

GD05
0 to 10 N

General Purpose 0.5 cm-diameter Ultra-thin Flexible Pressure Sensor

The Uneo™ pressure sensor series is a Wall Street Journal Technology Award-winning ultrathin flexible force sensing sensor suitable for a wide range of human-machine interface measurement from a gentle finger touch to full-body weighing scales. The patented sensor technology employs the latest advances in piezoresistive polymer composite processing and printing-based micromachining technology to enable simple and high-quality linear output in the form of variable conductance (inverse of resistance) that is proportional to the input force.

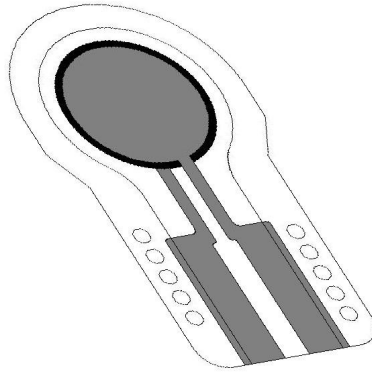
Features

- > Linearity Exceeding 99% over 0 to 10N
- > Capable of up to 10 Million Actuations
- > Wide Temperature Range -10°C ~ 65°C
- > Compatible with Simple Voltage-Divider Readout
- > Environmentally-Friendly Fabrication

ORDERING INFORMATION

Device Name	Force Range	Sensor Type	Connector Type
Uneo GD05	0 – 10N	Resistive	Crimpflex

Package



Uneo GD05

Operating Characteristics

Table 1. Operating Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted, F is positive)

Characteristic	Symbol	Min	Typ	Max	Unit
Force Range ⁽¹⁾	F_{OP}	0		10	N
Linearity ⁽²⁾			0.99		
Repeatability ⁽³⁾				± 2	%
Hysteresis ⁽⁴⁾				± 2	%
Drift ⁽⁵⁾				6	%/log(s)
Response Time ⁽⁶⁾	t_R			0.1	ms
Temperature Sensitivity ⁽⁷⁾	Y/T			0.35	%/°C

1. The equivalent pressure on sensor can be computed as the force on sensing area divided by the sensor area. Depending on the application, the usable force range could be higher than 10N.
2. Linearity indicates how well force vs. sensor conductance is correlated linearly. It is computed by taking the coefficient of determination, or R^2 , of measurements in sensor's operating force range.
3. Repeatability accounts for how well the sensor can reproduce a reading when the same force is applied within the rated operating force range using precision actuation systems. Results could vary depending on the stability of mechanical setup.
4. Hysteresis is the difference between sensor output values when force is added or removed continuously from the sensor. The value is defined by the maximum difference in sensor output values, at the same force, during the loading and unloading of force in the rated operating force range.
5. Drift is the gradual shift the sensor output while the sensor is subjected to a fixed force, and is defined as percentage of shift relative to initial reading over time. Typically, the sensor conductance will increase gradually with time, so such factor should be considered to derive accurate force measurement.
6. Response time (t_R) is defined as the time for the incremental change in the output to get from 10% to 90% of the final value when subjected to a change in applied force.
7. Temperature Sensitivity is measured by the percentage change in output conductance per change in operating temperature. The rating is only applicable when sensor is operated within conditions described in Table 2.

Maximum Ratings

Table 2. Maximum Ratings

Rating	Symbol	Value	Unit
Storage Temperature	T_{stg}	-40 to +85	°C
Operating Temperature	T_A	-10 to +65	°C

Operating beyond the specified limits could change the sensor output characteristic permanently.

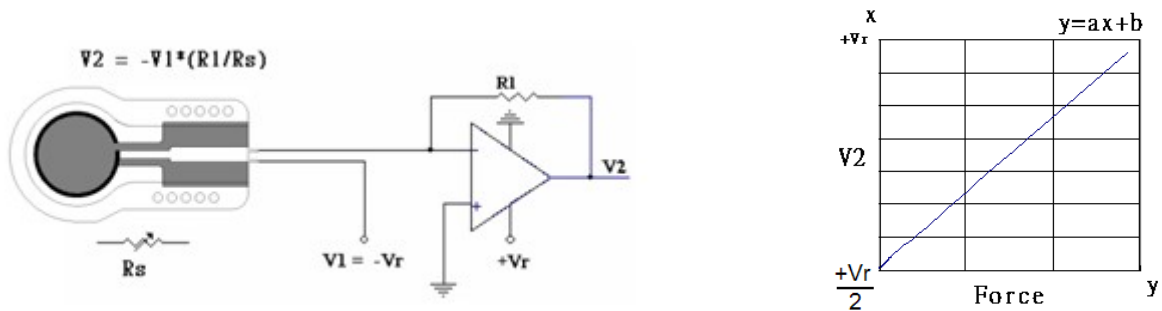
Operating Characteristics

Parameter	Typical Resistance Change	Notes(method)
High Temperature Storage test	$\leq \pm 10\%$	85°C 24hr, load 100g
Low Temperature Storage test	$\leq \pm 10\%$	-40°C 24hr, load 100g
Temperature Humidity Storage test	$\leq \pm 10\%$	65°C/90% 48hr , load 100g
Insulation test	$\geq 10 \text{ M}\Omega$	65°C/90% 24hr , No load

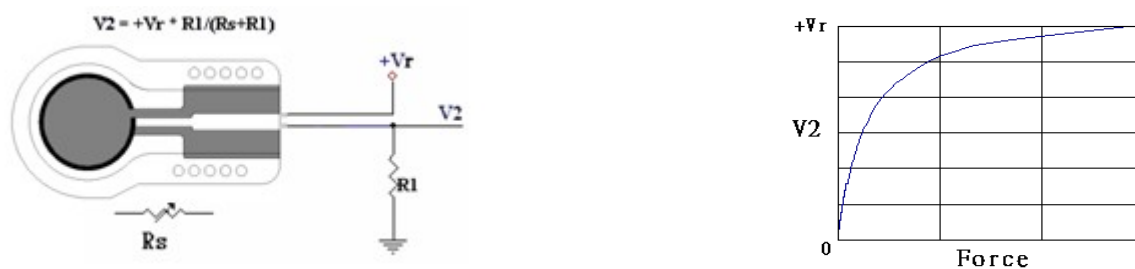
Measurement Circuit

Two methods to measure UNEO sensor is shown below:

- Using an operational amplifier (OP-AMP) in an inverting configuration to obtain a voltage output that varies linearly with respect to force input. Use this circuit if high output linearity is desired.



- Using a fixed resistor R_1 in a voltage divider configuration for an output V_2 that increases with respect to added force. Use this circuit topology for budget or power-conscious applications.

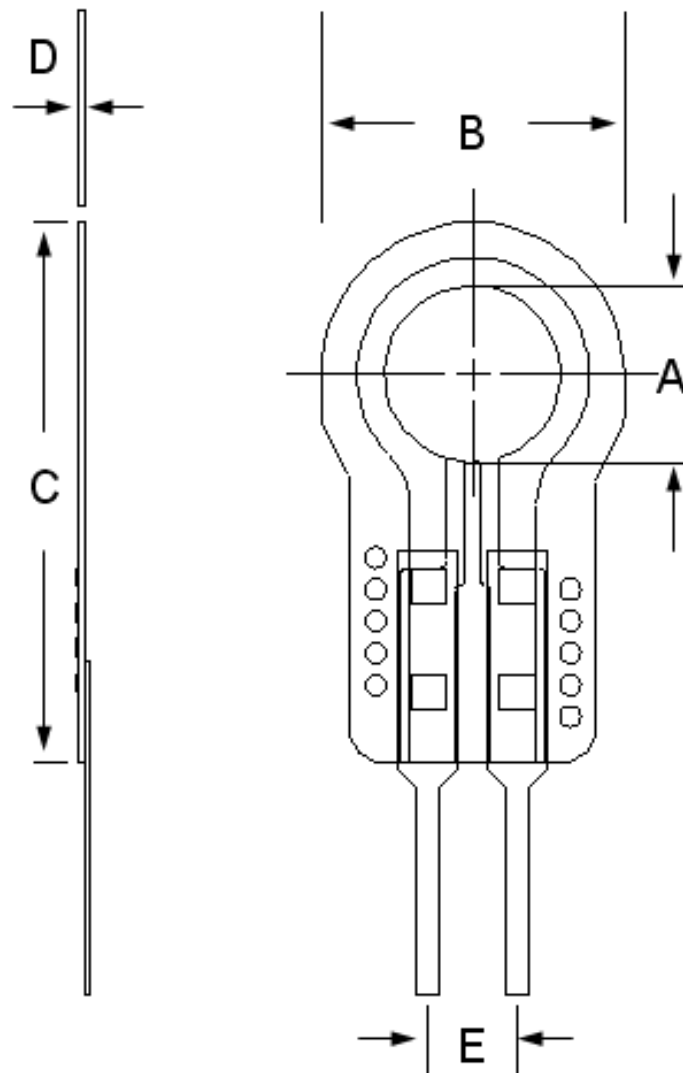


Note:

- R_1 is 1Kohm to 100Kohm
- V_2 is 0 to $+V_r$

Nominal Dimension

DIM	Millimeters
A	5.00
B	8.6
C	15.3
D	0.2
E	2.54



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