



**NEW!**

# Coupled Inductors—MSD1260 Series

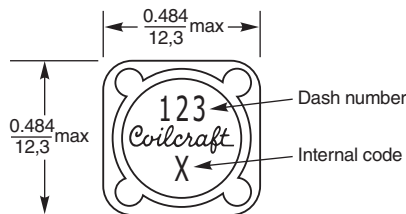
For SEPIC Applications



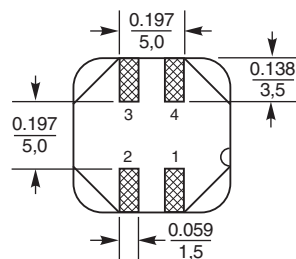
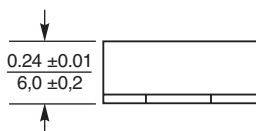
The excellent coupling coefficient ( $k \geq 0.98$ ) makes the MSD1260 series of coupled inductors ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part with lower DCR and higher current handling.

These parts provide high inductance, high efficiency and excellent current handling in a rugged, low cost part. They are also well suited for use as a VRM inductors in high-current DC-DC converters and VRM/VRD controllers.

They can also be used as two single inductors connected in series or parallel, or as a 1 : 1 transformer. See page 4 for details.

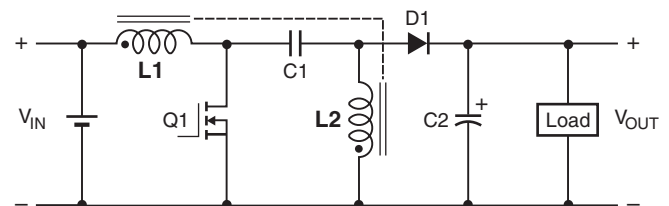
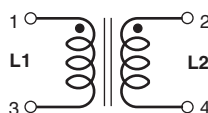
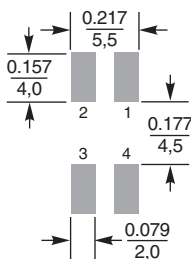


Parts manufactured prior to Sept. 2007 were marked with only the dash number.



Dimensions are in  $\frac{\text{inches}}{\text{mm}}$

### Recommended Land Pattern



**Typical SEPIC schematic**  
Refer to Application Note, Document 639, "Selecting Coupled Inductors for SEPIC Applications"

**Core material** Ferrite

**Terminations** RoHS compliant matte tin over nickel over phos bronze. Other terminations available at additional cost.

**Weight:** 2.8 – 3.2 g

**Ambient temperature**  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  with  $I_{\text{rms}}$  current,  $+85^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  with derated current

**Storage temperature** Component:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .  
Packaging:  $-55^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$

**Winding to winding isolation** 500 Vrms

**Resistance to soldering heat** Max three 40 second reflows at  $+260^{\circ}\text{C}$ , parts cooled to room temperature between cycles

**Moisture Sensitivity Level (MSL)** 1 (unlimited floor life at  $<30^{\circ}\text{C}$  / 85% relative humidity)

**Mean Time Between Failures (MTBF)** 26,315,789 hours

**Packaging** 500/13" reel; Plastic tape: 24 mm wide, 0.35 mm thick, 16 mm pocket spacing, 6.6 mm pocket depth

**PCB washing** Only pure water or alcohol recommended



Specifications subject to change without notice.  
Please check our website for latest information.

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**NEW!**

# Coupled Inductors for SEPIC – MSD1260 Series

Part number <sup>1</sup>	Inductance <sup>2</sup> ( $\mu$ H)	DCR max <sup>3</sup> (Ohms)	SRF typ <sup>4</sup> (MHz)	Isat <sup>5</sup> (A)	Irms (A)	
					both windings <sup>6</sup>	one winding <sup>7</sup>
MSD1260-472ML_	4.7 $\pm$ 20%	0.036	32.0	10.3	3.16	4.47
MSD1260-562ML_	5.6 $\pm$ 20%	0.040	31.0	9.66	3.00	4.24
MSD1260-682ML_	6.8 $\pm$ 20%	0.048	28.0	9.21	2.75	3.88
MSD1260-822ML_	8.2 $\pm$ 20%	0.052	25.0	8.55	2.63	3.72
MSD1260-103ML_	10 $\pm$ 20%	0.060	22.0	7.40	2.45	3.46
MSD1260-123ML_	12 $\pm$ 20%	0.074	21.0	6.86	2.21	3.12
MSD1260-153ML_	15 $\pm$ 20%	0.085	17.6	6.09	2.06	2.92
MSD1260-183ML_	18 $\pm$ 20%	0.097	17.0	5.30	1.93	2.73
MSD1260-223ML_	22 $\pm$ 20%	0.116	15.0	5.01	1.76	2.49
MSD1260-273ML_	27 $\pm$ 20%	0.124	13.6	4.66	1.70	2.41
MSD1260-333ML_	33 $\pm$ 20%	0.134	12.7	4.22	1.64	2.32
MSD1260-393ML_	39 $\pm$ 20%	0.142	11.7	3.80	1.59	2.25
MSD1260-473ML_	47 $\pm$ 20%	0.174	8.7	3.25	1.44	2.03
MSD1260-563ML_	56 $\pm$ 20%	0.198	7.6	3.07	1.35	1.91
MSD1260-683ML_	68 $\pm$ 20%	0.216	6.1	2.83	1.29	1.83
MSD1260-823ML_	82 $\pm$ 20%	0.274	5.3	2.55	1.15	1.62
MSD1260-104ML_	100 $\pm$ 20%	0.322	5.0	2.20	1.06	1.50
MSD1260-124KL_	120 $\pm$ 10%	0.418	4.4	2.05	0.93	1.31
MSD1260-154KL_	150 $\pm$ 10%	0.476	4.0	1.82	0.87	1.23
MSD1260-184KL_	180 $\pm$ 10%	0.536	3.6	1.60	0.82	1.16
MSD1260-224KL_	220 $\pm$ 10%	0.691	3.2	1.51	0.72	1.02
MSD1260-274KL_	270 $\pm$ 10%	0.806	2.8	1.41	0.67	0.95
MSD1260-334KL_	330 $\pm$ 10%	1.09	2.5	1.28	0.57	0.81
MSD1260-394KL_	390 $\pm$ 10%	1.20	2.3	1.16	0.55	0.77
MSD1260-474KL_	470 $\pm$ 10%	1.59	2.1	1.00	0.48	0.67
MSD1260-564KL_	560 $\pm$ 10%	1.81	2.0	0.95	0.45	0.63
MSD1260-684KL_	680 $\pm$ 10%	2.06	1.8	0.88	0.42	0.59
MSD1260-824KL_	820 $\pm$ 10%	2.65	1.5	0.79	0.37	0.52
MSD1260-105KL_	1000 $\pm$ 10%	3.06	1.2	0.69	0.34	0.49

1. When ordering, please specify **termination** and **packaging** codes:

MSD1260-105K L D

**Termination:** L = RoHS compliant matte tin over nickel over phos bronze. Special order: T = RoHS tin-silver-copper (95.5/4/0.5) or S = non-RoHS tin-lead (63/37).

**Packaging:** D = 13" machine-ready reel. EIA-481 embossed plastic tape (500 parts per full reel).

B = Less than full reel. In tape, but not machine ready. To have a leader and trailer added (\$25 charge), use code letter D instead.

- Inductance shown for each winding, measured at 100 kHz, 0.1 Vrms, 0 A dc on an Agilent/HP 4284A LCR meter or equivalent. When leads are connected in parallel, inductance is the same value. When leads are connected in series, inductance is four times the value.
- DCR is for each winding. When leads are connected in parallel, DCR is half the value. When leads are connected in series, DCR is twice the value.
- SRF measured using an Agilent/HP 4191A or equivalent. When leads are connected in parallel, SRF is the same value.
- DC current, at which the inductance drops 30% (typ) from its value without current. It is the current flowing in one winding or the sum of the current flowing in both windings.
- Equal current, when applied to each winding simultaneously, that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
- Maximum current, when applied to one winding, that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
- Electrical specifications at 25°C.

Refer to Doc 639 "Selecting Coupled Inductors for SEPIC Applications."  
Refer to Doc 362 "Soldering Surface Mount Components" before soldering.  
See Qualification Standards section for environmental and test data.

## Temperature rise calculation based on specified Irms

$$\text{Winding power loss} = (I_{L1}^2 + I_{L2}^2) \times \text{DCR}$$

$$\text{Temperature rise } (\Delta t) = \text{Winding power loss} \times \frac{55.6^\circ\text{C}}{W}$$

$$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{55.6^\circ\text{C}}{W}$$

**Example 1.** MSD1260-153ML (Equal current in each winding)

$$\text{Winding power loss} = (2.06^2 + 2.06^2) \times 0.085 = 0.721 \text{ W}$$

$$\Delta t = 0.721 \text{ W} \times \frac{55.6^\circ\text{C}}{W} = 40^\circ\text{C}$$

**Example 2.** MSD1260-153ML ( $I_{L1} = 2.4 \text{ A}$ ,  $I_{L2} = 1.3 \text{ A}$ )

$$\text{Winding power loss} = (2.4^2 + 1.3^2) \times 0.085 = 0.633 \text{ W}$$

$$\Delta t = 0.633 \text{ W} \times \frac{55.6^\circ\text{C}}{W} = 35.2^\circ\text{C}$$

## Coupled Inductor Core and Winding Loss Calculator

This web-based utility allows you to enter frequency, peak-to-peak (ripple) current, and Irms current to predict temperature rise and overall losses, including core loss. Visit [www.coilcraft.com/coupledloss](http://www.coilcraft.com/coupledloss).

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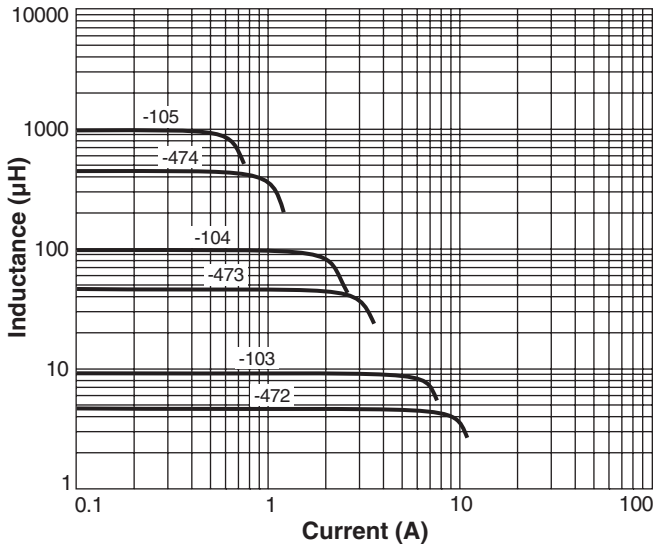
E-mail [info@coilcraft.com](mailto:info@coilcraft.com) Web <http://www.coilcraft.com>



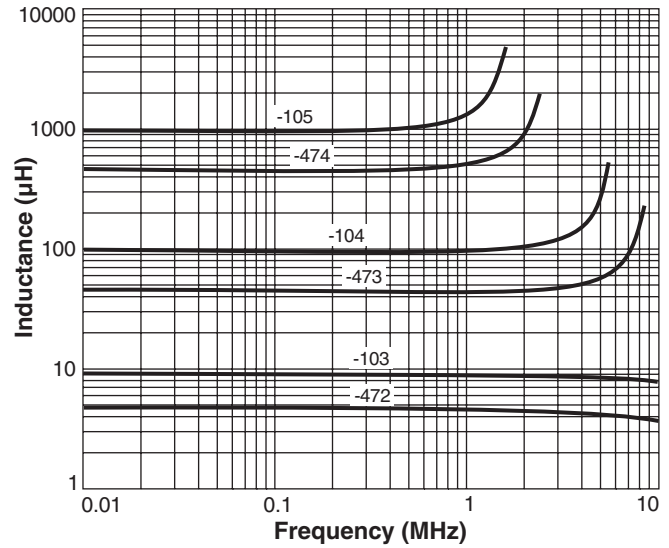
**NEW!**

# Coupled Inductors for SEPIC – MSD1260 Series

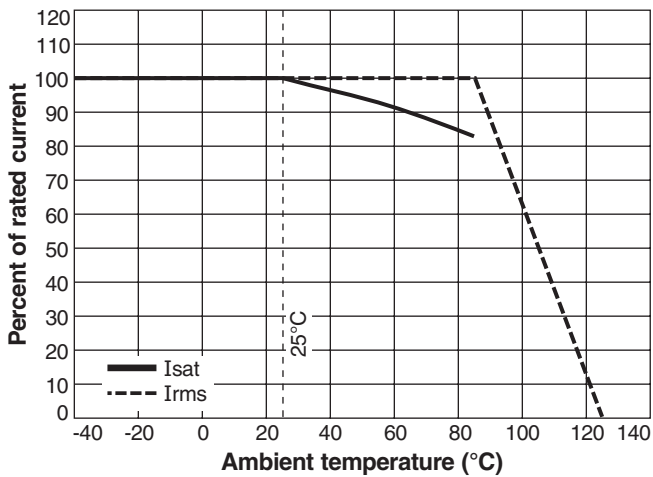
## Typical L vs Current



## Typical L vs Frequency



## Current Derating



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# NEW! Coupled Inductors for SEPIC – MSD1260 Series

Part number <sup>1</sup>	Leads connected in parallel					Leads connected in series				
	Inductance <sup>2,3</sup> (µH)	DCR max <sup>4</sup> (Ohms)	SRF typ <sup>5</sup> (MHz)	Isat <sup>6</sup> (A)	Irms <sup>7</sup> (A)	Inductance <sup>3</sup> (µH)	DCR max <sup>8</sup> (Ohms)	SRF typ <sup>5</sup> (MHz)	Isat <sup>6</sup> (A)	Irms <sup>7</sup> (A)
MSD1260-472ML_	4.7 ±20%	0.018	32.0	10.3	7.2	18.8 ±25%	0.072	12.0	5.15	3.4
MSD1260-562ML_	5.6 ±20%	0.020	31.0	9.66	7.0	22.4 ±25%	0.080	10.3	4.83	3.3
MSD1260-682ML_	6.8 ±20%	0.024	28.0	9.21	6.6	27.2 ±25%	0.095	8.4	4.61	3.2
MSD1260-822ML_	8.2 ±20%	0.026	25.0	8.55	6.4	32.8 ±25%	0.104	7.1	4.28	3.1
MSD1260-103ML_	10 ±20%	0.030	22.0	7.40	5.4	40 ±25%	0.120	6.0	3.70	2.8
MSD1260-123ML_	12 ±20%	0.037	21.0	6.86	5.2	48 ±25%	0.147	5.8	3.43	2.7
MSD1260-153ML_	15 ±20%	0.042	17.6	6.09	4.6	60 ±25%	0.170	5.5	3.05	2.5
MSD1260-183ML_	18 ±20%	0.048	17.0	5.30	4.4	72 ±25%	0.194	5.0	2.65	2.2
MSD1260-223ML_	22 ±20%	0.058	15.0	5.01	4.2	88 ±25%	0.232	4.1	2.51	2.1
MSD1260-273ML_	27 ±20%	0.062	13.6	4.66	3.7	108 ±25%	0.248	3.5	2.33	1.9
MSD1260-333ML_	33 ±20%	0.067	12.7	4.22	3.6	132 ±25%	0.268	3.1	2.11	1.6
MSD1260-393ML_	39 ±20%	0.071	11.7	3.80	3.2	156 ±25%	0.284	2.8	1.90	1.5
MSD1260-473ML_	47 ±20%	0.087	8.7	3.25	2.9	188 ±25%	0.348	2.0	1.63	1.4
MSD1260-563ML_	56 ±20%	0.099	7.6	3.07	2.7	224 ±25%	0.396	2.0	1.54	1.3
MSD1260-683ML_	68 ±20%	0.108	6.1	2.83	2.5	272 ±25%	0.432	1.8	1.42	1.2
MSD1260-823ML_	82 ±20%	0.137	5.3	2.55	2.3	328 ±25%	0.548	1.6	1.28	1.1
MSD1260-104ML_	100 ±20%	0.161	5.0	2.20	1.9	400 ±25%	0.642	1.4	1.10	1.0
MSD1260-124KL_	120 ±10%	0.209	4.4	2.05	1.8	480 ±25%	0.834	1.2	1.03	0.80
MSD1260-154KL_	150 ±10%	0.238	4.0	1.82	1.7	600 ±25%	0.952	1.1	0.91	0.78
MSD1260-184KL_	180 ±10%	0.268	3.6	1.60	1.6	720 ±25%	1.072	0.81	0.80	0.75
MSD1260-224KL_	220 ±10%	0.346	3.2	1.51	1.5	880 ±25%	1.382	0.74	0.76	0.71
MSD1260-274KL_	270 ±10%	0.403	2.8	1.41	1.4	1080 ±25%	1.610	0.63	0.71	0.65
MSD1260-334KL_	330 ±10%	0.545	2.5	1.28	1.2	1320 ±25%	2.180	0.60	0.64	0.56
MSD1260-394KL_	390 ±10%	0.600	2.3	1.16	1.0	1560 ±25%	2.400	0.52	0.58	0.50
MSD1260-474KL_	470 ±10%	0.795	2.1	1.00	0.86	1880 ±25%	3.180	0.43	0.50	0.41
MSD1260-564KL_	560 ±10%	0.905	2.0	0.95	0.80	2240 ±25%	3.620	0.36	0.48	0.38
MSD1260-684KL_	680 ±10%	1.030	1.8	0.88	0.74	2720 ±25%	4.120	0.32	0.44	0.35
MSD1260-824KL_	820 ±10%	1.325	1.5	0.79	0.67	3280 ±25%	5.300	0.27	0.40	0.32
MSD1260-105KL_	1000 ±10%	1.530	1.2	0.69	0.50	4000 ±25%	6.120	0.23	0.35	0.29

1. When ordering, please specify **termination** and **packaging** codes:

**MSD1260-105KL D**

**Termination:** L = RoHS compliant matte tin over nickel over phos bronze.  
Special order:

T = RoHS tin-silver-copper (95.5/4/0.5) or  
S = non-RoHS tin-lead (63/37).

**Packaging:** D = 13" machine-ready reel. EIA-481 embossed plastic tape (500 parts per full reel).

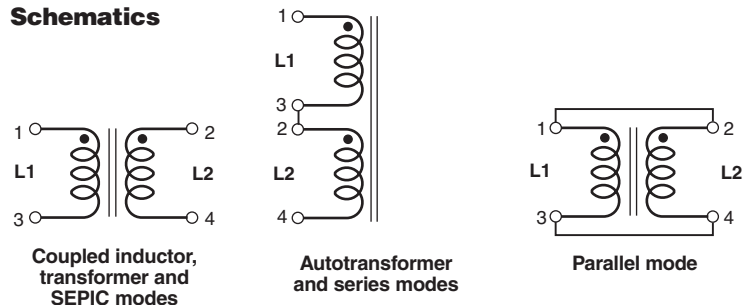
B = Less than full reel. In tape, but not machine ready. To have a leader and trailer added (\$25 charge), use code letter D instead.

- Inductance shown for coupled inductor and for two inductors connected in parallel.
- Inductance is measured at 100 kHz, 0.1 Vrms, 0 Adc on an Agilent/HP 4284A LC meter or equivalent.
- DCR is for both windings when connected in parallel. DCR for each winding is twice the value.
- SRF measured using Agilent/HP 4191A or equivalent.
- DC current at which the inductance drops 30% (typ) from its value without current.
- Current that causes a 40°C temperature rise from 25°C ambient.
- DCR is for both windings.
- Electrical specifications at 25°C.

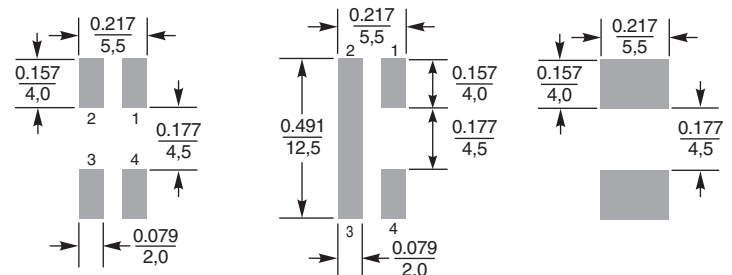
See Qualification Standards section for environmental and test data.

Refer to Doc 362 "Soldering Surface Mount Components" before soldering.

### Schematics



### Recommended Land Patterns



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