

# Zynq-7000 All Programmable SoC Family Product Tables and Product Selection Guide



ZYNQ.

 **XILINX**  
ALL PROGRAMMABLE.™

# Zynq®-7000 All Programmable SoC Family

|  |  | Cost-Optimized Devices   |            |             |   |            |             | Mid-Range Devices  |              |              |              |
|--|--|--|------------|-------------|---|------------|-------------|--|--------------|--------------|--------------|
| Device Name  |  | Z-7007S  | Z-7012S    | Z-7014S     | Z-7010  | Z-7015     | Z-7020      | Z-7030   | Z-7035       | Z-7045       | Z-7100       |
| Part Number  |  | XC7Z007S   | XC7Z012S   | XC7Z014S    | XC7Z010   | XC7Z015    | XC7Z020     | XC7Z030  | XC7Z035      | XC7Z045      | XC7Z100      |
| Processing System (PS)   | Processor Core   | Single-Core<br>ARM® Cortex™-A9 MPCore™<br>Up to 766MHz                                       |            |             | Dual-Core ARM<br>Cortex-A9 MPCore<br>Up to 866MHz |            |             | Dual-Core ARM<br>Cortex-A9 MPCore<br>Up to 1GHz <sup>(1)</sup> |              |              |              |
|  | Processor Extensions   | NEON™ SIMD Engine and Single/Double Precision Floating Point Unit per processor              |            |             |   |            |             |  |              |              |              |
|  | L1 Cache   | 32KB Instruction, 32KB Data per processor  |            |             |   |            |             |  |              |              |              |
|  | L2 Cache   | 512KB  |            |             |   |            |             |  |              |              |              |
|  | On-Chip Memory   | 256KB  |            |             |   |            |             |  |              |              |              |
|  | External Memory Support <sup>(2)</sup>   | DDR3, DDR3L, DDR2, LPDDR2  |            |             |   |            |             |  |              |              |              |
|  | External Static Memory Support <sup>(2)</sup>  | 2x Quad-SPI, NAND, NOR   |            |             |   |            |             |  |              |              |              |
|  | DMA Channels   | 8 (4 dedicated to PL)  |            |             |   |            |             |  |              |              |              |
|  | Peripherals  | 2x UART, 2x CAN 2.0B, 2x I2C, 2x SPI, 4x 32b GPIO  |            |             |   |            |             |  |              |              |              |
|  | Peripherals w/ built-in DMA <sup>(2)</sup>   | 2x USB 2.0 (OTG), 2x Tri-mode Gigabit Ethernet, 2x SD/SDIO                                   |            |             |   |            |             |  |              |              |              |
| Security <sup>(3)</sup>  | RSA Authentication of First Stage Boot Loader,<br>AES and SHA 256b Decryption and Authentication for Secure Boot |  |            |             |   |            |             |  |              |              |              |
| Processing System to Programmable Logic Interface Ports (Primary Interfaces & Interrupts Only) |  | 2x AXI 32b Master, 2x AXI 32b Slave<br>4x AXI 64b/32b Memory<br>AXI 64b ACP<br>16 Interrupts |            |             |   |            |             |  |              |              |              |
| Programmable Logic (PL)  | 7 Series PL Equivalent   | Artix®-7   | Artix-7    | Artix-7     | Artix-7   | Artix-7    | Artix-7     | Kintex®-7  | Kintex-7     | Kintex-7     | Kintex-7     |
|  | Logic Cells  | 23K  | 55K        | 65K         | 28K   | 74K        | 85K         | 125K   | 275K         | 350K         | 444K         |
|  | Look-Up Tables (LUTs)  | 14,400   | 34,400     | 40,600      | 17,600  | 46,200     | 53,200      | 78,600   | 171,900      | 218,600      | 277,400      |
|  | Flip-Flops   | 28,800   | 68,800     | 81,200      | 35,200  | 92,400     | 106,400     | 157,200  | 343,800      | 437,200      | 554,800      |
|  | Total Block RAM (# 36Kb Blocks)  | 1.8Mb (50)   | 2.5Mb (72) | 3.8Mb (107) | 2.1Mb (60)  | 3.3Mb (95) | 4.9Mb (140) | 9.3Mb (265)  | 17.6Mb (500) | 19.2Mb (545) | 26.5Mb (755) |
|  | DSP Slices   | 66   | 120        | 170         | 80  | 160        | 220         | 400  | 900          | 900          | 2,020        |
|  | PCI Express®   | —  | Gen2 x4    | —           | —   | Gen2 x4    | —           | Gen2 x4  | Gen2 x8      | Gen2 x8      | Gen2 x8      |
|  | Analog Mixed Signal (AMS) / XADC <sup>(2)</sup>  | 2x 12 bit, MSPS ADCs with up to 17 Differential Inputs                                       |            |             |   |            |             |  |              |              |              |
|  | Security <sup>(3)</sup>  | AES & SHA 256b Decryption & Authentication for Secure Programmable Logic Config              |            |             |   |            |             |  |              |              |              |
|  | Speed Grades   | Commercial   | -1         |             |   | -1         |             |  | -1           |              |              |
| Extended   |  | -2   |            |             | -2,-3   |            |             | -2,-3  |              |              | -2           |
| Industrial   |  | -1, -2   |            |             | -1, -2, -1L                                       |            |             | -1, -2, -2L  |              |              | -1, -2, -2L  |

Notes:  
 1. 1 GHz processor frequency is available only for -3 speed grades in Z-7030, Z-7035, and Z-7045 devices. See [DS190](#), Zynq-7000 All Programmable SoC Overview for details.  
 2. Z-7007S and Z-7010 in CLG225 have restrictions on PS peripherals, memory interfaces, and I/Os. Please refer to [UG585](#), Zynq-7000 All Programmable SoC Technical Reference Manual for more details.  
 3. Security block is shared by the Processing System and the Programmable Logic.

# Zynq®-7000 All Programmable SoC Family

## HR I/O, HP I/O, PS I/O, and Transceivers (GTP or GTX)

| Package Footprint <sup>(1)</sup> | Device Name | Cost-Optimized Devices                                     |                  |                  |                                |        |                    | Mid-Range Devices  |                     |                     |        |
|----------------------------------|-------------|--|------------------|------------------|--------------------------------|--------|--------------------|--|---------------------|---------------------|--------|
|                                  |             | Z-7007S  | Z-7012S          | Z-7014S          | Z-7010                         | Z-7015 | Z-7020             | Z-7030   | Z-7035              | Z-7045              | Z-7100 |
| Dimensions (mm)                  |             | HR I/O, HP I/O<br>PS I/O <sup>(2)</sup> , GTP Transceivers |                  |                  |                                |        |                    | HR I/O, HP I/O<br>PS I/O <sup>(2)</sup> , GTX Transceivers |                     |                     |        |
| CLG225                           | 13x13       | 54, 0<br>84 <sup>(3)</sup> , 0                             |                  |                  | 54, 0<br>84 <sup>(3)</sup> , 0 |        |                    |  |                     |                     |        |
| CLG400                           | 17x17       | 100, 0<br>128, 0   |                  | 125, 0<br>128, 0 | 100, 0<br>128, 0               |        | 125, 0<br>128, 0   |  |                     |                     |        |
| CLG484                           | 19x19       |  |                  | 200, 0<br>128, 0 |                                |        | 200, 0<br>128, 0   |  |                     |                     |        |
| CLG485 <sup>(4)</sup>            | 19x19       |  | 150, 0<br>128, 4 |                  |                                |        | 150, 0<br>128, 4   |  |                     |                     |        |
| SBG485 <sup>(4)</sup>            | 19x19       |  |                  |                  |                                |        | 50, 100<br>128, 4  |  |                     |                     |        |
| FBG484                           | 23x23       |  |                  |                  |                                |        | 100, 63<br>128, 4  |  |                     |                     |        |
| FBG676 <sup>(1)</sup>            | 27x27       |  |                  |                  |                                |        | 100, 150<br>128, 4 | 100, 150<br>128, 8   | 100, 150<br>128, 8  |                     |        |
| FFG676 <sup>(1)</sup>            | 27x27       |  |                  |                  |                                |        | 100, 150<br>128, 4 | 100, 150<br>128, 8   | 100, 150<br>128, 8  |                     |        |
| FFG900                           | 31x31       |  |                  |                  |                                |        |                    | 212, 150<br>128, 16  | 212, 150<br>128, 16 | 212, 150<br>128, 16 |        |
| FFG1156                          | 35x35       |  |                  |                  |                                |        |                    |  |                     | 250, 150<br>128, 16 |        |

### Notes:

1. Devices in the same package are footprint compatible. FBG676 and FFG676 are also footprint compatible.
2. PS I/O count does not include dedicated DDR calibration pins.
3. PS DDR and PS MIO pin count is limited by package size. See [DS190](#), *Zynq-7000 All Programmable SoC Overview* for details.
4. CLG485 and SBG485 are pin-to-pin compatible. See product data sheets and user guides for more details.  
See [DS190](#), *Zynq-7000 All Programmable SoC Overview* for package details.

# Zynq®-7000 Device Footprint Compatibility

13mm–35mm

## HR I/O, PS I/O, and GTP Transceivers

| PCB Footprint Dimensions (mm) | 13x13     | 17x17       | 19x19       | 19x19       | 23x23  | 27x27  | 27x27  | 31x31  | 35x35   |
|-------------------------------|-----------|-------------|-------------|-------------|--------|--------|--------|--------|---------|
| Unique Footprint              | CLG225    | CLG400      | CLG484      | CLG485      | FBG484 | FBG676 | FFG676 | FFG900 | FFG1156 |
| Z-7007S                       | 54, 84, 0 | 100, 128, 0 |             |             |        |        |        |        |         |
| Z-7012S                       |           |             |             | 150, 128, 4 |        |        |        |        |         |
| Z-7014S                       |           | 125, 128, 0 | 200, 128, 0 |             |        |        |        |        |         |
| Z-7010                        | 54, 84, 0 | 100, 128, 0 |             |             |        |        |        |        |         |
| Z-7015                        |           |             |             | 150, 128, 4 |        |        |        |        |         |
| Z-7020                        |           | 125, 128, 0 | 200, 128, 0 |             |        |        |        |        |         |

## HR I/O, HP I/O, PS I/O, GTX Transceivers

|        |  |  |  |                 |                 |                  |                  |                   |                   |
|--------|--|--|--|-----------------|-----------------|------------------|------------------|-------------------|-------------------|
| Z-7030 |  |  |  | 50, 100, 128, 4 | 100, 63, 128, 4 | 100, 150, 128, 4 | 100, 150, 128, 4 |                   |                   |
| Z-7035 |  |  |  |                 |                 | 100, 150, 128, 8 | 100, 150, 128, 8 | 212, 150, 128, 16 |                   |
| Z-7045 |  |  |  |                 |                 | 100, 150, 128, 8 | 100, 150, 128, 8 | 212, 150, 128, 16 |                   |
| Z-7100 |  |  |  |                 |                 |                  |                  | 212, 150, 128, 16 | 250, 150, 128, 16 |

The footprint compatibility range is indicated by shading per column.

Important: Verify all data in this document with the device data sheets found at [www.xilinx.com](http://www.xilinx.com)

# Zynq®-7000 Family Speed Grades

|   |             | Device Name <sup>(1)</sup> |         |         |        |        |        |        |        |        |        |
|---|-------------|----------------------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
|   | Speed Grade | Z-7007S                    | Z-7012S | Z-7014S | Z-7010 | Z-7015 | Z-7020 | Z-7030 | Z-7035 | Z-7045 | Z-7100 |
| C | -1          | •                          | •       | •       | •      | •      | •      | •      | •      | •      | •      |
| E | -2          | •                          | •       | •       | •      | •      | •      | •      | •      | •      | •      |
|   | -3          | –                          | –       | –       | •      | •      | •      | •      | •      | •      | –      |
| I | -1          | •                          | •       | •       | •      | •      | •      | •      | •      | •      | •      |
|   | -2          | •                          | •       | •       | •      | •      | •      | •      | •      | •      | •      |
|   | -1L         | –                          | –       | –       | •      | •      | •      | –      | –      | –      | –      |
|   | -2L         | –                          | –       | –       | –      | –      | –      | •      | •      | •      | •      |

Notes:

1. For full part number details, see the Ordering Information section in [DS190](#), *Zynq®-7000 All Programmable SoC Overview*.

- Available
- Not offered

C = Commercial (T<sub>j</sub> = 0°C to +85°C)

E = Extended (T<sub>j</sub> = 0°C to +100°C)

I = Industrial (T<sub>j</sub> = –40°C to +100°C)

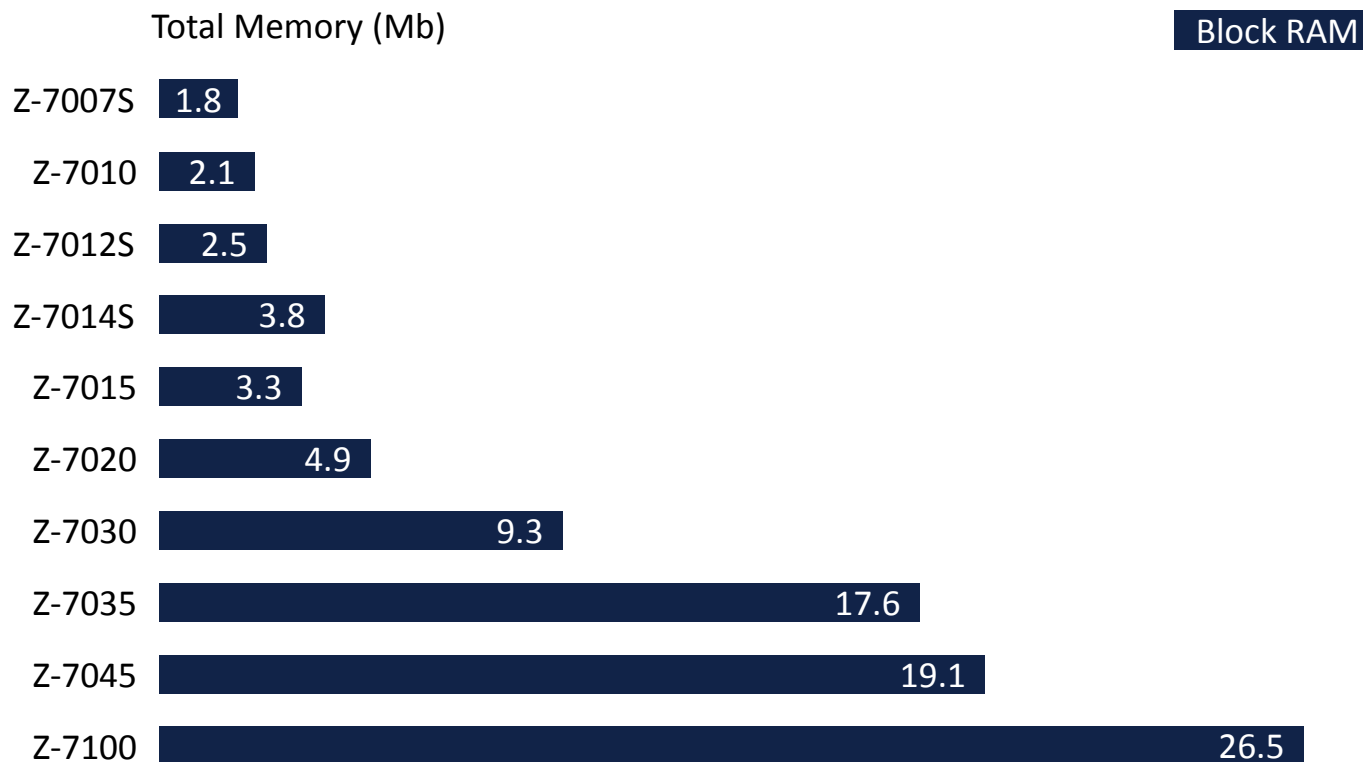
# Zynq®-7000 Family Device Migration Table

| Pkg     | mm | Zynq®-7000 Family |         |         |        |        |        |        |        |        |        |
|---------|----|-------------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
|         |    | Z-7007S           | Z-7012S | Z-7014S | Z-7010 | Z-7015 | Z-7020 | Z-7030 | Z-7035 | Z-7045 | Z-7100 |
| CLG225  | 13 | ■                 |         |         | ■      |        |        |        |        |        |        |
| CLG400  | 17 | ■                 |         | ■       | ■      |        | ■      |        |        |        |        |
| CLG484  | 19 |                   |         | ■       |        |        | ■      |        |        |        |        |
| CLG485  | 19 |                   | ■       |         |        | ■      |        |        |        |        |        |
| SBG485  | 19 |                   |         |         |        |        | ■      |        |        |        |        |
| FBG484  | 23 |                   |         |         |        |        | ■      |        |        |        |        |
| FBG676  | 27 |                   |         |         |        |        | ■      | ■      | ■      |        |        |
| FFG676  | 27 |                   |         |         |        |        | ■      | ■      | ■      |        |        |
| FFG900  | 31 |                   |         |         |        |        |        | ■      | ■      | ■      |        |
| FFG1156 | 35 |                   |         |         |        |        |        |        |        |        | ■      |

# Memory



The Zynq®-7000 family has block RAM (dual-port, programmable, built-in optional error correction).



Important: Verify all data in this document with the device data sheets found at [www.xilinx.com](http://www.xilinx.com)

# Transceiver Count and Bandwidth



The serial transceivers in the Zynq-7000 family include the proven on-chip circuits required to provide optimal signal integrity in real-world environments, at data rates up to 6.25Gb/s (GTP) and 12.5Gb/s (GTX).

## Total Transceiver Count and Bandwidth

**GTP** GTX

Z-7007S 0

Z-7010 0

Z-7012S 4 25Gb/s

Z-7014S 0

Z-7015 4 25Gb/s

Z-7020 0

Z-7030 4 50Gb/s

Z-7035 16 200Gb/s

Z-7045 16 200Gb/s

Z-7100 16 200Gb/s

GTP = 6.25Gb/s  
GTX = 12.5Gb/s

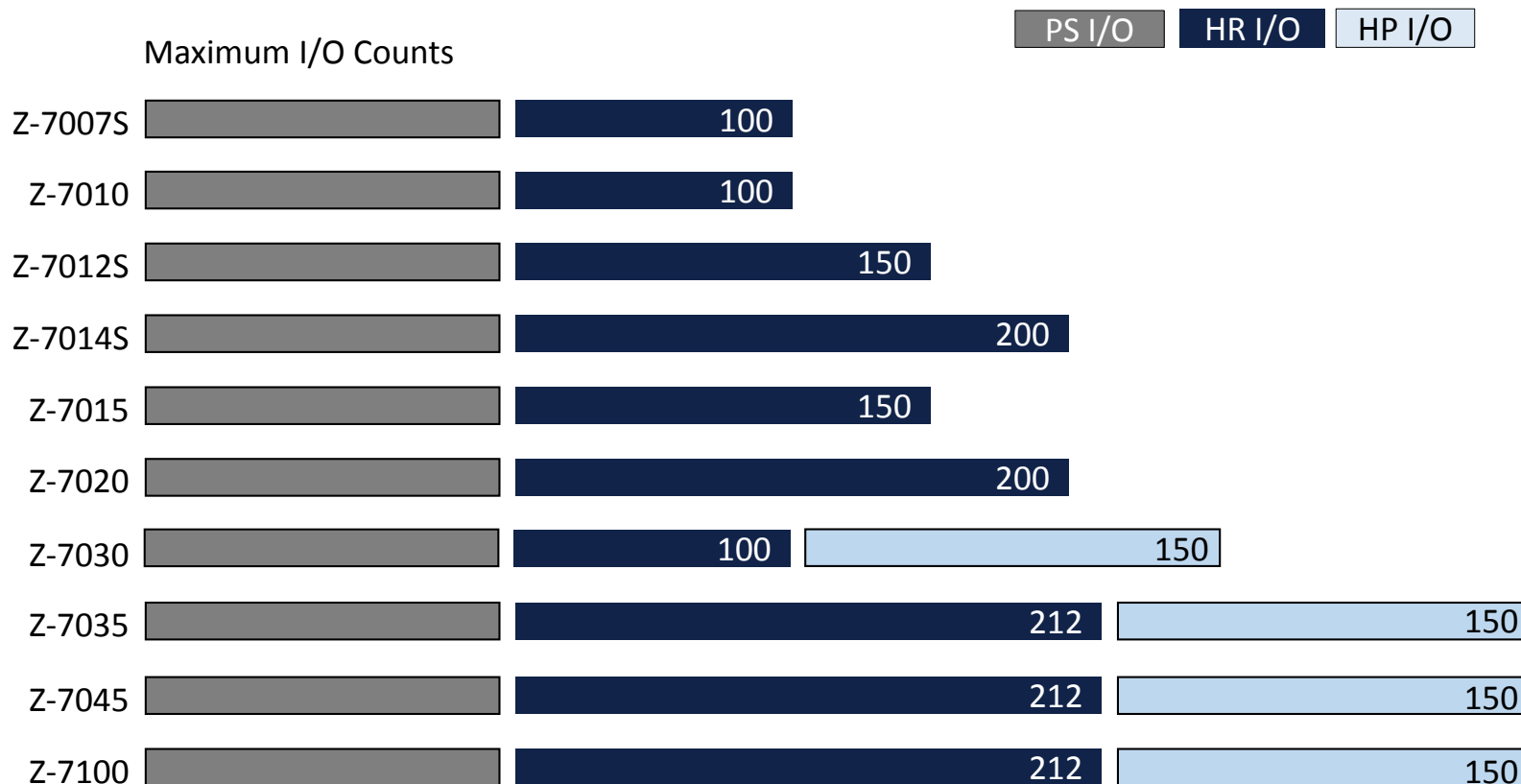
Important: Verify all data in this document with the device data sheets found at [www.xilinx.com](http://www.xilinx.com)



# I/O Count



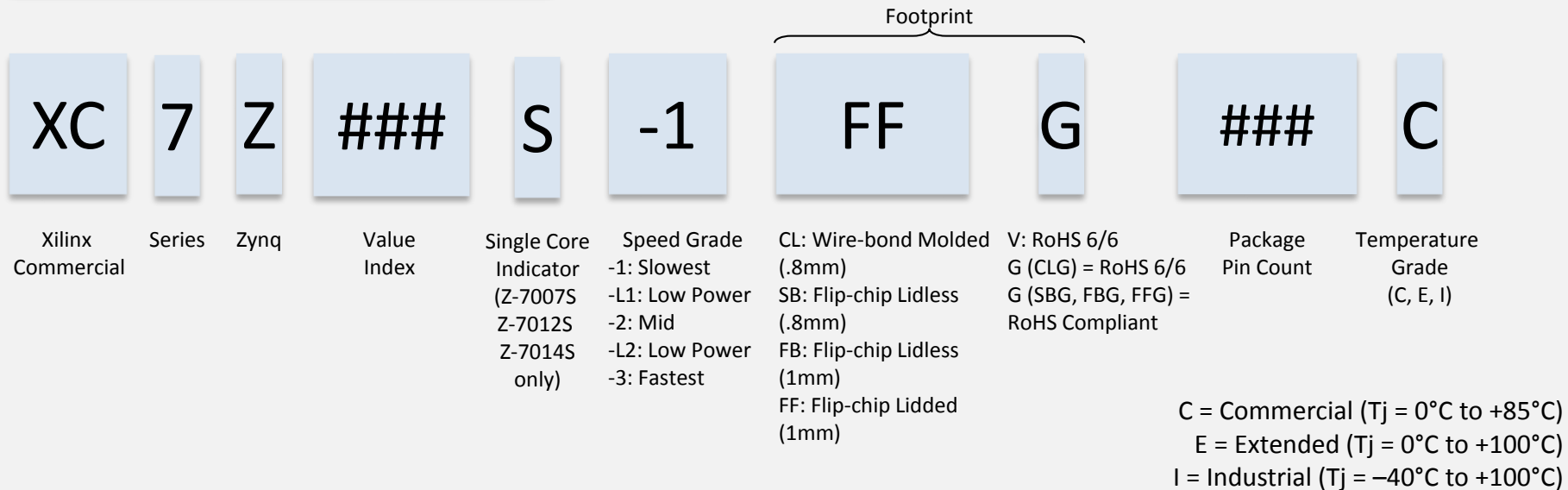
The I/Os are classified as PS I/O, high-range (HR) I/O, and high-performance (HP) I/O. The PS I/Os are composed of multi-use I/O (MIO), which support 1.8V to 3.3V standards. The HR I/Os are reduced-feature I/Os, providing voltage support from 1.2V to 3.3V. The HP I/Os are optimized for highest performance operation, from 1.2V to 1.8V.



Notes:  
 1. The PS I/O count is composed of 54 I/Os (excluding DDR interface), which are used to communicate to external components, referred to as multiplexed I/O (MIO).

Important: Verify all data in this document with the device data sheets found at [www.xilinx.com](http://www.xilinx.com)

# Zynq®-7000 Family Device Ordering Information



Refer to DS190, Zynq-7000 All Programmable SoC Overview for additional information.

Important: Verify all data in this document with the device data sheets found at [www.xilinx.com](http://www.xilinx.com)

# References

[DS190](#), *Zynq®-7000 All Programmable SoC Overview*

[DS187](#), *Zynq-7000 AP SoC (Z-7007S, Z-7012S, Z-7014S, Z-7010, Z-7015, and Z-7020): DC and AC Switching Characteristics*

[DS191](#), *Zynq-7000 AP SoC (Z-7030, Z-7035, Z-7045, and Z-7100):DC and AC Switching Characteristics*

[DS176](#), *Zynq-7000 AP SoC and 7 Series Devices Memory Interface Solutions (v4.0)*

[UG585](#), *Zynq-7000 All Programmable SoC Technical Reference Manual*

[UG865](#), *Zynq-7000 All Programmable SoC Packaging and Pinout Product Specification*

[UG471](#), *7 Series FPGAs SelectIO™ Resources User Guide*

[UG472](#), *7 Series FPGAs Clocking Resources User Guide*

[UG473](#), *7 Series FPGAs Memory Resources User Guide*

[UG474](#), *7 Series FPGAs Configurable Logic Block User Guide*

[UG479](#), *7 Series FPGAs DSP48E1 Slice User Guide*

[UG480](#), *7 Series FPGAs and Zynq-7000 All Programmable SoC XADC Dual 12-Bit 1 MSPS ADC User Guide*

[UG482](#), *7 Series FPGAs GTP Transceivers User Guide*

[UG821](#), *Zynq-7000 All Programmable SoC Software Developers Guide*

[UG933](#), *Zynq-7000 All Programmable SoC PCB Design Guide*

For a complete list of available documentation, go to: <http://www.xilinx.com/products/silicon-devices/soc/zynq-7000.html#documentation>

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