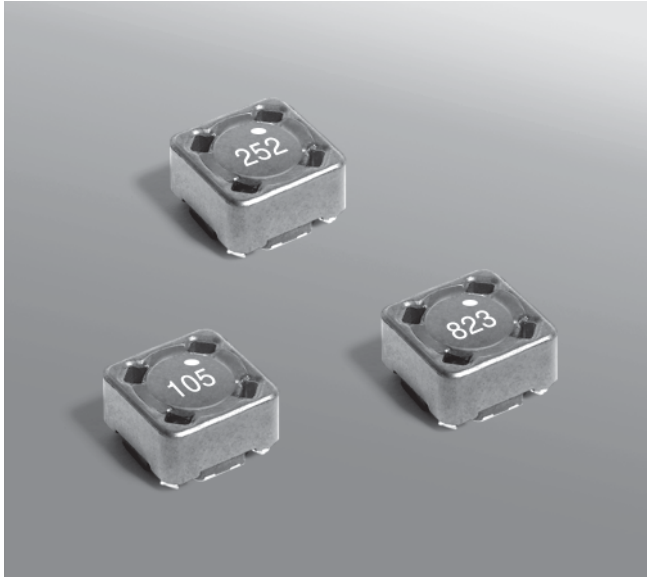


**NEW!**

# Coupled Inductors—MSD7342 Series

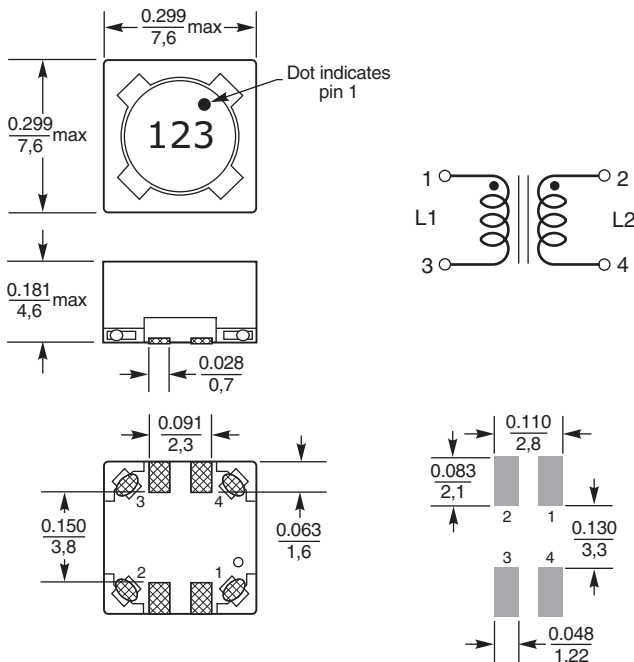
For SEPIC  
Applications



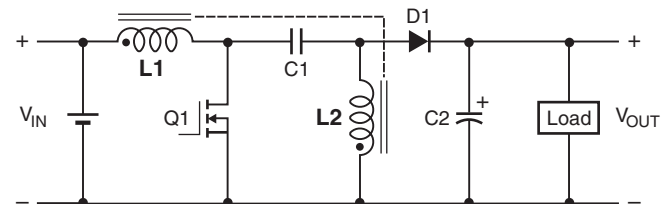
The excellent coupling coefficient ( $k \geq 0.94$ ) makes the MSD7342 series of coupled inductors ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part 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 can be used as two single inductors connected in parallel, as a 1 : 1 transformer or as an autotransformer when connected in series.



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



### 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** 0.76 – 0.87g

**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** 200 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** 250/7" reel; 1000/13" reel Plastic tape: 16 mm wide, 0.4 mm thick, 12 mm pocket spacing, 4.9 mm pocket depth

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

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**NEW!**

# Coupled Inductors for SEPIC Applications – MSD7342 Series

Part number <sup>1</sup>	Inductance <sup>2</sup> ±20% (µH)	DCR max <sup>3</sup> (Ohms)	SRF typ <sup>4</sup> (MHz)	Isat (A) <sup>5</sup>			Irms (A)	
				10% drop	20% drop	30% drop	both windings <sup>6</sup>	one winding <sup>7</sup>
MSD7342-252ML	2.5	0.033	55	6.0	6.2	6.3	2.17	3.06
MSD7342-332ML	3.3	0.037	43	5.2	5.3	5.4	2.05	2.89
MSD7342-472ML	4.7	0.051	35	4.1	4.3	4.6	1.74	2.46
MSD7342-562ML	5.6	0.063	32	3.9	4.1	4.2	1.57	2.22
MSD7342-682ML	6.8	0.070	30	3.7	3.8	3.9	1.49	2.10
MSD7342-822ML	8.2	0.075	27	3.3	3.4	3.5	1.44	2.03
MSD7342-103ML	10	0.100	22	2.8	2.9	3.0	1.24	1.76
MSD7342-123ML	12	0.120	20	2.5	2.6	2.7	1.14	1.61
MSD7342-153ML	15	0.130	18	2.2	2.3	2.4	1.09	1.54
MSD7342-183ML	18	0.170	15	2.0	2.2	2.3	0.95	1.35
MSD7342-223ML	22	0.220	13.5	1.9	2.0	2.1	0.84	1.19
MSD7342-273ML	27	0.250	12.0	1.7	1.8	1.9	0.79	1.11
MSD7342-333ML	33	0.270	11.0	1.5	1.6	1.7	0.76	1.07
MSD7342-393ML	39	0.380	10.0	1.3	1.4	1.5	0.64	0.90
MSD7342-473ML	47	0.420	9.5	1.2	1.3	1.4	0.61	0.86
MSD7342-563ML	56	0.460	8.7	1.1	1.2	1.3	0.58	0.82
MSD7342-683ML	68	0.600	7.3	1.0	1.1	1.2	0.51	0.72
MSD7342-823ML	82	0.680	6.2	0.90	1.00	1.1	0.48	0.67
MSD7342-104ML	100	0.770	5.5	0.80	0.92	0.98	0.45	0.63
MSD7342-124ML	120	1.03	4.5	0.70	0.80	0.90	0.39	0.55
MSD7342-154ML	150	1.35	4.0	0.65	0.76	0.80	0.34	0.48
MSD7342-184ML	180	1.52	3.8	0.62	0.66	0.73	0.32	0.45
MSD7342-224ML	220	1.72	3.5	0.59	0.62	0.66	0.30	0.42
MSD7342-274ML	270	2.41	3.3	0.55	0.57	0.60	0.25	0.36
MSD7342-334ML	330	2.70	3.0	0.49	0.52	0.54	0.24	0.34
MSD7342-394ML	390	3.05	2.8	0.45	0.47	0.50	0.23	0.32
MSD7342-474ML	470	4.00	2.6	0.41	0.43	0.46	0.20	0.28
MSD7342-564ML	560	4.43	2.5	0.38	0.40	0.42	0.19	0.26
MSD7342-684ML	680	5.00	2.3	0.36	0.37	0.38	0.18	0.25
MSD7342-824ML	820	6.80	2.2	0.30	0.32	0.35	0.15	0.21
MSD7342-105ML	1000	7.80	2.0	0.27	0.29	0.31	0.14	0.20

1. Please specify **termination** and **packaging** codes:

**MSD7342-105M L C**

**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:** **C** = 7" machine-ready reel. EIA-481 embossed plastic tape (250 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 C instead.

**D** = 13" machine-ready reel. EIA-481 embossed plastic tape. Factory order only, not stocked (1000 parts per full reel).

- 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, when applied to one winding, at which the inductance drops the specified amount from its value without current.
- 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

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

Temperature rise ( $\Delta t$ ) = Winding power loss  $\times \frac{129^\circ\text{C}}{\text{W}}$

$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{129^\circ\text{C}}{\text{W}}$

**Example 1.** MSD7342-123ML (Equal current in each winding)

Winding power loss =  $(1.14^2 + 1.14^2) \times 0.120 = 0.312 \text{ W}$

$\Delta t = 0.312 \text{ W} \times \frac{129^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$

**Example 2.** MSD7342-123ML ( $I_{L1} = 1.4 \text{ A}$ ,  $I_{L2} = 0.6 \text{ A}$ )

Winding power loss =  $(1.4^2 + 0.6^2) \times 0.120 = 0.278 \text{ W}$

$\Delta t = 0.278 \text{ W} \times \frac{129^\circ\text{C}}{\text{W}} = 36^\circ\text{C}$

## 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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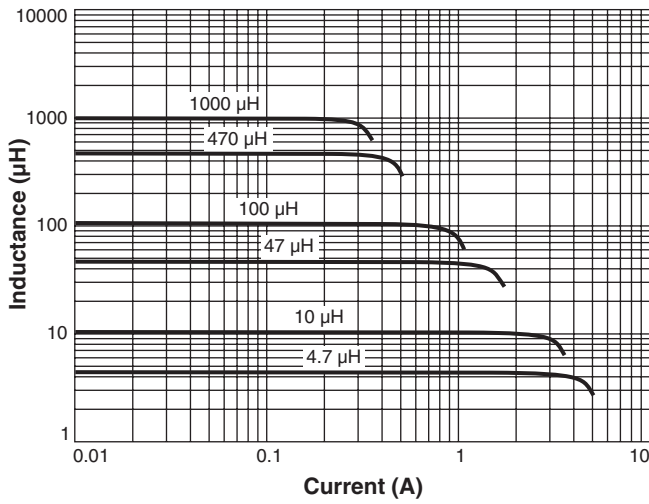
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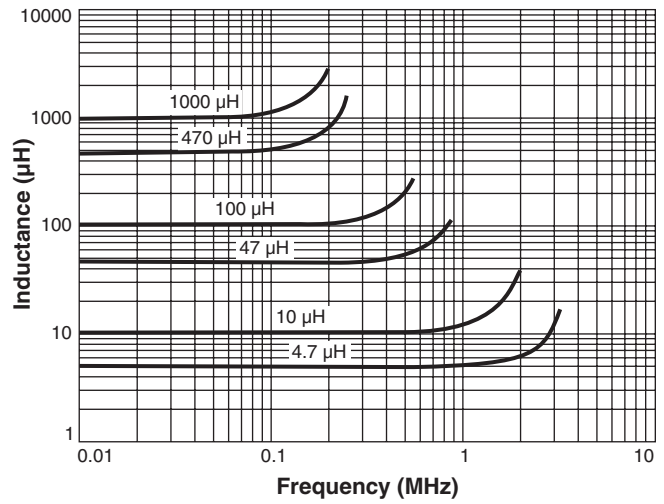
**NEW!**

# Coupled Inductors for SEPIC Applications – MSD7342 Series

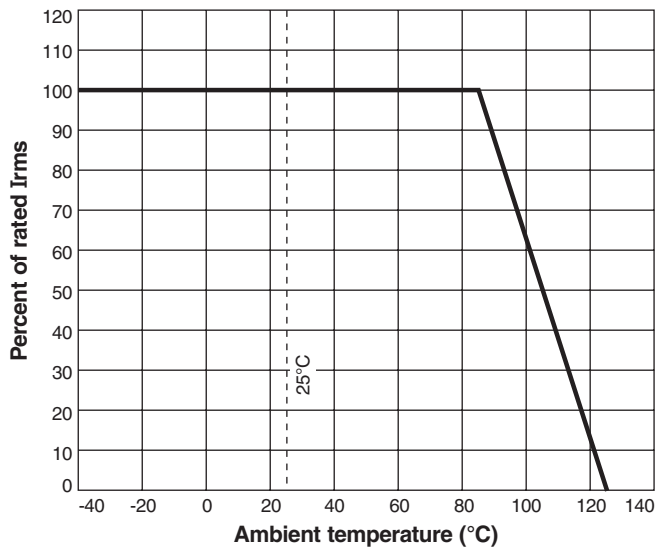
Typical L vs Current



Typical L vs Frequency



Irms Derating



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