

# Outgassing Compliant Coupled Inductors AE612PND

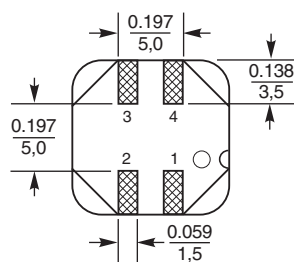
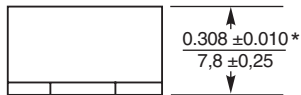
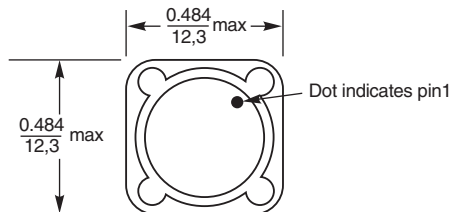


The AE612PND series of shielded coupled inductors was designed with special materials that pass NASA low outgassing specifications and allow use in high temperature applications – up to 155°C. Tin-lead (Sn-Pb) terminations are used for the best possible board adhesion.

They offer excellent coupling coefficient ( $k \geq 0.98$ ) and can be used in SEPIC applications. In SEPIC topologies, the required inductance for each winding 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.

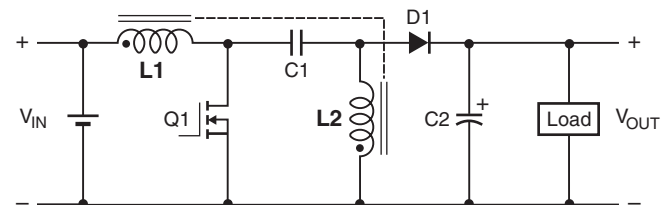
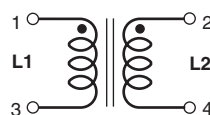
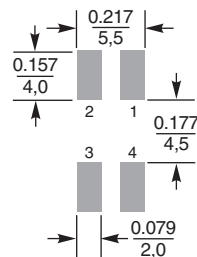
They can also be used as two single inductors connected in series or parallel, as a common mode choke or as a 1 : 1 transformer.



\*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



### Typical SEPIC schematic

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

**Core material** Ferrite

**Core and winding loss** [Go to online calculator](#)

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

**Weight:** 3.8 g – 4.6 g

**Ambient temperature** –55°C to +105°C with Irms current

**Maximum part temperature** +155°C (ambient + temp rise)

**Storage temperature** Component: –55°C to +155°C.

Packaging: –55°C to +80°C

**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, 0.4 mm thick, 16 mm pocket spacing, 8.1 mm pocket depth

# AE612PND Series (1278)

| Part number <sup>1</sup> | Inductance <sup>2</sup><br>( $\mu$ H) | DCR max <sup>3</sup><br>(Ohms) | SRF (MHz) <sup>4</sup> |      | Coupling<br>coefficient<br>typ | Leakage<br>L typ<br>( $\mu$ H) | Isat (A) <sup>5</sup> |             |             | Irms (A)                      |                             |
|--------------------------|---------------------------------------|--------------------------------|------------------------|------|--------------------------------|--------------------------------|-----------------------|-------------|-------------|-------------------------------|-----------------------------|
|                          |                                       |                                | min                    | typ  |                                |                                | 10%<br>drop           | 20%<br>drop | 30%<br>drop | both<br>windings <sup>6</sup> | one<br>winding <sup>7</sup> |
| AE612PND472MSZ           | 4.7 $\pm$ 20%                         | 0.040                          | 26.0                   | 33.0 | 0.98                           | 0.22                           | 13.90                 | 15.20       | 16.36       | 3.16                          | 4.47                        |
| AE612PND562MSZ           | 5.6 $\pm$ 20%                         | 0.046                          | 24.0                   | 30.0 | 0.98                           | 0.23                           | 13.38                 | 14.86       | 15.74       | 2.87                          | 4.06                        |
| AE612PND682MSZ           | 6.8 $\pm$ 20%                         | 0.048                          | 18.0                   | 23.0 | 0.98                           | 0.22                           | 12.10                 | 13.56       | 14.20       | 2.81                          | 3.98                        |
| AE612PND822MSZ           | 8.2 $\pm$ 20%                         | 0.055                          | 16.0                   | 20.0 | 0.98                           | 0.34                           | 10.30                 | 11.52       | 12.20       | 2.76                          | 3.90                        |
| AE612PND103MSZ           | 10 $\pm$ 20%                          | 0.058                          | 14.0                   | 17.0 | 0.98                           | 0.34                           | 8.80                  | 10.00       | 10.66       | 2.56                          | 3.62                        |
| AE612PND123MSZ           | 12 $\pm$ 20%                          | 0.062                          | 12.0                   | 15.0 | 0.98                           | 0.36                           | 8.20                  | 9.18        | 9.74        | 2.48                          | 3.50                        |
| AE612PND153MSZ           | 15 $\pm$ 20%                          | 0.072                          | 10.0                   | 13.0 | 0.99                           | 0.41                           | 7.40                  | 8.36        | 9.03        | 2.30                          | 3.25                        |
| AE612PND183MSZ           | 18 $\pm$ 20%                          | 0.080                          | 9.6                    | 12.0 | 0.99                           | 0.37                           | 6.50                  | 7.38        | 7.86        | 2.18                          | 3.08                        |
| AE612PND223MSZ           | 22 $\pm$ 20%                          | 0.096                          | 8.8                    | 11.0 | 0.99                           | 0.41                           | 6.00                  | 6.80        | 7.26        | 1.99                          | 2.81                        |
| AE612PND273MSZ           | 27 $\pm$ 20%                          | 0.120                          | 8.0                    | 10.0 | 0.99                           | 0.43                           | 5.80                  | 6.56        | 7.02        | 1.78                          | 2.52                        |
| AE612PND333MSZ           | 33 $\pm$ 20%                          | 0.150                          | 7.6                    | 9.5  | 0.99                           | 0.56                           | 5.50                  | 6.10        | 6.52        | 1.59                          | 2.25                        |
| AE612PND393MSZ           | 39 $\pm$ 20%                          | 0.161                          | 6.8                    | 8.5  | 0.99                           | 0.64                           | 4.70                  | 5.26        | 5.60        | 1.54                          | 2.18                        |
| AE612PND473MSZ           | 47 $\pm$ 20%                          | 0.180                          | 6.0                    | 7.5  | 0.99                           | 0.70                           | 3.70                  | 4.34        | 4.60        | 1.45                          | 2.05                        |
| AE612PND563MSZ           | 56 $\pm$ 20%                          | 0.190                          | 5.6                    | 7.0  | 0.99                           | 0.76                           | 3.60                  | 4.18        | 4.50        | 1.41                          | 2.00                        |
| AE612PND683MSZ           | 68 $\pm$ 20%                          | 0.210                          | 5.2                    | 6.5  | 0.99                           | 0.88                           | 3.50                  | 4.04        | 4.32        | 1.35                          | 1.90                        |
| AE612PND823MSZ           | 82 $\pm$ 20%                          | 0.280                          | 4.0                    | 5.0  | 0.99                           | 0.85                           | 3.30                  | 3.72        | 4.02        | 1.16                          | 1.65                        |
| AE612PND104MSZ           | 100 $\pm$ 20%                         | 0.300                          | 3.6                    | 4.5  | >0.99                          | 0.90                           | 2.80                  | 3.24        | 3.46        | 1.13                          | 1.59                        |
| AE612PND124KSZ           | 120 $\pm$ 10%                         | 0.410                          | 3.4                    | 4.3  | 0.99                           | 1.31                           | 2.60                  | 2.94        | 3.16        | 0.96                          | 1.36                        |
| AE612PND154KSZ           | 150 $\pm$ 10%                         | 0.460                          | 3.3                    | 4.1  | >0.99                          | 1.46                           | 2.20                  | 2.54        | 2.70        | 0.91                          | 1.29                        |
| AE612PND184KSZ           | 180 $\pm$ 10%                         | 0.510                          | 3.2                    | 4.0  | >0.99                          | 0.93                           | 2.10                  | 2.42        | 2.58        | 0.86                          | 1.22                        |
| AE612PND224KSZ           | 220 $\pm$ 10%                         | 0.690                          | 2.7                    | 3.4  | >0.99                          | 1.54                           | 1.90                  | 2.16        | 2.28        | 0.74                          | 1.05                        |
| AE612PND274KSZ           | 270 $\pm$ 10%                         | 0.900                          | 2.5                    | 3.1  | >0.99                          | 1.17                           | 1.70                  | 1.94        | 2.10        | 0.65                          | 0.92                        |
| AE612PND334KSZ           | 330 $\pm$ 10%                         | 1.02                           | 2.3                    | 2.9  | 0.99                           | 4.14                           | 1.50                  | 1.70        | 1.84        | 0.61                          | 0.86                        |
| AE612PND394KSZ           | 390 $\pm$ 10%                         | 1.12                           | 2.2                    | 2.7  | >0.99                          | 1.64                           | 1.40                  | 1.60        | 1.70        | 0.58                          | 0.82                        |
| AE612PND474KSZ           | 470 $\pm$ 10%                         | 1.53                           | 1.8                    | 2.2  | >0.99                          | 1.25                           | 1.30                  | 1.50        | 1.60        | 0.50                          | 0.70                        |
| AE612PND564KSZ           | 560 $\pm$ 10%                         | 1.69                           | 1.6                    | 2.0  | >0.99                          | 2.68                           | 1.20                  | 1.34        | 1.46        | 0.47                          | 0.67                        |
| AE612PND684KSZ           | 680 $\pm$ 10%                         | 2.29                           | 1.4                    | 1.7  | >0.99                          | 2.11                           | 1.00                  | 1.08        | 1.22        | 0.41                          | 0.58                        |
| AE612PND824KSZ           | 820 $\pm$ 10%                         | 2.55                           | 1.1                    | 1.4  | >0.99                          | 2.39                           | 0.900                 | 1.04        | 1.18        | 0.39                          | 0.55                        |
| AE612PND105KSZ           | 1000 $\pm$ 10%                        | 2.87                           | 1.0                    | 1.3  | >0.99                          | 4.28                           | 0.850                 | 0.948       | 1.05        | 0.37                          | 0.52                        |

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

**AE612PND105KSZ**

**Screening:** Z = Unscreened

Y = Unscreened (SLDC Option A)

W = Unscreened (SLDC Option B)

H = Coilcraft CP-SA-10001 Group A

G = Coilcraft CP-SA-10001 Group A (SLDC Option A)

D = Coilcraft CP-SA-10001 Group A (SLDC Option B)

1 = EEE-INST-002 (Family 1) Level 1

2 = EEE-INST-002 (Family 1) Level 2

3 = EEE-INST-002 (Family 1) Level 3

4 = MIL-STD-981 (Family 04) Class B

5 = MIL-STD-981 (Family 04) Class S

F = ESCC3201 (F4 operational life performed at 105°C)

- Screening performed to the document's latest revision.
- Lot qualification (Group B) available.
- Testing T and U have been replaced with more detailed codes 4, 5, and 1, 2, 3, respectively. Codes T and U can still be used, if necessary. Custom testing also available.
- Country of origin restrictions available; prefix options G or F.

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 25°C that causes the specified inductance drop 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. This information is for reference only and does not represent absolute maximum ratings.

7. Maximum current when applied to one winding that causes a 40°C temperature rise from 25°C ambient. This information is for reference only and does not represent absolute maximum ratings.

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.

## 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. [Go to online calculator.](#)



CRITICAL PRODUCTS & SERVICES

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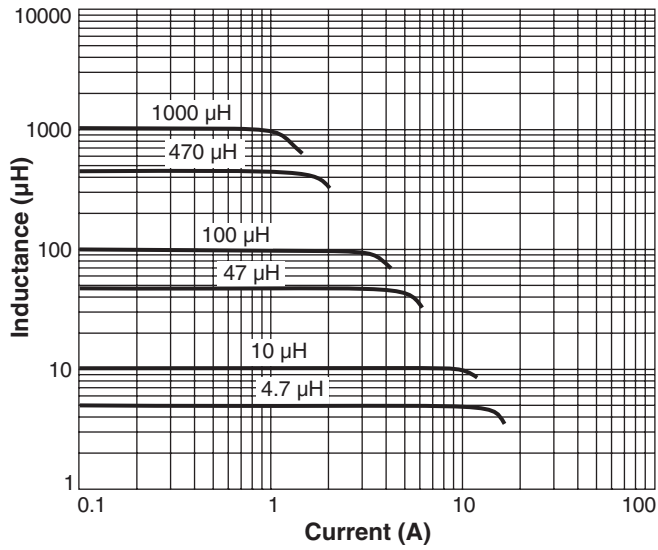
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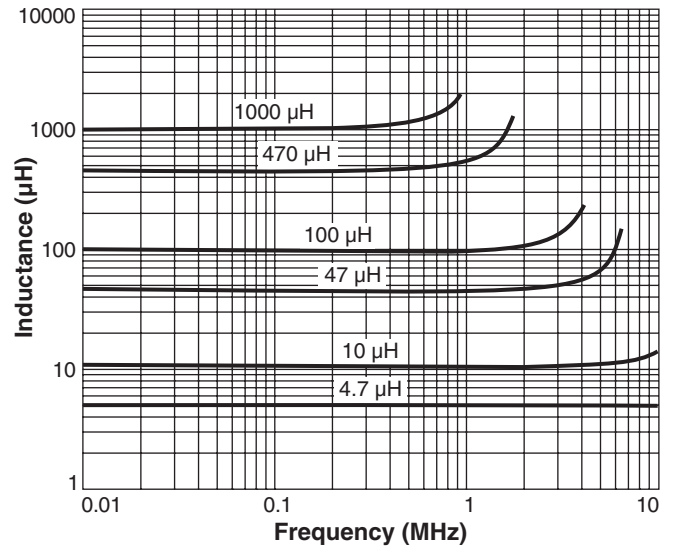
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# AE612PND Series (1278)

## Typical L vs Current



## Typical L vs Frequency



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