Overview

The KEMET MPGV metal composite inductors are ideal for use in DC to DC switching power supplies for automotive applications. The metal composite core has high saturation capabilities maintaining functionality with high current transients and is characterized by temperature stable inductance. The durability has been further improved and allows for vibration resistance of up to 50 G.

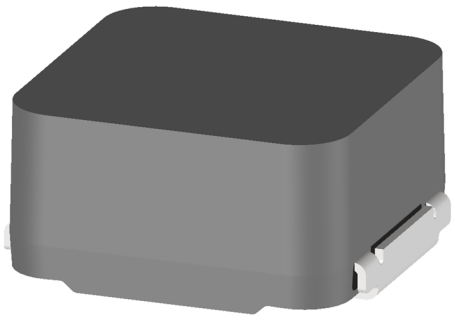
Applications

Inductors for automotive ECUs requiring high vibration resistance, such as:

- e-Axle design
- Engine peripherals
- High power motors etc.

Benefits

- Metal composite powder
- Shielded construction, SMD configuration
- 50 G vibration resistance
- Inductance range from 0.15 – 47.00 µH
- Operating temperature up to +155°C
- Low acoustic noise
- Low magnetic flux leakage
- AEC–Q200 qualified



Part Number System

MPGV	1	D1054	L	1R5
Series	Version	Size Code	Inductor	Inductance Code µH
MPGV	1	D0830 = 8x8x3.0 mm D0840 = 8x8x4.0 mm D1040 = 10x10x4.0 mm D1054 = 10x10x5.4 mm D1235 = 12x12x3.5 mm D1250 = 12x12x5.0 mm D1264 = 12x12x6.4 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 = 10.00 µH R68 = 0.68 µH 1R5 = 1.50 µH

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to +155°C (including self-temperature rise)
Rated Inductance Range	0.15 – 47.00 µH at 100 kHz, 1 mA
Inductance Tolerance	±20%
Rated DC Resistance Range	1.1 – 135.2 mΩ maximum
Rated Current Range	3.6 – 53.0 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)			Self-Resonance Frequency (MHz)	Weight (g)
					Irms[1] (Reference)	Isat[2] (Reference)	Isat[3] (Reference)		
MPGV1D0830LR22	0.22	±20%	1.60	1.90	30.7	27.0	43.0	140.0	1.07
MPGV1D0830LR33	0.33	±20%	2.30	2.70	25.8	22.5	35.0	83.0	1.07
MPGV1D0830LR47	0.47	±20%	2.70	3.10	24.0	20.5	30.0	80.0	1.07
MPGV1D0830LR68	0.68	±20%	3.80	4.40	20.1	20.0	28.0	55.0	1.07
MPGV1D0830L1R0	1.00	±20%	5.00	5.70	17.6	16.0	23.0	46.0	1.07
MPGV1D0830L1R5	1.50	±20%	7.90	9.10	14.0	13.0	18.0	37.0	1.07
MPGV1D0830L2R2	2.20	±20%	11.80	13.60	11.4	11.0	14.0	30.0	1.07
MPGV1D0830L3R3	3.30	±20%	19.40	22.30	8.9	9.0	12.5	24.0	1.07
MPGV1D0830L4R7	4.70	±20%	25.80	29.70	7.7	7.5	10.5	18.0	1.07
MPGV1D0840LR22	0.22	±20%	1.20	1.50	35.4	35.0	53.0	100.0	1.45
MPGV1D0840LR33	0.33	±20%	2.00	2.40	27.7	30.0	45.0	77.0	1.45
MPGV1D0840LR47	0.47	±20%	2.30	2.70	25.8	26.0	38.0	59.0	1.45
MPGV1D0840LR68	0.68	±20%	3.10	3.60	22.4	20.5	30.0	46.0	1.45
MPGV1D0840L1R0	1.00	±20%	3.60	4.20	20.8	19.5	28.0	40.0	1.45
MPGV1D0840L1R5	1.50	±20%	5.80	6.80	16.2	14.0	19.0	29.0	1.45
MPGV1D0840L2R2	2.20	±20%	7.50	8.70	14.3	13.0	17.0	27.0	1.45
MPGV1D0840L3R3	3.30	±20%	12.10	14.00	11.3	11.0	15.0	22.0	1.45
MPGV1D0840L4R7	4.70	±20%	20.40	23.50	8.7	7.5	11.0	17.0	1.45
MPGV1D1040LR22	0.22	±20%	1.40	1.60	32.7	40.0	60.0	108.0	2.20
MPGV1D1040LR33	0.33	±20%	1.60	1.90	29.7	31.0	47.0	75.0	2.20
MPGV1D1040LR47	0.47	±20%	2.10	2.40	26.4	29.0	42.0	65.0	2.20
MPGV1D1040LR68	0.68	±20%	2.70	3.20	23.1	23.0	34.5	47.0	2.20
MPGV1D1040L1R0	1.00	±20%	3.30	3.80	21.1	19.5	29.0	35.0	2.20
MPGV1D1040L1R5	1.50	±20%	4.60	5.40	17.7	18.0	26.0	30.0	2.20
MPGV1D1040L2R2	2.20	±20%	6.80	7.90	14.6	13.0	18.5	23.0	2.20
MPGV1D1040L3R3	3.30	±20%	11.10	12.80	11.4	11.0	15.0	18.0	2.20
MPGV1D1040L4R7	4.70	±20%	13.80	15.90	10.3	10.0	14.0	17.0	2.20
MPGV1D1054LR47	0.47	±20%	1.60	1.90	30.9	39.0	51.0	46.0	3.00
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Irms[1]	Isat[2]	Isat[3]	Self-Resonance Frequency (MHz)	Weight (g)
					Rated Current (A)				

[1] *T = 40 K rise at rated current*
[2] *Inductance drop 20% at rated current*
[3] *Inductance drop 30% at rated current*

All electrical characteristics data is referenced to 25°C.

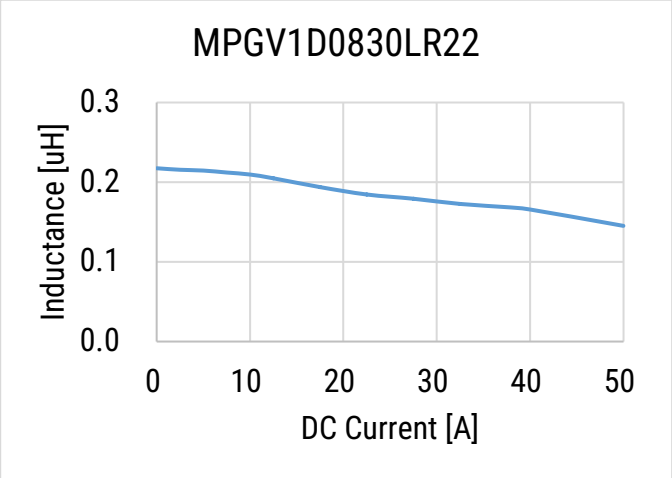
Table 1 – Ratings & Part Number Reference cont.

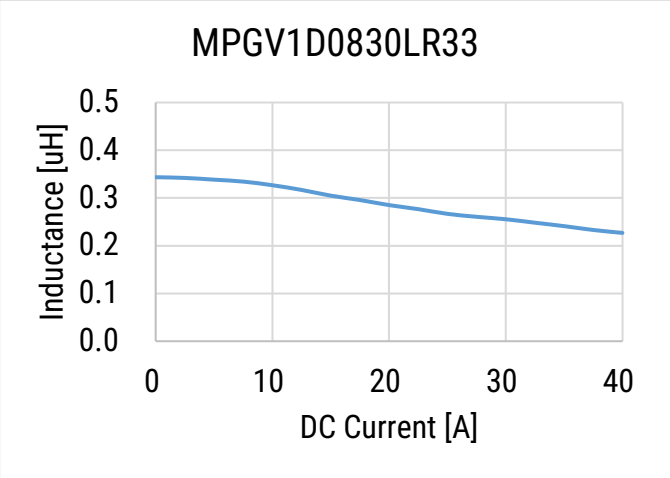
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)			Self-Resonance Frequency (MHz)	Weight (g)
					Irms[1] (Reference)	Isat[2] (Reference)	Isat[3] (Reference)		
MPGV1D1054LR68	0.68	±20%	2.30	2.80	25.6	28.0	38.0	37.0	3.00
MPGV1D1054L1R0	1.00	±20%	2.80	3.20	23.2	24.0	34.0	32.0	3.00
MPGV1D1054L1R5	1.50	±20%	3.90	4.50	19.7	19.5	28.0	24.0	3.00
MPGV1D1054L2R2	2.20	±20%	5.50	6.30	16.6	19.0	26.5	21.0	3.00
MPGV1D1054L3R3	3.30	±20%	7.20	8.30	14.5	16.5	23.0	16.0	3.00
MPGV1D1054L4R7	4.70	±20%	11.80	13.60	11.3	13.0	18.5	14.0	3.00
MPGV1D1054L6R8	6.80	±20%	17.00	19.60	9.4	11.0	15.0	10.0	3.00
MPGV1D1054L100	10.00	±20%	26.00	29.90	7.6	8.5	12.5	9.5	3.00
MPGV1D1054L150	15.00	±20%	34.20	39.30	6.6	7.0	11.0	7.5	3.00
MPGV1D1054L220	22.00	±20%	44.60	51.30	5.8	5.5	8.5	6.5	3.00
MPGV1D1054L330	33.00	±20%	74.00	85.10	4.5	5.0	7.5	5.0	3.00
MPGV1D1054L470	47.00	±20%	117.60	135.20	3.6	4.0	6.0	4.0	3.00
MPGV1D1235LR15	0.15	±20%	1.10	1.30	39.9	54.0	85.0	128.0	2.90
MPGV1D1235LR22	0.22	±20%	1.30	1.60	35.2	50.0	75.0	100.0	2.90
MPGV1D1235LR33	0.33	±20%	1.50	1.80	33.4	40.0	55.0	63.0	2.90
MPGV1D1235LR47	0.47	±20%	2.00	2.30	28.9	31.0	45.0	58.0	2.90
MPGV1D1235LR68	0.68	±20%	2.50	2.90	25.9	28.0	40.0	46.0	2.90
MPGV1D1235L1R0	1.00	±20%	3.60	4.20	21.5	22.0	32.5	33.0	2.90
MPGV1D1235L1R5	1.50	±20%	5.20	6.00	17.9	19.0	28.0	29.0	2.90
MPGV1D1235L2R2	2.20	±20%	7.30	8.40	15.2	15.5	23.0	21.0	2.90
MPGV1D1235L3R3	3.30	±20%	10.60	12.20	12.5	12.0	18.0	18.0	2.90
MPGV1D1235L4R7	4.70	±20%	14.20	16.40	10.9	11.5	17.5	14.0	2.90
MPGV1D1250LR22	0.22	±20%	1.00	1.20	42.7	55.0	85.0	95.0	4.20
MPGV1D1250LR33	0.33	±20%	1.10	1.30	41.6	45.0	65.0	68.0	4.20
MPGV1D1250LR47	0.47	±20%	1.50	1.80	34.8	37.0	55.0	54.0	4.20
MPGV1D1250LR68	0.68	±20%	1.70	2.00	32.7	30.0	45.0	45.0	4.20
MPGV1D1250L1R0	1.00	±20%	2.20	2.60	28.8	30.5	43.0	34.0	4.20
MPGV1D1250L1R5	1.50	±20%	3.10	3.60	24.2	22.0	32.0	25.0	4.20
MPGV1D1250L2R2	2.20	±20%	4.10	4.80	21.0	20.0	28.5	21.0	4.20
MPGV1D1250L3R3	3.30	±20%	6.40	7.40	16.8	15.0	22.0	17.0	4.20
MPGV1D1250L4R7	4.70	±20%	8.80	10.10	14.4	12.0	17.5	13.0	4.20
MPGV1D1264LR22	0.22	±20%	0.90	1.10	53.0	68.0	100.0	90.0	5.50
MPGV1D1264LR33	0.33	±20%	1.00	1.20	45.6	48.0	70.0	61.0	5.50
MPGV1D1264LR47	0.47	±20%	1.40	1.70	38.2	40.0	58.0	53.0	5.50
MPGV1D1264LR68	0.68	±20%	1.70	1.90	35.4	34.0	50.0	45.0	5.50
MPGV1D1264L1R0	1.00	±20%	2.00	2.30	32.2	30.0	45.0	30.0	5.50
MPGV1D1264L1R5	1.50	±20%	2.50	2.90	28.8	25.0	35.5	24.0	5.50
MPGV1D1264L2R2	2.20	±20%	3.20	3.70	25.4	23.0	32.0	20.0	5.50
MPGV1D1264L3R3	3.30	±20%	5.30	6.20	19.7	16.5	22.5	16.0	5.50
MPGV1D1264L4R7	4.70	±20%	7.10	8.20	17.1	14.0	19.5	13.0	5.50
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Irms[1]	Isat[2]	Isat[3]	Self-Resonance Frequency (MHz)	Weight (g)
					Rated Current (A)				

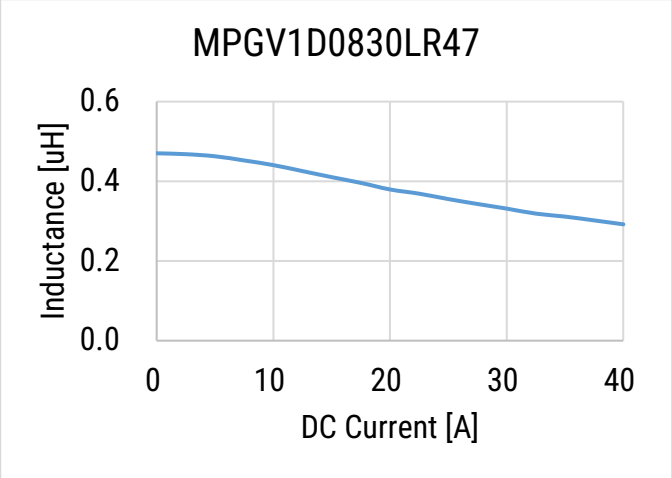
[1] T = 40 K rise at rated current
[2] Inductance drop 20% at rated current
[3] Inductance drop 30% at rated current
All electrical characteristics data is referenced to 25°C.

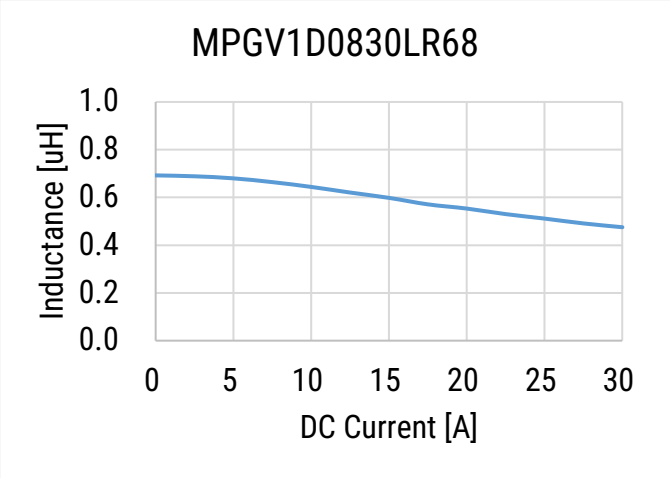
DC-Superposed Characteristics

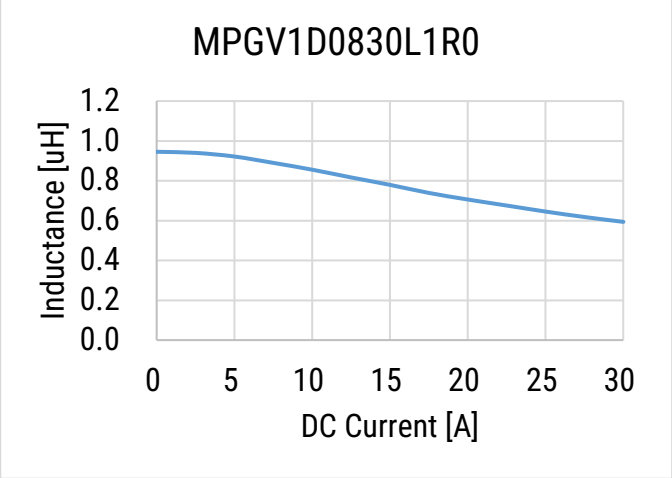
MPGV1D0830

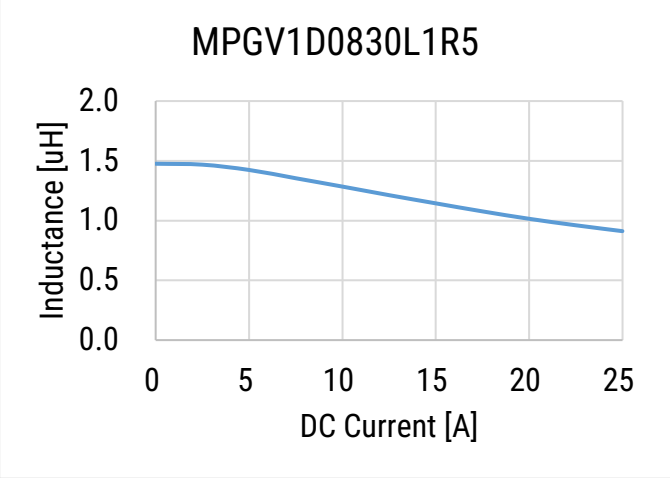












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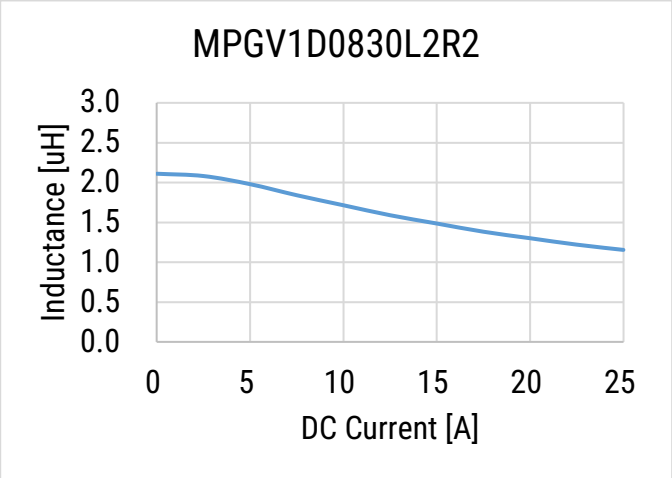

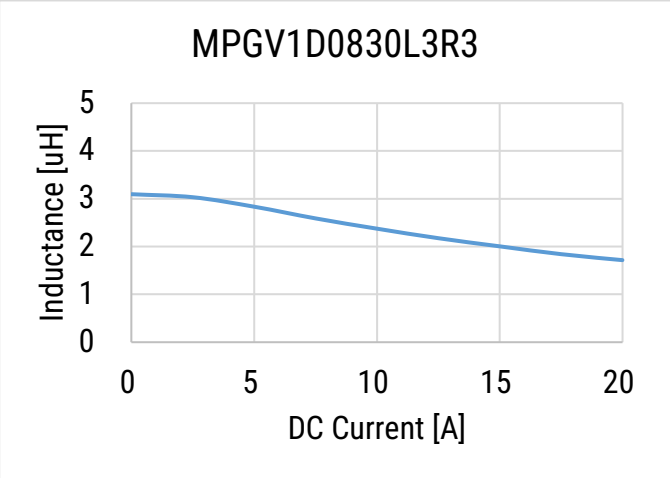

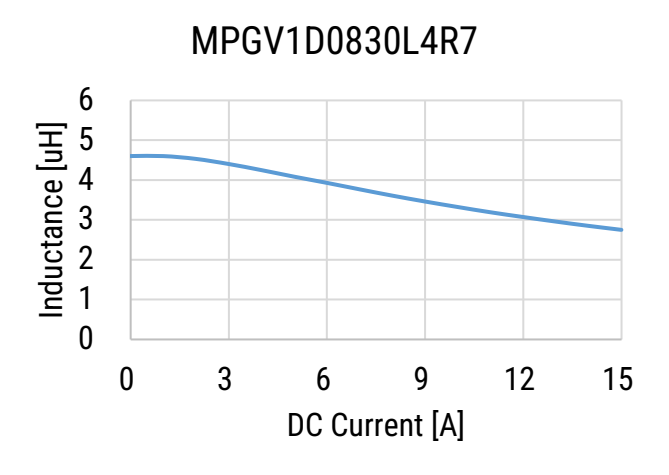

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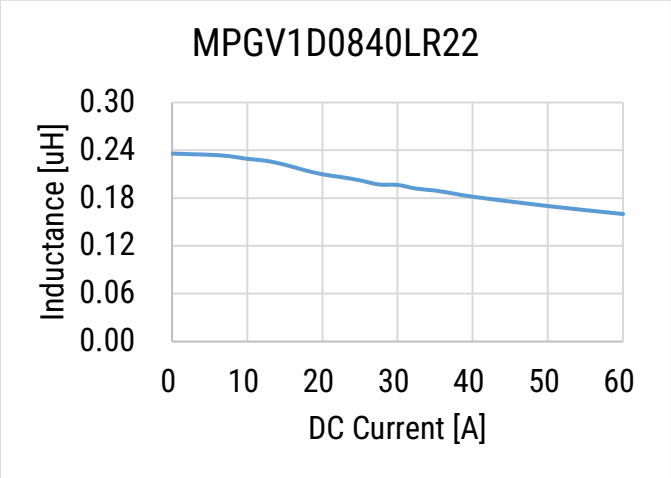

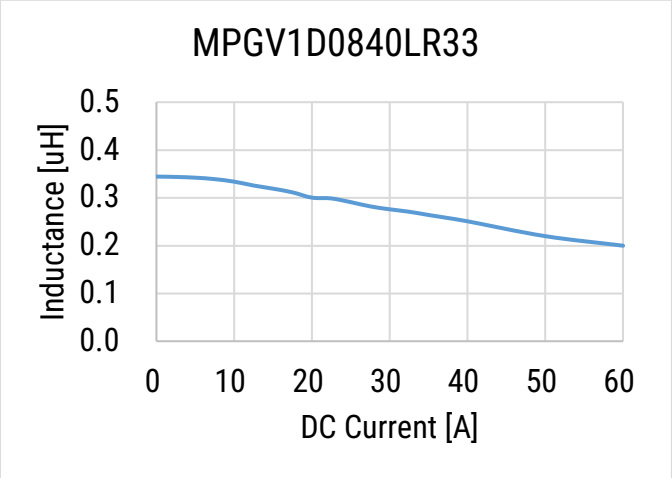

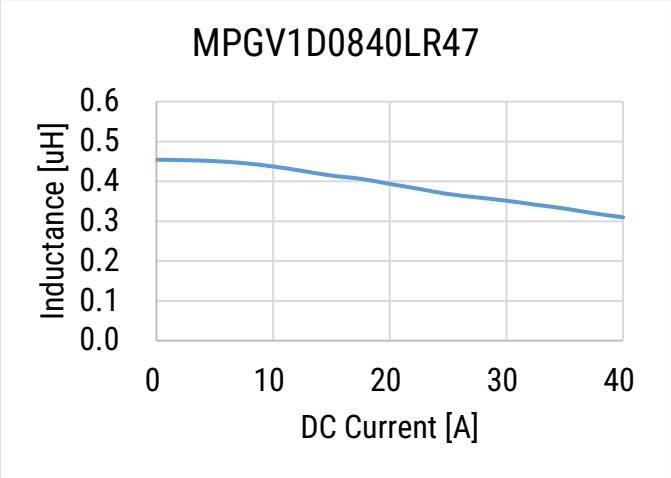

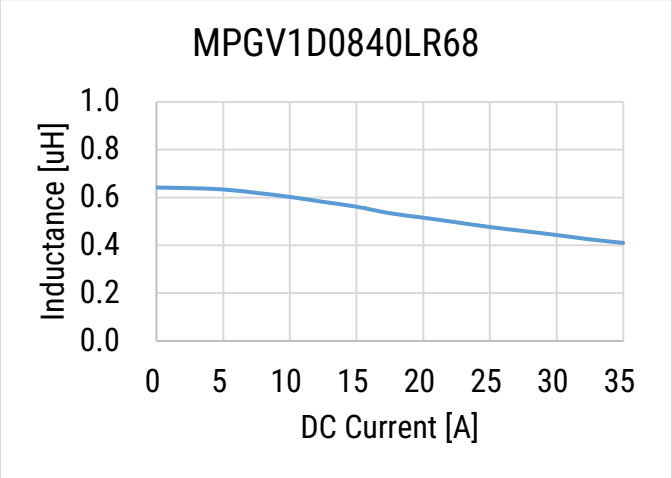

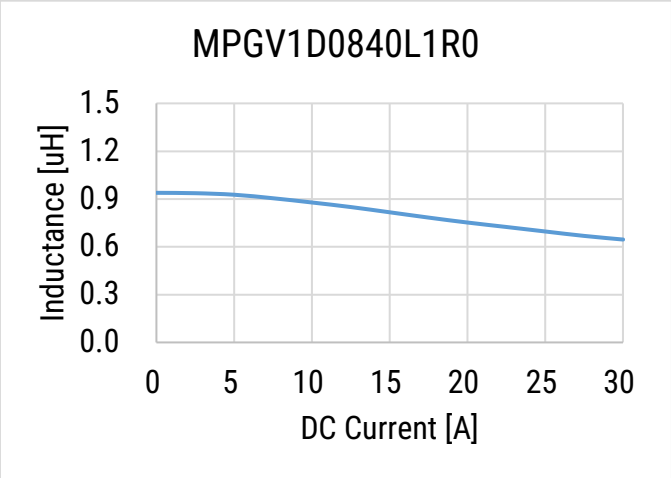

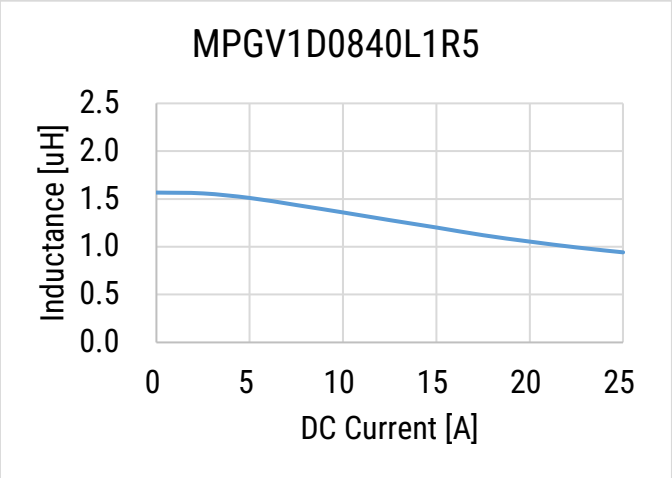

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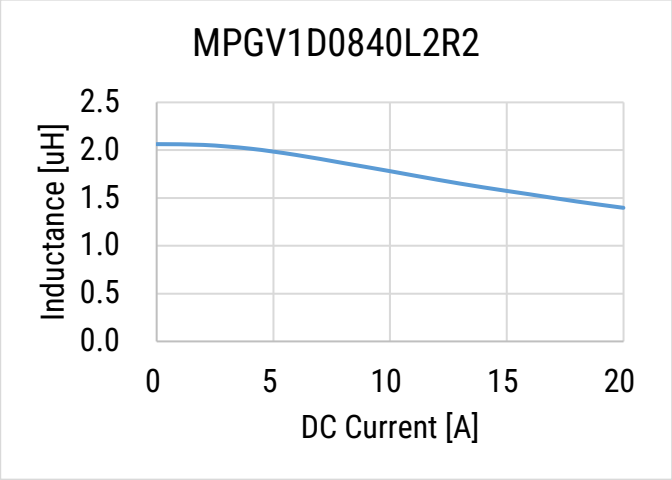

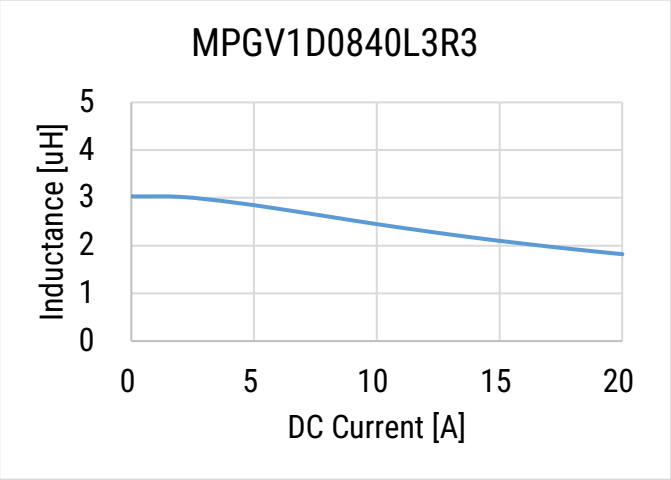

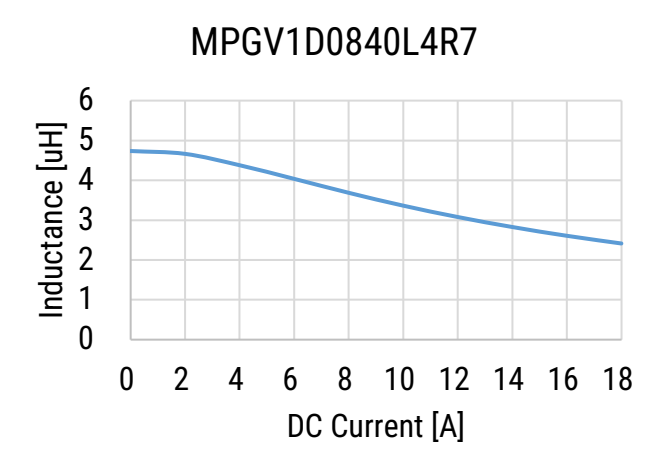

DC-Superposed Characteristics cont.

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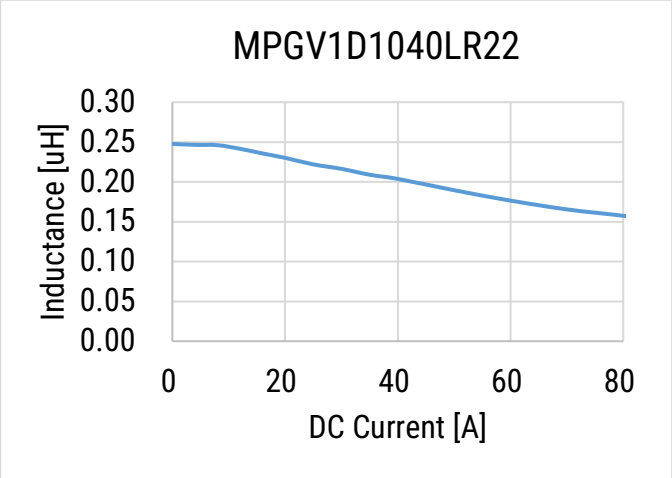
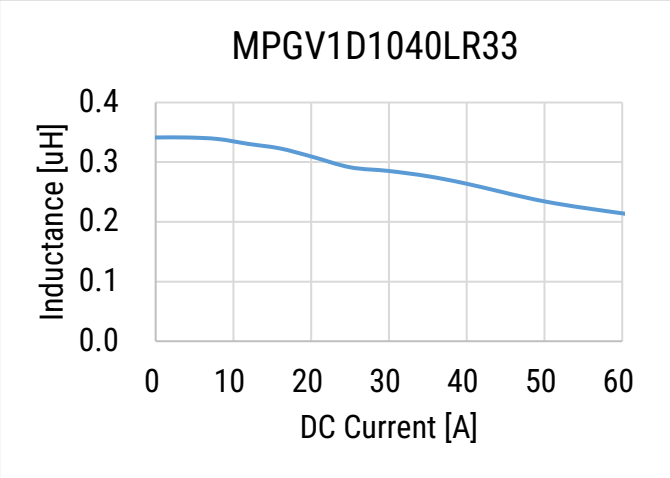
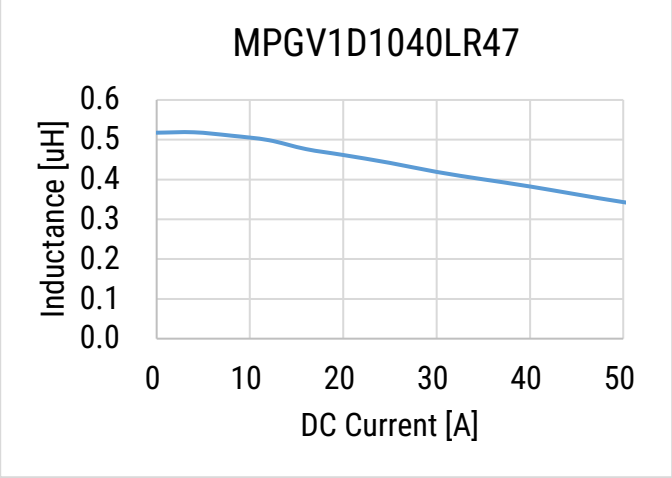
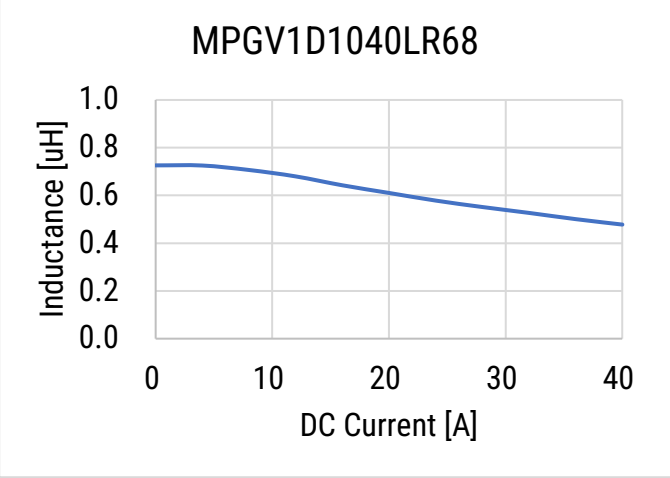
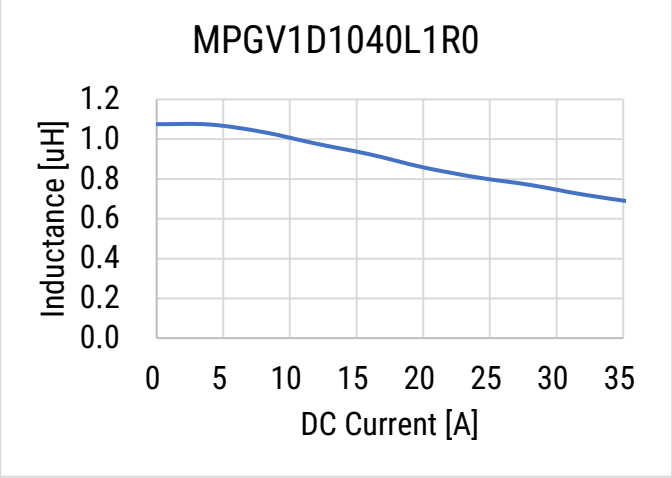
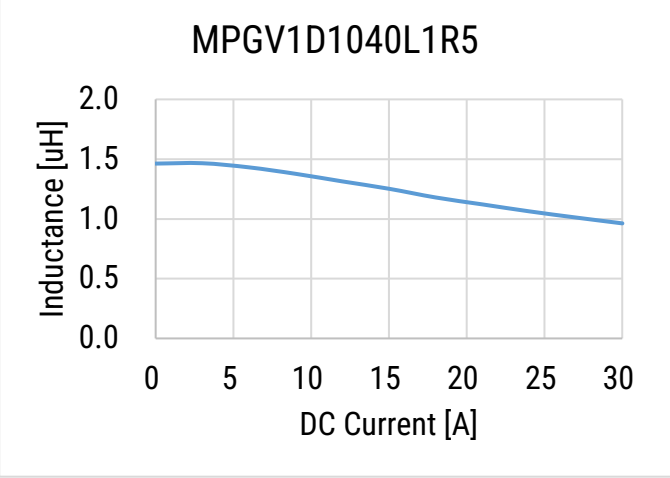




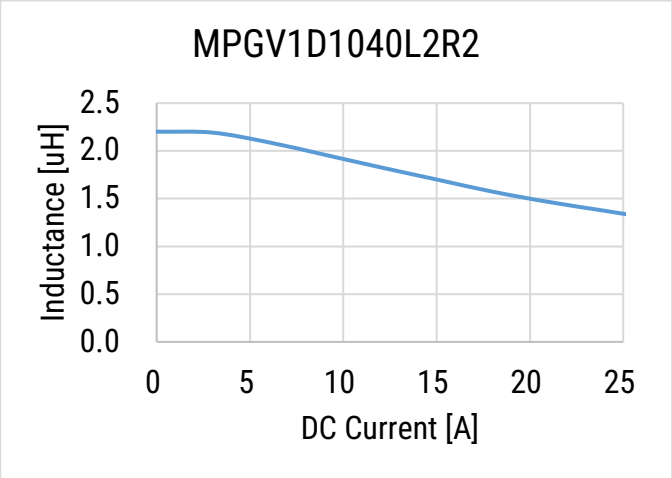


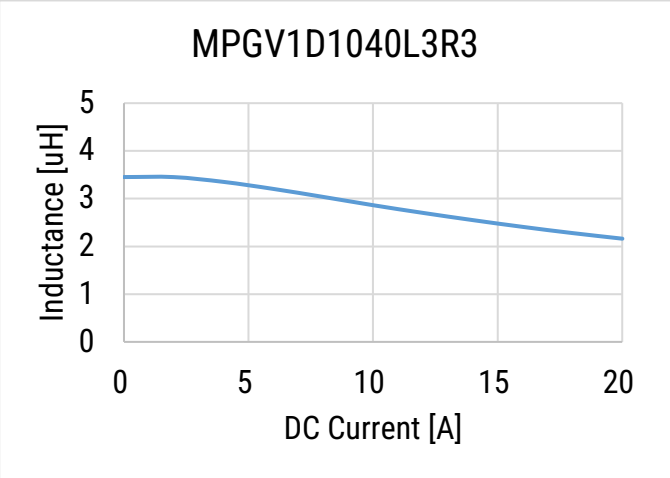


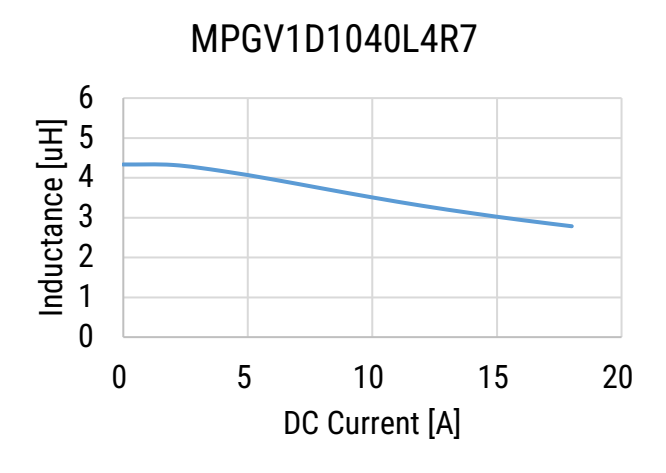




DC-Superposed Characteristics cont.







DC-Superposed Characteristics cont.

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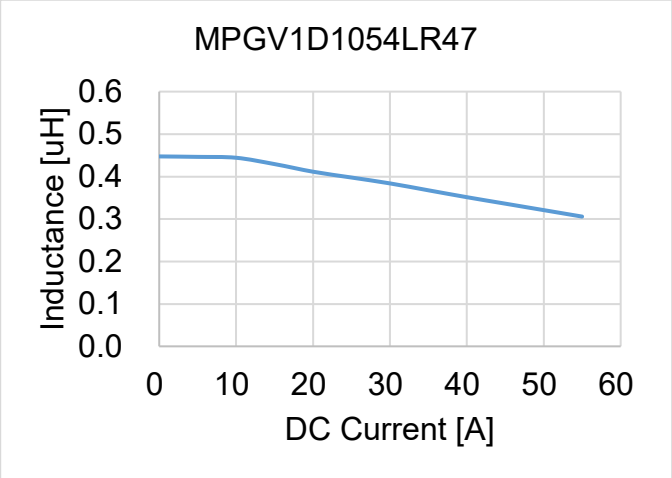
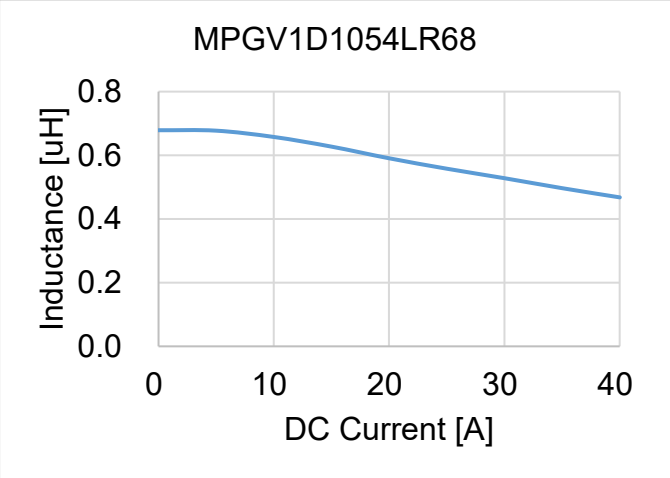
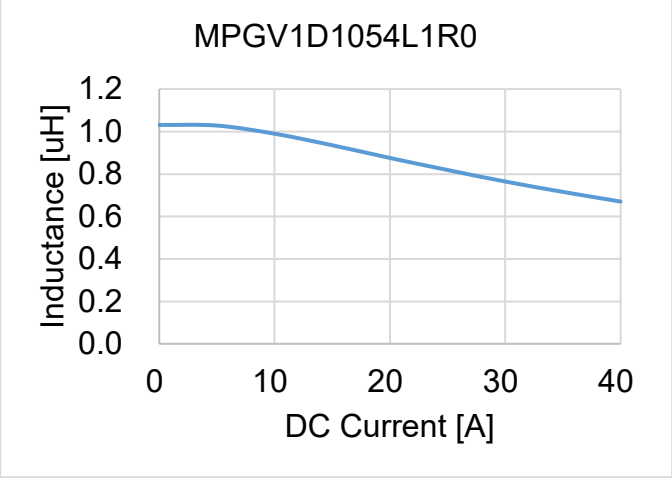
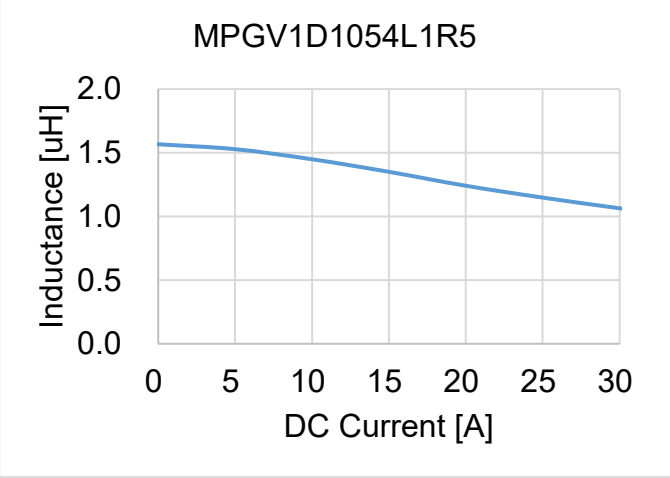
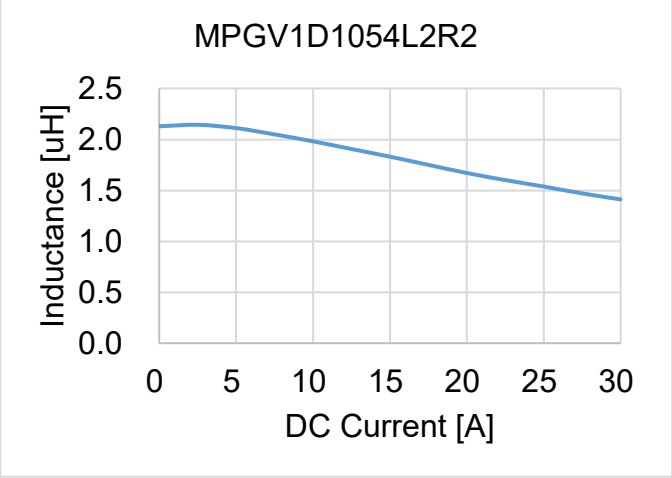
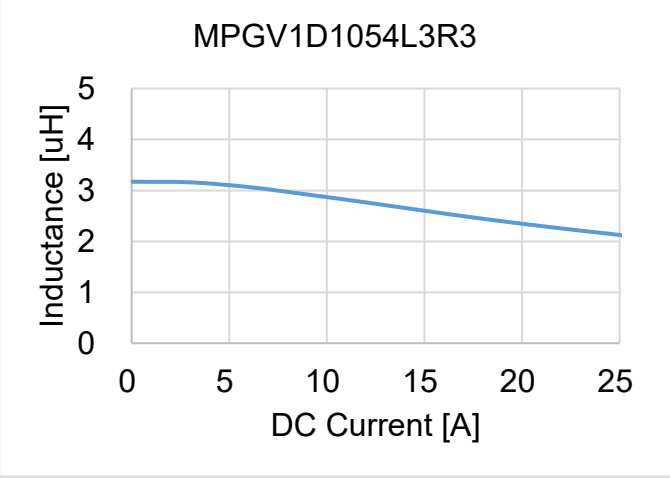




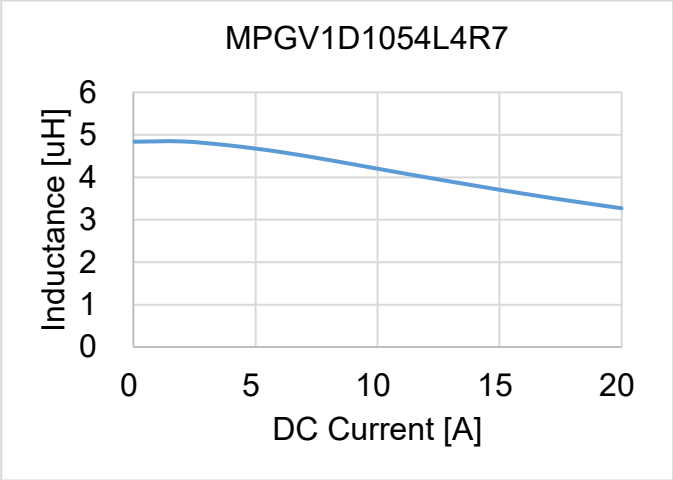


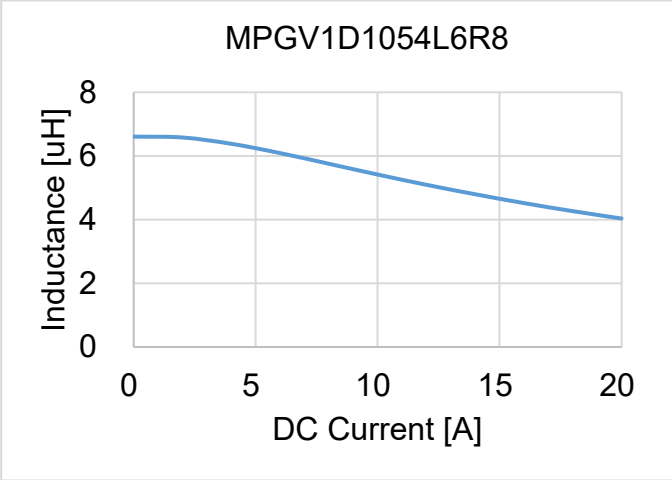


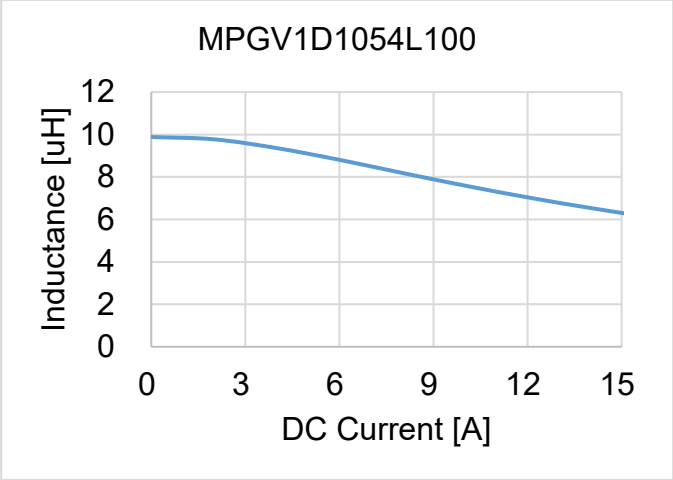


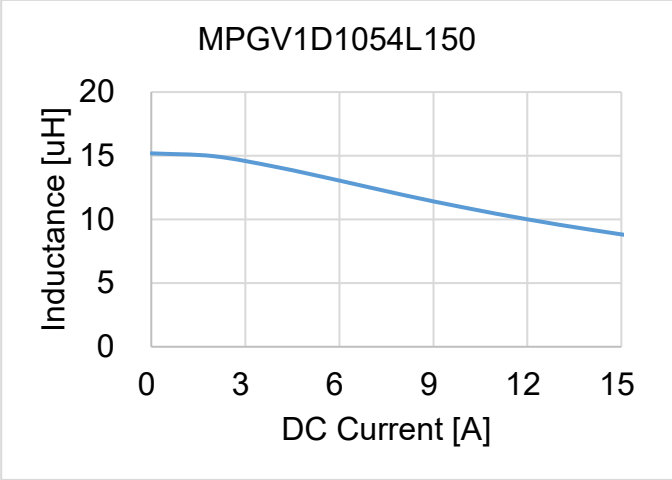


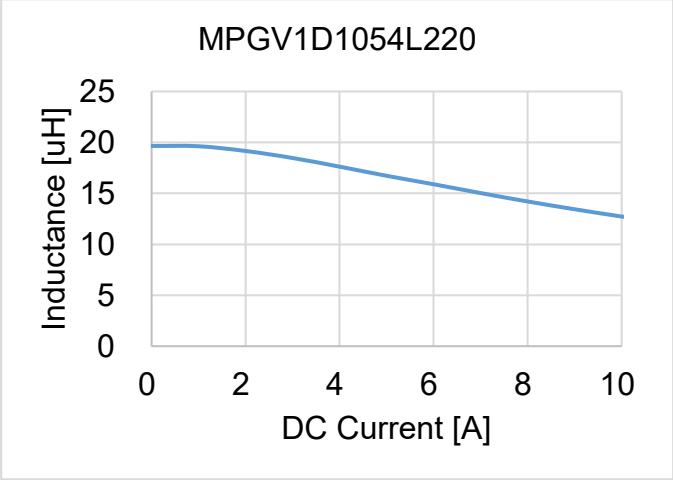
DC-Superposed Characteristics cont.

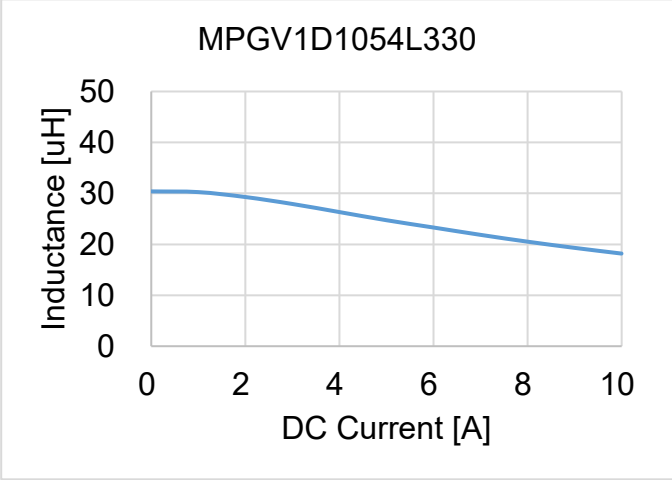




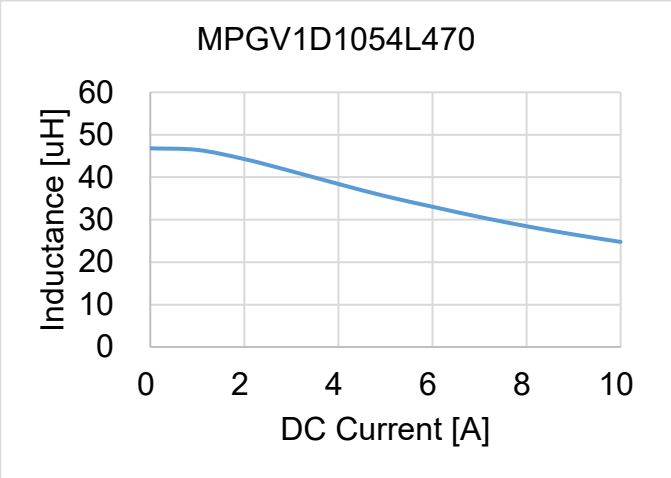




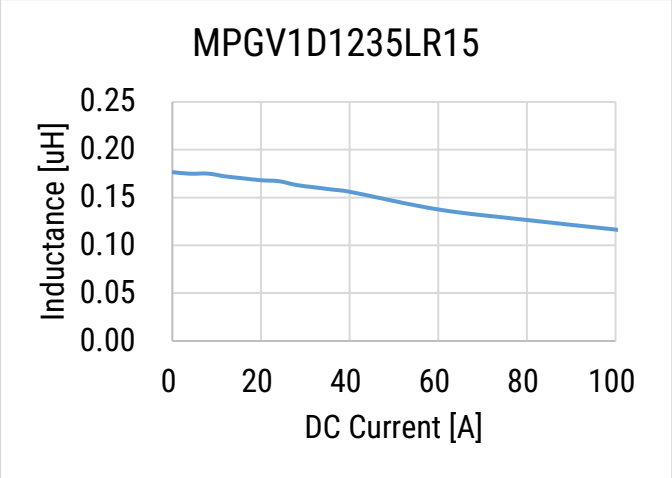


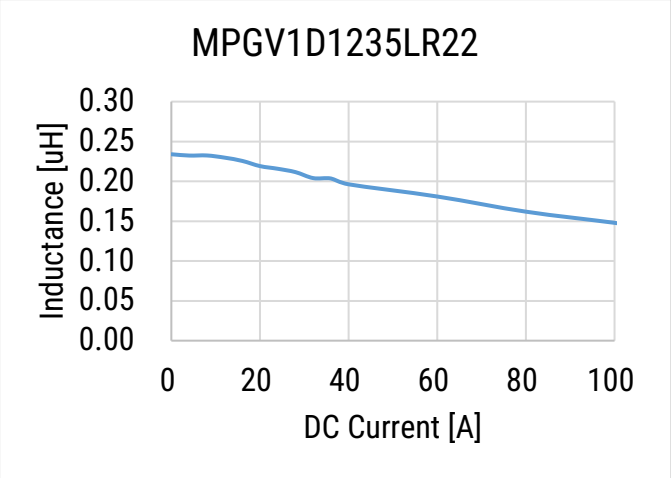


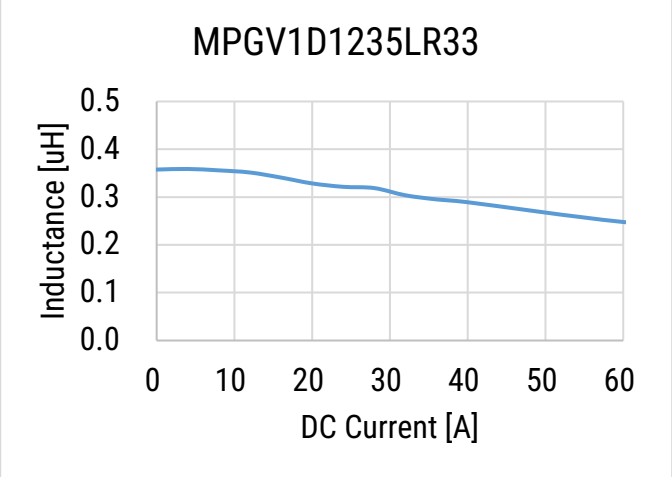
DC-Superposed Characteristics cont.

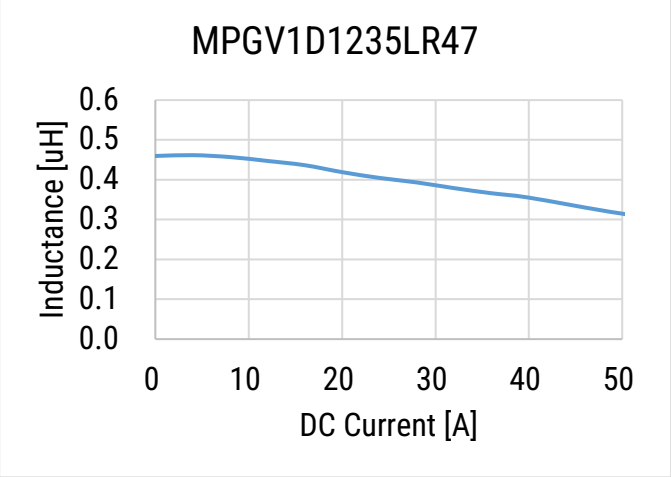


MPGV1D1235

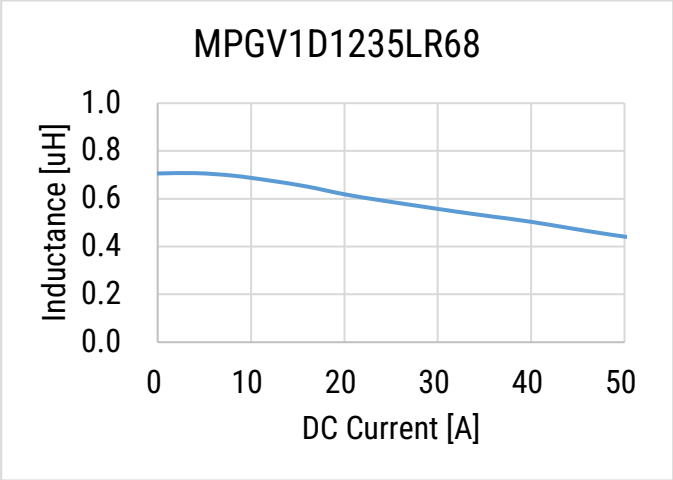


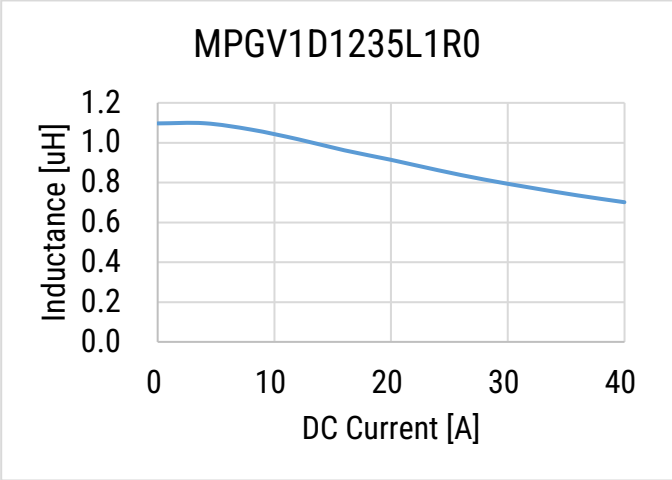


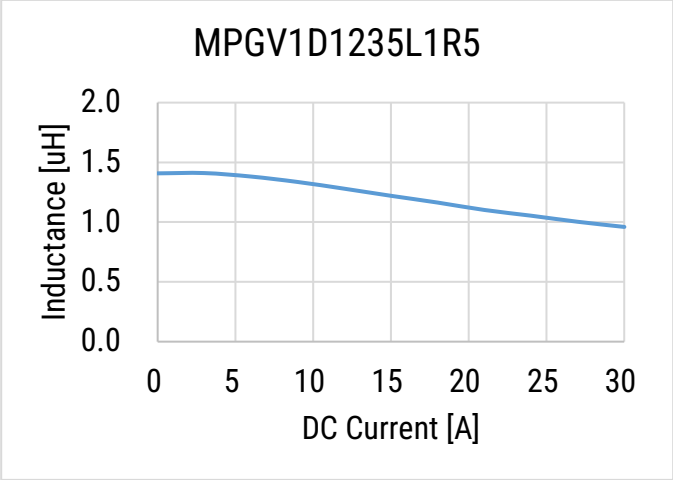


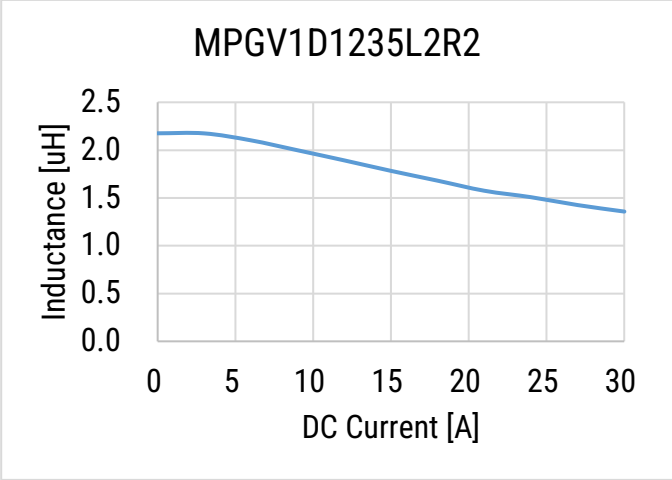


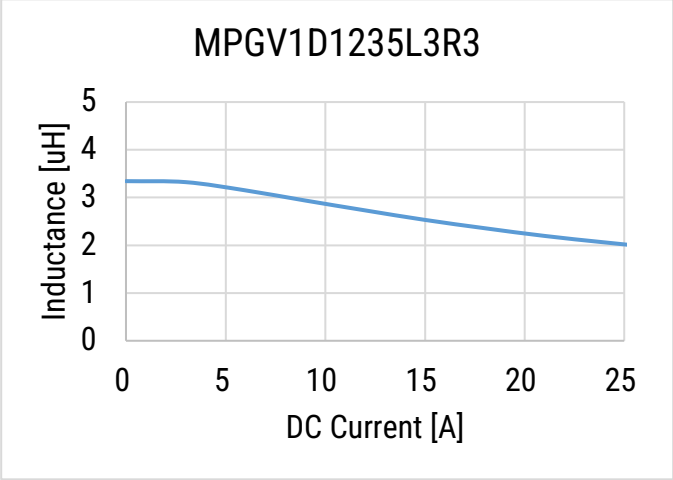
DC-Superposed Characteristics cont.

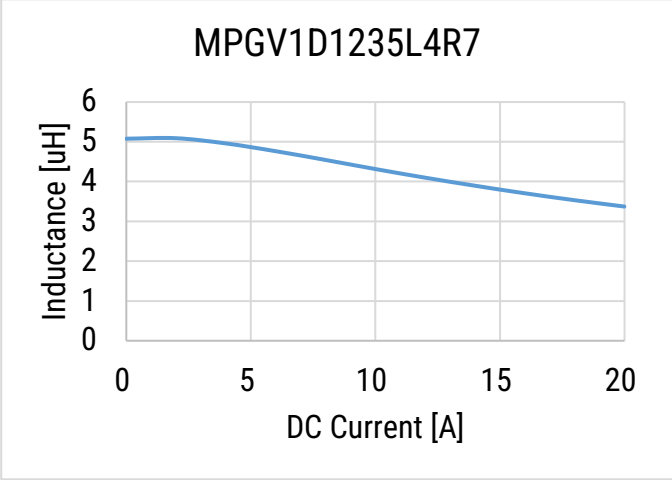






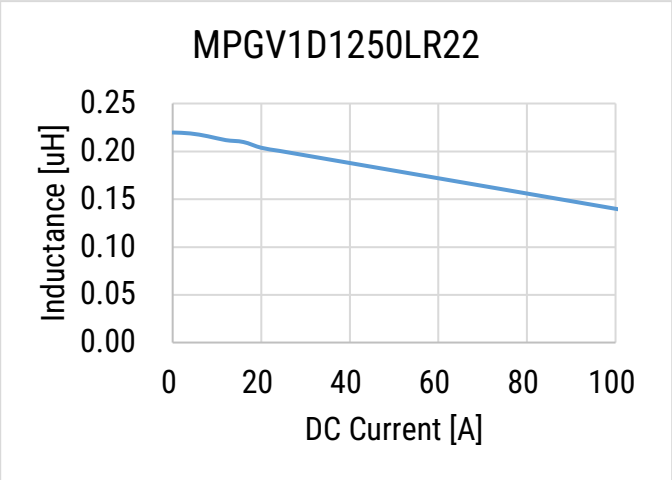


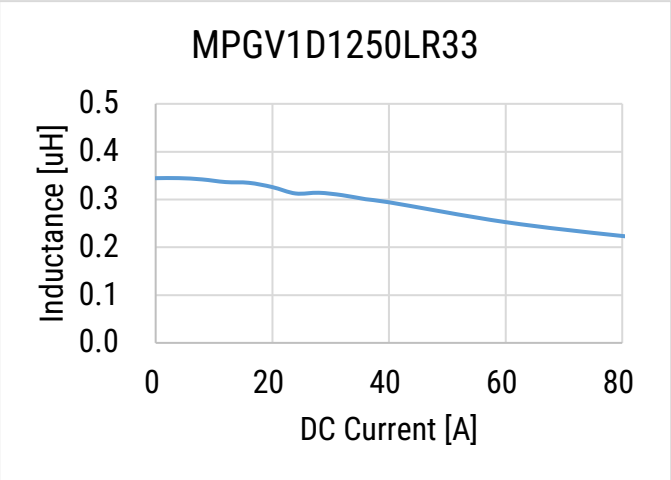


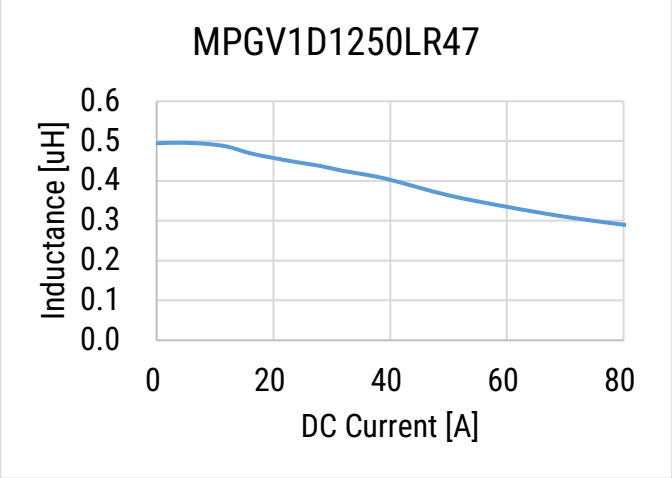


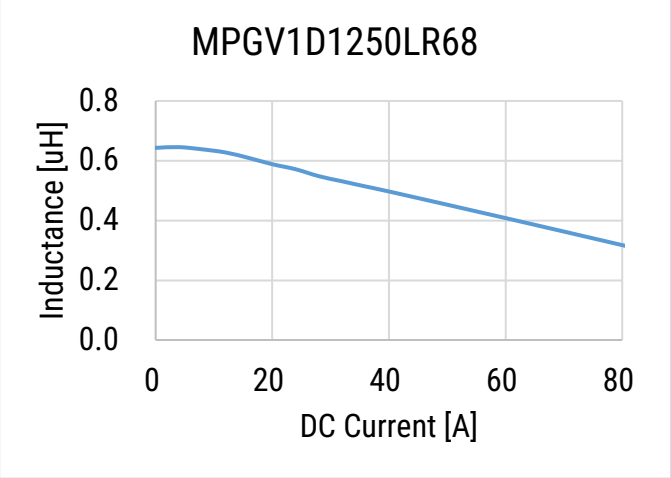
DC-Superposed Characteristics cont.

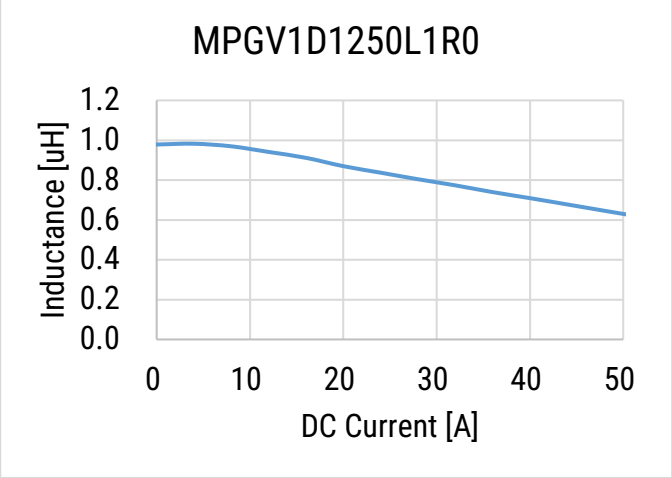
MPGV1D1250

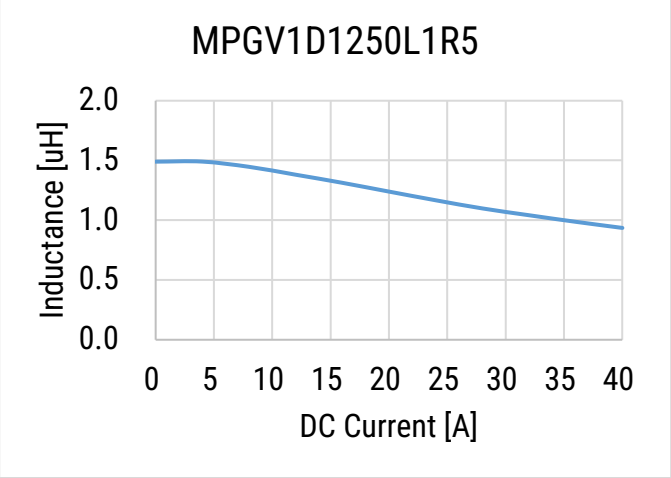




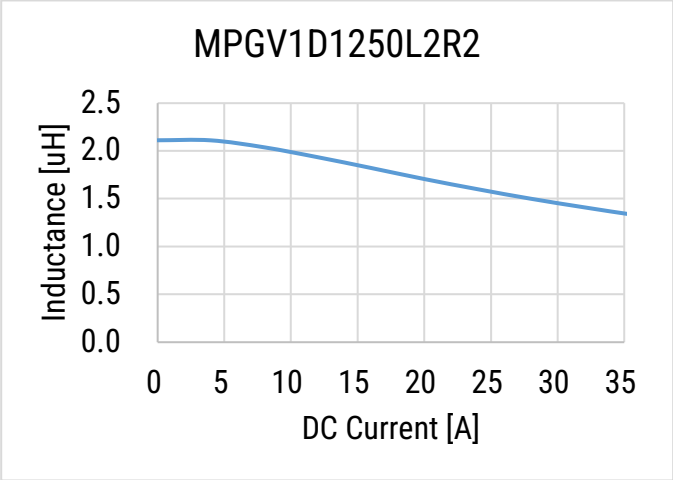


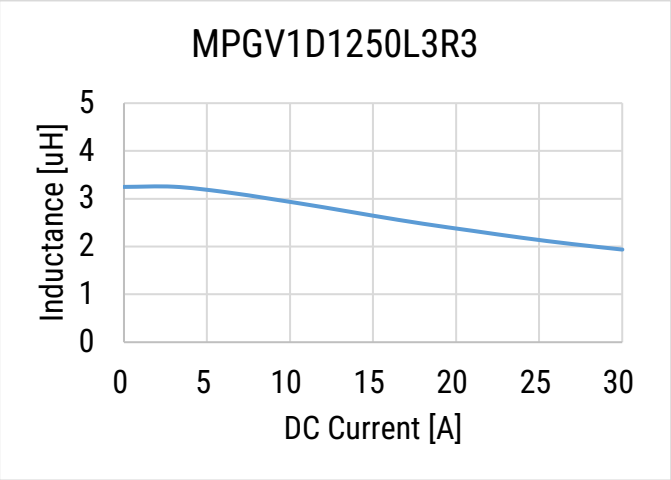


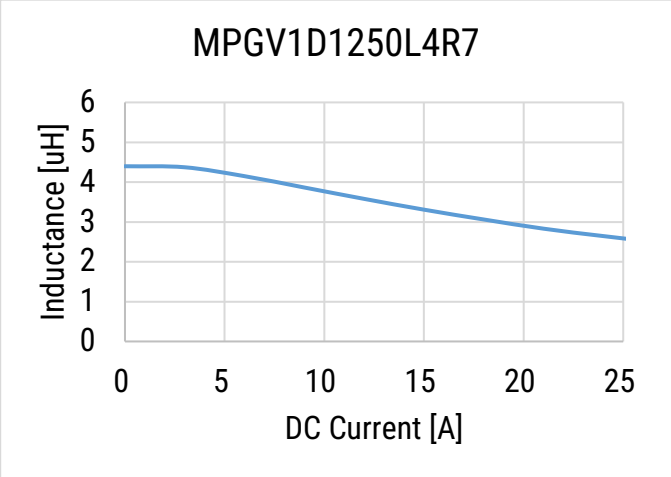




DC-Superposed Characteristics cont.

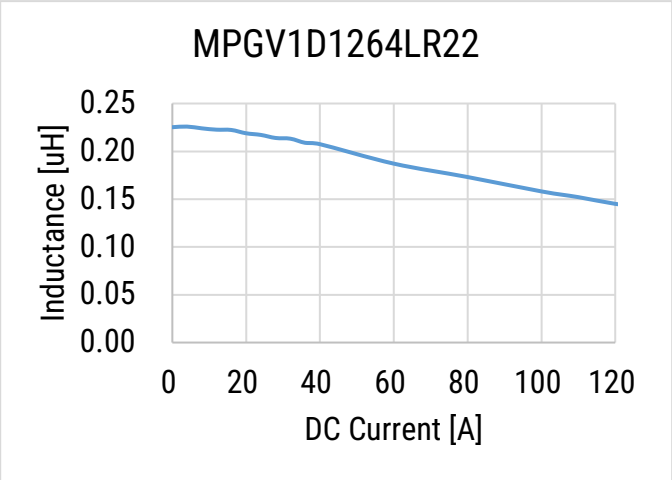


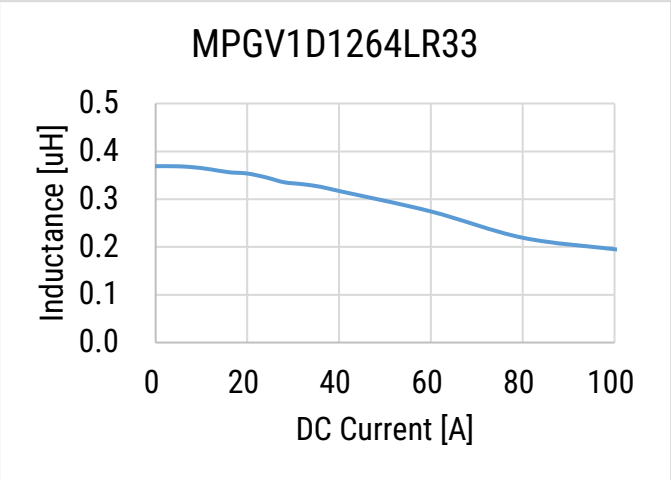


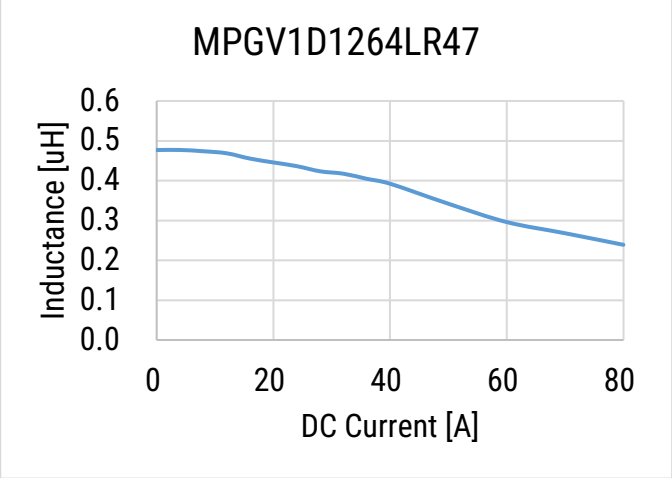


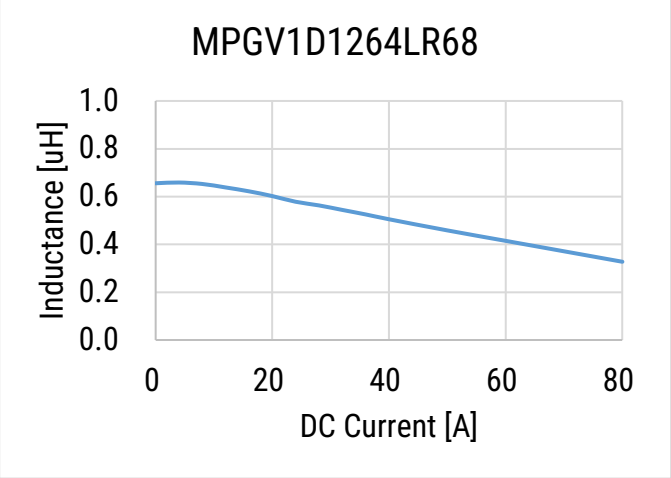
DC-Superposed Characteristics cont.

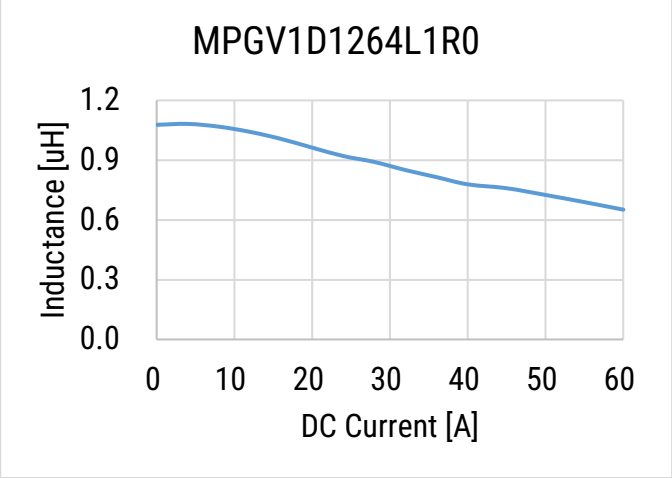
MPGV1D1264

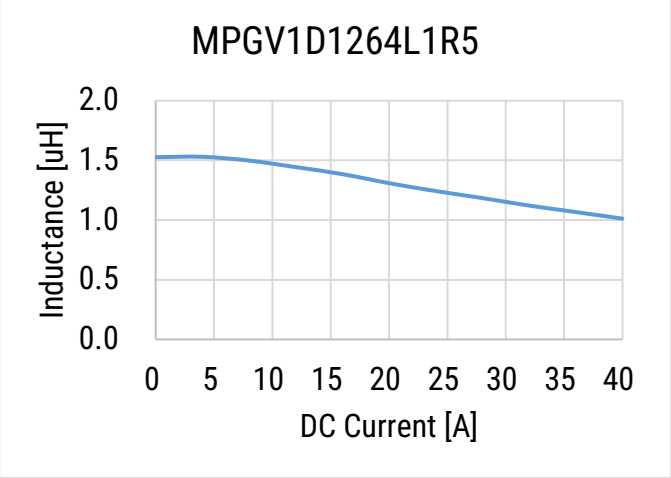




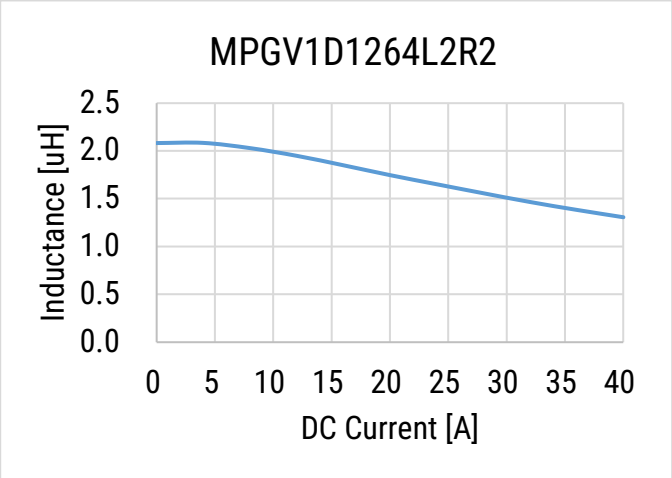


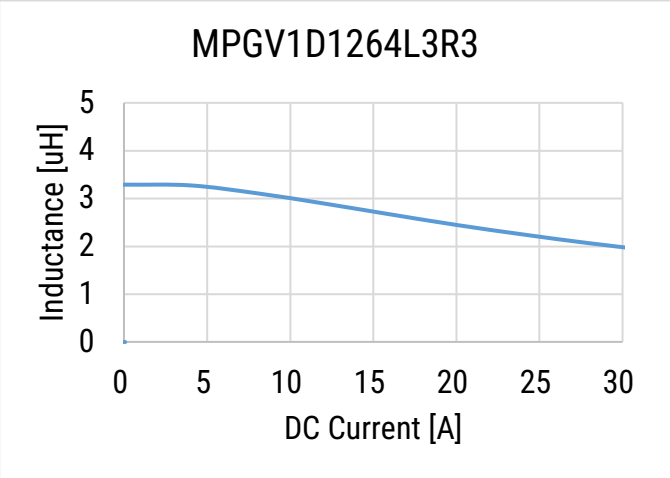


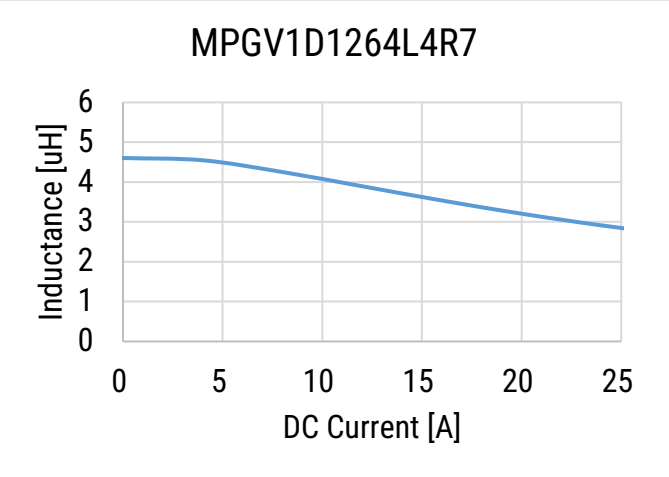




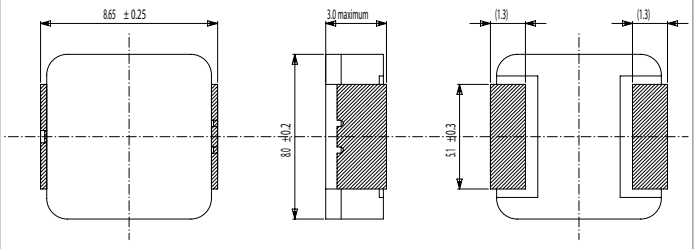
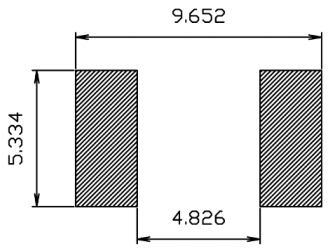
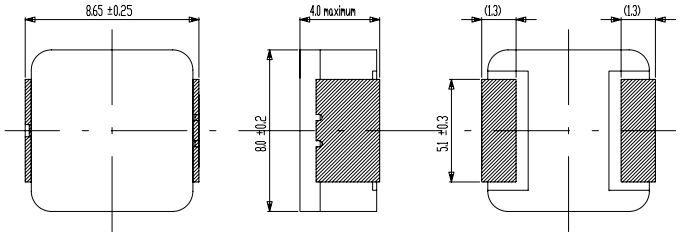
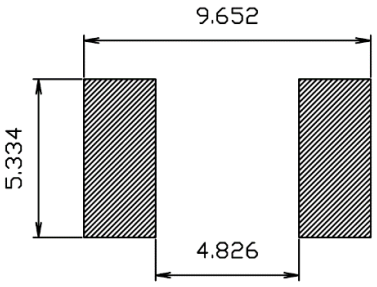
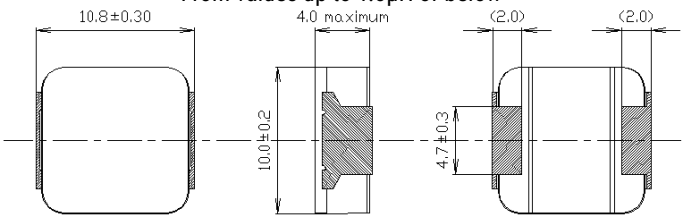
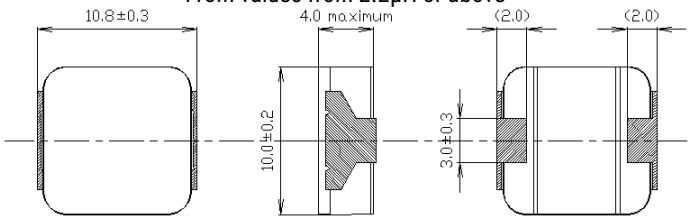
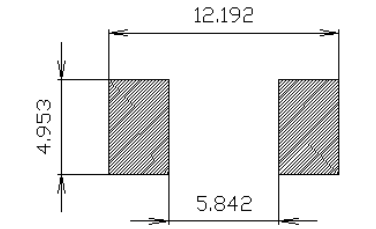
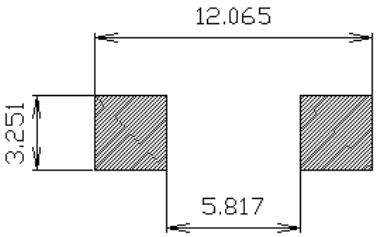
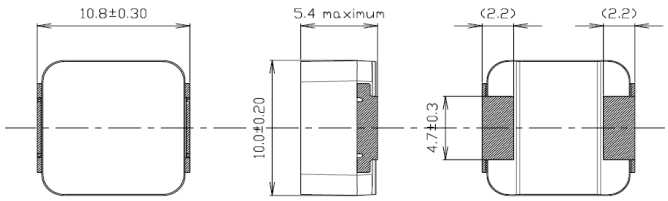
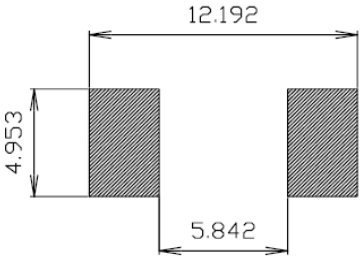
DC-Superposed Characteristics cont.



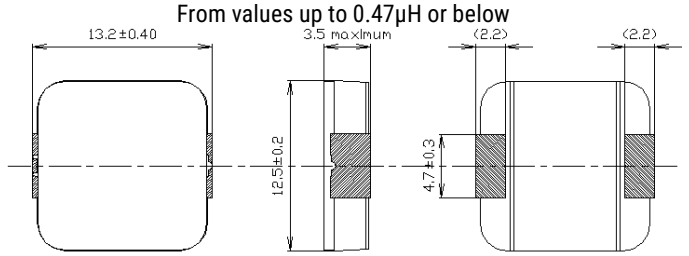
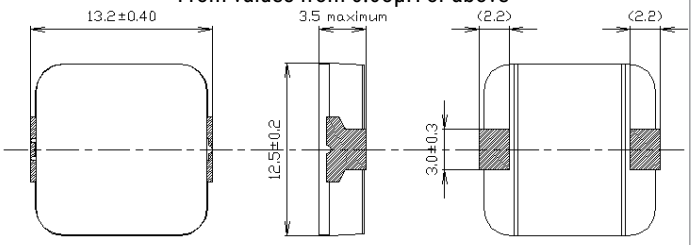
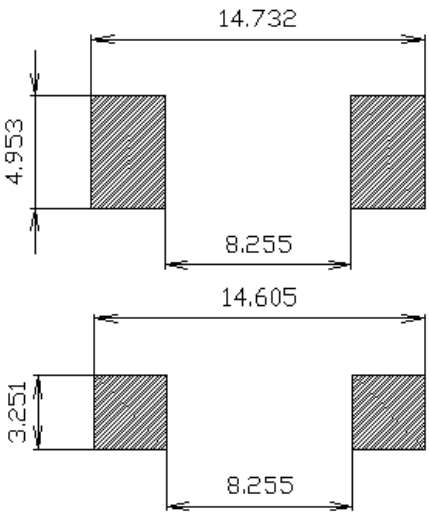
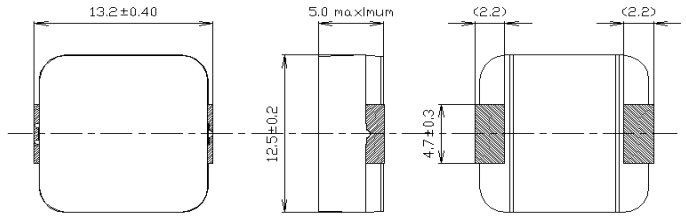
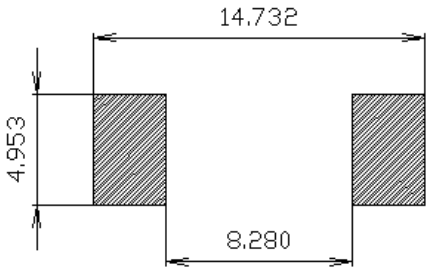
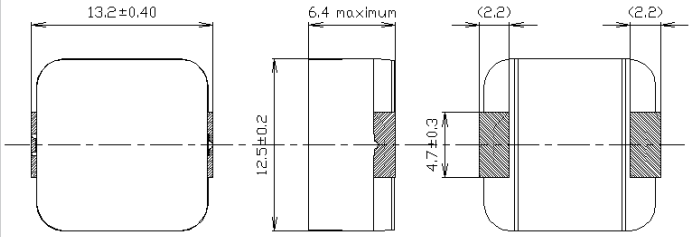
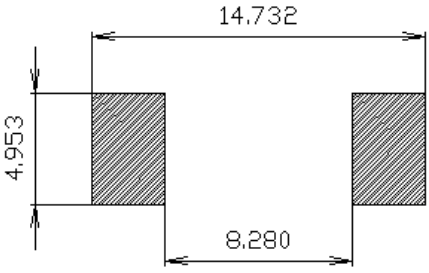




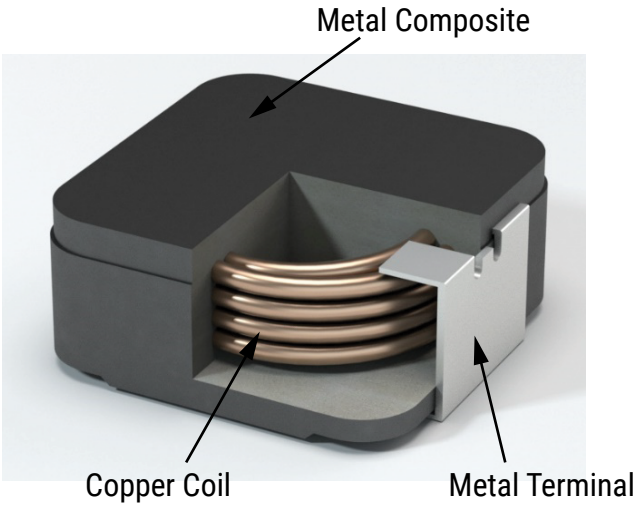
Dimensions

Case Size	Dimensions (mm)	Land Pattern (mm)
MPGV1D0830		
MPGV1D0840		
MPGV1D1040	From values up to 1.5μH or below  From values from 2.2μH or above 	 
MPGV1D1054		

Dimensions cont.

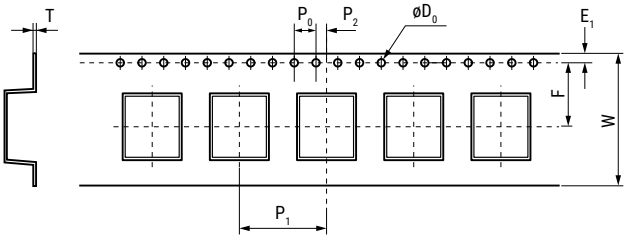
MPGV1D1235	From values up to 0.47µH or below  From values from 0.68µH or above 	
MPGV1D1250		
MPGV1D1264		

Construction



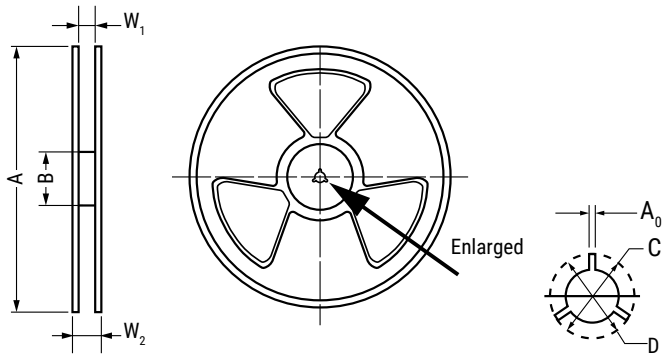
Taping Specification

Dimensions of Indented Square Hole Plastic Tape



Case Size	Reel Quantity		Dimensions (mm)							
			W	F	E_1	P_1	P_2	P_0	$øD_0$	T
MPGV1D0830	1,500	Tolerance	±0.30	±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
MPGV1D0840	1,000	Tolerance	±0.30	±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
MPGV1D1040	500	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	16.0	2.0	4.0	1.55	0.4
MPGV1D1054	500	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	16.0	2.0	4.0	1.55	0.4
MPGV1D1235	500	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	24.0	2.0	4.0	1.55	0.4
MPGV1D1250	250	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	24.0	2.0	4.0	1.55	0.4
MPGV1D1264	250	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	24.0	2.0	4.0	1.55	0.4

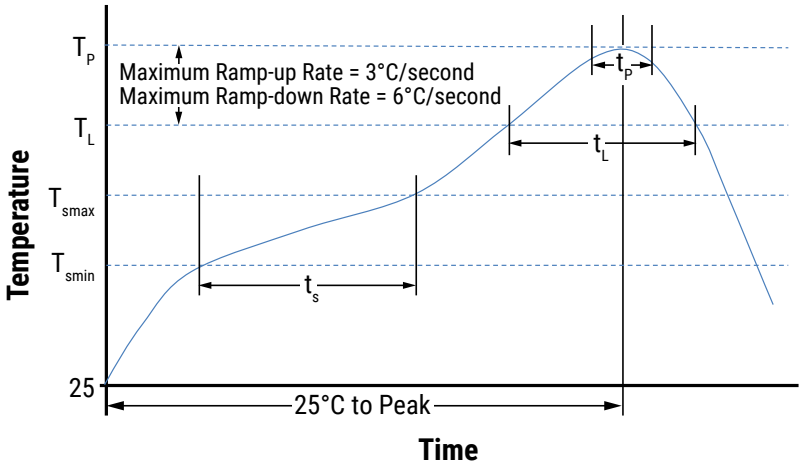
Reel Specifications



Case Size		Dimensions (mm)						
		A	B	C	D	A0	W1	W2
MPGV1D0830	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPGV1D0840	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPGV1D1040	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4
MPGV1D1054	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4
MPGV1D1235	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4
MPGV1D1250	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4
MPGV1D1264	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4

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)	250°C for MPGV1D0830, 0840 245°C for MPGV1D1040, 1054, 1235, 1250, 1264
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

Environmental Compliance

All KEMET SMD Inductors are RoHS compliant.

Handling Precautions

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

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 and sulfur bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts.

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

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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