

# SX-A Family FPGAs



## Leading-Edge Performance

- 250 MHz System Performance
- 350 MHz Internal Performance

## Specifications

- 12,000 to 108,000 Available System Gates
- Up to 360 User-Programmable I/O Pins
- Up to 2,012 Dedicated Flip-Flops
- 0.22  $\mu$  / 0.25  $\mu$  CMOS Process Technology

## Features

- Hot-Swap Compliant I/Os
- Power-Up/Down Friendly (No Sequencing Required for Supply Voltages)
- 66 MHz PCI Compliant
- Nonvolatile, Single-Chip Solution

- Configurable I/O Support for 3.3 V / 5 V PCI, 5 V TTL, 3.3 V LVTTTL, 2.5 V LVCMOS2
- 2.5 V, 3.3 V, and 5 V Mixed-Voltage Operation with 5 V Input Tolerance and 5 V Drive Strength
- Devices Support Multiple Temperature Grades
- Configurable Weak-Resistor Pull-Up or Pull-Down for I/O at Power-Up
- Individual Output Slew Rate Control
- Up to 100% Resource Utilization and 100% Pin Locking
- Deterministic, User-Controllable Timing
- Unique In-System Diagnostic and Verification Capability with Silicon Explorer II
- Boundary-Scan Testing in Compliance with IEEE Standard 1149.1 (JTAG)
- Actel Secure Programming Technology with FuseLock™ Prevents Reverse Engineering and Design Theft

Table 1 • SX-A Product Profile

Device	A54SX08A	A54SX16A	A54SX32A	A54SX72A
Capacity				
Typical Gates	8,000	16,000	32,000	72,000
System Gates	12,000	24,000	48,000	108,000
Logic Modules	768	1,452	2,880	6,036
Combinatorial Cells	512	924	1,800	4,024
Dedicated Flip-Flops	256	528	1,080	2,012
Maximum Flip-Flops	512 <sup>1</sup>	990	1,980	4,024
Maximum User I/Os	130	180	249	360
Global Clocks	3	3	3	3
Quadrant Clocks	0	0	0	4
Boundary Scan Testing	Yes	Yes	Yes	Yes
3.3 V / 5 V PCI	Yes	Yes	Yes	Yes
Input Set-Up (External)	0 ns	0 ns	0 ns	0 ns
Speed Grades <sup>2</sup>	-F, Std, -1, -2	-F, Std, -1, -2, -3	-F, Std, -1, -2, -3	-F, Std, -1, -2, -3
Temperature Grades	C, I, A, M	C, I, A, M	C, I, A, M	C, I, A, M
Package (by pin count)				
PQFP	208	208	208	208
TQFP	100, 144	100, 144	100, 144, 176	-
PBGA	-	-	329	-
FBGA	144	144, 256	144, 256, 484	256, 484
CQFP	-	-	208, 256	208, 256

### Notes:

1. A maximum of 512 registers is possible if all 512 C cells are used to build an additional 256 registers.
2. All -3 speed grades have been discontinued.

## Ordering Information



**Notes:**

- For more information about the CQFP package options, refer to the [HiRel SX-A datasheet](#).
- All -3 speed grades have been discontinued.

## Device Resources

Device	User I/Os (Including Clock Buffers)							
	208-Pin PQFP	100-Pin TQFP	144-Pin TQFP	176-Pin TQFP	329-Pin PBGA	144-Pin FBGA	256-Pin FBGA	484-Pin FBGA
A54SX08A	130	81	113	–	–	111	–	–
A54SX16A	175	81	113	–	–	111	180	–
A54SX32A	174	81	113	147	249	111	203	249
A54SX72A	171	–	–	–	–	–	203	360

**Notes:** Package Definitions: PQFP = Plastic Quad Flat Pack, TQFP = Thin Quad Flat Pack, PBGA = Plastic Ball Grid Array, FBGA = Fine Pitch Ball Grid Array

## Temperature Grade Offering

Package	A54SX08A	A54SX16A	A54SX32A	A54SX72A
PQ208	C,I,A,M	C,I,A,M	C,I,A,M	C,I,A,M
TQ100	C,I,A,M	C,I,A,M	C,I,A,M	
TQ144	C,I,A,M	C,I,A,M	C,I,A,M	
TQ176			C,I,M	
BG329			C,I,M	
FG144	C,I,A,M	C,I,A,M	C,I,A,M	
FG256		C,I,A,M	C,I,A,M	C,I,A,M
FG484			C,I,M	C,I,A,M
CQ208			C,M,B	C,M,B
CQ256			C,M,B	C,M,B

### Notes:

1. C = Commercial
2. I = Industrial
3. A = Automotive
4. M = Military
5. B = MIL-STD-883 Class B
6. For more information regarding automotive products, refer to the [SX-A Automotive Family FPGAs datasheet](#).
7. For more information regarding Mil-Temp and ceramic packages, refer to the [HiRel SX-A Family FPGAs datasheet](#).

## Speed Grade and Temperature Grade Matrix

	F	Std	-1	-2	-3
Commercial	✓	✓	✓	✓	Discontinued
Industrial		✓	✓	✓	Discontinued
Automotive		✓			
Military		✓	✓		
MIL-STD-883B		✓	✓		

### Notes:

1. For more information regarding automotive products, refer to the [SX-A Automotive Family FPGAs datasheet](#).
2. For more information regarding Mil-Temp and ceramic packages, refer to the [HiRel SX-A Family FPGAs datasheet](#).

Contact your Actel Sales representative for more information on availability.