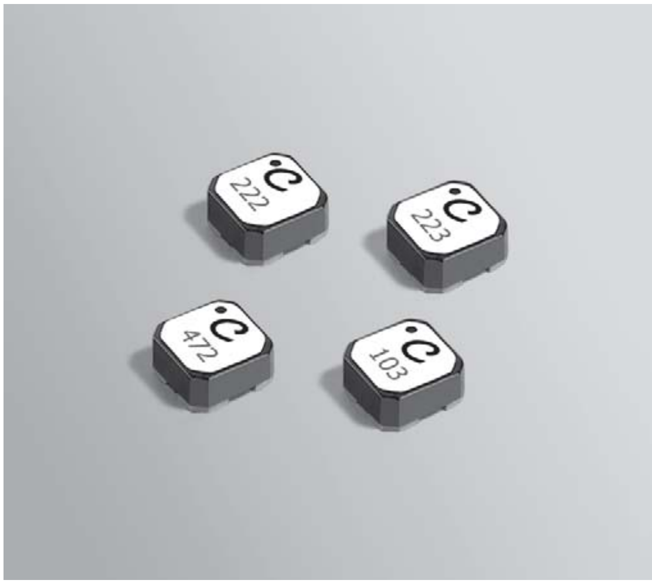
NEW!

# Coupled Inductors–LPD3015 Series

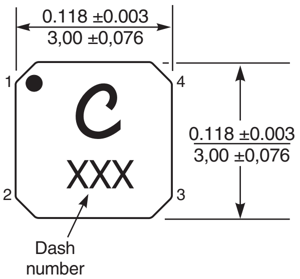
For SEPIC Applications

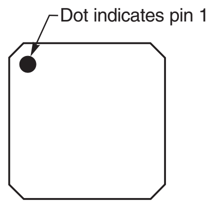


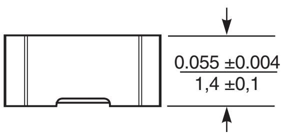

At only 1.4 mm high and 3 mm square, the LPD3015 is Coilcraft's smallest shielded coupled inductor. The excellent coupling coefficient (k ≥ 0.97) makes it ideal for use in SEPIC applications. In SEPIC topologies, the required inductance for each winding in a coupled inductor is half the value needed for two separate inductors, allowing selection of a part with lower DCR and higher current handling.

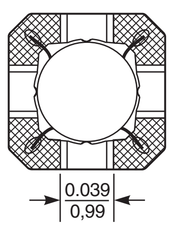
These inductors provide high efficiency and excellent current handling in a rugged, low cost part.

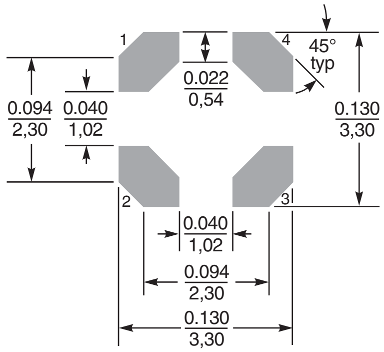
They can also be used as two single inductors connected in series or parallel, as a common mode choke or as a 1 : 1 transformer.

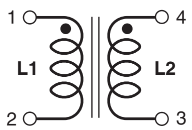


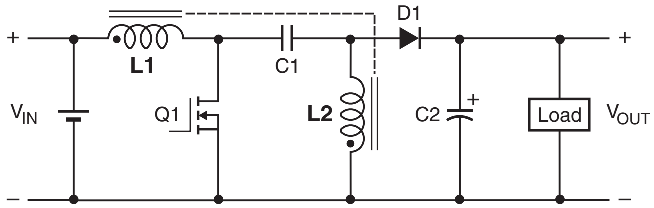




Dimensions are in inches / mm




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

**Core material** Ferrite

**Weight** 45 – 52 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 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** 1000/7″reel; 3500/13″ reel Plastic tape: 12 mm wide, 0.26 mm thick, 8 mm pocket spacing, 1.65 mm pocket depth
**Recommended pick and place nozzle** OD: 3 mm; ID: ≤ 1.5 mm

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



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# Coupled Inductors for SEPIC - LPD3015 Series

| Part number[1] | Inductance[2] ±20% (µH) | DCR max[3] (Ohms) | SRF typ[4] (MHz) | Isat (A)[5] 10% drop | Isat (A)[5] 20% drop | Isat (A)[5] 30% drop | Irms (A) both windings[6] | Irms (A) one winding[7] |
|---|---|---|---|---|---|---|---|---|
| LPD3015-391ML_ | 0.39 | 0.071 | 289 | 3.2 | 3.3 | 3.4 | 1.45 | 2.05 |
| LPD3015-561ML_ | 0.56 | 0.079 | 235 | 2.7 | 2.8 | 2.8 | 1.37 | 1.94 |
| LPD3015-102ML_ | 1.0 | 0.129 | 160 | 2.0 | 2.1 | 2.2 | 1.08 | 1.52 |
| LPD3015-152ML_ | 1.5 | 0.204 | 140 | 1.6 | 1.7 | 1.8 | 0.86 | 1.20 |
| LPD3015-182ML_ | 1.8 | 0.243 | 135 | 1.5 | 1.6 | 1.6 | 0.78 | 1.10 |
| LPD3015-222ML_ | 2.2 | 0.263 | 110 | 1.5 | 1.6 | 1.6 | 0.75 | 1.05 |
| LPD3015-332ML_ | 3.3 | 0.337 | 90 | 1.0 | 1.1 | 1.2 | 0.67 | 0.94 |
| LPD3015-472ML_ | 4.7 | 0.503 | 79 | 0.86 | 0.87 | 0.88 | 0.54 | 0.76 |
| LPD3015-682ML_ | 6.8 | 0.622 | 58 | 0.77 | 0.78 | 0.79 | 0.49 | 0.69 |
| LPD3015-103ML_ | 10 | 1.040 | 48 | 0.58 | 0.59 | 0.60 | 0.38 | 0.53 |
| LPD3015-153ML_ | 15 | 1.420 | 35 | 0.49 | 0.50 | 0.51 | 0.32 | 0.46 |
| LPD3015-183ML_ | 18 | 1.550 | 33 | 0.46 | 0.47 | 0.48 | 0.31 | 0.44 |
| LPD3015-223ML_ | 22 | 1.89 | 30 | 0.42 | 0.43 | 0.44 | 0.28 | 0.40 |
| LPD3015-333ML_ | 33 | 2.84 | 23 | 0.34 | 0.35 | 0.36 | 0.23 | 0.32 |
| LPD3015-473ML_ | 47 | 4.03 | 17 | 0.28 | 0.29 | 0.30 | 0.19 | 0.27 |
| LPD3015-683ML_ | 68 | 6.11 | 14 | 0.24 | 0.25 | 0.26 | 0.16 | 0.22 |
| LPD3015-104ML_ | 100 | 8.54 | 11 | 0.20 | 0.21 | 0.22 | 0.13 | 0.19 |
| LPD3015-124ML_ | 120 | 9.23 | 9.0 | 0.19 | 0.20 | 0.20 | 0.13 | 0.18 |
| LPD3015-154ML_ | 150 | 12.40 | 8.0 | 0.16 | 0.17 | 0.18 | 0.11 | 0.16 |
| LPD3015-184ML_ | 180 | 15.32 | 7.5 | 0.15 | 0.16 | 0.17 | 0.10 | 0.14 |
| LPD3015-224ML_ | 220 | 18.56 | 6.0 | 0.13 | 0.14 | 0.15 | 0.09 | 0.13 |
| LPD3015-334ML_ | 330 | 27.70 | 5.0 | 0.11 | 0.12 | 0.12 | 0.07 | 0.10 |

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

   **LPD3015-564M L 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 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.

**Temperature rise calculation based on specified Irms**

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

Temperature rise = Winding power loss $\times \frac{135°C}{W}$

**Examples for LPD3015-152ML:**

**Equal current in each winding (1.2 A):**

Winding power loss = $(1.2^2 + 1.2^2) \times 0.204 = 0.301$ W

Temperature rise = $0.301\ W \times \frac{135°C}{W} = 40.6°C$

**Unequal current ($I_{L1}$ = 1.0 A, $I_{L2}$ = 0.6 A):**

Winding power loss = $(1.0^2 + 0.6^2) \times 0.204 = 0.277$ W

Temperature rise = $0.277\ W \times \frac{135°C}{W} = 37.4°C$



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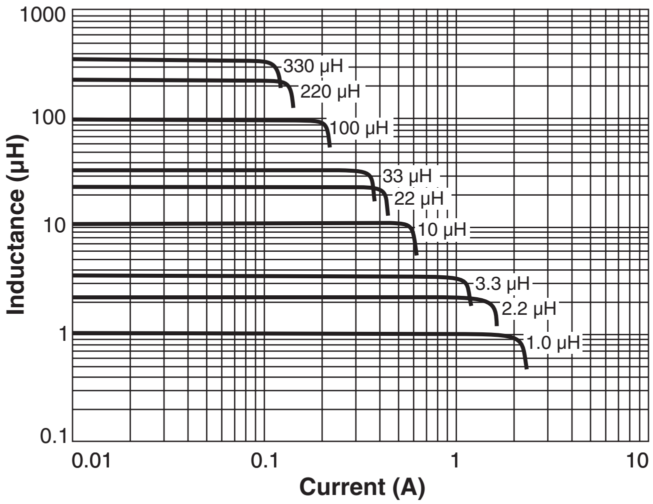
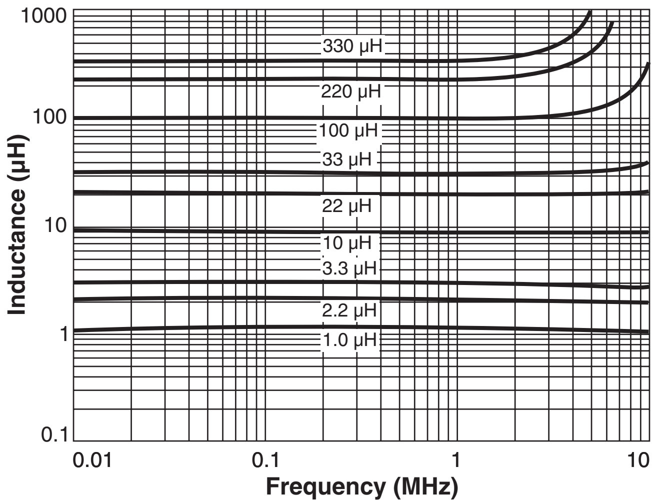
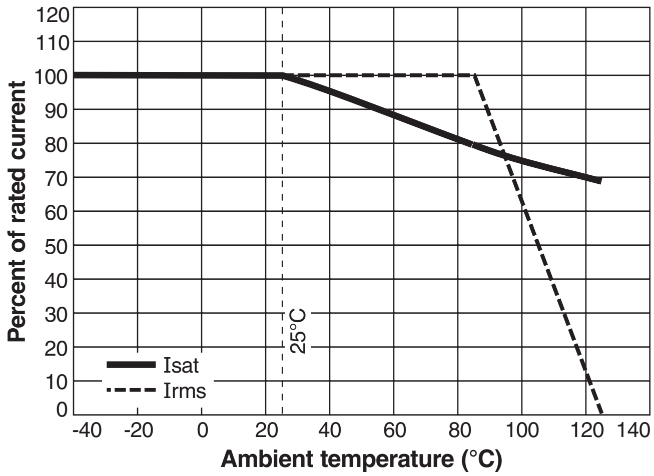
## Typical L vs Current




## Typical L vs Frequency




## Typical Current Derating



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