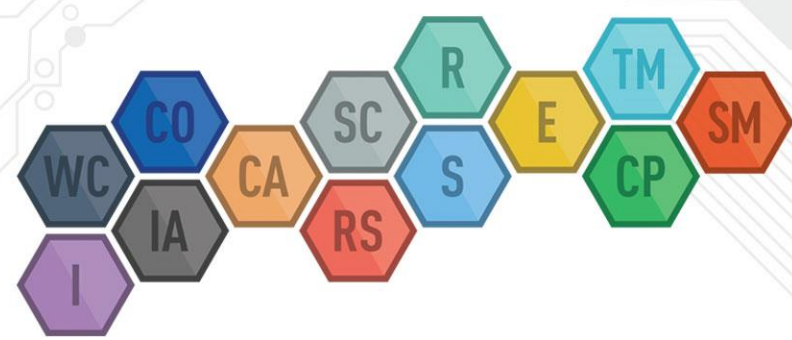


**Panasonic**

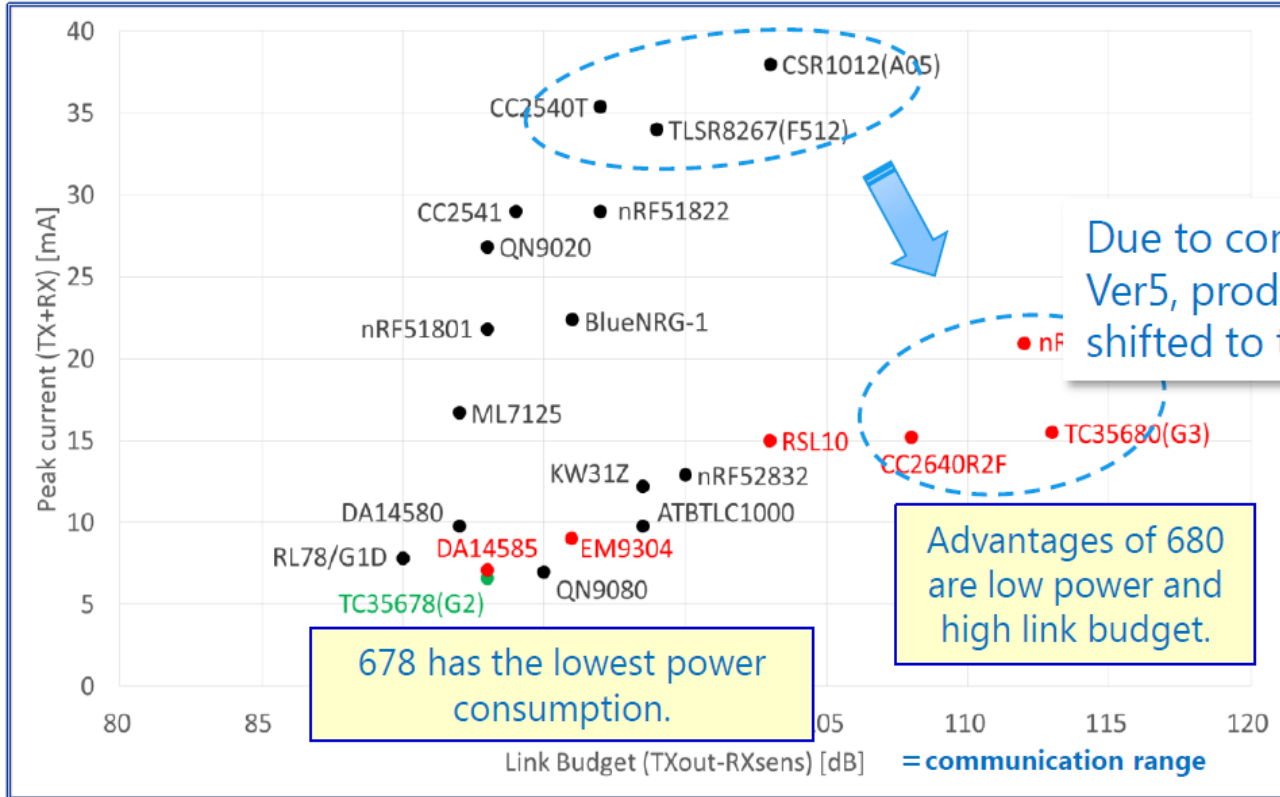


# PAN1760A & PAN1762

## Product Highlights

# BLE Market Comparison

development



PAN1760A is based on Toshiba TC35678

PAN1762 is based on Toshiba TC35680



# PAN1760A (BLE 4.2)

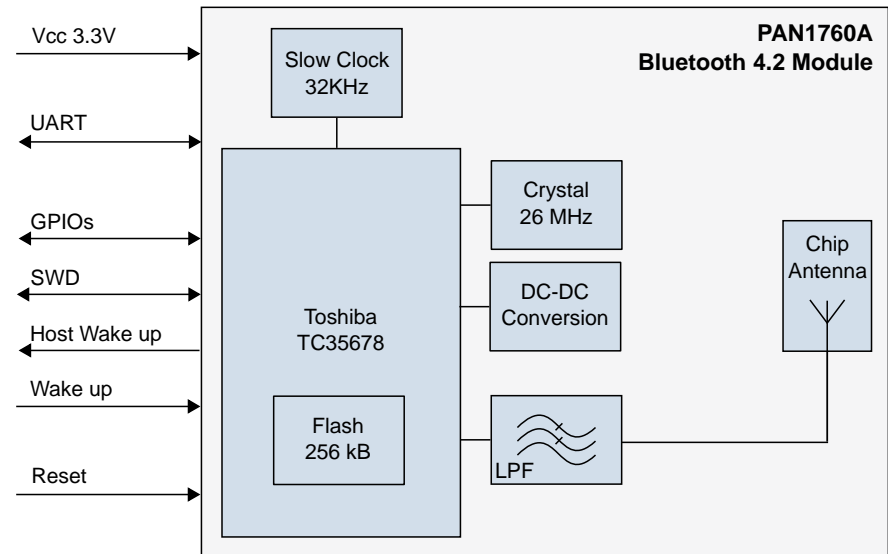
## Best in Class Power Consumption



- Toshiba TC35678
- MESH 1.0 (BT SIG Approved)
- Bluetooth® Core spec V4.2
- AT Commands



- 
- Ultra Low Power
    - Peak current 3.6mA (TX 0dBm@3.0V)
    - Sleep current < 1.2uA (Advertise)
  - Interfaces
    - UART/SPI/I<sup>2</sup>C/GPIOs
  - User Memory:
    - 80 kByte SRAM
    - 256 kByte Flash

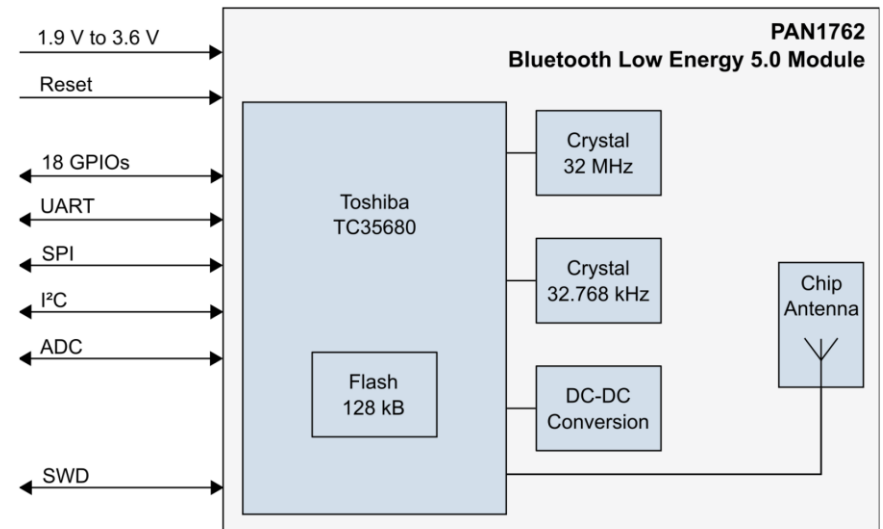


# PAN1762 (BLE 5.0)

- Toshiba TC35680
- Bluetooth® Core spec V5.0 (high speed & long range)



- 
- 15.6 mm x 8.7 mm x 1.9 mm
  - Host mode, AT command mode or stand-alone operation mode
  - 18 General Purpose IOs
  - 2·SPI, 2·I<sup>2</sup>C, UART, PWM, Wake-up inputs, general purpose ADC
  - ARM® Cortex®-M0
  - 128 kB flash memory
  - 128 kB internal RAM for application code and data patches



# Product Comparison

## Bluetooth® LE Product Comparison

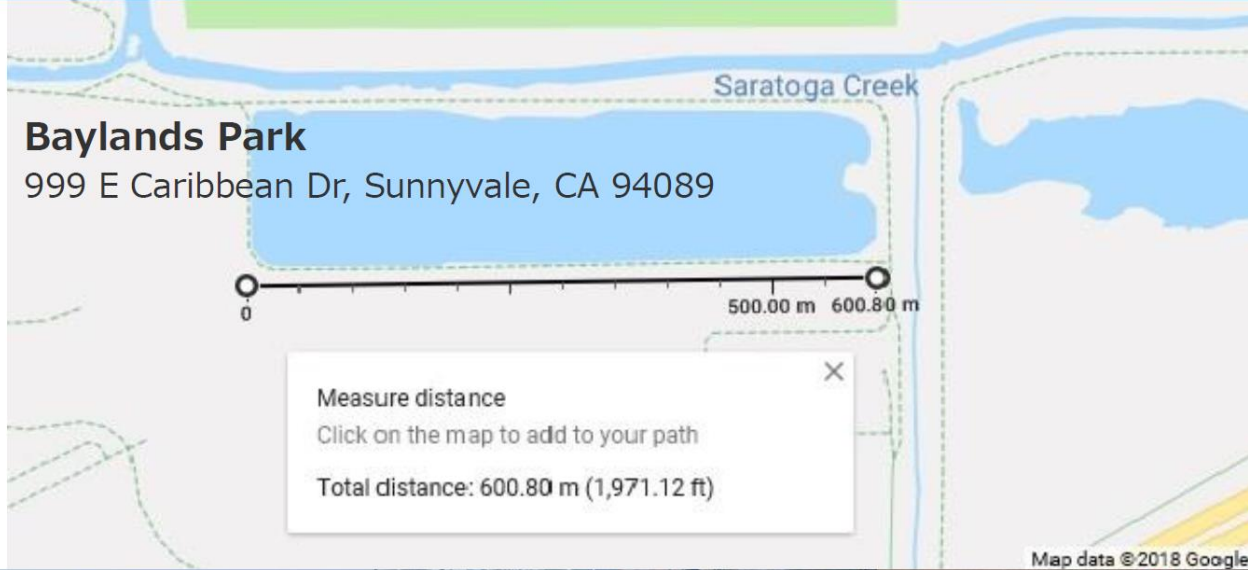
Item	TC35678FSG	TC3567CFSG	TC35680FSG
Bluetooth Core spec	V4.2	V4.2	V5.0
CPU core	Cortex-M0	Cortex-M0	Cortex-M0
Peak current Tx @ 0dBm	3.3mA	3.3mA	6.0mA
Peak current Rx	3.3mA	3.3mA	5.1mA
Tx Output Power (Max)	0dBm	0dBm	+8dBm
Rx Sensitivity	-93.5dBm	-93.5dBm	-95dBm (1Mbps) -105dBm (125kbps)
Standalone	✓	✓	✓
Scatter net	✓	✓	NA
LE secure connection	✓	✓	✓
Maximum # of Connections	8 (2 masters/8 slaves)	4 (2 masters/4 slaves)	1 (1 master/1 slave)
User NVM area	256KB	128KB	128KB
User RAM area	83KB	51KB	76KB
Input Main Clock Frequency	26MHz	26MHz	32MHz
PKG	QFN40 5.0x5.0mm	QFN40 5.0x5.0mm	QFN40 5.0x5.0mm
Operation Temperature	-40 / +85 °C	-40 / +85 °C	-40 / +85 °C



# Toshiba TC35680 Range Testing

## Distance Measurement of TC35680

600m communication distance has been demonstrated.



# Coded PHY Results

## Distance Measurement of TC35680

600m communication distance has been demonstrated.

Test date: April 25<sup>th</sup>, 2018

Test condition: Coded\_PHY(125kbps) and TX Power +8dBm, Link budget 113dB

Test results:

Antenna height	Connection	Advertise
1.5m	400m(1312feet)	450m(1476feet)
2.5m	500m(1640feet)	600m(1868feet)

- Connection criteria:

Maintain connection over 10 seconds and be able to read firmware characteristics.  
Connection Interval 46.25ms, SVTO 1600ms

- Advertising criteria:

To receive advertise report at least once per 10sec.  
Advertise interval 40ms

