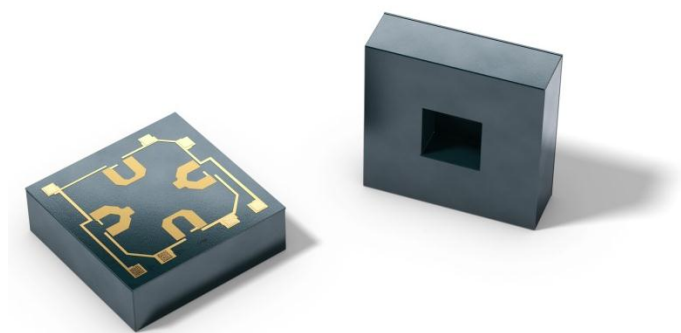


OEM Silicon Pressure Die

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 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. 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		

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

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 V_{dd} = 5.0 V supply voltage at 25°C, unless otherwise noted.

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
10	Span (FS P _{RANGE})	V _{SPAN}	60	90	120	mV
			55	80	105	
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	NL _{BS}	-0.3	<±0.2	0.3	%FS
			-0.15	<±0.10	0.15	
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

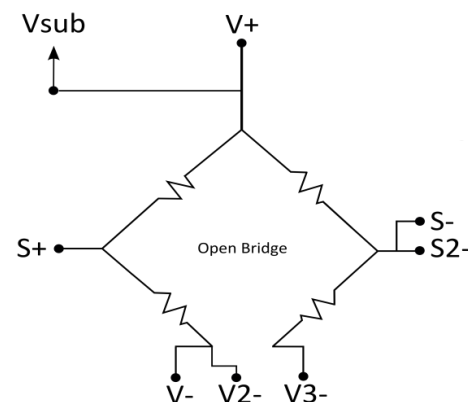
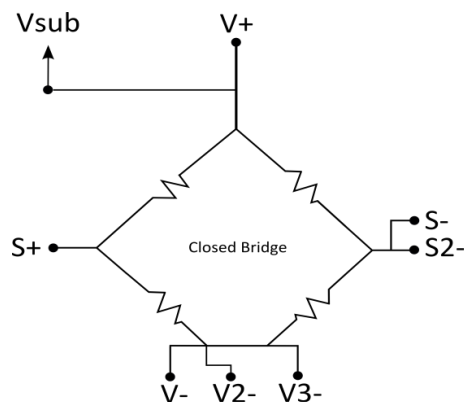
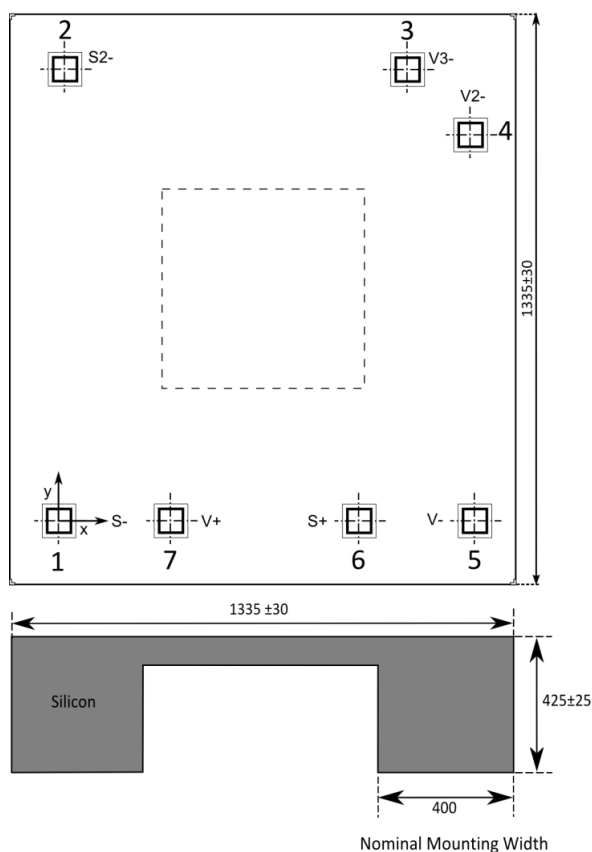
f. Determined by measurements taken over -40°C to 150°C

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

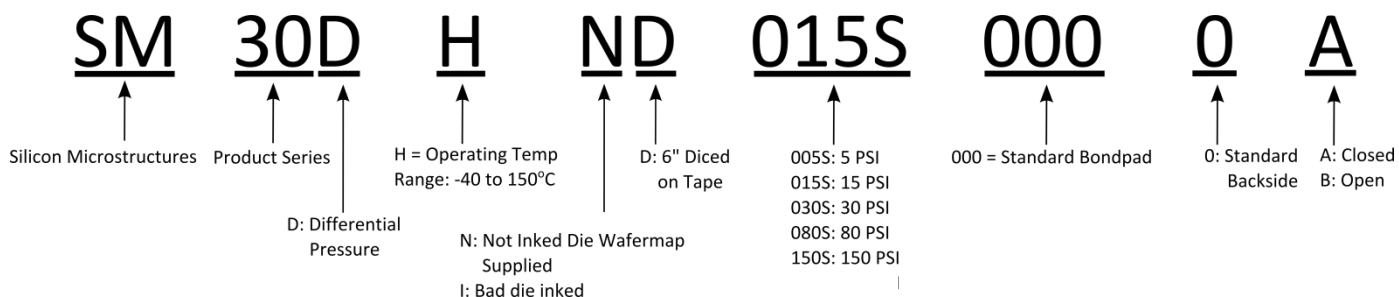
Ordering Information

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	

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



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. 2001-2020. All rights reserved.