



NEW!

Coupled Inductors-MSD1278

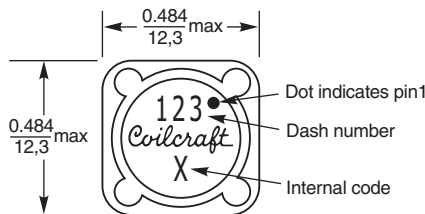
For SEPIC and other Applications



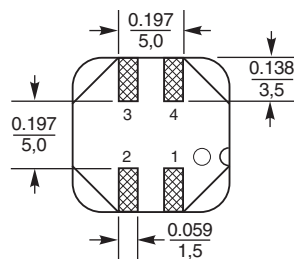
The excellent coupling coefficient ($k \geq 0.94$) makes the MSD1278 series of coupled inductors ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part with lower DCR and higher current handling.

These inductors provide high inductance, high efficiency and excellent current handling in a rugged, low cost part. They are 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, as a common mode choke or as a 1 : 1 transformer.

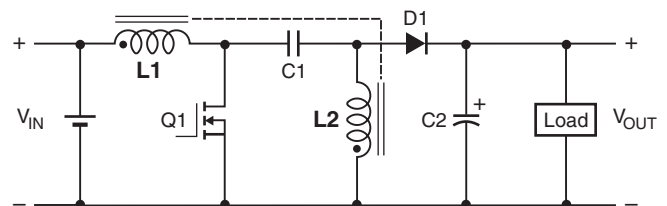
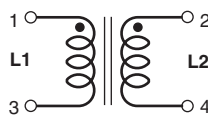
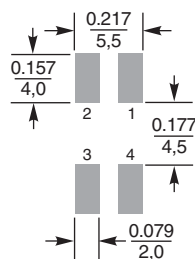


Parts manufactured prior to Sept. 2007 were marked with only the dash number.



Dimensions are in inches/mm

Recommended Land Pattern



Typical SEPIC schematic

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

Designer's Kit C400 contains 3 each of all values.

Core material Ferrite

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

Weight: 3.7 – 4.4 g

Ambient temperature -40°C to +85°C with I_{rms} current, +85°C to +125°C with derated current

Storage temperature Component: -40°C to +125°C. Packaging: -40°C to +80°C

Winding to winding isolation 500 Vrms

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)

Failures in Time (FIT) / Mean Time Between Failures (MTBF) 38 per billion hours / 26,315,789 hours, calculated per Telcordia SR-332

Packaging 500/13" reel; Plastic tape: 24 mm wide, 0.4 mm thick, 16 mm pocket spacing, 8.1 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 – MSD1278 Series

Part number ¹	Inductance ² (μ H)	DCR max ³ (Ohms)	SRF typ ⁴ (MHz)	Isat ⁵ (A)	Irms (A)	
					both windings ⁶	one winding ⁷
MSD1278-472ML_	4.7 \pm 20%	0.038	32.0	14.9	3.16	4.47
MSD1278-562ML_	5.6 \pm 20%	0.046	25.0	13.4	2.87	4.06
MSD1278-682ML_	6.8 \pm 20%	0.048	24.0	13.1	2.81	3.98
MSD1278-822ML_	8.2 \pm 20%	0.050	18.0	10.8	2.76	3.90
MSD1278-103ML_	10 \pm 20%	0.058	16.5	10.5	2.56	3.62
MSD1278-123ML_	12 \pm 20%	0.062	14.5	9.6	2.48	3.50
MSD1278-153ML_	15 \pm 20%	0.072	11.8	9.1	2.30	3.25
MSD1278-183ML_	18 \pm 20%	0.080	10.5	8.0	2.18	3.08
MSD1278-223ML_	22 \pm 20%	0.096	9.0	6.8	1.99	2.81
MSD1278-273ML_	27 \pm 20%	0.120	8.4	6.5	1.78	2.52
MSD1278-333ML_	33 \pm 20%	0.150	7.6	5.6	1.59	2.25
MSD1278-393ML_	39 \pm 20%	0.160	6.5	5.5	1.54	2.18
MSD1278-473ML_	47 \pm 20%	0.180	6.0	5.2	1.45	2.05
MSD1278-563ML_	56 \pm 20%	0.190	5.6	4.5	1.41	2.00
MSD1278-683ML_	68 \pm 20%	0.210	5.0	4.1	1.35	1.90
MSD1278-823ML_	82 \pm 20%	0.280	4.1	3.8	1.16	1.65
MSD1278-104ML_	100 \pm 20%	0.300	3.6	3.4	1.13	1.59
MSD1278-124KL_	120 \pm 10%	0.410	3.2	3.2	0.96	1.36
MSD1278-154KL_	150 \pm 10%	0.460	3.0	2.8	0.91	1.29
MSD1278-184KL_	180 \pm 10%	0.510	2.7	2.5	0.86	1.22
MSD1278-224KL_	220 \pm 10%	0.690	2.5	2.3	0.74	1.05
MSD1278-274KL_	270 \pm 10%	0.900	2.1	2.1	0.65	0.92
MSD1278-334KL_	330 \pm 10%	1.02	2.0	1.9	0.61	0.86
MSD1278-394KL_	390 \pm 10%	1.12	1.8	1.7	0.58	0.82
MSD1278-474KL_	470 \pm 10%	1.43	1.6	1.6	0.50	0.70
MSD1278-564KL_	560 \pm 10%	1.69	1.5	1.5	0.47	0.67
MSD1278-684KL_	680 \pm 10%	2.29	1.4	1.3	0.41	0.58
MSD1278-824KL_	820 \pm 10%	2.55	1.3	1.2	0.39	0.55
MSD1278-105KL_	1000 \pm 10%	2.83	1.1	1.1	0.37	0.52

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

MSD1278-105KL \bar{L} \bar{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 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.
- 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 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.

Temperature rise calculation based on specified Irms

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

Temperature rise (Δt) = Winding power loss $\times \frac{52.6^\circ\text{C}}{\text{W}}$

$$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{52.6^\circ\text{C}}{\text{W}}$$

Example 1. MSD1278-153ML (Equal current in each winding)

Winding power loss = $(2.3^2 + 2.3^2) \times 0.072 = 0.761 \text{ W}$

$$\Delta t = 0.761 \text{ W} \times \frac{52.6^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$$

Example 2. MSD1278-153ML ($I_{L1} = 2.4 \text{ A}$, $I_{L2} = 1.3 \text{ A}$)

Winding power loss = $(2.4^2 + 1.3^2) \times 0.072 = 0.536 \text{ W}$

$$\Delta t = 0.536 \text{ W} \times \frac{52.6^\circ\text{C}}{\text{W}} = 28.2^\circ\text{C}$$

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.

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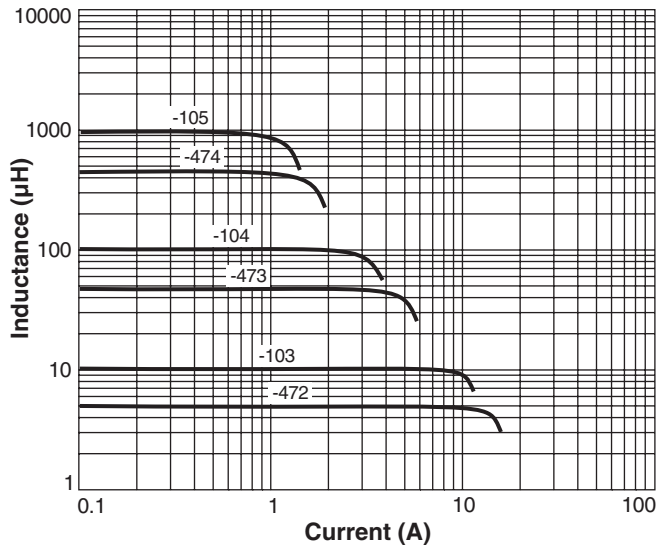
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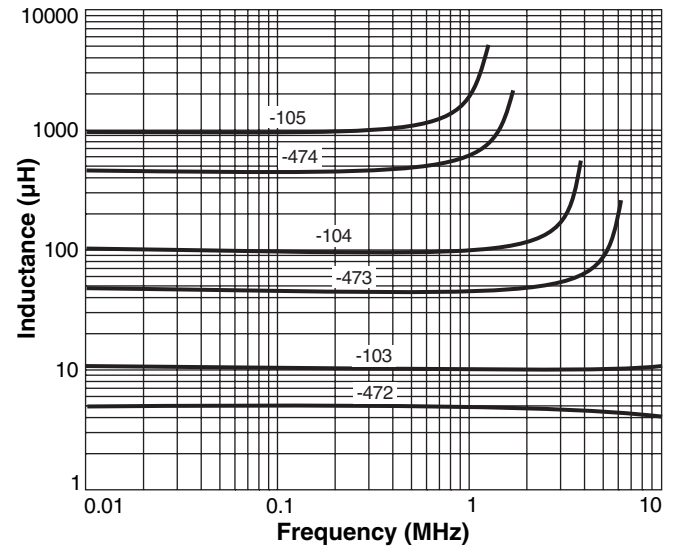
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Coupled Inductors for SEPIC – MSD1278 Series

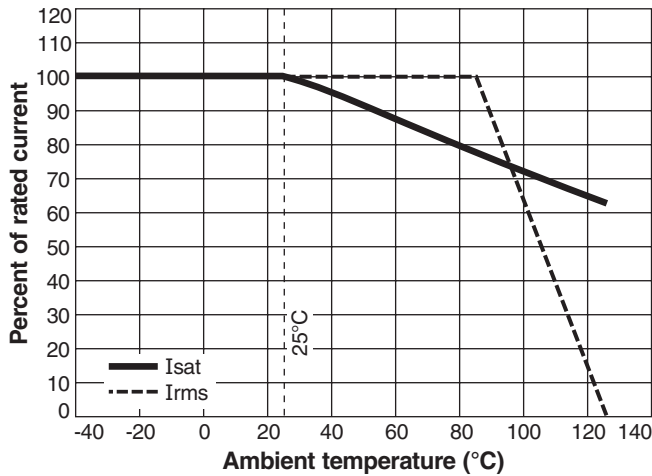
Typical L vs Current



Typical L vs Frequency



Current Derating



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