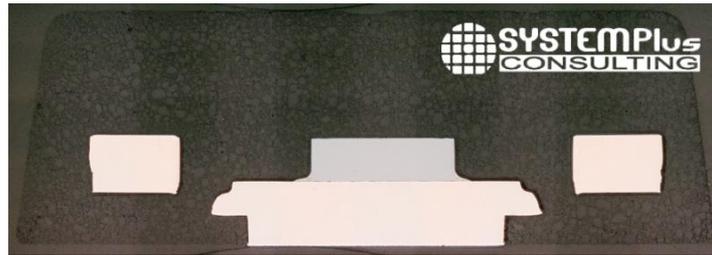


Structural, Process & Costing Report

Power Discrete Packaging Comparison 2018

A cost-oriented overview of evolutionary trends in power discrete packages, from mW to kW



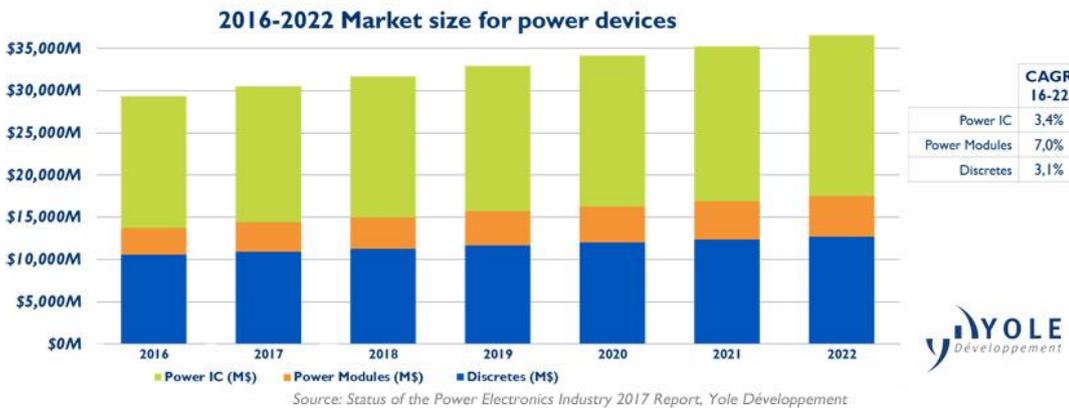
Title: Power Discrete Packaging Comparison 2018

Pages: 115

Date: May 2018

Format: PDF & Excel file

The most recent market forecast by Yole Développement shows the global rise of power devices. The market for discrete devices will follow that trend, increasing in value by an estimated \$1.5 billion in the next five years.



COMPLETE TEARDOWN WITH:

- Detailed photos
- Precise measurements
- Manufacturing process flow
- Manufacturing cost analysis
- Estimated sales price

In recent years the packaging market industry has stabilized around some standard formats and footprints. But the race for optimization is far from over.

The electric and hybrid electric vehicle markets are evolving fast, as are other aspects of electrification of transportation. This, and more generally the power electronic market's growth, has induced competition between component manufacturers.

In the race to innovation and efficiency, the semiconductor die itself isn't the only key to success. In fact, when chasing after the optimum configuration for electrical, thermal and mechanical performance, manufacturers also must battle with the mechanical reliability and cost of packaging. More than a simple "shell", the packaging surrounding the dies can make or break a design.

To satisfy an industry where standardization and 'return on experience' are key elements of success, seemingly small but smart tweaks around common packages can turn out to be highly differentiating.

Through physical analyses, including chemical opening, cross-sections, and various measurements, this report tries to summarize the state of the art of packaging power semiconductors at a discrete level. With a cost-oriented viewpoint, we reveal the hidden details that make the difference between over 20 types of packages, ranging from mW to kW designs.



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Overview/Introduction

- Executive Summary
- Reverse Costing Methodology
- Devices Analyzed

Introduction

- Discrete Market

Physical Analysis

- 3x1.3mm²
 - ✓ SOT23
- 3x1.6mm²
 - ✓ TSOP6
- 3x3mm²
 - ✓ SON3x3
 - ✓ TSMT8
- 4.5x2.5mm²
 - ✓ SOT89
 - ✓ SOIC-8

- 5x6mm²
 - ✓ PowerFLAT 5x6
 - ✓ PowerFLAT 5x6 double island
 - ✓ PowerFLAT 5x6 dual side cooling
 - ✓ SOP advance
- 10x10mm²
 - ✓ D2PAK7
 - ✓ H2PAK
 - ✓ PSOFA-008
 - ✓ TO-220
- 15x20mm²
 - ✓ TO-247

Manufacturing process flow

Cost Simulation

Comparison

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Farid Hamrani joined System Plus Consulting

In 2016 as a system cost engineer. He's in charge of systems reverse cost analysis with a focus on embedded systems. He previously worked in the high-reliability packaging field. Farid holds a master degree in micro-electronics and material from the University of Nantes.

Guillaume Chevalier (Lab)

Guillaume has joined System Plus Consulting in early 2018 to perform physical analyses. He previously worked during 4 years for metrology laboratories.

ANALYSIS PERFORMED WITH OUR COSTING TOOLS POWER COSIM+ AND POWER PRICE+

	Process-Based Costing Tools	Parametric Costing Tools
Integrated Circuits		IC Price+
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Advanced Packaging	3D-Package CoSim+	
Electronic Boards Substrates		PCB Price+
Electronic Systems	SYScost+	
Displays		Display Price+

System Plus Consulting offers powerful costing tools to evaluate the production cost & selling price from single chip to complex structures.

POWER CoSim+ is a process based costing tool used to evaluate the manufacturing cost per wafer using your own inputs or using the pre-defined parameters included in the tool.

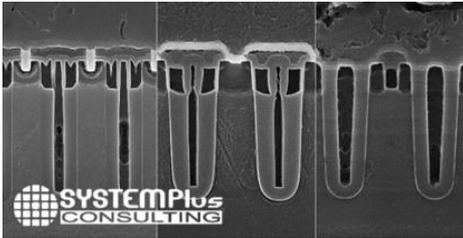
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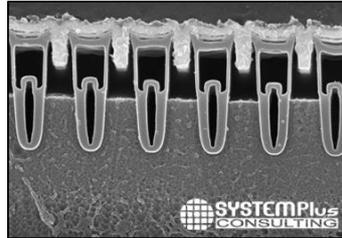
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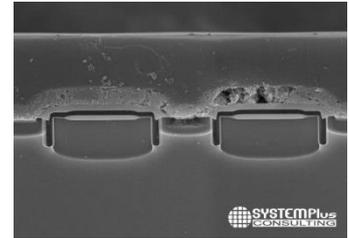
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