Register 1 — Temperature Register/$T_{AMBIENT}$ (address = 01h) (Read-Only)

Bit #	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Bit Name	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	T0	0	0
Reset Value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1. Temperature Register Bits

Register Description

Register 1 (address 01h) is the Temperature Register ($T_{AMBIENT}$). This register stores the result of the most recent conversion for the local TMP006 die temperature, $T_{AMBIENT}$. The Temperature Register is a 14-bit, binary twos complement, read-only register. One least significant bit (LSB) is equal to 1/32°C = 0.03125°C.

Following power-up or software reset, the Temperature Register reads 0°C (0000h) until the first conversion is complete. Data from this register is used in conjunction with the data from the Sensor Voltage Register (V_{OBJECT}, address 00h) to calculate the object temperature.

Temperature Format

The Temperature Register provides 14 bits of data in binary twos complement signed integer format, as shown in Table 2.

TEMPERATURE (°C)	DIGITAL OUTPUT (BINARY)	SHIFTED HEX
150	0100 1011 0000 0000	12C0
125	0011 1110 1000 0000	0FA0
100	0011 0010 0000 0000	0C80
80	0010 1000 0000 0000	0A00
75	0010 0101 1000 0000	0960
50	0001 1001 0000 0000	0640
25	0000 1100 1000 0000	0320
0.03125	0000 0000 0000 0100	0001
0	0000 0000 0000 0000	0000
-0.03125	1111 1111 1111 1100	FFFC
-0.0625	1111 1111 1111 1000	FFF8
-25	1111 0011 0111 0000	F370
-40	1110 1011 1111 1100	EBFC
-55	1110 0100 0111 1100	E47C

Table 2. Temperature Data Format

Converting the integer temperature result of the TMP006 to physical temperature is done by right-shifting the last two LSBs followed by a divide-by-32 of T_{REG} to obtain the physical temperature result in degrees Celsius. T_{REG} is the 14-bit signed integer contained in the corresponding register. The sign of the temperature is the same as the sign of the integer read form the TMP006. In twos complement notation, the MSB is the sign bit. If the MSB is '1', the integer is negative and the absolute value can be obtained by inverting all bits and adding '1'. An alternative method of calculating the absolute value of negative integers is abs(i) = i xor FFFFh + 1.