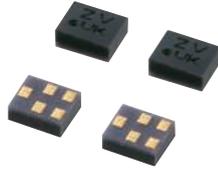




## Piezoelectric components

### Surface acoustic wave (SAW) filters

(New segment of net sales classification: High frequency devices and communications modules)



SAW filter is a filter that can pick out electric signals in a particular frequency band, using the surface acoustic wave that propagates along the surface of the piezoelectric substrate. Ensuring smooth wireless communication between devices requires high-functioning filters that can let through electric signals in a particular frequency band without loss, while eliminating noises of unnecessary frequency bands. There are many types of filters, but the SAW filters that Murata produces can achieve high attenuation, low insertion loss, and small size, so they are most suited for use for smartphones.

Nowadays with the spread of IoT devices other than smartphones, the wireless communications function is added to various applications. The required frequency bands vary for Cellular, Wi-Fi®, Bluetooth®, GPS, etc., and demand for filters has been increasing along with the increased popularity of smartphones. In addition, due to the introduction of 5G, the combinations of frequency bands are becoming more complex and the use of frequency bands below 6 GHz is increasing. These only lead to greater demands for higher frequency and smaller filters with superior composite performance. Murata strives to expand the business with SAW filters by responding to such demands in a timely manner.

Murata has led the industry for a long time with an R&D structure that can create unique technologies, production capability to accommodate demand from many customers, quality control that ensures the supply of reliable products and distribution channels that seamlessly support the entire world. At present, Murata holds the largest production capacity in the industry, and has secured a global share of 50% of the SAW filter market for communications applications.

In order to respond to the new market needs and realize customer satisfaction, Murata will accelerate efforts to create composite products that are compact and with superior features by utilizing proprietary I.H.P. technologies, TC-SAW technologies based on our accurate understanding of customer requirements, while working to strengthen alliances in new technologies. Murata aims to contribute to the development of society and industry by working to differentiate our future product line-up from those of competitors, striving to maintain or build optimum supply structures corresponding to supply-demand balances amid a wildly fluctuating economy.

#### Business opportunities

- Emergence and expansion of new applications and communication devices for 5G
- Addition of wireless communications functions to IoT devices
- Increasing demand for higher frequency and smaller filters with superior composite performance

#### Competitors

TAIYO YUDEN (Japan), Qualcomm (U.S.), Qorvo (U.S.), Wisol (South Korea), Shoulder (China), etc.

#### Strengths

- Extensive product lineup/High market share
- Superior characteristics (high frequency/broadband/high attenuation/low insertion loss/small size)
- Reliable quality
- Largest production capacity in the industry and reliable supply capability

#### Risks

- Potential moves by customers and component suppliers due to changes in U.S.-China relations
- Intensified competition with other manufacturers and entry by low-cost manufacturers into the SAW filter market