Difference between resonator and filter

Resonator (One-port SAW resonator)

A SAW resonator or one-port SAW resonator is shown in Fig. 1. One-port SAW resonator is composed of an interdigital transducer (IDT) and end reflection gratings or reflectors. The equivalent circuit is shown in Fig. 2. This equivalent circuit is similar to the equivalent circuit for conventional quartz crystal resonators. One-port SAW resonators are very similar to crystal resonators, from the electrical view point. Consequently, oscillators are constructed with the same type of crystal oscillator circuits. Basically, one-port SAW resonator is an impedance element device and one-port SAW resonator should act as good reactors in the oscillator circuits.

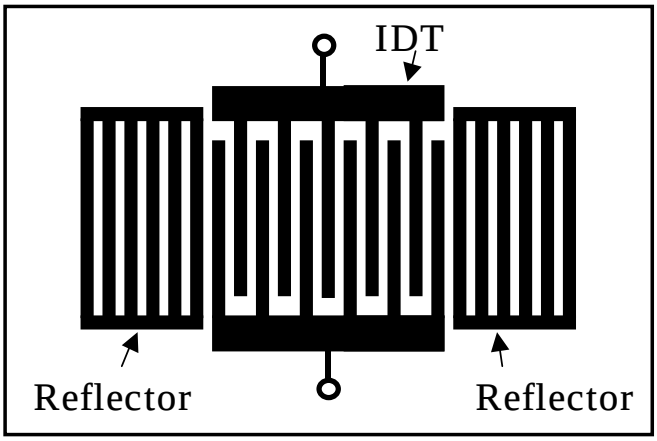

Fig. 1 SAW resonator or one-port SAW resonator.

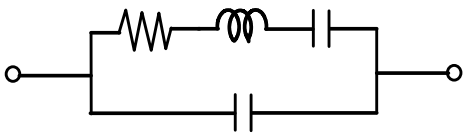

Fig. 2 Equivalent circuit for one-port SAW resonator.

Filter (Two-port SAW resonator)

SAW filter or two-port SAW resonator is shown in Fig. 3. Two-port SAW resonator is composed of input IDT, output IDT and end reflection gratings. Since two-port SAW resonator shows a band-pass frequency response with a

low insertion loss and a very narrow bandwidth, two-port SAW resonators are electrically treated as narrow bandwidth filters. Then two-port SAW resonator is called as two-port SAW resonator filter, SAW filter or SAW delay line. The narrow bandwidth filter can provide a high-performance feedback-loop type oscillator.

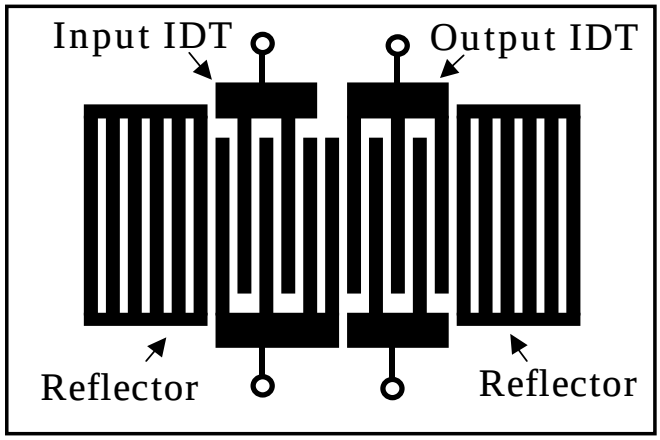

Fig. 3 SAW filter, Two-port SAW resonator or SAW delay line.

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Hiromi Yatsuda