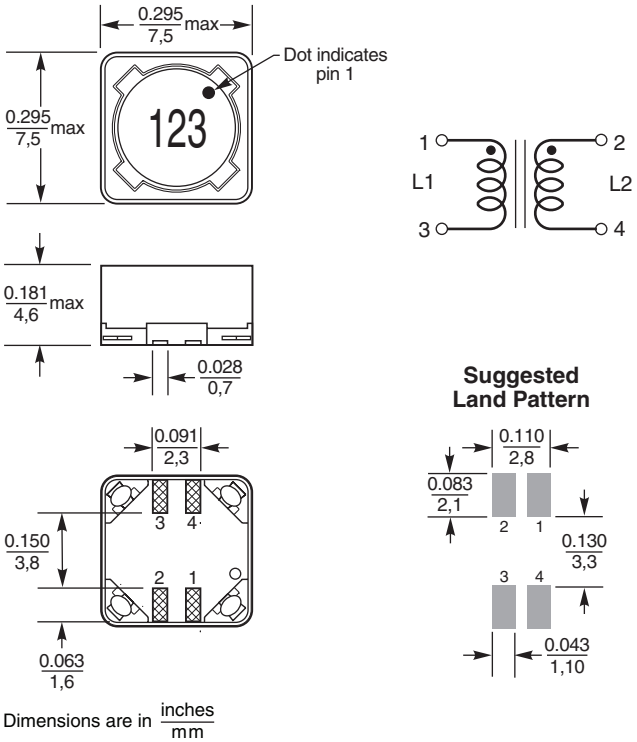
Coupled Inductors for Critical Applications

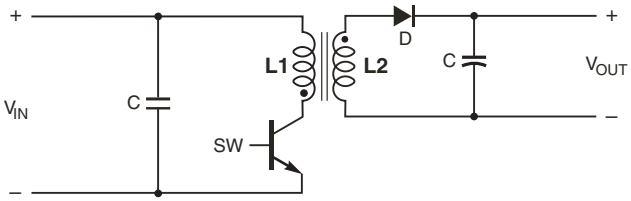


Dimensions are in inches / mm

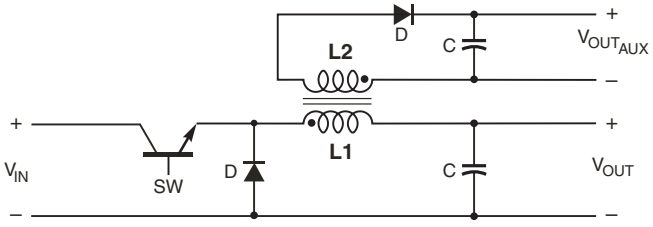
Tight coupling (k ≥ 0.97) and 200 V isolation make the ST526PND series of coupled inductors ideal for use in a variety of circuits including flyback, multi-output buck and SEPIC.

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

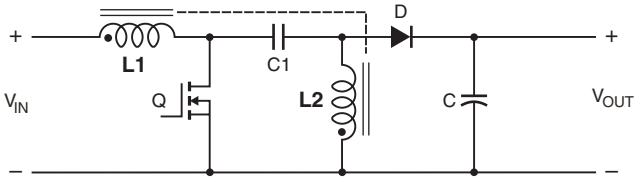
They can also be used as two single inductors connected in series or parallel, as a common mode choke or as a 1 : 1 transformer.



Typical Flyback Converter



Typical Buck Converter with auxiliary output



Typical SEPIC schematic

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°C to +85°C with Irms current, +85°C to +125°C with derated current

Storage temperature Component: –55°C to +125°C. Tape and reel packaging: –55°C to +80°C

Winding to winding isolation 200 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)

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

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Coupled Inductors – ST526PND

Part number[1]	Inductance[2] ±20% (µH)	DCR max[3] (Ohms)	SRF typ[4] (MHz)	Coupling coefficient typ	Leakage L typ[5] (µH)	Isat (A)[6] 10% drop	Isat (A)[6] 20% drop	Isat (A)[6] 30% drop	Irms (A) both windings[7]	Irms (A) one winding[8]
ST526PND252MLZ	2.5	0.033	55	0.97	0.14	6.0	6.2	6.3	2.17	3.06
ST526PND332MLZ	3.3	0.037	43	0.99	0.09	5.2	5.3	5.4	2.05	2.89
ST526PND472MLZ	4.7	0.051	35	0.99	0.11	4.1	4.3	4.6	1.74	2.46
ST526PND562MLZ	5.6	0.063	32	0.99	0.09	3.9	4.1	4.2	1.57	2.22
ST526PND682MLZ	6.8	0.070	30	0.99	0.14	3.7	3.8	3.9	1.49	2.10
ST526PND822MLZ	8.2	0.075	27	0.98	0.25	3.3	3.4	3.5	1.44	2.03
ST526PND103MLZ	10	0.100	22	0.98	0.30	2.8	2.9	3.0	1.24	1.76
ST526PND123MLZ	12	0.120	20	0.98	0.36	2.5	2.6	2.7	1.14	1.61
ST526PND153MLZ	15	0.130	18	0.98	0.49	2.2	2.3	2.4	1.09	1.54
ST526PND183MLZ	18	0.170	15	>0.99	0.16	2.0	2.2	2.3	0.95	1.35
ST526PND223MLZ	22	0.220	13.5	>0.99	0.20	1.9	2.0	2.1	0.84	1.19
ST526PND273MLZ	27	0.250	12.0	>0.99	0.20	1.7	1.8	1.9	0.79	1.11
ST526PND333MLZ	33	0.270	11.0	>0.99	0.15	1.5	1.6	1.7	0.76	1.07
ST526PND393MLZ	39	0.380	10.0	0.99	0.70	1.3	1.4	1.5	0.64	0.90
ST526PND473MLZ	47	0.420	9.5	>0.99	0.30	1.2	1.3	1.4	0.61	0.86
ST526PND563MLZ	56	0.460	8.7	>0.99	0.51	1.1	1.2	1.3	0.58	0.82
ST526PND683MLZ	68	0.600	7.3	>0.99	0.51	1.0	1.1	1.2	0.51	0.72
ST526PND823MLZ	82	0.680	6.2	0.99	1.17	0.90	1.00	1.1	0.48	0.67
ST526PND104MLZ	100	0.770	5.5	>0.99	0.96	0.80	0.92	0.98	0.45	0.63
ST526PND124MLZ	120	1.03	4.5	>0.99	0.61	0.70	0.80	0.90	0.39	0.55
ST526PND154MLZ	150	1.35	4.0	>0.99	0.54	0.65	0.76	0.80	0.34	0.48
ST526PND184MLZ	180	1.52	3.8	>0.99	0.75	0.62	0.66	0.73	0.32	0.45
ST526PND224MLZ	220	1.72	3.5	>0.99	1.43	0.59	0.62	0.66	0.30	0.42
ST526PND274MLZ	270	2.41	3.3	>0.99	1.56	0.55	0.57	0.60	0.25	0.36
ST526PND334MLZ	330	2.70	3.0	>0.99	1.65	0.49	0.52	0.54	0.24	0.34
ST526PND394MLZ	390	3.05	2.8	0.99	4.73	0.45	0.47	0.50	0.23	0.32
ST526PND474MLZ	470	4.00	2.6	0.99	5.50	0.41	0.43	0.46	0.20	0.28
ST526PND564MLZ	560	4.43	2.5	>0.99	4.85	0.38	0.40	0.42	0.19	0.26
ST526PND684MLZ	680	5.00	2.3	0.99	7.59	0.36	0.37	0.38	0.18	0.25
ST526PND824MLZ	820	6.80	2.2	>0.99	8.01	0.30	0.32	0.35	0.15	0.21
ST526PND105MLZ	1000	7.80	2.0	>0.99	8.69	0.27	0.29	0.31	0.14	0.20

1. When ordering, please specify **termination** and **testing** codes:

   ST526PND105MLZ

   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).

   Testing: **Z** = COTS
   H = Screening per Coilcraft CP-SA-10001
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. Leakage inductance is for L1 and is measured with L2 shorted.
6. 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.
7. Equal current when applied to each winding simultaneously that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
8. Maximum current when applied to one winding that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
9. 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 (Δt) = Winding power loss $\times \frac{129°C}{W}$

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

Example 1. 526PND-123ML (Equal current in each winding)
Winding power loss = $(1.14^2 + 1.14^2) \times 0.120 = 0.312$ W

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

Example 2. 526PND-123ML ($I_{L1} = 1.4$ A, $I_{L2} = 0.6$ A)
Winding power loss = $(1.4^2 + 0.6^2) \times 0.120 = 0.278$ W

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

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-cps.com/coupledloss.

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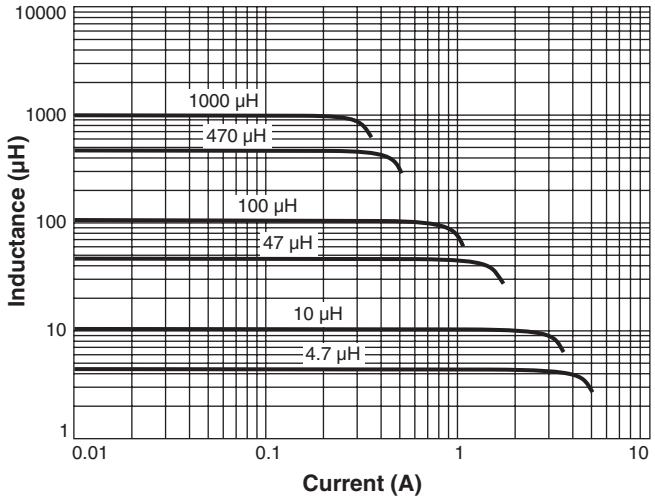
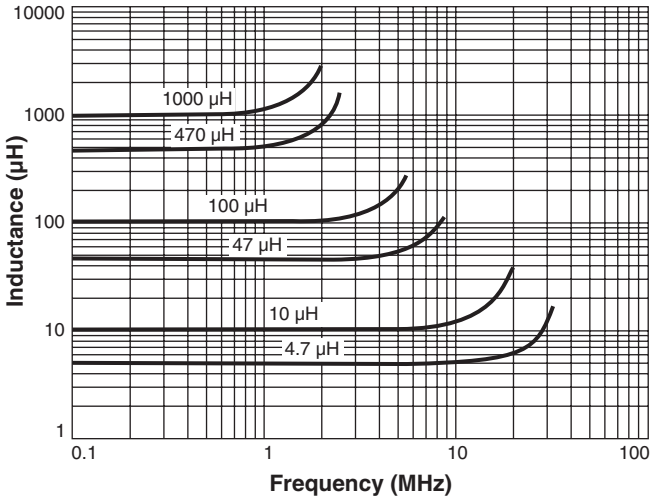
Coupled Inductors – ST526PND

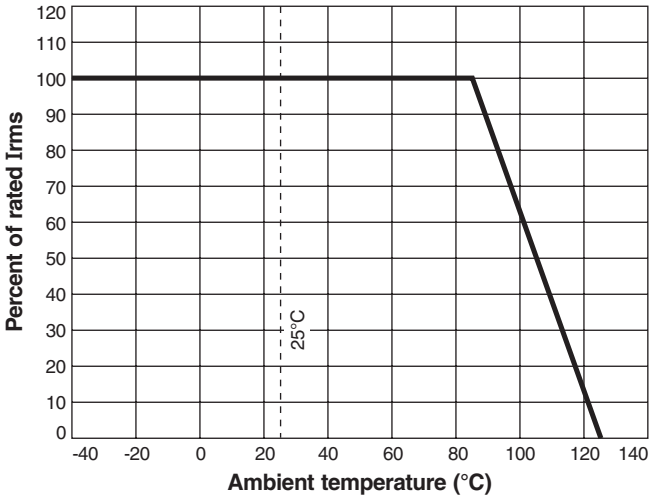
Typical L vs Current



Typical L vs Frequency



Irms Derating



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