



KS SERIES POWDER CORES

A HYBRID POWDER CORE MATERIAL FROM CHANG SUNG CORP

KS Series

- Chang Sung Corp and MH&W International announce the availability of a new line of powder cores, the KS Series. The KS Series is a hybrid material comprising Mega Flux and Sendust powder materials. The combination of these two materials provides:
 - High B_{sat} – 14 KGauss
 - DC Bias characteristics of KS material higher than Sendust
 - Core losses for the KS material are lower than the Mega Flux
 - Prices for the KS material are lower than the Mega Flux
 - High Curie Temperature
 - Designed for large current applications such as Inverter Inductors and smoothing chokes for Solar Power, UPS and Electric Vehicles

General Information

(1) General Information

KS Series

Permeability(μ)	26, 40, 60
Coating Color	Dark blue
Bmax(G)	14,000
Curie Temp[°C]	500
Operating temp[°C]	-40 to 150
OD BF [mm]	9.6~165



(2) Identification

KS270060

Permeability : 26 μ , 40 μ , 60 μ

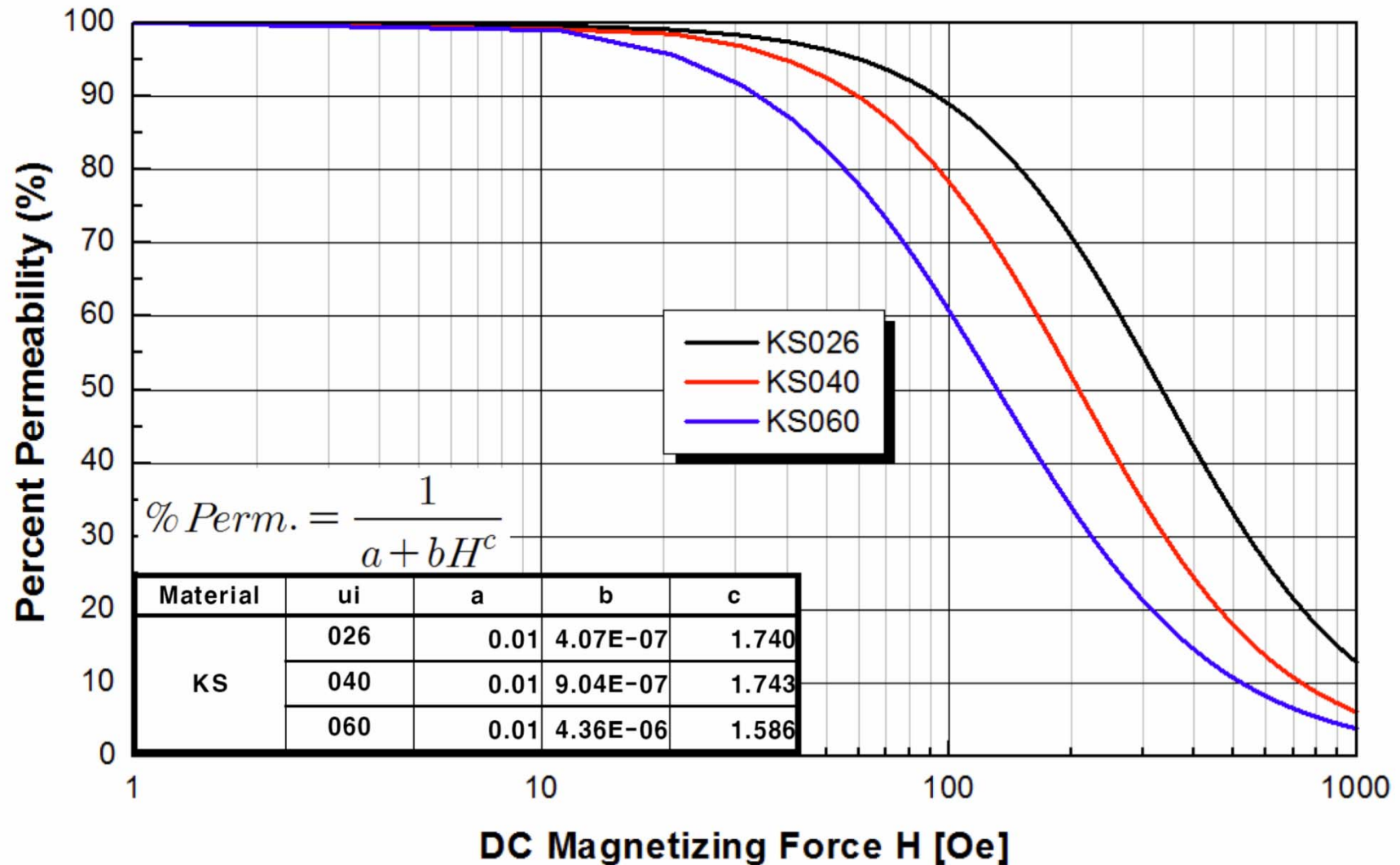
OD Size : 27.0mm Available Size : 9.6 ~ 165mm

KS Core

Material Comparison Between CSC Products

MATERIALS		COATING COLOR	PERM	B _{sat}	CORE LOSS mW/cc 60 μ	CORE LOSS mW/cc 60 μ	DC BIAS	DC BIAS	CURIE TEMP	Price Ranking
			μ	Kgauss	50KHz-500G	50KHz-1KG	60 μ @ 200 Oe	60 μ @ -3db	° C	
MPP		Gray	14 - 173	7	38	170	20%	80 Oe	450	7
High Flux		Khaki	26 - 160	15	37	180	45%	160 Oe	500	6
Sendust		Black	26 - 125	10	61	279	22%	55 Oe	500	1
Mega Flux		Dark Brown	26 - 90	16	132	590	44%	130 Oe	700	4
HS	High Flux - Sendust	Dark Blue	19 - 90	14	43	206	41%	110 Oe	500	3
KS	Mega Flux - Sendust	Dark Blue	26 - 60	14	102	478	33%	70 Oe	500	2
KH	Mega flux - High Flux	Dark Blue	26 - 90	15	92	433	46%	160 Oe	600	5

DC Bias @ Various Permeability

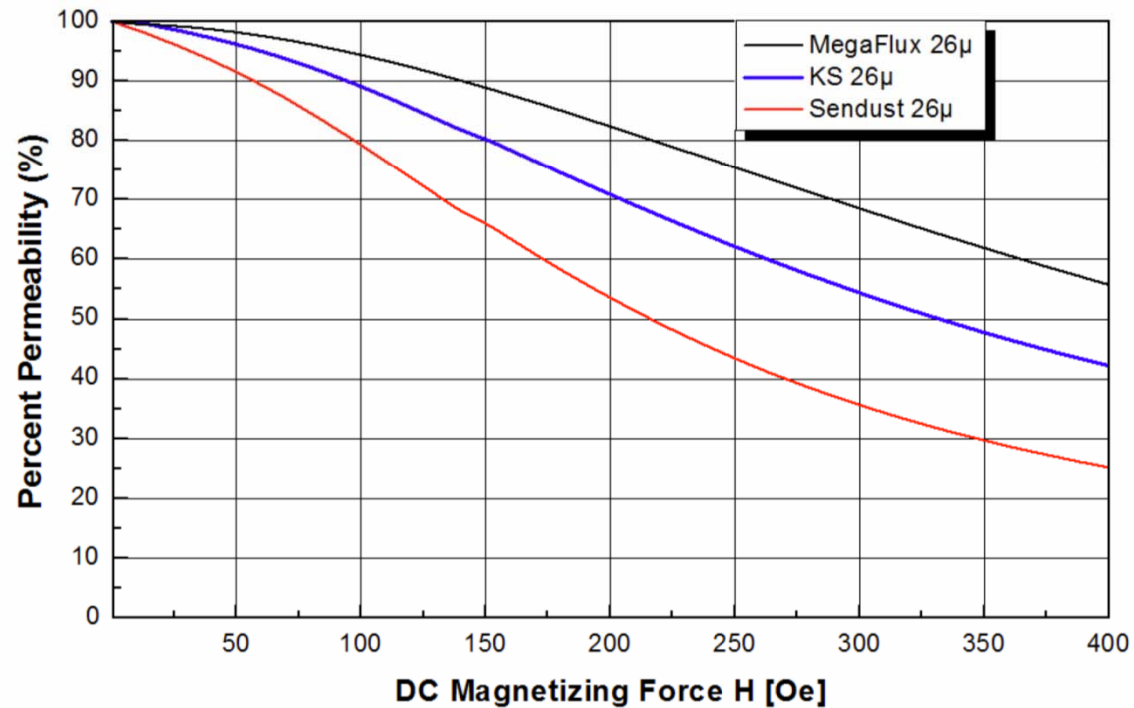


DC Bias - 26 μ

(1) Material Comparison

Material	26 μ DCB%		
	@200 Oe	@300 Oe	@400 Oe
Mega Flux	82%	68%	56%
KS Core	70%	54%	42%
SENDUST	53%	35%	25%

(2) DCB Graph

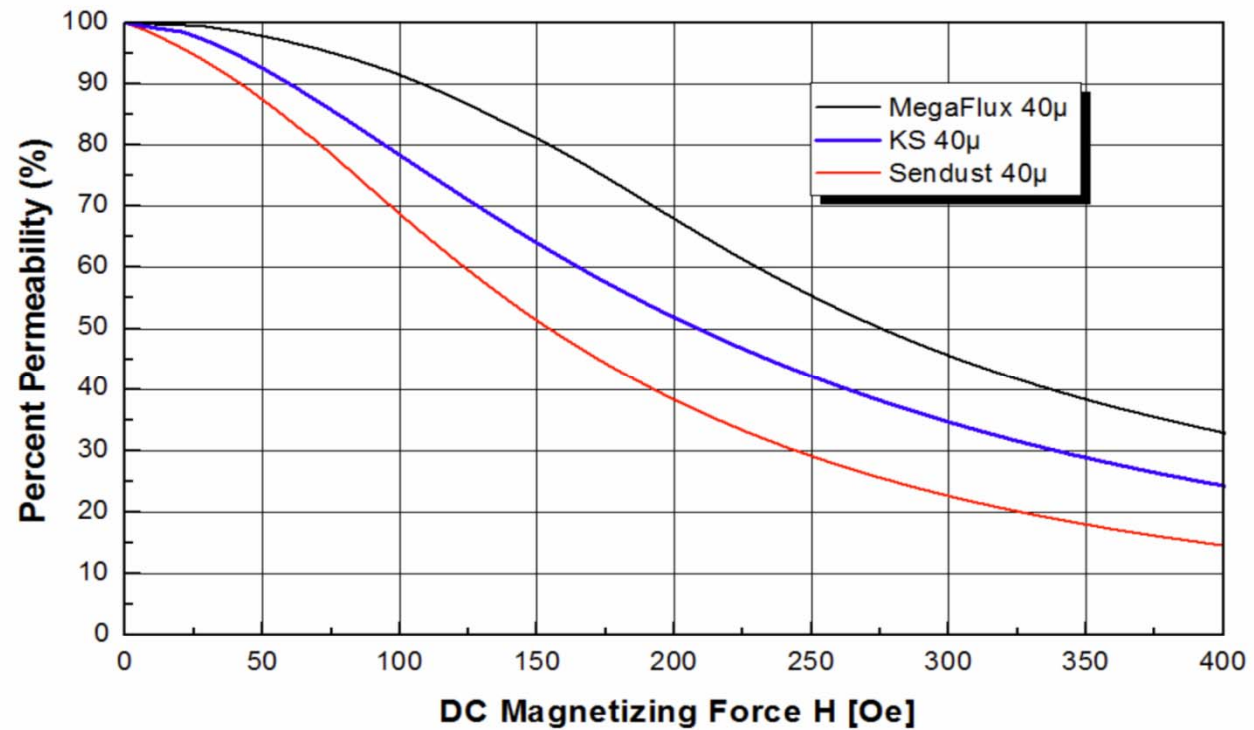


DC Bias - 40 μ

(1) Material Comparison

Material	40 μ DCB%		
	@150 Oe	@250 Oe	@350 Oe
Mega Flux	81%	55%	38%
KS Core	64%	42%	28%
SENDUST	51%	29%	17%

(2) DCB Graph

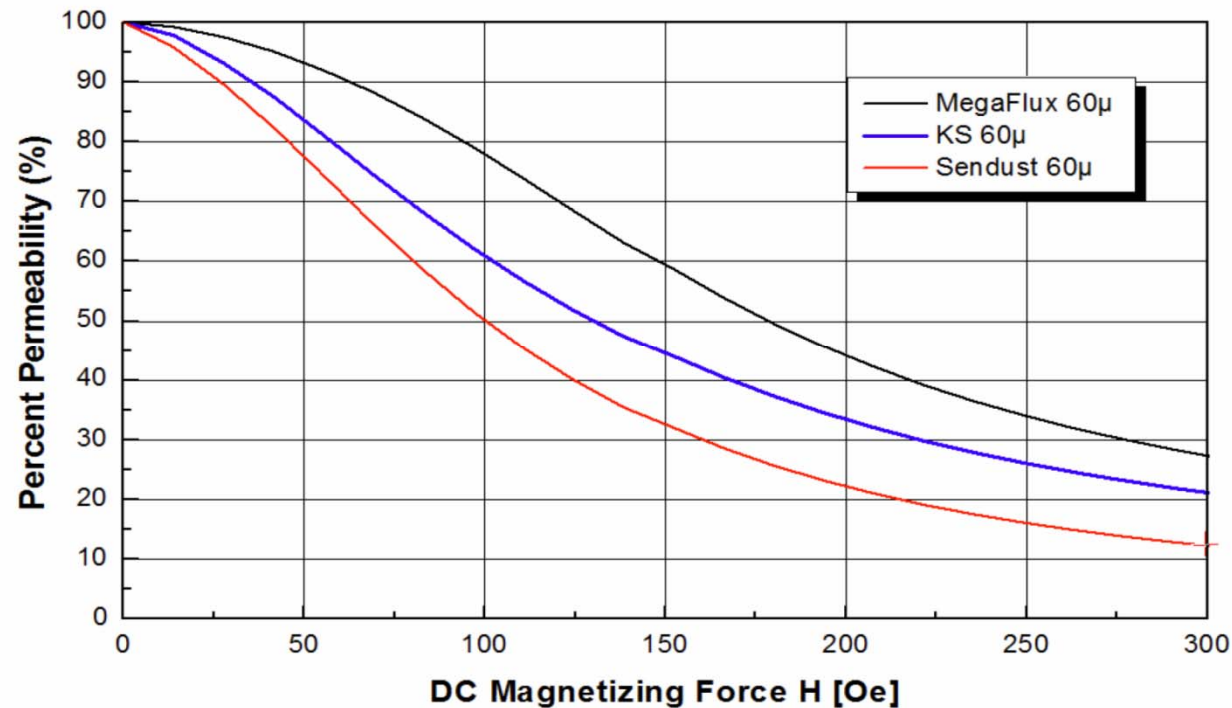


DC Bias - 60μ

(1) Material Comparison

Material	60 μ DCB%		
	@100 Oe	@150 Oe	@200 Oe
Mega Flux	78%	59%	44%
KS Core	61%	44%	33%
SENDUST	50%	32%	22%

(2) DCB Graph



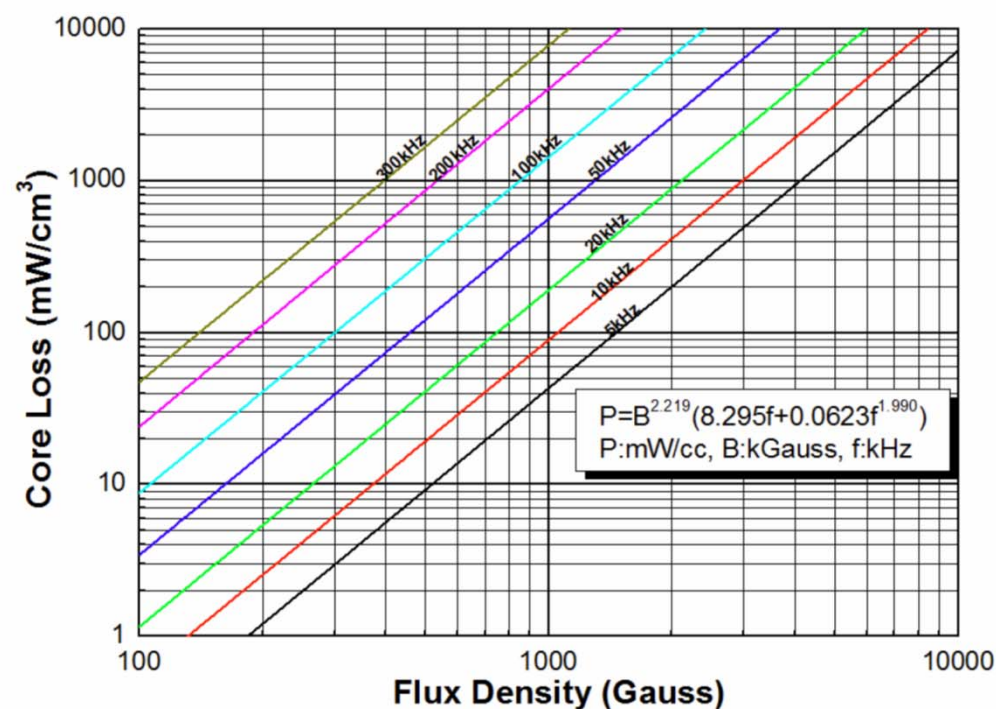
Core Loss - 26μ

(1) Material Comparison

Unit : [mW/cc]

Material	26 μ Core Loss		
	Core Loss Equation (P:mW/cc, B:kGauss, f:kHz)	@20kHz,1000G	@50kHz,500G
MegaFlux	$P=B^{2.166}(9.918f+0.0519f^{2.061})$	223	147
KS Core	$P=B^{2.219}(8.295f+0.0623f^{1.990})$	190	121
SENDUST	$P=B^{2.048}(4.245f+0.0215f^{1.990})$	93	64

(2) Core Loss Graph



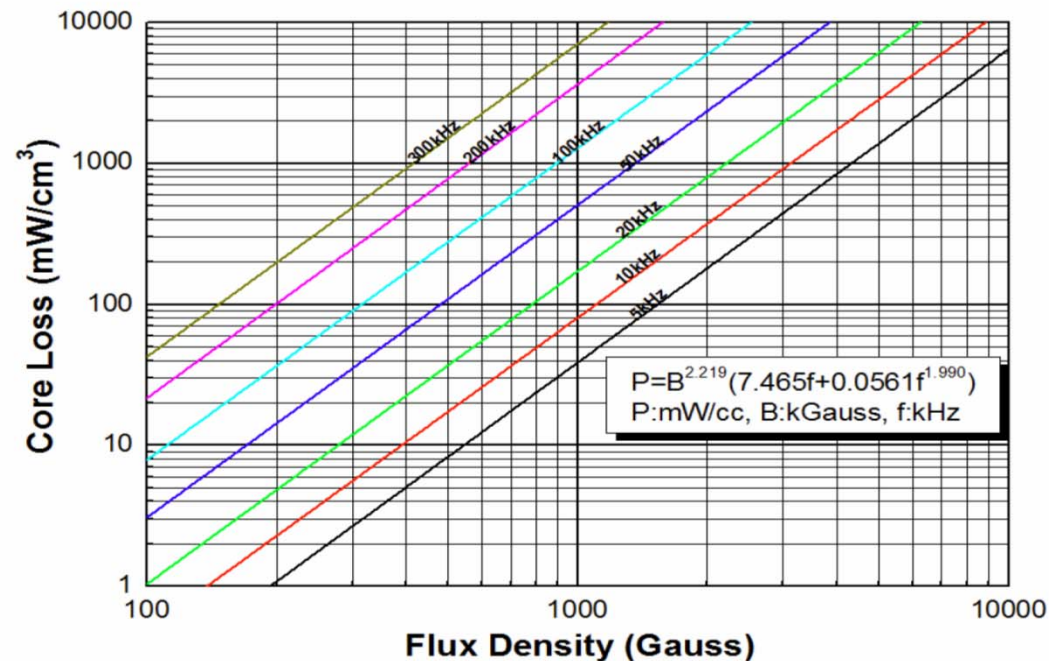
Core Loss - 40μ

(1) Material Comparison

Unit : [mW/cc]

Material	40 μ Core Loss		
	Core Loss Equation (P:mW/cc, B:kGauss, f:kHz)	@20kHz,1000G	@50kHz,500G
MegaFlux	$P=B^{2.145}(9.667f+0.0689f^{1.980})$	219	145
KS Core	$P=B^{2.219}(7.465f+0.0561f^{1.990})$	171	109
SENDUST	$P=B^{2.207}(4.518f+0.0244f^{1.967})$	99	60

(2) Core Loss Graph



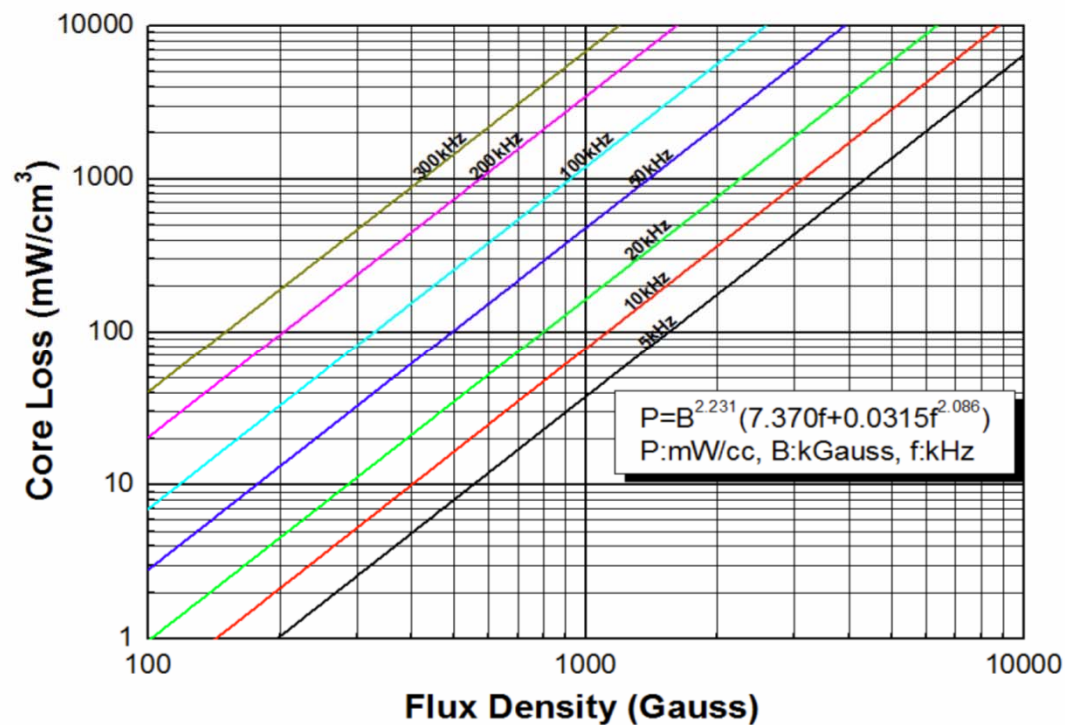
Core Loss - 60μ

(1) Material Comparison

Unit : [mW/cc]

Material	60 μ Core Loss		
	Core Loss Equation (P:mW/cc, B:kGauss, f:kHz)	@20kHz, 1000G	@50kHz, 500G
MegaFlux	$P=B^{2.145}(8.874f+0.0632f^{1.980})$	201	132
KS Core	$P=B^{2.231}(7.370f+0.0315f^{2.086})$	163	102
SENDUST	$P=B^{2.207}(4.518f+0.0244f^{1.967})$	99	60

(2) Core Loss Graph



Design Example: Solar Inverter

APPLICATION: 9KW Solar Inverter AC Filter Inductor

SWITCHING FREQUENCY: 17 KHz

I_{rms} : 13 A

I_{peak} : 21 A

ΔI : 6.3 A

INDUCTANCE: 700 μ h @ 21 A

Design Example: Solar Inverter

(1) Core Selection – Same Core Size for $L(21A)=700\ \mu H$

- MegaFlux : CK610060
- KS : KS610040
- Sendust : CS610026

(2) Wire & Winding (Same Core Size, Same Winding Factor)

Material	Core P/N	Current Density	Wire Size	Wire Eff. Area	Turns	Wire Weight	Winding Factor
MegaFlux	CK610060	3.42 A/mm ²	ϕ 2.2 mm	3.80mm ²	77	245g	38%
KS	KS610040	4.36 A/mm ²	ϕ 1.95 mm	2.98mm ²	99	245g	38%
Sendust	CS610026	6.50 A/mm ²	ϕ 1.6 mm	2.01mm ²	146	245g	38%

Design Example: Solar Inverter

(3) Inductance

Material	Core P/N	Wire Size	Turns	L(0A)	L(13A)	L(21A) Spec=700 μ H min
MegaFlux	CK610060	ϕ 2.2 mm	77	1,138 μ H	927 μ H	711 μ H
KS	KS610040	ϕ 1.95 mm	99	1,254 μ H	940 μ H	705 μ H
Sendust	CS610026	ϕ 1.6 mm	146	1,769 μ H	1,060 μ H	703 μ H

(4) ΔT & Loss

Material	Core P/N	Wire Size	Turns	ΔT	DCR@20 $^{\circ}$ C	Core Loss	Copper Loss	Total Loss
MegaFlux	CK610060	ϕ 2.2 mm	77	96 $^{\circ}$ C	31.9m Ω	23.0W	7.0W	30.0W
KS	KS610040	ϕ 1.95 mm	99	75 $^{\circ}$ C	52.3m Ω	11.5W	10.8W	22.3W
Sendust	CS610026	ϕ 1.6 mm	146	89 $^{\circ}$ C	114.7m Ω	2.80W	24.6W	27.5W

Design Example: UPS Inductor

- APPLICATION: 20KVA UPS Inductor
- SWITCHING FREQUENCY: 20 KHz
- I_{rms} : 24 A
- I_{peak} : 34 A
- ΔI : 8.0 A
- INDUCTANCE: 260 μ h @ 34 A

Design Example: UPS Inductor

(1) Core Selection – Same Core Size for $L(34A)=260\ \mu\text{H}$

- MegaFlux : CK571060 x 2pcs
- KS : KS571040 x 2pcs
- Sendust : CS571026 x 2pcs

(2) Wire & Winding (Same Core Size, Same Winding Factor)

Material	Core P/N Stacking	Current Density	Wire Size	Wire Eff. Area	Turns	Wire Weight	Winding Factor
MegaFlux	CK571060 2pcs	3.90 A/mm ²	ϕ 2.80 mm	6.15mm ²	38	223g	45%
KS	KS571040 2pcs	5.10 A/mm ²	ϕ 2.45 mm	4.71mm ²	49	220g	45%
Sendust	CS571026 2pcs	7.40 A/mm ²	ϕ 2.03 mm	3.24mm ²	71	220g	45%

Design Example: UPS Inductor

(3) Inductance

Material	Core P/N Stacking	Wire Size	Turns	L(0A)	L(24A)	L(34A) Spec=260 μ H min
MegaFlux	CK571060 2pcs	ϕ 2.80 mm	38	398 μ H	317 μ H	263 μ H
KS	KS571040 2pcs	ϕ 2.45 mm	49	442 μ H	322 μ H	263 μ H
Sendust	CS571026 2pcs	ϕ 2.03 mm	71	604 μ H	351 μ H	263 μ H

(4) ΔT & Loss

Material	Core P/N Stacking	Wire Size	Turns	ΔT	DCR@20 $^{\circ}$ C	Core Loss	Copper Loss	Total Loss
MegaFlux	CK571060 2pcs	ϕ 2.80 mm	38	81 $^{\circ}$ C	11.2m Ω	16.9W	8.0W	24.9W
KS	KS571040 2pcs	ϕ 2.45 mm	49	71 $^{\circ}$ C	18.8m Ω	8.3W	13.0W	21.3W
Sendust	CS571026 2pcs	ϕ 2.03 mm	71	100 $^{\circ}$ C	39.6m Ω	2.1W	30.0W	32.1W

KS Core Part List Toroids

P/N	Before Finish Dimensions			After Finish Dimensions			Path length (cm)	Cross Section Area (cm ²)	AL value (nH/n ²)		
	OD(mm) MAX	ID(mm) MIN	HT(mm) MAX	OD(mm) MAX	ID(mm) MIN	HT(mm) MAX			026u	040μ	060u
KS096	9.65	4.78	3.18	10.29	4.27	3.81	2.18	0.0752	11	17	25
KS097	9.65	4.78	3.96	10.29	4.27	4.57	2.18	0.0945	14	21	32
KS102	10.16	5.08	3.96	10.80	4.57	4.57	2.38	0.1000	14	21	32
KS112	11.18	6.35	3.96	11.90	5.89	4.72	2.69	0.0906	11	17	26
KS127	12.70	7.62	4.75	13.46	6.99	5.51	3.12	0.114	12	18	27
KS166	16.51	10.16	6.35	17.4	9.53	7.11	4.11	0.192	15	23	35
KS172	17.27	9.65	6.35	18.03	9.02	7.11	4.14	0.232	19	29	43
KS203	20.32	12.7	6.35	21.1	12.07	7.11	5.09	0.226	14	21	32
KS229	22.86	13.97	7.62	23.62	13.39	8.38	5.67	0.331	19	29	43
KS234	23.57	14.4	8.89	24.3	13.77	9.7	5.88	0.388	22	34	51
KS270	26.92	14.73	11.18	27.7	14.1	11.99	6.35	0.654	32	50	75
KS330	33.02	19.94	10.67	33.83	19.3	11.61	8.15	0.672	28	41	61
KS343	34.29	23.37	8.89	35.2	22.6	9.83	8.95	0.454	16	25	38
KS358	35.81	22.35	10.46	36.7	21.5	11.28	8.98	0.678	24	37	56
KS400	39.88	24.13	14.48	40.7	23.3	15.37	9.84	1.072	35	54	81
KS467	46.74	24.13	18.03	47.6	23.3	18.92	10.74	1.990	59	90	135
KS468	46.74	28.7	15.24	47.6	27.9	16.13	11.63	1.340	37	57	86
KS508	50.8	31.75	13.46	51.7	30.9	14.35	12.73	1.250	32	49	73
KS571	57.15	26.39	15.24	58	25.6	16.1	12.50	2.290	60	92	138
KS572	57.15	35.56	13.97	58	34.7	14.86	14.30	1.444	33	50	75
KS610	62	32.6	25	63.1	31.37	26.27	14.37	3.675	83	128	192
KS740	74.1	45.3	35	75.2	44.07	36.27	18.38	5.040	89	137	206
KS777	77.8	49.23	12.7	78.9	48	13.97	20.00	1.770	30	45	68
KS778	77.8	49.23	15.9	78.9	48	17.02	20.00	2.270	37	57	85
KS888	88.9	66	15.9	90	64.74	17.2	24.01	1.830	24	38	57

KS Part List: Big toroidal Core

P/N	Before Finish Dimensions			After Finish Dimensions			Path length (cm)	Cross Section Area (cm ²)	AL value (nH/n ²)		
	OD(mm) MAX	ID(mm) MIN	HT(mm) MAX	OD(mm) MAX	ID(mm) MIN	HT(mm) MAX			026u	040μ	060u
KS1013	101.6	57.2	13.6	103.1	55.7	14.9	24.27	2.972	40	61	92
KS1016	101.6	57.2	16.5	103.1	55.7	17.8	24.27	3.522	48	75	112
KS1027	101.6	57.2	27.2	103.1	55.7	28.5	24.27	5.944	80	123	184
KS1033	101.6	57.2	33.0	103.1	55.7	34.3	24.27	7.044	96	149	224
KS1320	132.5	78.6	20.3	134.2	77.0	21.7	32.42	5.347	54	83	124
KS1325	132.5	78.6	25.4	134.2	77.0	26.8	32.42	6.710	68	104	156
KS1333	132.5	78.6	33.0	134.2	77.0	34.4	32.42	8.717	88	135	202
KS1340	132.5	78.6	40.6	134.2	77.0	42.0	32.42	10.694	108	165	248
KS1625	165.0	88.9	25.4	167.2	86.9	27.3	38.65	9.460	80	123	184

KS Part List Block Cores

P/N	Dimensions			Path length (cm)	Cross Section Area (cm ²)	4PCS AL value (nH/n ²)±12%		
	A Length (mm)	B Width (mm)	C Height (mm)			026u	040u	060u
BSH5315	50.5±0.5	30.3±0.3	15±0.2	18,71	4,5	95	121	181
BSH5320	50.5±0.5	30.3±0.3	20±0.2	18.28	6	130	165	247
BSH6315	60.5±0.5	30.3±0.3	15±0.2	22.71	4.5	79	100	149
BSH6320	60.5±0.5	30.3±0.3	20±0.2	22.28	6	107	135	203
BSH7315	70.5±0.5	30.3±0.3	15±0.2	26.71	4.5	67	85	127
BSH7320	70.5±0.5	30.3±0.3	20±0.2	26.28	6	91	115	172
BSH8315	80.5±0.5	30.3±0.3	15±0.2	30.71	4.5	58	74	110
BSH8320	80.5±0.5	30.3±0.3	20±0.2	30.28	6	78	100	149



Chang Sung Corp is the global leader in the manufacture of powder cores. Their offering includes:

- MPP
- High Flux (HF)
- Sendust
- Megaflux
- KH Series
- KS Series
- HS Series

Chang Sung Corp is Distributed in North America by:

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