

# UltraScale+ FPGAs

## Product Tables and Product Selection Guide



ARTIX<sup>+</sup>  
UltraSCALE+

KINTEX<sup>+</sup>  
UltraSCALE+

VIRTEX<sup>+</sup>  
UltraSCALE+

 XILINX<sup>®</sup>

Device Name	AU10P	AU15P	AU20P	AU25P
System Logic Cells (K)	96	170	238	308
CLB Flip-Flops (K)	88	156	218	282
CLB LUTs (K)	44	78	109	141
Max. Dist. RAM (Mb)	1.0	2.5	3.2	4.7
Total Block RAM (Mb)	3.5	5.1	7.0	10.5
36K Block RAM Blocks	100	144	200	300
UltraRAM (Mb)	–	–	–	–
Clock Management Tiles (CMTs)	3	3	3	4
DSP Slices	400	576	900	1,200
PCIe® Gen3 / Gen4	PCIe Gen 4	PCIe Gen 4	PCIe Gen 3	PCIe Gen 3
AMS - System Monitor	1	1	1	1
Max. Single-Ended HD I/Os	72	72	72	96
Max. Single-Ended HP I/Os	156	156	156	208
GTH 16.3Gb/s Transceivers <sup>(1)</sup>	12	12	–	–
GTY 16.3Gb/s Transceivers <sup>(1)</sup>	–	–	12	12
Extended			-1 -2	
Industrial			-1 -2 -1L	

Footprint <sup>(2,3)</sup>	Dim. (mm)	Ball Pitch (mm)	HD I/O, HP I/O, GTH, GTY			
A368	11.5x9.5	0.5	24, 104, 8, 0	24, 104, 8, 0		
B484	19x19	0.8	48, 156, 12, 0	48, 156, 12, 0		
B784	23x23	0.8			72, 156, 0, 12	96, 208, 0, 12
B676	27x27	1.0	72, 156, 12, 0	72, 156, 12, 0	72, 156, 0, 12	72, 208, 0, 12

1. GTH and GTY transceiver line rates are package limited: SFVB784, SBVB484, and UBVA368 to 12.5Gb/s. 12.5Gb/s operation in UBVA368 package is pending characterization.

2. For full part number details, see [DS890](#), *UltraScale Architecture and Product Overview*.

3. Consult [UG583](#), *UltraScale Architecture PCB Design User Guide* for specific migration details.

	Device Name	KU3P	KU5P	KU9P	KU11P	KU13P	KU15P	KU19P
Logic	System Logic Cells (K)	356	475	600	653	747	1,143	1,843
	CLB Flip-Flops (K)	325	434	548	597	683	1,045	1,685
	CLB LUTs (K)	163	217	274	299	341	523	842
Memory	Max. Distributed RAM (Mb)	4.7	6.1	8.8	9.1	11.3	9.8	11.6
	Total Block RAM (Mb)	12.7	16.9	32.1	21.1	26.2	34.6	60.8
	UltraRAM (Mb)	13.5	18.0	0	22.5	31.5	36.0	81.0
Clocking	Clock Mgmt Tiles (CMTs)	4	4	4	8	4	11	9
Integrated IP	DSP Slices	1,368	1,824	2,520	2,928	3,528	1,968	1,080
	PCIe4 (PCIe® Gen3 x16)	1	1	0	4	0	5	0
	PCIe4C (PCIe® Gen3 x16 / Gen4 x8 /CCIX)	0	0	0	0	0	0	3
	150G Interlaken	0	0	0	1	0	4	0
	100G Ethernet w/ KR4 RS-FEC	0	1	0	2	0	4	1
I/O	Max. Single-Ended HD I/Os	96	96	96	96	96	96	72
	Max. Single-Ended HP I/Os	208	208	208	416	208	572	468
	GTH 16.3Gb/s Transceivers	0	0	28	32	28	44	0
	GTY 32.75Gb/s Transceivers	16	16	0	20	0	32	32
Speed Grades	Extended <sup>(1)</sup>	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3
	Industrial	-1 -1L -2	-1 -1L -2	-1 -1L -2	-1 -1L -2	-1 -1L -2	-1 -1L -2	-1 -1L -2
	Footprint <sup>(2, 3)</sup>	Dimensions (mm)	HD I/O, HP I/O, GTH 16.3Gb/s, GTY 32.75Gb/s					
Footprint compatible with 20nm UltraScale Devices with same footprint identifier	B784 <sup>(4)</sup>	23x23 <sup>(5)</sup>	96, 208, 0, 16	96, 208, 0, 16				
	A676 <sup>(4)</sup>	27x27	48, 208, 0, 16	48, 208, 0, 16				
	B676	27x27	72, 208, 0, 16	72, 208, 0, 16				
	D900 <sup>(4)</sup>	31x31	96, 208, 0, 16	96, 208, 0, 16		96, 312, 16, 0		
	E900	31x31			96, 208, 28, 0		96, 208, 28, 0	
	A1156 <sup>(4)</sup>	35x35				48, 416, 20, 8		48, 468, 20, 8
	E1517	40x40				96, 416, 32, 20		96, 416, 32, 24
	A1760	42.5x42.5						96, 416, 44, 32
	E1760	42.5x42.5						96, 572, 32, 24
	J1760	42.5x42.5						72, 468, 0, 32
B2104	47.5x47.5						72, 468, 0, 32	

1. -2LE (Tj = 0°C to 110°C). For more details, see the Ordering Information section in DS890, UltraScale Architecture and Product Overview.  
 2. Maximum achievable performance is device and package dependent; consult the associated data sheet for details.  
 3. For full part number details, see the Ordering Information section in DS890, UltraScale Architecture and Product Overview.

4. GTY transceiver line rates are package limited: B784 to 12.5 Gb/s; A676, D900, and A1156 to 16.3 Gb/s. Refer to data sheet for details.  
 5. The B784 package is only offered in 0.8mm ball pitch. All other packages are 1.0mm ball pitch.

		Foundation							58G PAM4		
Device Name	VU3P	VU5P	VU7P	VU9P	VU11P	VU13P	VU19P	VU23P	VU27P	VU29P	
System Logic Cells (K)	862	1,314	1,724	2,586	2,835	3,780	8,938	2,252	2,835	3,780	
CLB Flip-Flops (K)	788	1,201	1,576	2,364	2,592	3,456	8,172	2,059	2,592	3,456	
CLB LUTs (K)	394	601	788	1,182	1,296	1,728	4,086	1,030	1,296	1,728	
Max. Dist. RAM (Mb)	12.0	18.3	24.1	36.1	36.2	48.3	58.4	14.2	36.2	48.3	
Total Block RAM (Mb)	25.3	36.0	50.6	75.9	70.9	94.5	75.9	74.3	70.9	94.5	
UltraRAM (Mb)	90.0	132.2	180.0	270.0	270.0	360.0	90.0	99.0	270.0	360.0	
DSP Slices	2,280	3,474	4,560	6,840	9,216	12,288	3,840	1,320	9,216	12,288	
Peak INT8 DSP (TOP/s)	7.1	10.8	14.2	21.3	28.7	38.3	10.4	4.1	28.7	38.3	
PCIe® Gen3 x16	2	4	4	6	3	4	0	0	1	1	
PCIe Gen3 x16/Gen4 x8 / CCIX <sup>(1)</sup>	–	–	–	–	–	–	8	4	–	–	
150G Interlaken	3	4	6	9	6	8	0	0	8	8	
100G Ethernet w/ KR4 RS-FEC	3	4	6	9	9	12	0	2	15	15	
Max. Single-Ended HP I/Os	520	832	832	832	624	832	1,976	572	676	676	
Max. Single-Ended HD I/Os	0	0	0	0	0	0	96	72	0	0	
GTy 32.75Gb/s Transceivers	40	80	80	120	96	128	80	34	32	32	
GTM 58Gb/s PAM4 Transceivers	–	–	–	–	–	–	–	4	48	48	
100G / 50G KP4 FEC	–	–	–	–	–	–	–	2 / 4	24 / 48	24 / 48	
Extended <sup>(2)</sup>	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	
Industrial	-1 -2	-1 -2	-1 -2	-1 -2	-1 -2	-1 -2	–	-1, -2	-1 -2	-1 -2	
Footprint <sup>(3,4,5)</sup>	Dim. (mm)	HP I/O, GTY				HP I/O, HD I/O, GTY		HP I/O, HD I/O, GTY, GTM			
A1365 <sup>(4)</sup>	35x35							364, 0, 34 <sup>(8)</sup> , 4			
C1517	40x40	520, 40									
J1760	42.5x42.5							572, 72, 34, 4			
F1924 <sup>(6)</sup>	45x45					624, 64					
A2104	47.5x47.5	832, 52		832, 52		832, 52					
	52.5x52.5 <sup>(7)</sup>					832, 52					
B2104	47.5x47.5	702, 76		702, 76		572, 76					
	52.5x52.5 <sup>(7)</sup>					702, 76					
C2104	47.5x47.5	416, 80		416, 80		416, 104		416, 96			
	52.5x52.5 <sup>(7)</sup>					416, 104		416, 104			
D2104	47.5x47.5			676, 76		572, 76					
	52.5x52.5 <sup>(7)</sup>					676, 76		676, 16, 30		676, 16, 30	
H2104	47.5x47.5										
A2577	52.5x52.5			448, 120		448, 96		448, 128			
A3824	65x65							1976, 96, 48			
B3824	65x65							1664, 96, 80			

Footprint compatible with 20mm UltraScale Devices with same footprint identifier

1. This block operates in compatibility mode for 16.0GT/s (Gen4) operation. See [PG213](#).  
2. -2LE (Tj = 0°C to 110°C). See Ordering Information in DS890.  
3. For full part number details, see DS890, *UltraScale Architecture and Product Overview*.  
4. All packages are 1.0mm ball pitch, with the exception of A1365, which is 0.92mm.

5. Consult [UG583](#), *UltraScale Architecture PCB Design User Guide* for specific migration details.  
6. The GTY transceiver line rate in the F1924 footprint is package limited to 16.3Gb/s. Refer to data sheet for details.  
7. These 52.5x52.5mm packages have the same PCB ball footprint as the 47.5x47.5mm packages and are footprint compatible.  
8. GTYs in quads 224-230 and 232 are limited to 16Gb/s.

Device Name	HBM (4GB)	HBM (8GB)			HBM (16GB)			
	VU31P	VU33P	VU35P	VU37P	VU45P	VU47P	VU57P	
System Logic Cells (K)	962	962	1,907	2,852	1,907	2,852	2,852	
CLB Flip-Flops (K)	879	879	1,743	2,607	1,743	2,607	2,607	
CLB LUTs (K)	440	440	872	1,304	872	1,304	1,304	
Max. Dist. RAM (Mb)	12.5	12.5	24.6	36.7	24.6	36.7	36.7	
Total Block RAM (Mb)	23.6	23.6	47.3	70.9	47.3	70.9	70.9	
UltraRAM (Mb)	90.0	90.0	180.0	270.0	180.0	270.0	270.0	
HBM DRAM (GB)	4	8	8	8	16	16	16	
HBM AXI Interfaces	32	32	32	32	32	32	32	
Clock Mgmt Tiles (CMTs)	4	4	8	12	8	12	12	
DSP Slices	2,880	2,880	5,952	9,024	5,952	9,024	9,024	
Peak INT8 DSP (TOP/s)	8.9	8.9	18.6	28.1	18.6	28.1	28.1	
PCIe® Gen3 x16	0	0	1	2	1	2	0	
PCIe Gen3 x16/Gen4 x8 / CCIX <sup>(1)</sup>	4	4	4	4	4	4	4	
150G Interlaken	0	0	2	4	2	4	4	
100G Ethernet w/ KR4 RS-FEC	2	2	5	8	5	8	10	
Max. Single-Ended HP I/Os	208	208	416	624	416	624	624	
GTY 32.75Gb/s Transceivers	32	32	64	96	64	96	32	
GTM 58Gb/s PAM4 Transceivers	–	–	–	–	–	–	32	
100G / 50G KP4 FEC	–	–	–	–	–	–	16/32	
Extended <sup>(2)</sup>	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	-1 -2 -2L -3	
Industrial	–	–	–	–	–	–	–	
Footprint <sup>(3, 4, 5, 6)</sup>	Dim. (mm)	HP I/O, GTY					HP I/O, GTY, GTM	
H1924	45x45	208, 32						
H2104	47.5x47.5		208, 32	416, 64		416, 64		
H2892	55x55			416, 64	624, 96	416, 64	624, 96	
K2892	55x55						624, 32, 32	

1. This block operates in compatibility mode for 16.0GT/s (Gen4) operation. See [PG213](#).  
2. -2LE (Tj = 0°C to 110°C). See Ordering Information in DS890.  
3. For full part number details, see DS890, *UltraScale Architecture and Product Overview*.  
4. All packages are 1.0mm ball pitch.  
5. Consult [UG583](#), *UltraScale Architecture PCB Design User Guide* for specific migration details.  
6. Footprint compatible with 20nm UltraScale Devices with same footprint identifier.

# UltraScale Architecture Migration Table

Footprint	Kintex® UltraScale™							Kintex UltraScale+™							Virtex® Ultra Scale							Virtex Ultra Scale+																	
	KU025	KU035	KU040	KU060	KU085	KU095	KU115	KU3P	KU5P	KU5F	KU11P	KU13P	KU15P	KU16P	VU065	VU080	VU095	VU125	VU160	VU190	VU440	VU3P	VU5P	VU7P	VU9P	VU11P	VU13P	VU15P	VU23P	VU27P	VU29P	VU31P	VU33P	VU35P	VU37P	VU45P	VU47P	VU57P	
A784	■	■						■	■																														
B784								■	■																														
A676	■	■	—	—	—	—	—	■	■																														
B676								■	■																														
A900	■	■																																					
D900								■	■	—	—	■																											
E900										■	■	—	—	■																									
A1156	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
A1365																																						■	
A1517		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
C1517																																						■	
D1517																																						■	
E1517																																						■	
A1760																																						■	
B1760																																						■	
E1760																																						■	
J1760																																						■	
D1924																																						■	
F1924																																						■	
H1924																																						■	
A2104																																						■	
B2104																																						■	
C2104																																						■	
D2104																																						■	
H2104																																						■	
B2377																																						■	
A2577																																						■	
A2892																																						■	
H2892																																						■	
K2892																																						■	
A3824																																						■	
B3824																																						■	

**Legend**  
 ■ Device  
 — Migration Path

Notes:  
 1. The body size of the VU13P device in the A2104, B2104, C2104, and D2104 packages is 52.5mm. These packages are footprint compatible with the corresponding 47.5mm body size packages. See [UG583, UltraScale Architecture PCB Design User Guide](#) for important migration details.  
 2. Virtex UltraScale+ HBM devices migrate among each other but do not migrate to other devices.

# Artix® UltraScale+™ FPGA Speed Grades

		Device Name <sup>(1)</sup>				
		Speed Grade	AU10P	AU15P	AU20P	AU25P
Extended	-1	•	•	•	•	
	-2	•	•	•	•	
Industrial	-1	•	•	•	•	
	-1L	•	•	•	•	
	-2	•	•	•	•	

Notes:

1. For full part number details, see the Ordering Information section in [DS890](#), *UltraScale Architecture and Product Overview*.

- :: available
- :: not offered

# Kintex® UltraScale+™ FPGA Speed Grades

		Device Name <sup>(1)</sup>							
		Speed Grade	KU3P	KU5P	KU9P	KU11P	KU13P	KU15P	KU19P
Extended <sup>(2)</sup>	-1	•	•	•	•	•	•	•	•
	-2	•	•	•	•	•	•	•	•
	-2L	•	•	•	•	•	•	•	•
	-3	•	•	•	•	•	•	•	•
Industrial	-1	•	•	•	•	•	•	•	•
	-1L	•	•	•	•	•	•	•	•
	-2	•	•	•	•	•	•	•	•

Notes:

1. For full part number details, see the Ordering Information section in [DS890, UltraScale Architecture and Product Overview](#).

2.-2LE (T<sub>j</sub> = 0°C to 110°C). For more details, see the Ordering Information section in [DS890, UltraScale Architecture and Product Overview](#).

- :: available
- :: not offered



# Virtex® UltraScale+™ FPGA Speed Grades

Device Name<sup>(1)</sup>

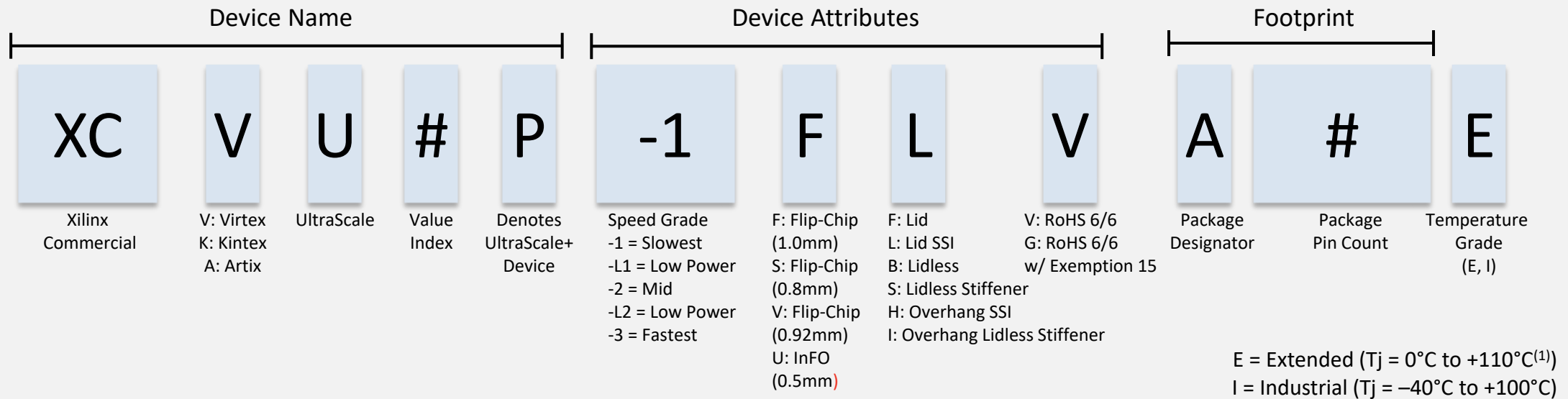
	Speed Grade	VU3P	VU5P	VU7P	VU9P	VU11P	VU13P	VU19P	VU23P	VU27P	VU29P	VU31P	VU33P	VU35P	VU37P	VU45P	VU47P	VU57P
Extended <sup>(2)</sup>	-1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	-2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	-2L	•	•	•	•	•	•	–	•	•	•	•	•	•	•	•	•	•
	-3	•	•	•	•	•	•	–	•	•	•	•	•	•	•	•	•	•
Industrial	-1	•	•	•	•	•	•	–	•	•	•	–	–	–	–	–	–	–
	-2	•	•	•	•	•	•	–	•	•	•	–	–	–	–	–	–	–

Notes:

- For full part number details, see the Ordering Information section in [DS890](#), *UltraScale Architecture and Product Overview*.
- 2LE (Tj = 0°C to 110°C). For more details, see the Ordering Information section in [DS890](#), *UltraScale Architecture and Product Overview*.

- :: available
- :: not offered

# UltraScale+ Device Ordering Information



Notes:

1. For more details on 110°C operation, see the Ordering Information section in [DS890](#), *UltraScale Architecture and Product Overview*

For valid part/package combinations, go to [DS890](#), *UltraScale Architecture and Product Overview: Device-Package Combinations and Maximum I/Os Tables*

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

# References



[DS890](#), *UltraScale™ Architecture and Product Overview*

[DS922](#), *Kintex® UltraScale+™ FPGAs Data Sheet: DC and AC Switching Characteristics*

[DS923](#), *Virtex UltraScale+ FPGA Data Sheet: DC and AC Switching Characteristics*

[UG570](#), *UltraScale Architecture Configuration User Guide*

[UG571](#), *UltraScale Architecture SelectIO™ Resources User Guide*

[UG572](#), *UltraScale Architecture Clocking Resources User Guide*

[UG573](#), *UltraScale Architecture Memory Resources User Guide*

[UG574](#), *UltraScale Architecture Configurable Logic Block User Guide*

[UG575](#), *UltraScale and UltraScale+ FPGAs Packaging and Pinouts Product Specification*

[UG576](#), *UltraScale Architecture GTH Transceivers User Guide*

[UG578](#), *UltraScale Architecture GTY Transceivers User Guide*

[UG579](#), *UltraScale Architecture DSP Slice User Guide*

[UG580](#), *UltraScale Architecture System Monitor User Guide*

[UG583](#), *UltraScale Architecture PCB Design User Guide*

[PG150](#), *UltraScale Architecture-Based FPGAs Memory IP Product Guide*

[PG182](#), *UltraScale FPGAs Transceivers Wizard Product Guide*