NXP SO-DIMM and RDIMM temperature sensors SE97 and SE98

High-precision temp sensors for use 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 including 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 (SE97 only)
▸ Compliant JEDEC JC42.4
▸ Compatible with I²C-bus standard/fast mode and SMBus
▸ Over-, under-, and critical-temperature alarms
▸ Programmable hysteresis threshold
▸ Comparator or interrupt EVENT output down to 1.1 V
▸ Security lock bit for temperature set-point data protection
▸ Low operating and standby currents
▸ Single-die solution for higher reliability
▸ Hardware and software write protection
▸ TSSOP8 and HVSON8 packages

Applications

▸ Memory modules
▸ Notebooks
▸ Servers
▸ Communications

The NXP DIMM temperature sensor SE97 integrates a 2-kbit EEPROM that can be used for Serial Presence Detect (SPD). The SE98, 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 critical-temperature 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

Actual size of TSSOP8 and HVSON8 packages

founded by Philips

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 SE97 is organized as a 256 x 8-bit EEPROM that supports read operations from 1.7 to 3.6 V 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 both devices.

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 -20 to 125 °C, the temperature resolution is 0.125 °C, and the temperature conversion time is 8 ms.
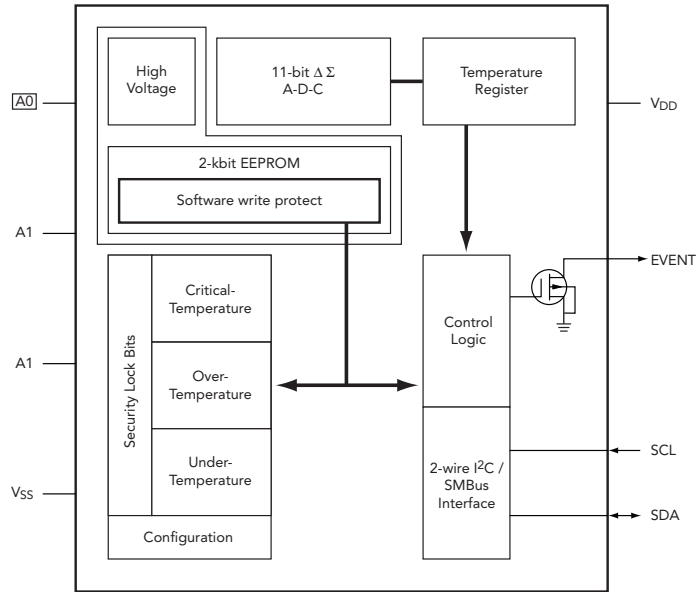
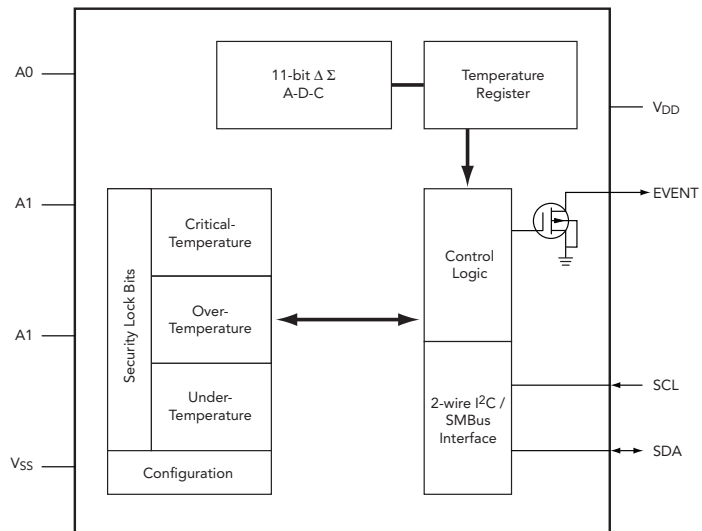For more information visit www.nxp.com/i2clogic.

0	0	1	1	A2	A1	A0	R/$\overline{W}$
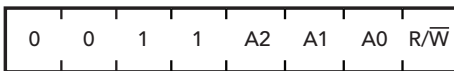
Temp sensor I²C address

1	0	1	0	A2	A1	A0	R/$\overline{W}$
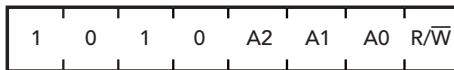
EEPROM sensor I²C address

SE97 block diagram

SE98 block diagram

SE97/98 temperature accuracy

Temperature range	Grade-B accuracy	Grade-C accuracy
75 to 95 °C	±1 °C	±2 °C
40 to 125 °C	±2 °C	±3 °C
-20 to 125 °C	±3 °C	±4 °C

Ordering information

Type number Grade-B	Type number Grade-C	Description	Package
SE97PW/1,118	SE97PW, 118	Temp sensor with 2-kbit EEPROM	TSSOP8
SE97TK/1,118	SE97TK, 118	Temp sensor with 2-kbit EEPROM	HVSON8
SE98PW/1,118	SE98PW, 118	Temp sensor	TSSOP8
SE98TK/1,118	SE98TK, 118	Temp sensor	HVSON8