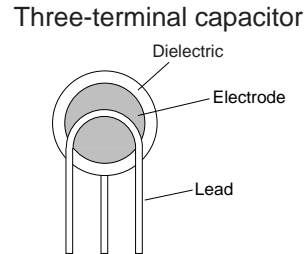
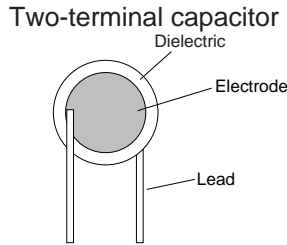


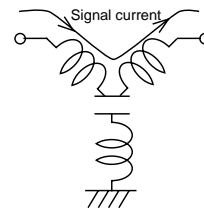
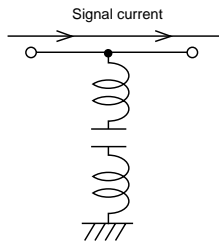
3. Noise Suppression by Low-pass Filters
3.7. Improvement of High-frequency Characteristic

Three-terminal Capacitor Structure

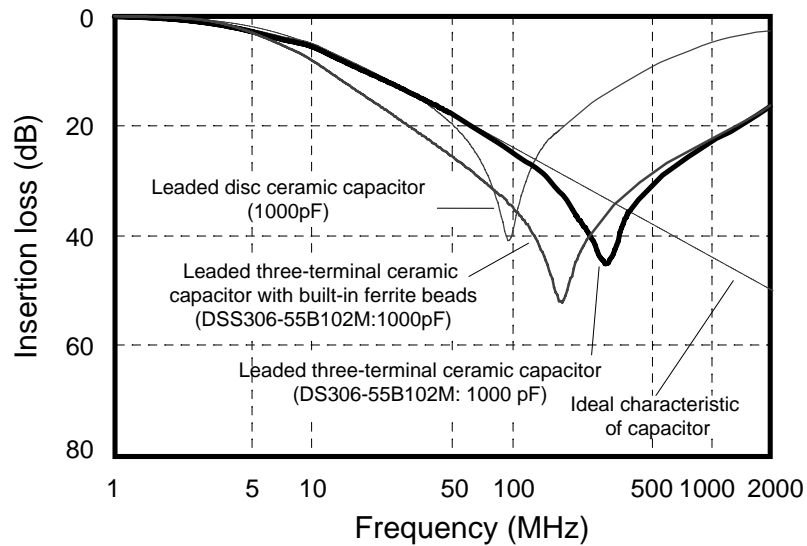
(a) Structure of capacitors



(b) Equivalent circuit with considerations for ESL



(c) Improvement results in insertion loss characteristic



With leaded two-terminal capacitors, the residual inductance is larger because the lead wires work as inductors.

[Notes]

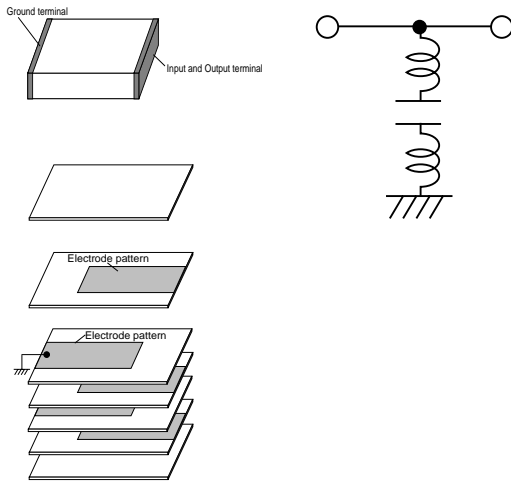
By making the three terminal structure, the residual inductance in series with capacitance becomes lower. Therefore, the insertion loss is better than two-terminal capacitors.

3. Noise Suppression by Low-pass Filters
 3.7. Improvement in High-frequency Characteristic of Capacitors

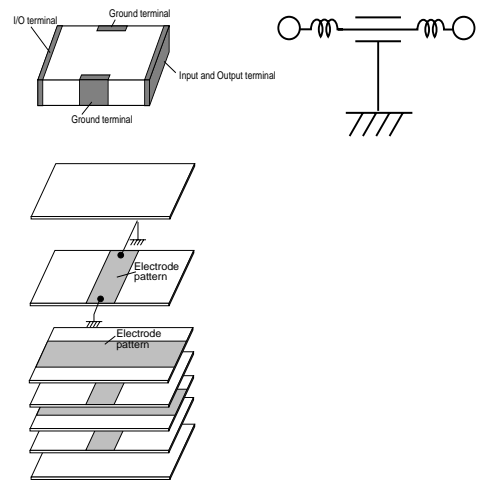
Chip Type Three-terminal Capacitors

(a) Structure of capacitors

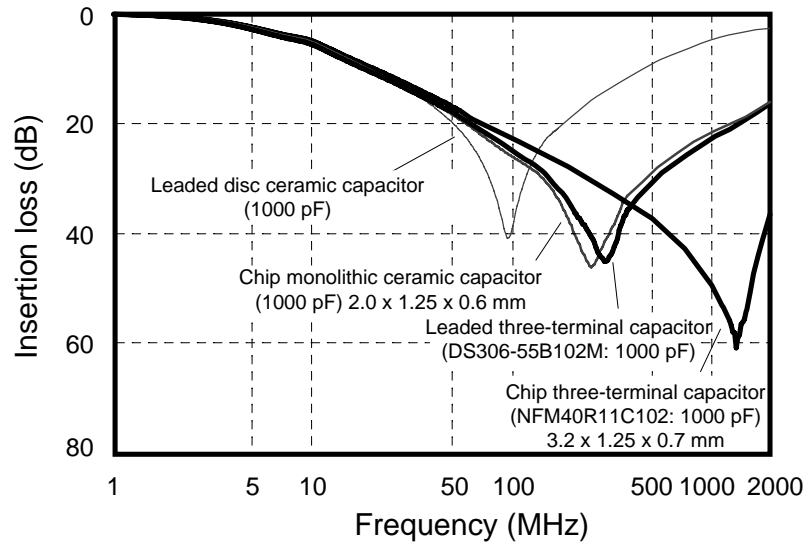
Chip two-terminal capacitor



Chip three-terminal capacitor



(b) Improvement results of insertion loss characteristic



The structural model of the chip three-terminal capacitor is shown above. An electrode pattern is printed on each dielectric sheet. Input and output terminals are provided on both ends and are connected using the electrode pattern. This structure allows the signal current to pass through the capacitor. The residual inductance on the ground terminal is reduced with ground terminals on both sides. This structure makes an extremely low residual inductance, which provides a higher self-resonance frequency.

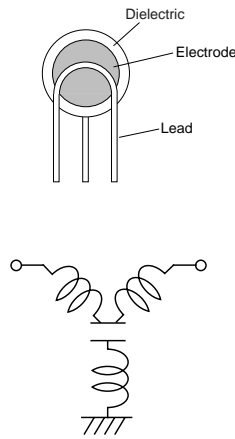
[Notes]

3. Noise Suppression by Low-pass Filters
3.7. Improvement in High-frequency Characteristic of Capacitors

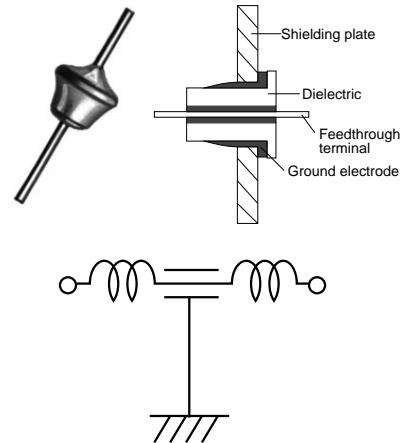
Feedthrough Capacitors

(a) Structure of capacitors

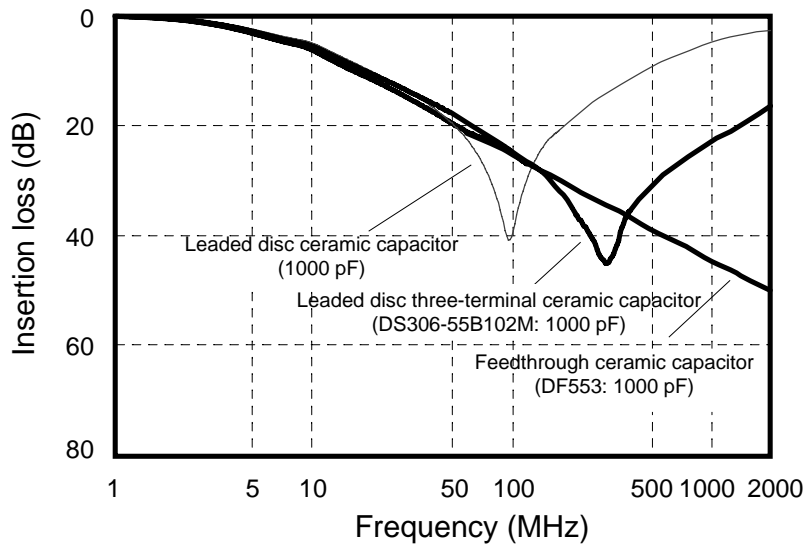
Three-terminal capacitor



Feedthrough capacitor



(b) Improvement results of insertion loss characteristic



Feedthrough capacitors have a structure in which the ground electrode surrounds the dielectric and the signal terminal goes through the dielectric. Feedthrough capacitors are used by making a mounting hole in the shielding case and soldering the ground electrode directly to the shielding case (plate). Since this type of capacitor has no residual inductance on the ground terminal side as well as on the signal terminal side, it can provide nearly ideal insertion loss characteristics.

[Notes]