

HIGH QUALITY MAG-AMP CORES

PRODUCT SUMMARY

Description Mag-Amp technique is one of simple, the most reliable and cost-effective post regulation ways providing control on the secondary side of the auxiliary outputs in multiple-output switch mode power supplies. Therefore, Mag-Amp cores are now the industry standard for implementing high precision and high efficiency independent of outputs in switch-mode power supplies of server, telecom and personal computer applications.

Adapting MA Mag-Amp gives following attractive benefits.

1. Shorten Design Time with Reduced Total Cost

simple circuit construction with fewer component for the control circuit is achieved.

2. High Reliability

Mag-Amp can withstand instantaneous surges in current or voltage and protect output diode from voltage and current spike in circuit.

3. High Precision and Low Noise

The output voltage kept in tightly from no load to full load conditions and noise from output diode is suppressed by high inductance of Mag-Amp in series connection with diode.

it's differ from semiconductor regulation(eg.MOS-FET)which adds switching noise in regulating circuit.

Feature • High squareness(~98%)

- Low coercive force field
- Low temperature rise
- High efficiency
- Low reset current requirement
- UL94V-0 compliant

Application • Magnetic Amplifiers for Switched mode power supplies.(PC, Server, OA)

- Magnetic Amplifiers for DC to DC Converter.
- Power supplies for network products such as Hubs, etc.
- Adapter for notebook / laptop
- Oscillating transformer
- Other kinds of saturable reactors

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STANDARD CORE DIMENSIONS & SPECIFICATIONS

Part No.	Finished Core(mm) ①			L _{eff} ② (mm)	A _{eff} ③ (mm ²)	V _{eff} ④ (mm ³)	W _a ⑤ (mm ²)	ØW _a ⑥ (μWb-mm ²)	Ø ⑦ (μWb)
	OD	ID	HT						
MA-09S-L	10.7	5.5	6.3	25.0	3.5	88	24	97	4.1
MA-10S-L	11.9	5.8	6.3	27.0	4.7	129	26	145	5.5
MA-10B-L	11.2	5.7	5.7	25.9	6.0	157	26	176	6.9
MA-11A-L	14.0	6.6	4.8	29.9	3.7	113	34	147	4.3
MA-11S-L	14.0	6.6	6.3	29.9	5.6	196	34	257	6.6
MA-12A-L	14.0	6.6	4.8	31.0	4.7	147	34	185	5.4
MA-12S-L	14.0	6.6	6.3	31.0	7.0	221	34	277	8.1
MA-13B-L	14.7	7.8	4.6	34.8	4.1	144	48	235	4.8
MA-14S-L	15.9	6.8	6.5	34.3	10.0	350	36	421	11.6
MA-15A-L	16.7	10.5	6.3	42.2	5.3	223	87	528	6.1
MA-15S-L	16.9	8.6	6.5	38.7	9.1	355	58	624	10.5
MA-16B-L	17.8	11.0	5.1	44.7	4.0	179	95	445	4.6
MA-16D-L	17.8	8.3	8.1	39.3	12.6	504	54	801	14.8
MA-16A-L	17.8	8.3	8.1	40.1	14.4	588	54	904	16.7
MA-18S-L	19.8	10.4	6.4	46.5	10.5	496	85	1036	12.2
MA-18D-L	20.0	8.7	12.0	45.7	21.1	973	59	1451	24.4
MA-19B-L	21.2	11.0	5.1	49.4	8.1	407	95	910	9.4
MA-19A-L	21.6	11.0	7.9	49.8	15.9	805	95	1758	18.5
MA-20A-L	22.5	10.4	10.1	50.1	23.4	1195	85	2302	27.1
MA-21S-L	22.8	12.4	6.3	54.2	12.3	675	121	1727	14.3
MA-25A-L	27.7	17.3	12.9	70.4	19.5	1378	235	5312	22.6
MA-25S-L	28.4	13.8	12.2	63.4	35.1	2261	150	5912	40.7

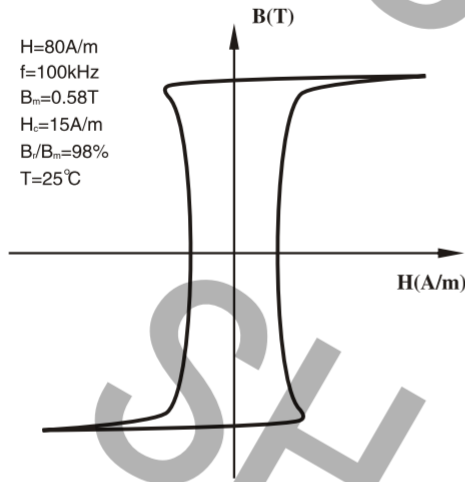
Notes:

- ① The finished core dimensions shows a nominal ones. please consult sales department for tolerance.
- ② Norminal values of magnetic path length.
- ③ Norminal values of cross-section area.
- ④ Norminal values of volume.
- ⑤ Norminal values window area.
- ⑥ Norminal handling power factor.
- ⑦ The typical total flux with its tolerance of ± 15%. All values are measured at 100kHz, 80A/m, RT(~25°C).
For the detailed total flux specification limits, please contact sales and marketing department.
The squareness, Br/Bm(%), of all above listing part numbers is greater than 96% at 100kHz, 80A/m and 25°C.
- * * The coercive force field, Hc(A/m), of all above listing part number is lower than 18A/m at 100kHz, 80A/m and 25°C.
- * * * If customer need the exact information's on each part number, please inquire of SHINHOM sales department.
For a special request, SHINHOM can be provide special Mag-Amp cores with higher permeability.

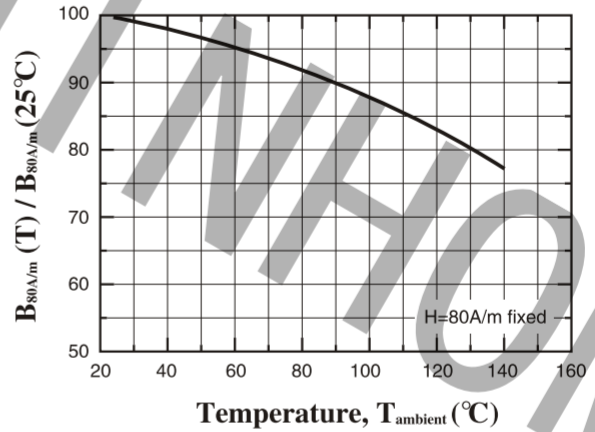
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TYPICAL MAGNETIC CHARACTERISTICS

Typical B-H loop shape @100kHz

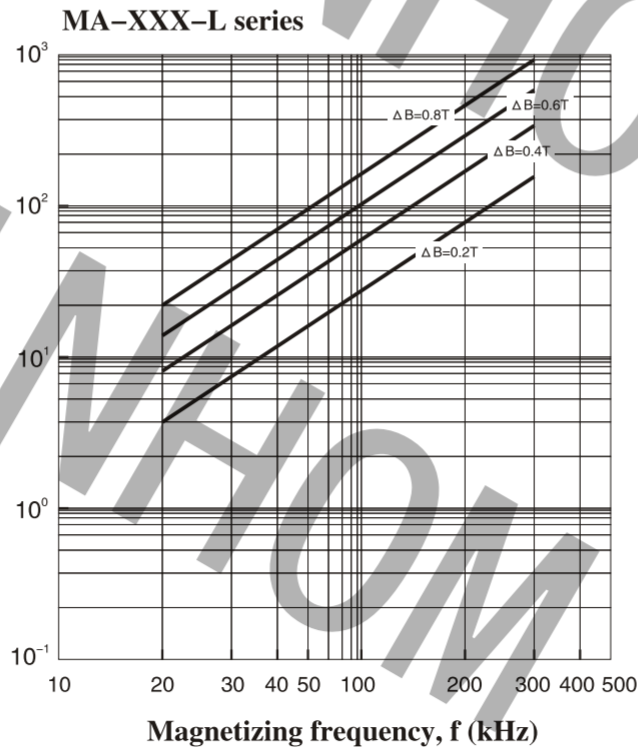


Temperature dependency of $B_T(T)$



* At higher temperatures a lower total flux density swing, $\Phi(T)=2B(T)A$, has to be considered by designer in SMPS design.

Typical magnetic reversal losses of MA series Mag-Amp cores, $P_c(f, \Delta B)$

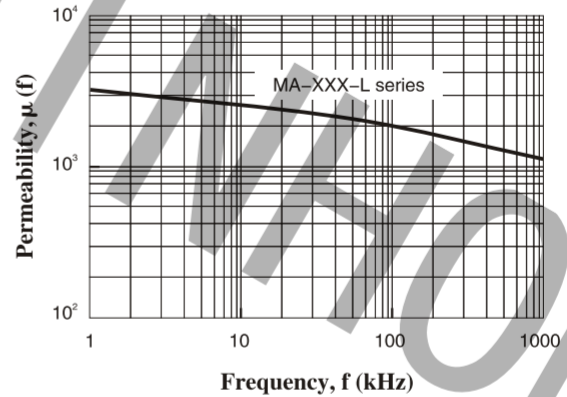
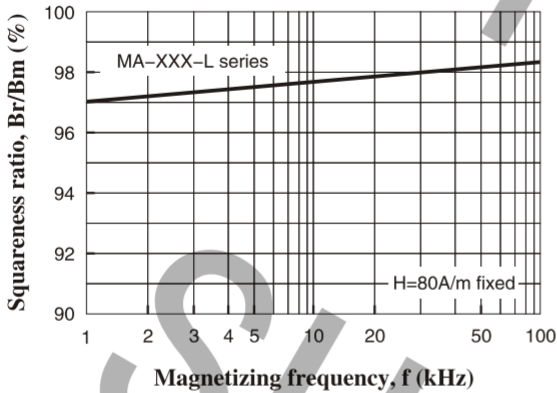


* The core losses measured by sinusoidal waveforms in bipolar swing between +B to -B.

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TYPICAL MAGNETIC CHARACTERISTICS

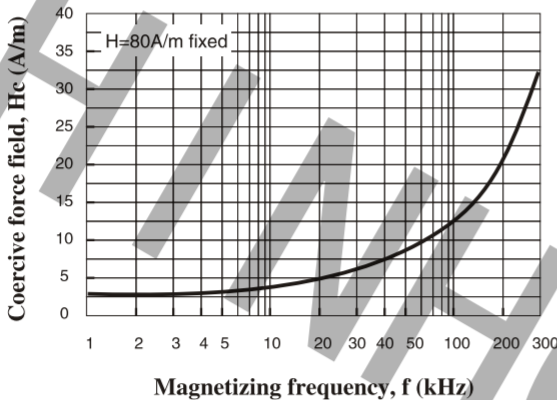
Typical frequency dependency of squareness ratio and permeability



* The squareness of MA-XXX-L series Mag-Amp with Magnetizing frequency shows a nearly constant between lower and higher frequency ranges. MA-XXX-L series is suitable for a high stability SMPS when the load changes dynamically in parallel connected PSU system.

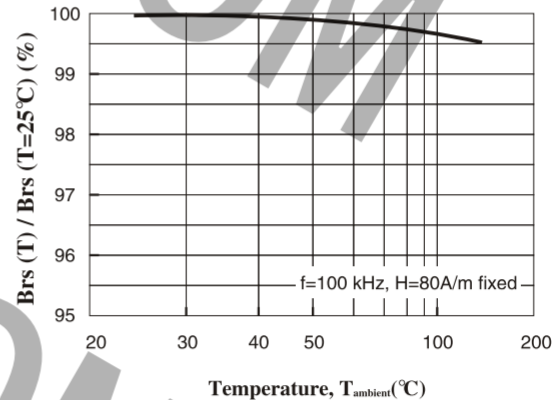
* The permeability of MA-XXX-L series Mag-Amp shows a quite different characteristics with frequency. Before install MA series Mag-AMP in SMPS, it have to be considered the corner frequency and stability of feedback circuit in the PSU system.

Typical frequency dependency of Hc



* The coercive force field have still low value even at 300kHz. it might be provide a higher Mag-Amp gain from PSU feedback-controlled switching element to the output.

Typical temp. dependency of Br/Bm



* The squareness ratio with ambient temperature are negligible in most cases up to 100°C. In normal case, it may not affect the output voltage regulation if the ambient temperature goes up to 100°C except on if the PSU system has a temperature protection function in switching element.