Product Overview
Small-Size TMP110 Versus TI's Temperature Sensors

TEXAS INSTRUMENTS

Minimizing the footprint of integrated circuits is always important. However, with temperature sensors, reducing the size of the IC has additional benefits such as reducing the thermal mass of the device—thus, improving the thermal response. TMP110 is TI's first X2SON packaged temperature sensor. Featuring a significantly smaller form factor than the rest of our packaged temperature sensors portfolio, comparable in size to chip-scale devices, this pushes the boundaries for improved response time and saving space of packaged ICs while also allowing to place the temperature sensor closer to the heat source. In addition, the package protects the die inside from external factors (moisture, light, oxidation). The TMP110 is an I2C digital temperature sensor which offers an additional address orderable and different alert orderables with factory-programmed device-address. To put this into perspective, Figure 1 shows where the new X2SON TMP110 fits within TI's portfolio:
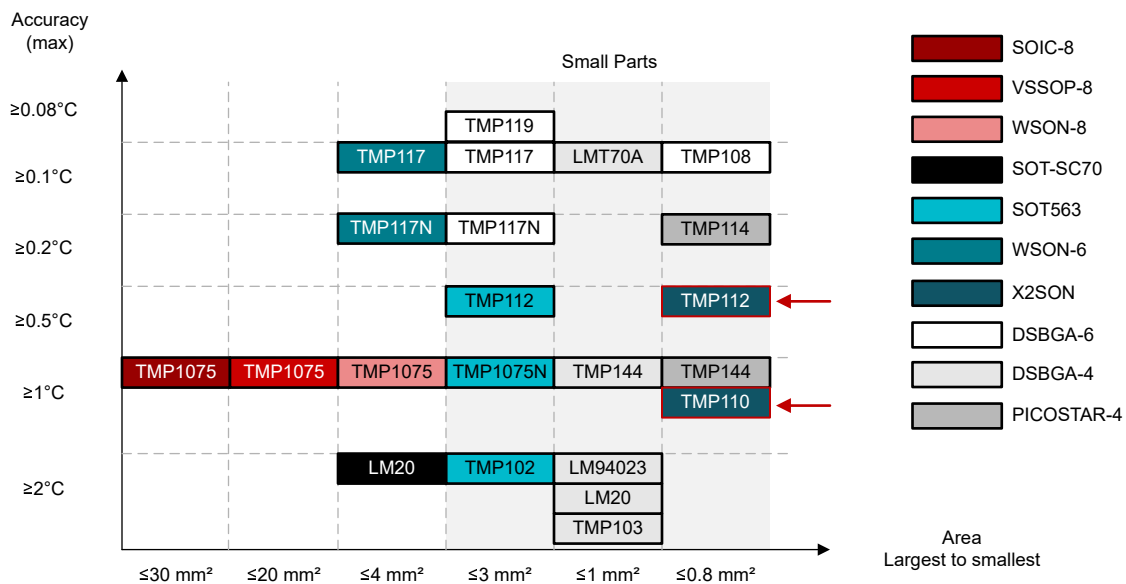

Figure 1. Where TMP110 Fits

The table below shows a comparison on key specs of this device versus others in TI's portfolio.

Table 1. Key Specifications Comparison

Device	Maximum Accuracy	Package	Area (mm)	Power Supply Range	Shutdown Iq	Q100 Available
TMP110	1°C	X2SON	0.8 x 0.8	1.14V to 5.5V	0.15µA	No
TMP119	0.08°C	DSBGA-6	1.488 x 0.95	1.7V to 5.5V	0.15µA	No
TMP112	0.5°C	SOT563 X2SON	1.6 x 1.6 0.8 x 0.8	1.4V to 3.6V	0.5µA 0.15µA	Yes
TMP108	0.75°C	DSBGA-6	1.216 x 0.816	1.4V to 3.6V	0.3µA	No
TMP114	0.2°C	PICOSTAR-4	0.76 x 0.76	1.08V to 1.98V	0.16µA	No
TMP103	2°C	DSBGA-4	1 x 1	1.4V to 3.6V	0.5µA	No

TMP110 Next To Commonly Used Packages

Figure 2 shows a visual representation as a PCB layout of how the X2SON package compares in size with other common packages.
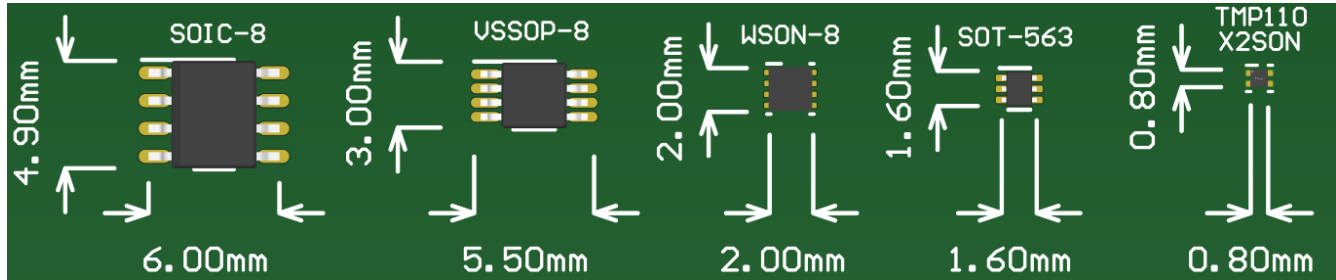

Figure 2. Package Size Comparison With Common Packages

As seen above, the TMP110 is considerably smaller than the common packaged temperature sensors. As reference, Figure 3 shows the TMP110 compared to chip-scale devices on a PCB layout along with the smallest leaded package.
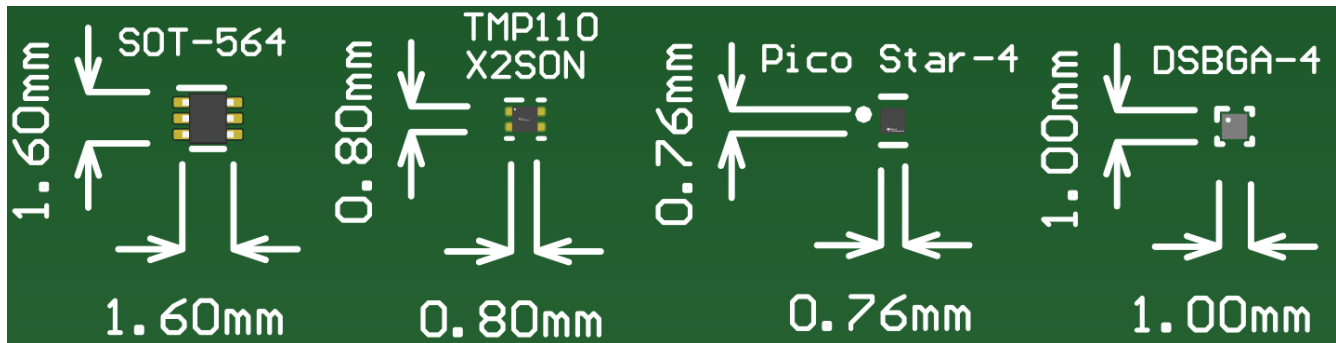

Figure 3. Package Size Comparison With Chip-Scale Devices

Comprehensive Overview

Table 2 shows a comprehensive overview of TI's portfolio of local temperature sensors in terms of package and performance over multiple interfaces. Table 3 serves as reference to pick the right device according to the end application needs.

Table 2. Featured Devices

Interface	Smallest Leaded Device	Smallest Surface Mount Device	Smallest Chip Scale Device	Highest Accuracy
Digital	TMP102 TMP112DRL TMP1075N	TMP110 TMP112DPW	TMP114	TMP119
Analog	TMP20	LM57 LM26LV	LMT70 LM94023	LMT70

Learn More

- Learn about the recommended layout practices and considerations when designing with X2SON packages
- Guide to monitoring ambient and PCB temperature using surface-mount devices
- Refer to the TMP LM 75 family comparison application note for more information on compatibility

Choosing the Right Device

Table 3. TI's X2SON Temperature Sensors

Generic Part Number	Orderable Part Number	Center Pad	Address (7-bit format)
TMP110	TMP110D0IDPWR	ALERT	0x48
	TMP110D1IDPWR		0x49
	TMP110D2IDPWR		0x4A
	TMP110D3IDPWR		0x4B
	TMP110DIDPWR	ADDRESS	0x40, 0x41, 0x42, 0x43
TMP112	TMP112D0IDPWR	ALERT	0x48
	TMP112D1IDPWR		0x49
	TMP112D2IDPWR		0x4A
	TMP112D3IDPWR		0x4B
	TMP112DIDPWR	ADDRESS	0x40, 0x41, 0x42, 0x43

For additional assistance, ask questions to TI engineers on the TI E2E Sensors Support Forum.

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