GMF103 Analog Force Sensor

General Introduction

GMF103 is an analog force sensor especially designed for consumer applications like touch panels, seamless buttons, and smart shoes. It is housed in a compact 4.0×4.0×1.0 mm^3 package. The force sensor is based on the industry-recognized piezo-resistive technology featuring long-term stability and EMC robustness. The force sensor is capable of continuously measuring forces from 0N up to 10N.

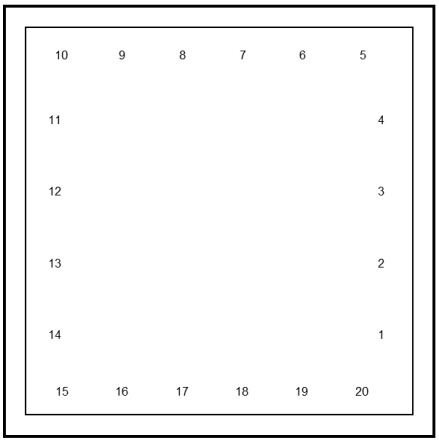
Focusing on micro force measurement, the high sensitivity, and the high resolution makes GMF103 especially suitable for applications that detect forces from hand related movement such as finger taps or pen drawing.

Features

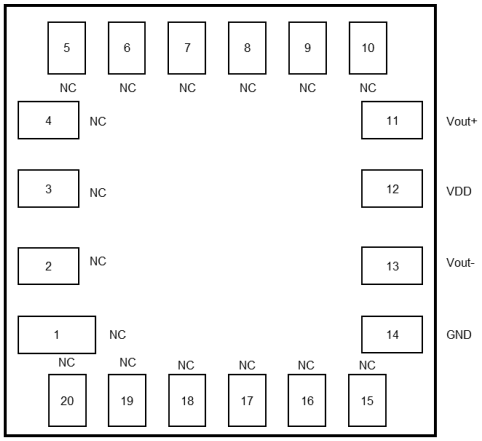
- Operation range:
  - Force: 0~10N
  - Temperature: -40~+85℃
- Force resolution:
  - Up to1mN
- Supply voltage:
  - VDD: +2.4V ~ +3.6V
- RoHS-compliance package:
  - 20-pin LTCC package
  - Footprint: 4.0 × 4.0 mm^2
  - Height: 1.0 mm.

Applications

Force buttons, painting stylus, gaming, robotic end-effectors, and insoles of smart shoes



Top View



Bottom View

Specifications

Table 1: Pin Descriptions

Pin#	Name	Description
1-10	NC	No connection inside
11	Vout+	Analog output voltage +
12	VDD	Power supply in
13	Vout-	Analog output voltage -
14	GND	Ground pin
15-20	NC	No connection inside

Table 2: Specification

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operation voltage	VDD		2.4	3.0	3.6	V
Temperature range	Ta		-40	+25	+85	°C
Force range	F		0	—	10	N
Span				600		mV
Zero offset			-10	0	10	mV
Zero offset shift		25 to 50°C		TBD		mV
Sensitivity			—	60	—	mV/N at 3V
Sensitivity shift		25 to 50°C		TBD		%Span
Linearity				±5		%Span
Noise (RMS)				0.01		mV
Long term stability	FSTAB			TBD		%Span

Table 3: Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit
Power supply voltage	VDD		5.5	V
Overload force	FMAX	0	TBD	N
Storage temperature	TST	-40	+85	°C
ESD	HBM	—	±2	kV

Package

Outline Dimension

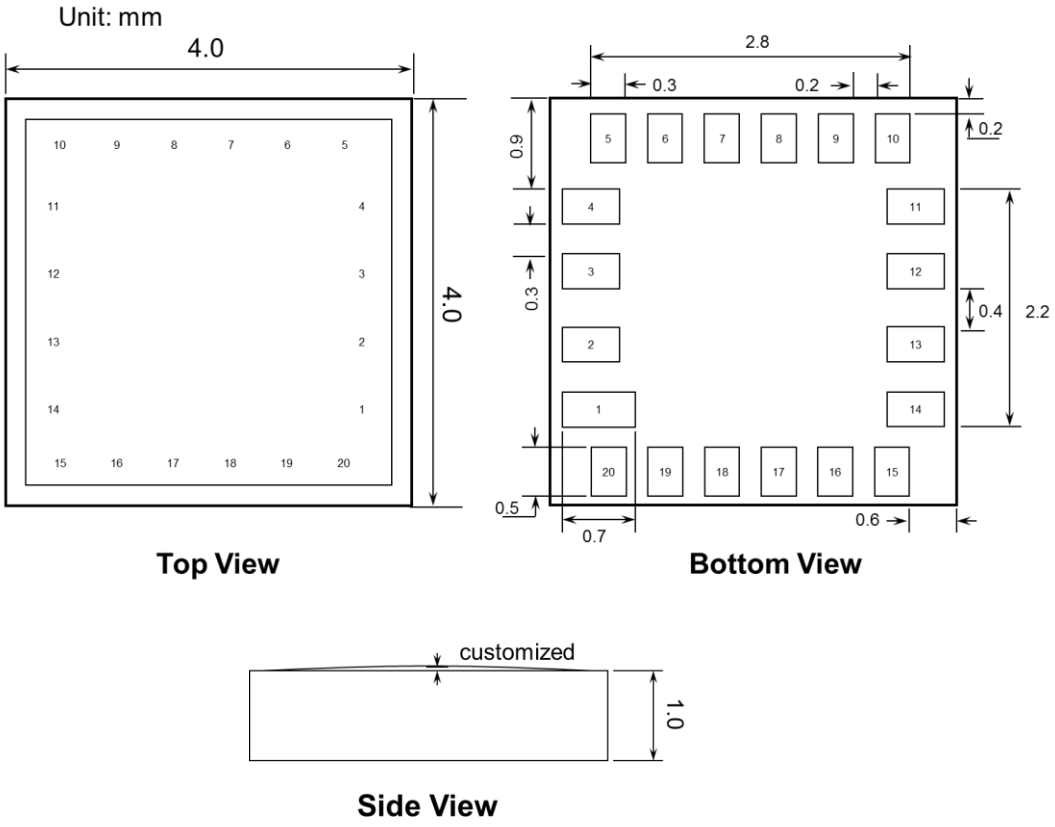


Figure 1: Package Outline Dimension

RoHS Compliance

GMEMS LTCC package with silicone cover sensors are compliant with Restrictions on Hazardous Substances (RoHS) and having lead-free terminations. Reflow profiles applicable to those processes can be used successfully for soldering the devices.

Recommended PCB Foot Print Layout

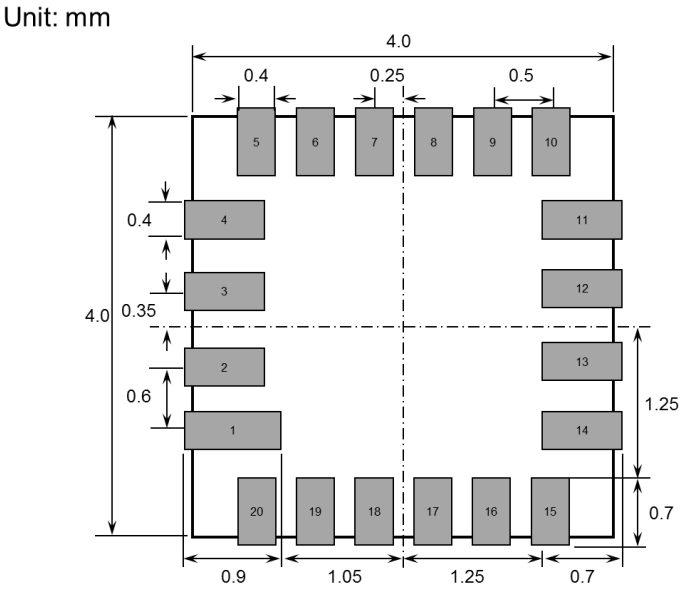


Figure 2: Layout Recommendation for PCB Land Pad

Moisture Sensitivity Level

GMF103 package MSL rating is Level 3.

Document History and Modification

Revision No.	Description	Date
V0.10	Preliminary datasheet	2017.03.03
V0.11	Modification of the sensor height	2017.10.13