NXP SO-DIMM and RDIMM temperature sensors SE97B and SE98A

High-precision temp sensors for us with DDR2 and DDR3 DIMMs

Accurate to within ±1 °C (max), these high-precision temp sensors are designed to monitor the temperature of a DDR2/DDR3 SO-DIMM or RDIMM or UDIMM-ECC including an optional 2 kbit EEPROM Serial Presence Detect (SPD) replacement.

Key features
▸ Monitor local temperature within ±1 °C (max)
▸ On-chip 2 kbit EEPROM for SPD (SE97B only)
▸ Compliant JEDEC JC42.4
▸ Compatible with I²C-bus standard/ fast mode and SMBus
▸ Over-, under-, and criticaltemperature alarms
▸ Programmable hysteresis threshold
▸ Comparator or interrupt EVENT output down to 1.1 V
▸ Security lock bit for temperature setpoint data protection
▸ Low operating and standby currents
▸ Single-die solution for higher reliability
▸ Hardware and software write protection
▸ TSSOP8 and HWSON8 packages

Applications
▸ Memory modules
▸ Notebooks
▸ Servers
▸ Communications

The NXP DIMM temperature sensor SE97B integrates a 2 kbit EEPROM that can be used for Serial Presence Detect (SPD). The SE98A, a standalone sensor without an EEPROM, is for applications that separate the functions for temperature sensing and SPD.

Both devices comply with the standard JEDEC JC42.4 footprint and specification. Both devices are also compatible with I²C-bus standard/fast mode and SMBus, and support SMBus ALERT and TIMEOUT.

Each device uses an intelligent digital sensor to monitor its own temperature and stores the reading in an 11 bit two's complement data register. The reading is compared with three alarm registers, one each for over-, under-, and criticaltemperature alarms.

Settings for the alarms are programmable via a two-wire interface configured as an I²C-bus in standard, 100 kHz fast, or 400 kHz mode, or as an SMBus. Different temperature-sensing events are tracked and stored in the status register and read via the two-wire interface.

The EVENT output is used as an on/off output or as an interrupt to signal the host when the temperature reading exceeds the threshold of the alarm register.

The alarm registers have an associated hysteresis register that can be set to 0, 1, 3, 5, or 6 °C.

Security register lock bits provide additional safety by preventing register settings from being modified during normal system operation.

The SPD in the SE97B is organized as a 256 x 8 bit EEPROM that supports read and write operations from 3.0 to 3.6 V. The temperature sensor V_{DD} supply range is 3.0 to 3.6 V for the SE97B and 1.7 to 3.6 V for the SE98A.

The write buffer is 16 bytes and the maximum write cycle takes only 5 ms. The bottom half of the 256 byte is software write-protected and can be configured, using the hardware pin, as permanent or as reversible write-protect. The write buffer supports up to a million write/erase cycles and retains data for up to ten years.

The operating temperature range is -40 to 125 °C, the temperature resolution is 0.125 °C, and the temperature conversion time is 8 ms.

The new HWSON8 package, SOT1069-2, has wider K spacing (0.3 mm min vs 0.2 mm JEDEC min) between the pins and heat pad to reduce the number of solder shorts during manufacturing.

For more information visit www.nxp.com/i2clogic.
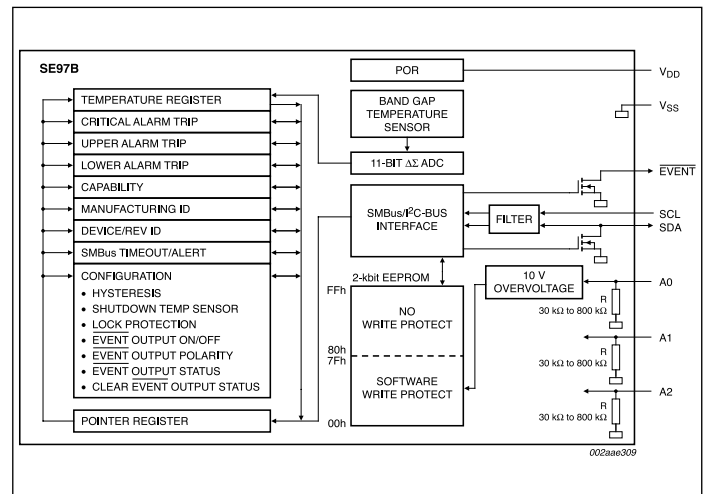

SE97B block diagram

Temp Accuracy Graph

SE97B/98A temperature accuracy

Temperature range	Grade-B accuracy
75 to 95 °C	±1 °C (max)
40 to 125 °C	±2 °C (max)
-40 to 125 °C	±3 °C (max)
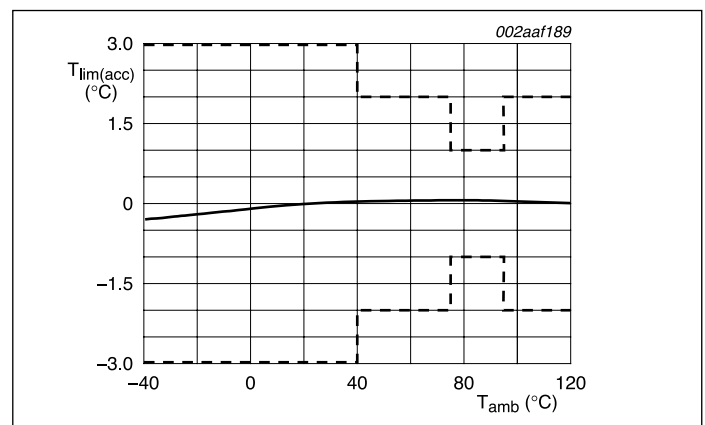
Ordering information

Type number Grade-B	Description	Package
SE97BTP, 547	Temp Sensor with 2-kbit EEPROM	HWSON8
SE98APW, 118	Temp Sensor	TSSOP8
SE98ATP, 547	Temp Sensor	HWSON8

Actual size of TSSOP8 and HWSON8 packages

For more information, please visit www.nxp.com/i2clogic

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