

## Data Sheet

**Customer:**

**Product:** Wire Wound Type Power Inductor—MLP(H) Series

**Sizes.:** 0803/0805/0806/1004/1008/1310

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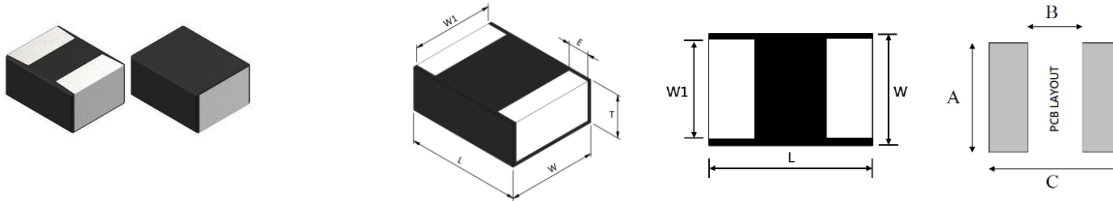
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## Wire Wound Type Power Inductor



### Dimensions

Unit: mm

Type	Size (Inch)	L	W	W1	T	E	A	B	C
MLP03	0803	2.00±0.20	1.20±0.20	-	0.80 max	0.50±0.30	1.2	0.9	2.0
MLP05	0805	2.00±0.20	1.20±0.20	1.00±0.20	1.00 max	0.50±0.20	1.2	0.9	2.0
MLP06	0806	2.00±0.20	1.60±0.20	1.40±0.20	1.00 max	0.50±0.20	1.6	0.9	2.0
MLPH06	0806	2.00±0.20	1.60±0.20	1.40±0.20	1.00 max	0.60±0.30	1.6	0.9	2.0
MLP(H)04	1004	2.50±0.20	2.00±0.20	1.80±0.20	1.00 max	0.60±0.30	2.0	1.2	2.8
MLP(H)08	1008	2.50±0.20	2.00±0.20	1.80±0.20	1.20 max	0.60±0.30	2.0	1.2	2.8
MLP10	1310	3.20±0.20	2.50±0.20	2.30±0.20	1.10±0.1	0.60±0.20	2.5 typ	1.7 typ	3.2 typ

### Features

- High saturation current realized by material properties and structure design
- Low DC resistance to achieve high conversion efficiency and lower temperature rising
- Magnetically shielded structure to accomplish high resolution in EMC protection
- Halogen free, Lead Free, RoHS Compliance
- The moisture sensitivity level (MSL) of products is level 1.

### Applications for MLP(H)06/04/08/10

- Smart phone, PAD
- Thin-type Power Supply Module
- DC-DC Converters

### Applications for MLP03/05

- Mobile Phones
- HDDs, DSCs, Pads
- LCD, LED Display, etc.

### Characteristics for MLP(H)05/06/04/08/10

- Isat: DC current that will cause Li to drop approximately 30%
- Irms: DC current that will cause an approximately  $\Delta T40^{\circ}C$
- The rated current value is following either Isat (max.) or Irms (max), which value is lower one
- The part temperature (ambient + temp rise) should not exceed  $125^{\circ}C$  under worst case operating conditions. PCB land pattern, trace size -thick, circuit design and proximity to other components are all the factors will affect the temperature performance of the device. Therefore, it should be approved in application conditions and end product.
- Rated voltage: 20V DC (max.)
- Operating temperature range:  $-40 \sim 125^{\circ}$  (including self-temperature rising)
- Test equipment:  
L: HP4285A LCR meter or equivalent  
DCR: Micro-ohm meter RM3542 or equivalent
- All test referenced to  $25^{\circ}C$  ambient

### Characteristics for MLP03

- Isat: DC current that will cause Li to drop approximately 30%
- Irms: DC current that will cause an approximately  $\Delta T40^{\circ}C$
- Operating temperature range:  $-40 \sim 125^{\circ}$  (including self-temperature rising)
- Test equipment:  
L: HP4285A LCR meter or equivalent  
DCR: Micro-ohm meter RM3542 or equivalent
- All test referenced to  $26^{\circ}C$  ambient

### Part Numbering

MLP	08	M	T	1R0
Product Type	Dimensions	Inductance Tolerance	Packaging Code	Inductance
MLP: Standard MLPH: High Current	03: 0803 05: 0805 06: 0806 04: 1004 08: 1008 10: 1310	M: $\pm 20\%$	T: Taping Reel	R47: 0.47uH 1R0: 1.0uH 1R5: 1.5uH 2R2: 2.2uH

**Standard Electrical Specifications**

MLP03(0803) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)	
				typ.	max.	typ.	max.	typ.	max.
MLP03MTR24	0.24	±20%	1MHz, 1V	22	26	6.70	6.00	4.70	4.10
MLP03MTR47	0.47	±20%	1MHz, 1V	29	35	4.60	4.20	4.00	3.70

MLP05(0805) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLP05MT1R0	1.0	±20%	1MHz, 1V	58	67	3.40	3.10	3.00	2.70	>120	25

MLP06(0806) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLP06MTR24	0.24	±20%	1MHz, 1V	17	21	5.60	5.05	5.00	4.50	>120	30
MLP06MTR33	0.33	±20%	1MHz, 1V	24	29	5.00	4.50	4.10	3.69	>120	30
MLP06MTR47	0.47	±20%	1MHz, 1V	33	40	4.40	4.00	3.50	3.15	>120	30
MLP06MTR68	0.68	±20%	1MHz, 1V	41	49	3.70	3.33	3.40	3.06	>120	30
MLP06MT1R0	1.0	±20%	1MHz, 1V	60	69	2.90	2.61	2.60	2.26	100	30
MLP06MT1R5	1.5	±20%	1MHz, 1V	114	129	2.50	2.25	2.00	1.81	75	30
MLP06MT2R2	2.2	±20%	1MHz, 1V	135	150	1.90	1.71	1.70	1.50	65	30

MLP04(1004) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLP04MTR22	0.22	±20%	1MHz, 1V	9	12.5	7.90	7.20	5.90	5.30	>120	30
MLP04MTR33	0.33	±20%	1MHz, 1V	21	26	6.60	6.00	4.40	4.00	>120	30
MLP04MTR47	0.47	±20%	1MHz, 1V	27	32	5.00	4.50	3.90	3.51	>120	30
MLP04MTR68	0.68	±20%	1MHz, 1V	37	44	4.30	3.87	3.40	3.06	110	30
MLP04MT1R0	1.0	±20%	1MHz, 1V	45	54	3.50	3.15	3.00	2.70	95	30
MLP04MT1R5	1.5	±20%	1MHz, 1V	76	91	2.60	2.34	2.50	2.25	75	30
MLP04MT2R2	2.2	±20%	1MHz, 1V	99	119	2.40	2.16	2.30	2.07	60	30
MLP04MT4R7	4.7	±20%	1MHz, 1V	220	262	1.80	1.62	1.36	1.22	35	30

MLP08(1008) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLP08MTR47	0.47	±20%	1MHz, 1V	21	25	5.30	4.95	4.60	4.18	>120	30
MLP08MTR68	0.68	±20%	1MHz, 1V	29	35	5.00	4.63	3.70	3.36	100	30
MLP08MT1R0	1.0	±20%	1MHz, 1V	41	49	4.40	4.04	3.50	3.18	85	30
MLP08MT1R5	1.5	±20%	1MHz, 1V	64	77	3.20	2.91	2.50	2.27	75	30
MLP08MT2R2	2.2	±20%	1MHz, 1V	85	98	3.00	2.73	2.27	2.06	65	30
MLP08MT3R3	3.3	±20%	1MHz, 1V	125	150	2.10	1.80	2.00	1.80	40	30
MLP08MT4R7	4.7	±20%	1MHz, 1V	196	235	1.90	1.58	1.61	1.40	40	30

MLP10(1310) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLP10MTR47	0.47	±20%	1MHz, 1V	15	19	7.70	7.00	5.80	5.20	>120	25
MLP10MTR68	0.68	±20%	1MHz, 1V	16	20	6.20	5.80	5.30	4.70	100	25
MLP10MT1R0	1.0	±20%	1MHz, 1V	25	32	5.50	5.00	4.90	4.40	85	25
MLP10MT1R5	1.5	±20%	1MHz, 1V	45	54	4.80	4.30	3.40	3.10	65	25
MLP10MT2R2	2.2	±20%	1MHz, 1V	60	72	4.00	3.50	3.00	2.70	50	25
MLP10MT3R3	3.3	±20%	1MHz, 1V	95	109	3.40	2.90	2.30	2.00	40	25
MLP10MT4R7	4.7	±20%	1MHz, 1V	150	168	2.80	2.40	1.70	1.40	35	25
MLP10MT6R8	6.8	±20%	1MHz, 1V	190	210	2.40	2.10	1.50	1.20	30	25

**High Current Electrical Specifications**

MLPH06(0806) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLPH06MTR10	0.10	±20%	1MHz, 1V	7	11	12.20	11.00	9.50	9.00	>120	30
MLPH06MTR15	0.15	±20%	1MHz, 1V	10	16	10.00	9.00	7.50	7.00	>120	30
MLPH06MTR22	0.22	±20%	1MHz, 1V	15	19	7.90	7.00	6.50	6.00	>120	30
MLPH06MTR24	0.24	±20%	1MHz, 1V	17	20	6.80	6.30	5.80	5.30	>120	30
MLPH06MTR33	0.33	±20%	1MHz, 1V	21	26	6.70	6.10	4.70	4.20	>120	30
MLPH06MTR47	0.47	±20%	1MHz, 1V	23	30	6.10	5.30	4.50	4.10	>120	30
MLPH06MTR68	0.68	±20%	1MHz, 1V	40	47	4.70	4.20	4.00	3.50	>120	30
MLPH06MT1R0	1.0	±20%	1MHz, 1V	48	60	3.90	3.30	3.20	3.00	90	30
MLPH06MT1R5	1.5	±20%	1MHz, 1V	86	99	3.40	3.10	2.40	2.20	80	30
MLPH06MT2R2	2.2	±20%	1MHz, 1V	117	140	2.60	2.45	2.20	2.00	60	30
MLPH06MT3R3	3.3	±20%	1MHz, 1V	200	220	1.90	1.65	1.80	1.50	40	30
MLPH06MT4R7	4.7	±20%	1MHz, 1V	240	288	1.80	1.60	1.30	1.10	40	30

MLPH04(1004) Wire Wound Type Power Inductor

Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLPH04MTR22	0.22	±20%	1MHz, 1V	10	13.5	10.5	9.0	6.9	6.3	>120	30
MLPH04MTR24	0.24	±20%	1MHz, 1V	11.5	14.5	8.8	8.0	6.6	6.0	>120	30
MLPH04MTR33	0.33	±20%	1MHz, 1V	17	22	7.8	7.0	5.6	4.8	>120	30
MLPH04MTR47	0.47	±20%	1MHz, 1V	23	2929	6.6	6.00	5.2	4.40	>120	30
MLPH04MTR68	0.68	±20%	1MHz, 1V	30	36	5.5	5.0	4.3	3.7	90	30
MLPH04MT1R0	1.0	±20%	1MHz, 1V	41	5252	4.4	4.00	3.4	3.10	70	30
MLPH04MT1R5	1.5	±20%	1MHz, 1V	62	72	3.8	3.4	2.9	2.5	60	30
MLPH04MT2R2	2.2	±20%	1MHz, 1V	88	110	3.3	3.00	2.4	2.10	50	30
MLPH04MT3R3	3.3	±20%	1MHz, 1V	140	160	2.5	2.2	1.9	1.6	40	30
MLPH04MT4R7	4.7	±20%	1MHz, 1V	200	240	2.2	1.9	1.6	1.4	30	30

MLPH08(1008) Wire Wound Type Power Inductor

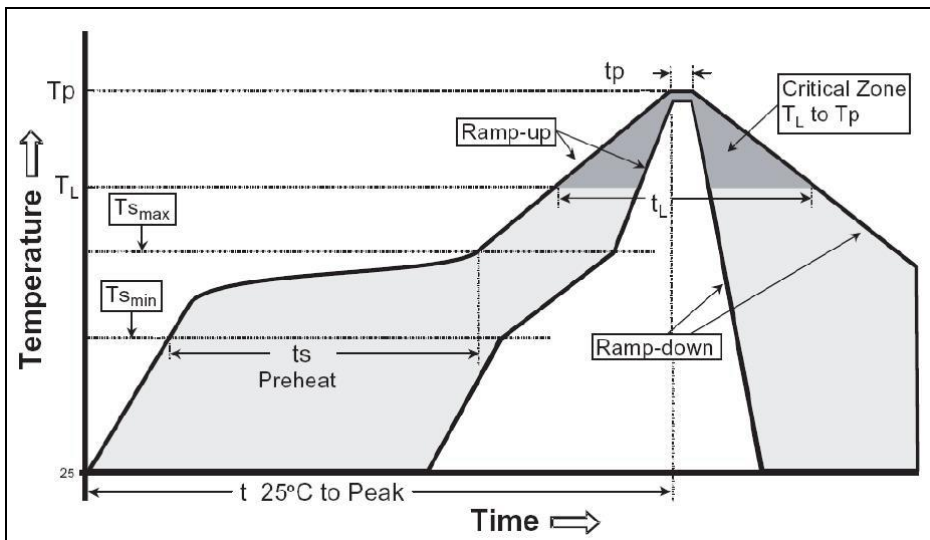
Part No	Inductance (uH)	Tolerance	Test Condition	DCR(mΩ)		Isat(A)		Irms(A)		SRF (MHz) typ.	Q typ.
				typ.	max.	typ.	max.	typ.	max.		
MLPH08MTR47	0.47	±20%	1MHz, 1V	16	22	6.80	6.20	5.80	4.90	>120	30
MLPH08MT1R0	1.0	±20%	1MHz, 1V	36	44	4.80	4.30	3.90	3.30	70	30
MLPH08MT1R5	1.5	±20%	1MHz, 1V	54	63	4.00	3.50	2.90	2.50	60	30
MLPH08MT2R2	2.2	±20%	1MHz, 1V	74	89	3.50	3.20	2.50	2.20	50	30
MLPH08MT3R3	3.3	±20%	1MHz, 1V	116	130	2.80	2.50	2.10	1.80	40	30
MLPH08MT4R7	4.7	±20%	1MHz, 1V	160	180	2.20	2.00	1.80	1.50	35	30

**Environmental Characteristics**

Item	Requirement	Test Method
Resistance to Soldering Heat	Appearance: No damage More than 95% of the terminal. Electrode should be covered with solder. Inductance: within $\pm 20\%$ of initial value	Flux: Rosin Solder Temperature: $260 \pm 5^\circ\text{C}$ Immersion Time: $10 \pm 1$ sec.
Adhesive Test	No mechanical damage Soldering the products on PCB after the pulling test force $> 5\text{N}$	Reflow temperature: $245^\circ\text{C}$ it shall be soldered on the substrate applying direction parallel to the substrate Apply force(F) : 5 N Test time : 10 sec
Temperature Cycle	No mechanical damage Inductance: within $\pm 20\%$ of initial value	Temperature: $-50 \sim 125^\circ\text{C}$ for 30 minutes each Cycle: 500cycles Measurement: at ambient temperature 24 hours after test completion
Dry Heat Test		Temperature: $85 \pm 2^\circ\text{C}$ Testing time: 500 hrs Applied current: full rated current Measurement: at ambient temperature 24 hours after test completion
Humidity Test		Temperature: $60 \pm 2^\circ\text{C}$ , Humidity: 90~95% RH Testing time: 500 hrs Applied current: full rated current Measurement: at ambient temperature 24 hours after test completion

**Storage Temperature: 5 ~ 40°C; Humidity: <65%RH**

Recommendable Reflow Soldering

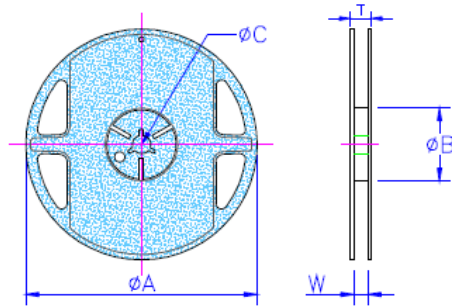


Reference IPC-020c-5-1

Profile Feature	Pb-Free Assembly
Average Ramp Rate (T <sub>s</sub> max to T <sub>p</sub> )	3 °C/second max.
<b>Preheat</b>	
Temperature Min (T <sub>smin</sub> )	150 °C
Temperature Min (T <sub>smax</sub> )	200 °C
Time (T <sub>smin</sub> to T <sub>smin</sub> )	60-180 seconds
Time maintained above:	
Temperature (T <sub>L</sub> )	217 °C
Time (t <sub>L</sub> )	60-150 seconds
Peak temperature (T <sub>p</sub> )	260°C +0/-5°C
Time within 5 °C of actual Peak Temperature (T <sub>p</sub> )	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

**■Packaging**

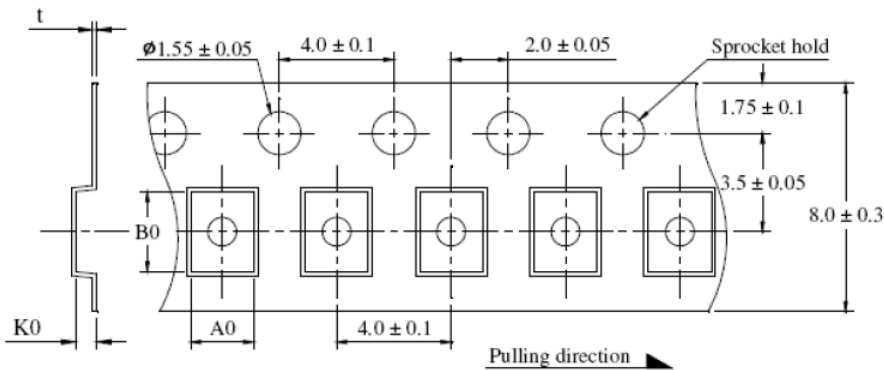
Reel Specifications



Unit: mm

Type	A	B	C	W	T	Quantity (EA)
MLP03	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000
MLP05	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000
MLP(H)06	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000
MLP(H)04	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000
MLP(H)08	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000
MLP10	178±1	60.0+0.5	13.0±0.2	9.00±0.5	12.0±0.15	3,000

Tape Specifications



Unit: mm

Type	A0	B0	K0	t
MLP03	1.45±0.10	2.20±0.10	1.12±0.10	0.22±0.05
MLP05	1.45±0.10	2.20±0.10	1.12±0.10	0.22±0.05
MLP(H)06	1.82±0.05	2.23±0.05	1.15±0.05	0.22±0.05
MLP(H)04	2.25±0.05	2.80±0.10	1.35±0.10	0.22±0.05
MLP(H)08	2.25±0.05	2.80±0.10	1.35±0.10	0.22±0.05
MLP10	2.80±0.10	3.45±0.10	1.34±0.10	0.23±0.05