**AWR1642 77 & 79 GHz RFCMOS Radar Chipset from Texas Instruments**

*The world’s first single-chip radar (76 - 81 GHz) in a System-on-Chip*

Ahead of its competitors in RFCMOS applications, Texas Instruments (TI) has begun manufacturing highly integrated radar sensor chips - the latest of which is the AWR1642. But rather than integrating all transmitters, receivers, and local oscillators in a single chip, TI went further and integrated a microcontroller unit (MCU) and a digital signal processor (DSP) on the same chip. This makes the AWR1642 the most integrated radar chipset currently available on the market. It features six channels (four receivers and two transmitters) along with an MCU and a DSP, all on the same chip. Not surprisingly, this new chipset is extremely compact compared to its competitors.

With a portfolio that now contains three different chip solutions, TI targets multiple automotive and industrial applications, from ultra-short-range radar detection (USRR) to radar imaging (RI). Also, TI’s portfolio ranges from low-power, highly-integrated devices, to high-performance radar working in the 79 GHz band. TI seeks to replace the 24 GHz market for short-range applications, which is expected to decrease in 2020 with the coming European restriction law. Also, having the control unit and the signal processing chip on the same die allows TI to drastically reduce the PCB footprint, with an almost 60% space reduction compared to other solutions.

This report reviews the AWR1642, including a complete die analysis, cost analysis, and price estimate for the chips. Also included is a physical and technical comparison with Delphi’s SRR chipset solution and TI’s own AWR1243 (featuring four receivers and three transmitters without the MCU and the DSP) targeting long-range radar detection and radar imaging.
Overview/Introduction
Texas Instruments Company
Profile
Radar Chipset - Market Analysis
Physical Analysis
- Physical Analysis Methodology
- Package Assembly
  ✓ View and dimensions
  ✓ Package overview and cross-section
  ✓ Package opening
- Die
  ✓ View, dimensions, and markings
  ✓ Die Overview - VCO, receiver, transmitter
  ✓ Die process
  ✓ Cross-section and process characteristics

Physical & Cost Comparison
- Integrated vs. Separated Solution: - AWR 1642 vs. Delphi Blind-Spot Radar Chipset
- SiGe vs. RFCMOS - Cost Comparison
- Ti mmWave - Portfolio Comparison

Manufacturing Process Flow
- Die Process & Wafer Fabrication Unit
- BGA Packaging Process and Fabrication Unit

Cost Analysis
- Cost Analysis Overview
- Main Steps Used in the Economic Analysis
- Yield Hypotheses
- Die Cost
  ✓ Front-end (FE) cost
  ✓ Wafer and die cost
- BGA Packaging Assembly Cost
- Component Cost

Estimated Price Analysis

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