

Atmel TPM Power Supply Decoupling Guide

AT97SC3205

1 Overview

The following guidelines are consistent with industry-standard decoupling recommendations for all active system components. Effective decoupling of the power supply inputs to the Atmel® Trusted Platform Module (TPM) is critical to assuring reliable component performance in a high-density printed circuit board environment. The TPM is a complex system-on-a-chip integrated circuit design containing an internal microprocessor, EEPROM, ROM, and SRAM memories, digital logic, and analog components. The TPM executes firmware operations independently of the external system, as well as executing command operations received over the communications bus. As a result, the TPM is subjected to a wide range of frequencies. These signals must be decoupled from the TPM power supply pins to assure consistently reliable operation over the lifetime of the system.

Table 1-1. TPM Power Supply and Ground Pins

Pin		Industry-Standard	
		28-lead TSSOP	32-pad VQFN
V _{CC}	Power Supply	3, 10, 19, 24	1, 8, 22
GND	Ground	4, 11, 18, 25	2, 9, 23, 32

2 Atmel TPM Decoupling Recommendations

2.1 Decouple the V_{CC} Pins

Effective decoupling of the V_{CC} inputs to the Atmel TPM is critical to assure consistently reliable operation over the lifetime of the system. The Atmel recommendation for a decoupling bypass capacitor (within the range of 2,200pF to 4,700pF) is to be placed as close as possible, less than 5mm, to each of the V_{CC} pins located between each V_{CC} pin and the immediately adjacent GND pin. A 0.1μF decoupling bypass capacitor should be placed at the node where the V_{CC} traces join, which should be as close as possible, less than 10mm, to the TPM. In all cases, this bypass capacitor should be closer than the next closest component. All capacitors should be of high quality with dielectric ratings of X5R or X7R. A low-power state is automatically entered when the device is idle. No further action is required by the system to enter low-power mode.



No other component should be placed closer to the TPM V_{CC} pin than the low frequency decoupling capacitor. Each component should be properly decoupled from the power supply signal to prevent injection of noise onto the power plane. All capacitors should have a high quality dielectric rating of X5R or X7R, depending on the system temperature requirements.

2.2 Decoupling Diagrams

The below figures illustrate power and ground pins only.

Figure 2-1. 28-lead TSSOP

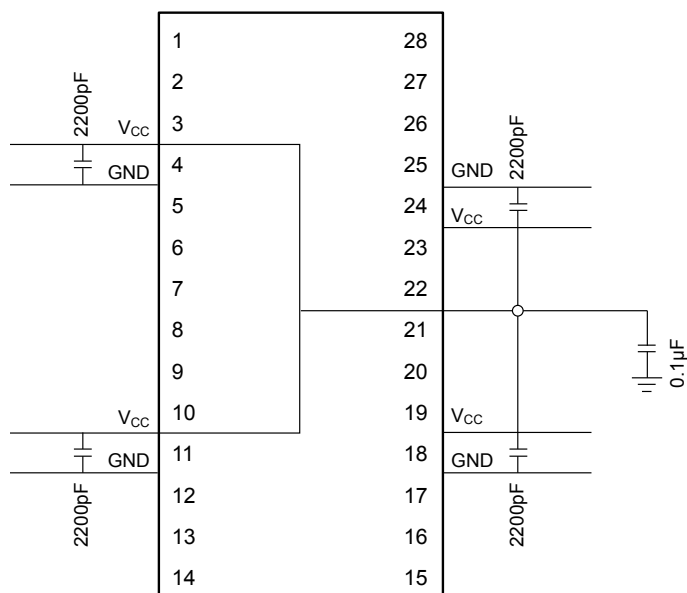
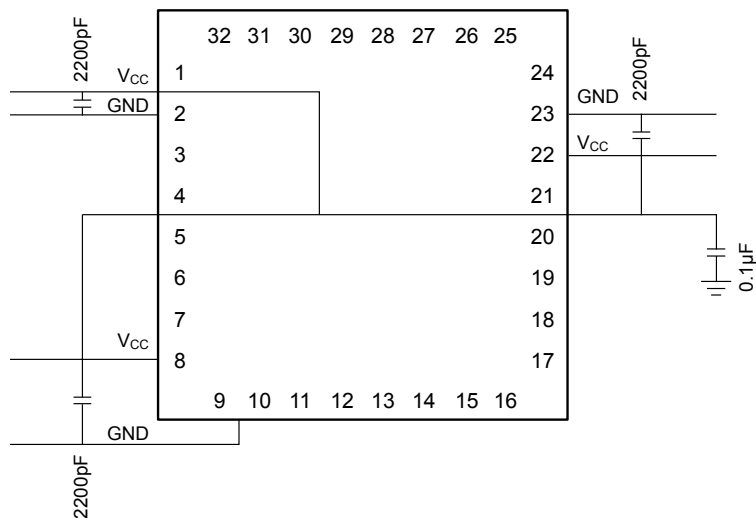


Figure 2-2. 32-pad VQFN



3 Revision History

Doc Rev.	Date	Comments
8913B	07/2014	Correct V _{CC} TSSOP pins in table, "TPM Power Supply and Ground Pins".
8913A	06/2014	Initial document release.

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