

Overview

The KEMET MPX metal composite inductors are ideal for use in DC to DC switching power supplies, as power inductors as well as EMI filter inductors. The metal composite core has high saturation characteristics maintaining function in rush current mode and characterized by temperature stable inductance.

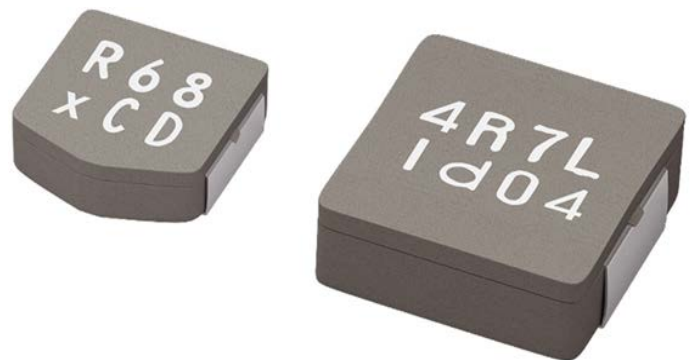
Applications

Consumer and commercial power applications such as:

- High frequency DC-DC converters, including WBG GaN applications
- PCs and servers
- Points of loads (POL)
- Field-programmable gate arrays (FPGA)
- Battery powered regulators

Benefits

- Metal composite powder
- Shielded construction, SMD configuration
- Inductance range from 0.10 – 47.00 μ H
- Operating temperature up to +155°C
- Low acoustic noise
- Low magnetic flux leakage



Part Number System

MPX	Version	D0520	L	1R5
Series		Size Code	Inductor	Inductance Code μ H
MPX	1	D0520 = 5x5x2.0 mm D0530 = 5x5x3.0 mm D0618 = 6x6x1.8 mm D0624 = 6x6x2.4 mm D0630 = 6x6x3.0 mm D0650 = 6x6x5.0 mm D0830 = 8x8x3.0 mm D0840 = 8x8x4.0 mm		The first two digits represent the inductance value. The third digit indicates the number of zeros to be added. R = decimal point Examples: 100 = 10.0 μ H R68 = 0.68 μ H 1R5 = 1.50 μ H

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to +155°C (including self-temperature rise)
Rated Inductance Range	0.10 – 47.00 µH at 100 kHz, 1 mA
Inductance Tolerance	±20%
Rated DC Resistance Range	1.5 – 341.2 mΩ maximum
Rated Current Range	2.0 – 35.4 A

Table 1 – Ratings & Part Number Reference

Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)	
					I _{rms} ¹ (Reference)	I _{sat} ² (Reference)
MPX1D0520LR15	0.15	±20%	3.4	3.9	16.9	22.0
MPX1D0520LR22	0.22	±20%	4.3	5.0	15.0	19.0
MPX1D0520LR33	0.33	±20%	5.3	6.2	13.4	16.0
MPX1D0520LR47	0.47	±20%	6.7	7.8	12.0	14.0
MPX1D0520LR68	0.68	±20%	10.6	12.2	9.5	11.0
MPX1D0520L1R0	1.00	±20%	16.4	18.9	7.6	9.0
MPX1D0520L1R5	1.50	±20%	30.9	35.6	5.6	7.0
MPX1D0520L2R2	2.20	±20%	35.1	40.4	5.2	6.5
MPX1D0520L3R3	3.30	±20%	55.8	64.2	4.1	5.5
MPX1D0520L4R7	4.70	±20%	84.0	96.6	3.4	4.5
MPX1D0520L6R8	6.80	±20%	113.4	130.5	2.9	4.0
MPX1D0520L100	10.00	±20%	193.7	222.8	2.2	3.5
MPX1D0530LR15	0.15	±20%	2.4	2.8	22.0	21.0
MPX1D0530LR22	0.22	±20%	3.4	3.9	18.4	16.0
MPX1D0530LR33	0.33	±20%	4.5	5.2	16.0	15.0
MPX1D0530LR47	0.47	±20%	6.0	6.9	13.8	13.0
MPX1D0530LR68	0.68	±20%	7.1	8.2	12.6	12.0
MPX1D0530L1R0	1.00	±20%	10.0	11.5	10.7	10.5
MPX1D0530L1R5	1.50	±20%	15.3	17.7	8.6	8.0
MPX1D0530L2R2	2.20	±20%	21.4	24.6	7.3	6.5
MPX1D0530L3R3	3.30	±20%	37.2	42.8	5.5	5.5
MPX1D0530L4R7	4.70	±20%	54.1	62.2	4.6	4.5
MPX1D0530L6R8	6.80	±20%	93.7	107.8	3.5	4.0
MPX1D0530L100	10.00	±20%	121.8	140.1	3.1	3.5
MPX1D0530L150	15.00	±20%	186.5	214.6	2.5	3.0
MPX1D0530L220	22.00	±20%	296.6	341.2	2.0	2.5
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	I _{rms} ¹	I _{sat} ²
					Rated Current (A)	

¹ T = 40 K rise at rated current

² Inductance drop 30% at rated current

All electrical characteristics data is referenced to 25°C.

Table 1 – Ratings & Part Number Reference cont.

Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)	
					I _{rms} ¹ (Reference)	I _{sat} ² (Reference)
MPX1D0618LR10	0.10	±20%	2.4	2.8	18.9	40.0
MPX1D0618LR15	0.15	±20%	3.2	3.8	16.2	30.0
MPX1D0618LR22	0.22	±20%	4.6	5.3	13.7	26.0
MPX1D0618LR33	0.33	±20%	5.3	6.1	12.7	20.0
MPX1D0618LR47	0.47	±20%	7.4	8.5	10.7	17.0
MPX1D0618LR68	0.68	±20%	11.0	12.7	8.8	13.0
MPX1D0618L1R0	1.00	±20%	16.7	19.3	7.1	11.0
MPX1D0618L1R5	1.50	±20%	22.4	25.8	6.2	10.5
MPX1D0618L2R2	2.20	±20%	29.4	33.8	5.4	9.0
MPX1D0618L3R3	3.30	±20%	53.4	61.5	4.0	6.5
MPX1D0618L4R7	4.70	±20%	72.5	83.4	3.4	6.0
MPX1D0624LR10	0.10	±20%	1.5	1.8	26.6	42.0
MPX1D0624LR15	0.15	±20%	2.0	2.3	23.2	37.0
MPX1D0624LR22	0.22	±20%	2.8	3.3	19.4	29.0
MPX1D0624LR33	0.33	±20%	3.6	4.2	17.2	22.5
MPX1D0624LR47	0.47	±20%	4.5	5.2	15.4	20.0
MPX1D0624LR68	0.68	±20%	6.7	7.8	12.6	16.0
MPX1D0624L1R0	1.00	±20%	9.1	10.5	10.8	13.0
MPX1D0624L1R5	1.50	±20%	16.1	18.5	8.1	10.0
MPX1D0624L2R2	2.20	±20%	26.6	30.7	6.3	9.0
MPX1D0624L3R3	3.30	±20%	29.4	33.8	6.0	8.0
MPX1D0624L4R7	4.70	±20%	44.0	50.6	4.9	6.5
MPX1D0624L6R8	6.80	±20%	58.6	67.4	4.3	5.5
MPX1D0624L100	10.00	±20%	98.4	113.2	3.3	4.5
MPX1D0630LR10	0.10	±20%	1.3	1.5	31.1	50.0
MPX1D0630LR15	0.15	±20%	1.6	1.9	27.6	40.0
MPX1D0630LR22	0.22	±20%	2.2	2.6	23.3	33.0
MPX1D0630LR33	0.33	±20%	2.7	3.2	21.1	25.0
MPX1D0630LR47	0.47	±20%	3.5	4.0	18.7	21.0
MPX1D0630LR68	0.68	±20%	5.3	6.2	15.1	17.0
MPX1D0630L1R0	1.00	±20%	7.1	8.2	13.1	13.0
MPX1D0630L1R5	1.50	±20%	11.0	12.7	10.5	11.0
MPX1D0630L2R2	2.20	±20%	15.9	18.3	8.7	9.0
MPX1D0630L3R3	3.30	±20%	26.3	30.3	6.8	7.0
MPX1D0630L4R7	4.70	±20%	31.8	36.7	6.2	6.5
MPX1D0630L6R8	6.80	±20%	44.2	50.9	5.2	5.5
MPX1D0630L100	10.00	±20%	67.8	78.0	4.2	4.5
MPX1D0630L150	15.00	±20%	113.2	130.2	3.3	4.0
MPX1D0630L220	22.00	±20%	162.0	186.3	2.7	3.5
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	I _{rms} ¹	I _{sat} ²
					Rated Current (A)	

¹ T = 40 K rise at rated current

² Inductance drop 30% at rated current

All electrical characteristics data is referenced to 25°C.

Table 1 – Ratings & Part Number Reference cont.

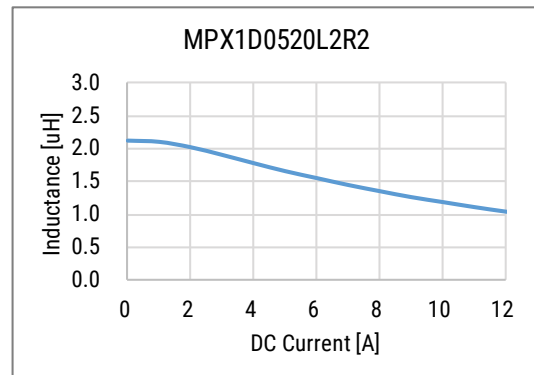
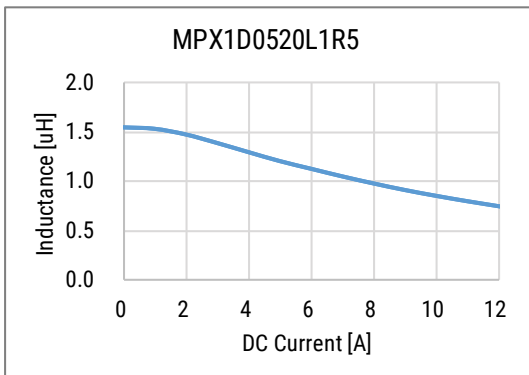
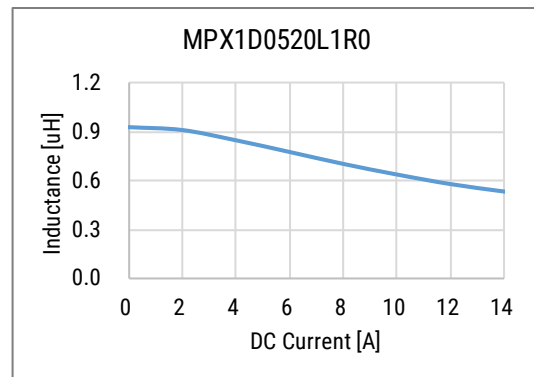
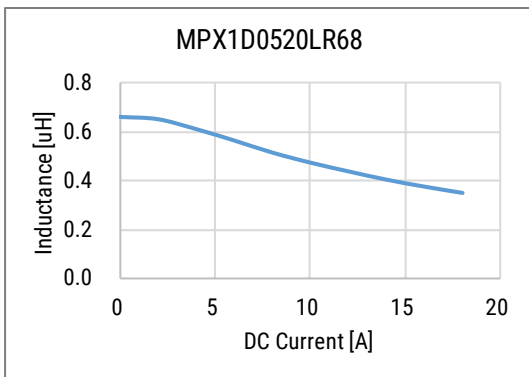
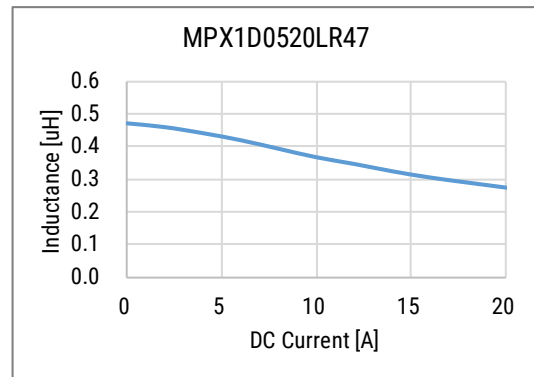
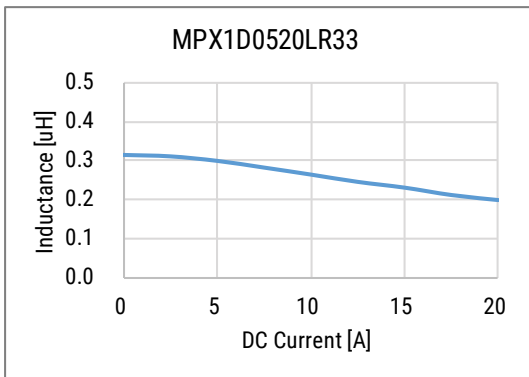
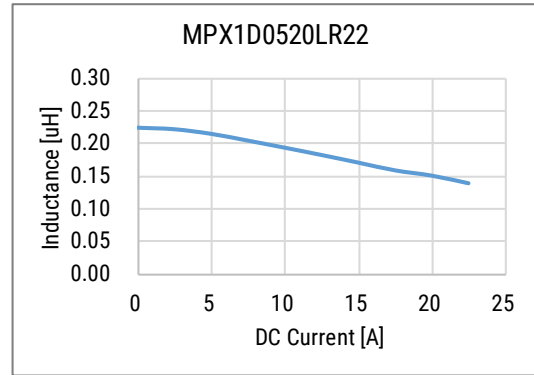
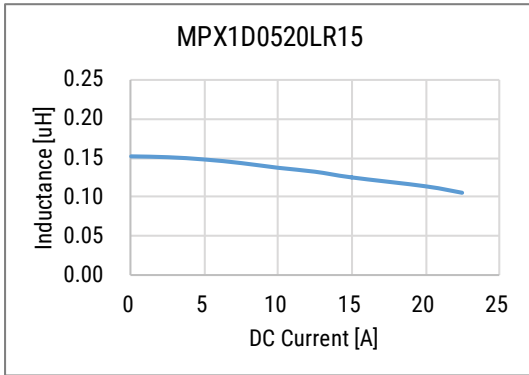
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)	
					I _{rms} ¹ (Reference)	I _{sat} ² (Reference)
MPX1D0650LR68	0.68	±20%	3.6	4.1	18.8	17.0
MPX1D0650L1R0	1.00	±20%	5.1	6.0	15.6	13.0
MPX1D0650L1R5	1.50	±20%	7.2	8.3	13.2	12.0
MPX1D0650L2R2	2.20	±20%	10.0	11.6	11.2	10.0
MPX1D0650L3R3	3.30	±20%	16.4	18.9	8.7	8.0
MPX1D0650L4R7	4.70	±20%	27.8	32.0	6.7	6.5
MPX1D0650L6R8	6.80	±20%	38.4	44.2	5.7	5.5
MPX1D0650L100	10.00	±20%	53.4	61.4	4.8	4.5
MPX1D0830LR22	0.22	±20%	1.6	1.9	30.7	43.0
MPX1D0830LR33	0.33	±20%	2.3	2.7	25.8	35.0
MPX1D0830LR47	0.47	±20%	2.7	3.1	24.0	30.0
MPX1D0830LR68	0.68	±20%	3.8	4.4	20.1	28.0
MPX1D0830L1R0	1.00	±20%	5.0	5.7	17.6	23.0
MPX1D0830L1R5	1.50	±20%	7.9	9.1	14.0	18.0
MPX1D0830L2R2	2.20	±20%	11.8	13.6	11.4	14.0
MPX1D0830L3R3	3.30	±20%	19.4	22.3	8.9	12.5
MPX1D0830L4R7	4.70	±20%	25.8	29.7	7.7	10.5
MPX1D0830L6R8	6.80	±20%	32.9	37.9	6.8	10.0
MPX1D0830L100	10.00	±20%	53.6	61.7	5.4	8.0
MPX1D0830L150	15.00	±20%	82.3	94.6	4.3	6.5
MPX1D0830L220	22.00	±20%	116.9	134.5	3.6	5.0
MPX1D0830L330	33.00	±20%	199.6	229.5	2.8	4.0
MPX1D0840LR22	0.22	±20%	1.2	1.5	35.4	53.0
MPX1D0840LR33	0.33	±20%	2.0	2.4	27.7	45.0
MPX1D0840LR47	0.47	±20%	2.3	2.7	25.8	38.0
MPX1D0840LR68	0.68	±20%	3.1	3.6	22.4	30.0
MPX1D0840L1R0	1.00	±20%	3.6	4.2	20.8	28.0
MPX1D0840L1R5	1.50	±20%	5.8	6.8	16.2	19.0
MPX1D0840L2R2	2.20	±20%	7.5	8.7	14.3	17.0
MPX1D0840L3R3	3.30	±20%	12.1	14.0	11.3	15.0
MPX1D0840L4R7	4.70	±20%	20.4	23.5	8.7	11.0
MPX1D0840L6R8	6.80	±20%	29.0	33.4	7.3	9.0
MPX1D0840L100	10.00	±20%	43.1	49.6	6.0	7.5
MPX1D0840L150	15.00	±20%	56.5	65.0	5.2	6.5
MPX1D0840L220	22.00	±20%	85.4	98.3	4.2	5.5
MPX1D0840L330	33.00	±20%	134.1	154.2	3.4	4.5
MPX1D0840L470	47.00	±20%	197.1	226.7	2.8	3.5
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	I _{rms} ¹	I _{sat} ²
					Rated Current (A)	

¹ T = 40 K rise at rated current

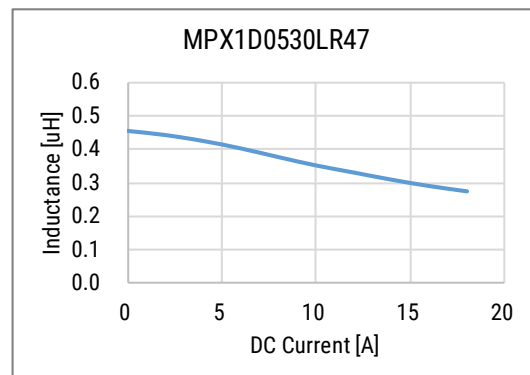
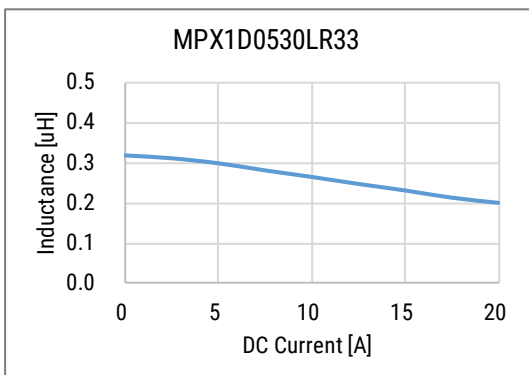
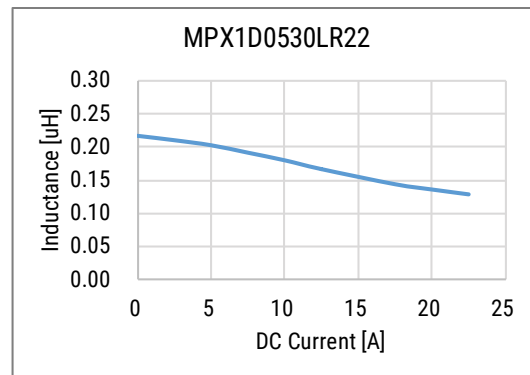
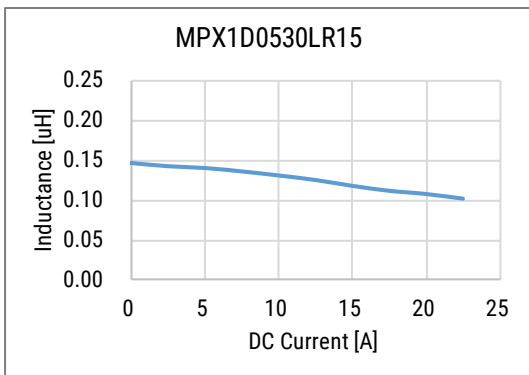
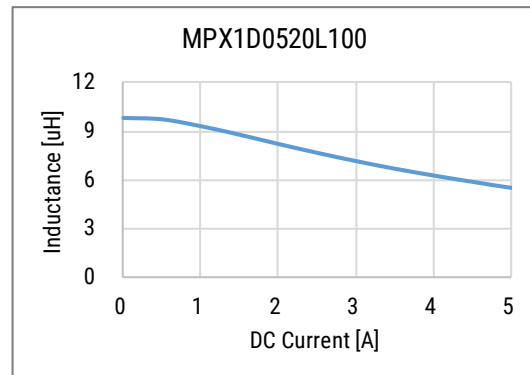
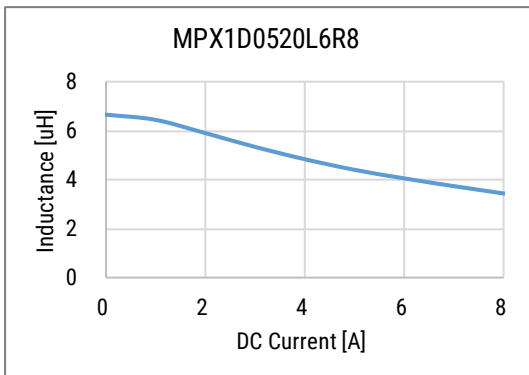
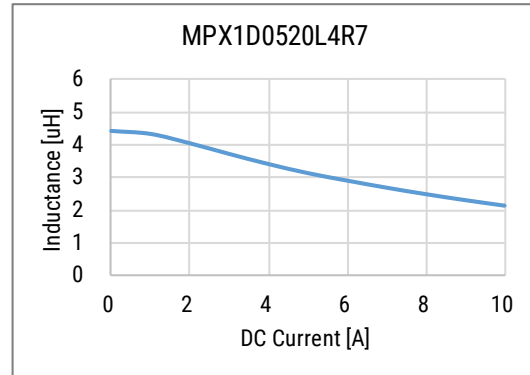
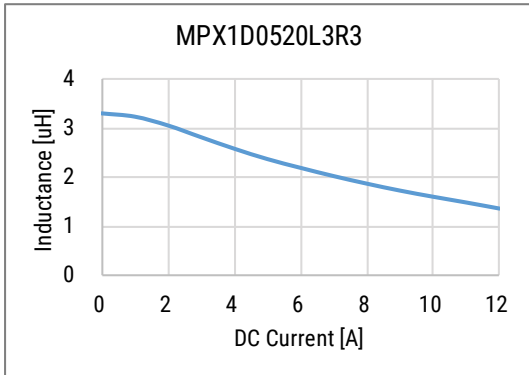
² Inductance drop 30% at rated current

All electrical characteristics data is referenced to 25°C.

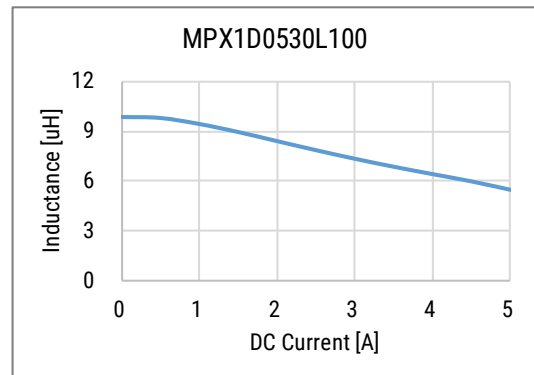
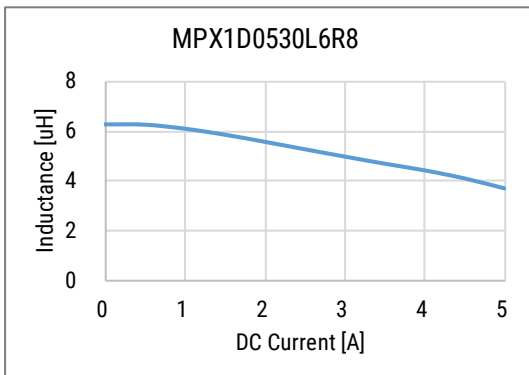
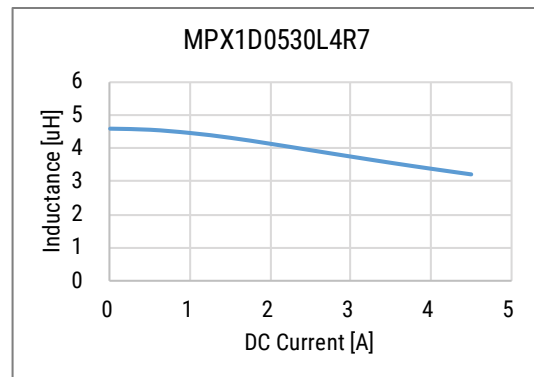
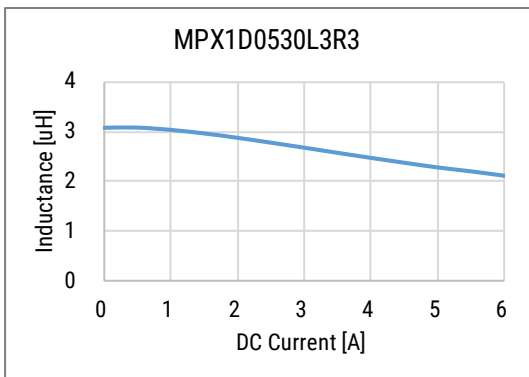
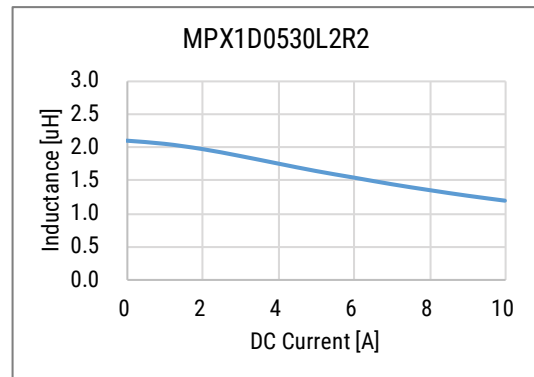
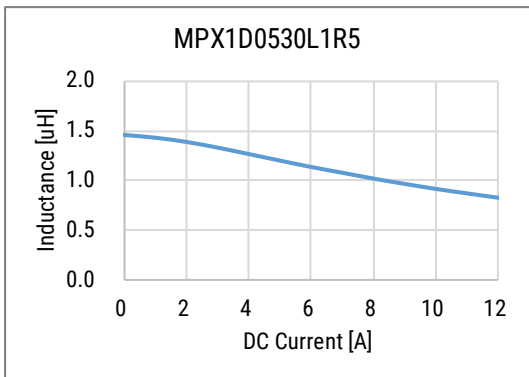
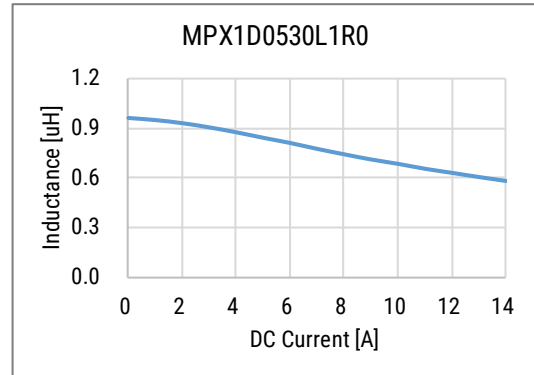
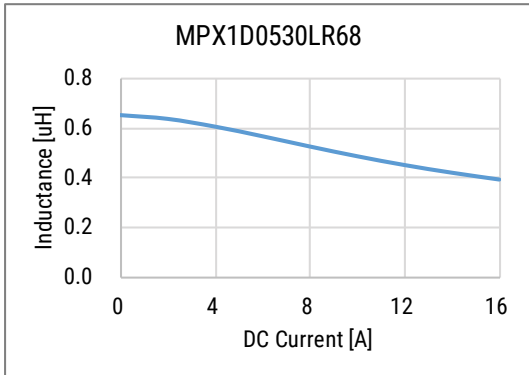
DC-Superposed Characteristics



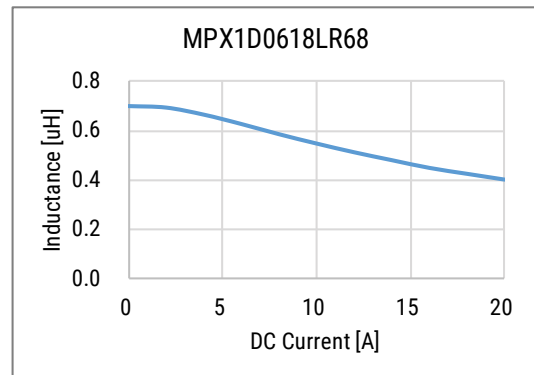
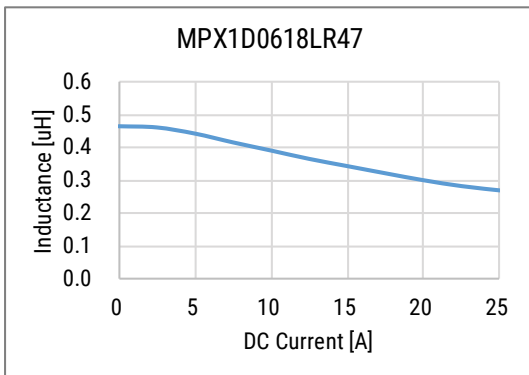
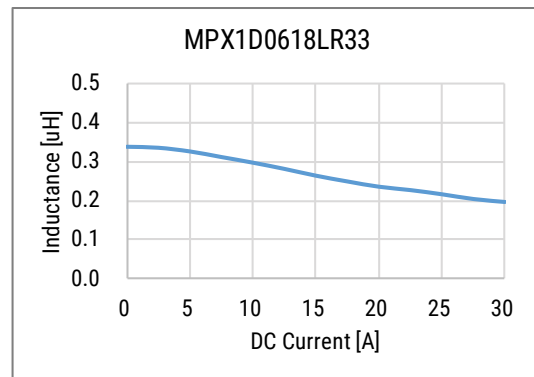
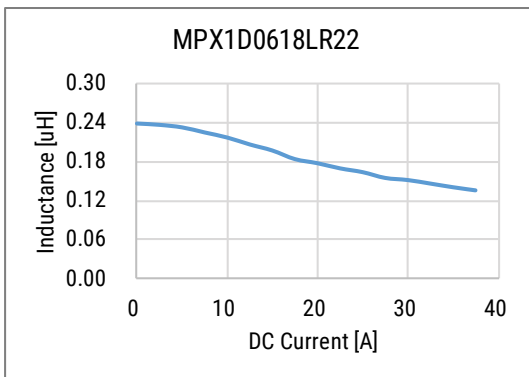
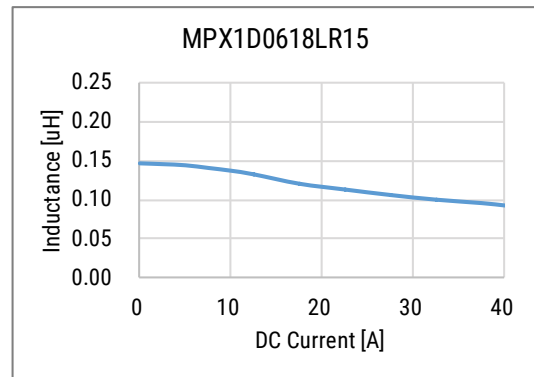
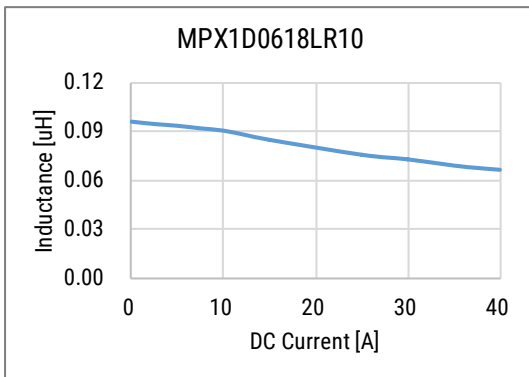
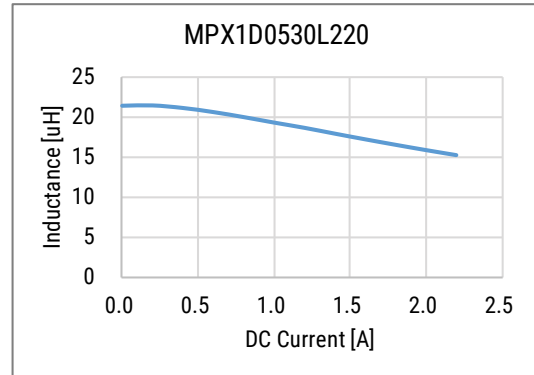
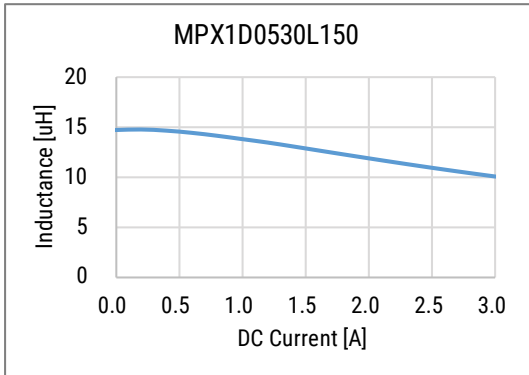
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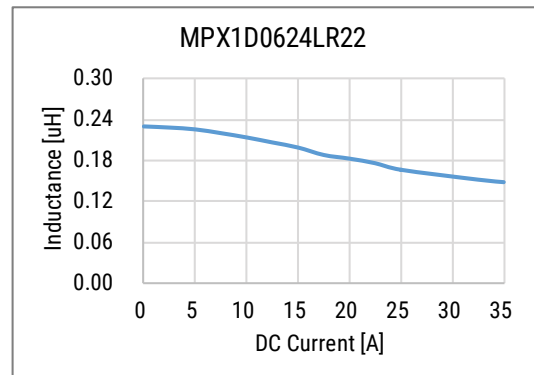
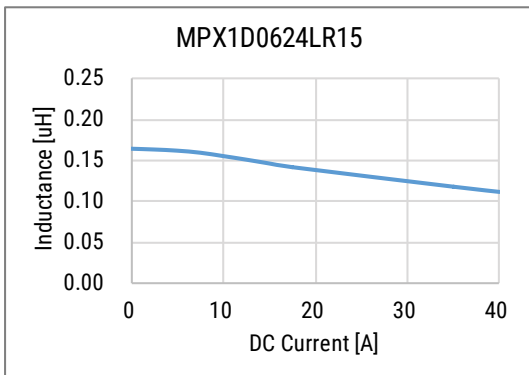
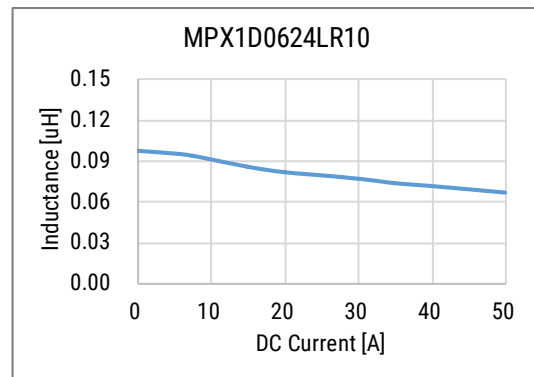
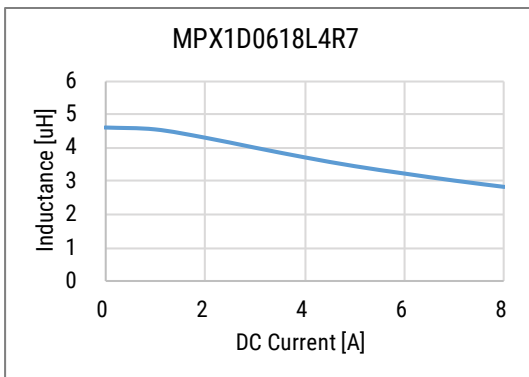
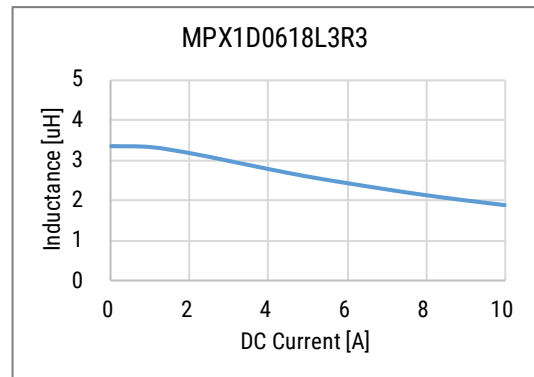
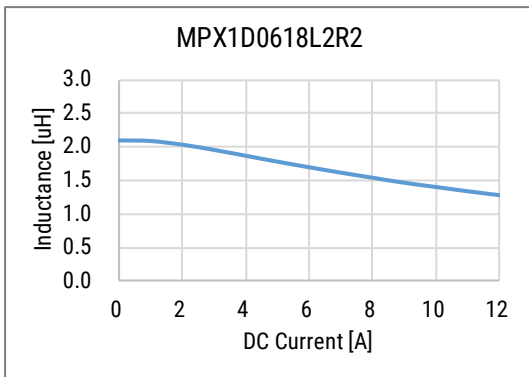
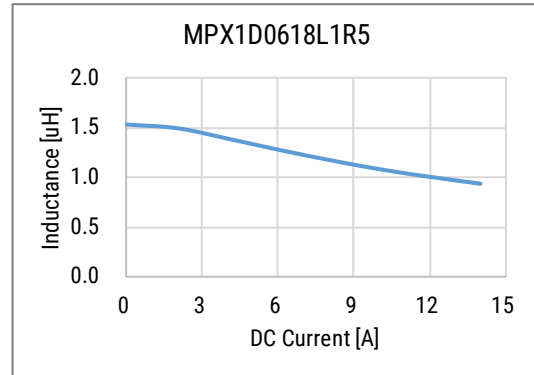
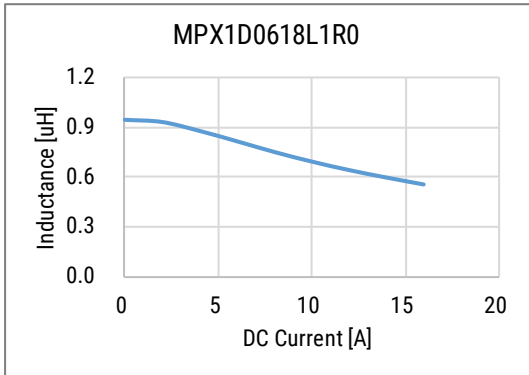
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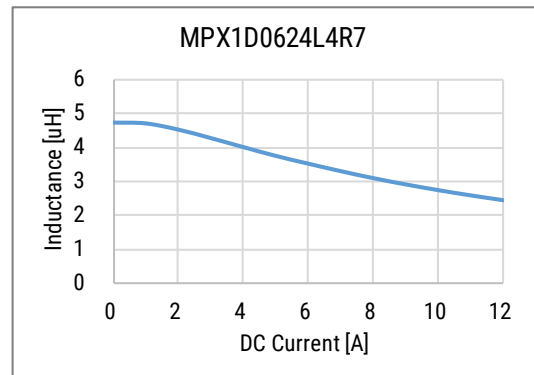
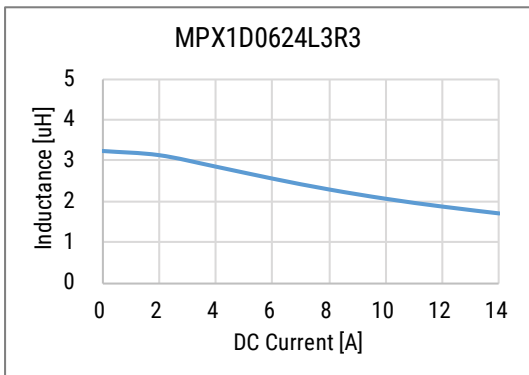
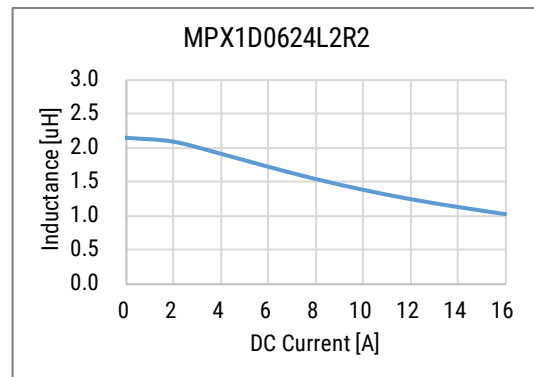
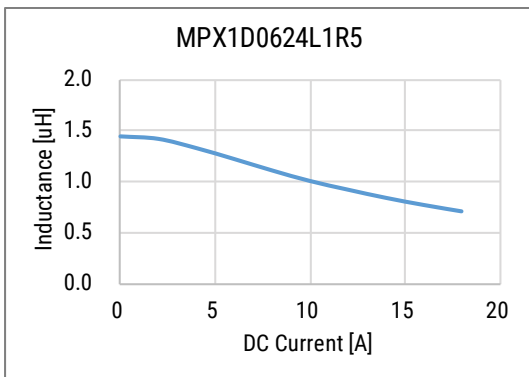
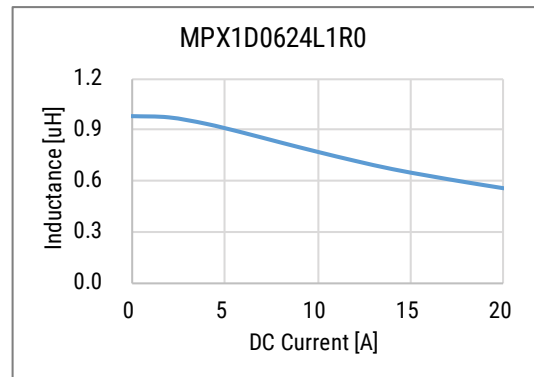
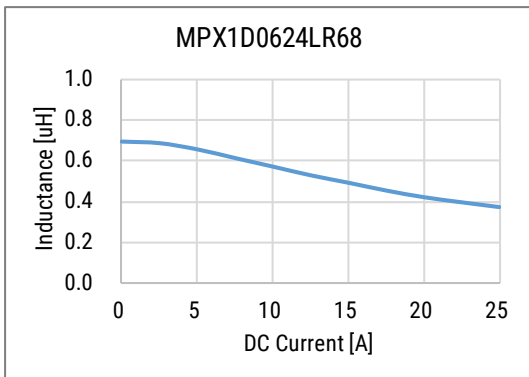
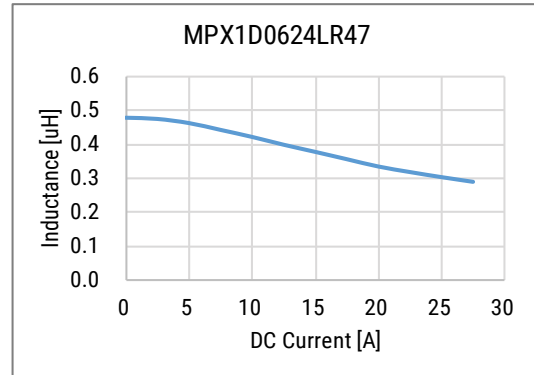
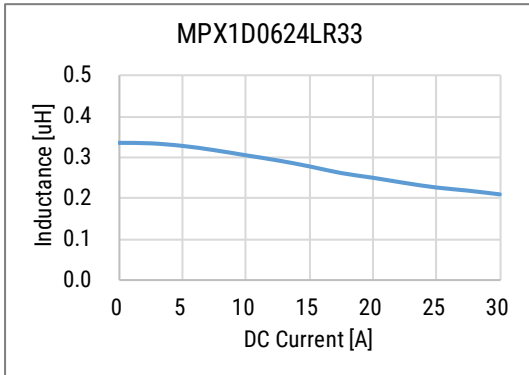
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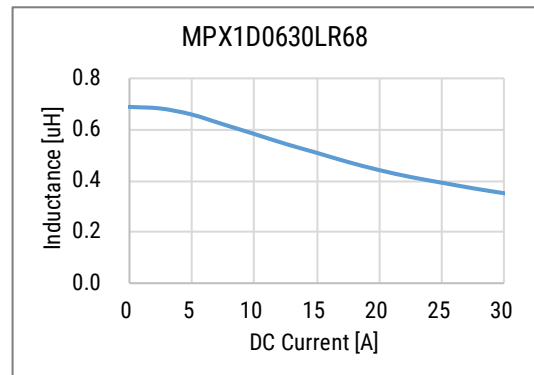
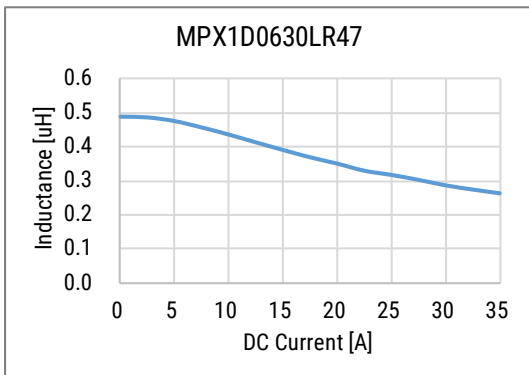
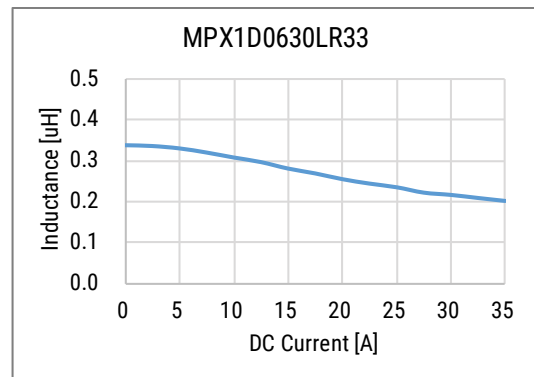
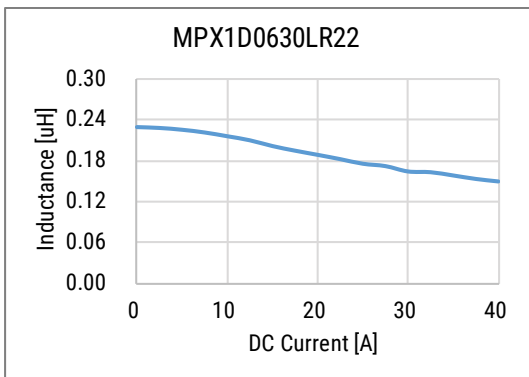
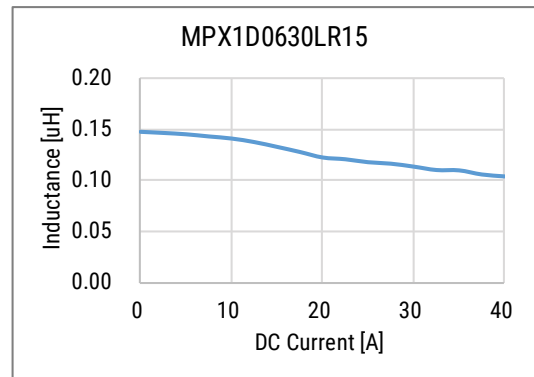
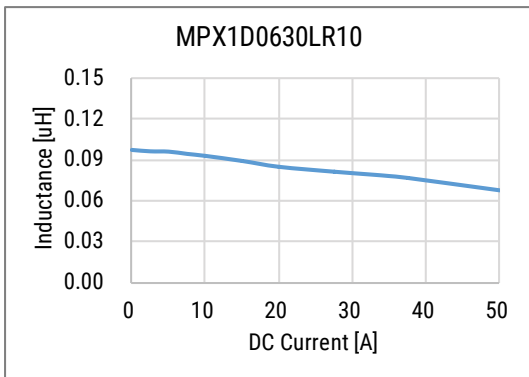
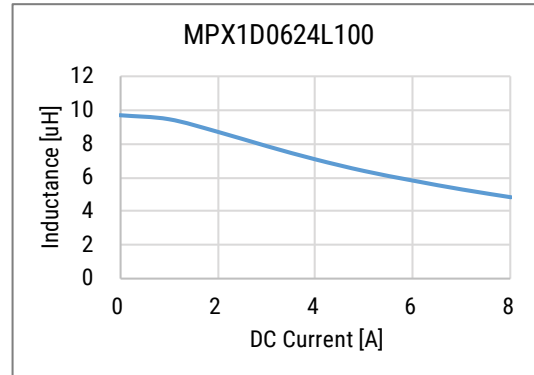
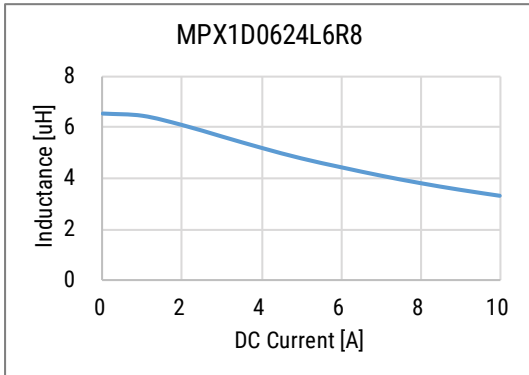
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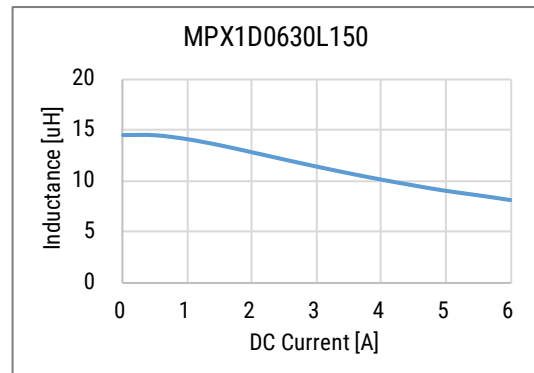
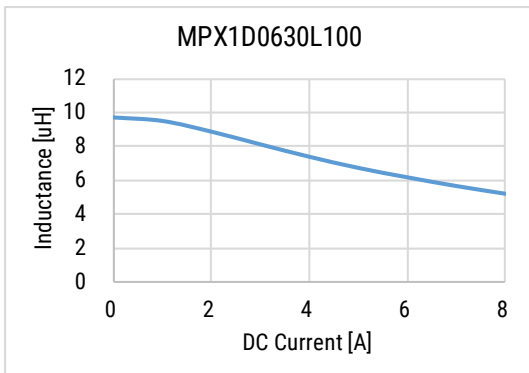
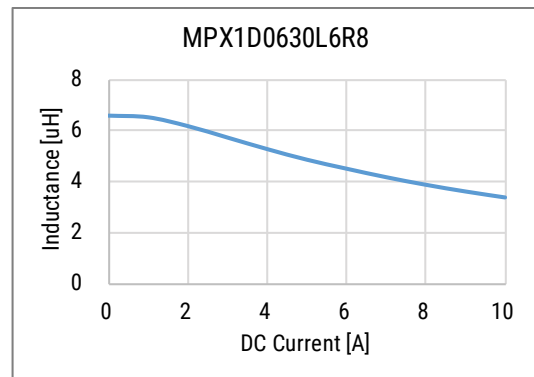
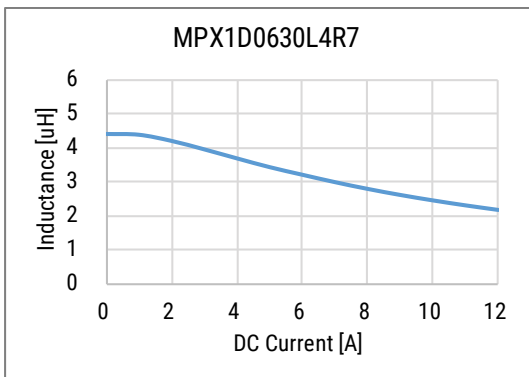
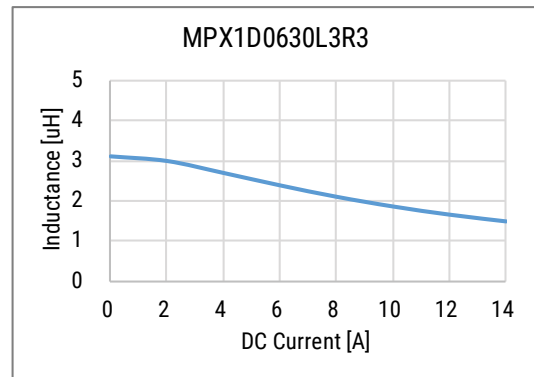
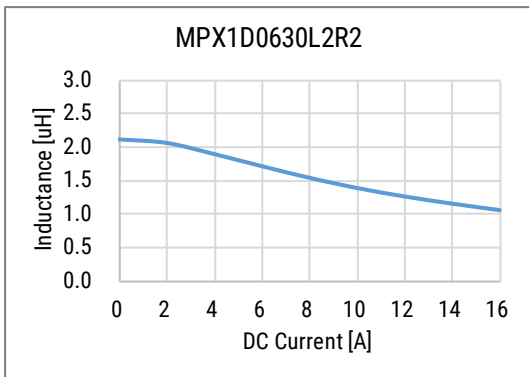
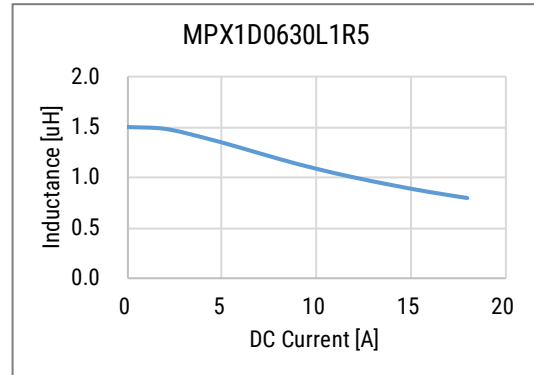
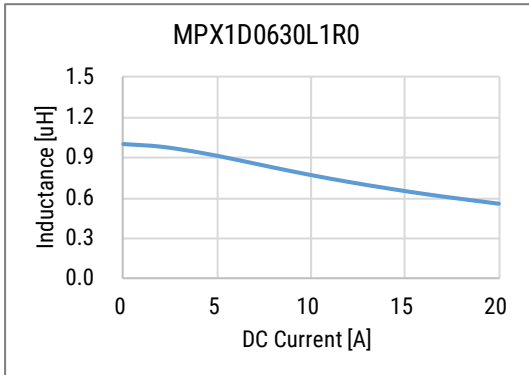
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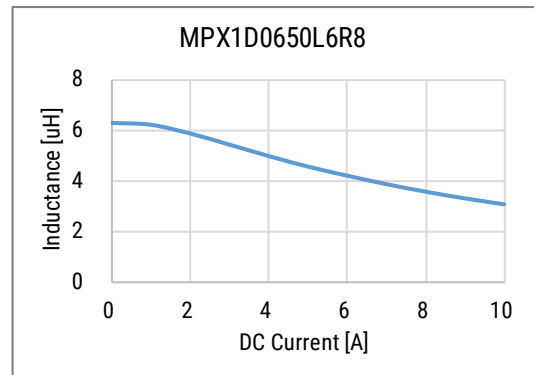
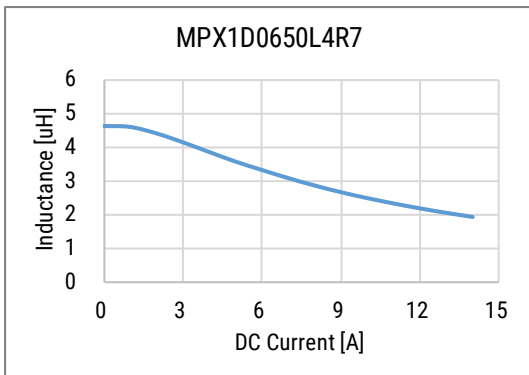
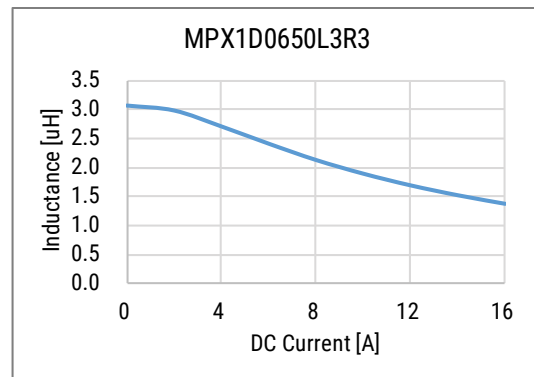
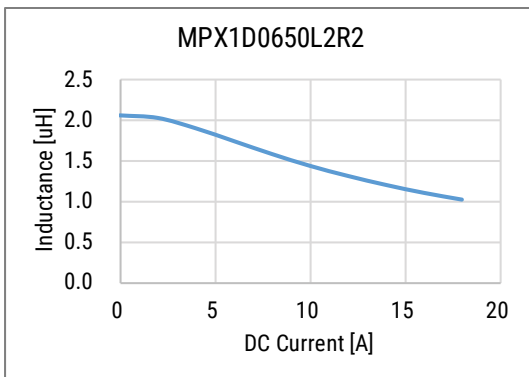
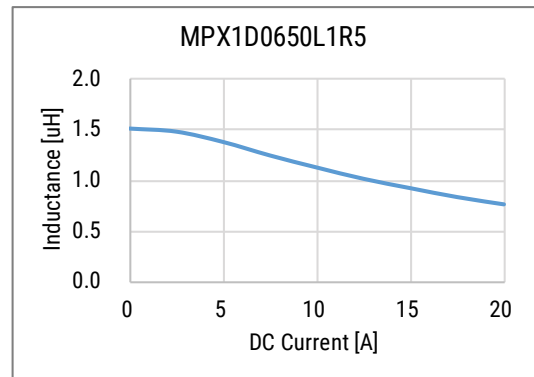
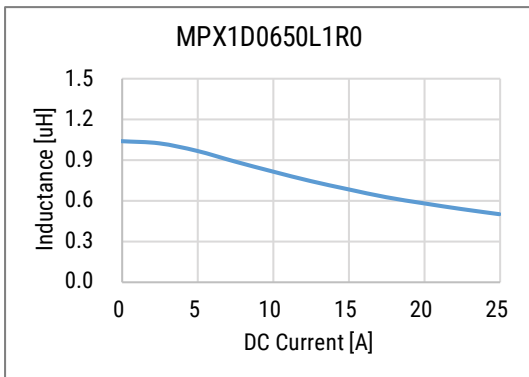
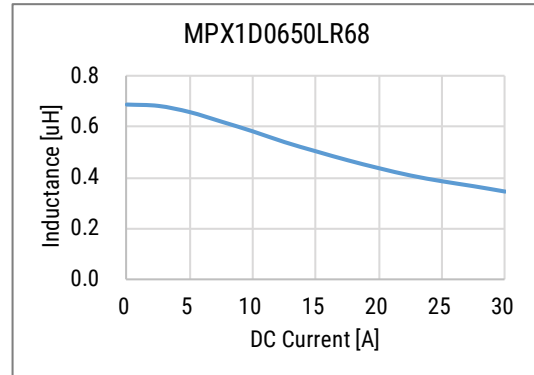
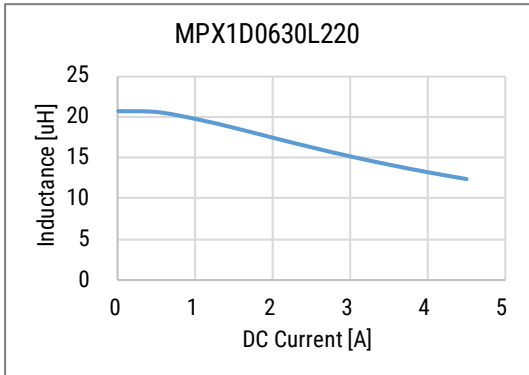
DC-Superposed Characteristics cont.



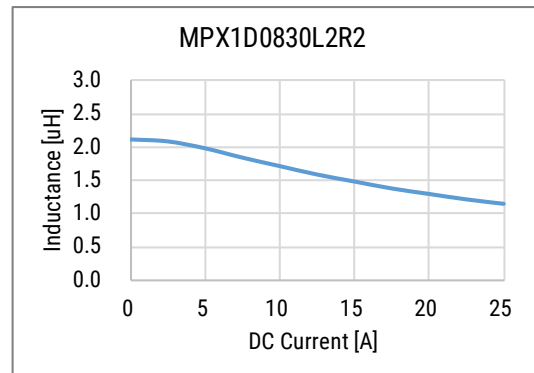
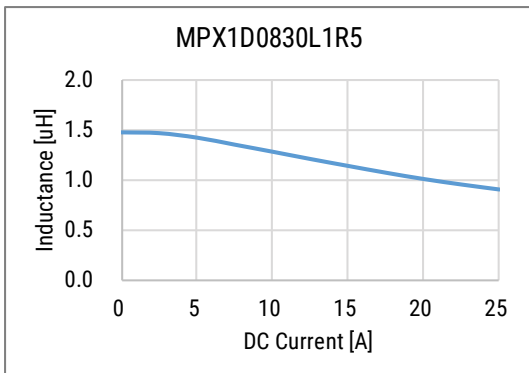
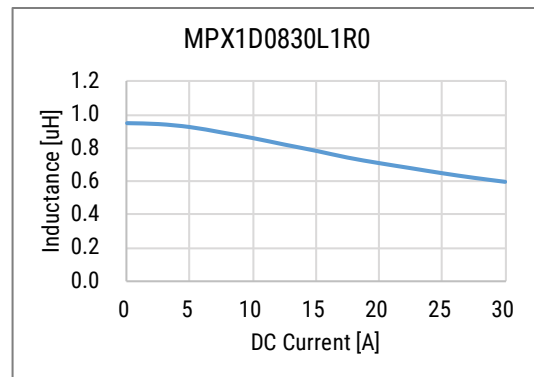
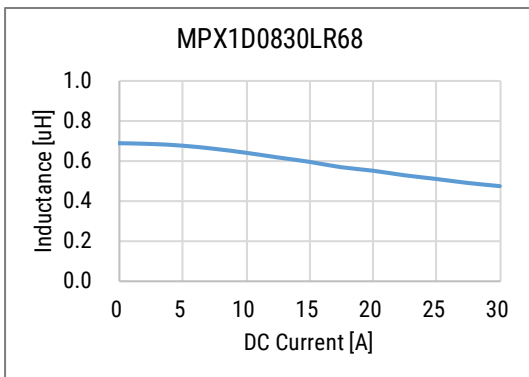
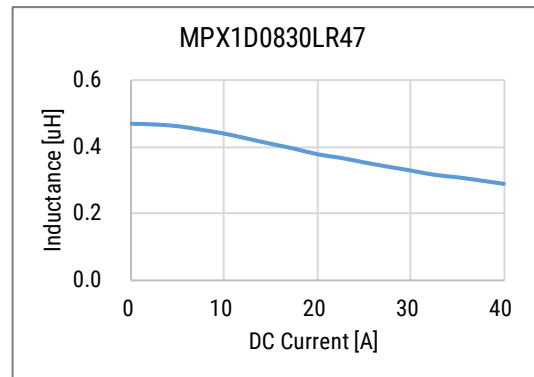
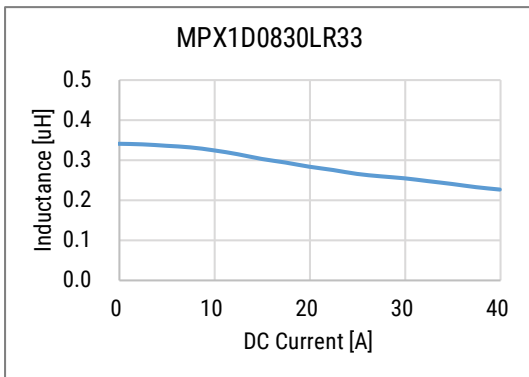
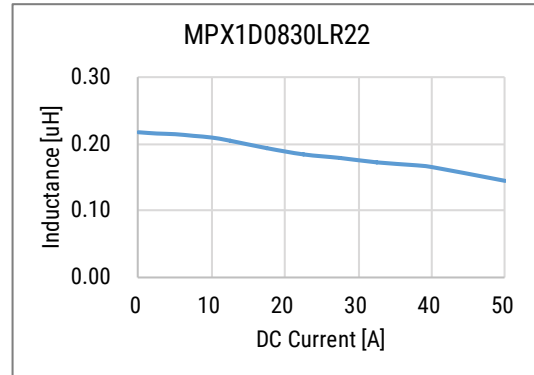
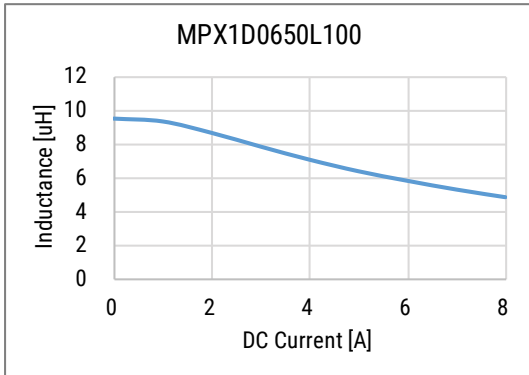
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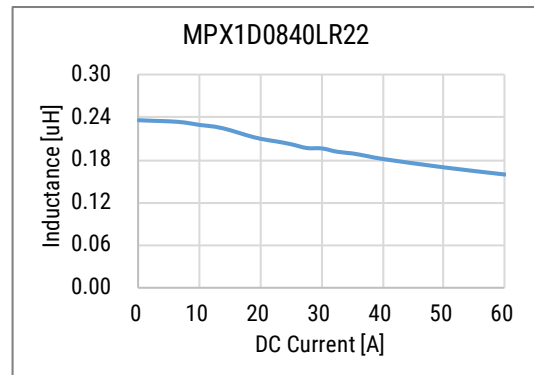
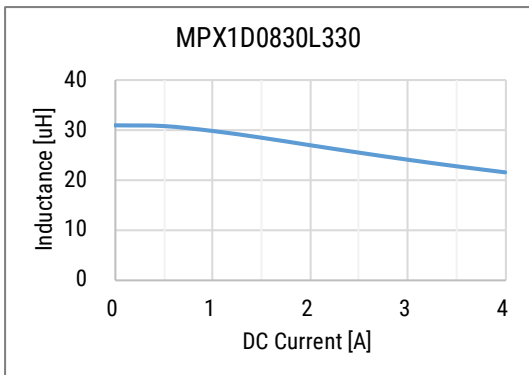
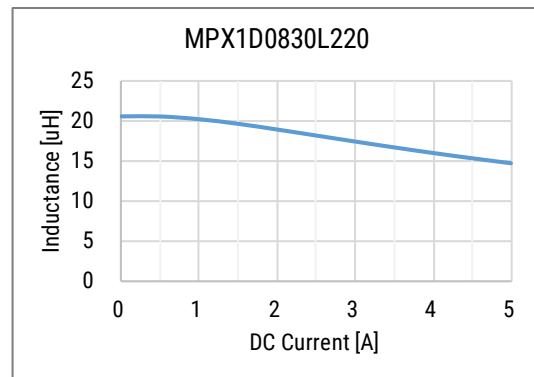
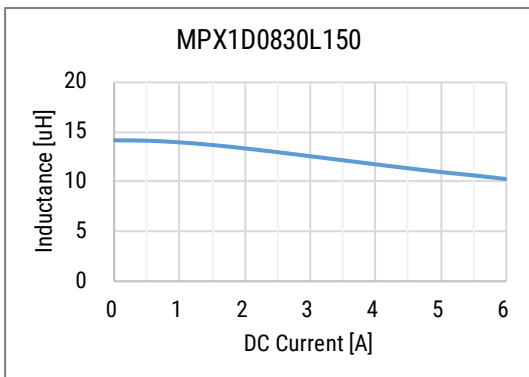
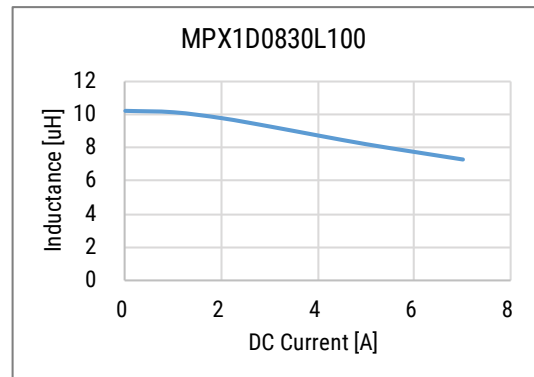
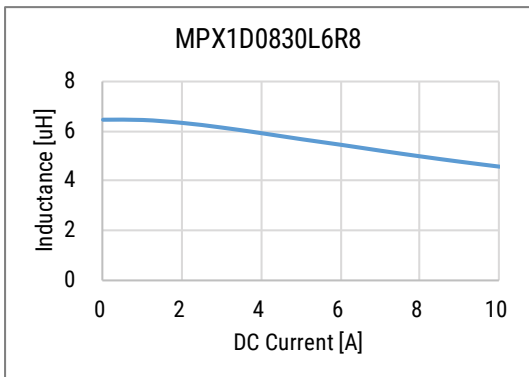
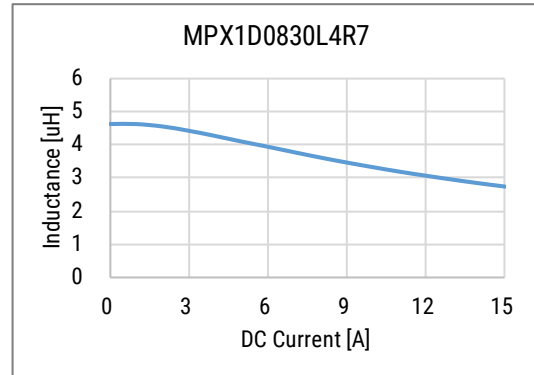
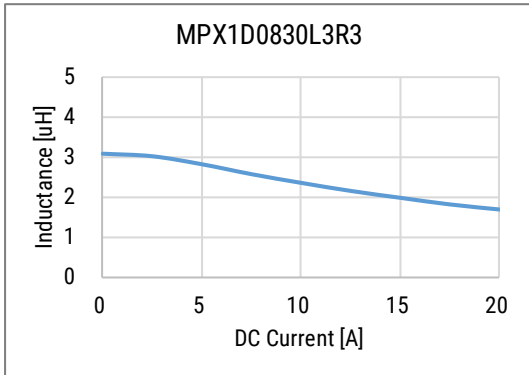
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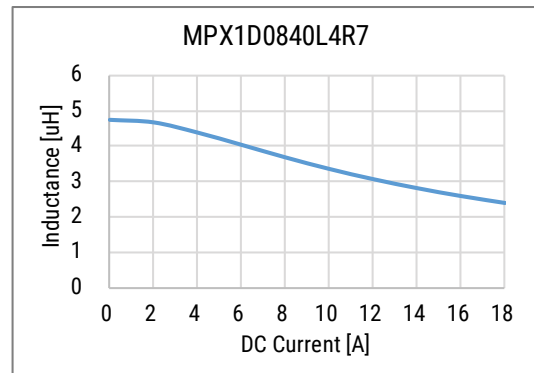
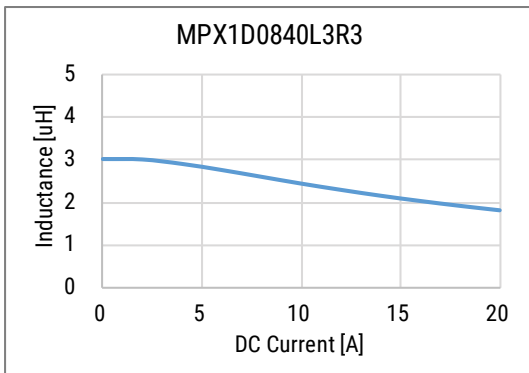
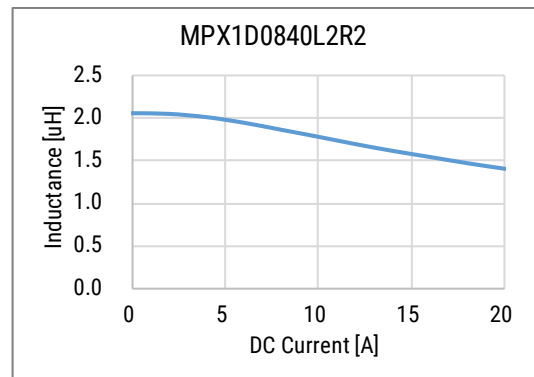
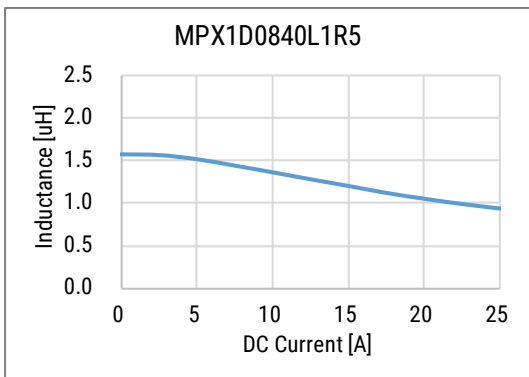
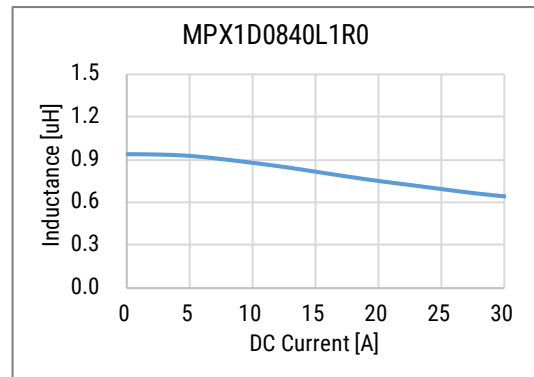
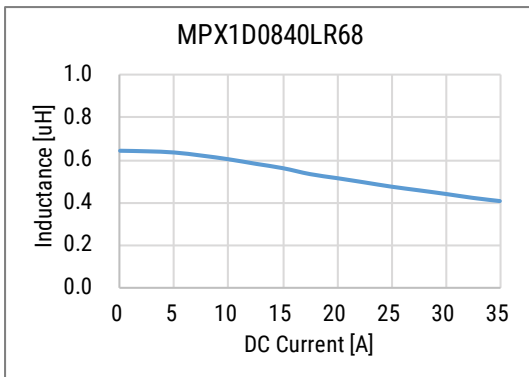
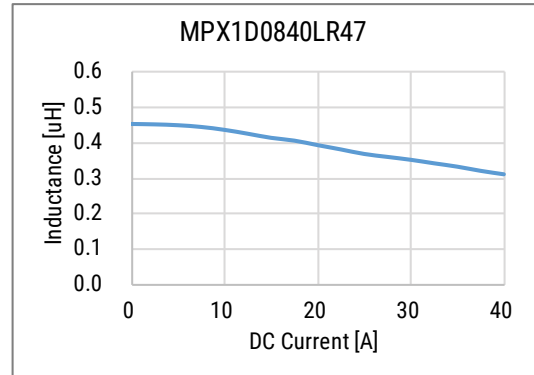
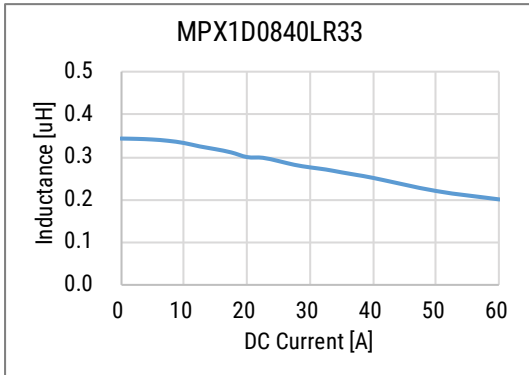
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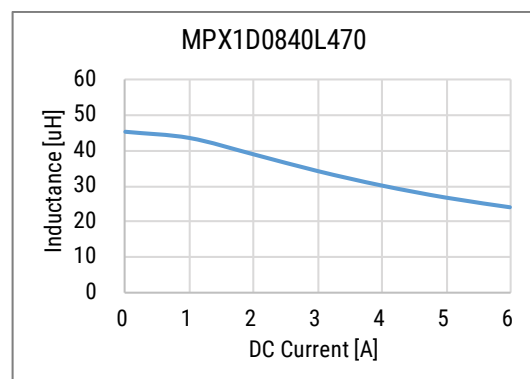
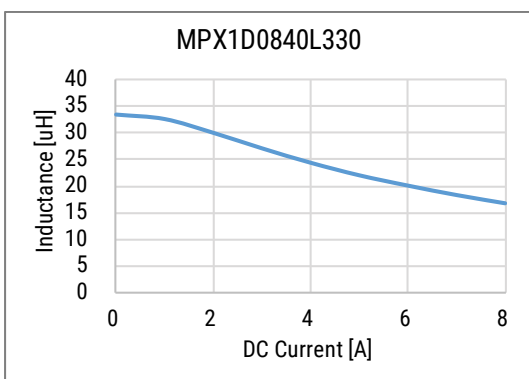
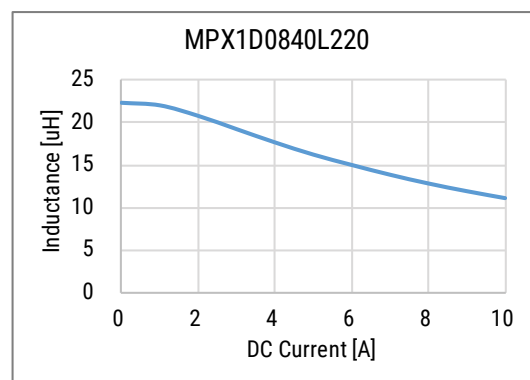
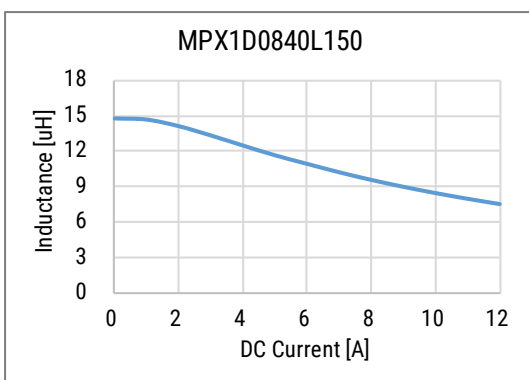
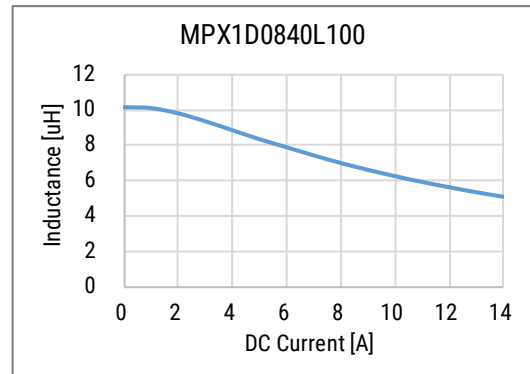
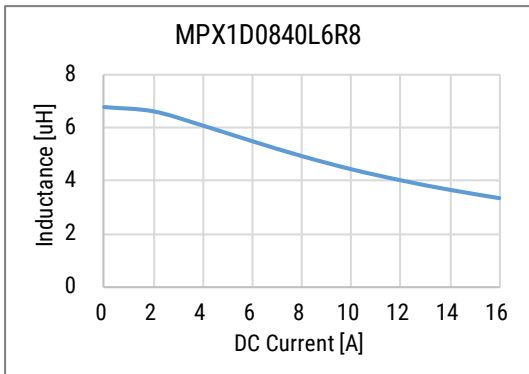
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DC-Superposed Characteristics cont.



DC-Superposed Characteristics cont.



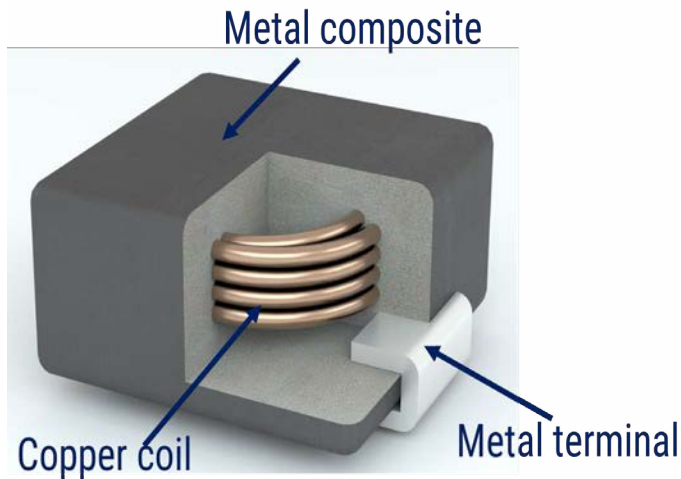
Dimensions

Case Size	Dimensions (mm)	Land Pattern (mm)
MPX1D0520		
MPX1D0530		
MPX1D0618		
MPX1D0624		

Dimensions

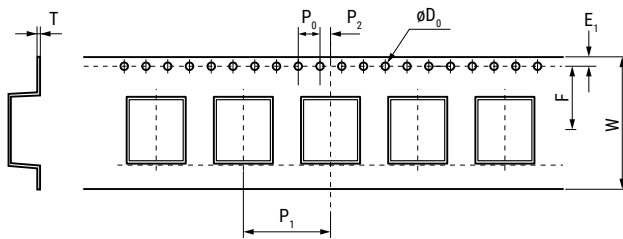
Case Size	Dimensions (mm)	Land Pattern (mm)
MPX1D0630		
MPX1D0650		
MPX1D0830		
MPX1D0840		

Construction



Taping Specification

Dimensions of Indented Square Hole Plastic Tape

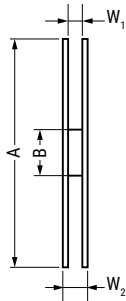
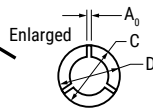
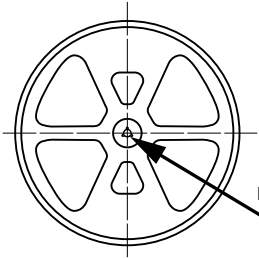


Case Size	Reel Quantity		Dimensions (mm)								
			W	F	E	P ₁	P ₂	P ₀	øD ₀	T	
MPX1D0520	3,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	12.00	5.50	1.75	8.00	2.00	4.00	1.50	0.40	
MPX1D0530	2,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	12.00	5.50	1.75	8.00	2.00	4.00	1.50	0.40	
MPX1D0618	2,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.50	0.40	
MPX1D0624	1,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40	
MPX1D0630	1,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40	
MPX1D0650	1,000	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40	
MPX1D0830	1,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40	
MPX1D0840	1,000	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.50	0.40	

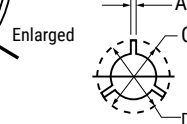
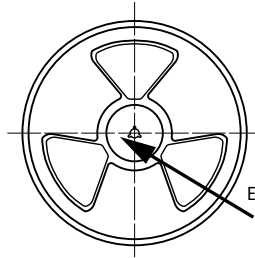
Reel Specifications

Reel Dimensions

MPX1D05XX



MPX1D06XX, MPX1D08XX



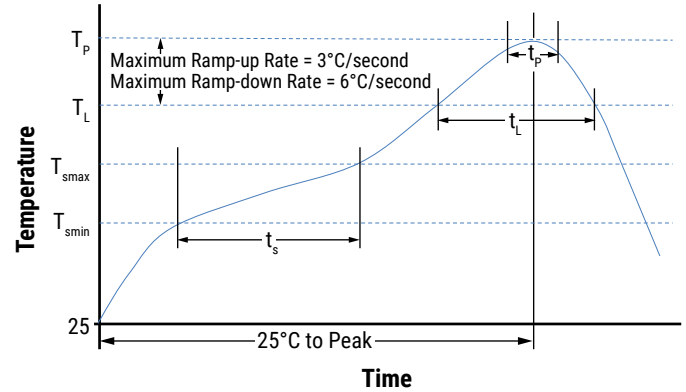
Case Size		Dimensions (mm)						
		A	B	C	D	A ₀	W ₁	W ₂
MPX1D0520	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø80	ø13.0	ø21.0	2.0	13.5	17.5
MPX1D0530	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø80	ø13.0	ø21.0	2.0	13.5	17.5
MPX1D0618	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPX1D0624	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPX1D0630	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPX1D0650	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPX1D0830	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPX1D0840	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3

Soldering Process

Recommended Reflow Soldering Profile

Reference ICP/JEDEC J-STD-020E

Profile Feature	Pb-Free Assembly
Preheat/Soak	
Temperature Minimum (T_{smin})	150°C
Temperature Maximum (T_{smax})	200°C
Time (t_s) from T_{smin} to T_{smax}	60 – 120 seconds
Ramp-Up Rate (T_L to T_p)	3°C/second maximum
Liquidous Temperature (T_L)	217°C
Time Above Liquidous (t_L)	60 – 150 seconds
Peak Temperature (T_p)	260°C for MPX1D0520, 0618, 0624 250°C for MPX1D0530, 0630, 0650, 0830, 0840
Time within 5°C of Maximum Peak Temperature (t_p)	30 seconds maximum
Ramp-Down Rate (T_p to T_L)	6°C/second maximum
Time 25°C to Peak Temperature	8 minutes maximum



Handling Precautions

Inductors should be stored in normal working environments. While the inductors themselves are quite robust in other environments, exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage degrades solderability.

KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 70% relative humidity. Atmospheres should be free of chlorine-bearing and sulfur-bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts.

For optimized solderability, inductor stock should be used promptly, preferably within six months of receipt.

Export Control

For customers in Japan

For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.

For customers outside Japan

Inductors should not be used or sold for use in the development, production, stockpiling, or utilization of any conventional weapons or weapons of mass destruction (nuclear weapons, chemical weapons, biological weapons, or missiles), or any other weapons.

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