**ACCU-L® TECHNOLOGY**

The L0402 LGA Inductor and the L0805 Accu-L® SMD Inductor are based on thin-film multilayer technology. This technology provides a level of control on the electrical and physical characteristics of the component which gives consistent characteristics within a lot and lot-to-lot. The original design provides small size, excellent high-frequency performance and rugged construction for reliable automatic assembly.

The AEC-Q200 Qualified Accu-L® Series is designed to meet the demanding performance specifications in automotive signal and power applications.

**APPLICATIONS**

- Vehicle to Vehicle Communications
- Infotainment
- Telematics
- GPS
- Radar
- Vehicle Locations Systems
- Keyless Entry
- Filters
- Matching Networks

**FEATURES**

- High Q
- RF Power Capability
- High SRF
- Low DC Resistance
- Ultra-Tight Inductance Tolerance
- Standard 0402 and 0805 Chip Sizes
- Low Profile
- Rugged Construction
- Taped and Reeled

Operating/Storage Temp. Range: -55°C to +125°C

**L0402 DIMENSIONS:** millimeters (inches)

**(Bottom View)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>1.00±0.10 (0.039±0.004)</td>
</tr>
<tr>
<td>W</td>
<td>0.58±0.07 (0.023±0.003)</td>
</tr>
<tr>
<td>T</td>
<td>0.35±0.10 (0.014±0.004)</td>
</tr>
<tr>
<td>A</td>
<td>0.48±0.05 (0.019±0.002)</td>
</tr>
<tr>
<td>B</td>
<td>0.17±0.05 (0.007±0.002)</td>
</tr>
<tr>
<td>S, H</td>
<td>0.064±0.05 (0.003±0.002)</td>
</tr>
</tbody>
</table>

**L0805 DIMENSIONS:** millimeters (inches)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>2.11±0.10 (0.083±0.004)</td>
</tr>
<tr>
<td>W</td>
<td>1.5±0.10 (0.059±0.004)</td>
</tr>
<tr>
<td>T</td>
<td>0.91±0.13 (0.036±0.005)</td>
</tr>
<tr>
<td>B</td>
<td>0.25±0.15 (0.010±0.006)</td>
</tr>
</tbody>
</table>
Accu-L® AEC-Q200 Qualified
High-Q RF Inductors - L0402 & L0805

HOW TO ORDER

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>0402</td>
<td>0805</td>
<td>4R7</td>
<td>4 = AEC-Q200 Qualified Accu-L®</td>
<td>S = Nickel/Sn100 Lead Free Solder coated (L0805)</td>
</tr>
</tbody>
</table>

TO ORDER

1. IDC measured for 15°C rise at 25°C ambient temperature
2. IDC measured for 70°C rise at 25°C ambient temperature
3. L, Q, SRF measured on HP 4291A, Boonton 34A and Wiltron 360 Vector Analyzer, RDC measured on Keithley 580 micro-ohmmeter.

**ELECTRICAL SPECIFICATIONS TABLE FOR ACCU-L® 0402**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>L (nH)</th>
<th>Q (Typ)</th>
<th>Q (Typ)</th>
<th>Q (Typ)</th>
<th>Q (Typ)</th>
<th>SRF min (MHz)</th>
<th>Rdc max (Ω)</th>
<th>Ioc max (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please contact factory for intermediate inductance values within the indicated range.

**ELECTRICAL SPECIFICATIONS TABLE FOR ACCU-L® 0805**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>L (nH)</th>
<th>Available Inductance</th>
<th>L (nH)</th>
<th>Available Inductance</th>
<th>L (nH)</th>
<th>Available Inductance</th>
<th>SRF min (MHz)</th>
<th>Rdc max (Ω)</th>
<th>∆T = 15°C</th>
<th>∆T = 70°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 MHz</td>
<td></td>
<td>60 ±0.05nH</td>
<td>92 ±0.1nH</td>
<td>1.2 ±0.05nH</td>
<td>1.2 ±0.1nH</td>
<td>1.2 ±0.2nH</td>
<td>1.2 ±0.5nH</td>
<td>10000</td>
<td>0.06</td>
<td>1000</td>
</tr>
<tr>
<td>900 MHz</td>
<td></td>
<td>60 ±0.05nH</td>
<td>92 ±0.1nH</td>
<td>1.2 ±0.05nH</td>
<td>1.2 ±0.1nH</td>
<td>1.2 ±0.2nH</td>
<td>1.2 ±0.5nH</td>
<td>10000</td>
<td>0.06</td>
<td>1000</td>
</tr>
<tr>
<td>1700 MHz</td>
<td></td>
<td>60 ±0.05nH</td>
<td>92 ±0.1nH</td>
<td>1.2 ±0.05nH</td>
<td>1.2 ±0.1nH</td>
<td>1.2 ±0.2nH</td>
<td>1.2 ±0.5nH</td>
<td>10000</td>
<td>0.06</td>
<td>1000</td>
</tr>
<tr>
<td>2400 MHz</td>
<td></td>
<td>60 ±0.05nH</td>
<td>92 ±0.1nH</td>
<td>1.2 ±0.05nH</td>
<td>1.2 ±0.1nH</td>
<td>1.2 ±0.2nH</td>
<td>1.2 ±0.5nH</td>
<td>10000</td>
<td>0.06</td>
<td>1000</td>
</tr>
</tbody>
</table>

(1) Ioc measured for 15°C rise at 25°C ambient temperature
(2) Ioc measured for 70°C rise at 25°C ambient temperature

L, Q, SRF measured on HP 4291A, Boonton 34A and Wiltron 360 Vector Analyzer, Rdc measured on Keithley 580 micro-ohmmeter.
**Accu-L® AEC-Q200 Qualified**
High-Q RF Inductors - L0402 & L0805

**Typical Inductance vs. Frequency**
L0805

Measured on HP4291A and Wiltron 360 Vector Analyzer

**Typical Q vs. Frequency**
L0805

Measured on HP4291A and Boonton 34A Coaxial Line

**Maximum Temperature Rise**
at 25°C ambient temperature (on FR-4)
L0805

Temperature rise will typically be no higher than shown by the graph
**FINAL QUALITY INSPECTION**

Finished parts are tested for electrical parameters and visual/mechanical characteristics. Parts are 100% tested for inductance at 450MHz. Parts are 100% tested for $R_{DC}$. Each production lot is evaluated on a sample basis for:

- $Q$ at test frequency
- Static Humidity Resistance: 85°C, 85% RH, 160 hours
- Endurance: 125°C, $I_R$, 4 hours

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**ENVIRONMENTAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITIONS</th>
<th>REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solderability</td>
<td>Components completely immersed in a solder bath at 235 ± 5°C for 2 secs.</td>
<td>Terminations to be well tinned. No visible damage.</td>
</tr>
<tr>
<td>Leach Resistance</td>
<td>Components completely immersed in a solder bath at 260 ±5°C for 60 secs.</td>
<td>Dissolution of termination faces ≤ 15% of area. Dissolution of termination edges ≤ 25% of length.</td>
</tr>
<tr>
<td>Storage</td>
<td>12 months minimum with components stored in “as received” packaging.</td>
<td>Good solderability</td>
</tr>
<tr>
<td>Shear</td>
<td>Components mounted to a substrate. A force of 5N applied normal to the line joining the terminations and in a line parallel to the substrate.</td>
<td>No visible damage</td>
</tr>
<tr>
<td>Rapid Change of Temperature</td>
<td>Components mounted to a substrate. 5 cycles -55°C to +125°C.</td>
<td>No visible damage</td>
</tr>
<tr>
<td>Bend Strength</td>
<td>Tested as shown in diagram</td>
<td>No visible damage</td>
</tr>
<tr>
<td>Temperature Coefficient of Inductance (TCL)</td>
<td>Component placed in environmental chamber -55°C to +125°C.</td>
<td>$\text{TCL} = \frac{L_2-L_1}{L_1 (T_2-T_1)} \cdot 10^6$ (typical) $T_1 = 25°C$</td>
</tr>
</tbody>
</table>

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HANDLING
SMD chips should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of plastic tipped tweezers or vacuum pick-ups is strongly recommended for individual components. Bulk handling should ensure that abrasion and mechanical shock are minimized. For automatic equipment, taped and reeled product is the ideal medium for direct presentation to the placement machine.

CIRCUIT BOARD TYPE
All flexible types of circuit boards may be used (e.g. FR-4, G-10) and also alumina.
For other circuit board materials, please consult factory.

COMPONENT PAD DESIGN
Component pads must be designed to achieve good joints and minimize component movement during soldering.
Pad designs are given below for both wave and reflow soldering.
The basis of these designs is:
  a. Pad width equal to component width. It is permissible to decrease this to as low as 85% of component width but it is not advisable to go below this.
  b. Pad overlap about 0.3mm.
  c. Pad extension about 0.3mm for reflow.
    Pad extension about 0.8mm for wave soldering.

REFLOW SOLDERING
DIMENSIONS: millimeters (inches)

<table>
<thead>
<tr>
<th>0402 Accu-L®</th>
<th>0805 Accu-L®</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 (0.028)</td>
<td>0.7 (0.028)</td>
</tr>
<tr>
<td>0.6 (0.024)</td>
<td>0.6 (0.024)</td>
</tr>
<tr>
<td>0.5 (0.019)</td>
<td>0.4 (0.015)</td>
</tr>
<tr>
<td>0.4 (0.015)</td>
<td>0.4 (0.015)</td>
</tr>
<tr>
<td>0.4 (0.015)</td>
<td>0.4 (0.015)</td>
</tr>
<tr>
<td>0.3 (0.012)</td>
<td>0.3 (0.012)</td>
</tr>
<tr>
<td>0.3 (0.012)</td>
<td>0.3 (0.012)</td>
</tr>
<tr>
<td>0.2 (0.008)</td>
<td>0.2 (0.008)</td>
</tr>
<tr>
<td>0.1 (0.004)</td>
<td>0.1 (0.004)</td>
</tr>
<tr>
<td>0.1 (0.004)</td>
<td>0.1 (0.004)</td>
</tr>
<tr>
<td>0.0 (0.000)</td>
<td>0.0 (0.000)</td>
</tr>
<tr>
<td>0.0 (0.000)</td>
<td>0.0 (0.000)</td>
</tr>
</tbody>
</table>

PREHEAT & SOLDERING
The rate of preheat in production should not exceed 4°C/second. It is recommended not to exceed 2°C/second. Temperature differential from preheat to soldering should not exceed 150°C.
For further specific application or process advice, please consult AVX.

HAND SOLDERING & REWORK
Hand soldering is permissible. Preheat of the PCB to 100°C is required. The most preferable technique is to use hot air soldering tools. Where a soldering iron is used, a temperature controlled model not exceeding 30 watts should be used and set to not more than 260°C. Maximum allowed time at temperature is 1 minute. When hand soldering, the base side (white side) must be soldered to the board.

COOLING
After soldering, the assembly should preferably be allowed to cool naturally. In the event of assisted cooling, similar conditions to those recommended for preheating should be used.

CLEANING RECOMMENDATIONS
Care should be taken to ensure that the devices are thoroughly cleaned of flux residues, especially the space beneath the device. Such residues may otherwise become conductive and effectively offer a lossy bypass to the device. Various recommended cleaning conditions (which must be optimized for the flux system being used) are as follows:
- Cleaning liquids . . . . . . i-propanol, ethanol, acetacete-
  tone, water, and other standard PCB cleaning liquids.
- Ultrasonic conditions . . power – 20w/liter max.
  frequency – 20kHz to 45kHz.
- Temperature . . . . . . 80°C maximum (if not otherwise
  limited by chosen solvent system).
- Time . . . . . . . . . . . 5 minutes max.

STORAGE CONDITIONS
Recommended storage conditions for Accu-L® prior to use are as follows:
  Temperature . . . . . . 15°C to 35°C
  Humidity . . . . . . ≤65%
  Air Pressure . . . . . . 860mbar to 1060mbar

RECOMMENDED SOLDERING PROFILE