

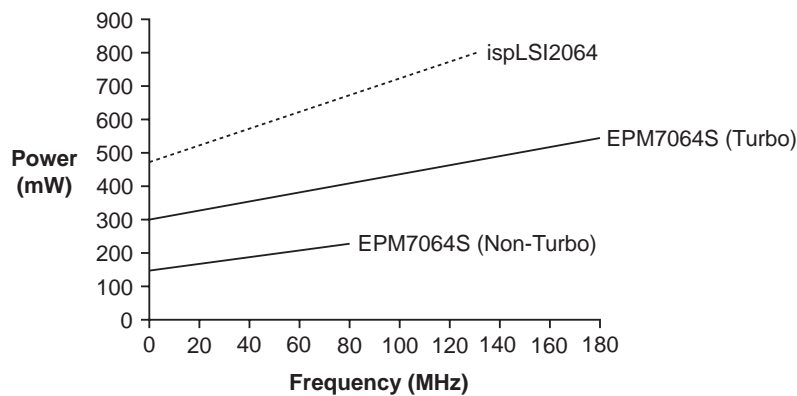
# MAX 7000S Power Consumption

Altera® MAX® 7000S devices offer high density, high performance, and advanced features, such as in-system programmability (ISP) and a programmable power-saving mode. These power-saving devices are competitively priced, and they are supported by the industry-leading MAX+PLUS® II development system. This technical brief discusses the power consumption and cost advantages of MAX 7000S devices and compares them to Lattice ispLSI 2000 devices.

## Power Consumption for 5.0-V Devices

Altera Applications recently compared 5.0-V MAX 7000S and Lattice ispLSI 2000 devices with 64 and 128 macrocells. As shown in Figures 1 and 2, Altera EPM7064S and EPM7128S devices consumed 30% less power than Lattice ispLSI2064 and ispLSI2128 devices, respectively.

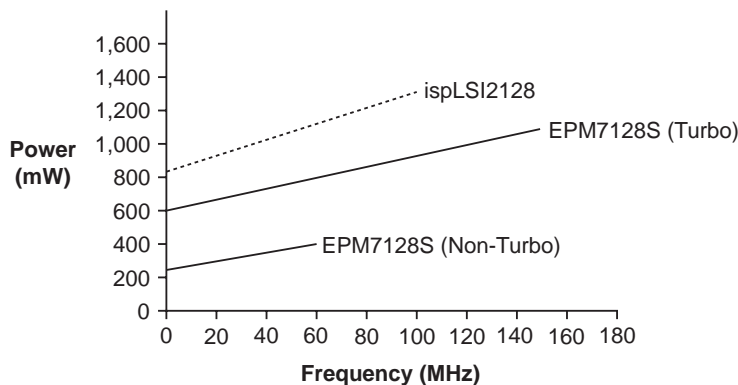
Figure 1. ispLSI2064 vs. EPM7064S Power Consumption, Note (1)



Note:

(1) Source: Altera 1998 Data Book and Lattice 1997 Data Book.

Figure 2. EPM7128S vs. ispLSI2128 Power Consumption, Note (1)



Note:

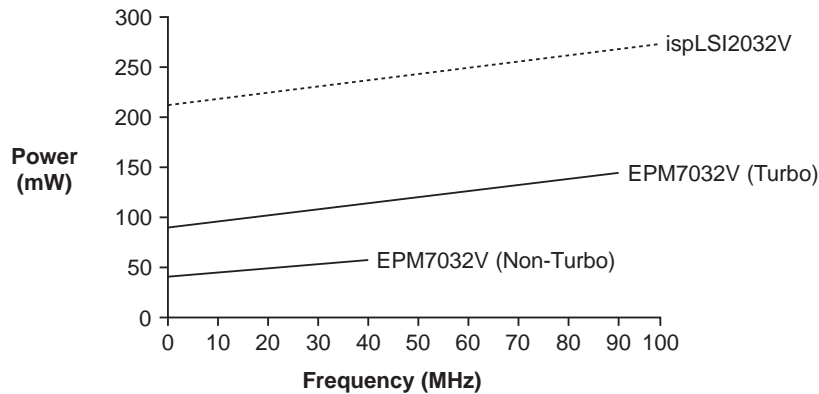
(1) Source: Altera 1998 Data Book and Lattice 1997 Data Book.

In the study, the power consumption advantage of MAX 7000S devices was even more pronounced when the devices operated in non-turbo mode (i.e., when the Turbo Bit™ option was turned off). Figures 1 and 2 illustrate power consumption when the output pins were either all set to turbo mode or non-turbo mode and represent the upper and lower ranges of power consumption. During a typical application, MAX 7000S devices will consume power between the turbo and non-turbo ranges. Lattice does not offer a non-turbo mode option.

### Power Consumption for 3.3-V Devices

Altera Applications also compared the power consumption of 3.3-V EPM7032V and ispLSI2032V devices. As shown in Figure 3, Altera EPM7032V devices consumed 50% less power than Lattice ispLSI2032V devices.

Figure 3. EPM7032V vs. ispLSI2032V Power Consumption, Note (1)

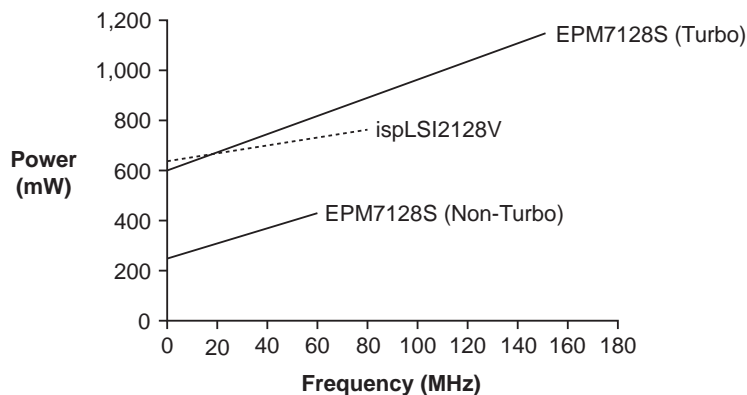


Note:

(1) Source: Altera 1998 Data Book and Lattice 1997 Data Book.

Even when Altera 5.0-V devices were compared with Lattice 3.3-V devices, the Altera devices used considerably less power. For example, Figures 4 and 5 compare the power consumption of Altera's 5.0-V MAX 7000S and Lattice's 3.3-V ispLSI 2000V devices with 128 and 64 macrocells. Typical applications consume power between the turbo and non-turbo ranges. As shown in these figures, 5.0-V MAX 7000S devices provide a competitive alternative to Lattice's 3.3-V ispLSI 2000V devices.

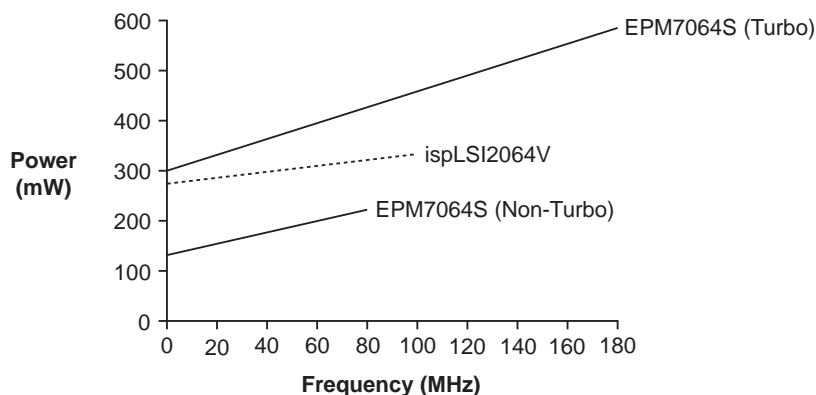
Figure 4. EPM7128S vs. ispLSI2128V Power Consumption, Note (1)



Note:

(1) Source: Altera 1998 Data Book and Lattice 1997 Data Book.

Figure 5. EPM7064S vs. ispLSI2064V Power Consumption, Note (1)



Note:

(1) Source: Altera 1998 Data Book and Lattice 1997 Data Book.

## Cost Advantages

MAX 7000S devices are available at lower prices than ispLSI 2000 devices (see Table 1). In fact, Altera's 128-macrocell EPM7128S device costs significantly less than Lattice's 96-macrocell ispLSI2096 device. Thus, EPM7128S devices provide more macrocells at a lower price.

Table 1. Price Comparison of MAX 7000S & ispLSI 2000 Devices, Notes (1), (2)

Lattice		Altera		Percent Difference
Device	Device Cost	Device	Device Cost	
ispLSI2064	\$10.00	EPM7064S	\$4.50	122%
ispLSI2096	\$14.75	EPM7128S	\$10.00	48%
ispLSI2128	\$20.00	EPM7128S	\$10.00	100%

Notes:

(1) Source: Arrow/Marshall web sales listing, February 1, 1998 and Altera first quarter 1998 price list.

(2) Prices based on 100-unit quantities.

The documents listed below provide more detailed information and are available in the Altera *1998 Data Book*.

- *MAX 7000 Programmable Logic Device Family Data Sheet*
- *AN 74: Evaluating Power in Altera Devices*

You can request these documents from:

- Altera Literature Services at (888) 3-ALTERA
- World-wide web site at <http://www.altera.com>
- Your local Altera sales representative