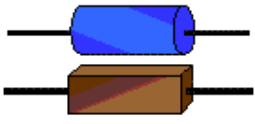
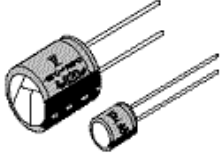
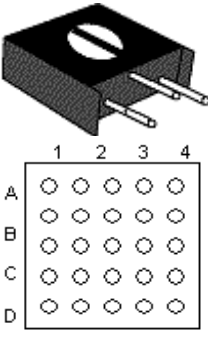
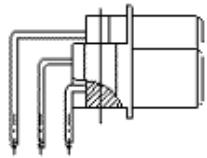
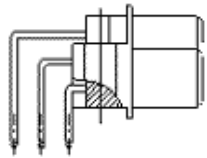
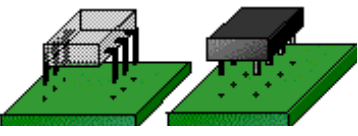
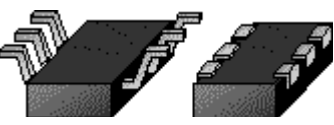

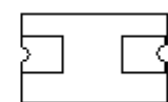
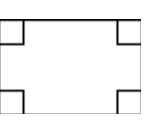

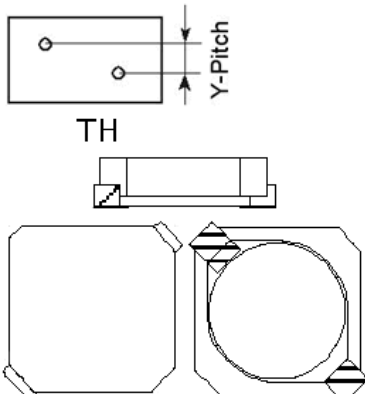
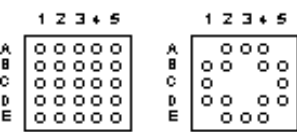
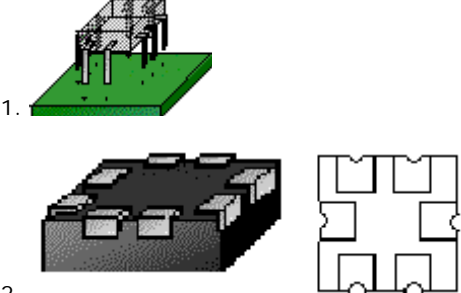
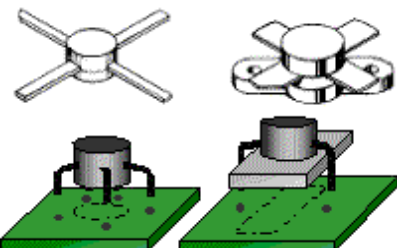
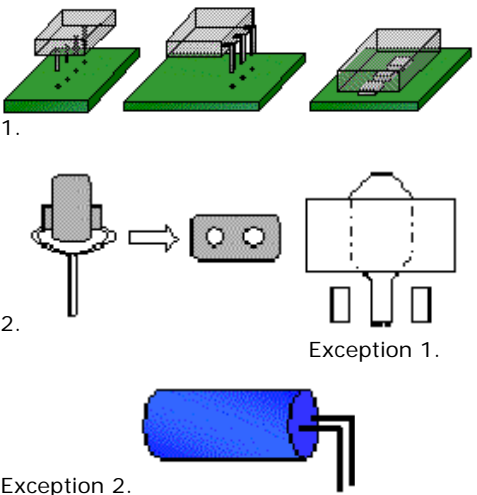
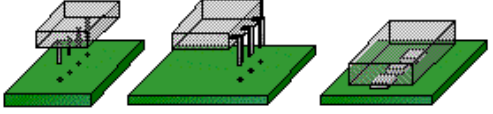
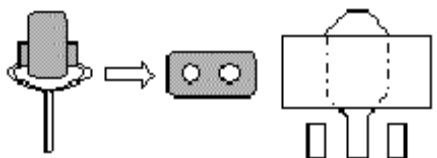


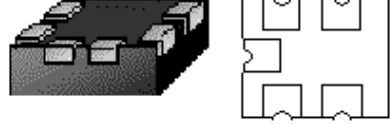
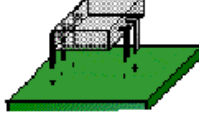
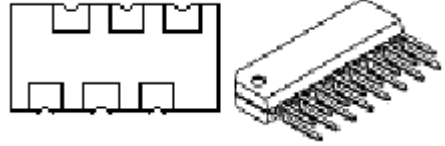


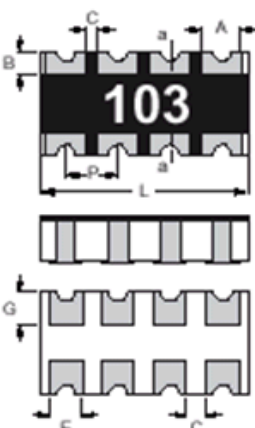
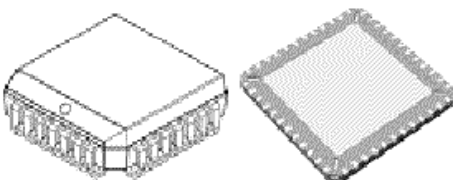
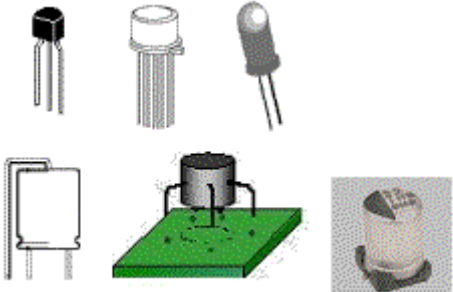
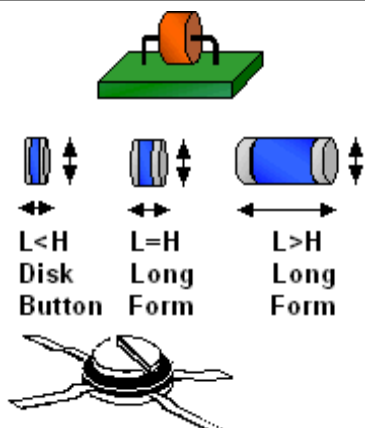
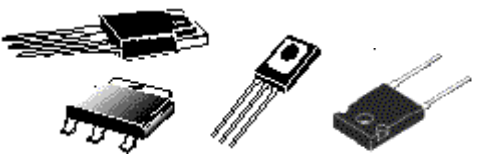
## POSITION TYPES

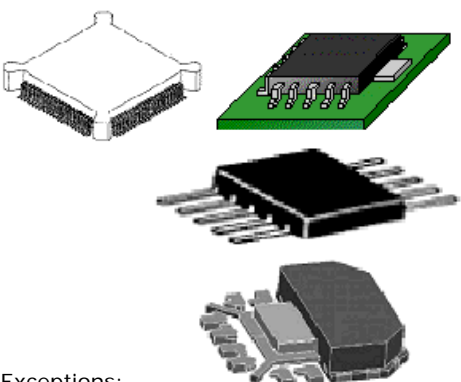
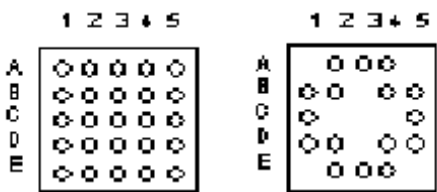
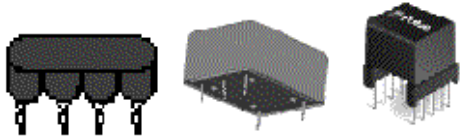
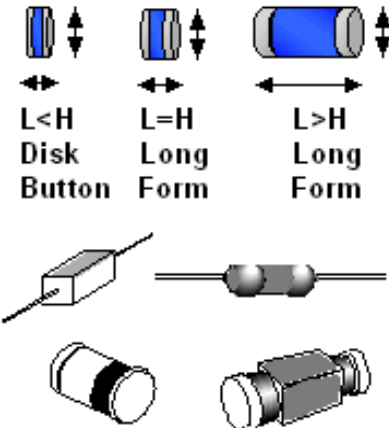
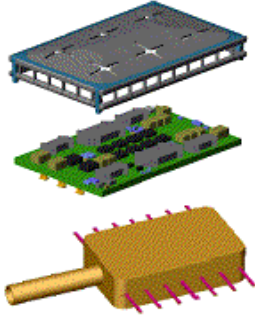
Code - Position	Definition / Characteristics	Sample
<b>A-Axiaal</b>	Through-Hole pins. Pins emerge from two opposite sides of an elongated component through the main axis.	
<b>B-Bottom</b>	<p>1. Terminals extending from the bottom of a cylindrical or multisided package (more than 4 sides), facing the board at the point of exit from the body.</p> <p>2. Terminals extending from or attached to the bottom of the body, facing the board at the point of exit from the body, and not ordered in any of the above configurations.</p> <p>3. SMT Butts or Balls arranged in a matrix configuration.</p> <p><b>Exception:</b> Right-angle components with more than 3 rows of terminals would have the same Position definition as their straight version, therefore, if the terminals extend from the bottom of the package, the Position is 'Bottom'.</p>	<p>1. </p> <p>2. </p> <p>3. </p> <p>Exception: </p>
<b>D-Dual</b>	<p>1. Two or more terminals extending from two opposite sides of the body.</p> <p>2. Two or more terminals facing two opposite sides at their exit point from the body, and creating two parallel rows on the board.</p> <p>3. More than two terminals located on the bottom of the body, creating two parallel rows on the board.</p> <p>4. Two SMT terminals located on the bottom of the body, so that the extremity of the terminals is the same as the body's extremity.</p> <p>5. Two SMT terminals located on the bottom of the body, so that the projection of the terminals protrudes from the projection of the body in two opposite directions.</p> <p><b>Exception:</b> The position for the component shown in the sample on the right would be defined as 'Dual'.</p>	<p>1. </p> <p>2. </p> <p>3. </p> <p>4. </p> <p>5. </p>
<b>E-End</b>	SMT Leads. Leads act as a cover, wrapping an entire side, or are attached to the side of a cylindrical body.	

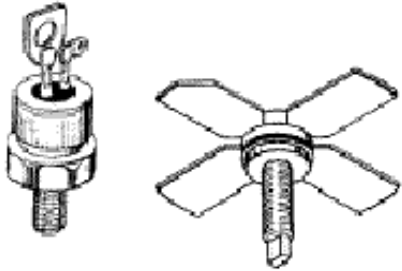
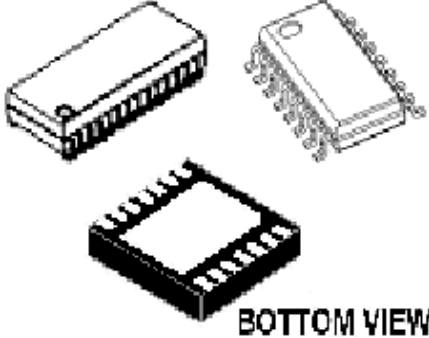



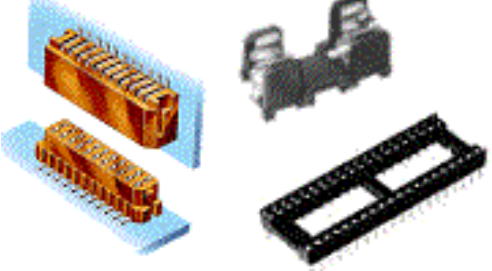
Code - Position	Definition / Characteristics	Sample
<b>G-Diagonal</b>	A 2-pin component with pins on diagonal of the body.	
<b>P-Perpendicular</b>	Through-Hole pins organized in a matrix pattern. Rows and columns are enumerated separately. Any number of pins can be omitted from the matrix.	
<b>Q-Quad</b>	<p>1. Terminals attached to four different sides of the package body, extending in four different directions.</p> <p>2. SMT terminals located on the bottom of the body, so that the extremity of the terminals is the same as, or exceeds, the extremity of the body (on four sides).</p> <p><b>Note:</b> The directions in which the terminals point must be perpendicular to one another.</p>	
<b>R-Radial</b>	A cylindrical or multisided (more than 4 sides) component, in which terminals extend from the circumference of the body on a single horizontal plane.	
<b>S-Single</b>	<p>1. Two or more terminals extending from one side (or from the bottom) of the body, aligned on the board in single row, and parallel to one of the edges of the body.</p> <p>2. Two or more terminals extending from two opposite sides of a box-shaped body, and bending underneath the body to form a single row parallel to one of the edges of the body.</p> <p><b>Note:</b> These definitions do not apply to cylindrical components.</p> <p><b>Exception 1:</b> The position for SOT-89 packages is defined as 'Single'.</p> <p><b>Exception 2:</b> The position for cylindrical component mounted on the board as shown, is defined as 'Single'.</p>	

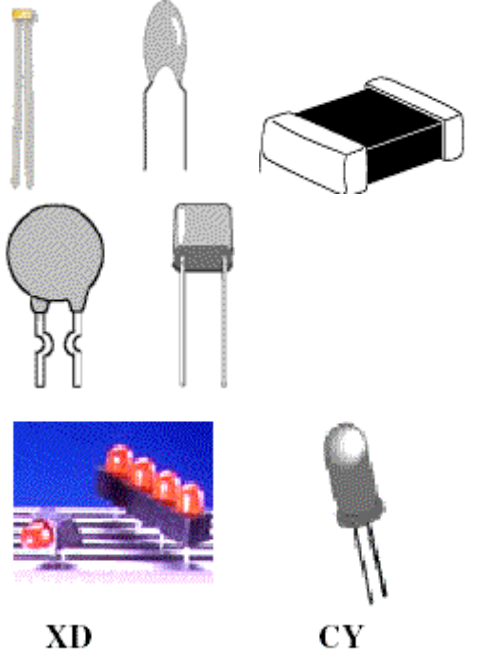
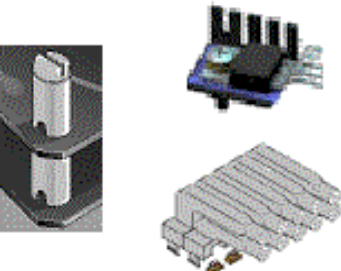
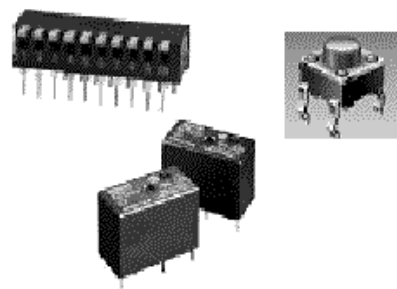
Code - Position	Definition / Characteristics	Sample
<b>S-Single</b>	<p>1. Two or more terminals extending from one side (or from the bottom) of the body, aligned on the board in single row, and parallel to one of the edges of the body.</p> <p>2. Two or more terminals extending from two opposite sides of a box-shaped body, and bending underneath the body to form a single row parallel to one of the edges of the body.</p> <p><b>Note:</b> These definitions do not apply to cylindrical components.</p> <p><b>Exception 1:</b> The position for SOT-89 packages is defined as 'Single'.</p> <p><b>Exception 2:</b> The position for cylindrical component mounted on the board as shown, is defined as 'Single'.</p>	<p>1.</p>  <p>2.</p>  <p>Exception 1.</p>  <p>Exception 2.</p>
<b>T-Triple</b>	<p>1. Terminals attached to three different sides of the package body, extending in three different directions.</p> <p>2. SMT terminals located on the bottom of the body, so that the extremity of the terminals is the same as, or exceeds. The extremity of the body (on three sides).</p> <p><b>Note:</b> The directions in which the terminals point must be perpendicular to one another.</p>	<p>1.</p>  <p>2.</p> 
<b>U-Upper</b>		
<b>X-Other</b>	Terminal configuration does not conform to any of the above descriptions.	
<b>Z-Zig Zag</b>	Terminals are arranged on the board in a staggered configuration.	 

## PACKAGE TYPES


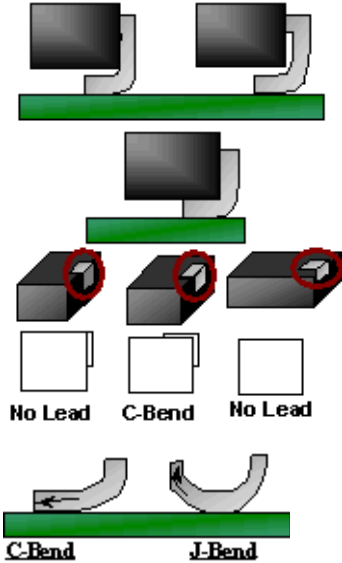
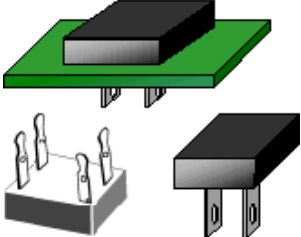
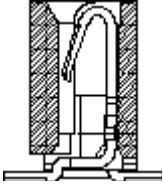


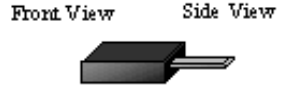
Code - Package Type	Definition / Characteristics	Sample
<b>AT-Array Type</b>	Arrays (such as resistor arrays) and other components that have smt leads and do not belong to any of the other package types.	
<b>CC-Chip Carrier</b>	<ul style="list-style-type: none"> <li>• Square or rectangular body.</li> <li>• Terminals extending from three or four sides of the body and located around the body.</li> <li>• Terminals do not point away from the body (i.e. a component with Gull-Wing leads is not defined as a 'Chip Carrier').</li> </ul>	
<b>CY-Cylindrical</b>	<p>Cylindrical or Can</p> <ul style="list-style-type: none"> <li>• Package body is a cylinder or a trimmed cylinder.</li> <li>• Terminals can extend from any side of the component, including top and bottom (any number of terminals).</li> <li>• Cylindrical components are mounted vertically.</li> </ul>	
<b>DB-Disk Button</b>	<ul style="list-style-type: none"> <li>• A Disk-shaped component.</li> <li>• Package body can be round or multi-sided.</li> <li>• The length of the body is less than the diameter of the section of the body.</li> <li>• For SMT components, terminals extend from the perimeter of the body in a radial configuration. The cylindrical body is mounted so that the cross-section of the body is parallel to the board.</li> </ul>	
<b>FM-Flange Mount</b>	<ul style="list-style-type: none"> <li>• Components that have an integral plate that serves as a heat sink or an anchor.</li> <li>• Components that have an anchoring hole, even if there is no heat sink.</li> </ul>	

Code - Package Type	Definition / Characteristics	Sample
<b>FP-Flat Pack</b>	<ul style="list-style-type: none"> <li>• Square or rectangular body (with optional bumpers).</li> <li>• Terminals extending from three or four sides of the body, pointing away from the body.</li> </ul> <p><b>Exception 1:</b> Components with terminals on only two sides of the body would be considered as FlatPacks only if their Lead Form is 'Flat'.</p> <p><b>Exception 2:</b> QFN components are considered as FlatPacks.</p>	 <p>Exceptions:</p>
<b>GA-Grid Array</b>	<ul style="list-style-type: none"> <li>• Square or rectangular body.</li> <li>• Terminals are attached to or extend from the bottom of the body.</li> <li>• Terminals arranged in a matrix configuration, or as two matrices entwined in a staggered configuration.</li> <li>• Any number of terminals can be omitted from the matrix.</li> </ul>	
<b>IP-In-Line</b>	<p>(DIP, SIP, ZIP)</p> <ul style="list-style-type: none"> <li>• A Through-Hole component.</li> <li>• Package body is caseshaped, with possible stand-offs or bumps.</li> <li>• Component has more than two pins.</li> </ul>	
<b>LF-Long Form</b>	<ul style="list-style-type: none"> <li>• Component body is shaped like a cylinder, or a case, or a combination of both.</li> <li>• Terminals are either attached to both ends of the component, or extend from the ends of the component through the main axis of the body.</li> </ul>	
<b>MA-Micro Assembly</b>	<ul style="list-style-type: none"> <li>• An assembly of various microcircuits.</li> <li>• For all purposes, considered as a single, indivisible component.</li> <li>• Components supplied in a closed package would be considered as Micro Assembly if they are one of the following: <ul style="list-style-type: none"> <li>○ DC-DC or AC-DC converter</li> <li>○ Power supply</li> <li>○ Fiber optic module</li> </ul> </li> </ul>	

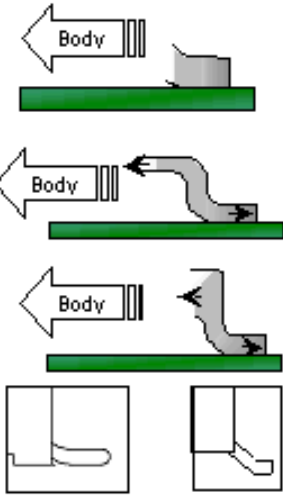
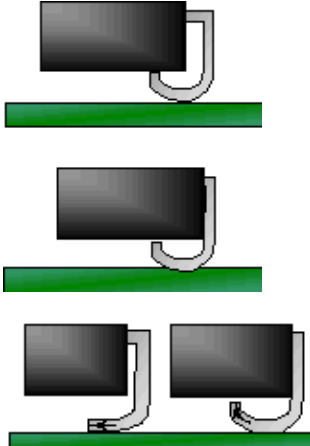

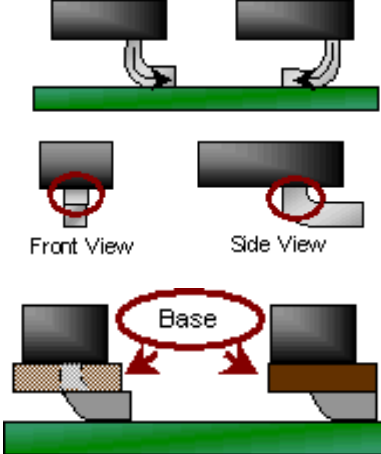
Code - Package Type	Definition / Characteristics	Sample
<b>PM-Post Mount</b>	<ul style="list-style-type: none"> <li>• Component is attached to the board using a threaded stud, threaded hole, or a mounting post.</li> <li>• Component has Non- Board terminals of various shapes, or flat leads extending from perimeter of the body.</li> </ul>	
<b>SO-Small Outline</b>	<ul style="list-style-type: none"> <li>• Square or rectangular body.</li> <li>• Terminals are only attached to or extending from two opposite sides of the body.</li> <li>• Square/Rectangular packages with 'No-Lead' terminals attached to two opposite edges on the same side.</li> <li>• Standoffs are allowed, however, if the terminals extend from the standoff rather than from the body, the package does not qualify as Small Outline.</li> <li>• Components with various protrusions or dents qualify as Small Outline.</li> </ul> <p><b>Exception:</b> SOT-89 components are regarded as Small Outline.</p>	 <p><b>BOTTOM VIEW</b></p> <p>Small Outline with standoffs:</p>  <p>Not Small Outline:</p>  <p>With protrusions or dents:</p> 
<b>XC-Connector</b>	<p>A component that connects between the PCB and another component/PCB, transferring electrical signals or current.</p>	

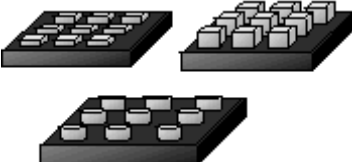
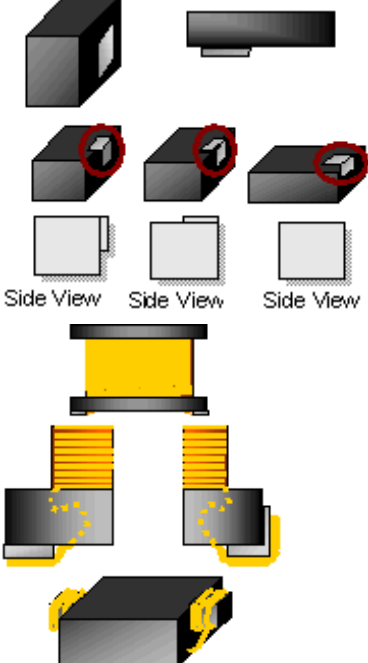
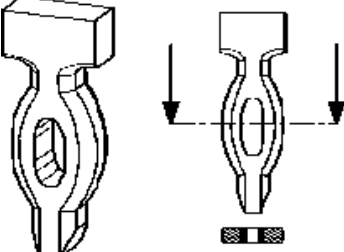
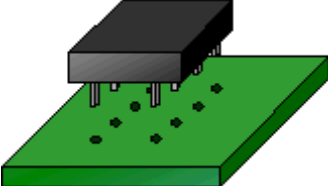
Code - Package Type	Definition / Characteristics	Sample
<b>XD-Discrete</b>	<p>An electrical component with two terminals, which does not match any of the above definitions.</p> <p>It should be one of the following types:</p> <ul style="list-style-type: none"> <li>• Capacitor</li> <li>• Crystal/Oscillator</li> <li>• Diode</li> <li>• Filter</li> <li>• Fuse</li> <li>• Inductor</li> <li>• Jumper</li> <li>• Potentiometer</li> <li>• Resistor</li> <li>• Transformer</li> <li>• Transistor</li> </ul> <p><b>Exception:</b> LED and LED array component would be defined as XD, regardless of the number of terminals, except for cylindrical components which would still be defined as 'CY'.</p>	
<b>XH-Hardware</b>	<ul style="list-style-type: none"> <li>• A component used solely for performing auxiliary activities such as heat or light conduction, support, anchoring, etc.</li> <li>• The component has no electrical activity unless otherwise specified.</li> </ul>	
<b>XS-Switch</b>	<ul style="list-style-type: none"> <li>• A component that opens and closes the flow of current in an electrical circuit.</li> <li>• Relays are also regarded as switches.</li> </ul>	
<b>XX-Other</b>	Package does not match any of the above categories.	

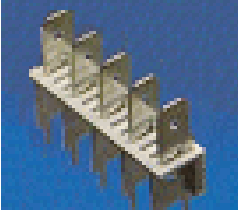
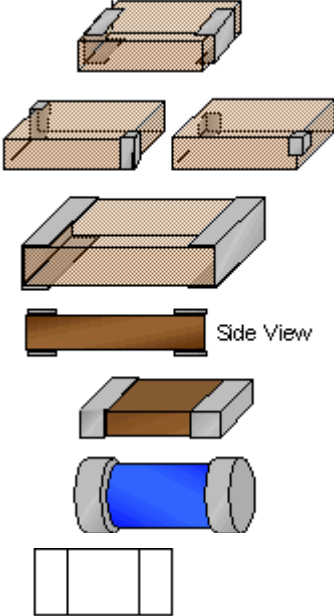

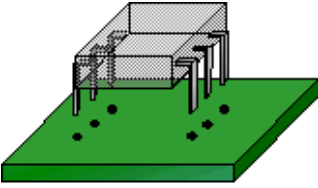
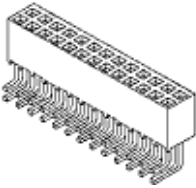
## LEAD FORMS

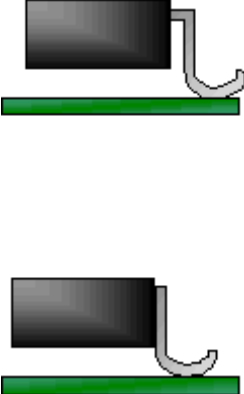

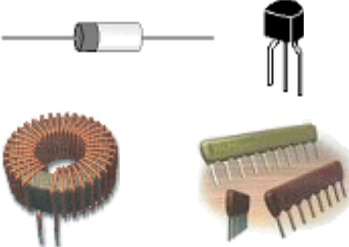
Code - Lead Form	Definition / Characteristics	Sample
<b>B-Ball</b>	SMT Terminals shaped as spheres or balls, attached to the bottom of the body, arranged in a matrix configuration.	
<b>C-C-Bend</b>	<ul style="list-style-type: none"> <li>SMT Terminals extending from the sides of the body, bending down towards the board. Slightly above the board, the terminals bend back towards the body, forming a flat contact area with the board.</li> <li>A C-Bend terminal can come in contact with the body of the package not only at the point of extension from the body, but also during the remainder of its path.</li> <li>A contact surface bent around the edge of the body, protruding beyond the extremities of the body on two sides.</li> </ul> <p>Differs from J-Bend terminals in that the lower part of a C-Bend terminal is flat and not rounded.</p>	 <p>No Lead   C-Bend   No Lead</p> <p>C-Bend   J-Bend</p>
<b>D-Solder Lug</b>	Lug terminals extending from the side of the body (can be Through-Hole, or Non-Board).	
<b>E-Mixed SMT</b>	The component has several kinds of SMT lead: GullWing, L-Bend, etc.	
<b>F-Flat</b>	Flat SMT terminals extending from the sides of the body, pointing away from the body or closely attached to the bottom of the body so that there is no visible bend towards the bottom of the body (unlike L-Bend terminals).	 <p>Front View   Side View</p>  <p>Front View   Side View</p>  <p>Front View   Side View</p>



Code - Lead Form	Definition / Characteristics	Sample
<b>G-Gull-Wing</b>	<ul style="list-style-type: none"> <li>An SMT terminal whose flat end is in contact with the board, bends upwards from the board and then again towards the body.</li> <li>A terminal extending from the side or bottom edge of the package.</li> </ul>	
<b>I-Insulated</b>	<p>According to JESD30-B, a flat lead formed by depositing a thin conductor onto a supporting insulating film.</p>	
<b>J-J-Bend</b>	<ul style="list-style-type: none"> <li>SMT Terminals extending from the sides of the body, bending down towards the board. Slightly above the board, the terminals curve back towards the body, forming a 'J' shaped terminal.</li> <li>A J-Bend terminal can come in contact with the body of the package not only at the point of extension from the body, but also during the remainder of its path.</li> </ul> <p>A C-Bend terminal (on the left) differs from a J-Bend terminal in that the lower part of a C-Bend terminal is flat and not rounded.</p>	
<b>K-Mixed TH</b>	<p>Components with several kinds of TH leads (for example, Through hole and Pin or Peg)</p>	
<b>L-L-Bend</b>	<ul style="list-style-type: none"> <li>SMT terminals extending from the bottom of the body and bending sideways to form an L.</li> <li>Terminals can bend in any horizontal direction.</li> <li>A visible gap must exist between the horizontal section of the terminal and the bottom of the body.</li> <li>The component might be mounted on a base with the terminals extending from the bottom of the body, passing through the base and bending to the side.</li> </ul>	

Code - Lead Form	Definition / Characteristics	Sample
<b>M-Column</b>	SMT Terminals shaped as square, rectangular or cylindrical columns, arranged in a matrix.	
<b>N-No Lead</b>	<ul style="list-style-type: none"> <li>• An SMT contact surface located on one side of the body.</li> <li>• An SMT contact surface bent around the edge of the body, possibly protruding beyond the extremities of the body on one side only. (Protrusions on two sides indicate a 'C-Bend' lead).</li> <li>• The component might have the electrical contact between the component and the board achieved through the end of a wire attached to a contact surface, as shown.</li> </ul>	
<b>O-Press-Fit</b>	Press fit	
<b>P-Pin or Peg</b>	<p>Reinforced pins extending from the bottom of the package and soldered into a drilled hole in the board. These can only be defined for the following types of components</p> <ul style="list-style-type: none"> <li>• FM - Flange Mount</li> <li>• GA - Grid Array</li> <li>• IP - Inline Package (except for SIP packages)</li> <li>• XC - Connector</li> <li>• XS - Switch</li> <li>• XH - Hardware</li> <li>• MA - Micro Assembly</li> </ul> <p>For other types of components, pins mounted in Through-Hole technology are defined as 'Wire'.</p>	

Code - Lead Form	Definition / Characteristics	Sample
<b>Q-Quick Connect</b>	According to JESD30-B, a tablike terminal extending from the body of the package.	
<b>R-Wraparound</b>	<ul style="list-style-type: none"> <li>• SMT terminals bent around three sides of a component.</li> <li>• SMT terminals wrapped around an entire end of the body.</li> <li>• SMT terminals attached to the end of the body, where the cross section of the terminal is greater than or equal to the cross section of the body.</li> <li>• Terminals cannot be defined as Wraparound based only on one point of view.</li> </ul>	 <p>Side View</p> <p>Top (or bottom) view</p>
<b>S-S-Bend</b>	SMT terminals attached to the bottom of the board, shaped like the letter 'S' or its mirror image.	
<b>T-Through hole</b>	<ul style="list-style-type: none"> <li>• Reinforced pins extending from the side of the body and soldered into a drilled hole in the board.</li> <li>• Through-Hole pins extending horizontally from the body, and bending down towards the board.</li> </ul> <p>These can only be defined for the following types of components:</p> <ul style="list-style-type: none"> <li>• FM - Flange Mount</li> <li>• IP - Inline Package</li> <li>• XC - Connector</li> <li>• XS - Switch</li> <li>• XH - Hardware</li> <li>• MA - Micro Assembly</li> </ul> <p>For other types of components, pins mounted in Through-Hole technology are defined as 'Wire' or 'Pin-or-Peg'.</p> <p>For right-angle components, the lead form should be defined as 'Pin-or-Peg' (to maintain consistency with the straight version of those components).</p>	 

Code - Lead Form	Definition / Characteristics	Sample
<b>U-J-inverted</b>	<ul style="list-style-type: none"> <li>SMT Terminals extending from the sides of the body, bending down towards the board. Slightly above the board, the terminals curve away from the body, forming an inverted 'J' shape.</li> <li>A U-Bend terminal can come in contact with the body of the package not only at the point of extension from the body, but also during the remainder of its path.</li> </ul>	
<b>V-Mixed technology</b>	Components with several smt and TH or Press-fit leads (for example, Through hole and Gull-Wing).	
<b>W-Wire</b>	<ul style="list-style-type: none"> <li>Non-Reinforced leads that can be formed into various shapes, according to the method of assembly.</li> <li>Terminals that are part of a wire wrapped around a component body.</li> <li>The terminals for SIP components</li> </ul>	
<b>X-Other</b>	Terminals that do not match any of the above categories.	
<b>Y-Screw</b>	A threaded bolt or hole that is an integral part of the component.	