

MIDAS[®]-M GAS DETECTOR

Application Note



Honeywell

SINGLE-POINT EXTRACTIVE WITH 4-IN-1 MULTI GAS DETECTOR

Bringing visibility, reliability, and ease-of-use to gas detection in semiconductor processing and industrial manufacturing.

GAS DETECTION SOLUTIONS FOR SEMICONDUCTOR PROCESSING

Honeywell Sensing & Safety Technologies (SST) Semiconductor Solutions serve mainly the cleanroom industries, through which low detection levels are needed to detect toxic gas leaks that are beyond their allowable threshold limit. The Honeywell product portfolio provides sensitive, high-functionality solutions.

GAS DETECTION SOLUTIONS FOR SEMICONDUCTOR MANUFACTURING

Manufacturing semiconductor materials involves the use of toxic and flammable gas. Phosphine, Arsenic, Boron Trichloride, and Gallium are commonly used as doping agents. Hydrogen is used both as a reactant and a reducing atmosphere carrier gas. Etching and cleaning gases include Ammonia and other perfluoro compounds.

Typical applications of gas detection in semiconductor manufacturing are as follows:

- Wafer reactor
- Wafer dryers
- Gas cabinets
- Chemical vapor deposition

Below are the target gases at Display and Semiconductor Fab:

| TYPICAL OLED FAB | | | | | | | | | |
|------------------|------|------------------|-----------------|-----------------|------------------|-----------------|-----------------|----------------|------|
| PH ₃ | HCl | BCl ₃ | BF ₃ | Cl ₂ | SiH ₄ | NF ₃ | NH ₃ | H ₂ | TEOS |
| 59Pt | 68Pt | 113Pt | 60Pt | 151Pt | 499Pt | 227Pt | 498Pt | 405Pt | 5Pt |
| 2.8% | 3.3% | 5.4% | 2.9% | 7.2% | 23.9% | 10.9% | 23.9% | 19.4% | 0.2% |

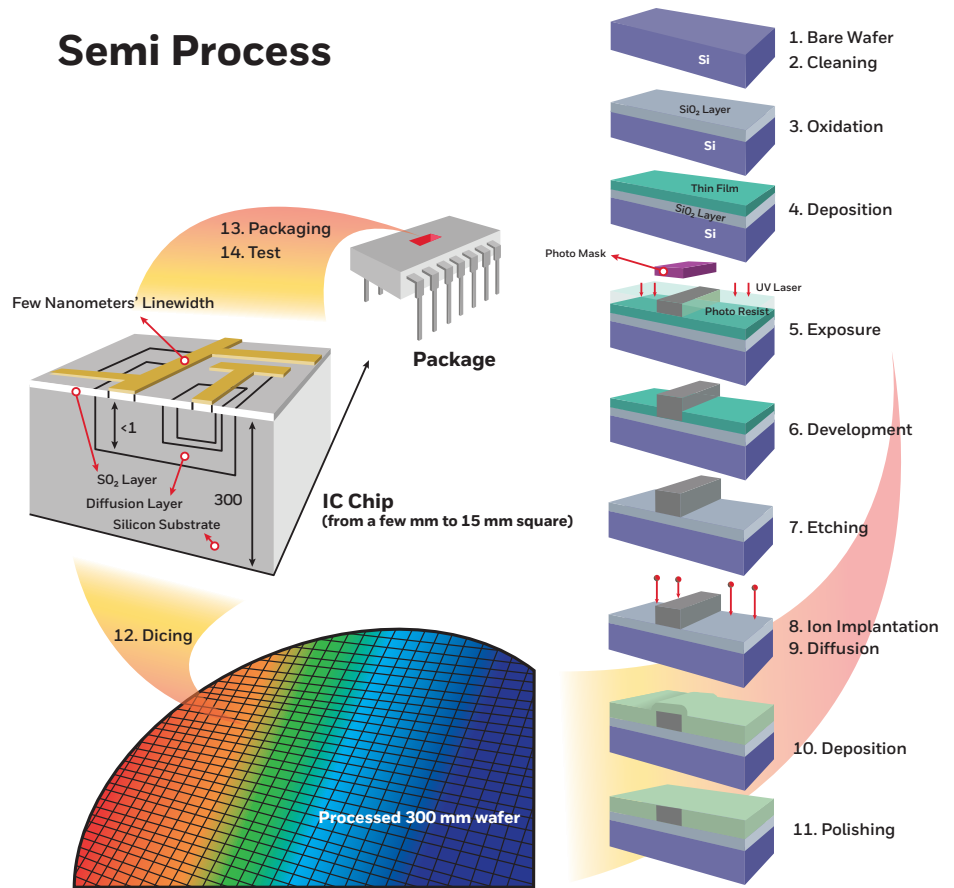
| TYPICAL LCD FAB | | | | | | | | | |
|-----------------|--|--|--|-----------------|------------------|-----------------|-----------------|----------------|------|
| PH ₃ | | | | Cl ₂ | SiH ₄ | NF ₃ | NH ₃ | H ₂ | TEOS |
| 301Pt | | | | 94Pt | 4Pt | 157Pt | 316Pt | 261Pt | |
| 26.6% | | | | 8.3% | 0.4% | 13.9% | 27.9% | 23.0% | |

| TYPICAL SEMI FAB | | | | | | | | | |
|------------------|-------------------------------|------------------|-----------------|-------------------|------------------|-------------------|-----------------|------------------|------|
| AsH ₃ | B ₂ H ₆ | BCl ₃ | BF ₃ | Cl ₂ | C15 ₃ | DCS | F ₂ | GeH ₄ | HBr |
| 97Pt | 331Pt | 115Pt | 129Pt | 938Pt | 437Pt | 193Pt | 883Pt | 52Pt | 46Pt |
| 1.05% | 3.6% | 1.25% | 1.4% | 10.2% | 4.75% | 2.1% | 9.05% | 0.56% | 0.5% |
| HCl | HF | NH ₃ | PH ₃ | SiCl ₄ | SiH ₄ | TiCl ₄ | WF ₆ | | |
| 78Pt | 313Pt | 2079Pt | 18Pt | 810Pt | 1237Pt | 492Pt | 396Pt | | |
| 0.85% | 3.4% | 22.6% | 0.2% | 8.8% | 13.45% | 5.35% | 4.3% | | |

SEMICONDUCTOR MANUFACTURING PROCESS

Typically, the metal–oxide–semiconductor (MOS) devices used in the integrated circuit (IC) chips are present in everyday electrical and electronic devices. Electronic circuits are gradually created on a wafer made of pure semiconducting material. It is a multiple-step sequence of photolithographic and chemical processing steps, including surface passivation, thermal oxidation, planar diffusion, and junction isolation. Various compound semiconductors are used for specialized applications, but commonly Silicon is utilized.

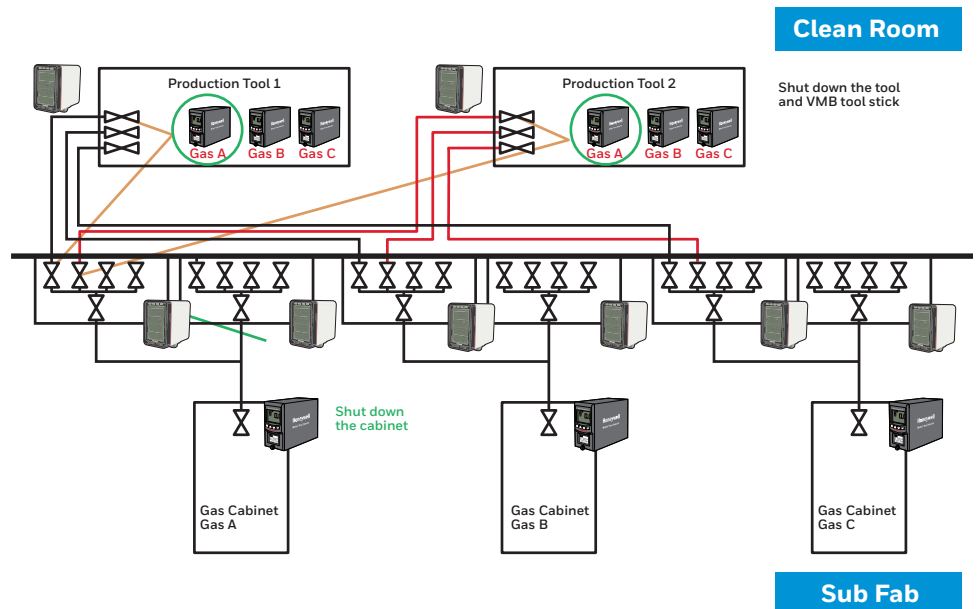
Semi Process



BENEFITS OF MIDAS®-M STRUCTURE

- Low cost of installation in 4-in-1 multi-gas transmitter, tubing, and wiring
- Flexible smart sensor configuration
- Enhanced safety tolerance: alarm voting, alarm Verif-I, LIT
- Flexible options for future and retrofit applications with power features and communications
- Web pages ideal for setup and diagnostics
- Advanced fault diagnostics
- Automated flow control
- Option to introduce wireless technology

Set-Up Options



MIDAS-M Set Up Options at Semiconductor Manufacturing

MIDAS-M[®] GAS DETECTOR

Choose the Midas-M fixed extractive, 4-in-1 multi-gas detector to detect more than 30 gases – precisely, easily, quickly, and with low cost of ownership based on consumer experience design.

BRINGING NEW VISIBILITY, RELIABILITY, AND EASE-OF-USE TO GAS DETECTION IN SEMICONDUCTOR PROCESSING AND INDUSTRIAL MANUFACTURING

The Midas-M is a Fixed Extractive Single Point with a 4-in-1 Multi Gas Detector that draws a sample locally or from a remote point to a sensor cartridge inside the detector's chassis. A wide range of toxic, flammable, and oxygen gas sensor cartridges are available that enable the detection of gases used or generated in the semiconductor and other manufacturing industries.

- **Low cost of ownership:** The Midas-M Gas Detector is Fixed Extractive Single Point with a 4-in-1 Multi-Gas Detector.
- **Improved user interface and ease of use:** The Midas-M Gas Detector is equipped with a large LCD display with individual multicolor back light and intuitive icons that provide instant alerts to gas readings or alarm levels.
- **The Midas-M Gas Detector comprises of four parts:** The main module, the mounting bracket assembly, the sensor cartridge, and the pump module.
- **Numerous applications:** With feature-rich capabilities that are easy to use, the Midas-M Gas Detector is suitable for various industry applications, including semiconductor processing, light industrial manufacturing, university laboratories, aerospace, wastewater, and the others.



FEATURES

- Over *33 gases available with two-year warranty: 17 gases available at launch
- 4-in-1 multi smart sensor cartridge with on board * 'e-calibration' certificate
- Modular design for ease-of-use and service (front, pump, sensor cartridge, main, and base)
- Three built in relays (Form C) for Alarm 1, 2 and Fault
- Power over Ethernet (PoE) communication
- Keypad interface and remote web browser interface
- *Optional external relay module with nine relays
- *Optional Line Integrity Test (LIT) module to detect a leakage in tubing
- * Optional Alarm Verifier Module to reduce false alarm
- Password protected menu levels to preserve system integrity
- Bright LEDs and intuitive icon driven; large LCD display with individual multicolor backlit
- Factory-calibrated sensors to reduce need for frequent gas testing
- Isolated 0 mA to 21 mA analog output with fault and event reporting
- Modbus/TCP Ethernet for easy connectivity to all control and alarm systems ports for control connectivity and service interaction
- Robust extractive pump system (Two year lifetime) sampling up to 100 feet
- CE marked for total immunity to Radio Frequency Interference
- Reflex[®] sensor health check for improved safety
- TempuraSure™ temperature compensation technology as appropriate
- Event logging to review sensor history

* Respect to sequential release

For more information

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FUTURE
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