F75386M/F75386SG Datasheet

Dual ±1°C Accuracy Temperature Sensor IC with Fan Speed Control

Release Date: July, 2007
Revision: V0.27P

F75386 Datasheet Revision History

Version	Date	Page	Revision History
0.20P	Feb.,2005		Original version
0.21P	Mar.,2005	17	Add ARA register Index FDh
0.22P	Mar.,2005	11,13,18,23	(1) Revise Index 02/Index 16/Index 10-2Fh (2) Add MSOP Package and delete SOP package
0.23P	Dec.,2005		Revise typo
0.24P	Feb.,2006		Add SOP Green package description
0.25P	Dec, 2006	1	Add Taiwan patent certification number
0.26P	Jan, 2007	15	Register-0x4C description correction
0.27P	July, 2007	-	Company readdress

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Fintek for any damages resulting from such improper use or sales.

Table of Contents

1. General Description

The F75386 is a temperature sensor IC with fan speed monitoring and controlling function which is specific designed for notebook etc. An 11-bit analog-to-digital converter (ADC) was built inside F75386. The F75386 can provide 2 remote temperature sensor and 1 local temperature sensor. The remote temperature sensor can be performed by CPU/GPU thermal diode or transistor 2N3906. The F75386 can also provide alert signals for system protection which is optional with fan speed monitoring and controlling. The users can set up the upper and lower limits (alarm thresholds) of all monitored parameters and this chip will issue warning messages for system protection if there is something wrong with monitored items. As for fan speed control, the fan speed will be related to temperature variations. The F75386 can use PWM duty cycle output to automatically control fan speed. There are 8 steps PWM duty cycle output for users to program according to the temperature variations.

Through the BIOS or application software, the users can read all the monitored parameters of system all the time. And a pop-up warning can be also activated when the monitored item was out of the proper/pre-setting range. The F75386 is in the green package of 8-pin MSOP/SOP and powered by 3.3V.

2. Features

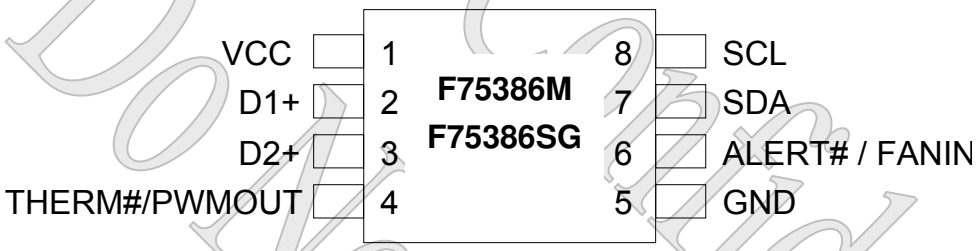
- Provide 1 on-chip local and 2 remote temperature sensing
  - ✓ ±1 °C accuarcy on remote channel(+60 °C to +126 °C)
- Integrated fan speed monitoring function and PWM duty cycle output for automatic fan speed control
- User selectable multi-function pin for either tachometer input or ALERT# output function
- User selectable multi-function pin for either PWM duty cycle output or THERM# output function
- ALERT# output for SMBus alert
- THERM# output for over temperature alert or for system shut down
- Programmable THERM# limits and THERM# hysteresis
- Programmable alert queue and limited and setting points(alert threshold) for monitored items
- 2 wire SMBus interface
- 3VCC operation and in 8-MSOP/SOP green package

Patented: TW235231, TWI263778

3. Key Specifications

- Supply Voltage 3.0~3.6V
- Supply Current 630 uA (@ conversion rate = 16Hz)
- Measured Range 0 ~ 145.75 °C
- Remote Diode Temperature Accuracy ±1 °C from +60°C to +126°C
- Local Temperature Accuracy ±3 °C from 0°C to +100°C

4. Pin Configuration



5. Pin Descriptions

POD_{12} - Pure Open-drain output pin with 12 mA sink capability

IN_{ts} - TTL level input pin and schmitt trigger

AIN - Input pin(Analog)

PWR - Power

PIN NO	PIN NAME	TYPE	PWR	DESCRIPTION
1	VCC	PWR	VCC	Power Pin
2	D1+	AIN	VCC	Positive connection to remote temperature sensor (ex: thermal diode anode)
3	D2+	AIN	VCC	Positive connection to remote temperature sensor (ex: thermal diode anode)
4	THERM# PWMOUT	POD_{12} (5V-tolerance)	VCC	This is a multi-function pin. Power-on default is THERM# function. When it acts as PWMOUT function, it uses PWM duty cycle output to control the fan speed. When it acts as THERM# function, it will be asserted when the temperature exceeds its THERM limit.

5	GND	PWR	VCC	Ground
6	ALERT# FANIN	OD_{12} / IN_{ts} (5V-tolerance)	VCC	This is a multi-function pin. Power-on default is ALERT# function. When it acts as ALERT# function, it will be asserted when the temperature exceeds its high limit or goes below its low limit. When it is as FANIN function, it is for monitoring the fan speed.
7	SDA	IN_{ts}/OD_{12} (5V-tolerance)	VCC	Serial bus data
8	SCL	IN_{ts} (5V-tolerance)	VCC	Serial bus clock

6. Functional Description

6.1 General Description

The F75386 is a temperature sensor IC with fan speed monitoring and controlling function which is specific designed for notebook etc. An 11-bit analog-to-digital converter (ADC) was built inside F75386. The F75386 can provide 2 remote temperature sensor and 1 local temperature sensor. The remote temperature sensor can be performed by CPU/GPU thermal diode or transistor 2N3906. The F75386 can also provide alert signals for system protection which is optional with fan speed monitoring and controlling. The users can set up the upper and lower limits (alarm thresholds) of all monitored parameters and this chip will issue warning messages for system when there is something wrong with monitored items. As for fan speed control, the fan speed will be related to temperature variation. The F75386 can use PWM duty cycle output to automatically control fan speed. There are 8 steps PWM duty cycle output for users to program according to the temperature variation.

6.2 Access Interface

The F75386 can be connected to a compatible 2-wire serial system management bus as a slave device under the control of the master device, using two device terminals SCL and SDA. The F75386 supports SMBus protocol of, “Write Byte”, “Read Byte”, both with or without Packet Error checking(PEC) which is calculated using CRC-8. For detail information about PEC, please check SMBus 1.1 specification. The F75386 supports 25ms timeout for no activity on the SMBus. This timeout function is programmed at 22h bit7 and default is disabled. F75386 also supports Alert Response Address(ARA) protocol.The operation of the protocol is described with details in the following sections.

(a) SMBus write to internal address register followed by the data byte

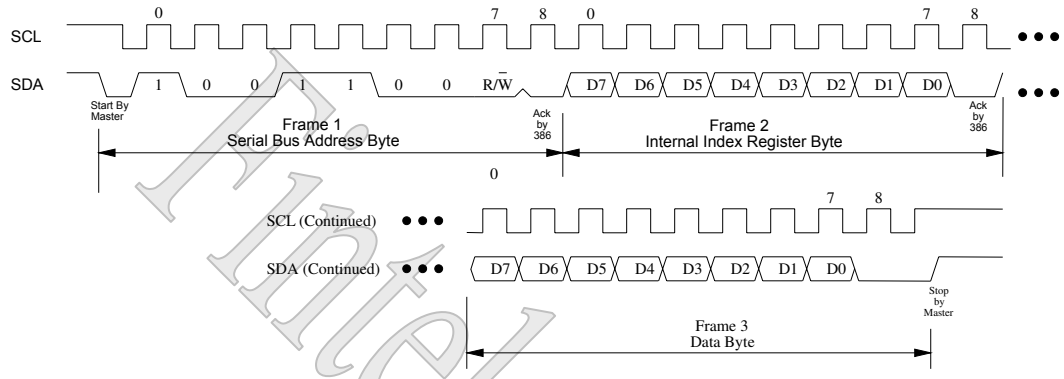


Figure 1. Serial Bus Write to Internal Address Register followed by the Data Byte

(b) Serial bus write to internal address register only

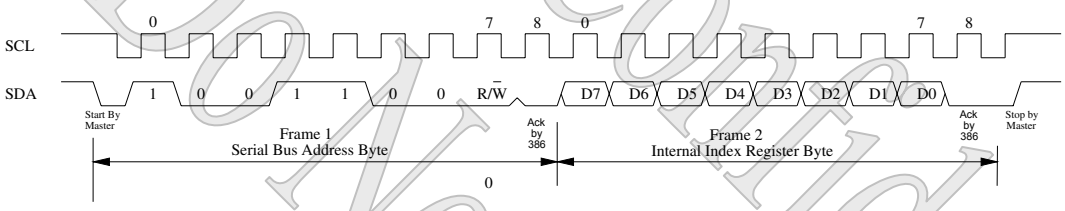


Figure 2. Serial Bus Write to Internal Address Register Only

(c) Serial bus read from a register with the internal address register prefer to desired location

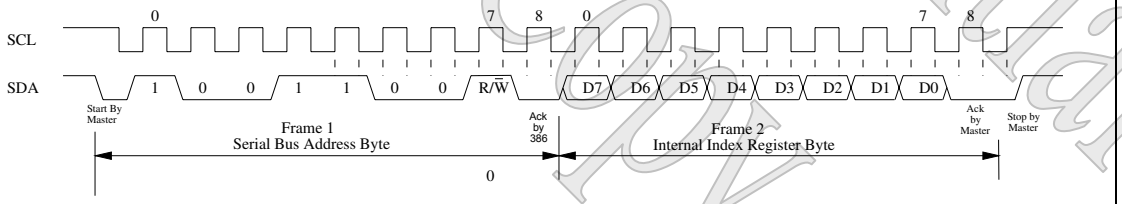


Figure 3. Serial Bus Read from Internal Address Register

(d) Alert Response Address

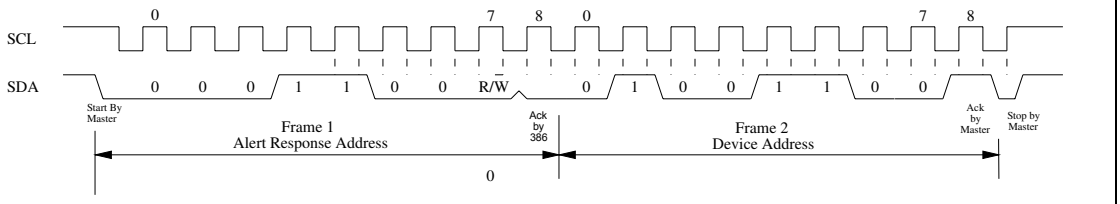


Figure 4. Alert Response Address