



AMO

CORPORATE PROFILE
TRUSTED INNOVATION

Since 1994, The AMO Group leads the global market with its unique technological process, claiming its reputation as a Hidden Champion company

339 Million(USD)

Sales in 2019

6 products

World Best Product
in 2019

31.7 Million(USD)

R&D expenses in 2019

3,523 patents

Patents as of
December 31, 2019

3,291 employees

Employees as of
December 31, 2019

13 factories

Production Site



It makes innovation to reality that 29 Division specialized in their own technology

AMO Group

AMOTECH	AMOGREENTECH		AMOSENSE	AMOLIFESCENCE
EMC	Magnetic Component	Nano Fiber	Wireless Charging	Bio Device
Antenna	Flexible Battery	Thermal Magnetic EMI	PCB ass'y	AMO Skin
Motor	Vent	Thin-film PCB	RF module	Nano-mag
MLCC	AMO Plant	Flexible PCB	LED Lighting module	Stem Cell
	ESS	Metal-Graphite	Sensor module	Bio Medical
	Water Treatment	Metallic Converter	IoT Device	
	Smart Clean Window		Sigfox Operator	

AMO is chosen by the leading global companies in industries

✔ Global Leader's Choice

Mobile



Automotive



IoT



Chipset



AMO guarantees the stable stream of production and on-time supply with its ten globally-certified production facilities across the world and 643 supply networks



☑ Domestic and Foreign Production Facilities

Country	Established	City	No. of Employees	Certification
1 Korea	1994	Kimpo Tongjin	35	
	2000	Kimpo Hasung	98	
	2003	Inchon	650	
	2007	Pyong-taek	198	
	2008	Chonan Factory 1	93	
	2012	Chonan Factory 2	75	
	2017	Cheorwon	8	
	2019	Geomdan	60	
2 China	2003	Zibo Factory 1	360	
	2007	Zibo Factory 2	280	
	2006	Qingdao	257	
3 Vietnam	2014	Hanoi Factory 1	564	
	2018	Hanoi Factory 2	615	
Total	-	13 factories	3,291	

AMOGREENTECH

Advanced Materials Technologies

The high efficiency magnetic material
for green energy

Amogreotech is advanced materials and components company leading the 4th industrial revolution with nano-material technology

Company name	Amogreentech Co., LTD.	Headquarter	Gimpo, Korea
CEO	S.C Yang & Y.S Song	R&D Location	Korea & China
Sales(2019)	77M USD	Factory location	China & Vietnam
Employees	280 (Worldwide)	History	Established in 2004 Acquired IATF16949 in 2012 Listed on Korean stock market in 2019

Main products



Magnetic components



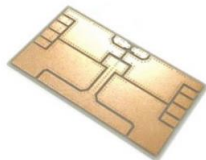
FIN Heater



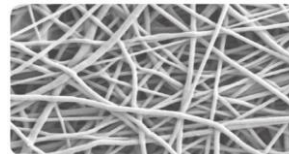
Thermal Solution



Flexible Battery



AMB Substrate



Nano Membrane(vent)



Nano Thin Film

Magnetic components for Inductor(Coil), EMI Filter, Current sensor

High-Efficiency Magnetic Component

Based on Fe-Amorphous & nanocrystalline alloy ribbons design and manufacturing technology, we have been leading the rapidly growing component market with high efficiency magnetic components for power converter as well as for precise measurement.



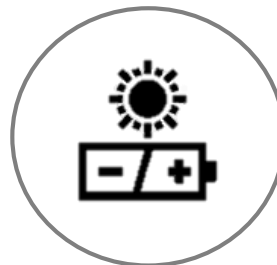
Application



EV & Charging



5G



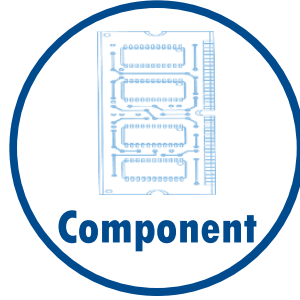
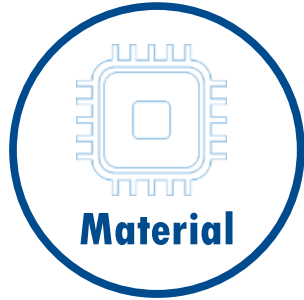
Solar & ESS



Smart Grid

.....

Providing total solution



- Amorphous & Nanocrystalline core



- Thermal pad & Grease



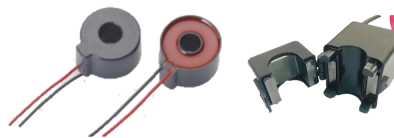
- e-Heat Sink & e-Bus bar



- Inductor, CMC



- Current Transformer



- Hybrid bus bar



- Filter Design –Inductor, CMC, Capacitor
- Small space, e-Bus bar & Thermal solution (Thermal Coat & Mold)



- EMI Test by EMI Chamber



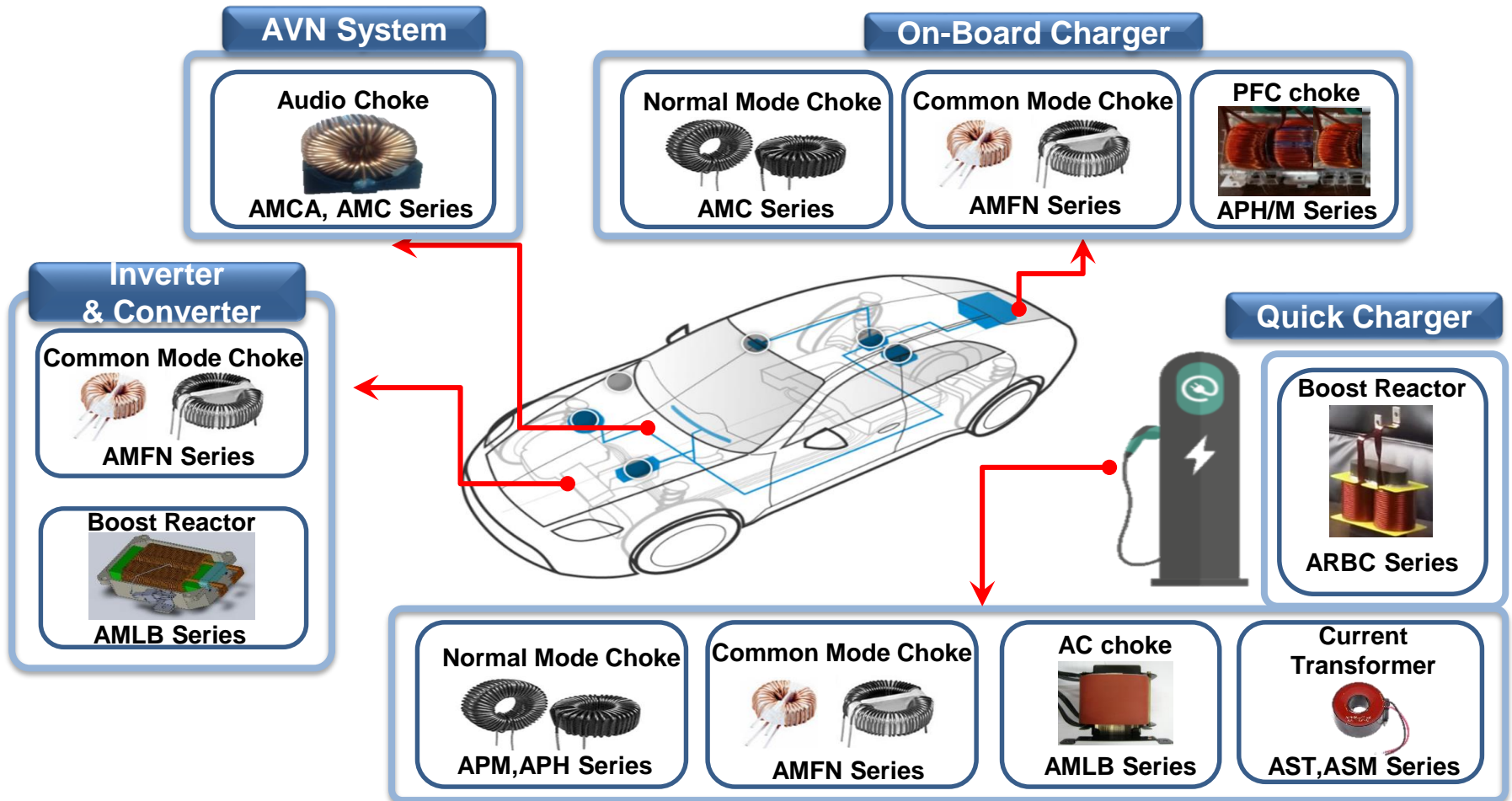
EV

Advanced Materials Technologies

The high efficiency magnetic material

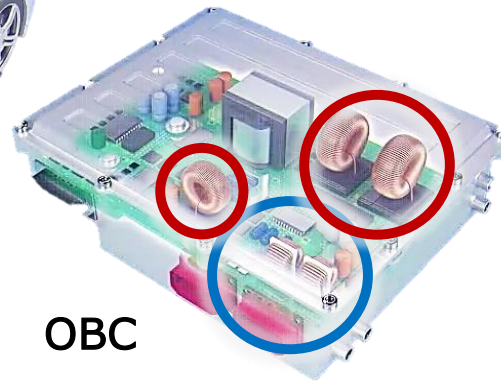
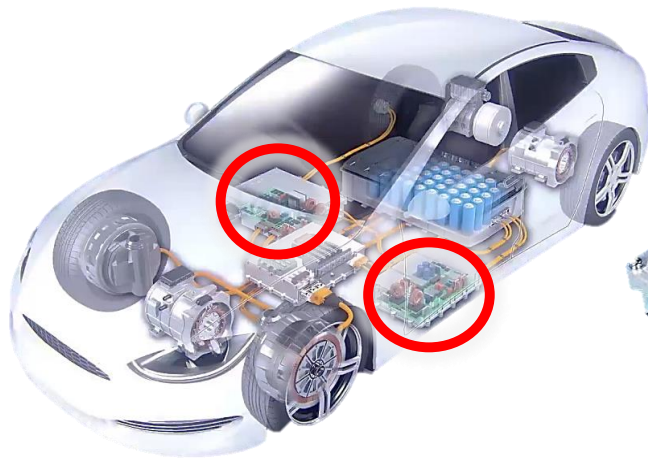


Solution for EV

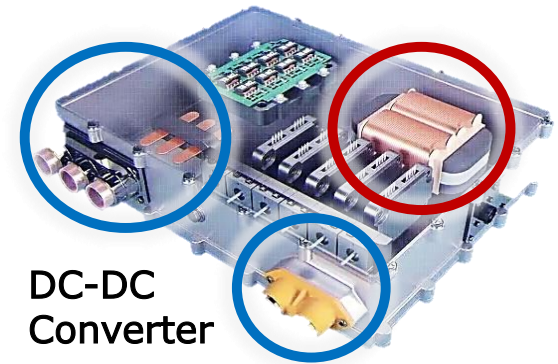


Solution for EV

On board charger / DC-DC converter



OBC

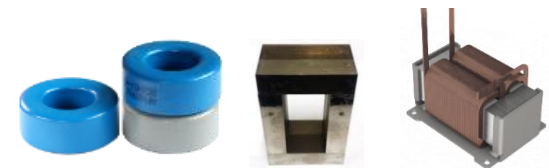


DC-DC Converter



Noise reduction part

- Common mode choke core : AMFN
- Choke core : AMC








Inductor part

- Inductor core : AMLB, AMCU, APH, APM
- Choke core : AMC

Application Reference

Appl.	Part No.	Image
4kW OBC Input EMI	AMFN372415SA	
4.6kW OBC OPC	AMC-271525C	
4.6kW OBC Input EMI	AMFN564415SA	
250kW Drive inverter EMI	AMFN1005025TR	
5kW OBC Input EMI	AMFN543020SS	
62kW Fast charger Input EMI	AMFN906020SV	

Application Reference

Appl.	Circuit	Part no	Image
OBC	PFC(3.7kW)	APM40P60	
	PFC(4kW)	APH40P60	
	PFC(4.6kW)	APH46P60	
	PFC(5.6kW)	APH33P60	
Fast charger	Boost choke	ARBC10035-40	



Solar / ESS

Home / APPLICATIONS / ESS

 ENERGY STORAGE





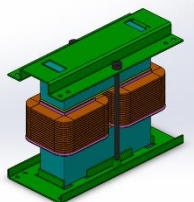
DC Charger, PV & ESS

Advanced Materials Technologies

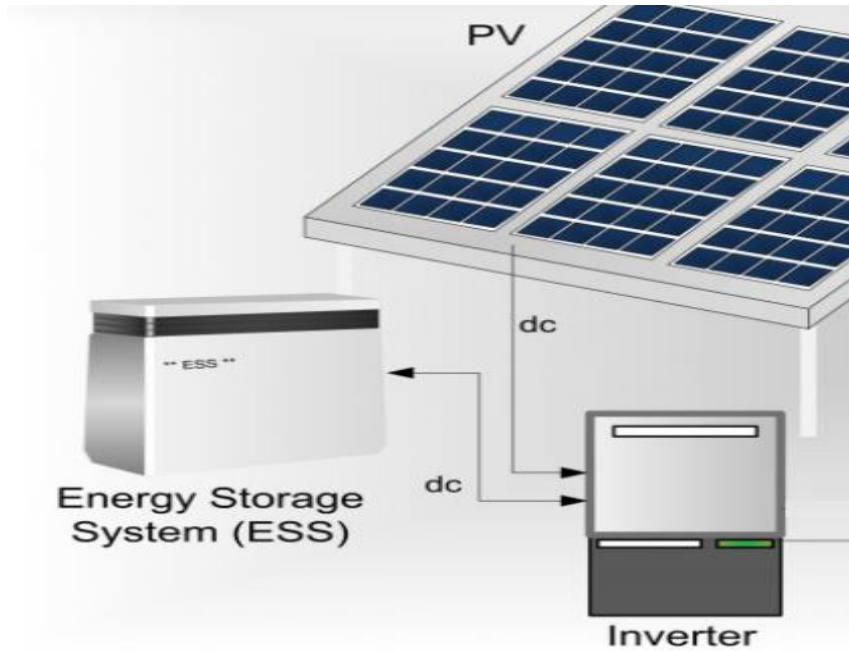
The high efficiency magnetic material



Application Reference

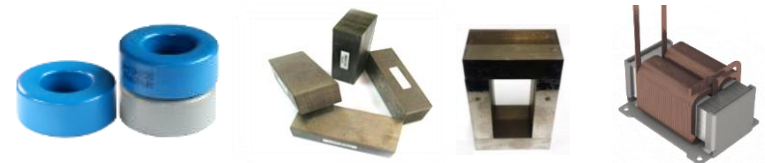
Appl.	Circuit	Part no	Image
50kW quick charger	PFC	AMP-R3P 67A	
		AMP-L3P 67A	
52kW quick charger	AC choke	ARBC10035-40	
	Input EMI filter	AMFN302010SH1 AMFN402515SV	
66kW Quick charger	AC Choke	AMLB series	

Solution for Solar & ESS



Noise reduction part

- Common mode choke core : AMFN



Inductor part

- Inductor core : AMLB, AMCU, APH, APM

Common Mode Choke



AMFN Series

Normal Mode Choke



APM,APH Series

AC choke



AMLB Series

Current Transformer







AST,ASM Series

Boost Reactor



AMLB Series
ARBC Series

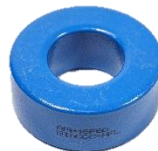
Solution for Solar & ESS

	Application	Part no	Image
Solar inverter	AC choke (50kW)	AMLB-63615 AMLB-73615	
	AC choke (20kW)	AMLB-5315 AMLB-6315	
ESS	AC choke (5kW)	APH57P60	
	AC choke (5kW)	AMFN543020SS	

Product Introduction

Advanced Materials Technologies

The high efficiency magnetic material
for green energy



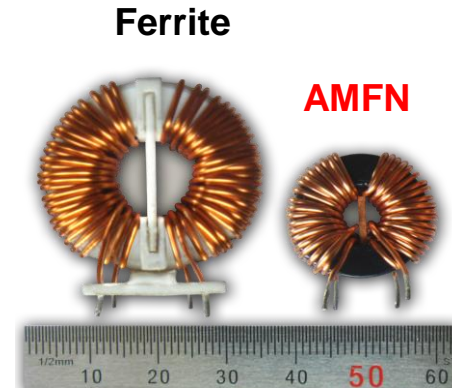
Common Mode Choke core – AMFN series

Features

1. High & wide range of permeability
2. Reliability on high temperature

Benefits

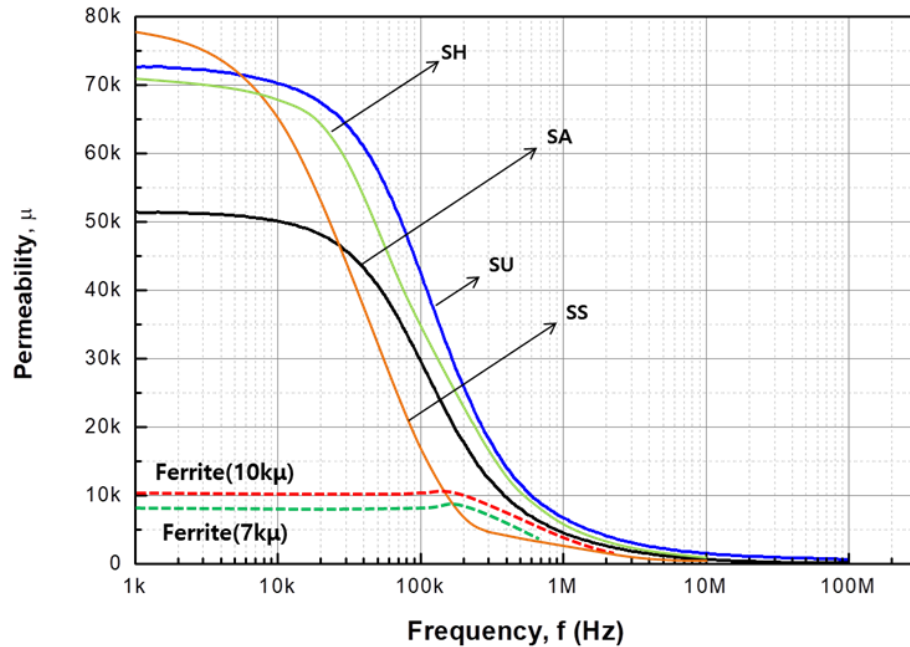
- ▶ Reduction of product size and winding turns
- ▶ High impedance over the wide range of frequency



Parameters	AMFN	Ferrite
Permeability(μ)	80,000~100,000	10,000
Size	Small	Big
No. of Turns	Fewer	More
Core loss	Low	Low
High Impedance Range	Wide	Narrow
Operating Temperature	High	Low

Strength of AMFN-series

① High & Wide range of permeability



Ribbon type	Permeability (μ) @10kHz	Permeability(μ) @100kHz
SU	50,000	35,000
SH	50,000	28,000
SA	60,000	23,000
SS	80,000	18,000

* Adjustable at 10 kHz

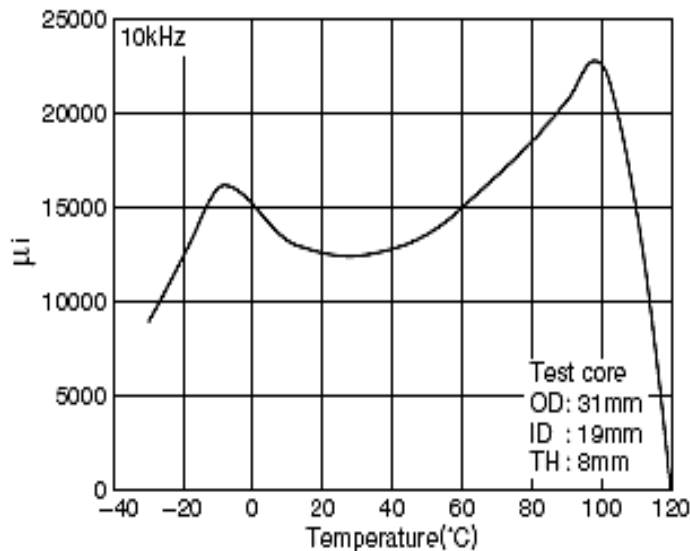
[Permeability dependence on Freq(AMFN-series Vs Ferrite)]



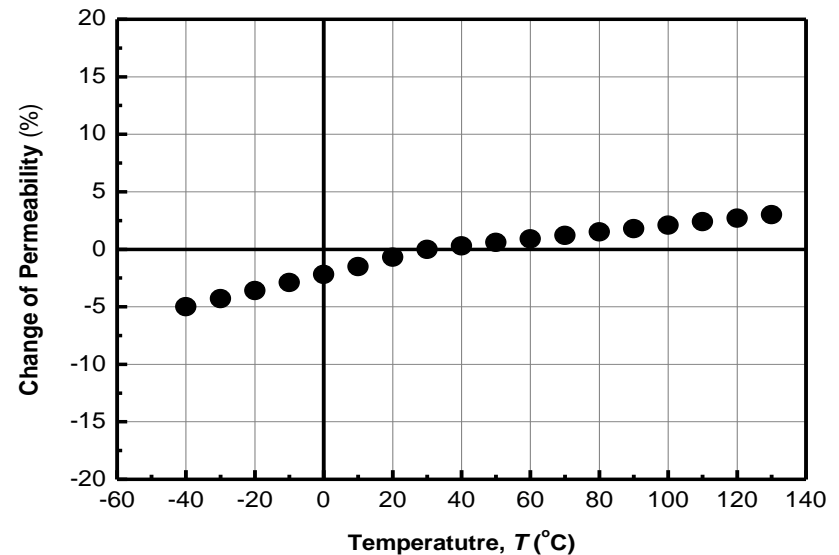
Strength of AMFN-series

② Reliability on high temperature

[Permeability dependence on temperature]



Mn-Zn Ferrite



AMFN-Series






Properties	AMFN™ series	Ferrite (Mn-Zn)
Curie Temperature, T_c (°C)	570	150
Operating Temperature(°C)	≥150	~100

Standard product list

P/N (core), AMFN	Core Dimension [mm]			L _{Fe} [mm]	A _{Fe} [mm ²]	Mass [g]	Inductance, A _L (μH)		Cross product	
	O.D	I.D	H.T				10kHz	100kHz	H社	V社
161006SS	16	10	6	40.8	13.5	4.0	33.5	7.0		
161006SA	16	10	6	40.8	13.5	4.0	25.0	9.6		
161006SH	16	10	6	40.8	13.5	4.0	43.0	10.1		W403
201208SS	20	12.5	8	51.0	22.5	8.4	45.0	10.0		
201208SH	20	12.5	8	51.0	22.5	8.4	55.2	13.6		
201208SA	20	12.5	8	51.0	22.5	8.4	34.0	13.0		W409
252010SS	25	20	10	70.7	18.8	9.7	27.0	6.0		
252010SA	25	20	10	70.7	18.8	9.7	17.0	7.5		
252010SH	25	20	10	70.7	18.8	9.7	28.4	7.3		W523
251504SA	25	15	4	62.8	15.0	6.9	18.5	7.0		
251610SS	25	16	10	64.4	33.8	15.9	47.0	10.0		
251610SA	25	16	10	64.4	33.8	15.9	40.0	15.0		
251610SH	25	16	10	64.4	33.8	15.9	65.5	15.5		W380
302010SS	30	20	10	78.5	37.5	21.5	49.0	10.5		
302010SA	30	20	10	78.5	37.5	21.5	40.0	14.0		
302010SH	30	20	10	78.5	37.5	21.5	59.3	14.0		W423
302015SH	30	20	15	78.5	56.3	32.2	15.7	14.1		V129
312115SS	31	21	15	81.6	56.3	33.5	70.0	16.0		
312115SA	31	21	15	81.6	56.3	33.5	53.0	20.0		
372415SS	37	24	15	95.8	73.1	51.1	77.0	18.0		
372415SA	37	24	15	95.8	73.1	51.1	60.0	27.0	F3724E	
372820SA	36.5	28	20	101.3	63.8	47.1	48.0	18.5		
382612SA	38	26	12	100.5	54.0	39.6	32.0	15.0		
403215SH	40	32	15	113.0	45.0	37.1	47.2	11.1		W422
452520SS	45	25	20	109.9	150.0	120.3	130.0	30.0	F4424G	
504020SS	50	40	20	141.3	75.0	77.4	54.0	12.0		
504020SA	50	40	20	141.3	75.0	77.4	45.3	14.0		W516
543020SS	54	30	20	131.9	180.0	173.3	130.0	30.0		
604520SA	60	45	20	164.9	112.5	135.4	68.0	17.0	F6045G	
635025SS	63	50	25	177.4	121.8	157.8	69.1	15.6		W517
906020SV	90	60	20	235.5	225.0	386.8	81.0	25.1		W518
1008020SH	100	80	20	282.6	150.0	309.4	47.5	12.0	F10080G	
14010030SS	140	100	30	376.8	450.0	1237.79	110.0	24.0	F140100	

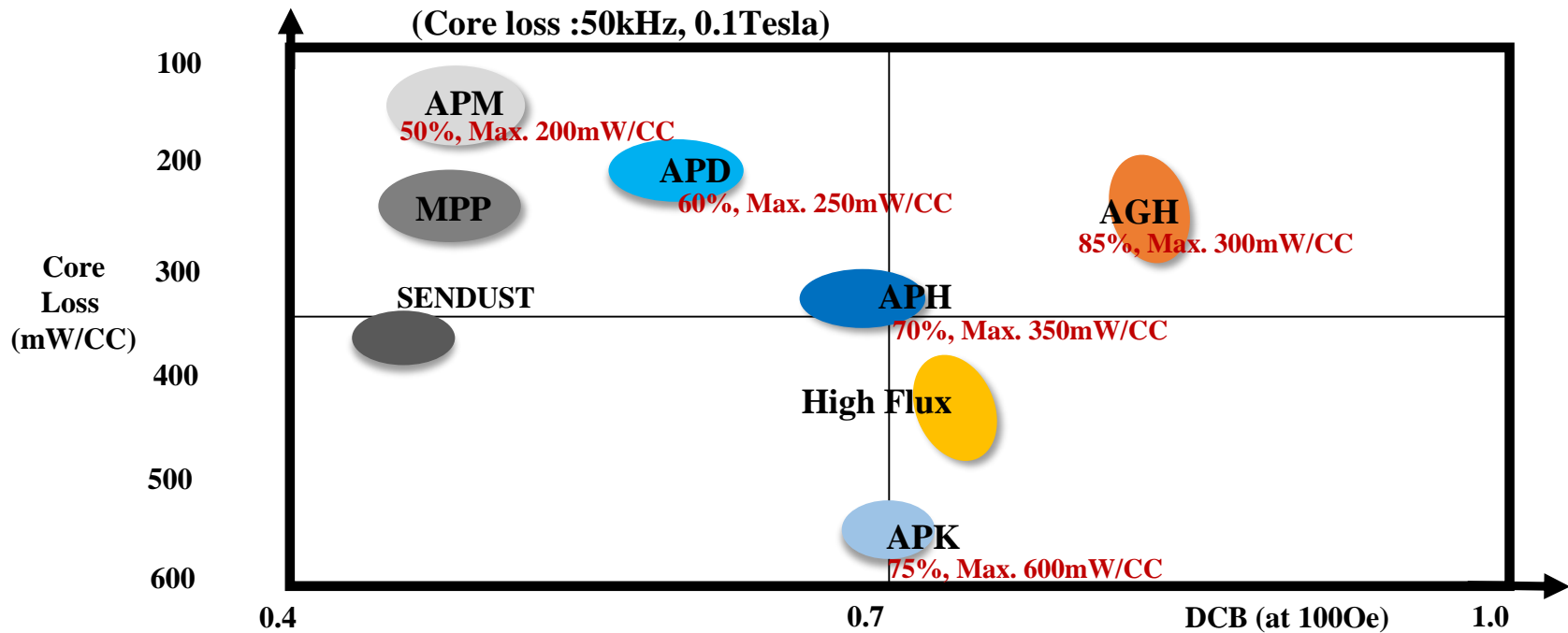
PFC & DC Output Choke core

Basic characteristics

Product	APH series	APM series	AGH Series	APD series	APK series
Material Alloy	Fe-Amorphous	Nanocrystalline	Fe-based metal	Fe-based metal	Fe-based metal
Composition	Fe-Si-B	Fe-Si-B-Nb-Cu	Fe-Ni	Fe-Si-Al	Fe-Si
Permeability(μ)	60, 90 μ	26, 60, 90 μ	26, 40, 60 μ	26, 60, 90 μ	26, 40, 60, 75, 90 μ
Size(mm)	\varnothing 13~57	\varnothing 13~57	\varnothing 13~57	\varnothing 13~57	\varnothing 13~57
Curie Temp.	395°C	570°C	500°C	500°C	700°C
Features	Good DCB Low core loss	Lowest core loss	High DCB	Good formability Low core loss	Low cost Good DCB
Color					

Strength of powder core

- ▶ APH - Good DCB & Low core loss
- ▶ APM - The lowest core loss
- ▶ APK - Low cost & Good DCB
- ▶ APD - Low cost & Low core loss & Good DCB
- ▶ AGH - Highest DCB & low core loss



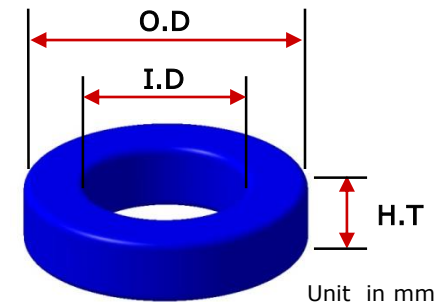
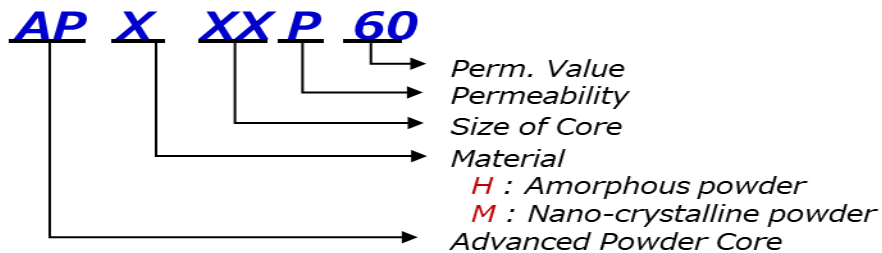
Comparison Data

Property		Amorphous Line		Metal Line		
		APH Fe Amorphous	APM Nano-Crystalline	AGH Fe-Ni based alloy	APK Fe-Si based alloy	APD Fe-Si based alloy
Saturation Flux Density Bs(Gauss)		15,000	12,000	15,000	16,000	12,000
Core Loss (mW/cm ³)	50kHz, 0.1T	300 ~ 350	150 ~ 200	250 ~ 300	600 ~ 650	200 ~ 250
	100kHz, 0.1T	600 ~ 700	300 ~ 400	550 ~ 650	1,200 ~ 1,300	400 ~ 500
DC Bias @100Oe		70%	48 %	85%	70%	60%
Relative Cost		Medium	Med-Hi	Med-Hi	Low	Lower

Note : The properties are typical value measured.(60μ)

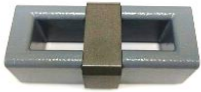

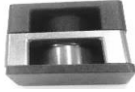



Standard product list

P/N	Size (Finished) (OD×ID×HT)	APH TM		APD TM		APM TM			L _e (cm)	A _c (cm ²)	Vol (cm ³)	Competitor ("C")
		A _L (nH/N ²)		A _L (nH/N ²)		A _L (nH/N ²)						
		60μ	90μ	60μ	90μ	26μ	60μ	90μ				
13PXX	13.5 × 7.0 × 5.5	27	40	27	40	12	27	40	3.12	0.11	0.36	CH/M127
17PXX	17.4 × 9.5 × 7.1	35	52	35	52	15	35	52	4.11	0.19	0.79	CH/M166
18PXX	18.0 × 9.0 × 7.1	43	64	43	64	19	43	64	4.14	0.23	0.96	CH/M172
20PXX	21.1×12.1× 7.1	32	49	32	49	14	32	49	5.09	0.23	1.15	CH/M203
23PXX	23.6 × 13.4 × 8.4	43	65	43	65	19	43	65	5.67	0.33	1.88	CH/M229
24PXX	24.3 × 13.8 × 9.7	51	76	51	76	22	51	76	5.88	0.39	2.28	CH/M234
27PXX	27.7×14.1 × 12.0	75	113	75	113	32	75	113	6.35	0.65	4.15	CH/M270
33PXX	33.8×19.3×11.6	61	-	61	92	28	61	92	8.15	0.67	5.48	CH/M330
36PXX	36.7×21.5×11.3	56	-	56	84	24	56	84	8.98	0.68	6.09	CH/M358
40PXX	40.7×23.3×15.4	81	122	81	122	35	81	122	9.84	1.07	10.55	CH/M400
46PXX	47.6×23.3 × 18.9	135	-	135	203	59	135	203	10.74	1.99	21.37	CH/M467
50PXX	51.7×30.9×14.4	73	-	73	109	32	73	109	12.73	1.25	15.93	CH/M508
57PXX	58.0×25.6×6.1	138	-	138	206	60	138	206	12.50	2.29	28.60	CH/M571



New type core – Shape core

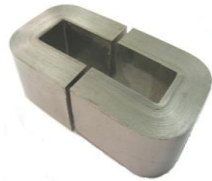
Line-Up

Item	Features	Size	Fig.	Material
UIU	<ul style="list-style-type: none"> 2.4kW PFC High DCB 	<ul style="list-style-type: none"> AUIU2016 – U core: 20.3 x 15.9 x 20.3mm 		<ul style="list-style-type: none"> APD
EQ	<ul style="list-style-type: none"> PFC / OPC Easy winding 	<ul style="list-style-type: none"> AEQ2619 AEQ3222 AEQ3626 		<ul style="list-style-type: none"> APD
EQI	<ul style="list-style-type: none"> Output choke for high power(2kW~) Low profile 	<ul style="list-style-type: none"> AEQI2619 AEQI3222 AEQI3626 		<ul style="list-style-type: none"> APD
FT Core	<ul style="list-style-type: none"> Square shape for low power(~1kW) High performance 	<ul style="list-style-type: none"> AFT3027 		<ul style="list-style-type: none"> APH/APM APD
EE (EER)	<ul style="list-style-type: none"> PFC choke for high power High current (30A~) 	<ul style="list-style-type: none"> AE4116-60 AE4321-60 		<ul style="list-style-type: none"> APK APD
Round block core (Cylinder)	<ul style="list-style-type: none"> Various Size & properties Good assembly 	<ul style="list-style-type: none"> ARBC10035 – Round block : 100.5 x 35mm – Cylinder : $\varnothing 35$ 		<ul style="list-style-type: none"> APK

High efficiency reactor core



AMLB series



AMCU series

Features

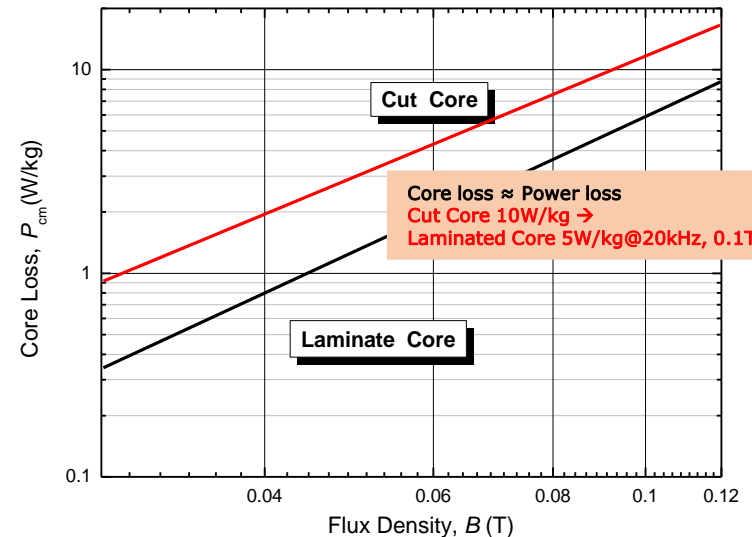
- Low eddy current loss and hysteresis loss
- High Saturation Flux Density
- Multiple gap core
- Made of Amorphous ribbon(25um)

Benefits

- High efficiency
- Stable temperature dependency
- Compact component size
- Size flexibility(Laminate core)

Material properties

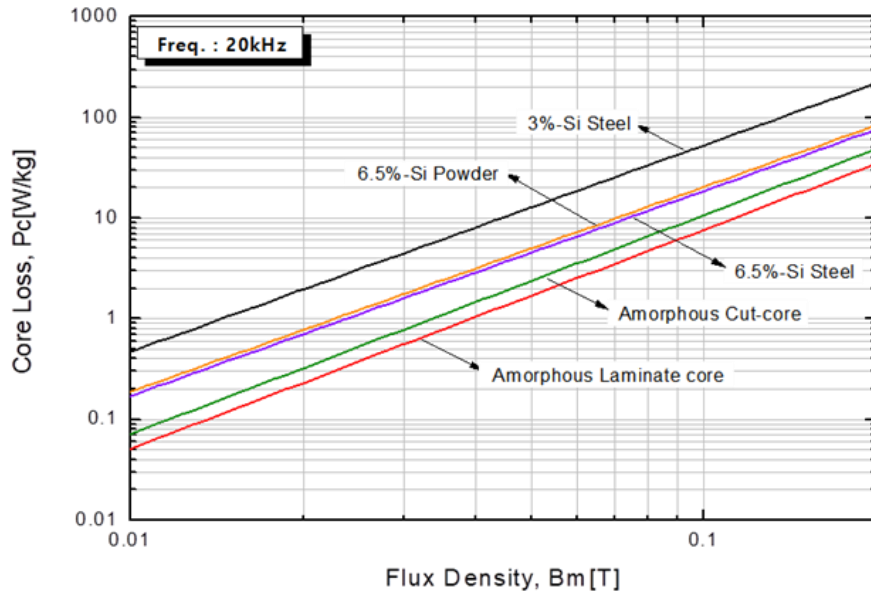
Properties	Fe-Amorphous
Material composition	Fe-Si-B
Saturation flux density Bs	1.56T
Permeability	200~7,000 μ i
Coercivity(Static, A/m)	2<Hc<3
Curie temperature Tc	395°C



Strength of AMLB/AMCU series

① Lowest Core loss

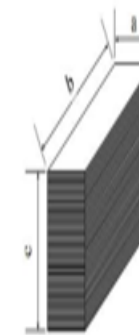
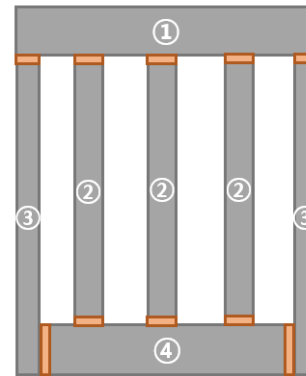
AMLB/AMCU series have much lower core loss in comparison with other materials.
 -> It will give you **higher efficiency** on your application.



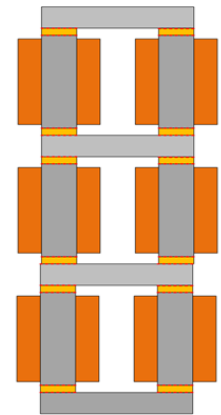
② Flexible design

It enables you to offer a various of core shape through block combination compared to cut Core.

<AC choke>



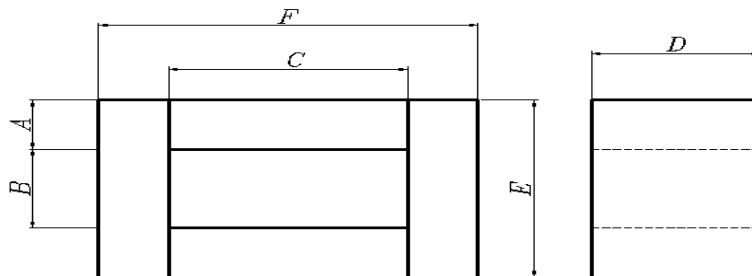
<DC/AC Inductor>



Standard product list

Part Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Mass (g)	L _m (mm)	A _c (mm ²)	V _e (mm ³)	W _A (mm ²)
AMLB-63615	15	30	60	36	60	90	828.4	240	480.6	115344	1800
AMLB-73615	15	40	70	36	70	100	966.4	280	480.6	134568	2800
AMLB-8320*	20	40	80	30	80	120	1227	320	534	32000	3200
AMLB-200	19	25	84	49	63	122	1749	294	829	39984	2100
AMLB-500	25	40	85	54	90	135	3019	350	1202	55300	3400
AMLB-800	25	40	85	85	90	135	4753	350	1891	77000	3400
AMLB-1000	33	40	105	85	106	171	7521	422	2482	99592	4200
AMLB-1700	50	50	150	100	150	250	19171	600	4450	180000	7500

* : These models are 1block standard type product



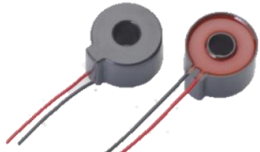
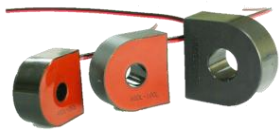

Comparison data

Property		AMLB-Series	Super-E	Si-Steel	BK
B _s (T)		1.56	1.80	1.87	1.60
Core Loss [W/kg]	@0.1T, 20kHz	7.8	20.9	51.6	18.2
L _{DC} / L ₀ (%) @ 100Oe		Dependent of gap size			
Size		Middle	Middle	Middle	Middle
Material		Fe-Si-B (Sheet)	Fe-Si(6.5%) (Sheet)	Fe-Si(3.5%) (Sheet)	Fe-Si(6.5%) (Powder)
Adaptive frequency (kHz)		20~40	~30	~13	~100
Price		Middle	High	Low	Middle

Note : Core loss is typical value at 100 kHz, 0.1T

Alternative Current Sensor

Basic characteristics

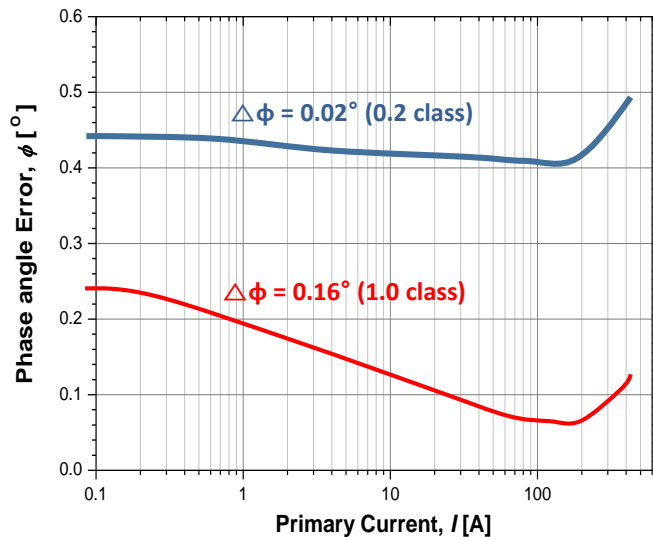
Product	AST Series	ASM series	ASLC series
Material Alloy	Nanocrystalline	Amorphous Nanocrystalline	Ferrite
Permeability(μ)	$\sim 160k$	$30k \sim 40K$	$10k$
Bs [T]	~ 1.2	~ 1.5	~ 0.4
DC-immune	No	Yes	No
Features	High Accuracy & Low ratio error	Excellent linearity and precision	Split type CT
Remark	IEC62053-22 ANSI C12.xx	IEC62053-21, IEC62053-23	-
Fig.			

Strength of AST & ASM-series

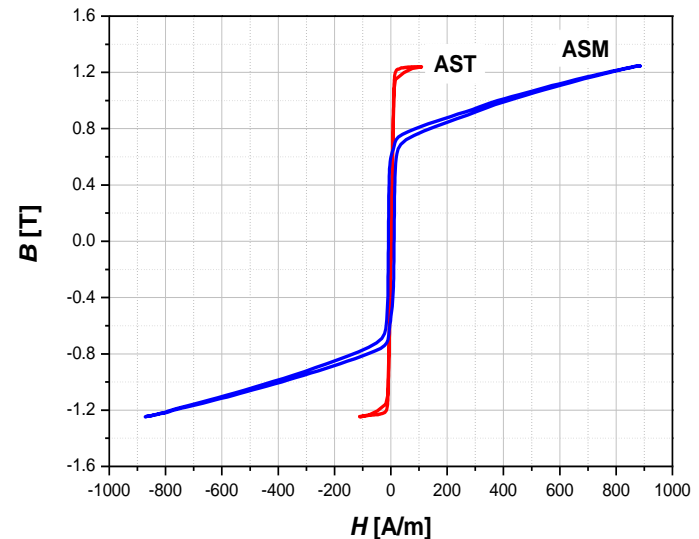
- ▶ **AST** - **Excellent accuracy** in current sensing
 - Very small and high linear phase and amplitude error
- ▶ **ASM** - **No saturation in DC factor**
 - Excellent linearity and precision



[Phase angle error]

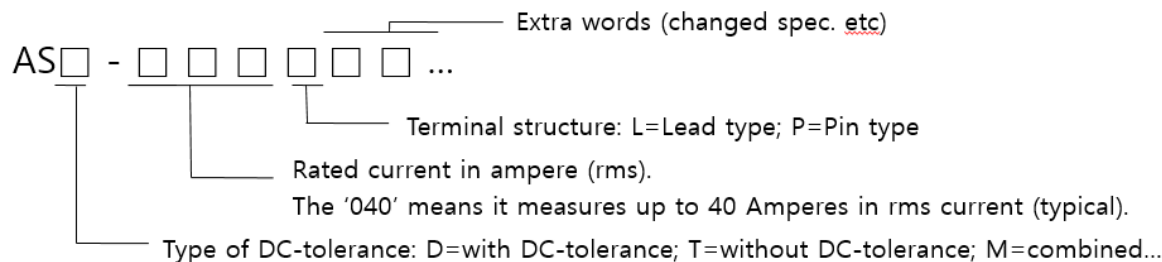


[B-H loop of CT-series]



Standard product list

Part number (P/N)	Primary current range		Turns ratio	Errors		Characteristics			Dimensions		Cross Product
	I_N (A _{rms})	$I_{DC,MAX}$ (A _{op})		Phase Φ (°)	Amplitude $ F $ (%)	L (H)	R_{cu} (Ω)	R_B (Ω)	Φ (mm)	Width x height (mm x mm)	
AST-005LA	5	-	2500	0.38	0.02	183	236	150	7.7	23.2 x 10.8	
AST-040L	40	-	2500	0.17	0.01	183	152	18.75	6	24.5 x 11.1	E4623-X002
AST-060P	60	-	2500	0.09	0.01	143	63	12.5	7.7	31.1 x 15.3	E4624-X502
AST-080L	80	-	2500	0.14	0.03	226	160	9.375	8.9	26.1 x 17.1	E4622-X002
AST-120L	120	-	2500	0.10	0.04	180	68	6.25	12.2	39.0 x 17.6	E4626-X002

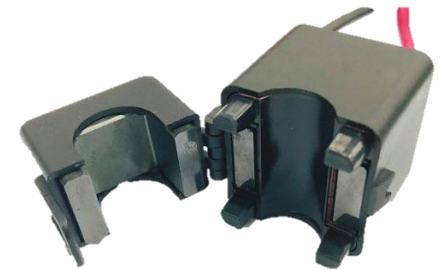


7	26.3 x 17.3	E4623-X101
1.5	26.0 x 17.5	E4623-X101
4.5	38.4 x 15.0	E4623-X101

Split type CT

Features

- ▶ **ASLC** - Easily installed and removed
 - No necessary to disconnect the primary cable
 - 60A – 400A AC current input range



Line-up

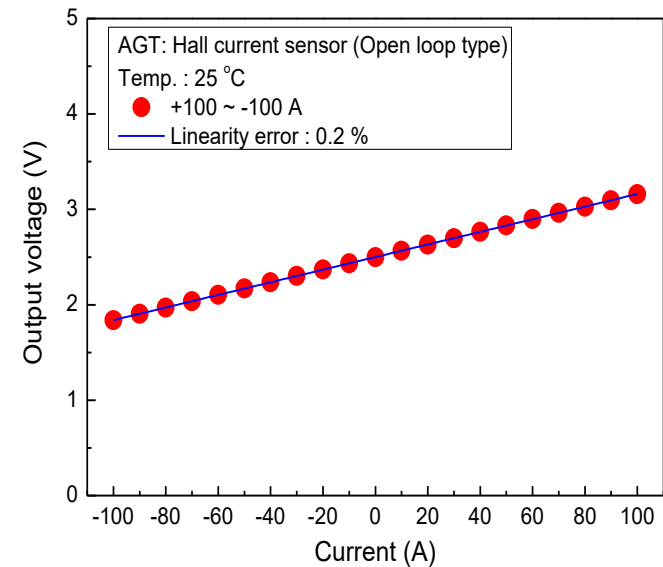
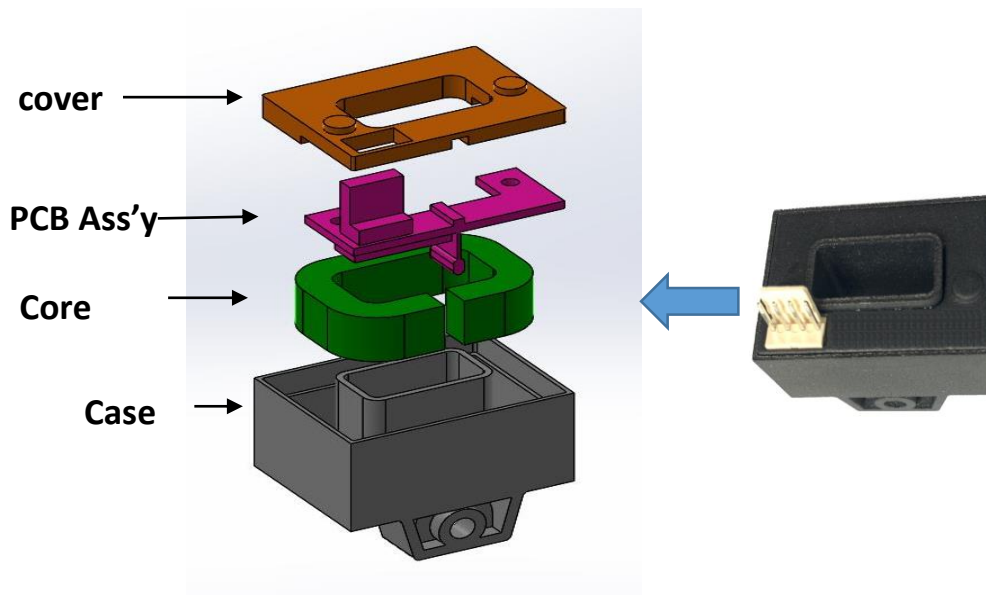
Part no.	Input current [A]	Output current [mA]	Turns ratio [:1, Ts]	Burden resistance	Error range [%]
ASLC-060L	0~50	0~16.67	2000 3000 4000 5000	20Ω	±0.5~1.0
ASLC-120L	0~100	0~33.33			
ASLC-150L	150	5000	30	1VA	1.0

Hall effect Sensor

Features

► Hall effect Sensor

- High accuracy in current sensing
- Excellent electrical insulation



Design Check List – Common mode choke

Common mode Choke Dimensions	<input type="checkbox"/> bare core	Outer Diameter	() mm
		Inside Diameter	() mm
		Height	() mm
	<input type="checkbox"/> finish core	Outer Diameter	() mm
		Inside Diameter	() mm
		Height	() mm
Inductance	$A_L = () \text{ mH @ } () \text{ kHz, } 0.1\text{V}$		
	$L = () \text{ mH @ } () \text{ kHz, } 0.1\text{V, } () \text{ turns}$		
Impedance	$Z = () \Omega @ () \text{ kHz, } 0.1\text{V}$		
L_{DC}			
Nominal current (I_{rms})	() A		
Max current (I_{rms})	() A		

Design Check List – Powder core

Powder Core Dimensions	Outer Diameter	() mm
	Inside Diameter	() mm
	Height	() mm
Material	<input type="checkbox"/> APH <input type="checkbox"/> APM <input type="checkbox"/> APD <input type="checkbox"/> Others	
Permeability	<input type="checkbox"/> 60 <input type="checkbox"/> 90 <input type="checkbox"/> 125	
Current, I	MS (), I _{peak} ()	
L_0	()mH	
L_{DC}	()mH @ ()A	
Winding conditions	Coil thickness (), Winding turns ()	
Core loss	Core loss (), Freq. (), Flux density ()	

Design Check List – Cut & Laminate Core

Cut & Laminate Core Dimensions	Width	() mm
	Depth	() mm
	Height	() mm
kW Class	() kW	
AC, DC type	<input type="checkbox"/> AC inductor <input type="checkbox"/> DC inductor <input type="checkbox"/> Others - ()	
Switching frequency	() kHz	
Inductance (L_0) @ A	() mH @ () A	
L_{DC} @ Nominal Current	() mH @ () A	
L_{DC} @ Max Current	() mH @ () A	
Lss. of ripple		
Rdc Max	() Ω	
Winding turn	() turns	
Gap		
Wire		

Design Check List – Current Transformer

Current transformer Dimensions	Outer Diameter	() mm
	Inside Diameter	() mm
	Height	() mm
Frequency	<input type="checkbox"/> 50 Hz <input type="checkbox"/> 60 Hz <input type="checkbox"/> Others - () Hz	
Primary current range (I_{rms})	Min. = () A, Max. = () A	
Required accuracy in current range	Phase error, $\phi = ()^\circ$	
Variation in the current range	Phase error, $\phi = \pm ()^\circ$	
Voltage across burden resistor @ Max Current (I_{max})	$V_2 = () V_{rms}$	
Burden resistor (R_B)	$R_B = () \Omega$	
Transformation ratio	$N_{pri.} = ()$ turns, $N_{sec.} = ()$ turns	
DC – tolerance	<input type="checkbox"/> Yes : Max. amplitude of a half-rectified current , $I_{DC-Max.} = () A_p$	
Ambient temperature range	() \sim () $^\circ C$	

For **Customer**

Thank you