

Second Sourcing Design for 0.4mm Pitch and 0.5mm Pitch QFP Packages



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ABSTRACT

This document provides a design to multi-sourcing 0.4mm pitch QFP products with 0.5mm pitch QFP products. Many 0.5mm pitch QFP products can take advantage of the smaller form factor 0.4mm QFP products using a specific PCB footprint. This footprint can give advantages such as simplified sourcing, cost benefits, and increased flexibility.

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1 Introduction

During PCB development for QFP packages, the trend for designers is to select layouts that offer multiple sourcing options from multiple semiconductor manufacturers. Having a multisource requirement can often restrict the ability to use the smaller and most cost-effective package designs that are in the market. To remedy this, design a PCB footprint of the smaller package within the footprint of the larger package.

2 Advantages

Since sourcing is a continued concern in global semiconductor market, this dual footprint QFP layout provides a design to a multisource requirement from a customer by allowing the customer to use a 0.4mm pitch and 0.5mm pitch version. This design increases the pool of parts that a customer can use for a PCB layout, and potentially enabling TI to provide two sources for this part (a 0.4mm pitch and 0.5mm pitch version).

The 0.4mm pitch QFP package offers a smaller body size than a 0.5mm pitch QFP packages. [Table 2-1](#) lists the difference in body sizes between a 0.4mm pitch and 0.5mm pitch QFP package.

Table 2-1. QFP Body Size per Pin Count

Pin Count	0.4mm Pitch Package Body Size (mm)	0.5mm Pitch Package Body Size (mm)
64	7 × 7mm	10 × 10mm
80	10 × 10mm	12 × 12mm
100	12 × 12mm	14 × 14mm
144	16 × 16mm	20 × 20mm
176	20 × 20mm	24 × 24mm

The smaller 0.4mm pitch QFP packages are less expensive than the 0.5mm pitch packages because of the smaller size. Smaller packages use less amount of materials, and have more efficient production which makes them a lower cost option. The 0.4mm pitch QFP packages also occupy much smaller area on the PCB. This footprint helps design more compact and cost-effective solutions especially in emerging electronic equipment sectors (robotics, industrial automation, power control, consumer, and so on).

This lower cost QFP and the reduced PCB footprint can together provide the customer a competitive advantage in the market.

In the event of a customer requiring a QFP package to be 0.5mm pitch, the secondary smaller footprint allows for the customer to effortlessly migrate to a next generation 0.4mm pitch version with no change to the PCB.

3 Example Footprint

The QFP footprint shown in [Figure 3-1](#) is a design that shows a 0.4mm pitch 64 pin package within a 0.5mm pitch 64 pin QFP. Using the following recommended pad guidelines allows for the clean routing of 5-mil traces with a 5-mil air gap.

Recommended Pad Guideline:

- 0.5mm pad: 1.35mm × 0.3mm
- 0.4mm pad: 1.2mm × 0.2mm

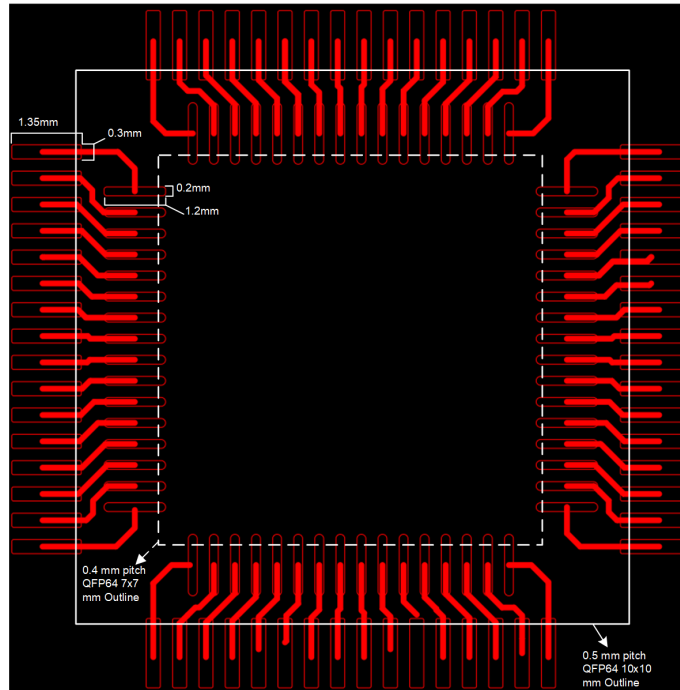


Figure 3-1. 0.5mm Pitch QFP (PM): 0.4mm Pitch QFP (PTE)

4 Summary

Utilizing a dual footprint in a PCB design is a design that allows for simplified sourcing, cost savings, increased flexibility, and simple next generation migration.

5 References

- Texas Instruments, [Second Sourcing Options for Multiplexers and Signal Switches](#), application note.

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