



# K60168-P Product Brief

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**Revision History**

| Revision Number | Release Date | Description of Revision |                           |
|-----------------|--------------|-------------------------|---------------------------|
|                 |              | Reference               | Description of the Change |
| 1.00            | 20-Feb-2021  | --                      | Original release          |
| 1.01            | 24-Aug-2021  | --                      | Format modification       |
|                 |              |                         |                           |
|                 |              |                         |                           |
|                 |              |                         |                           |

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## 1 Main Specifications

### Description

K60168-P is a hand gesture recognition SoC using 60GHz millimeter-wave radar and AI accelerator. The SoC has 1 transmit antenna and 3 receive antennas which are integrated on top of a 6.5 x 6.0mm package. This SoC is also able to perform 1D, 2D, and 3D position tracking. As it stands, it can be used in smart phone, tablet, notebook, gaming console, TWS, etc. as human-interface device.

### Gesture control feature

- Application distance 1 ~ 30cm.
- Angle, FOV +/- 30° 3dB beamwidth.
- Gesture recognition.
- Initial provide pre-trained gesture classified.
- Gesture recognition accuracy > 95%.
- Gesture tracking, support 3D finger tracking.

### SoC/AiP

- Full Integration of millimeter-wave transceiver, baseband, radar DSP, AI accelerator, DC/DC, and PMU.
- Antenna in package design.
- Require external 8Mbits 3.3V flash, QSPI interface.
- Interface for SoC to host: I2C or UART\*1/GPIO\*/SPI\*2.

### Transceiver

- Integrated frequency synthesizer, transmitter, receiver, baseband and ADC...
- Radar modulation – FMCW.
- Max modulation bandwidth 10GHz from 57~67GHz.
- Build-in self-test and calibration.

### DSP

- Adaptive Interference Cancellation (AIC).
- Self-Interference Cancellation (SIC).
- Fast Fourier Transform (FFT) programmable engine.
- Build-in 3D tracking engine.

### AI accelerator for machine learning

- Gesture inference running on AI accelerator to minimize power consumption and latency.

### BOM count

Few external components needed.

- IC body size: 6.5\*6.0\*1.6mm BGA 196.
- 40MHz XTAL (1.6\*1.2\*0.3 mm).
- 4.7uH\*1 (2\*1.6\*1mm) Inductor.
- 4.7uF\*1 (1.6\*0.8\*0.8mm) Capacitor.
- 0.1uF\*1 Capacitor.

2 Block Diagram

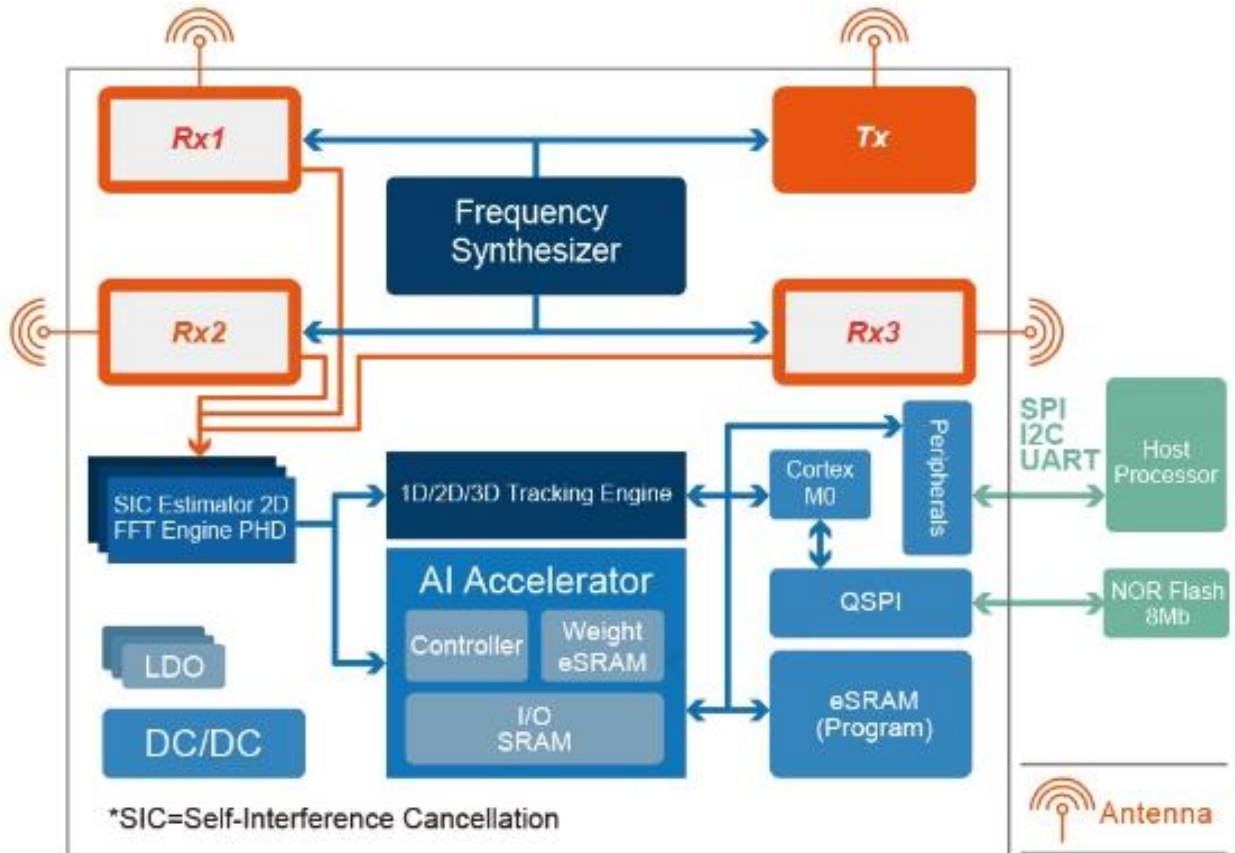
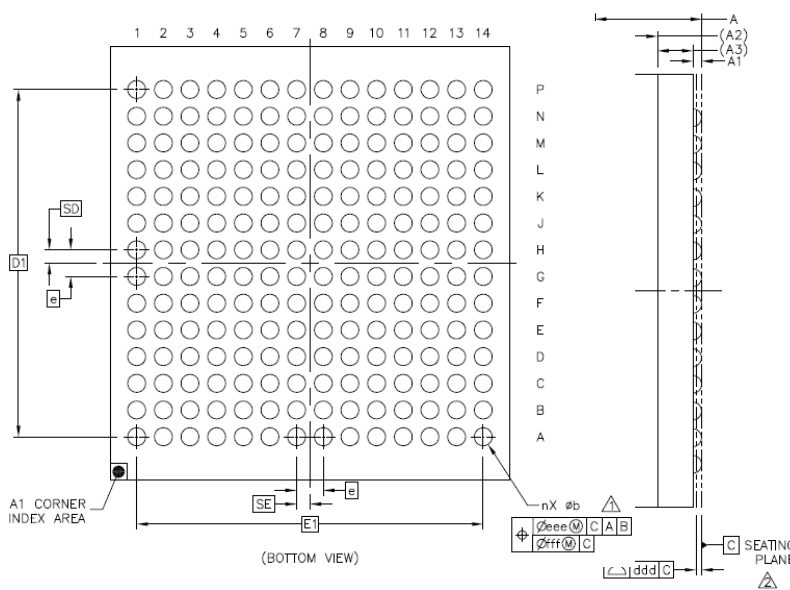
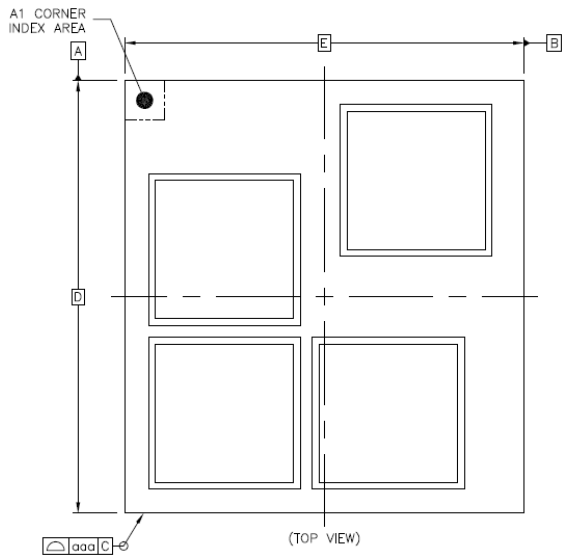


Figure 1 K60168-P Block Diagram

### 3 Package Outline Dimension



|                             | SYMBOL | COMMON DIMENSIONS |       |      |
|-----------------------------|--------|-------------------|-------|------|
|                             |        | MIN.              | NOR.  | MAX. |
| TOTAL THICKNESS             | A      | 1.381             | 1.584 | 1.8  |
| STAND OFF                   | A1     | 0.08              | 0.13  | 0.18 |
| SUBSTRATE THICKNESS         | A2     | 0.934             |       | REF  |
| MOLD THICKNESS              | A3     | 0.53              |       | REF  |
| BODY SIZE                   | D      | 6.5               |       | BSC  |
|                             | E      | 6                 |       | BSC  |
| BALL DIAMETER               |        | 0.25              |       |      |
| LASER ABLATION OPENING      |        | 0.25              |       |      |
| BALL WIDTH                  | b      | 0.22              | 0.27  | 0.32 |
| BALL PITCH                  | e      | 0.4               |       | BSC  |
| BALL COUNT                  | n      | 196               |       |      |
| EDGE BALL CENTER TO CENTER  | D1     | 5.2               |       | BSC  |
|                             | E1     | 5.2               |       | BSC  |
| BODY CENTER TO CONTACT BALL | SD     | 0.2               |       | BSC  |
|                             | SE     | 0.2               |       | BSC  |
| PACKAGE EDGE TOLERANCE      | aaa    | 0.1               |       |      |
| MOLD FLATNESS               | bbb    | ---               |       |      |
| COPLANARITY                 | ddd    | 0.08              |       |      |
| BALL OFFSET (PACKAGE)       | eee    | 0.15              |       |      |
| BALL OFFSET (BALL)          | fff    | 0.08              |       |      |
|                             |        |                   |       |      |
|                             |        |                   |       |      |
|                             |        |                   |       |      |



NOTES:

- △ DIMENSION b IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO DATUM PLANE C.
- △ DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

Figure 2 K60168-P Package Outline Dimension





*kaikuTek*

Echo to the Future