NEW!

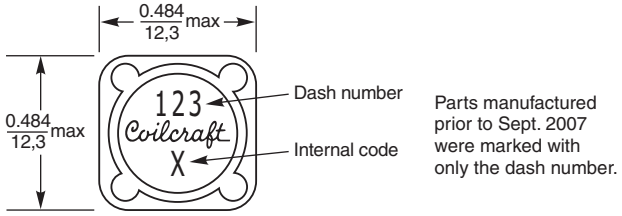
Coupled Inductors–MSD1260 Series

For SEPIC Applications

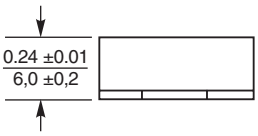
The excellent coupling coefficient (k ≥ 0.98) makes the MSD1260 series of coupled inductors ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part with lower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

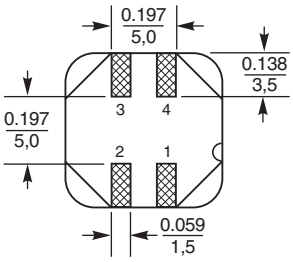
These parts provide high inductance, high efficiency and excellent current handling in a rugged, low cost part. They are also well suited for use as a VRM inductors in high-current DC-DC converters and VRM/VRD controllers.

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.

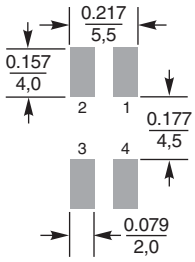


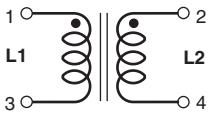
Parts manufactured prior to Sept. 2007 were marked with only the dash number.



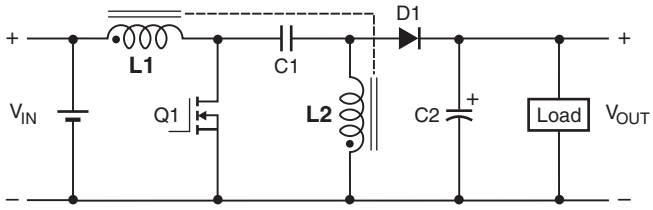


Recommended Land Pattern





Dimensions are in inches / mm



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 –55°C to +85°C with Irms current, +85°C to +125°C with derated current

Storage temperature Component: –55°C to +125°C. Packaging: –55°C to +80°C

Winding to winding isolation 500 V

Resistance to soldering heat Max three 40 second reflows at +260°C, parts cooled to room temperature between cycles

Moisture Sensitivity Level (MSL) 1 (unlimited floor life at <30°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

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Coupled Inductors for SEPIC – MSD1260 Series

Part number[1]	Inductance[2] (µH)	DCR max[3] (Ohms)	SRF typ[4] (MHz)	Isat[5] (A)	Irms (A) both windings[6]	Irms (A) one winding[7]
MSD1260-472ML_	4.7 ±20%	0.036	32.0	10.3	3.16	4.47
MSD1260-562ML_	5.6 ±20%	0.040	31.0	9.66	3.00	4.24
MSD1260-682ML_	6.8 ±20%	0.048	28.0	9.21	2.75	3.88
MSD1260-822ML_	8.2 ±20%	0.052	25.0	8.55	2.63	3.72
MSD1260-103ML_	10 ±20%	0.060	22.0	7.40	2.45	3.46
MSD1260-123ML_	12 ±20%	0.074	21.0	6.86	2.21	3.12
MSD1260-153ML_	15 ±20%	0.085	17.6	6.09	2.06	2.92
MSD1260-183ML_	18 ±20%	0.097	17.0	5.30	1.93	2.73
MSD1260-223ML_	22 ±20%	0.116	15.0	5.01	1.76	2.49
MSD1260-273ML_	27 ±20%	0.124	13.6	4.66	1.70	2.41
MSD1260-333ML_	33 ±20%	0.134	12.7	4.22	1.64	2.32
MSD1260-393ML_	39 ±20%	0.142	11.7	3.80	1.59	2.25
MSD1260-473ML_	47 ±20%	0.174	8.7	3.25	1.44	2.03
MSD1260-563ML_	56 ±20%	0.198	7.6	3.07	1.35	1.91
MSD1260-683ML_	68 ±20%	0.216	6.1	2.83	1.29	1.83
MSD1260-823ML_	82 ±20%	0.274	5.3	2.55	1.15	1.62
MSD1260-104ML_	100 ±20%	0.322	5.0	2.20	1.06	1.50
MSD1260-124KL_	120 ±10%	0.418	4.4	2.05	0.93	1.31
MSD1260-154KL_	150 ±10%	0.476	4.0	1.82	0.87	1.23
MSD1260-184KL_	180 ±10%	0.536	3.6	1.60	0.82	1.16
MSD1260-224KL_	220 ±10%	0.692	3.2	1.51	0.72	1.02
MSD1260-274KL_	270 ±10%	0.806	2.8	1.41	0.67	0.95
MSD1260-334KL_	330 ±10%	1.09	2.5	1.28	0.57	0.81
MSD1260-394KL_	390 ±10%	1.20	2.3	1.16	0.55	0.77
MSD1260-474KL_	470 ±10%	1.59	2.1	1.00	0.48	0.67
MSD1260-564KL_	560 ±10%	1.81	2.0	0.95	0.45	0.63
MSD1260-684KL_	680 ±10%	2.06	1.8	0.88	0.42	0.59
MSD1260-824KL_	820 ±10%	2.65	1.5	0.79	0.37	0.52
MSD1260-105KL_	1000 ±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.

2. Inductance shown for each winding, measured at 100 kHz, 0.1 Vrms, 0 Adc 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.
3. 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.
4. SRF measured using an Agilent/HP 4191A or equivalent. When leads are connected in parallel, SRF is the same value.
5. 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.
6. Equal current, when applied to each winding simultaneously, that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
7. Maximum current, when applied to one winding, that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
8. 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

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

Temperature rise (Δt) = Winding power loss $\times \frac{55.6°C}{W}$

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

Example 1. MSD1260-153ML (Equal current in each winding)
Winding power loss = $(2.06^2 + 2.06^2) \times 0.085 = 0.721$ W

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

Example 2. MSD1260-153ML ($I_{L1} = 2.4$ A, $I_{L2} = 1.3$ A)
Winding power loss = $(2.4^2 + 1.3^2) \times 0.085 = 0.633$ W

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

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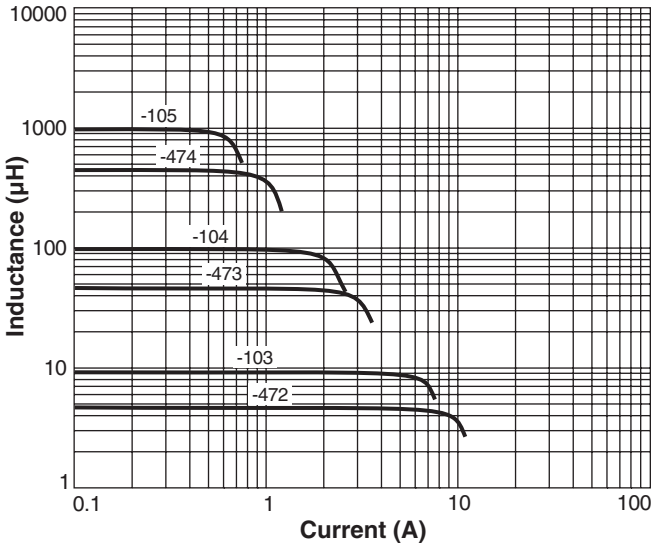
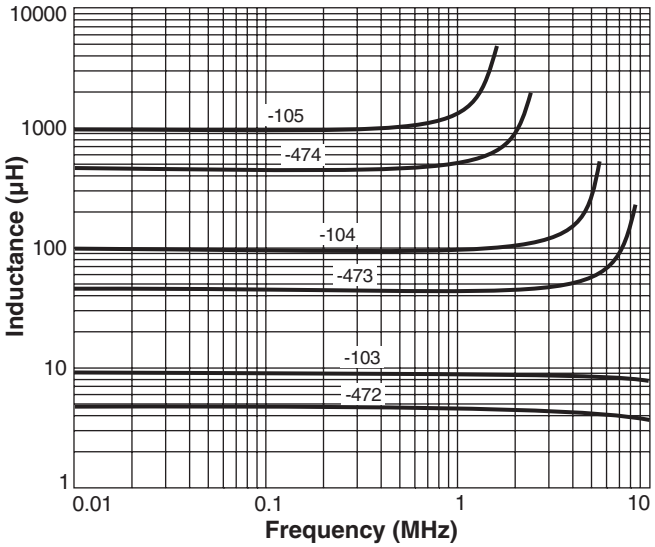
Coupled Inductors for SEPIC – MSD1260 Series

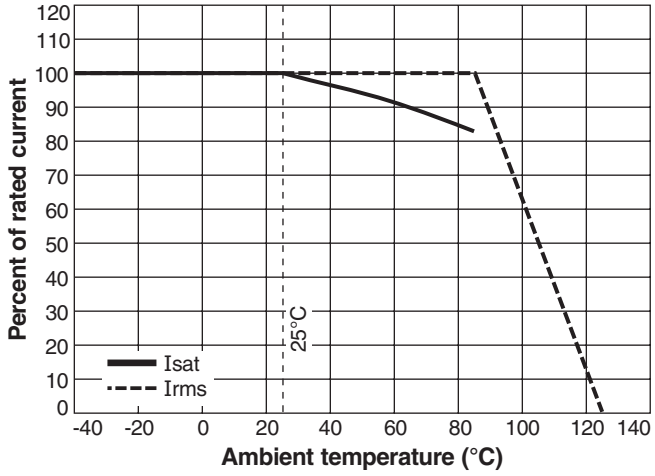
Typical L vs Current



Typical L vs Frequency



Current Derating



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Coupled Inductors for SEPIC – MSD1260 Series

Part number[1]	Leads connected in parallel: Inductance[2,3] (µH)	DCR max[4] (Ohms)	SRF typ[5] (MHz)	Isat[6] (A)	Irms[7] (A)	Leads connected in series: Inductance[3] (µH)	DCR max[8] (Ohms)	SRF typ[5] (MHz)	Isat[6] (A)	Irms[7] (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:

MSD1260-105K 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).

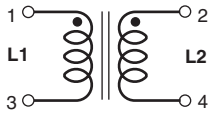
Packaging: **D** = 13″ machine-ready reel. EIA-481 embossed plastic tape (500 parts per full reel).
B = Less than full reel. In tape, but not machine ready. To have a leader and trailer added ($25 charge), use code letter D instead.

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

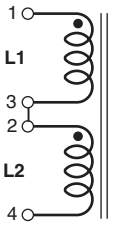
See Qualification Standards section for environmental and test data.

Refer to Doc 362 “Soldering Surface Mount Components” before soldering.

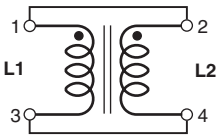
Schematics



Coupled inductor, transformer and SEPIC modes

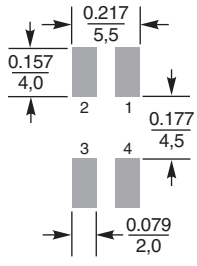


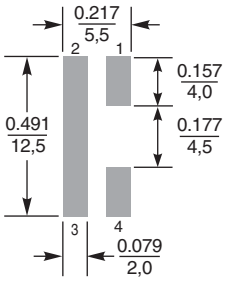
Autotransformer and series modes

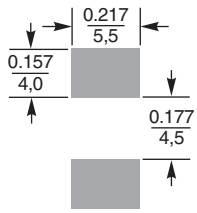


Parallel mode

Recommended Land Patterns







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