STTS424

JEDEC JC42.4-compliant memory module temperature sensors

STMicroelectronics' STTS424 and STTS424E02 memory module temperature sensors conform to the JEDEC JC42.4 mobile platform, memory module, thermal sensor specification. The STTS424E02 has an integrated 2 Kbit serial presence detect (SPD) EEPROM and consumes 50% less operating current than required by the JC42.4 specification.

Upgrading existing DIMM designs can be easily achieved. You can also replace existing SPD EEPROM solutions with the pin-and-package-compatible STTS424E02 and gain a temperature sensor without increasing component count or modifying the layout.

Key features

- Ambient temperature sensing range from -40 °C to +125 °C
  - +/-1 °C accuracy from 75 °C to +95 °C
  - +/-2 °C accuracy from 40 °C to +125 °C
  - +/-3 °C accuracy from -40 °C to +125 °C
- Temperature sensor resolution: 0.25 °C (typ)/LSB
- Low operating current: 200 µA (max)
- 2-wire I²C/SMBus-compatible serial interface
- Operating voltage range: 2.7 V to 3.6 V
- Hysteresis selectable set points: 0, 1.5, 3, 6 °C
- ADC conversion time: 125 ms (max)
- STTS424E02
  - 2 Kb SPD EEPROM functional identical to M34E02
  - Permanent and reversible software data protection for lower 128 bytes
  - Byte and page write: up to 16 bytes
  - Selt-time WRITE cycle: 5 ms (max)
- Package options (halogen-free, lead-free):
  - DFN8 (DA)
  - TSSOP8 (DW)

Main applications

- Memory modules in:
  - Notebook computers
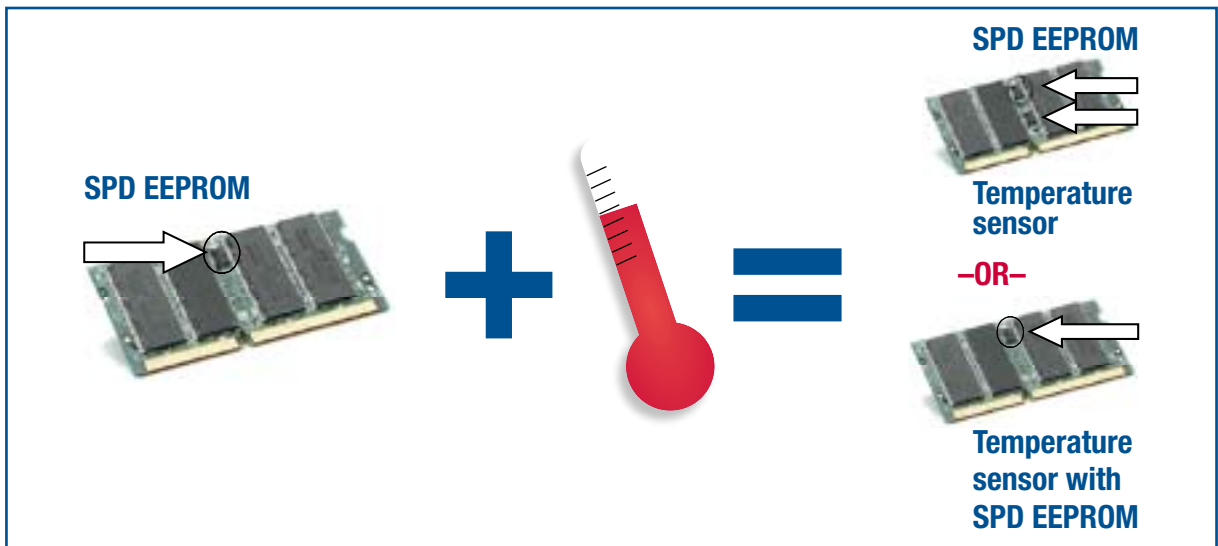 - Servers
  - Industrial

The STTS424 and STTS424E02 are JEDEC JC42.4-compliant, high-accuracy, digital temperature sensors. The STTS424E02 is integrated with 2 Kb of serial EEPROM. Both devices have 2-wire I²C/SMBus compatible interfaces. In the STTS424E02 the temperature sensor and the EEPROM each has its own unique I²C/SMBus address.

These products are targeted for DIMMs, incorporating high speed DDR2 and DDR3 DRAMs where a temperature sensor is needed to monitor overheating of the DIMM. Both products are available in 2 mm x 3 mm DFN8 and 4.4 mm x 3 mm TSSOP8 packages. The STTS424 standalone temperature sensor has a 50% lower operating current than required by the JC42.4 specification. The integrated device can be used in existing board implementations to replace the SPD EEPROM, upgrading the DIMM for temperature sensing without changing the board layout or through the addition of more components.

The STTS424 temperature sensor integrates an analog to digital converter (ADC) which monitors and digitizes the temperature to a resolution of up to 0.25 °C, with an accuracy of +/-1 °C from 75 °C to +95 °C. The device can operate with a supply voltage from 2.7 V to 3.6 V over a -40 to 125 °C temperature range. The typical supply current at 3.3 V is 100 µA. The devices are factory calibrated and require no external components to measure temperature.

The open drain event output pin is active when the monitored temperature either exceeds a programmed limit or if it strays outside the upper and lower limit of a customer programmed alarm window. This pin can be configured to operate in either a comparator mode for thermostat operation or in the interrupt mode.

The 2 Kb serial EEPROM in the STTS424E02 has the ability to permanently lock the data in the first upper half (128 bytes). This facility has been designed specifically for use in DDR DIMMs with SPD.

STTS424 key parameters

Part number	Standby current (max µA)	Operating current (max µA)	Operating voltage (V)	Accuracy @ -40 to 125 °C (+/-°C) max	EEPROM (bits)	Temperature range (°C)	Package
STTS424CDA3F	1.0	200	2.7 to 3.6	3.0	-	-40 to 125	DFN8
STTS424CDW3F	1.0	200	2.7 to 3.6	3.0	-	-40 to 125	TSSOP8
STTS424E02CDA6F	3.0	210	2.7 to 3.6	3.0	2 K	-40 to 125	DFN8
STTS424E02CDW6F	3.0	210	2.7 to 3.6	3.0	2 K	-40 to 125	TSSOP8

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Full product information at www.st.com

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