

UltraScale+ FPGAs

Product Tables and Product Selection Guide



KINTEX[®]
UltraSCALE⁺

VIRTEX[®]
UltraSCALE⁺

 XILINX

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

Notes:

- 2LE (Tj = 0°C to 110°C). For more details, see the Ordering Information section in DS890, UltraScale Architecture and Product Overview.
- Maximum achievable performance is device and package dependent; consult the associated data sheet for details.
- For full part number details, see the Ordering Information section in DS890, *UltraScale Architecture and Product Overview*.
- 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.
- 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
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 ⁽¹⁾			—	—	—	—	—	—	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 ⁽²⁾			-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 ^(3,4, 5)		Dim. (mm)	HP I/O, GTY						HP I/O, HD I/O, GTY	HP I/O, HD I/O, GTY, GTM		
Footprint compatible with 20mm UltraScale Devices with same footprint identifier	A1365	35x35								364, 0, 34 ⁽⁸⁾ , 4		
	C1517	40x40	520, 40									
	J1760	42.5x42.5								572, 72, 34, 4		
	F1924 ⁽⁶⁾	45x45					624, 64					
	A2104	47.5x47.5		832, 52	832, 52	832, 52						
		52.5x52.5 ⁽⁷⁾					832, 52					
	B2104	47.5x47.5		702, 76	702, 76	702, 76	572, 76					
		52.5x52.5 ⁽⁷⁾					702, 76					
	C2104	47.5x47.5		416, 80	416, 80	416, 104	416, 96					
		52.5x52.5 ⁽⁷⁾					416, 104					
	D2104	47.5x47.5				676, 76	572, 76					
		52.5x52.5 ⁽⁷⁾					676, 76			676, 16, 30		676, 16, 30
	H2104	47.5x47.5										
	A2577	52.5x52.5				448, 120	448, 96	448, 128			448, 32, 48	
A3824	65x65							1976, 96, 48				
B3824	65x65							1664, 96, 80				

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. 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.

		HBM (4GB)	HBM (8GB)			HBM (16GB)		
Device Name		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 ⁽¹⁾		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 ⁽²⁾		-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 ^(3, 4, 5, 6)	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® Ultra Scale™						Kintex Ultra Scale+™						Virtex® Ultra Scale						Virtex Ultra Scale+																			
	KU025	KU035	KU040	KU060	KU085	KU095	KU115	KU3P	KU5P	KU9P	KU11P	KU13P	KU15P	VU065	VU080	VU095	VU125	VU160	VU190	VU440	VU3P	VU5P	VU7P	VU9P	VU11P	VU13P	VU19P	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																												■										

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.

Kintex® UltraScale+™ FPGA Speed Grades

		Device Name ⁽¹⁾					
	Speed Grade	KU3P	KU5P	KU9P	KU11P	KU13P	KU15P
Extended ⁽²⁾	-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 (Tj = 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 ⁽¹⁾		VU3P	VU5P	VU7P	VU9P	VU11P	VU13P	VU19P	VU23P	VU27P	VU29P	VU31P	VU33P	VU35P	VU37P	VU45P	VU47P	VU57P
Extended ⁽²⁾	Speed Grade																	
	-1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	-2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	-2L	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	•	•
	-3	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	•	•
Industrial	-1	•	•	•	•	•	•	—	•	•	•	—	—	—	—	—	—	—
	-2	•	•	•	•	•	•	—	•	•	•	—	—	—	—	—	—	—

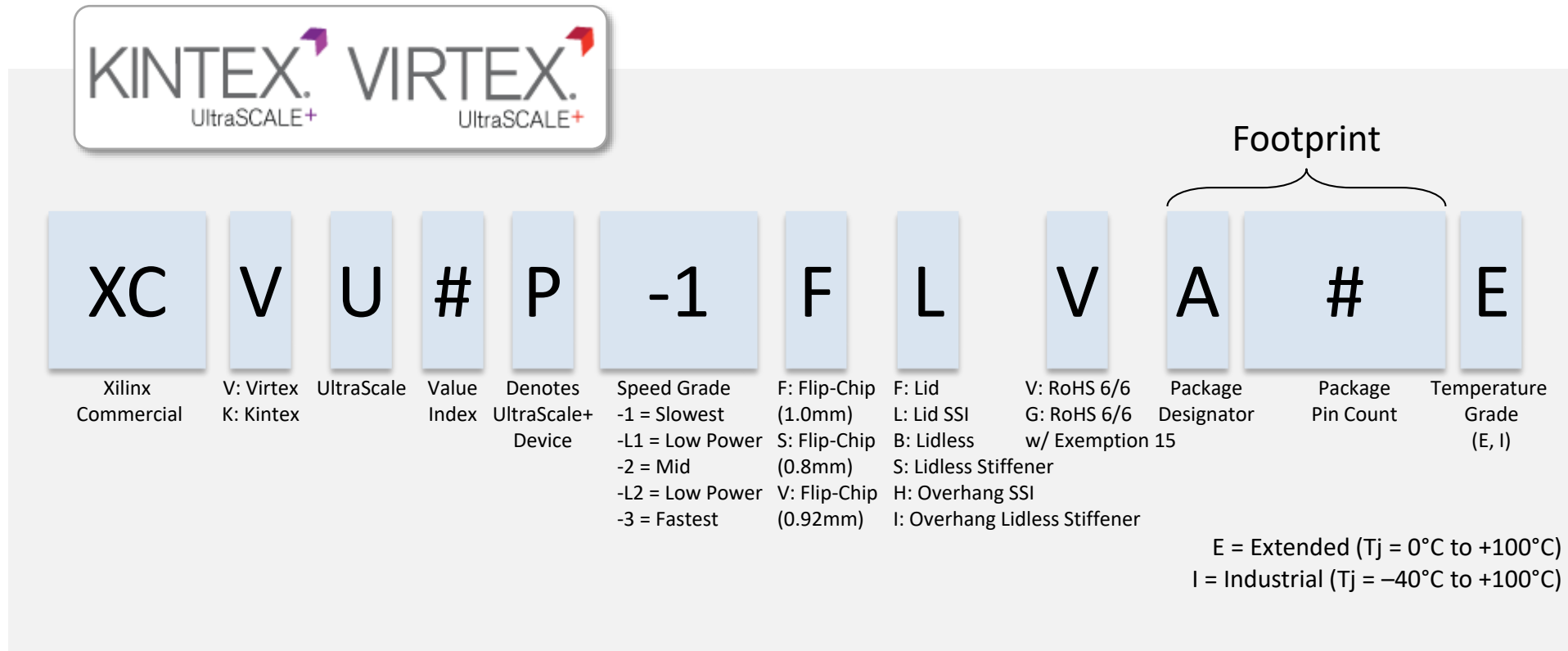
Notes:

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

2. -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



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

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*

Important: Verify all data in this document with the device data sheets found at www.xilinx.com

XMP103 (v1.19)