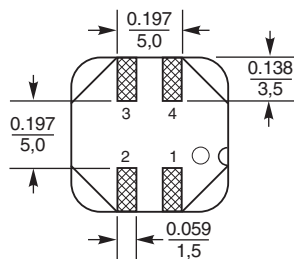
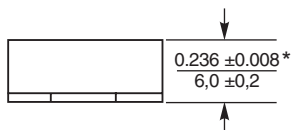
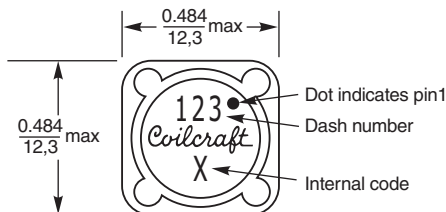


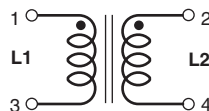
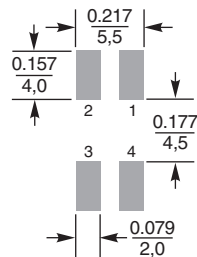
High Reliability Coupled Inductors MS590PND



*Dimensions are for the mounted part.
Dimensions before mounting can be
an additional 0.006 inch (0,152 mm).

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

Suggested Land Pattern

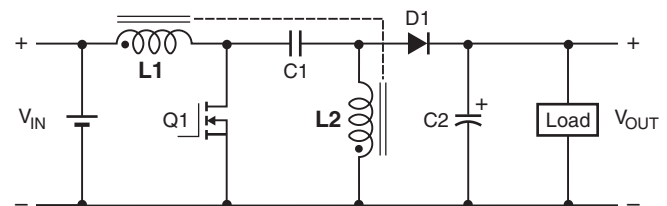


The MS590PND series of shielded coupled inductors was designed specifically for high temperature applications – up to 155°C. Tin-lead (Sn-Pb) terminations are used for the best possible board adhesion.

The excellent coupling coefficient ($k \geq 0.98$) 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 inductance, high efficiency, excellent current handling and 500 V isolation in a very rugged part. They are well suited for use as VRM inductors in high-current DC-DC and VRM/VRD controllers.

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 SEPIC schematic

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

Core material Ferrite

Terminations Tin-lead (63/37) over tin over nickel over phos bronze

Weight: 2.8 – 3.2 g

Ambient temperature –55°C to +105°C with Irms current, +105°C to +155°C with derated current

Storage temperature Component: –55°C to +155°C.
Tape and reel packaging: –55°C to +80°C

Winding to winding isolation 500 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)

Winding-to-winding and winding-to-core isolation 500 Vrms

Enhanced crush-resistant packaging 500/13" reel;
Plastic tape: 24 mm wide, 0.35 mm thick, 16 mm pocket spacing,
6.6 mm pocket depth

MS590PND Series (1260)

Part number ¹	Inductance ² (μ H)	DCR max ³ (Ohms)	SRF (MHz) ⁴		Coupling coefficient typ	Leakage L typ (μ H)	Isat (A) ⁵			Irms (A)	
			min	typ			10% drop	20% drop	30% drop	both windings ⁶	one winding ⁷
MS590PND472MSZ	4.7 \pm 20%	0.036	30.0	38.0	0.98	0.20	9.00	10.18	11.08	3.16	4.47
MS590PND562MSZ	5.6 \pm 20%	0.040	24.0	30.0	0.98	0.20	8.00	9.06	9.84	3.00	4.24
MS590PND682MSZ	6.8 \pm 20%	0.048	22.0	27.0	0.98	0.24	7.00	8.00	8.64	2.75	3.88
MS590PND822MSZ	8.2 \pm 20%	0.052	21.0	26.0	0.98	0.25	6.44	7.38	7.98	2.63	3.72
MS590PND103MSZ	10 \pm 20%	0.060	18.0	22.0	0.99	0.26	5.40	6.32	6.88	2.45	3.46
MS590PND123MSZ	12 \pm 20%	0.074	16.0	20.0	0.99	0.28	5.30	6.18	6.70	2.21	3.12
MS590PND153MSZ	15 \pm 20%	0.085	14.4	18.0	0.99	0.32	4.60	5.30	5.80	2.06	2.92
MS590PND183MSZ	18 \pm 20%	0.097	13.0	16.0	0.99	0.40	4.50	5.22	5.68	1.93	2.73
MS590PND223MSZ	22 \pm 20%	0.116	12.0	15.0	0.98	0.67	4.00	4.62	5.02	1.76	2.49
MS590PND273MSZ	27 \pm 20%	0.124	10.0	13.0	0.99	0.50	3.60	4.14	4.50	1.70	2.41
MS590PND333MSZ	33 \pm 20%	0.134	10.0	12.4	0.99	0.65	3.30	3.80	4.14	1.64	2.32
MS590PND393MSZ	39 \pm 20%	0.142	9.6	12.0	0.99	1.09	3.00	3.48	3.82	1.59	2.25
MS590PND473MSZ	47 \pm 20%	0.174	9.3	11.6	0.99	0.80	2.70	3.12	3.40	1.44	2.03
MS590PND563MSZ	56 \pm 20%	0.198	8.4	10.5	0.99	0.75	2.50	2.90	3.14	1.35	1.91
MS590PND683MSZ	68 \pm 20%	0.216	8.0	10.0	>0.99	0.57	2.30	2.66	2.88	1.29	1.83
MS590PND823MSZ	82 \pm 20%	0.274	6.9	8.6	0.99	1.52	2.10	2.40	2.60	1.15	1.62
MS590PND104MSZ	100 \pm 20%	0.322	6.2	7.8	0.99	1.41	1.90	2.18	2.38	1.06	1.50
MS590PND124KSZ	120 \pm 10%	0.418	5.5	6.8	0.99	1.34	1.60	1.84	2.04	0.93	1.31
MS590PND154KSZ	150 \pm 10%	0.476	5.1	6.4	0.99	1.52	1.50	1.76	1.92	0.87	1.23
MS590PND184KSZ	180 \pm 10%	0.536	4.9	6.1	0.99	1.80	1.40	1.64	1.78	0.82	1.16
MS590PND224KSZ	220 \pm 10%	0.691	4.4	5.5	>0.99	1.60	1.30	1.48	1.60	0.72	1.02
MS590PND274KSZ	270 \pm 10%	0.806	3.4	4.3	>0.99	2.23	1.10	1.30	1.40	0.67	0.95
MS590PND334KSZ	330 \pm 10%	1.09	3.2	4.0	>0.99	2.39	1.00	1.16	1.26	0.57	0.81
MS590PND394KSZ	390 \pm 10%	1.20	2.9	3.6	>0.99	3.72	0.950	1.11	1.23	0.55	0.77
MS590PND474KSZ	470 \pm 10%	1.59	2.4	3.0	>0.99	2.89	0.900	0.994	1.09	0.48	0.67
MS590PND564KSZ	560 \pm 10%	1.81	2.2	2.8	>0.99	2.55	0.800	0.908	0.948	0.45	0.63
MS590PND684KSZ	680 \pm 10%	2.06	2.1	2.6	>0.99	5.76	0.700	0.804	0.874	0.42	0.59
MS590PND824KSZ	820 \pm 10%	2.65	2.0	2.5	>0.99	2.86	0.640	0.732	0.802	0.37	0.52
MS590PND105KSZ	1000 \pm 10%	3.06	1.9	2.4	>0.99	4.32	0.590	0.674	0.728	0.34	0.49

1. When ordering, please specify **testing** code:

MS590PND105KSZ

Testing: Z = COTS

H = Screening per Coilcraft CP-SA-10001

N = Screening per Coilcraft CP-SA-10004

- 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.
- 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 (Δt) = Winding power loss $\times \frac{55.6^\circ\text{C}}{\text{W}}$

$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{55.6^\circ\text{C}}{\text{W}}$

Example 1. 590PND153 (Equal current in each winding)

Winding power loss = $(2.06^2 + 2.06^2) \times 0.085 = 0.721 \text{ W}$

$\Delta t = 0.721 \text{ W} \times \frac{55.6^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$

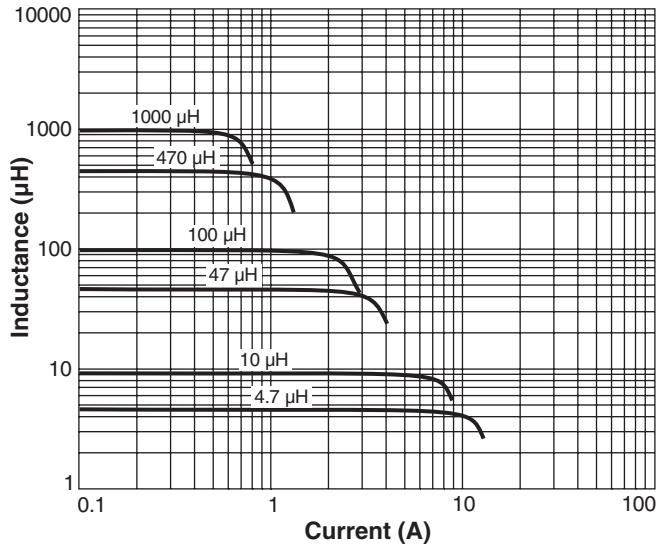
Example 2. 590PND153 ($I_{L1} = 2.4 \text{ A}$, $I_{L2} = 1.3 \text{ A}$)

Winding power loss = $(2.4^2 + 1.3^2) \times 0.085 = 0.633 \text{ W}$

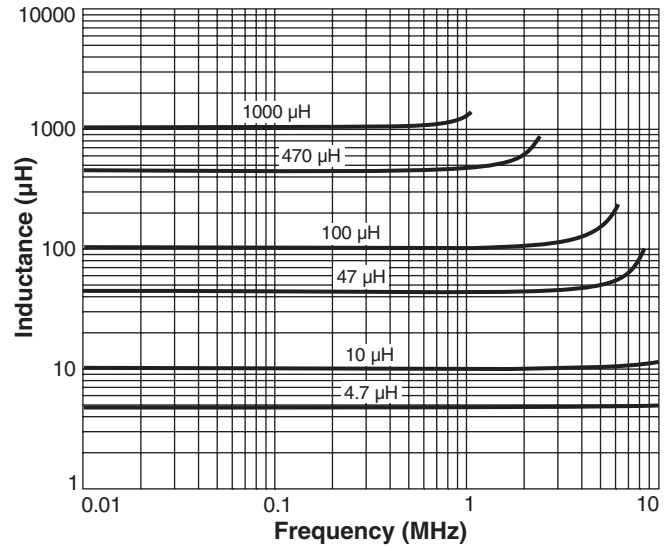
$\Delta t = 0.633 \text{ W} \times \frac{55.6^\circ\text{C}}{\text{W}} = 35.2^\circ\text{C}$

MS590PND Series (1260)

Typical L vs Current



Typical L vs Frequency



Current Derating

