MEMS POTENTIOSTAT MODEL SC

PRODUCT INFORMATION SHEET EC

MEMS Potentiostat Model SC

The MEMS Potentiostat has been specially designed for use with electrochemical etch-stop techniques.

The fabrication of many microelectro-mechanical systems (MEMS) depends on a reliable and easy to use potential controller for this processing step.

The MEMS Potentiostat meets both of these demands. A high degree of integration and a powerful microcontroller underscore the technical refinement of this system. Low noise op-amps, precision voltage references and high accuracy A/D- and D/A-converters guarantee excellent reproducibility of your etch-stop process.

Furthermore, the unit detects common errors, such as a broken wafer or cable, and alerts the operator with an error description. The MEMS Potentiostat has been designed for easy and safe operation. A display indicates the current process values, time and etch-stop status. The potentiostat offers both manual and computer controlled operation for a high degree of flexibility in research and production. In manual mode the user sets the bias voltage directly on the potentiostat. In computer controlled mode dedicated Windows software gives the user control over all potentiostat settings.

Software. A dedicated software package for Microsoft Windows (Vista, Win 7/8) gives you convenient control over all potentiostat settings. During the etching process the program logs all data and presents it on screen in an I/t-diagram. The potentiostat readout is permanently checked to ensure fast detection of problems during the process. All process relevant information is saved on the computer's hard disk for later use with other programs.

The integrated data analysis tool allows the user not only to reload data from disk, but also to view, print and customize diagrams or listed data and to include charts into other Windows programs via the Windows clipboard. Furthermore, AMMT's software engineers have included a cataloguing system that keeps track of every single wafer that you have processed with the MEMS Potentiostat.

Every piece of information, e. g. bias voltage, processing time and your wafer ID, are stored to help you to insure production quality.

Potential Controller. We have chosen a potential range of -10 to 10 V and a maximum output current of 750 mA that meet the needs of a MEMS fab line perfectly. By limiting the output voltage to a value appropriate for electrochemical etch-stop techniques, a significant reduction of the potentiostat's size and cost has been achieved. Thus, you can save both money and valuable cleanroom space. Moreover, the MEMS Potentiostat is a precision instrument offering a wide variety of interesting features, e. g. an additional voltage output for a four electrode configuration.

Microcontroller. A RISC microprocessor controls all functions of the potentiostat, such as the real-time display, manual mode and the autoranging current-to-voltage-converter. It also serves as protocol server for the computer interfaces and handles user programming via these ports.

Error detection. Often the etch-stop is the last processing step in microsystem fabrication and replacing a wafer lost due to etchant leakage or a broken electrode cable is expensive. Therefore, the MEMS Potentiostat firmware includes error detection that alerts the process operator and provides an error description on the display. In many cases, the setup can be corrected before the wafer is damaged if quick action is assured.

End-point detection. The software includes an end-point detection algorithm that identifies the current peak prior to passivation of the exposed silicon surface. The potentiostat indicates the end of the etch-stop process and switches an output relay, that could, for instance, control a DI water rinsing pump.

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Interfaces. A serial RS232, USB, or Ethernet interface provides a standard connection to any PC compatible computer. An easy to use command set makes it possible to integrate the MEMS Potentiostat in any computer application. Two user configurable relay-outputs allow the controlling of process related devices, e.g. electrical valves or pumps.

TECHNICAL SPECIFICATIONS

Product code	**MEMS Potentiostat Model SC**	
Bias output	-10V to +10V DC 16-bit D/A-converter 5 mVpp ripple 750 mA maximum output current	
4EC output	0V to -10V DC 16-bit D/A-converter 5 mVpp ripple 230 mA maximum output current	
RE input	Input impedance: 10^6 Common reference input for bath, additional reference input at wafer holder	
Current-to-Voltage converter Automatic range adjust	**Range**	**Accuracy**
	0 mA to 10 mA	1.6 µA
	10 mA to 750 mA	25 µA
A/D converter	16-bit A/D-converter	
Relay outputs	Two relays, up to 5 W each max. voltage 30 V max. current 0.5 A	
Control inputs	Two opto-coupled inputs max voltage 14 V DC max current 10 mA	
Computer interfaces	RS-232-C serial interface USB 2.0-interface Ethernet 10 MBit/s	
End-point detection	Built-in end-point detection algorithm connected to a relay	
Error detection	Built-in error detection (broken cable, broken wafer) connected to a relay	
Etch Process Control software (EPC)	A Windows program controls all features of the potentiostat, stores and presents etch-stop data, draws and prints I/t-diagrams. Also suitable for I/V-diagrams for passivation point measurement.	
Power supply	110 to 240 V AC (45 to 63 Hz)	
Size	105 x 105 x 220 mm (WxHxD) 4" x 4" x 8"	
Weight	1.1 kg, 2.3 lb	