Sumida's Consumer & Industrial Metal Composite Inductors

February 2023

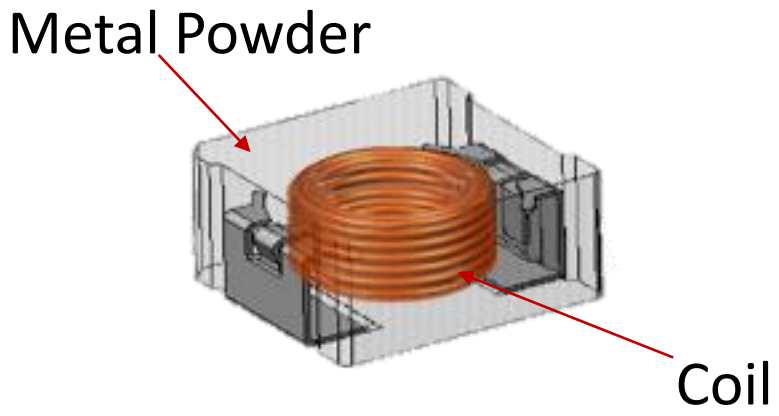
Metal Composite Inductors

A Brief Introduction to Sumida's Consumer & Industrial Metal Composite Inductors

Metal Composite Inductors

Construction Style

Metal Composite Inductors are an assembly of a copper wire coil molded within a core consisting of metal powder bound together with an insulating binding agent.



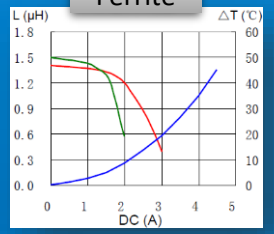
The technology is easily scalable enabling production of part families with sizes ranging from chip-scale inductors (2520) to large form factor inductors up to 17mm.

Metal Composite Type VS. Ferrite Type Inductors

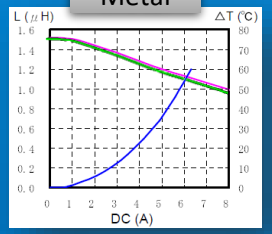
Technology Key Features

Soft/Slow Saturation & Temperature Stability versus Traditional Ferrite Inductors

Ferrite

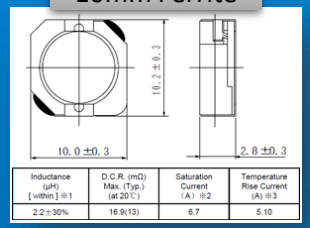


Metal



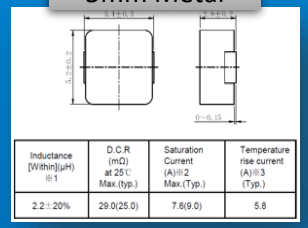
Socket Size Reduction versus Traditional Ferrite Inductors

10mm Ferrite



Inductance (μH) [within] ※1	D.C.R. (mΩ) Max. (Typ.) (at 20℃)	Saturation Current (A) ※2	Temperature Rise Current (A) ※3
2.2±30%	16.9(13)	6.7	5.10

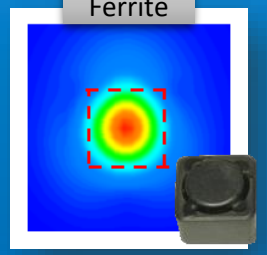
5mm Metal



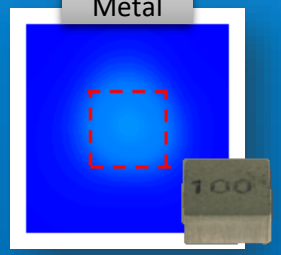
Inductance [Within](μH) ※1	D.C.R (mΩ) at 25℃ Max.(typ.)	Saturation Current (A)※2 Max.(Typ.)	Temperature rise current (A)※3 (Typ.)
2.2±20%	29.0(25.0)	7.6(9.0)	5.8

Reduced EMI Radiation versus Traditional Ferrite Inductors

Ferrite



Metal



Reduced Audible Magnetostriction Susceptibility

Ferrite

Multi-Part Inductor Assembly Lends to Magnetostriction Noise

Metal

Unified Molded Inductor Assembly Reduces Magnetostriction Noise

Metal Composite Type VS. Ferrite Type Inductors

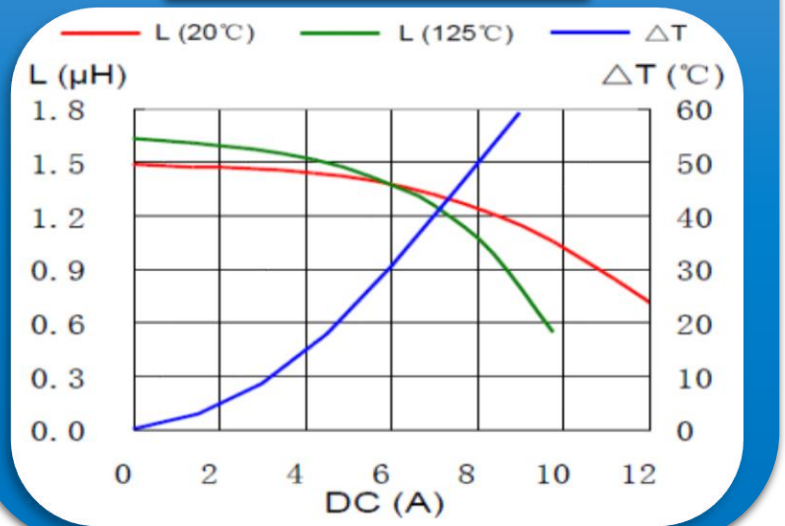
Technology Key Features

Slow Saturation & Temperature Stability

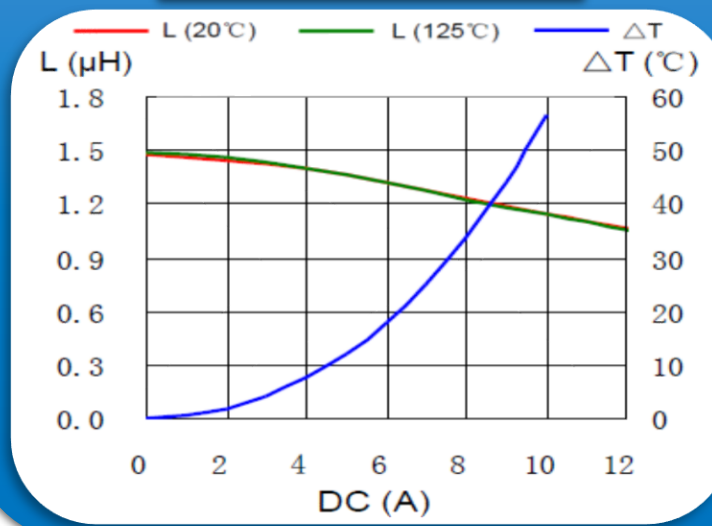
Traditional Ferrite versus Metal Composite Inductors

There is Very Little Degradation in the Saturation Current Performance Over the Full Operating Temperature Range

1.5uH Ferrite



1.5uH Metal



I_{SAT} Current (Temperature Stability)

- *Metal Composite Inductors:* I_{SAT} is stable across the operating temperature range (Sat curves overlay)
- *Ferrite Inductors:* there is performance de-rating as the temperature increases (Sat curves shift left)

I_{SAT} Current (Saturation Rate)

- *Metal Composite Inductors:* The rate of saturation is slow and linear as inductance drops to zero
- *Ferrite Inductors:* the rate of saturation is somewhat flat until the knee and then rolls off dramatically

Metal Composite Type VS. Ferrite Type Inductors

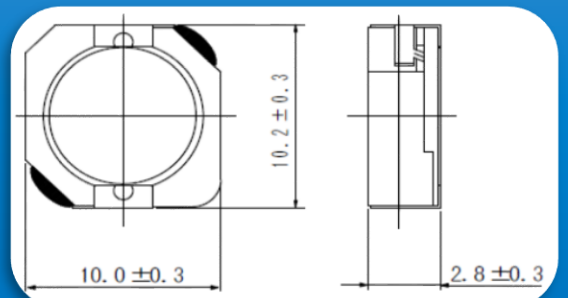
Technology Key Features

Socket Size Reduction

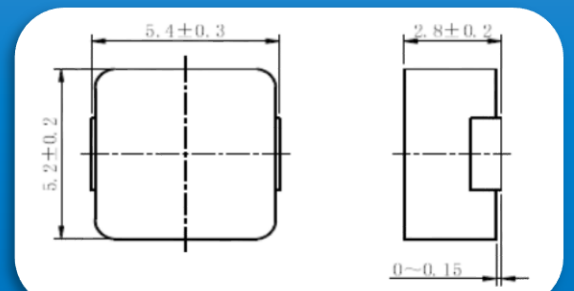
Traditional Ferrite versus Metal Composite Inductors

In this example there is a 72% reduction in the occupied board space while still maintaining similar part performance.

10mm Ferrite



5mm Metal



Inductance [Within](μH) ※1	D.C.R (mΩ) at 25℃ Max.(typ.)	Saturation Current (A)※2 Max.(Typ.)	Temperature rise current (A)※3 (Typ.)
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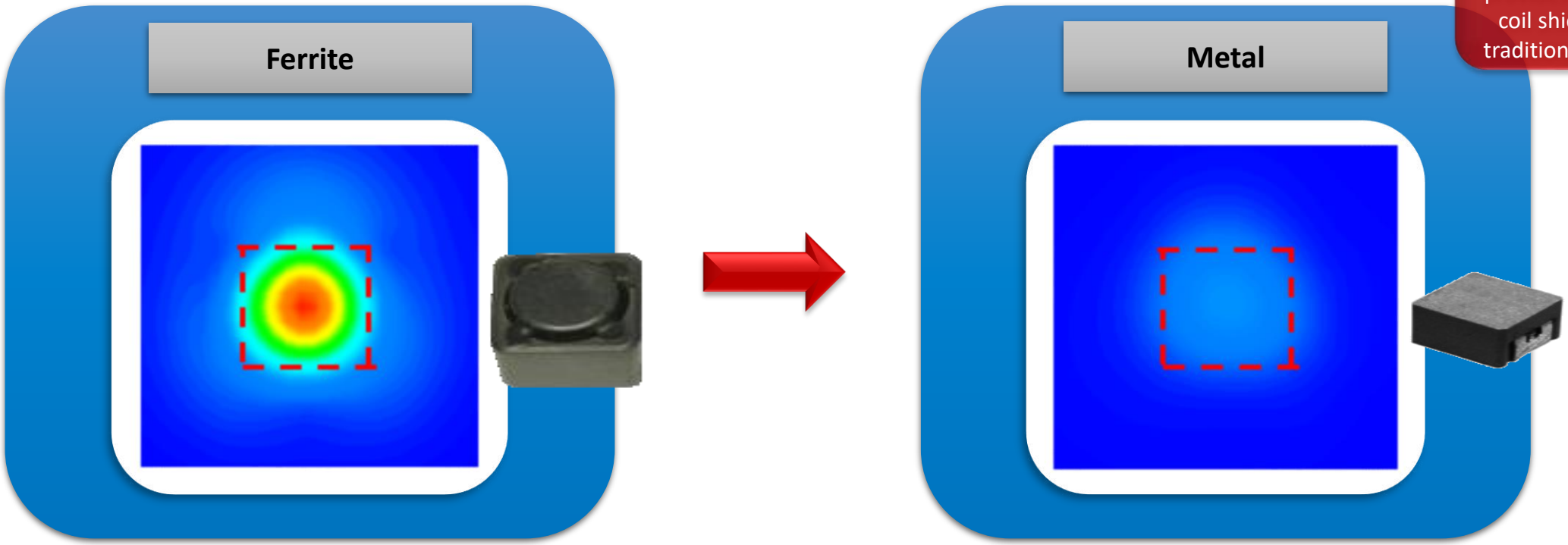
Metal Composite Type VS. Ferrite Type Inductors

Technology Key Features

Reduced EMI Radiation

Traditional Ferrite versus Metal Composite Inductors



The Encapsulated Structure of Metal Composite Inductors provides far superior coil shielding over traditional inductors.

Metal Composite Type VS. Ferrite Type Inductors

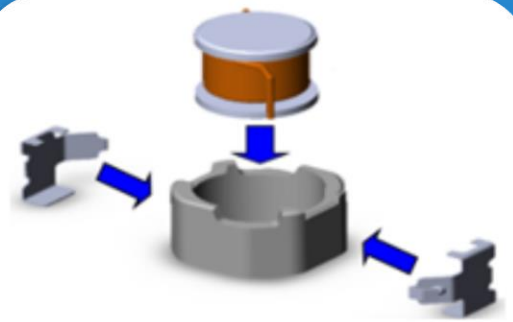
Technology Key Features

Reduced Audible Magnetostriction Susceptibility

Traditional Ferrite versus Metal Composite Inductors

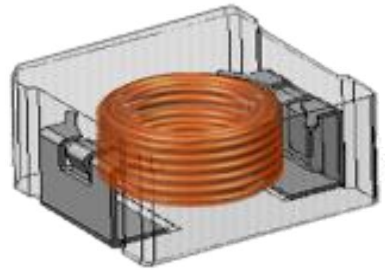
The Molded-style Architecture of Metal Composite Inductors significantly reduces the opportunity for audible noise issues.

Ferrite



Multi-Part Inductor Assembly Lends to Magnetostriction Noise

Metal



Unified Molded Inductor Assembly Reduces Magnetostriction Noise

Metal Composite Inductors (Consumer/Industrial)

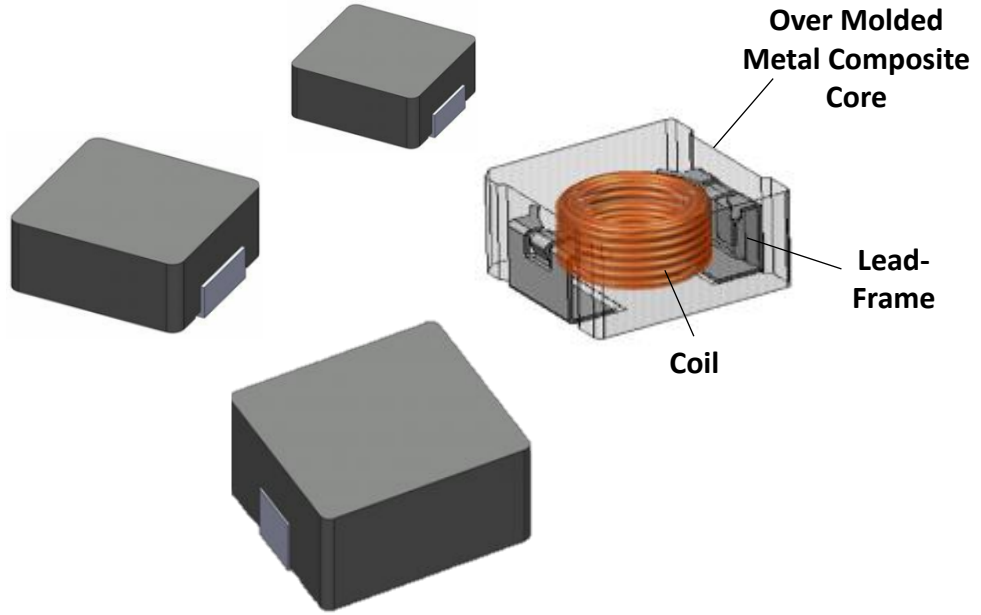
RoHS
Halogen Free

sumida

Product Overview

Features

- Magnetically Shielded, Over Molded Metal Composite Core Architecture
- Suitable for Large Current Designs
- Stable Saturation Performance over the full Temperature Range
- Low Audible Core Noise (Magnetostriction)
- Operational Temperature Range : **- 40℃ ～＋125℃**
  (including coil self-heating)
- Product Line Up: Sizes Range from 4mm ~ 17mm
- Targeting: Noise Filters, DC/DC Converters in CPU, LCD Display, POL, etc.

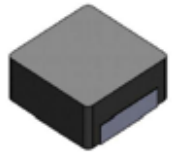


New Family Line Up

	4mm	5mm	6mm	8mm	10mm	12mm	17mm
Available Sizes & Physical Package	0410CDMCC/DS	0512CDMCC/DS	0618CDMCC/DS	0830CDMCC/DS	104CDMCC/DS	125CDMCC/DS	177CDMCC/DS
	0412CDMCC/DS	0518CDMCC/DS	0624CDMCC/DS	0840CDMCC/DS	104CDMCD/DS		
	0415CDMCC/DS	0530CDMCC/DS	0630CDMCC/DS				
	0420CDMCC/DS		0630CDMCD/DS				
			0640CDMCC/DS				

Metal Composite Inductors (Consumer/Industrial)

Product Family Summary

Sumida Type Name		Dimension (mm)			Saturation Current (A)		Temp Rise Current (A)		DCR (mΩ)		Inductance Range (µH)		
		L	W	H	Low	High	Low	High	Low	High	Low	100nH 1uH 10uH 100uH 1mH	High
	0410CDMCC/DS	4.8	4.5	1.0	16.0	1.5	14.0	1.6	4.9	265	0.10		10 .0
	0412CDMCC/DS	4.8	4.5	1.2	11.0	3.1	6.5	1.8	17	175	0.33		4.7
	0415CDMCC/DS	4.8	4.5	1.5	14.3	2.7	12.0	2.1	5.1	170	0.22		6.8
	0420CDMCC/DS	4.8	4.5	2.0	22.0	1.7	17.0	1.2	3.5	330	0.10		22
	0512CDMCC/DS	5.7	5.4	1.2	18.1	3.6	14.0	2.3	4.1	138	0.10		4.7
	0518CDMCC/DS	5.7	5.4	1.8	15.0	2.0	10.5	1.8	7.7	240	0.47		15
	0530CDMCC/DS	5.7	5.4	3.0	18.0	4.0	14.0	2.8	3.5	110	0.20		10
	0618CDMCC/DS	7.3	6.8	1.8	16.9	4.0	9.8	2.3	10.0	150	0.68		10
	0624CDMCC/DS	7.3	6.8	2.4	36.1	3.2	22.0	1.9	2.5	222	0.22		22
	0630CDMCC/DS	7.3	6.8	3.0	38.0	4.0	24.0	2.3	2.5	180	0.20		22
	0630CDMCD/DS	7.3	6.8	3.0	61.8	8.5	32.5	4.8	1.5	54	0.10		6.8
	0640CDMCC/DS	7.3	6.8	4.0	50.0	3.8	45.0	3.3	0.7	110	0.15		22
	0830CDMCC/DS	8.4	8.0	3.0	36.0	3.2	27.0	2.5	1.9	170	0.22		33
	0840CDMCC/DS	8.4	8.0	4.0	40.5	3.2	29.0	2.8	2.0	145	0.22		33
	104CDMCC/DS	11.5	10.3	4.0	71.0	4.0	43.0	2.5	0.5	178	0.15		68
	104CDMCD/DS	11.5	10.3	4.0	90.0	12.6	62.0	6.6	0.7	32.5	0.19		10
	125CDMCC/DS	13.8	12.9	5.0	80.0	6.3	40.0	4.5	0.7	81	0.36		47
	177CDMCC/DS	17.5	17.2	7.0	85.5	9.1	57.0	6.5	0.8	42.8	0.47		47

Thank You