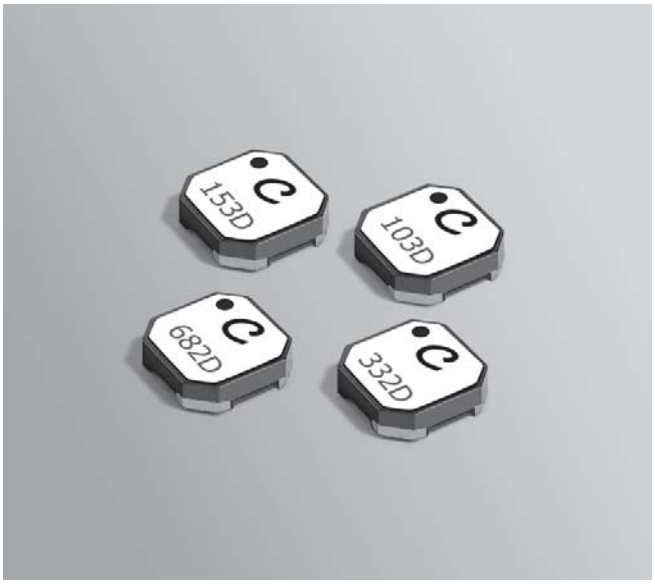
NEW!

Coupled Inductors–LPD4012 Series

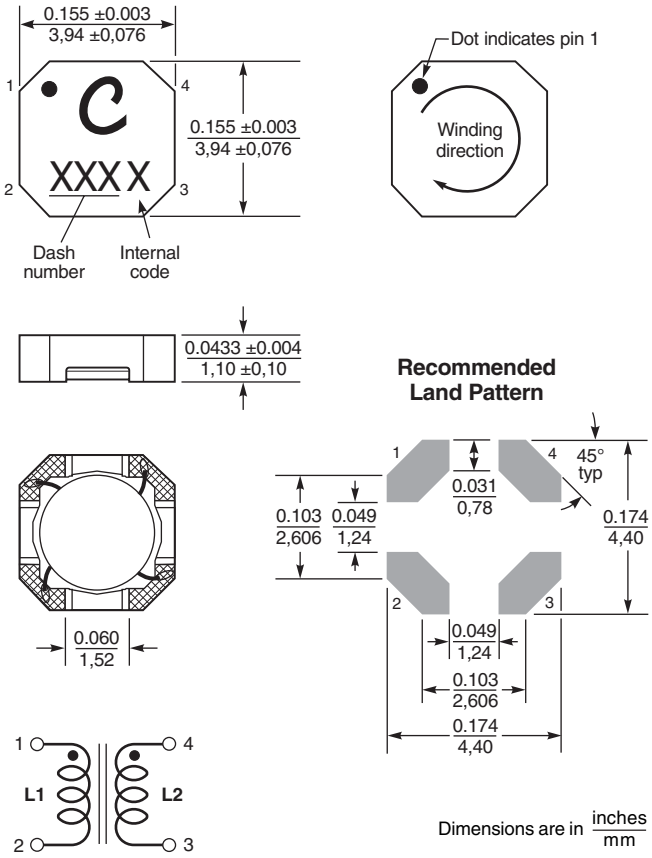
For SEPIC Applications

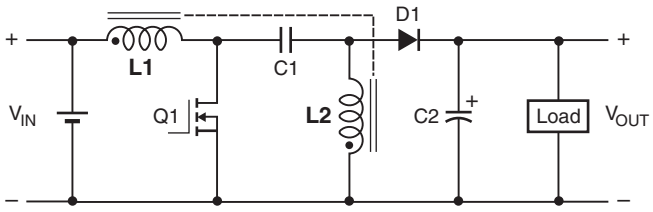


The LPD4012 series of coupled miniature shielded inductors are only 1,1 mm high and 4 mm square. The excellent coupling coefficient (k ≥ 0.94) makes it ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part with lower DCR and higher current handling.

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

They can be used as a coupled inductor, two single inductors connected in parallel, as a 1 : 1 transformer or as an autotransformer when connected in series.





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

Core material Ferrite

Core and winding loss See www.coilcraft.com/coreloss

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: –55°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)

Mean Time Between Failures (MTBF) 26,315,789 hours

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

PCB washing Only pure water or alcohol recommended

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RoHS COMPLIANT

Coupled Inductors for SEPIC Applications – LPD4012 Series

Part number[1]	Inductance[2] (µH)	DCR max[3] (Ohms)	SRF typ[4] (MHz)	Isat (A)[5] 10% drop	20% drop	30% drop	Irms (A) both windings[6]	one winding[7]
LPD4012-331NL_	0.33 ±30%	0.042	255	5.2	5.4	5.6	1.87	2.65
LPD4012-561NL_	0.56 ±30%	0.087	185	3.7	3.8	3.9	1.30	1.84
LPD4012-821NL_	0.82 ±30%	0.100	130	3.2	3.3	3.4	1.21	1.72
LPD4012-152ML_	1.5 ±20%	0.134	86	2.6	2.7	2.8	1.05	1.48
LPD4012-222ML_	2.2 ±20%	0.176	70	2.3	2.4	2.5	0.91	1.29
LPD4012-332ML_	3.3 ±20%	0.242	48	1.8	1.9	2.0	0.78	1.10
LPD4012-472ML_	4.7 ±20%	0.370	39	1.6	1.7	1.8	0.63	0.89
LPD4012-562ML_	5.6 ±20%	0.467	32	1.5	1.6	1.6	0.56	0.79
LPD4012-682ML_	6.8 ±20%	0.500	31	1.3	1.4	1.5	0.54	0.77
LPD4012-822ML_	8.2 ±20%	0.545	29	1.1	1.2	1.3	0.52	0.74
LPD4012-103ML_	10 ±20%	0.638	25	0.98	1.0	1.1	0.48	0.68
LPD4012-153ML_	15 ±20%	0.940	21	0.79	0.82	0.84	0.40	0.56
LPD4012-223ML_	22 ±20%	1.52	15	0.74	0.78	0.79	0.31	0.44
LPD4012-333ML_	33 ±20%	1.74	12	0.45	0.47	0.48	0.29	0.41
LPD4012-473ML_	47 ±20%	2.20	8.8	0.35	0.37	0.38	0.26	0.37
LPD4012-683ML_	68 ±20%	3.19	7.8	0.30	0.32	0.33	0.21	0.30
LPD4012-823ML_	82 ±20%	3.41	7.3	0.26	0.28	0.30	0.21	0.29
LPD4012-104ML_	100 ±20%	4.76	6.1	0.24	0.26	0.27	0.18	0.25
LPD4012-124ML_	120 ±20%	5.20	5.3	0.23	0.24	0.25	0.17	0.24
LPD4012-154ML_	150 ±20%	6.90	4.6	0.21	0.22	0.23	0.15	0.21
LPD4012-184ML_	180 ±20%	7.90	4.1	0.18	0.19	0.20	0.14	0.19
LPD4012-224ML_	220 ±20%	9.80	3.3	0.150	0.16	0.17	0.12	0.17
LPD4012-334ML_	330 ±20%	15.12	2.8	0.140	0.145	0.150	0.10	0.14
LPD4012-474ML_	470 ±20%	20.90	2.3	0.100	0.110	0.120	0.08	0.12
LPD4012-564ML_	560 ±20%	22.10	2.1	0.090	0.105	0.115	0.08	0.12

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

   LPD4012-564ML C

   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).
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 the specified amount 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 = Winding power loss $\times \frac{135°C}{W}$

Examples for LPD4012-152ML:

Equal current in each winding (1.05 A):

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

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

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

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

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

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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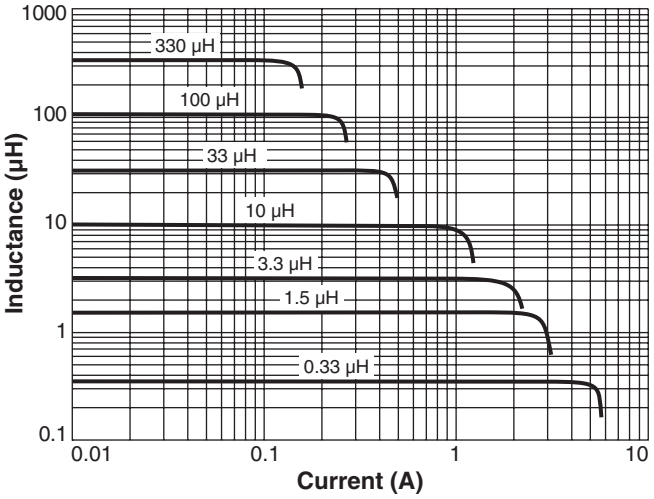
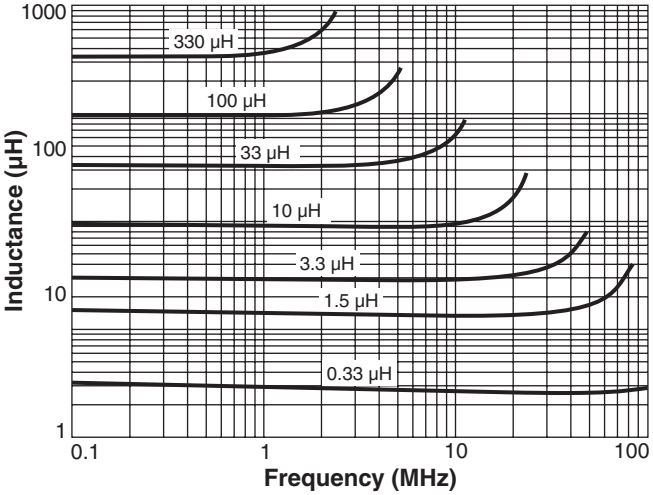
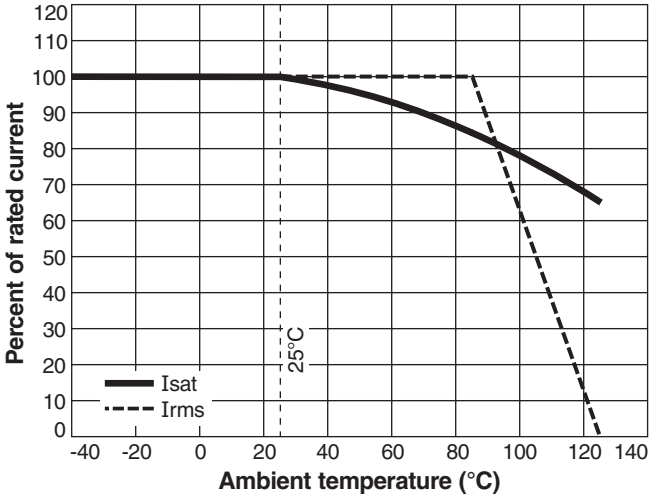
Typical L vs Current



Typical L vs Frequency



Typical Current Derating



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