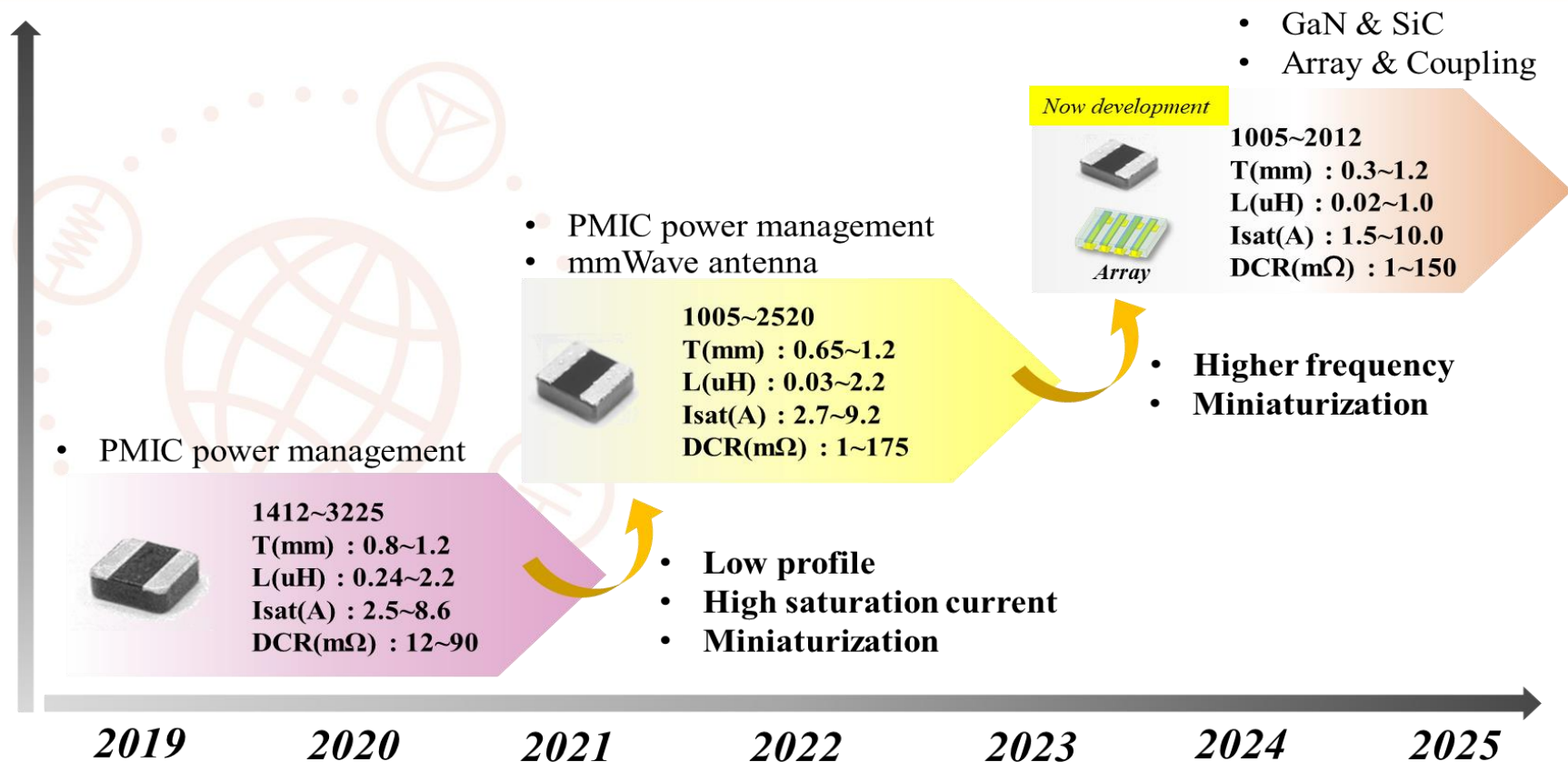
- Copper coil
- Turn number

- Magnetic Powder
- Metal Alloy

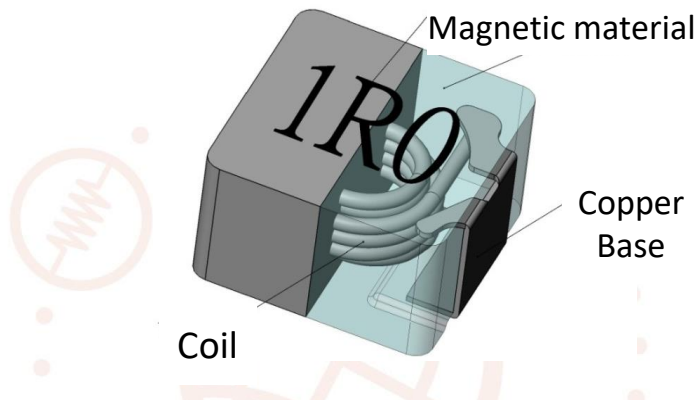
- External Termination
- Cu/Ni/Sn

- Mini-Molded

Mini Molding - Product Roadmap

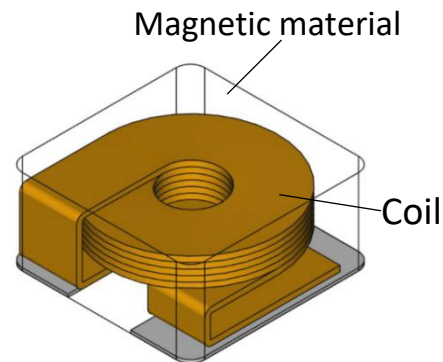


Large Molding Products



Features:

- Size: 4x4mm - 30x30mm
- Height: 1 - 10mm
- Inductance: 0.047 μ H - 47 μ H
- Traditional & Bottom terminal type
- Rating current: up to 55A
- Saturation current: up to 118A
- >2,800 part numbers
- >400 automotive parts

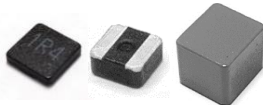


Special Designs:

- Stilted package for space saving
 - 4*4mm -12*12mm
- Sunk Package for Low profile
 - 1mm-1.2mm
- Coating for Corrosive/Flame Resistance
 - UL94V0,
 - 4*4mm – 17*17mm
- Custom Designs



Parts Selection

Product Series	BMMx AMMx	BMNx AMNx	AMHT	AMHP	BMBx BESP	Customization
Features	Consumer/ automotive application	Lower DCR, higher Isat BMNI -Low profile with high L	Up to 180°C operating temp.	Up to 100V rating voltage	Lowest DCR Low profile Bottom terminal	Customized design
						
	Raw materials • In house powder mixing • Exclusive magnetics powders • >30 types of powder formula		Structure/Process • Coil design • I core structure • I rod structure • Hot pressing		Simulation • Electrical • Mechanical • Thermal • Flat wire • Power losses	

Large Molding - Product Roadmap

Consumer



AC loss

2023

-10%

2024

-10%

2025

-10%

2026

-10%

2027

-10%

DC loss

-5%

-5%

-5%

-5%

-5%

Saturation current

+10%

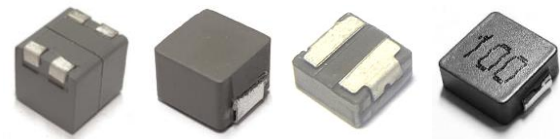
+10%

+10%

+10%

+10%

Automotive



Rating voltage

120V

150V

200V

220V

220V+

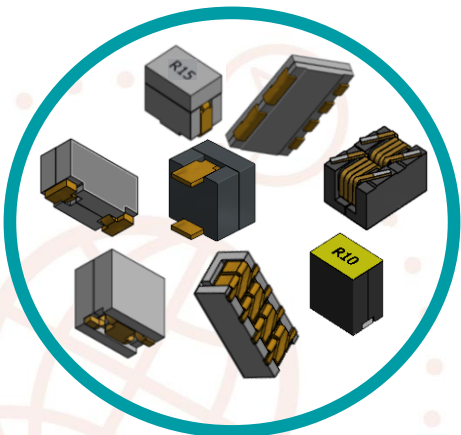
Operating temperature

200°C

220°C

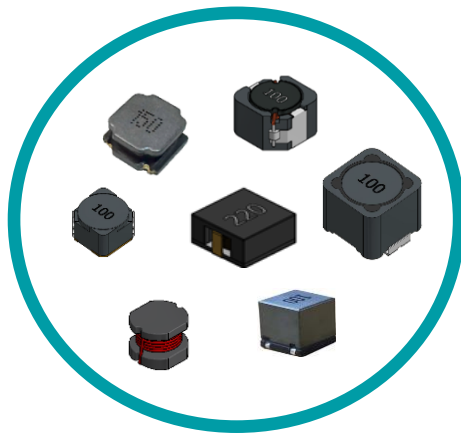
220°C+

Ferrite Core Inductor



Power Bead:

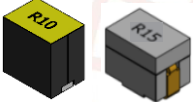
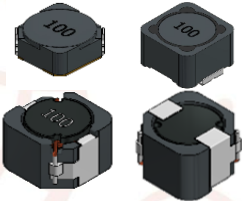
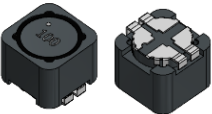
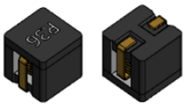
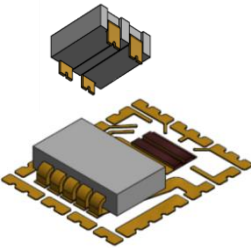
- Size: 4x4mm - 64x24mm
- Height: 2.5 - 18mm
- Inductance: 20nH – 3000nH
- Rating current: up to 150A
- Saturation current: up to 170A
- >600 part numbers
- STD & Customizable Design



Drum & EE Core type:

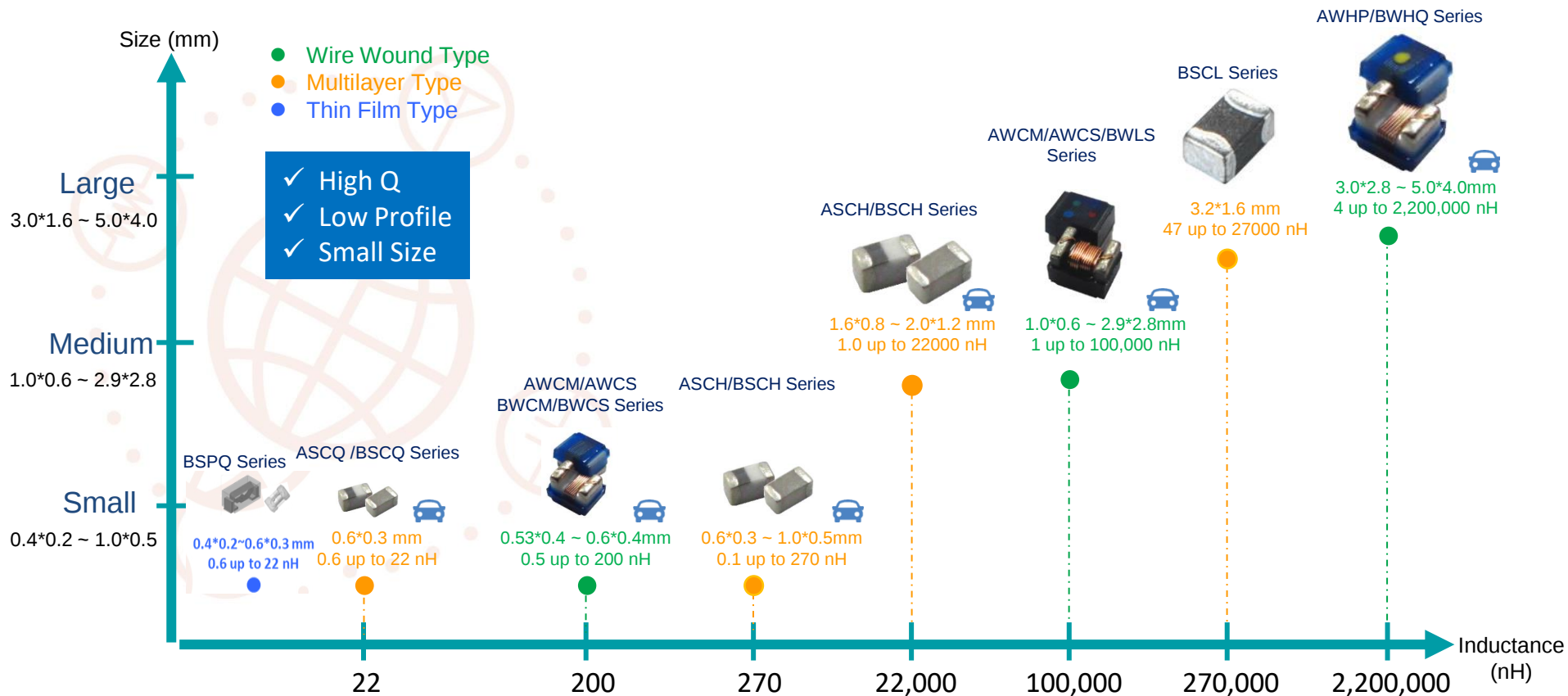
- Ferrite & Sintered Alloy material core
- Size: 3x3mm – 28x26 mm
- Inductance up to 1000uH
- Break down voltage up to 1500V
- No thermal aging issue
- >2000 part numbers
- Custom Designs

Wire Wound Power Inductor Portfolio

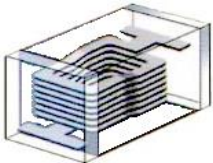
Product Series	BPMx APMx	BPCxA(B)PCA APCx	BPCP APCP	BPMD APMD	BPCK APCK	Customization
Application	V-core/ Datacenter Storage Switch Desktop	DC to DC/ Networking Automotive	SEPIC convertor Good PFC Wide-range voltage	Low DCR High Ls High Isat Large size available	Audio class-D amplifier Less distortion	Customized design
Feature	 Low inductance High power Low voltage applications	 Single winding Ls up to 1000uH Operating Temp Up to 155C	 Dual Coil/ One core Coupling factor 99%	 Flat wire/ Low DCR Alloy core/ High Isat Ferrite Core/ High Ls	 Dual winding in one core Non coupling Hard Isat curve	

High permeability/High inductance/High break down voltage/High operating Temp/No thermal aging

RF Inductor Line-up



EMI - Ferrite Bead Line-up

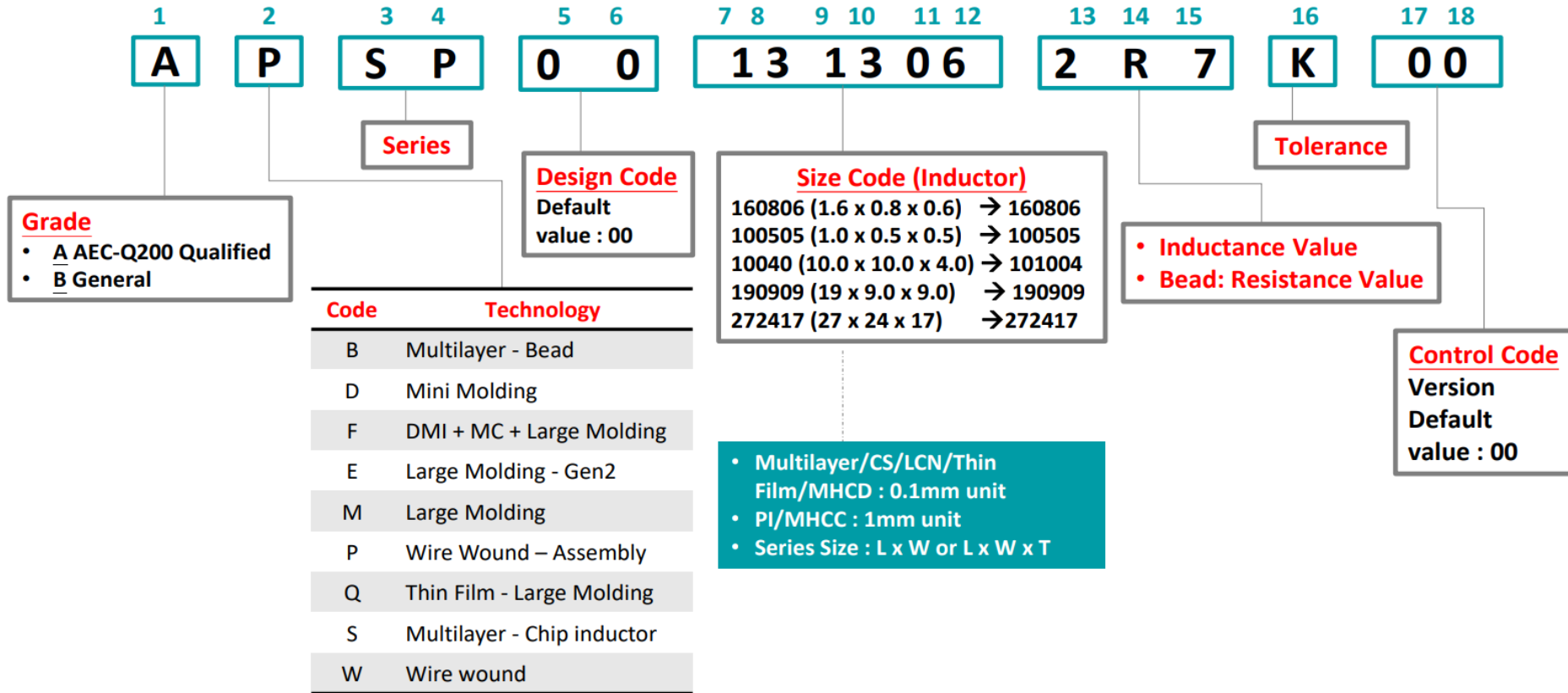
Product Series	BBSY/BBBK/BBGK ABSY/ABBK/ABGK 	BBNQ/BBSJ ABNQ/ABSJ 	BBPY ABPY 	BBUP ABUP 	BBFY BBFJ 
Application	General Signal 	High Speed Signal 	Power Line 	Power Line 	High Frequency for Giga Hz 
Feature	Wide Band Monolithic High Reliability	High Sharp Impedance Curve	High Current Low RDC	Ultra High Current Lower RDC	High Impedance at High Frequency

Full Size Range: 0201(0603) / 0402(1005) / 0603(1608) / 0805(2012) / 1206(3216) / 1210(3225) / 1812(4532)

Common Mode Filter

Size (mm/inch code)	Automotive Ethernet		CAN BUS		USB 2.0 IEEE1394b	LVDS	HDMI 2.0	USB3.1/ G1, G2	Powertrain
	100 Base-T1	1000 Base-T1	Classical	FD					
Signal line Speed	100Mbps	1000Mbps	~8Mbps		480Mbps	~1.5GMps	6Gbps	10Gbps	Power Line
1.2 x 1.0 (1210/0504)	Not applicable				BWCU001210 		BWCU001210 		
1.6 x 0.8 (1608/0603)					BWCU001608 				
2.0 x 1.2 (2012/0805)					 BWCU/BWCC 002012  AWCU002012	BWCU002012 	BWCU002012  AWCU002012		
2.3 x 1.5 , 2.5 x 2.0 (2315/, 2520/1008)					BWCU00231512 			BWCU00252012-3P 	
3.2 x 1.6 (3216/1206-3225/1210)	 AWCU003225 	 AWCU003225 	 AWCU003325 	 AWCU003325 	 BWCU003212 AWCU003212 	BWCU003216 		BWCU00322518-00 	
4.5 x 3.2 (4532/1812)	 AWCU004532  OPEN ALLIANCE 		 AWCU004532 					   	
7.0 x 6.0 Above ~								APPM/APPS /APTE BPPM	

Part Numbering



Capacity Overview

Category	Product Type	2023 Capacity	L/T
Inductor	 Multilayer(Thin Film)	3,250KK/M	8~10W
	 Wire-winding	490KK/M	8~10W
	 Molding	1,050KK/M	8~10W

NBO Success Cases



LONGCHEER
VIVO
Smartphone

BDQQ002012081R0MCK
BDCC00201208R47MXA
BDCC00201610R33MRV



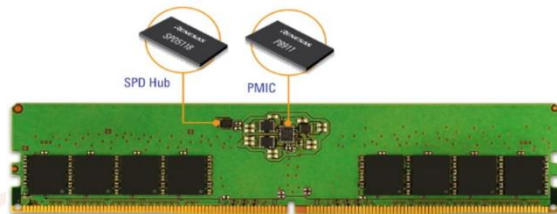
MEIG
Quectel
5G通訊模塊

BDBEDG141208R33MMA/單機3PCS
BDBEDG141208R47MMA/單機16PCS

Qualcomm in 2020 & 2022.
BEBE1412 parts design in MTK in 2021



NBO Success Cases



JEDEC[®]

Chilisin join member

DDR5/ Server

BDSP004040201R0MJP
BDSP004040201R2MJP
BDSP00404020R47MJP
BDSP00404020R68MJP

DDR5/ Client

BESP00322512R68MJS
BESP002520121R5MJS



Skyworth
Auto infotainment

APPM00151365501XYE
AMRU00131365100MA1
AMRU000404201R0MB1

KOE Footprints

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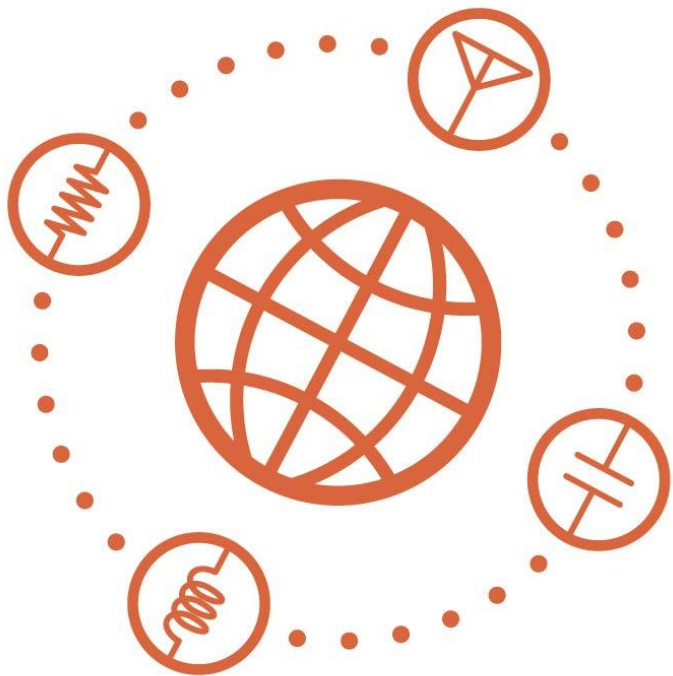


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Thank you!

謙虛，熱情，專業效率，協同合作

Humility , Enthusiasm, Professionalism & Efficiency, Collaboration

