

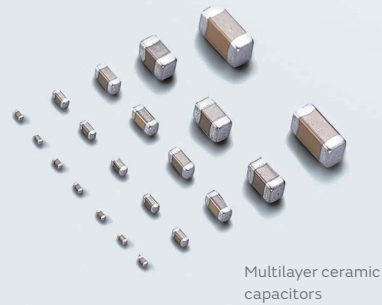
History of value provision

The evolution of electronics has been enriching people's lives and realizing various dreams.

Murata has contributed to the evolution of products and the expansion of the electronics market by foreseeing the future and tenaciously refining its technologies under the motto, "good electronic equipment starts with good electronic components and good electronic components start with good materials."

TOPICS

Compared to mobile phones used in the 1990s, the thickness, volume, and weight of smartphones used in 2017 are 1/3, 1/2.5, and 1/2, respectively; however, the number of components used has tripled. Murata has supported the evolution of smartphones, which have become lighter, thinner, and more functional, by realizing further miniaturization, increased functionality, and high-density mounting of components. Representative products include multilayer ceramic capacitors and inductors for high-frequency circuits. Murata has also developed communication modules that combine multiple components in anticipation of the trend toward space-saving and multi-functionalization.



Multilayer ceramic capacitors

1940s

Establishment
The spread of communications equipment after the start of commercial radio broadcasting

- 1944 Murata Manufacturing Co., Ltd. founded
- 1949 Japan's first mass production of temperature compensation type barium titanate ceramic capacitors for radios



Barium titanate ceramic capacitor

1950s

Emergence of the transistor radio
Beginning of the miniaturization and weight reduction of equipment

- 1950 Murata Manufacturing Co., Ltd. established
- 1953 Began manufacturing ceramic disc capacitors
- 1955-56 Established Murata Technology Research Laboratory Co. and moved thereto
- 1959 Launch of ceramic semiconductors PTC thermistors



PTC thermistors "POSISTOR"

1960s

Launch of color television broadcasting and increased demand for electronic components as the Tokyo Olympics drove economic growth

- 1962 Commercialization of ceramic filters for communications equipment
- 1966 Launch of multilayer ceramic capacitors
- 1967-69 Establishment of a mass production system for multilayer ceramic capacitors

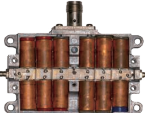


Multilayer ceramic capacitors

1970s-1980s

Emergence of car phones, mobile music players with stereo headphones, and CDs
Contributing to making information personal and portable

- 1975 Launch of GIGAFIL dielectric microwave filter
- 1977 Commercialization of ceramic resonator CERALOCK
- Around 1986 Commercialization of chip ferrite beads
- 1989 Commercialization of multilayer LC filters



GIGAFIL dielectric for microwave filters

1990s-2000s

Arrival of the age of the Internet owing to the miniaturization of mobile phones and the spread of personal computers

- Around 1997 Commercialization of SWITCHPLEXER
- Around 2000 Commercialization of Bluetooth® modules
- 2004 Development of multilayer ceramic capacitor in 0402 (0.4×0.2mm) size
- 2005 Commercialization of MEMS gyro sensors

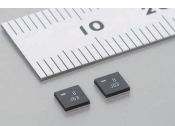
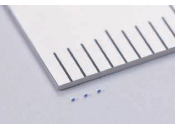


Bluetooth® modules

2010s

Multi-functionalization of smartphones
Changes in the way we communicate.

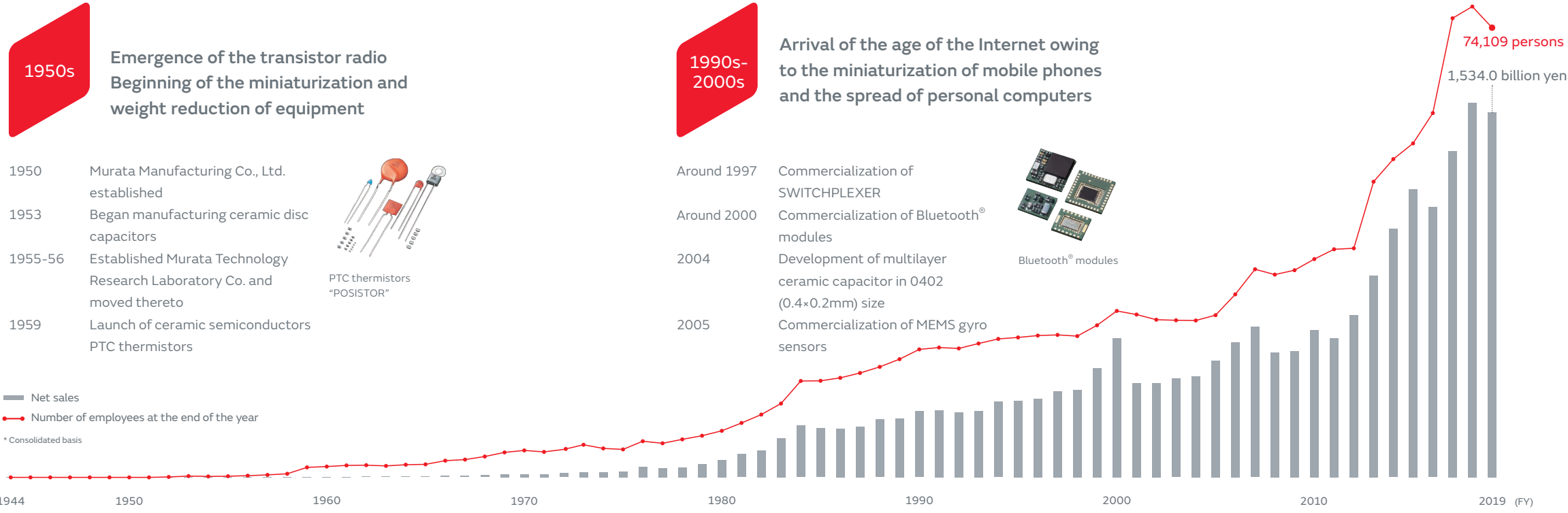
- 2012 Development of multilayer ceramic capacitor in 0201 (0.25×0.125mm) size
- 2016 Development of the world's first inductor in 0201 size
- 2017 Commercialization of hybrid multiplexer for smartphone wireless circuits



2020s-

Arrival of the 5G era and progress in vehicle electrification

Murata will continue to contribute to the growing trend toward multi-functionalization of electronic devices and the development of society as a result of such trends.



*Bluetooth is a trademark of Bluetooth SIG, Inc.