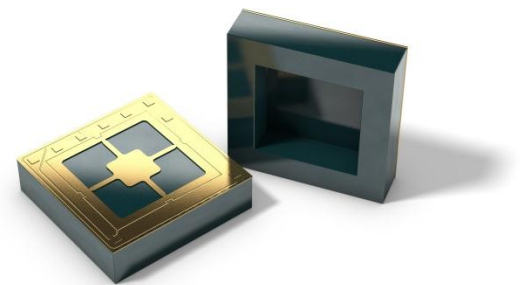


# OEM Silicon Pressure Die

## SM9520 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 SM9520 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	SM9520-010M-G-D	0 to 0.15 PSI	1.5 PSI	3.0 PSI
5	SM9520-040M-G-D	0 to 0.60 PSI	4.8 PSI	6.0 PSI
6	SM9520-100M-G-D	0 to 1.50PSI	12 PSI	15 PSI

**Notes:**

b. Tested on a sample basis.

**OPERATING CHARACTERISTICS FOR SM9520 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**

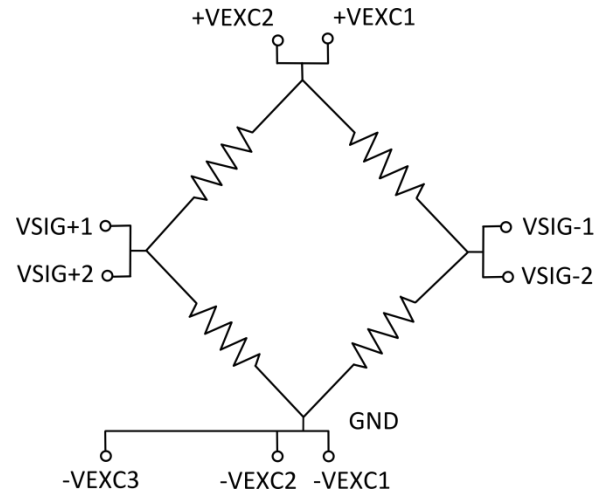
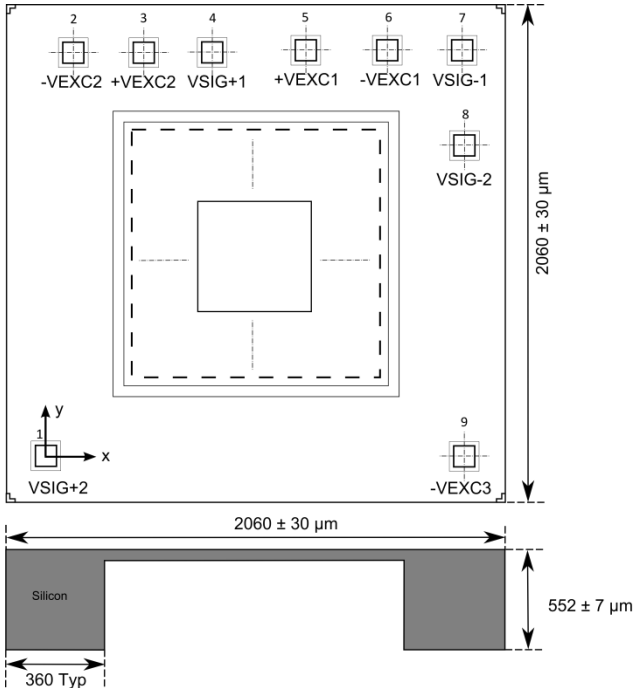
All parameters are specified at Vdd = 5.0 V supply voltage at 25°C, unless otherwise noted.

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.

SM9520 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.

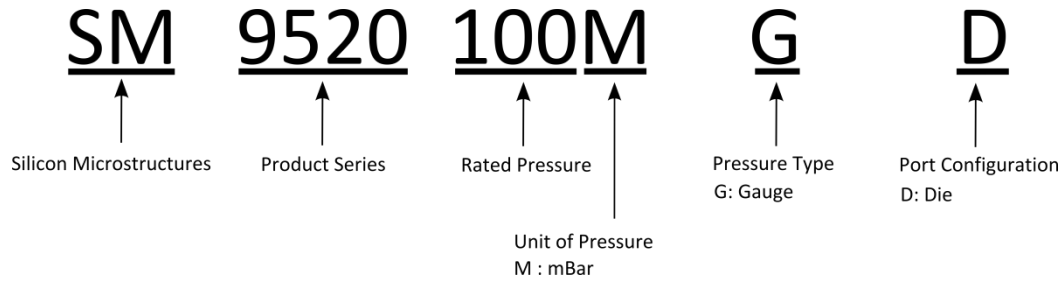
Typical Operation					Pad Coordinate	
PAD #	PAD DESCRIPTION	PAD LABEL	TYPE	VALUE	Coordinate X-Axis (μm)	Coordinate Y-Axis (μm)
1	VSIG+2		Positive Analog Out	-	0	0
2	--VEXC2		Negative Power	0 V	0	1760
3	+VEXC2		Positive Power	+5 V	350	1760
4	VSIG+1		Positive Analog Out	-	700	1760
5	+VEXC1		Positive Power	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
SM9520-010M-G-D	0.15 PSI	Gauge	1 Wafer (1 wafer = 5,500 ±10%)
SM9520-040M-G-D	0.60 PSI		
SM9520-100M-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



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