

**Features**

- Multiple Device Access (MDA)
  - Global read and write operations
- Temperature range: -40°C to +125°C
- Temperature measurement accuracy: ±1°C (-40°C ~ +125°C)
- Package: 4-Ball WCSP (DSBGA)
- Supply voltage
  - TMP103A: 1.4V ~ 2.8V
  - TMP103B: 1.4V ~ 3.6V
- Low static current
  - Normal operation: ≤3μA (0.25Hz)
  - Off mode: ≤1μA
- Resolution
  - TMP103A: 8Bits
  - TMP103B: 11Bits
- Digital output: compatible with SMBus™ and IC<sup>2</sup> interfaces

**Applications**

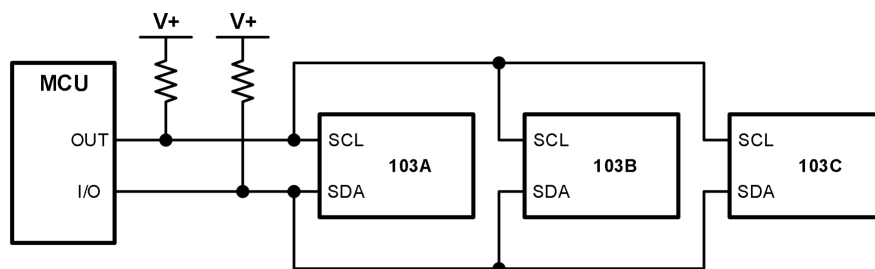
- Phone
- Laptop
- Solid State Drive (SSDs)
- Server
- Set top box
- Low power environment
- Sensor

**Description**

The TMP103 series temperature sensors are all in 4-Ball wafer-level packages, of which the TMP103A has a resolution of 1°C and the TMP103B has a resolution of 0.125°C.

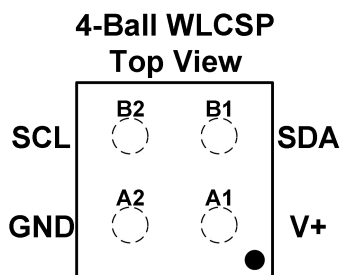
The two-wire interface of the TMP103 series is compatible with SMBus and IC<sup>2</sup> communication modes, and supports multi-chip access (MDA) commands, which can realize the communication between the host and multiple chips on the bus at the same time, without sending separate read and write commands to each TMP103 series chip. TMP103A supports up to 8 different address chips to be mounted on a main line, and TMP103B supports 16 different address chips to be mounted.

The TMP103 series is suitable for the system with limited temperature measurement area, temperature sensitivity, and multi-temperature area measurement and monitoring. The rated operating temperature range of the TMP103 series is -40°C ~ +125°C.



TMP103 Application Diagram

Pin Configuration and Functions



Pin Functions

PIN		DESCRIPTION
NO.	NAME	
A1	V+	Supply voltage.
A2	GND	Ground.
B1	SDA	Serial data input. Open-drain output, requires a pull-up resistor.
B2	SCL	Serial clock. Open-drain output, requires a pull-up resistor.

**Specifications**
**Absolute Maximum Ratings**

	MIN	MAX	UNIT
<b>Supply Voltage, V+</b>		4	V
<b>Voltage at SCL, SDA</b>	0.3	((V +) + 0.3) and ≤4	V
<b>Operating Temperature</b>	- 55	160	°C
<b>Junction Temperature</b>		150	°C
<b>Storage Temperature</b>	- 60	150	°C

In the course of using the TMP103 series, Over operating free-air temperature range (unless otherwise noted). Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.

**ESD Ratings**

		Value	UNIT
<b>Electrostatic Discharge, V<sub>ESD</sub></b>	Human Body Mode (HBM), per ANSI/ESDA/JEDEC JS-001	±5000	V
	Machine Mode (MM), per JEDEC-STD Classification	300	V

**Recommended Operating Conditions**

		MIN	NOM	MAX	UNIT
<b>Power supply voltage V+</b>	TMP103A	1.4		2.8	V
	TMP103B	1.4		3.6	
<b>Operating temperature range T</b>		- 40		125	°C

**Electrical Characteristics**

Unless otherwise specified, the following data are the characteristics of the TMP103 series chip at the temperature of +25°C and the supply voltage in the range of 1.4V ~ 2.8V (TMP103A) / 1.4V ~3.6V (TMP103B).

PARAMETER	TEST CONDITONS	MIN	TYP	MAX	UNIT
Operating Temperature Range		- 40		125	°C
Accuracy (Temperature Error)	-10°C to 100°C, V+ = 1.8V	2 -	0	2	°C
	-40°C to 125°C, V+ = 1.8V	- 3	Plus or	3	°C
	vs Supply	0.5	+ / - 0.2	0.5	°C/V
Resolution	TMP103A		1		°C
			8		Bits
	TMP103B		0.125		°C
			11		Bits
Conversion Time			26	35	ms
Conversion Modes	CR1 = 0, CR0 = 0		0.25		Conv/s
	CR1 = 0, CR0 = 1		1		
	CR1 = 1, CR0 = 0		4		
	CR1 = 1, CR0 = 1		8		
Timeout Time			30	40	ms
Communication Frequency		0.001		2.75	MHz
Power supply operating voltage	TMP103A	1.4		2.8	V
	TMP103B	1.4		3.6	
Average Quiescent Current, I <sub>Q</sub>	Bus not activated, CR1=0, CR0=0(default)		1.5	3	Mu A
	Bus activated, SCL frequency=400 kHz		15		
	Bus activated,SCL frequency=3.4 MHz		85		
Shutdown Current, I <sub>SD</sub>	Bus is not activated, V+=1.8V		0.5		Mu A
	Bus activated, SCL frequency=400 kHz		10		
	Bus activated,SCL frequency=3.4 MHz		80		

Detailed Description

Device Functional Modules

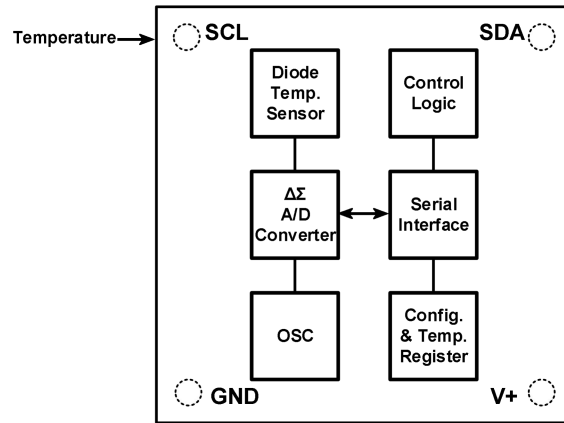
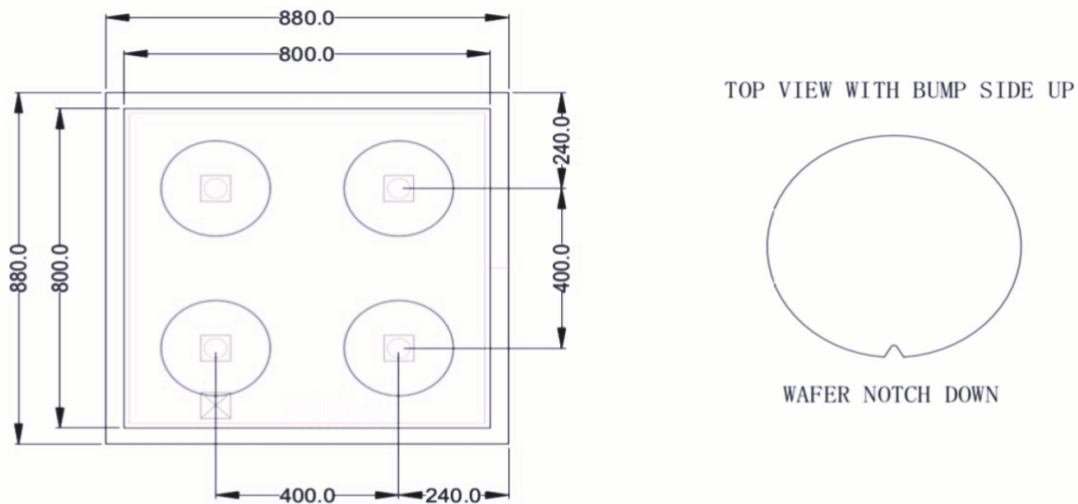


Figure 1 Block diagram of 103 series internal modules

DSBGA-4



Min bump pitch of die( $\mu\text{m}$ )	400	CUSTOMER DSJF		DEVICE NAME		TYPE IP1M-CSP	
Min bump pitch of between dies( $\mu\text{m}$ )	480	DRAWN Amy. xu	DRG. No. MS210021		REV A		
Number of total bumps	4	CHECK Brain. chen	MASK TYPE 6inch SMEE	UNIT UM	SHEET 2		

**Ordering information**

Order code	Package	Baseqty	Deliverymode	Marking
UMW TMP103AYFFR	DSBGA-4	3000	Tape and reel	TA UMW
UMW TMP103BYFFT	DSBGA-4	3000	Tape and reel	TB UMW

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