<u>memstech</u>

MTPD-007G-07S

Uncompensated Pressure Sensor Die



The MTPD007 series piezo-resistive pressure sensor dies are manufactured on six inch silicon wafers in a class 100 clean room using a state of the art 1.2 micron CMOS facility and are then bulked micro-machined in a class 1000 clean room. The wafers are batch manufactured using a electrochemical etch stop process to achieve excellent repeatability.

Applied pressure deforms a diaphragm causing piezo-resistors to change their resistance. This change in four resistors, which constitute a Wheat Stone Bridge, results in a pressure-proportional voltage.

Die are probed, inked, diced and visually inspected and shipped on tapes, in rings or in waffle packs. Dies can be mounted on ceramic or PCB substrates or packaged in application specific packages for measuring pressure in noncorrosive media.

FEATURES

- Piezo-resistive bridge
- Surface passivation
- Solid state
- High reliability
- Optimally sized for application
- Low cost design
- Suitable for non-invasive applications
- Meets industry specifications
- 6" wafer availability
- 100% factory tested
- Excellent repeatability
- Rated pressure of sensor 0 to 7 psi

THE MAIN FIELD OF APPLICATIONS

- ✓ Medical instrumentation
- ✓ Blood pressure measurement
- Infusion pumps
- ✓ Kidney dialysis machines
- ✓ Current source application

MEMSENZ[™] I Transduction Principle Capacitive Processing Technology Bulk/Deep RIE Actuation Mechanism Force (External) Signal Condition Two chips/Single chip MEMSENZ[™] II Transduction Principle Piezoresistive Processing Technology Bulk/Deep Wet Etch Actuation Mechanism Pressure (External) Signal Condition Two chips/Single chip

MEMSENZ[™] III Transduction Principle Resistive Processing Technology Surface Actuation Mechanism Thermal Signal Condition Two chips

MEMSENZ[™] IV Transduction Principle Capacitive Processing Technology Bulk Actuation Mechanism Sound Signal Condition Two chips Document #: EDS-SDEV-007-07 Bey A

MTPD-007G-07S

Uncompensated Pressure Sensor Die

TECHNICAL DATA – Using constant current source of 1.5mA

Maximum ratings

Specification	Min.	Тур.	Max.	Unit
Operating Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Supply Voltage	-	+5	+10	V
Operating Current	-	1.5	-	mA

Data

Temperature=22±2°C, Relative humidity=45±5%

Specification	Min.	Тур.	Max.	Unit
Constant Current	-	1.5	2.8	mA
	0	-	362	mmHg
Operating Process Range	0	-	7	psi
Operating Pressure hange	0	-	48	kpa
	0	-	0.5	bar
	-	-	14	psi
Over Pressure	-	-	724	mmHg
	-	-	96	kpa
	-	-	1.0	bar
Zero Pressure Offset Voltage	-10	-	+10	mV
	22	28	34	μV/V/mmHg
Sensitivity	1.2	1.4	1.7	mV/V/psi
Gensitivity	0.2	0.2	0.3	mV/V/kpa
	82	103	124	mV/bar
Span	40	50	60	mV
Non-linearity	-0.3	-	+0.3	%FS
Bridge Resistance (see note 5)	2700	3300	3900	Ω
Temperature coefficient of offset, TCO (0-50 ℃)	-8.0	-	+8.0	%FS
Temperature coefficient of sensitivity, TCS (0-50 ℃)	-1.3	-	+1.3	%FS
Offset Stability	-	±0.5	-	%FS

1. Supply voltage DC and AC up to 5kHz, $V_{pp} = 10V \pm 0.1$ VDC.

- 2. Current is linear in full range
- 3. Total error at half span is based on the difference between half span measurement and a straight line projection over the span of the device where

NL(%) =
$$\frac{O(\frac{S}{2}) - \frac{O(0) + O(S)}{2}}{O(\frac{S}{2})} x100$$

- 4. Bottom side pressure application
- 5. Resistance is measured by sourcing a constant current of 1.5mA
- 6. Parameters (except zero pressure offset which is measured directly) are computed from individual piezoresistance measurements made at different pressures under application of a current of 1.5mA, which represents the typical operating conditions
- 7. TCO, TCR & TCS are tested from 0°C to 50°C

MEMSENZ[™] II Transduction Principle Piezoresistive Processing Technology Bulk/Deep Wet Etch Actuation Mechanism Pressure (External) Signal Condition Two chips/Single chip

MEMSENZ[™] III Transduction Principle Resistive Processing Technology Surface Actuation Mechanism Thermal Signal Condition Two chips

<u>memstech</u>

MTPD-007G-07S

Uncompensated Pressure Sensor Die

DIMENSIONS



Dim.	Typical	Tolerance	Units
AA	1888	± 0.33	μm
BB	394	± 10	μm
CC	343	± 2.33	μm
Dicing process	60	± 15	μm

Note: Dimension AA & CC are prior to dicing process.

ELECTRICAL AND DIE LAYOUT



Note

- All dimensions are in µm.
- Mask fabrication tolerance of ±0.3um
- Design fabrication tolerance of ±0.03um



Pad	Symbol	Description
1	В	Output voltage
2	E	Supply voltage
3	D	Output voltage
4	С	Supply voltage
5	А	Supply voltage
GND	GND	Ground

MEMSENZ[™] I Transduction Principle Capacitive Processing Technology Bulk/Deep RIE Actuation Mechanism Force (External) Signal Condition Two chips/Single chip MEMSENZ[™] II Transduction Principle Piezoresistive Processing Technology Bulk/Deep Wet Etch Actuation Mechanism Pressure (External) Signal Condition Two chips/Single chip

MEMSENZTM III Transduction Principle Resistive Processing Technology Surface Actuation Mechanism Thermal Signal Condition Two chips

MEMSENZ[™] IV Transduction Principle Capacitive Processing Technology Bulk Actuation Mechanism Sound Signal Condition Two chips Document #: EDS-SDEV-007-07 Rev A

memstech

MTPD-007G-07S

Uncompensated Pressure Sensor Die

HOW TO SPECIFY PART NUMBER



USA Srini Naidu Executive Director, 42503 Steeple View, Northville MI 48167 Tel: 734 560 5506 Fax: 734 420 3004 Email: srini@memstech.com WORLWIDE Bryan K Patmon Chief Marketing Officer Singapore: 85 Science Park Drive, #01-01/02, The Cavendish, Singapore 118259 Tel: +65-68222889 Fax: +65-67793711 Email: bkpatmon@u

Singapore: 85 Ścience Park Drive, #01-01/0Ž, The Cavendish, Singapore 118259 Tel: +65-68222889 Fax: +65-67793711 Email: bkpatmon@memstech.com Malaysia: PTD 43005 Jalan Perindustrian Murni 11, Taman Perindustrian Murni, 81400 Senai Johor Malaysia Tel: +607 - 5996323 Fax: +607 - 598 6388 Email: bkpatmon@memstech.com Website: www.memstech.com

SALES TERMS:

MemsTech's Standard Sales Terms apply. Price and specifications are subject to change without notice.

WARRANTY:

Subject to the conditions set out below in this Clause, MemsTech and its subsidiaries warrants its products against defects in material and workmanship for a period of 12 months from the date of shipment. Products that are not subjected to misuse will be repaired or replaced. MemsTech and its subsidiaries reserves the right to make changes to any product herein without further notice. MemsTech and its subsidiaries makes no warranty, representation or guarantee regarding the suitability of its products for any application, nor does MemsTech and its subsidiaries assume liability arising out of the application or use of any product or circuit and specifically disclaims all liability without limitation consequential or incidental damages. The foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PATICULAR PURPOSE SHALL APPLY. This warranty does not extend to parts, materials or equipment not manufactured by MemsTech and its subsidiaries and this warranty is further subject to the conditions that MemsTech and its subsidiaries shall be under no liability whatsoever in respect of any defect in the products arising from any drawing design or specification supplied by the buyer or any defect arising from fair wera and tear, wilful damage, negligence, abnormal working conditions, failure to follow MemsTech and its subsidiaries' instructions (whether oral or in writing), misuse or alteration or repair of the products without MemsTech and its subsidiaries' approval. The provisions herein are governed by the laws of Singapore.

MEMSENZTM I Transduction Principle Capacitive Processing Technology Bulk/Deep RIE Actuation Mechanism Force (External) Signal Condition Two chips/Single chip MEMSENZ[™] II Transduction Principle Piezoresistive Processing Technology Bulk/Deep Wet Etch Actuation Mechanism Pressure (External) Signal Condition Two chips/Single chip

MEMSENZTM III Transduction Principle Resistive Processing Technology Surface Actuation Mechanism Thermal Signal Condition Two chips MEMSENZ[™] IV Transduction Principle Capacitive Processing Technology Bulk Actuation Mechanism Sound Signal Condition Two chips Document #: EDS-SDEV-007-07 Bey A