Overview

The KEMET MPEV metal composite inductors are ideal for use in DC to DC switching power supplies for automotive applications.The metal composite core has high saturation characteristics maintaining functionality with high current transients and is characterized by temperature stable inductance.The high heat resistance propriety of the inductor has been further improved and allows for operating temperature up to +180°C.

Applications

Automotive ECU applications such as:

- LED headlights
- Meter cluster panels
- Head-up displays (HUD)
- Electric water pumps (EWP)
- Electric oil pumps (EOP)
- Electric power steering (EPS)

Benefits

- Metal composite powder
- Shielded construction, SMD configuration
- Inductance range from 0.47 – 47.00 µH
- Operating temperature up to +180°C
- Low acoustic noise
- Low magnetic flux leakage
- AEC–Q200 qualified



Part Number System

MPEV	1	D0630	L	1R5
Series	Version	Size Code	Inductor	Inductance Code µH
MPEV	1	D0630 = 6x6x3.0 mm D1040 = 10x10x4.0 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 = 10.00 µH R68 = 0.68 µH 1R5 = 1.50 µH 101 = 100.00 µH

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Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to +180°C (including self-temperature rise)
Rated Inductance Range	0.47 – 47.00 µH at 100 kHz, 1 mA
Inductance Tolerance	±20%
Rated DC Resistance Range	2.4 – 186.3 mΩ maximum
Rated Current Range	2.7 – 26.4 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)			Self-Resonance Frequency (MHz)	Weight (g)
					Irms[1] (Reference)	Isat[2] (Reference)	Isat[3] (Reference)		
MPEV1D0630LR47	0.47	±20%	3.50	4.00	18.7	15.0	21.0	70.0	0.62
MPEV1D0630LR68	0.68	±20%	5.30	6.20	15.1	11.5	17.0	55.0	0.62
MPEV1D0630L1R0	1.00	±20%	7.10	8.20	13.1	9.0	13.0	43.0	0.62
MPEV1D0630L1R5	1.50	±20%	11.00	12.70	10.5	7.0	11.0	38.0	0.62
MPEV1D0630L2R2	2.20	±20%	15.90	18.30	8.7	6.5	9.0	30.0	0.62
MPEV1D0630L3R3	3.30	±20%	26.30	30.30	6.8	5.0	7.0	26.0	0.62
MPEV1D0630L4R7	4.70	±20%	31.80	36.70	6.2	4.5	6.5	21.0	0.62
MPEV1D0630L6R8	6.80	±20%	44.20	50.90	5.2	4.0	5.5	16.0	0.62
MPEV1D0630L100	10.00	±20%	67.80	78.00	4.2	3.5	4.5	15.0	0.62
MPEV1D0630L150	15.00	±20%	113.20	130.20	3.3	3.0	4.0	13.0	0.62
MPEV1D0630L220	22.00	±20%	162.00	186.30	2.7	2.5	3.5	9.6	0.62
MPEV1D1040LR47	0.47	±20%	2.10	2.40	26.4	29.0	42.0	65.0	2.20
MPEV1D1040LR68	0.68	±20%	2.70	3.20	23.1	23.0	34.5	47.0	2.20
MPEV1D1040L1R0	1.00	±20%	3.30	3.80	21.1	19.5	29.0	35.0	2.20
MPEV1D1040L1R5	1.50	±20%	4.60	5.40	17.7	18.0	26.0	30.0	2.20
MPEV1D1040L2R2	2.20	±20%	6.80	7.90	14.6	13.0	18.5	23.0	2.20
MPEV1D1040L3R3	3.30	±20%	11.10	12.80	11.4	11.0	15.0	18.0	2.20
MPEV1D1040L4R7	4.70	±20%	13.80	15.90	10.3	10.0	14.0	17.0	2.20
MPEV1D1040L6R8	6.80	±20%	20.90	24.10	8.3	8.0	11.5	14.0	2.20
MPEV1D1040L100	10.00	±20%	29.60	34.10	7.0	7.5	10.5	11.0	2.20
MPEV1D1040L150	15.00	±20%	44.50	51.20	5.7	5.5	8.5	8.0	2.20
MPEV1D1040L220	22.00	±20%	66.20	76.10	4.7	5.0	7.0	7.0	2.20
MPEV1D1040L330	33.00	±20%	104.10	119.70	3.7	3.5	5.0	5.0	2.20
MPEV1D1040L470	47.00	±20%	158.80	182.60	3.0	3.0	4.0	4.5	2.20
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)				

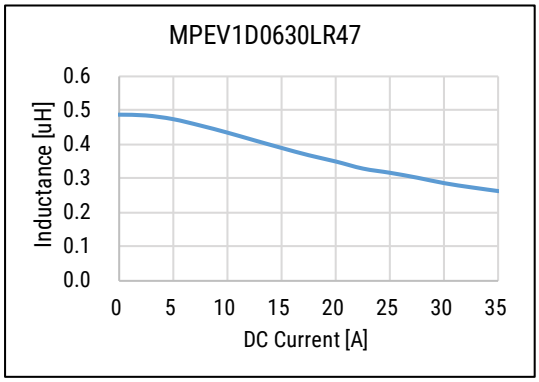
[1] *T = 40 K rise at rated current*
[2] *Inductance drop 20% at rated current*
[3] *Inductance drop 30% at rated current*

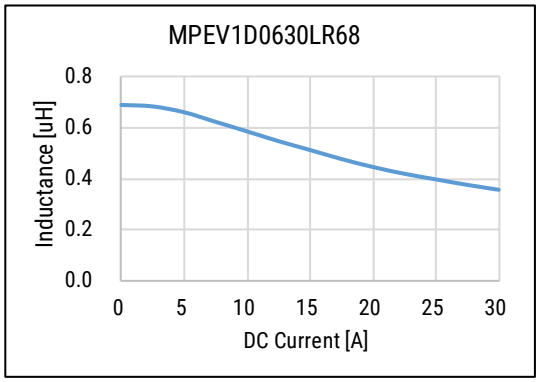
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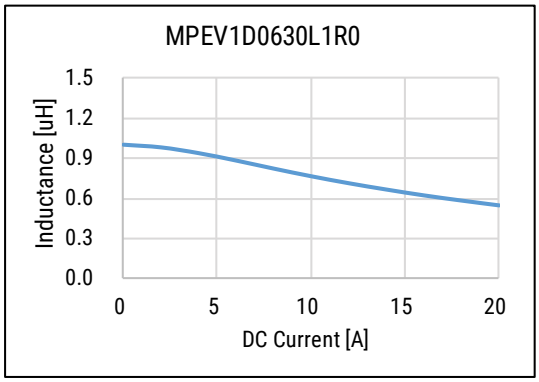
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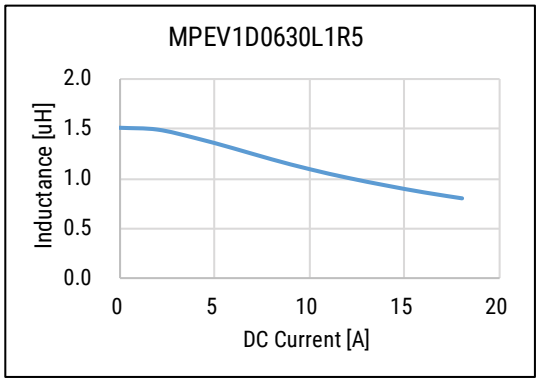
DC-Superposed Characteristics

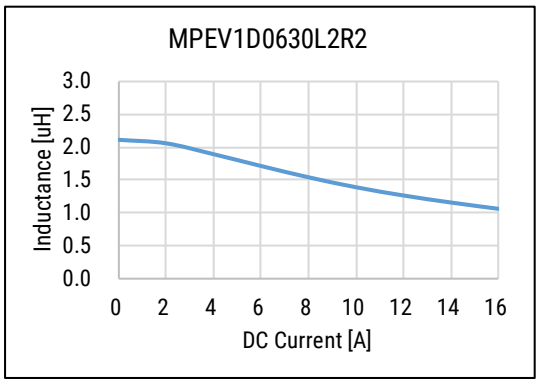
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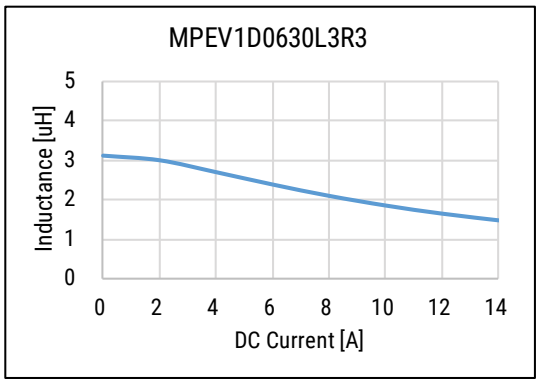


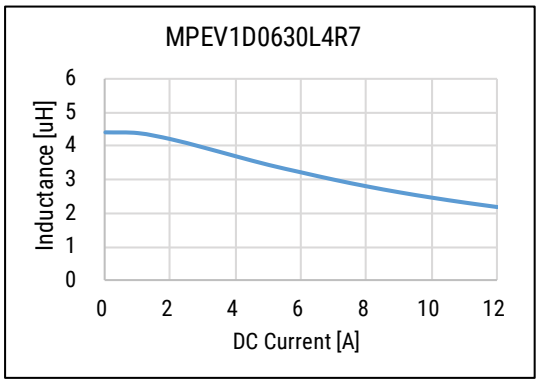


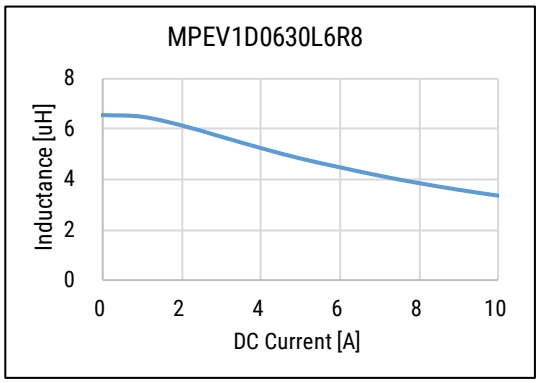








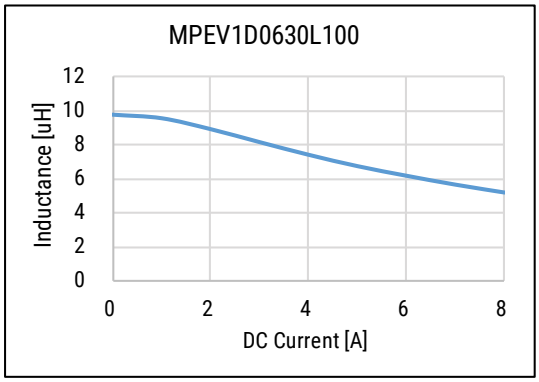


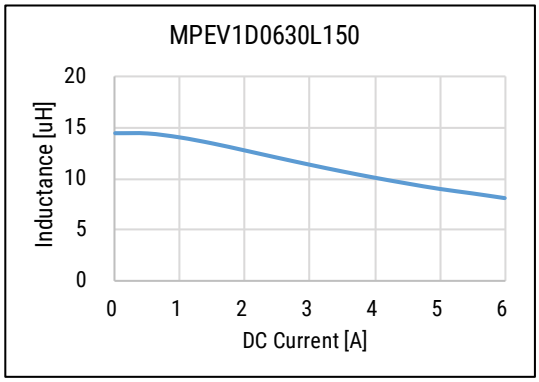


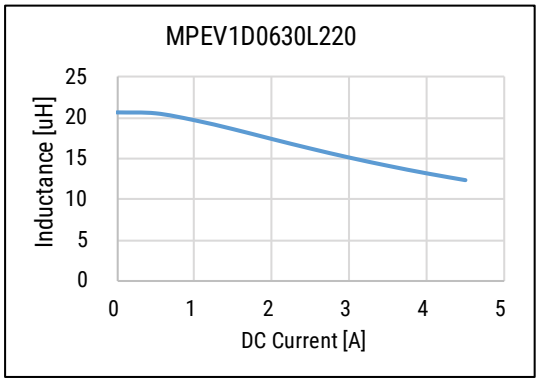
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DC-Superposed Characteristics cont.

MPEV1D0630 cont.



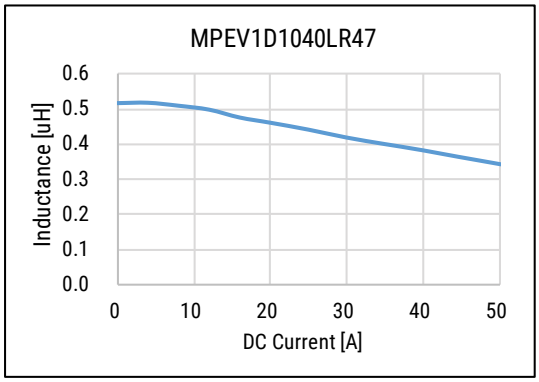


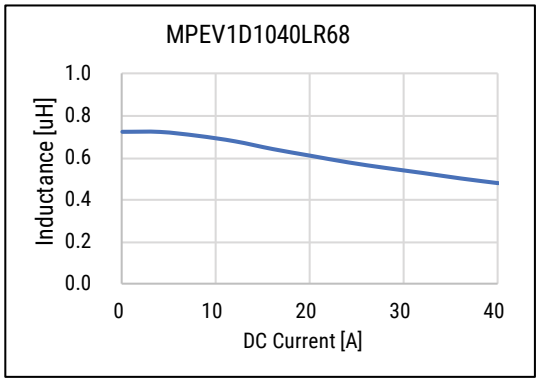


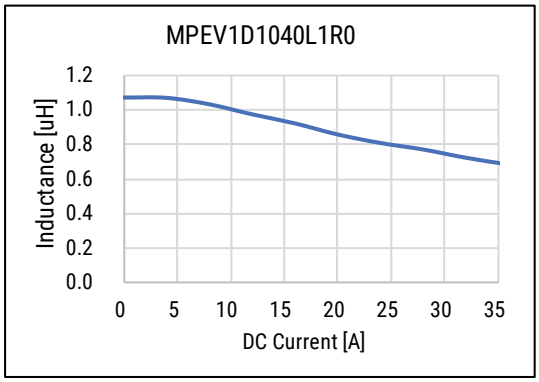
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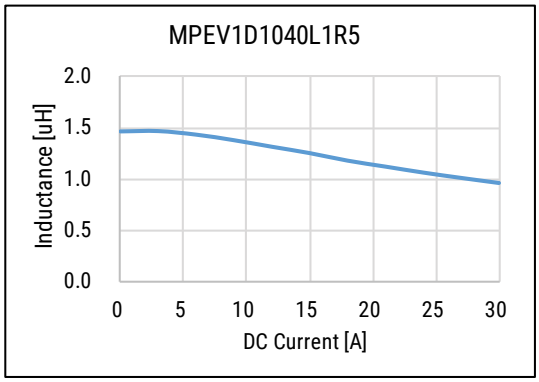
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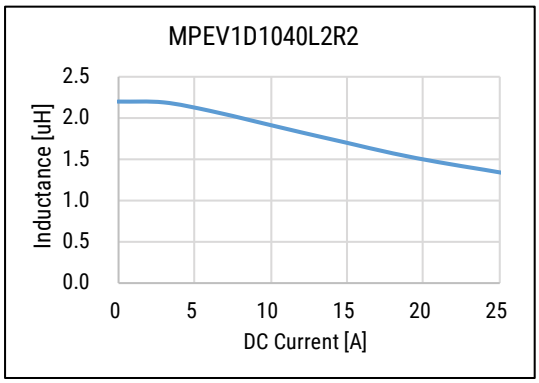
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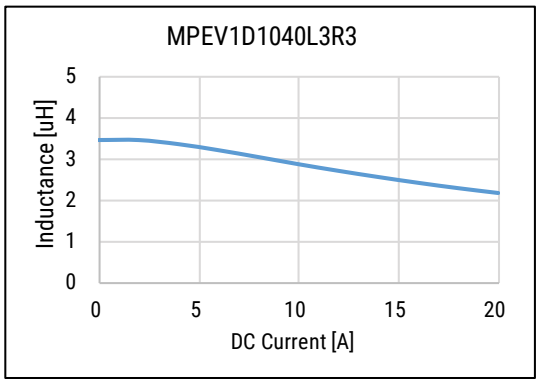


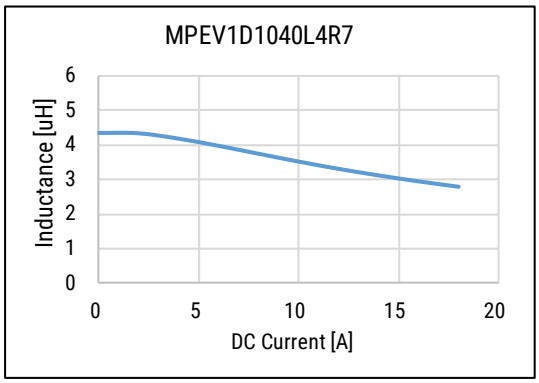


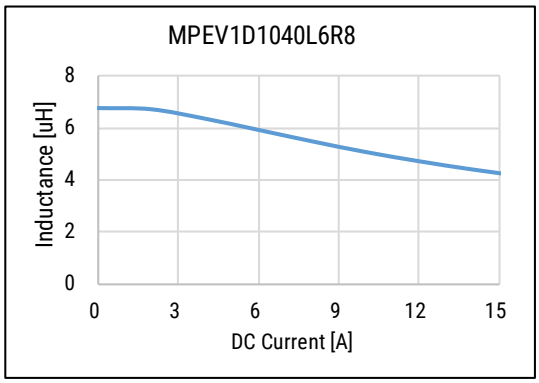








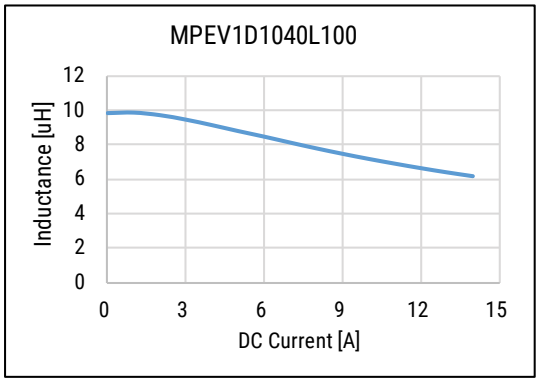


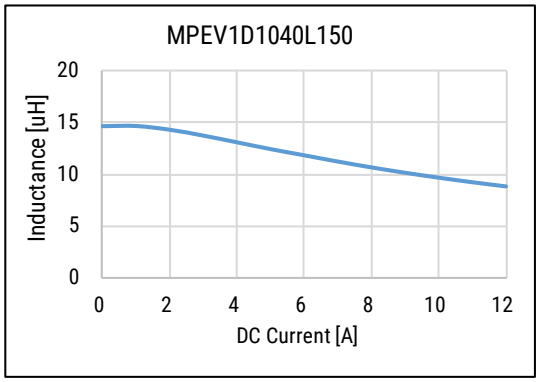


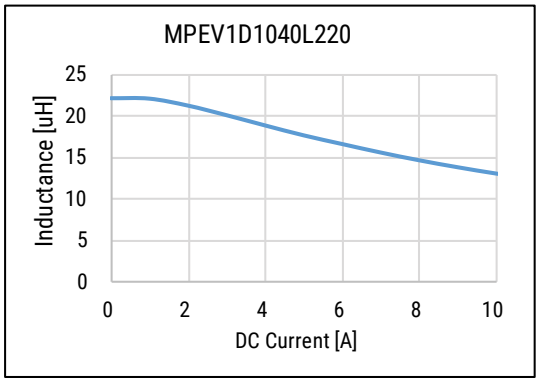
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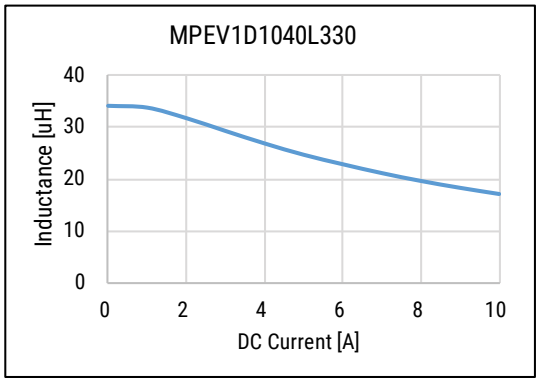
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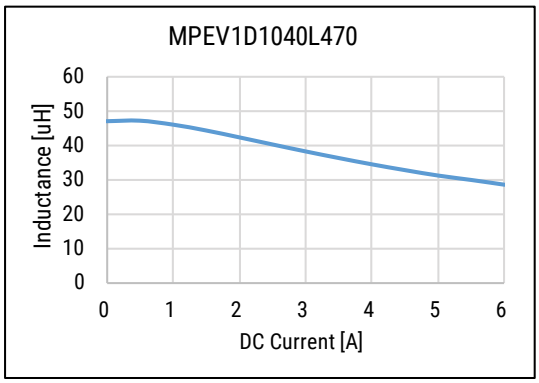
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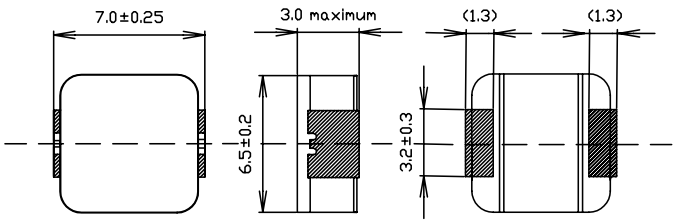
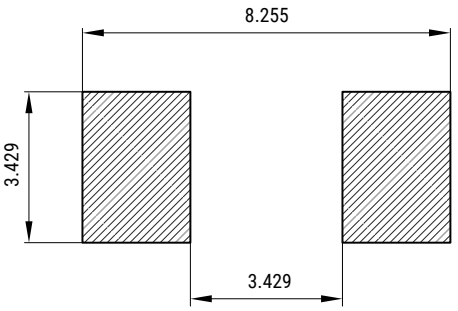
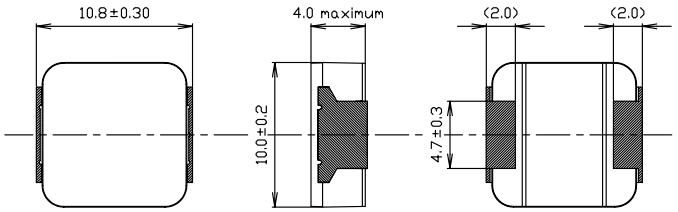
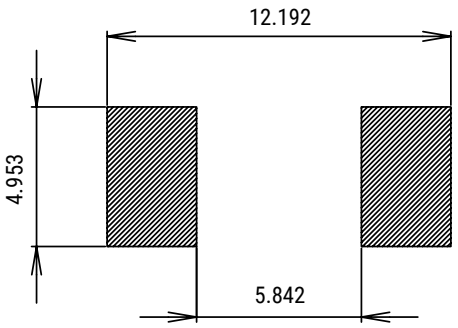
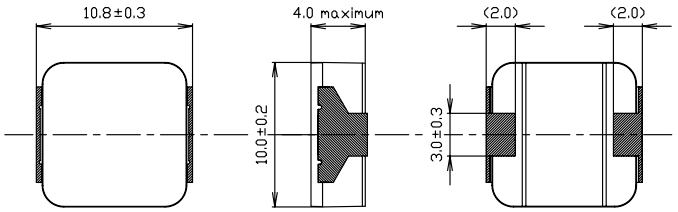
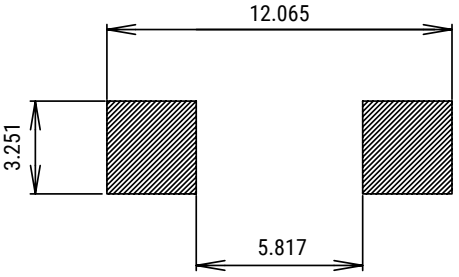






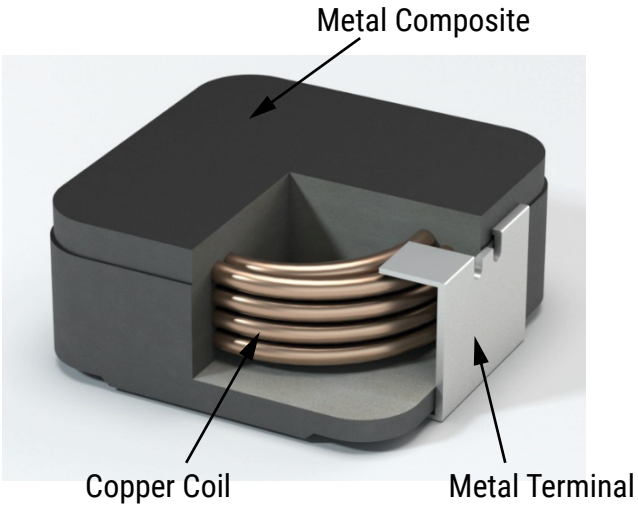
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Dimensions

Case Size	Dimensions (mm)	Land Pattern (mm)
MPEV1D0630		
MPEV1D1040 For values up to 1.5 µH or below		
MPEV1D1040 For values from 2.2 µH or above		

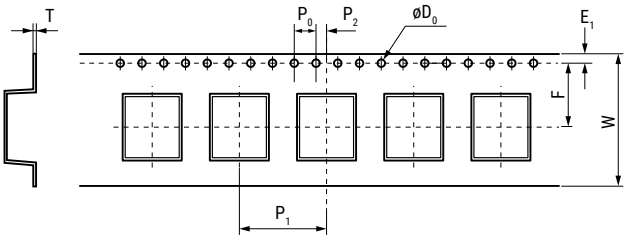
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Construction



Taping Specification

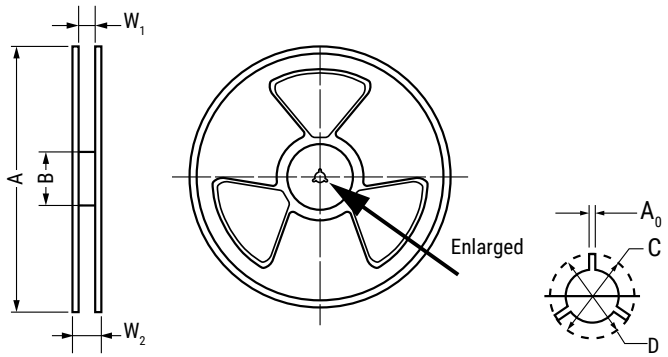
Dimensions of Indented Square Hole Plastic Tape



Case Size	Reel Quantity		Dimensions (mm)							
			W	F	E_1	P_1	P_2	P_0	$øD_0$	T
MPEV1D0630	1,500	Tolerance	±0.30	±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
MPEV1D1040	500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	24.00	11.50	1.75	16.00	2.00	4.00	1.55	0.40

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Reel Specifications

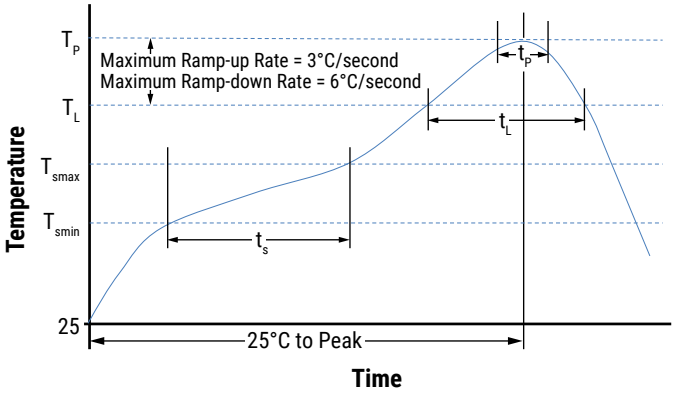


Case Size		Dimensions (mm)						
		A	B	C	D	A_0	W_1	W_2
MPEV1D0630	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.5	16.9	21.3
MPEV1D1040	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	ø330	ø100	ø13.0	ø21.5	2.6	25.0	29.4

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 MPEV1D0630 245°C for MPEV1D1040
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



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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 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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