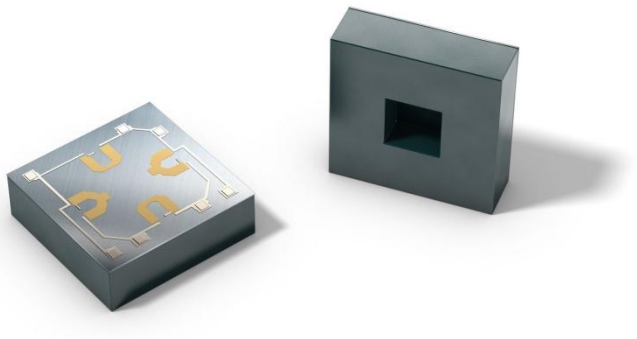
OEM Silicon Pressure Die

AccuStable™ SM30G Platinum Family

FEATURES

- Platinum bond-pads enable use in harsh environments
- Qualified using Grade 0 AEC-Q100 automotive standards
- Enhanced stability with an integrated field shield
- Extended operating temperature range: -40°C to 150°C
- Small size 1.35 x 1.35 mm
- <1% Output shift over life
- Differential or gage configuration
- Available 5, 15, & 30 PSI
- Ratiometric with supply voltage up to 10 V
- Manufactured according to ISO9001 and ISO/TS 16949 standards
- RoHS & REACH compliant



DESCRIPTION

The SM30G-Platinum is a silicon micro-machined, piezoresistive pressure sensing die. This device will be available with a full-scale range of 5 to 30 PSI and is ideal for OEM and high-volume applications. The device has platinum bond-pads to enable its use in harsh environments.

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 devices are electrically probed, diced, inspected and shipped on tape. Electronic wafer maps are provided with each wafer.

Medical	Industrial	Automotive
Patient Monitors	Industrial Controls	Diesel Particulate Filter (DPF)
Blood Pressure Monitors	Compressors & Pumps	Exhaust Gas Recirculation (EGR)
Oxygen Concentrators	Pressure Switches	Automotive Systems
Fluid Evacuation		Gas Particulate Filter (GPF)

+1-(408) 577-0100 / sales@si-micro.com / www.si-micro.com

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[c]	Proof Pressure (P_{PROOF})[b]	Burst Pressure (P_{BURST})[b]
5	SM30G-H-ND-005S-0010A	SM3022-005-G-D	±5 PSI 0 to 5 PSI 0 to -5 PSI	25 PSI	40 PSI
6	SM30G-H-ND-015S-0010A	SM3022-015-G-D	±15 PSI 0 to 15 PSI 0 to -15 PSI	45 PSI	75 PSI
7	SM30G-H-ND-030S-0010A	SM3022-030-G-D	±30 PSI 0 to 30 PSI 0 to -30 PSI	90 PSI	150 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. Can be operated as topside gauge, backside gage & differential.

OPERATING CHARACTERISTICS FOR SM30G Platinum Series

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

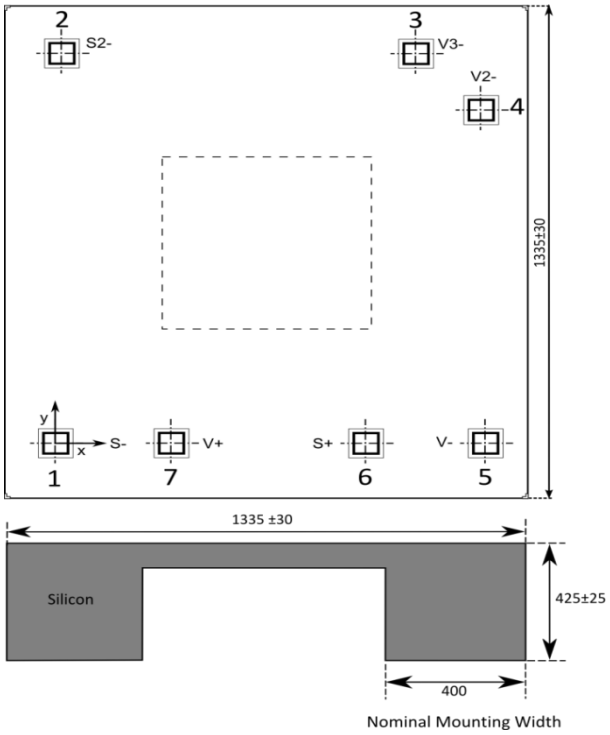
All parameters are specified at Vdd = 5.0 V supply voltage at 25°C, unless otherwise noted.

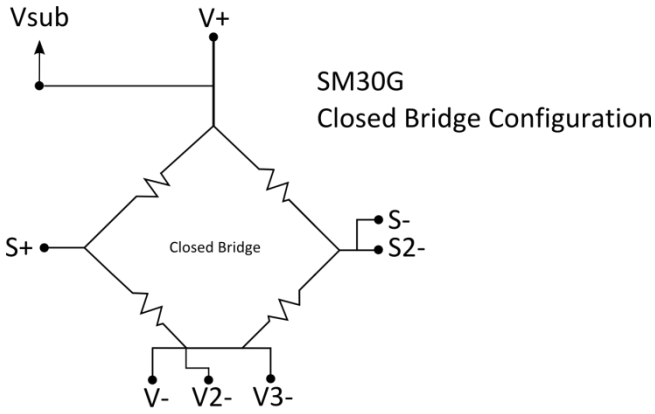
No.	Characteristic		Symbol	Minimum	Typical	Maximum	Units
8	Topside Span (FS P_{RANGE})	5, 15 PSI (c, d)	V_{SPAN}	60	90	120	mV
		30 PSI (c, d)		55	80	105	
9	Backside Span (FS P_{RANGE})	5, 15 PSI (c, d)	V_{SPAN}	60	90	120	mV
		30 PSI (c, d)		55	80	105	
10	Zero Offset		V_{ZERO}	-45	-5	+25	mV
11	TC Span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

Notes:

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

SM30G Diagrams and Dimensions





Platinum bond-pad size = 110x110µm

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 #	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	Legacy Product Number	Configuration	Full-Scale Pressure Range*	Minimum Order Quantity
SM30G-H-ND-005S-0010A	SM3022-005-G-D	Closed Bridge	5 PSI	1 Wafer (1 wafer = 6,000 ±10%)
SM30G-H-ND-015S-0010A	SM3022-015-G-D	Closed Bridge	15 PSI	
SM30G-H-ND-030S-0010A	SM3022-030-G-D	Closed Bridge	30 PSI	

NOTE: Part numbers of engineering samples are subject to change
* Topside 0 to +5 PSI, 0 to -5 PSI or ± FS Pressure

Part Number Legend

SM — Silicon Microstructures
30G — Product Series
H — H = Operating Temp Range: -40 to 150°C
ND — N: Not Inked Die Wafer Map Supplied; D: 6" Diced on Tape
015S — 005S: 5 PSI; 015S: 15 PSI; 030S: 30 PSI
0010A — Platinum Bondpads; Closed Bridge Configuration

Qualification Standards

REACH Compliant
RoHS Compliant
PFOS/PFOA Compliant
For qualification specifications, please contact Sales at sales@si-micro.com

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