1.0 Introduction

This document details the recommended power supply decoupling and device layout practices for the ZL30130, ZL30131, ZL30138, ZL30321, ZL30132, ZL30133, ZL30134, ZL30136, ZL30142, ZL30143, ZL30145, ZL30146, ZL30342, ZL30343 and ZL30347.

2.0 Power Supply Decoupling and Layout Practices

Jitter levels on the ZL30130, ZL30131, ZL30138, ZL30321, ZL30143, ZL30343, ZL30347, Figure 2 for 64 pin ZL30132, ZL30133, ZL30134, ZL30136, ZL30142, ZL30145, ZL30146, ZL30342 and Figure 3 for the 256 pin ZL30321.

The following common layout practices are recommended for improved power rail noise rejection.

- Each power island should have a bulk cap of at least 10 μF with very low ESR. Ceramic provides the lowest ESR but tantalum may also be acceptable. These capacitors are used to filter low frequency (up to several hundreds KHz) noise that originate from switching power supplies. If the switching power supply is not filtered with large bulk capacitances (100 μF or more), then the 10 μF capacitors used for 1.8 V core voltage supplies (AVCORE and VCORE) should be replaced with low ESR 100 μF ceramic or tantalum capacitors.

- A 0.1 μF decoupling cap (ceramic X5R or X7R) must be allocated for each power pin and placed as close as possible to the via connected to the power pin. The smallest available package size should be used. Each decoupling cap should be connected directly to only one power pin, and should not share vias to power or ground with other caps.

- Priority should be given to placement of decoupling caps in nearest proximity to AVDD and AVCORE pins.

- AVCORE pins B7 and H2 in Figure 1 and pins B6 and F1 in Figure 2 draw 25 mA each. This requires the series resistor to dissipate at least 1.25 mW of power.

- Two "power islands" should be created for the device, one for 3.3 V and the other for 1.8 V. A power island is a local copper area, separated from the main power plane by a series passive component. Its purpose is to provide improved isolation from noise on the board power planes. Ferrite beads provide additional suppression of digital switching noise generated by other integrated circuits connected to the main power planes. A recommended bead is Murata BLM21AG102SN1 or similar. Note that beads have some DC resistance which increases the minimum required supply voltage for the device (by about 1% for the above bead).
Figure 1 - Power Supply Decoupling for the 100 pin ZL30130, ZL30131, ZL30138, ZL30321, ZL30143, ZL30343 and ZL30347
Figure 2 - Power Supply Decoupling for the 64 pin ZL30132, ZL30133, ZL30134, ZL30136, ZL30142, ZL30145, ZL30146 and ZL30342
Figure 3 - Power Supply Decoupling for the 256 pin ZL30321