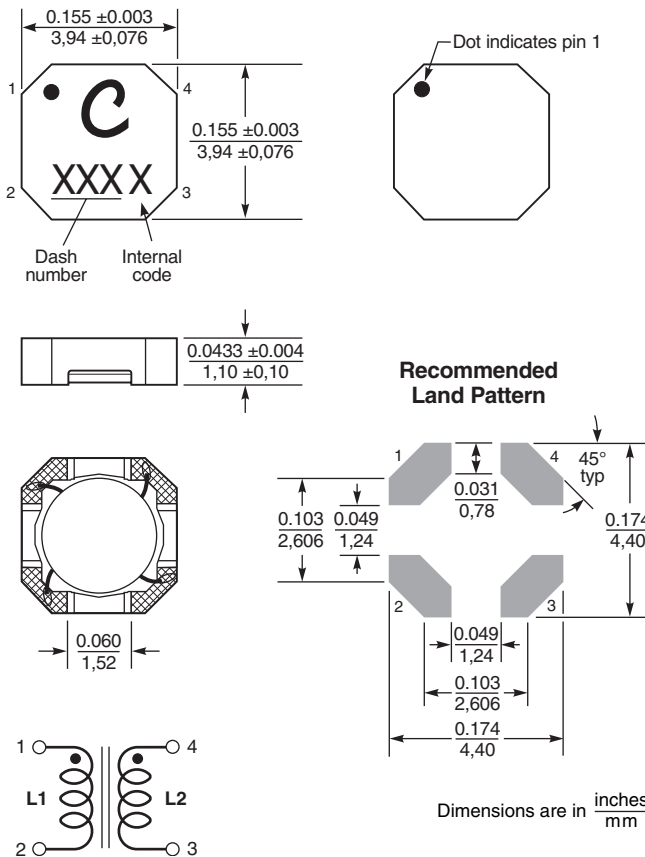
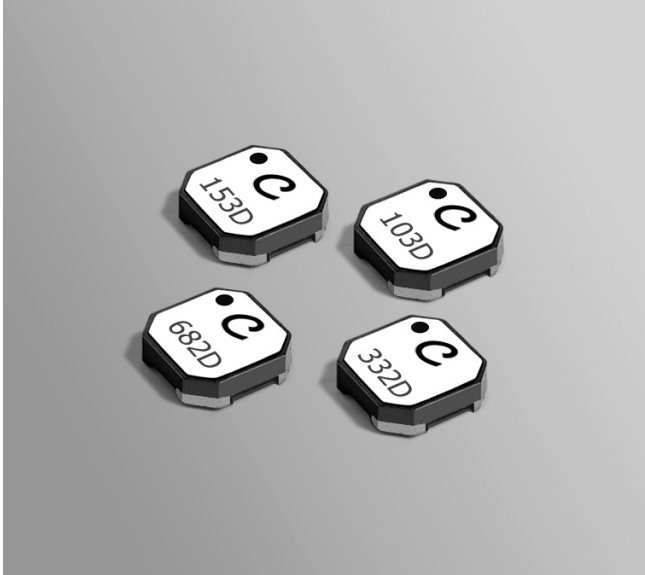




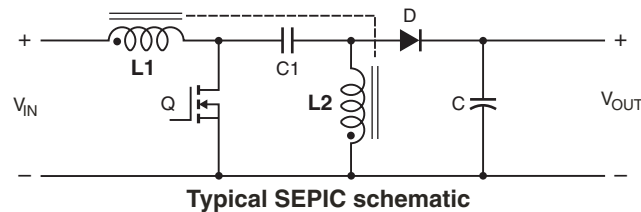
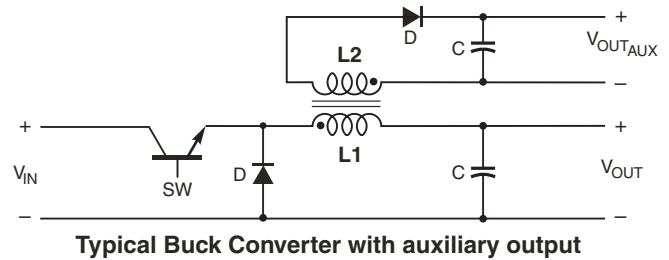
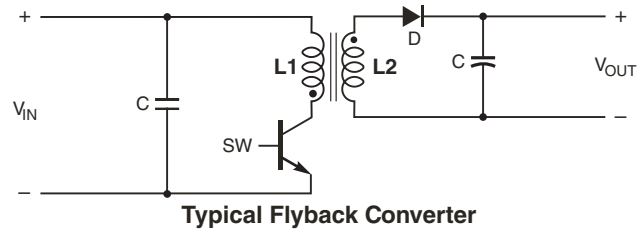
Coupled Inductors – LPD4012 For Flyback, SEPIC and other Applications



The LPD4012 coupled miniature shielded inductors are only 1,1 mm high and 4 mm square. They are ideal for use in a variety of circuits including flyback, multi-output buck and SEPIC.

These inductors provide high inductance, high efficiency and excellent current handling in a rugged, low cost part.

They can also be used as two single inductors connected in series or parallel or as a common mode choke.



- Core material** Ferrite
- Core and winding loss** See www.coilcraft.com/coupledloss
- Weight** 54 – 64 mg
- Terminations** RoHS compliant silver-palladium-platinum-glass frit. Other terminations available at additional cost.
- Ambient temperature** -40°C to +85°C with Irms 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** 100 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)
- Failures in Time (FIT) / Mean Time Between Failures (MTBF)** 38 per billion hours / 26,315,789 hours, calculated per Telcordia SR-332
- Packaging** 1000/7" reel; 3500/13" reel Plastic tape: 12 mm wide, 0.25 mm thick, 8 mm pocket spacing, 1.32 mm pocket depth
- Recommended pick and place nozzle** OD: 4 mm; ID: ≤ 2 mm
- PCB washing** Only pure water or alcohol recommended



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Coupled Inductors for SEPIC Applications – LPD4012 Series

Part number ¹	Inductance ² (μH)	DCR max ³ (Ohms)	SRF typ ⁴ (MHz)	Coupling coefficient typ	Leakage L typ ⁵ (μH)	Isat (A) ⁶			Irms (A)	
						10% drop	20% drop	30% drop	both windings ⁷	one winding ⁸
LPD4012-331NL_	0.33 ±30%	0.042	255	0.94	0.06	5.2	5.4	5.6	1.87	2.65
LPD4012-561NL_	0.56 ±30%	0.087	185	0.95	0.08	3.7	3.8	3.9	1.30	1.84
LPD4012-821NL_	0.82 ±30%	0.100	130	0.97	0.09	3.2	3.3	3.4	1.21	1.72
LPD4012-152NL_	1.5 ±30%	0.185	86	0.97	0.11	2.50	2.81	2.91	1.15	1.62
LPD4012-222NL_	2.2 ±30%	0.235	70	0.98	0.14	2.30	2.40	2.50	0.95	1.35
LPD4012-332NL_	3.3 ±30%	0.320	48	0.98	0.16	1.80	1.90	2.00	0.75	1.06
LPD4012-472ML_	4.7 ±20%	0.500	39	0.98	0.18	1.60	1.70	1.80	0.65	0.92
LPD4012-562ML_	5.6 ±20%	0.620	32	0.99	0.20	1.50	1.60	1.60	0.55	0.78
LPD4012-682ML_	6.8 ±20%	0.530	31	0.99	0.22	1.20	1.52	1.63	0.60	0.86
LPD4012-822ML_	8.2 ±20%	0.600	29	0.99	0.24	1.10	1.20	1.30	0.55	0.78
LPD4012-103ML_	10 ±20%	0.750	25	0.99	0.26	0.98	1.00	1.10	0.50	0.71
LPD4012-153ML_	15 ±20%	1.13	21	0.99	0.30	0.90	0.92	0.94	0.43	0.60
LPD4012-223ML_	22 ±20%	1.63	15	0.99	0.34	0.70	0.82	0.84	0.34	0.48
LPD4012-333ML_	33 ±20%	1.83	12	>0.99	0.41	0.37	0.57	0.58	0.31	0.44
LPD4012-473ML_	47 ±20%	2.52	8.8	>0.99	0.51	0.33	0.39	0.40	0.28	0.39
LPD4012-683ML_	68 ±20%	3.23	7.8	>0.99	0.66	0.27	0.36	0.37	0.25	0.36
LPD4012-823ML_	82 ±20%	3.66	7.3	>0.99	0.75	0.27	0.27	0.29	0.23	0.31
LPD4012-104ML_	100 ±20%	4.76	6.1	>0.99	0.86	0.22	0.28	0.29	0.20	0.27
LPD4012-124ML_	120 ±20%	5.54	5.3	>0.99	0.98	0.21	0.26	0.27	0.19	0.27
LPD4012-154ML_	150 ±20%	6.90	4.6	>0.99	1.19	0.18	0.26	0.27	0.17	0.23
LPD4012-184ML_	180 ±20%	8.75	4.1	>0.99	1.40	0.16	0.21	0.23	0.14	0.18
LPD4012-224ML_	220 ±20%	11.24	3.3	>0.99	1.66	0.15	0.16	0.17	0.12	0.17
LPD4012-334ML_	330 ±20%	17.00	2.8	>0.99	2.45	0.13	0.16	0.16	0.10	0.14

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

LPD4012-334MLC

Termination: L = RoHS compliant Silver-palladium-platinum-glass frit.

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 (1000 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.

D = 13" machine-ready reel. EIA-481 embossed plastic tape. Factory order only, not stocked (3500 parts per full reel).

- 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.

Temperature rise calculation based on specified Irms

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

Temperature rise = Winding power loss $\times \frac{135^\circ\text{C}}{\text{W}}$

Examples for LPD4012-152ML:

Equal current in each winding (1.05 A):

Winding power loss = $(1.05^2 + 1.05^2) \times 0.134 = 0.296 \text{ W}$

Temperature rise = $0.296 \text{ W} \times \frac{135^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$

Unequal current ($I_{L1} = 1.3 \text{ A}$, $I_{L2} = 0.7 \text{ A}$):

Winding power loss = $(1.3^2 + 0.7^2) \times 0.134 = 0.292 \text{ W}$

Temperature rise = $0.292 \text{ W} \times \frac{135^\circ\text{C}}{\text{W}} = 39.4^\circ\text{C}$

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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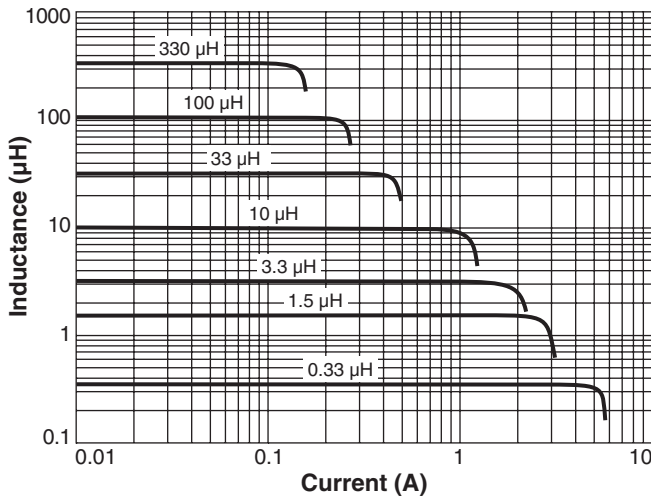
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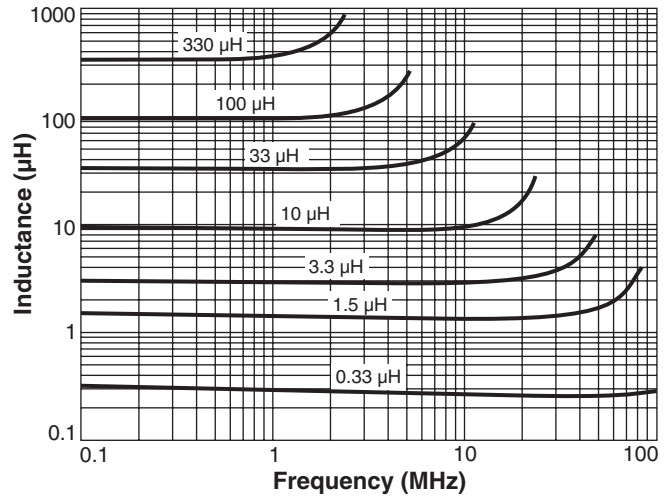


Coupled Inductors for SEPIC Applications – LPD4012 Series

Typical L vs Current



Typical L vs Frequency



Typical Current Derating

