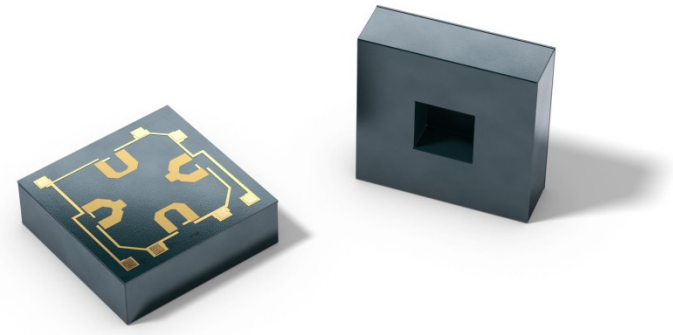
OEM Silicon Pressure Die

AccuStable SM30D Family (Replaces SM30G)

FEATURES

- Enhanced stability with an integrated field shield
- Qualified operating temperature range: -40°C to 150°C
- Small size 1.34 x 1.34 mm
- Differential or gauge configuration
- Available 5, 15, 30, 80, 150 & 500 PSI
- Ratiometric with supply voltage up to 10 V
- Qualified using Grade 0 AEC-Q100 automotive standards
- Manufactured according to ISO9001 and ISO/TS 16949 standards
- RoHS & REACH compliant



DESCRIPTION

The SM30D is a silicon micro-machined, piezoresistive pressure sensing die. This device is available with a full-scale range of 5 to 150 PSI. A 500 PSI version is in development. Both open-bridge and closed-bridge versions are available. This sensor is ideal for OEM and high-volume applications

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

The SM30D die are electrically probed, diced, inspected and shipped on tape. Electronic wafer maps are provided with each wafer. For additional shipping options, contact sales@si-micro.com

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		

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Absolute Maximum Ratings

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
1	Excitation Voltage[a]	V_{DD}	-	-	10	V
2	Operating Temperature	T_{OP}	-40	-	+150	°C
3	Storage Temperature[a]	T_{STG}	-55	-	+150	°C
4	ESD Rating - Human Body Model	V_{ESD}			2	kV

Notes:

a. The device can only be driven with the supply voltage connected to the pins as shown.

No.	Product Number	Legacy Product Number	Operating Pressure	Proof Pressure (P_{PROOF})[b]	Burst Pressure (P_{BURST})[b]
5	SM30D-H-ND-005S-0000A SM30D-H-ND-005S-0000B	SM3020-005-G-D SM3021-005-G-D	0 to 5 PSI	25 PSI	40 PSI
6	SM30D-H-ND-015S-0000A SM30D-H-ND-015S-0000B	SM3020-015-G-D SM3021-015-G-D	0 to 15 PSI	45 PSI	75 PSI
7	SM30D-H-ND-030S-0000A SM30D-H-ND-030S-0000B	SM3020-030-G-D SM3021-030-G-D	0 to 30 PSI	90 PSI	150 PSI
8	SM30D-H-ND-080S-0000A SM30D-H-ND-080S-0000B	SM3020-080-G-D SM3021-080-G-D	0 to 80 PSI	240 PSI	320 PSI
9	SM30D-H-ND-150S-0000A SM30D-H-ND-150S-0000B	SM3020-150-G-D SM3021-150-G-D	0 to 150 PSI	300 PSI	450 PSI
10	SM30D-H-ND-500S-0000A[c] SM30D-H-ND-500S-0000B[c]	SM3020-500-G-D SM3021-500-G-D	0 to 500 PSI	TBD	TBD

Notes:

b. Tested on a sample basis. The burst and proof pressure values are limited by pressure applied to the backside of the die. The burst and proof pressure values are higher than shown here when pressure is applied to the topside of the die.

c. Production release pending

OPERATING CHARACTERISTICS FOR SM30D

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.

The sensor can be operated with the highest pressure applied to the topside of the die (topside operation) or the highest pressure applied to the backside of the die (backside operation). With topside operation, increasing topside pressure will result in an increasing sensor output.

Operating Characteristics - Specifications

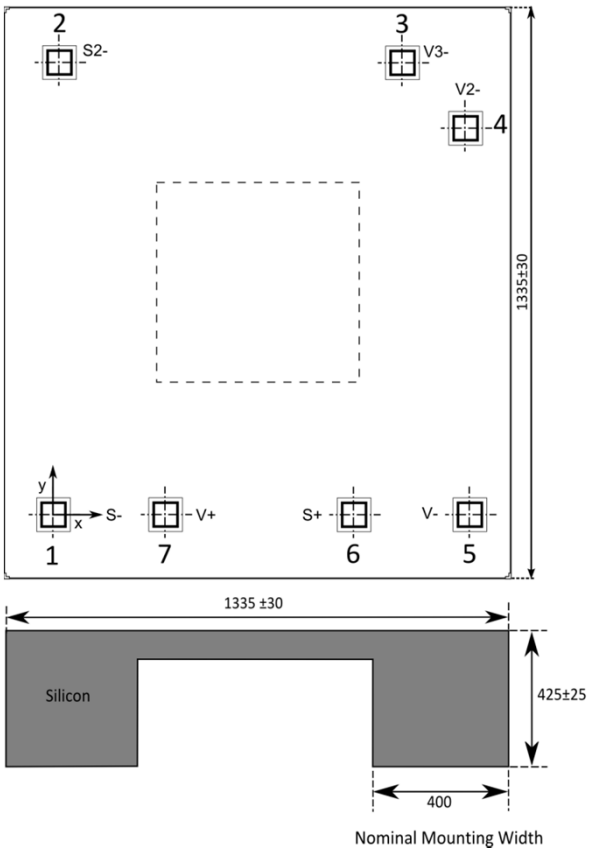
All parameters are specified at Vdd = 5.0 V supply voltage at 25°C, unless otherwise noted.

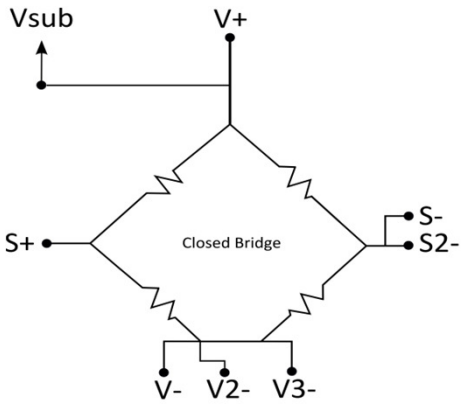
No.	Characteristic		Symbol	Minimum	Typical	Maximum	Units
10	Span (FS P_{RANGE})	5, 15, 80 PSI (d, e)	V_{SPAN}	60	90	120	mV
		30, 150 PSI (d, e)		55	80	105	
		500 PSI		TBD	TBD	TBD	
11	Zero Offset		V_{ZERO}	-45	-10	25	mV
12	TC Span (d, f, g)		TCS	-0.24	-0.19	-0.155	%/°C
13	TC Zero Offset(d, f, g)		TCZ	-75	-	75	µV/°C
14	TC Resistance(d, f, g)		TCR	0.24	0.275	0.33	%/°C
15	Linearity - Topside (d, g, h)		NL_{TS}	-0.15	<±0.10	0.15	%/FS
16	Linearity – Backside	5 PSI (d, g, i)	NL_{BS}	-0.3	<±0.2	0.3	%/FS
		15, 30, 80, 150 PSI (d, g, i)		-0.15	<±0.10	0.15	
		500 PSI (d, g, i)		TBD	TBD	TBD	
17	Bridge Resistance		R_B	4	5	6	kΩ
18	Pressure Hysteresis(d)		P_{HYS}		<±0.1		%FS
19	Thermal Hysteresis(d, f)		T_{HYS}		<±0.2		%FS

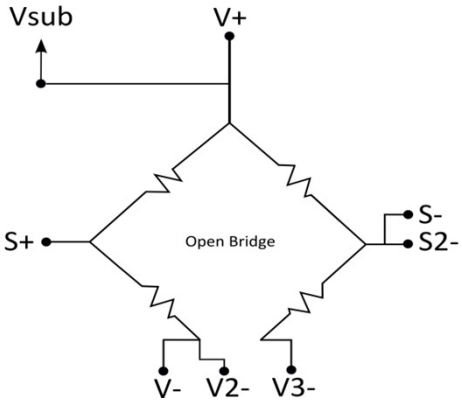
Notes:

d. Tested on a sample basis
e. For other pressures, please contact SMI sales at +1-(408) 577-0100 or email at sales@si-micro.com
f. Determined by measurements taken over -40°C to 150°C
g. Defined as best fit straight line
h. Topside linearity is with the highest pressure applied to the topside of the die
i. Backside linearity is with the highest pressure applied to the backside of the die

SM30D Diagrams and Dimensions







All dimensions are in micron.

Bond pad opening size = 90x90 µm

Typical Operation

PAD #	PAD DESCRIPTION	PAD LABEL	TYPE	VALUE	Coordinate X-Axis (µm)	Coordinate Y-Axis (µm)
1	Negative Sensor Output	S-	- Analog Output	-	0	0
2	Negative Sensor Output	S2-	- Analog Output	-	0	1100
3	Negative Supply Voltage	V3-	Power	0 V	890	1100
4	Negative Supply Voltage	V2-	Power	0 V	1100	890
5	Negative Supply Voltage	V-	Power	0 V	1100	0
6	Positive Sensor Output	S+	+ Analog Output	-	840	0
7	Positive Supply Voltage	V+	Power	+5 V	260	0

NOTES:

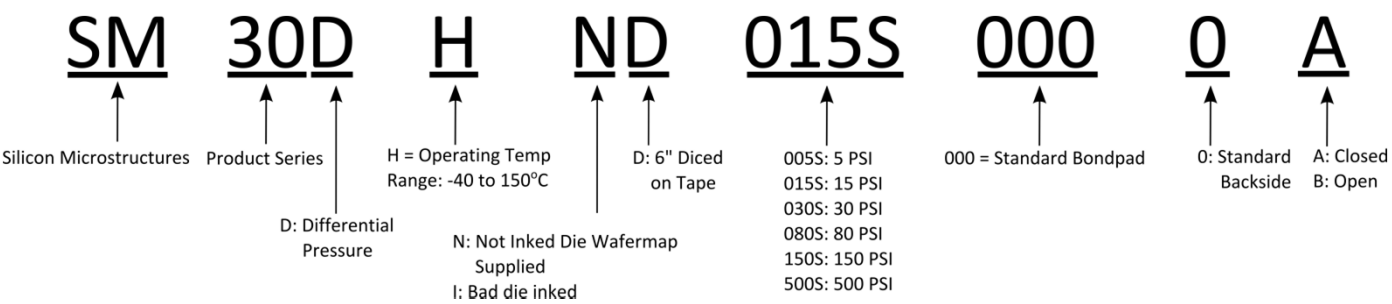
- Closed bridge configuration: Pads 3, 4, & 5 are connected
- Open bridge configuration: Pads 4 & 5 are connected, and pad 3 is the second negative supply voltage connection

Ordering Information

Order Code	Full-Scale Pressure Range	Pressure Type	Configuration	Minimum Order Quantity
SM30D-H-ND-005S-0000A SM30D-H-ND-005S-0000B	5 PSI	Differential / Gauge	Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	1 Wafer (1 wafer = 6,000 ±10%)
SM30D-H-ND-015S-0000A SM30D-H-ND-015S-0000B	15 PSI		Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	
SM30D-H-ND-030S-0000A SM30D-H-ND-030S-0000B	30 PSI		Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	
SM30D-H-ND-080S-0000A SM30D-H-ND-080S-0000B	80 PSI		Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	
SM30D-H-ND-150S-0000A SM30D-H-ND-150S-0000B	150 PSI		Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	
SM30D-H-ND-500S-0000A[j] SM30D-H-ND-500S-0000B[j]	500 PSI		Closed bridge, 6” wafer diced on tape Open bridge, 6” wafer diced on tape	

NOTES:
j: Production release pending

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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