



IC Cost and Price Model User Manual

IC Knowledge LLC, PO Box 20, Georgetown, MA 01833

Tx: (978) 352 – 7610, Fx: (978) 352 – 3870, email: info@icknowledge.com

Using the IC Cost and Price Model to Estimate Foundry Wafer Selling Prices and Manufacturing Costs

Introduction

A common application of the IC Knowledge – IC Cost and Price Model is to produce estimates of foundry wafer pricing and manufacturing costs. For example, foundry customers often want to understand what kind of margin a foundry is charging them.

Estimating Average Selling Prices

The IC Cost and Price Model includes company specific gross margins for foundries (note that for IDMs the wafer margin is zero by default). The gross margins are provided by year and are based on 90% utilization. Utilization rates have a large impact on manufacturing costs and our experience is that foundries assume some high utilization level when setting prices. We believe that the Total Wafer Cost presented in cell D32 of the '2 Wafer Cost' worksheet in the IC Cost and Price Model represents an average selling price for an average volume customer buying foundry wafers when a foundry process is selected and all defaults on the '4 Defaults' page are set to default.

To estimate foundry wafer prices for customers buying higher or lower than average volumes the '8 Pricing' worksheet should be used. When a foundry process is selected in the '2 Wafer cost' page engineering wafer, low volume, average volume and high volume gross margins, wafer selling price and wafer volume will be displayed at the top of the '8 Pricing' sheet (the foundry margin on the '2 Wafer cost' sheet is the average volume margin by default).

Please note that if a total product cost is being calculated for a product manufactured by a fabless semiconductor company, the appropriate gross margin for the appropriate volume displayed on the '8 Pricing' sheet should be entered in cell E34 (selection 23) on the '4 Defaults' worksheet so that the product cost will include the "correct" foundry margin charge.

Another factor to be aware of is the effect of volume on cost and price. Manufacturing cost is determined by the fab capacity and the utilization of the fab. For large foundries individual customers do not typically represent enough volume to materially affect the fab loading and therefore have minimal effect on cost. However, purchased volume does have a large effect of gross margin with the foundries charging large customers lower margins to help drive volume.

Estimating Manufacturing Costs

In order to accurately estimate manufacturing costs the actual utilization experienced by the foundry must be taken into account. Many of the major foundries disclose their utilization rates as part of their quarterly financial disclosures available in the investors section of their web sites (please note that TSMC over reports their utilization with numbers as high as 115% being reported. Utilization should be divided

by 1.15 to get their “actual” utilization before using it in the model) .The utilization values can be entered using the dropdown list in cell E25 on the ‘4 Defaults’ page (selection 15).

On the ‘2 Wafer cost’ sheet the year and quarter and process of interest can then be selected and with the appropriate utilization selected on the ‘4 Defaults’ sheet the foundries manufacturing cost will be displayed in cell D30 on the ‘2 Wafer cost’ sheet.