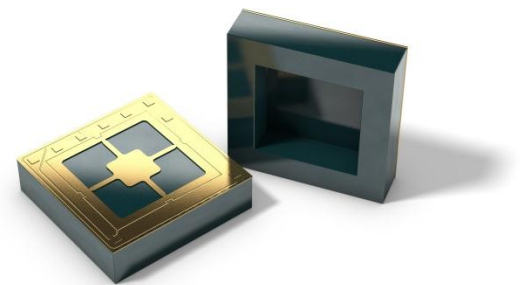


# OEM Silicon Pressure Die

## SM9520A Series

### FEATURES

- High volume, cost effective
- Gauge configuration
- Constant current or constant voltage drive
- Millivolt output
- Available in 0.15, 0.60 & 1.50 PSIG full-scale
- Ratiometric with supply voltage up to 6.5 V
- Manufactured according to ISO9001 and ISO/TS 16949 standards
- RoHS & REACH compliant

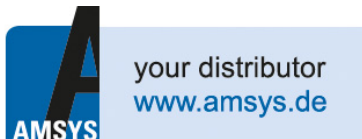


### DESCRIPTION

The SM9520A is a silicon micro-machined, piezoresistive pressure sensing die. This device is available with a full-scale range of 0.15 to 1.50 PSI (1.0 to 10 kPa) and is ideal for OEM and high-volume applications.

Provided in die form, these sensors can be mounted on ceramic or PC board substrates as part of an OEM system. They also may be packaged into proprietary or application specific sensor lines.

Dies are electrically probed, diced, inspected, and shipped as 200mm wafers on tape.



Medical	Industrial	Automotive
Patient Monitors	Industrial Controls	Diesel Particulate Filter
Blood Pressure Monitors	Compressors & Pumps	Exhaust Gas Recirculation
Oxygen Concentrators	Pressure Switches	Automotive Systems
Fluid Evacuation	Oil-Filled Packages	
Ventilators		

**Absolute Maximum Ratings**

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
1	Excitation Voltage <sup>(a)</sup>	V <sub>DD</sub>	-	-	6.5	V
2	Operating Temperature	T <sub>OP</sub>	-40	-	+85	°C
3	Storage Temperature <sup>(a)</sup>	T <sub>STG</sub>	-40	-	+125	°C

**Notes:**

a. Bridge must be driven with the positive voltage applied to +Vex

No.	Product Number	Operating Pressure	Proof Pressure (P <sub>PROOF</sub> ) <sup>(b)</sup>	Burst Pressure (P <sub>BURST</sub> ) <sup>(b)</sup>
4	SM9520A-010M-G-D	0 to 0.15 PSI	1.5 PSI	3.0 PSI
5	SM9520A-040M-G-D	0 to 0.60 PSI	4.8 PSI	6.0 PSI
6	SM9520A-100M-G-D	0 to 1.50PSI	12 PSI	15 PSI

**Notes:**

b. Tested on a sample basis.

**OPERATING CHARACTERISTICS FOR SM9520A DIE**

The operating characteristics are based on packaged die. The sensor performance may vary depending on the die attach material and process. The die attach material and process should minimize the stress transferred to the sensor die. All parameters are specified at VSUPPLY = 5.00 V supply voltage at 25°C, unless otherwise noted.

**Operating Characteristics - Specifications**

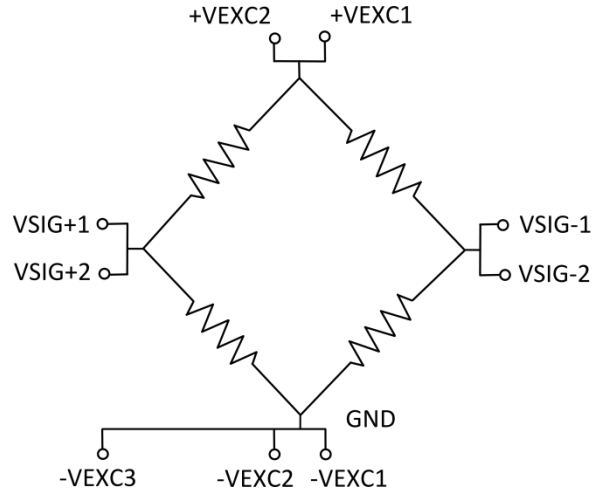
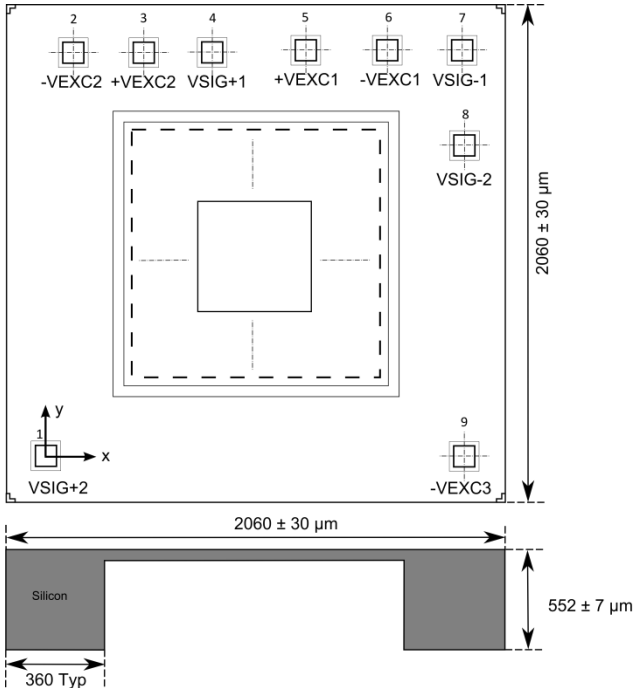
All parameters are specified at Vdd = 5.0 V supply voltage at 25°C, unless otherwise noted.

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units	
7	Span (FS P <sub>RANGE</sub> )	V <sub>SPAN</sub>	0.15 PSIG <sup>(b)</sup>	30	45	60	mV
			0.60 PSIG <sup>(b)</sup>	60	90	120	
			1.50 PSIG <sup>(b)</sup>	65	95	125	
8	Zero Offset <sup>(c)</sup>	V <sub>ZERO</sub>	-75	-	25	mV	
9	TC Span <sup>(b, d)</sup>	TCS	-0.24	-0.21	-0.155	%FS/°C	
10	TC Zero Offset <sup>(b, d)</sup>	TCZ		0 to 100		µV/°C	
11	TC Resistance <sup>(d, f)</sup>	TCR	0.17	0.20	0.23	%Rb/°C	
12	Linearity – Topside <sup>(b, e)</sup>	NL <sub>TS</sub>	-0.15	±0.1	0.15	%/FS	
13	Linearity – Backside <sup>(b, e)</sup>	NL <sub>BS</sub>	-0.35	±0.2	0.35	%/FS	
14	Bridge Resistance <sup>(c)</sup>	R <sub>B</sub>	4.0	5.2	6.0	kΩ	

**Notes:**

- b. Tested on a sample basis
- c. Tested 100% at wafer probe
- d. Determined by measurements taken over -40 to 85°C
- e. Defined as best fit straight line
- f. Tested annually on a sample basis.

SM9520A Diagrams and Dimensions



**Assembly Recommendations**

- (a) Use soft RTV for die-attachment
- (b) A bond line thickness of 180-220 μm is recommended
- (c) The RTV should not go up the inside of the die cavity by more than 50% of the die thickness.

All dimensions are in micron.

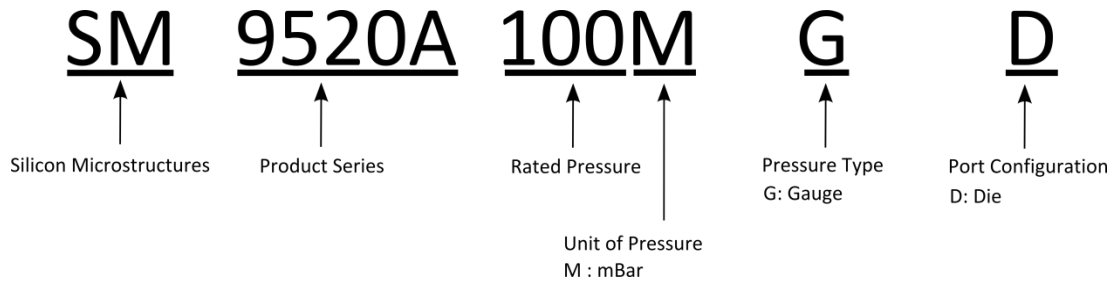
Typical Operation					Pad Coordinate	
PAD #	PAD DESCRIPTION	PAD LABEL	TYPE	VALUE	Coordinate X-Axis (μm)	Coordinate Y-Axis (μm)
1	VSIG+2		Positive Analog Out	-	0	0
2	--VEXC2		Negative Power	0 V	0	1760
3	+VEXC2		Positive Power	+5 V	350	1760
4	VSIG+1		Positive Analog Out	-	700	1760
5	+VEXC1		Positive Power	5 V	1050	1760
6	--VEXC1		Negative Power	0 V	1400	1760
7	VSIG-1		Negative Analog Out	-	1760	1760
8	VSIG-2		Negative Analog Out	-	1760	1360
9	--VEXC3		Negative Power	0 V	1760	0

Bond pad opening size = 100x100 μm

**Ordering Information**

Order Code	Full-Scale Pressure Range	Pressure Type	Minimum Order Quantity
SM9520A-010M-G-D	0.15 PSI	Gauge	1 Wafer (1 wafer = 5,500 ±10%)
SM9520A-040M-G-D	0.60 PSI		
SM9520A-100M-G-D	1.50 PSI		

**Part Number Legend**



**Qualification Standards**

REACH Compliant  
 RoHS Compliant  
 PFOS/PFOA Compliant  
 For qualification specifications, please contact Sales at [sales@si-micro.com](mailto:sales@si-micro.com)

**your distributor**  
 AMSYS GmbH & Co.KG  
 An der Fahrt 4, 55124 Mainz, Germany  
 Tel. +49 (0) 6131 469 875 0  
[info@amsys.de](mailto:info@amsys.de) | [www.amsys.de](http://www.amsys.de)



## Silicon Microstructures Warranty and Disclaimer:

Silicon Microstructures, Inc. reserves the right to make changes without further notice to any products herein and to amend the contents of this data sheet at any time and at its sole discretion.

Information in this document is provided solely to enable software and system implementers to use Silicon Microstructures, Inc. products and/or services. No express or implied copyright licenses are granted hereunder to design or fabricate any silicon-based microstructures based on the information in this document.

Silicon Microstructures, Inc. makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does Silicon Microstructures, Inc. assume any liability arising out of the application or use of any product or silicon-based microstructure, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Silicon Microstructure's data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals", must be validated for each customer application by customer's technical experts. Silicon Microstructures, Inc. does not convey any license under its patent rights nor the rights of others. Silicon Microstructures, Inc. makes no representation that the circuits are free of patent infringement. Silicon Microstructures, Inc. products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Silicon Microstructures, Inc. product could create a situation where personal injury or death may occur. Should Buyer purchase or use Silicon Microstructures, Inc. products for any such unintended or unauthorized application, Buyer shall indemnify and hold Silicon Microstructures, Inc. and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Silicon Microstructures, Inc. was negligent regarding the design or manufacture of the part.

Silicon Microstructures, Inc. warrants goods of its manufacture as being free of defective materials and faulty workmanship. Silicon Microstructures, Inc. standard product warranty applies unless agreed to otherwise by Silicon Microstructures, Inc. in writing; please refer to your order acknowledgement or contact Silicon Microstructures, Inc. directly for specific warranty details. If warranted goods are returned to Silicon Microstructures, Inc. during the period of coverage, Silicon Microstructures, Inc. will repair or replace, at its option, without charge those items it finds defective. The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Silicon Microstructures, Inc. be liable for consequential, special, or indirect damages.

While Silicon Microstructures, Inc. provides application assistance personally, through its literature and the Silicon Microstructures, Inc. website, it is up to the customer to determine the suitability of the product for its specific application. The information supplied by Silicon Microstructures, Inc. is believed to be accurate and reliable as of this printing. However, Silicon Microstructures, Inc. assumes no responsibility for its use. Silicon Microstructures, Inc. assumes no responsibility for any inaccuracies and/or errors in this publication and reserves the right to make changes without further notice to any products or specifications herein

Silicon Microstructures, Inc.™ and the Silicon Microstructures, Inc. logo are trademarks of Silicon Microstructures, Inc. All other service or product names are the property of their respective owners.

© Silicon Microstructures, Inc. 2001-2019. All rights reserved.