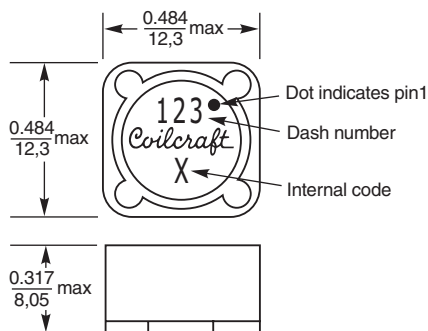


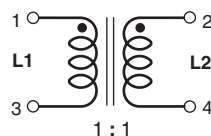
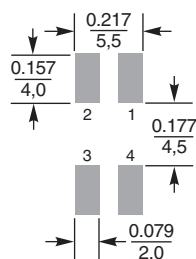
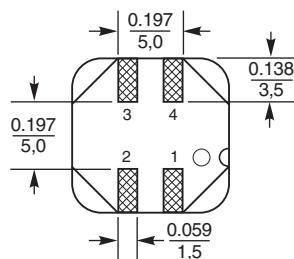
**NEW!**

# Coupled Inductors – MSC1278

For SEPIC Applications



### Recommended Land Pattern

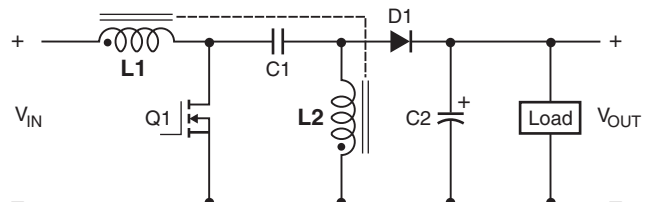


Dimensions are in  $\frac{\text{inches}}{\text{mm}}$

The MSC1278 coupled inductors are designed with high leakage inductance for use in SEPIC applications. The loosely coupled windings ( $K \approx 0.8$ ) improve SEPIC efficiency by reducing circulating current and provide twice the ripple current reduction of separate inductors.

These inductors offer 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.



### Typical SEPIC schematic

Refer to Application Note, Document 639, "Selecting Coupled Inductors for SEPIC Applications." Visit [http://www.coilcraft.com/apps/sepic/selector\\_2.cfm](http://www.coilcraft.com/apps/sepic/selector_2.cfm) for the Coilcraft on-line SEPIC Inductor Selector tool.

**Core material** Ferrite

**Core and winding loss** [Go to online calculator](#)

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

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

**Storage temperature** Component:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ . Tape and reel packaging:  $-40^{\circ}\text{C}$  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)

**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** Tested with pure water or alcohol only. For other solvents, see [Doc787\\_PCB\\_Washing.pdf](#).

**Coilcraft**

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**NEW!**

# Coupled Inductors for SEPIC – MSC1278 Series



Part number <sup>1</sup>	Inductance <sup>2</sup> (μH)	DCR max <sup>3</sup> (Ohms)	SRF typ <sup>4</sup> (MHz)	Coupling coefficient typ	Leakage inductance <sup>5</sup> typ (μH)	Isat (A) <sup>6</sup>			Irms (A)	
						10% drop	20% drop	30% drop	both windings <sup>7</sup>	one winding <sup>8</sup>
MSC1278-103ML_	10 ±20%	0.058	20	0.80	2.75	8.80	10.0	10.66	2.56	3.62
MSC1278-223KL_	22 ±10%	0.096	12	0.82	5.85	6.00	6.80	7.26	1.99	2.81
MSC1278-333KL_	33 ±10%	0.15	9.5	0.85	10.1	5.50	6.10	6.52	1.59	2.25
MSC1278-473KL_	47 ±10%	0.18	7.8	0.83	14.5	3.70	4.34	4.60	1.45	2.05

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

**MSC1278-473KLD**

**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.

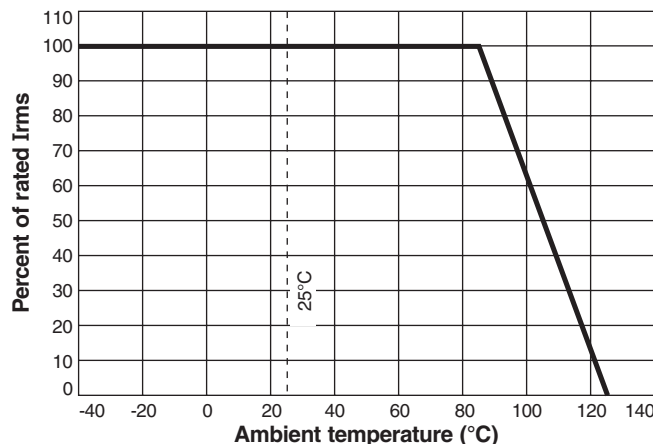
- Inductance shown for each winding, measured at 100 kHz, 0.1 Vrms, 0 Adc on an Agilent/HP 4284A LCR meter or equivalent. When leads are connected in parallel, inductance is the same value. When leads are connected in series, inductance is four times the value.
- DCR is for each winding. When leads are 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.
- Leakage inductance is for L1 and is measured with L2 shorted.
- DC current, at which the inductance drops the specified amount 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.

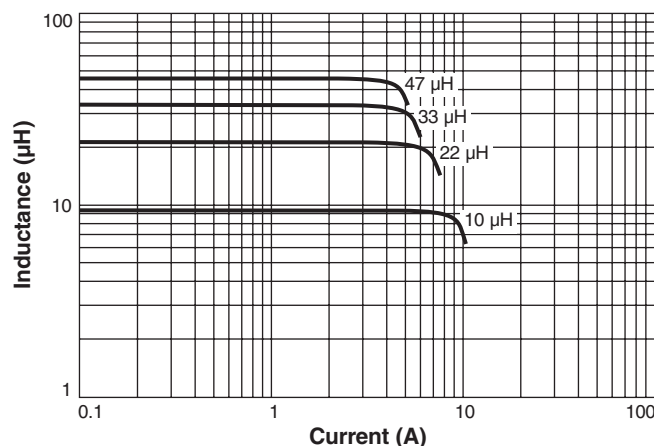
### Coupled Inductor Core and Winding Loss Calculator

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. [Go to online calculator.](#)

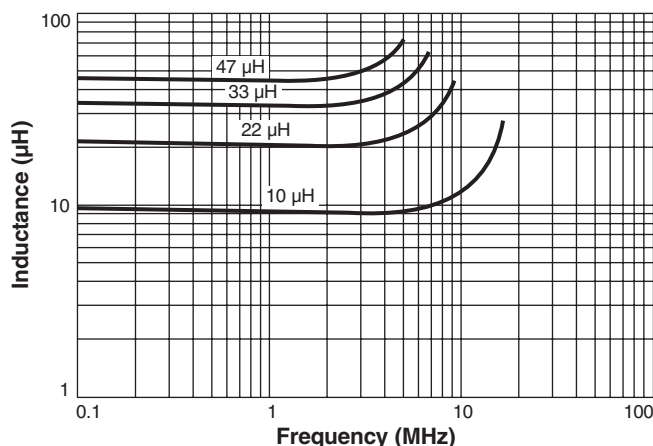
### Current Derating



### L vs Current



### L vs Frequency



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