Quick Answer: What Supply Chains at OEMs Dependent on Semiconductors Must Do in Wake of Current Chip Shortages

Published 26 April 2021 - ID G00751539 - 4 min read

By Analysts Gaurav Gupta

Initiatives: Sourcing and Procurement; Procurement Management; Supply Chain Planning

Strong demand for end electronic equipment as the COVID-19 pandemic accelerated the digital economy, supply and demand uncertainty due to the U.S.-China trade war, along with a few isolated events, have caused a major global chip shortage.

Quick Answer

What must supply chain leaders do in the current scenario of a global chip shortage?

- Extend supply chain visibility by including the entire supply chain from chip fabrication to testing and packaging to better understand the semiconductor dynamics.
- Gain leverage with chip vendors as a larger entity by adopting a companion model and, if scale allows, look at preinvestment opportunities to guarantee supply.
- Track leading indicators, such as capital investments, inventory index and semiconductor industry revenue growth projections as an early indicator of inventory situation.
- Diversify supplier base, and leverage partnerships with resellers and distributors.

More Detail

A series of events have led to the current chip shortage situation that has impacted OEMs across the globe. These include:

- The U.S.-China trade war in mid-2018 that led to Huawei being placed on the U.S. Entity List, which caused OEMs to pile up inventory
- The arrival of the 5G era that required more semiconductors
- The COVID-19 pandemic that created an unexpected demand for consumer electronics with higher device content
Additionally, the following events and isolated issues further worsened the supply/demand balance of chips and stressed the chip supply chain at various points:

- Semiconductor Manufacturing International Corp. (SMIC) placed on the Entity List in December 2020
- The Texas winter storm in the U.S. in March 2021
- The earthquake and fab fires in Japan

Supply chain leaders across the globe at OEMs dependent directly or indirectly on semiconductors are scrambling to ensure business continuity. To weather these crises, they must take the following actions.

**Extend Supply Chain Visibility**

The semiconductor and electronics supply chain is complex. It is geographically dispersed and intricately interconnected, as indicated in Figure 1. This situation makes it essential for supply chain leaders to extend the supply chain visibility beyond the supplier to the silicon level, which will be critical in projecting supply constraints and bottlenecks and, eventually, projecting when the crisis situation will improve. As an example, the chip shortage started primarily with devices fabricated on legacy nodes at 8-inch foundry fabs, which are supply-constrained. But, now it has extended beyond that to other devices, and there are capacity constraints and shortages for substrates, wire bonding, passives, materials, and testing, all of which are parts of the supply chain beyond chip fabs. These are highly commoditized industries with minimal flexibility/capacity to invest aggressively on a short notice.

**Figure 1: Semiconductor Supply Chain**

---

**Guarantee Supply With Companion Model and/or Preinvestments**
Semiconductor foundries and outsourced semiconductor assembly and test (OSAT) players work on volume and margin models. As a result, they give preference to larger customers and/or those with high-margin products. Consequently, smaller customers struggle to get supply. OEMs with smaller and critical component requirements must look to partner with similar entities and approach chip foundries and/or OSAT players as a combined entity to gain some leverage. This would require unique relationships with other companies, while maintaining their products’ intellectual property, roadmaps and so forth. Additionally, if the supply chain leader’s company needs scale and has long-term visibility into chip requirements, one approach is to look toward preinvesting in a commoditized part of the chip supply chain and/or foundries, which could guarantee the company a long-term supply. Several fabless companies are investing in smaller chip foundries and testing houses and utilizing this model.

**Track Leading Indicators**

Since the current chip shortage is a dynamic situation, it is essential to understand how this changes on a continuous basis. One approach is to track leading indicators. While no relevant parameter by itself will project how the shortage situation will evolve, a combination of relevant parameters will guide you, as the supply chain leader, in the right direction. As an example, capital expenditure (capex) guidance of chip companies can point toward upcoming situations of an undersupply or oversupply for a specific device category. Further, an inventory index across the entire supply chain can point toward bottlenecks and also show where behaviors are changing. Lastly, the overall end market demand and/or semiconductor revenue growth will guide you toward understanding how the overall industry is evolving — if there is a potential boom or if the demand looks sluggish. You should leverage Gartner’s regular quarterly reports on capex and device forecasts, and inventory index reports to educate themselves and keep updated on the issue.

**Diversify Supplier Base**

It is essential to understand the source of the chips to potentially qualify additional suppliers. Qualifying a different source of chips and/or OSAT partner will require additional work and investment, but it would go a long way in reducing risk. This qualification would require you, as the supply chain leader, to understand your suppliers’ capabilities, investment plans and long-term product roadmaps. Further, you should leverage distributors, resellers and traders — in certain cases, they have a global approach. Strategic and tight relationships can help you find the small volume for urgent components.

**Recommended by the Authors**

- Expert Insight Video: Global Chip Shortage Impacting the Automotive Sector
- Market Trends: Semiconductor Inventory Analysis, Worldwide, 4Q20 Update
- Forecast: Semiconductor Foundry Revenue, Supply and Demand, Worldwide, 1Q21 Update
- Semiconductor Forecast Database, Worldwide, 1Q21 Update
Forecast: Semiconductor Capital Spending, Wafer Fab Equipment and Capacity, Worldwide, 1Q21

Update

Supply Chain Brief: Semiconductor Shortages Must Drive Greater Collaboration for Resilience

© 2021 Gartner, Inc. and/or its affiliates. All rights reserved. Gartner is a registered trademark of Gartner, Inc. and its affiliates. This publication may not be reproduced or distributed in any form without Gartner's prior written permission. It consists of the opinions of Gartner's research organization, which should not be construed as statements of fact. While the information contained in this publication has been obtained from sources believed to be reliable, Gartner disclaims all warranties as to the accuracy, completeness or adequacy of such information. Although Gartner research may address legal and financial issues, Gartner does not provide legal or investment advice and its research should not be construed or used as such. Your access and use of this publication are governed by Gartner's Usage Policy. Gartner prides itself on its reputation for independence and objectivity. Its research is produced independently by its research organization without input or influence from any third party. For further information, see "Guiding Principles on Independence and Objectivity."