



Atmel's broad EPLD Product Line

Atmel's EPLD product line comprises of two major categories which are the PAL-type Simple Programmable Logic Devices (SPLDs) and the higher density Complex Programmable Logic Devices (CPLDs). Each of these major groups have a particular feature set that make it just right for certain designs.

Atmel SPLDs

Atmel SPLDs is a family of products based on the classic PAL architecture and consists of the popular industry standard 16V8, 20V8 and 22V10 in different speed, package and power specifications. Already in wide use and supported by a wide variety of development tools these variations offer features such as quarter-power, low standby power and zero standby power. Atmel's family of Flash based devices combines proven high-performance and low-power technologies. As a result, no matter how diverse the application, Atmel has the product that meets the design specification.

Atmel CPLDs

Atmel CPLDs are in turn sub-divided into two groups - Atmel Proprietary CPLDs and Industry Compatible CPLDs. The Atmel Proprietary CPLDs consists of the V-series CPLDs based on a 22V10-type architecture and provide market leading capacity and flexibility in 28, 44 and 68 pins. The ATV 750B has a 22V10 footprint with twice the registers and additional features for better logic utilization. A Flash version of the same device will become available soon. The ATV2500B offers 48 registers and 17 product terms per macro with 100 % connectivity. A Flash version of this device will also become available soon.

Atmel's group of Industry compatible CPLDs comprise of the 1500 Family which has a total of six members. These CPLDs have higher logic density with larger number of I/Os. This family of CPLDs have a macrocell count that ranges from 32 to 256. The pincount for this family ranges from 44 to 208 and the variety of packages include PLCC, PQFP, TQFP and PGA. These CPLDs in general have a higher connectivity than their counterparts available in the marketplace. Higher connectivity facilitates in helping a design fit better with improved performance. Another highlight of this family is the In-System Programmability (ISP) feature that is available in all members of this family. ISP is the ability to do In-System Programming of a device even at the design development stage of a design. It cuts down on the product development cycle and enables the product to get to the market faster. An added advantage of ISP is the less handling of the device during manufacturing and hence the cut down on the losses of devices due to bent leads and other associated defects. Another advantage of ISP is the ability to do field upgrades and quick design changes in the field without spending valuable time in bringing back the devices to be re-programmed.

Atmel Software Support

Designers have the ability to use well-known, high quality and user friendly development tools when designing with Atmel EPLDs. Popular third-party tools such as Synario and Win-CUPL support Atmel EPLDs. Design entry such as schematic and text entry (ABEL and VHDL) are supported with Synario. If timing simulation is required, that can also be accomplished within Synario. In addition, workstation support that includes Synopsys, Cadence and Mentor can be had by obtaining fitters for Atmel EPLDs from third party tool vendors such as MINC.

Power Saving with Atmel EPLDs

Atmel's low-power EPLDs are high-performance products with significantly reduced power consumption compared to standard-power products. Power savings upto 80 % can be obtained with Atmel EPLDs as opposed to solutions using competitor devices. Low power consumption allows for smaller, lower cost power supplies and provides lower junction temperatures that in system result in higher system reliability.

Low-Power Feature

Ideally suited for power sensitive applications, Atmel's low-power devices save power at low frequencies by applying the patented "L" feature. This feature enables the device to power down automatically to a standby mode. The power curve graph above shows the I_{CC} vs Frequency curves for standard and low-power devices. At low frequencies, Atmel's low-power devices automatically cycle through the wake-up and standby modes to save power while a standard power device remains powered at all times. This "L" feature offers dramatic power savings for designs with standby mode and for those that operate below 50 Mhz. Applications that are combinatorial in nature also benefit by using Atmel's low-power devices.

Quarter-Power Feature

Atmel's quarter-power devices offer lower active power than a standard-power device. This feature saves power at any frequency and these devices are compatible with other quarter power devices that are available in the market today.

"Z" Products

These are devices that have a standby current that is below 25 uA and ideal for battery powered applications.

"QL" Products

Atmel's quarter power devices are available with the "L" feature. These "QL" devices benefit from quarter-power savings and the low standby power feature all in one device, the ultimate in cost effective power savings.

"LV" Products

In 1990 Atmel was the first PLD vendor to introduce a 3.3 volt product with the AT22V10 and AT22V10L. Now, as the market develops, Atmel is expanding the "LV" offering to include its line of CPLDs such as the ATF1500A.

Connectivity and its importance to design

Connectivity is a measure of how effectively and easily signals are routed between logic blocks within a PLD. In SPLDs every input and feedback is connected to every product term of every macrocell - hence claiming 100 % connectivity. In CPLDs as the logic density grows, it has become common practice to trade off connectivity for speed and die size. Atmel's CPLDs however use a global interconnect architecture that combines speed and higher connectivity. Atmel's CPLDs that have pincount upto 44 claim 100% connectivity which implies higher utilization of product density and easier routing. Consequently, modifications are easily made to the design without having to re-layout the board since the pin assignments stay the same. Atmel's higher density CPLDs have higher connectivity than their industry counterparts which should still be a big factor in pin locking and avoiding board re-layout.