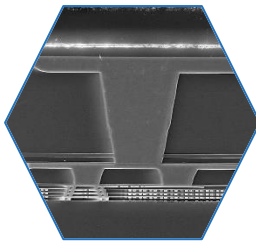
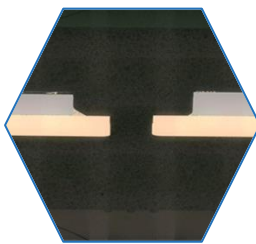


Infineon EiceDRIVER Gate Driver 1EDI3020AS

Complete technology and cost analysis of Infineon's 90nm-node BCD inductive galvanic isolation gate driver for IGBTs and SiC devices.



Title: Infineon EiceDRIVER Gate Driver 1EDI3020AS

Pages: 95

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Price: EUR 3,990

Reference: SPR21628

The IGBT market is expected to grow with a 6.8% CAGR 2020 - 2026, reaching \$8B by 2026. This growth, coupled with the need for high-reliability systems, requires an enhancement of all the components within a system, including the gate driver. Indeed, IGBT gate drivers integrate a low-voltage circuit with microcontroller and a high-voltage circuit with the IGBT gate driver ICs. It is necessary to insulate the two parts of the circuit to get safety systems for components above 600V, as requirements are becoming stricter, which is pushing for galvanic isolation. Historically, optocouplers were the best solution to galvanically isolate the circuit. But lately, more robust and smaller galvanic isolation is needed, pushed by the higher reliability, higher switching frequencies, and lower-size end-system requirements. Therefore, almost all gate driver manufacturers now integrate capacitors or transformers into the gate driver circuit to reach the galvanic isolation. Other solutions have been developed, including with SOI substrate, allowing to obtain an isolation of up to 600V or 1200V. However, this results in a quite expensive product, even though going up to 8000V galvanic isolation is necessary. Infineon has developed a galvanic isolation with two specific metal layers above the high-voltage die. The two dies are connected only by the coreless transformer.

This full reverse costing study has been conducted to provide insights on technology data, manufacturing cost, and selling price of the 1EDI3020AS Driver

from Infineon. This solution allows for high reliability at an affordable cost.

The 1EDI3020AS is an IGBT gate driver designed and manufactured by Infineon. It is a 1-channel IGBT gate driver for high-side or low-side switches. The two dies are manufactured with the last BCD technology: 90nm from Infineon. Only one of the dies uses deep-trench isolation while the other integrates a sixth metal layer to create the second coil of the galvanic transformer and edge isolation. The driver die drives an IGBT die with a V_t of 15V but can increase up to 30V and a current of up to 15A.

This full teardown includes a package analysis and connection between the two silicon dies through the coreless transformer and details the smartpower dies. High-resolution SEM images reveal Infineon's BCD 90nm process technology. The cost analysis includes an estimation of the wafer cost, die cost, and component cost of the 1EDI3020AS IGBT gate driver.

COMPLETE TEARDOWN WITH:

- Detailed optical and SEM photos
- Precise measurements
- Materials analysis
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Price estimation

TABLE OF CONTENTS

Overview/Introduction

- Executive Summary
- Reverse Costing Methodology

PMIC Market

Company Profile

Physical Analysis

- Summary of the Physical Analysis
- Physical Analysis Methodology
- Package
 - ✓ Package views
 - ✓ Package overview
 - ✓ Package opening
- Die 1
 - ✓ View and dimensions
 - ✓ Delayering
 - ✓ Identification of main blocks
 - ✓ Process: transistors, memories
 - ✓ Cross-section
 - ✓ Process characteristics
- Die 2
 - ✓ View and dimensions

- ✓ Delayering
- ✓ Identification of main blocks
- ✓ Process: transistors, memories
- ✓ Cross-section
- ✓ Process characteristics

Manufacturing Process

- Global Overview
- Front-End Process
- Wafer Fabrication Unit
- Back-End O Process

Cost Analysis

- Synthesis of the Cost Analysis
- Yields Explanation & Hypotheses
- Die 1
 - ✓ Front-end cost
 - ✓ Wafer and die cost
- Die 2
 - ✓ Front-end cost
 - ✓ Wafer and die cost
- Package
- Component Cost
- Component Price

AUTHORS

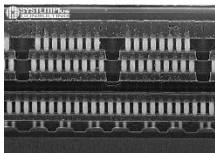


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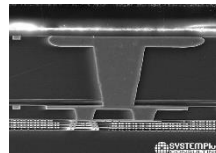
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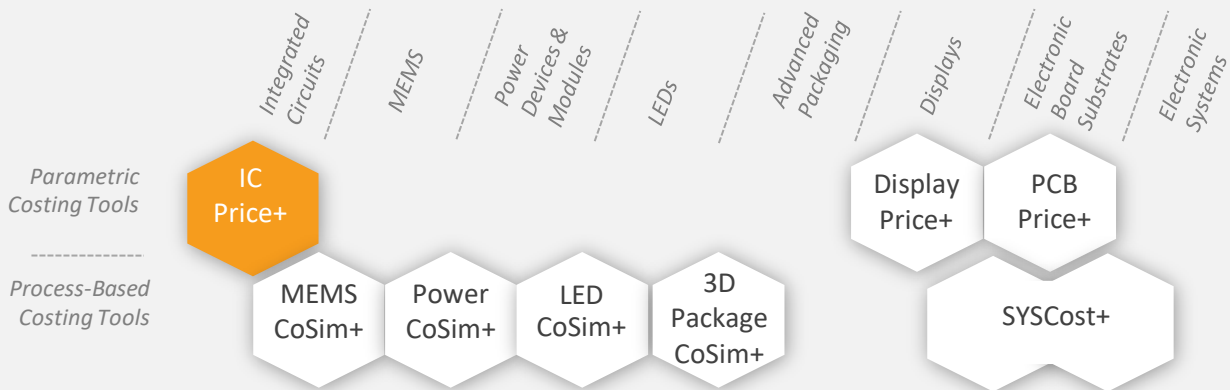


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Our analysis is performed with our costing tool IC Price+.

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ABOUT SYSTEM PLUS CONSULTING

WHAT IS A REVERSE COSTING®?

Reverse Costing® is the process of disassembling a device (or a system) in order to identify its technology and calculate its manufacturing cost, using in-house models and tools.



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