F75363 Datasheet

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

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

F75363 Datasheet Revision History

Version	Date	Page	Revision History
0.20P	Jan.,2005		Original version (Confidential)
0.21P	Feb.,2005	16	1. Update ARA register/Index FDh 2. Update Vendor ID(Manufacture ID) Register/Index FEh 3. Add version ID Register/Index FFh
0.22P	May.,2005	11 15 16	1. Update Alert Mask Register default value 2. Update version ID Register/Index FFh 3. Update T1 HIGH LIMIT default value
0.23P			Updated typo and patent
0.24P	July, 2006	12 13	1. Alert mask register1, Index 16h correction 2. Alert mask register2, Index 17h correction 3. PWM control and fan monitor register, Index 4Ah correction
0.25P	Dec, 2006	1	Add Taiwan patent certification number
0.26P	Jan, 2007	14	Register-0x4C description correction
0.27P	July,2007	-	Company readdress

Please note that all data and specifications are subject to change without notice. All the trade marks of products and companies mentioned in this data sheet belong to their respective owners.

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 F75363 is a temperature sensor IC with PWM duty cycle output which is specific designed for graphic cards etc. An 11-bit analog-to-digital converter (ADC) was built inside F75363. The F75363 can monitor temperature and fan speed which is important for the system to work stably and properly. This chip provides 1 remote temperature sensor and 1 local temperature sensor. The remote temperature sensor can be performed by CPU/GPU thermal diode or transistor 2N3906. The users can set up the upper and lower limits (alarm thresholds) of all monitored parameters and this chip can also issue warning messages for system protection when there is something wrong with monitored items. As for fan speed control, the F75363 can use PWM duty cycle output to automatically control fan speed. The fan speed control is related to temperature variation. There is 8-step lookup table for users to program PWM duty cycle output to control fan speed according to the temperature variation. The F75363 is in the package of 8-pin SOP and powered by 3.3V.

2. Features

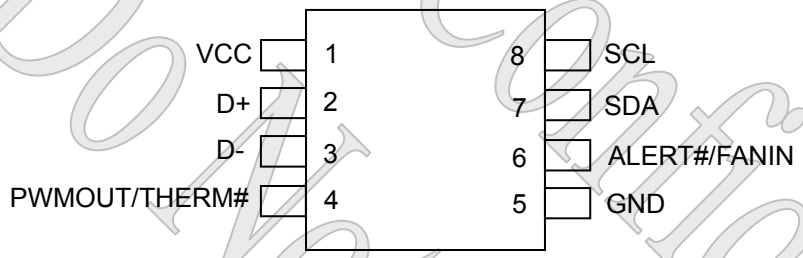
- Provide 1 on-chip local and 1 remote temperature sensing
- Accuarcy
  - ✓ ±1 °C accuarcy on remote channel (+60 °C to +126 °C)
  - ✓ ±3 °C accuarcy on local channel(+0 °C to +100 °C)
- User selectable multi-function pin for either PWM duty cycle output or THERM# signal output function
- User selectable multi-function pin for either ALERT# output or tachometer input function
- Automatic fan speed control with user programmable 8-step lookup table
- Programmable alert queue and limited and setting points(alert threshold) for monitored items
- 2 wire SMBus interface and ALERT# output for SMBus alert
- 3VCC operation and in 8-SOP package

Patented: TWI235231, TWI263788

3. Key Specifications

- Supply Voltage 3.0~3.6V
- Supply Current 630 uA (typ) (@ conversion rate = 16Hz)
- Measured Range 0 ~ 126.75 °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	Description
1	VCC	PWR	Power Pin
2	D+	AIN	Positive connection to remote temperature sensor (ex: thermal diode anode)
3	D-	AIN	Negative connection to remote temperature sensor(ex: thermal diode cathode)
4	PWMOUT / THERM#	POD_{12} (5V-tolerance)	This is a multi-function pin. Power-on default is PWMOUT function. When it acts as PWMOUT function, it controls the fan speed. When it acts as THERM# function, it will be asserted when the temperature exceeds its thermal limit.

5	GND	PWR	Ground
6	ALERT# / FANIN	POD_{12} / IN_{ts} (5V-tolerance)	This is a multi-function pin. Power-on default is ALERT# function. When it is used 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}/POD_{12} (5V-tolerance)	Serial bus data
8	SCL	$IN_{ts(5V\text{-}tolerance)}$	Serial bus clock

6. Functional Description

6.1 General Description

The F75363 is a temperature sensor IC with PWM duty cycle output which is specific designed for graphic cards etc. An 11-bit analog-to-digital converter (ADC) was built inside F75363. This chip provides 1 remote temperature sensor and 1 local temperature sensor. The remote temperature sensor can be performed by CPU/GPU thermal diode or transistor 2N3906. Users can set up the upper and lower limits (alarm thresholds) of monitored parameters and this chip can also issue warning messages for system protection when there is something wrong with monitored items. As for fan speed control, the F75363 can use PWM duty cycle output to automatically control fan speed. The fan speed control is related to temperature variation. There is 8-step lookup table for users to program PWM duty cycle output to control fan speed according to the temperature variation.

6.2 Access Interface

The F75363 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 F75363 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. F75363 supports 25ms timeout for no activity on the SMBus. This timeout function is programmed at 22h bit7 and default is disabled. F75363 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

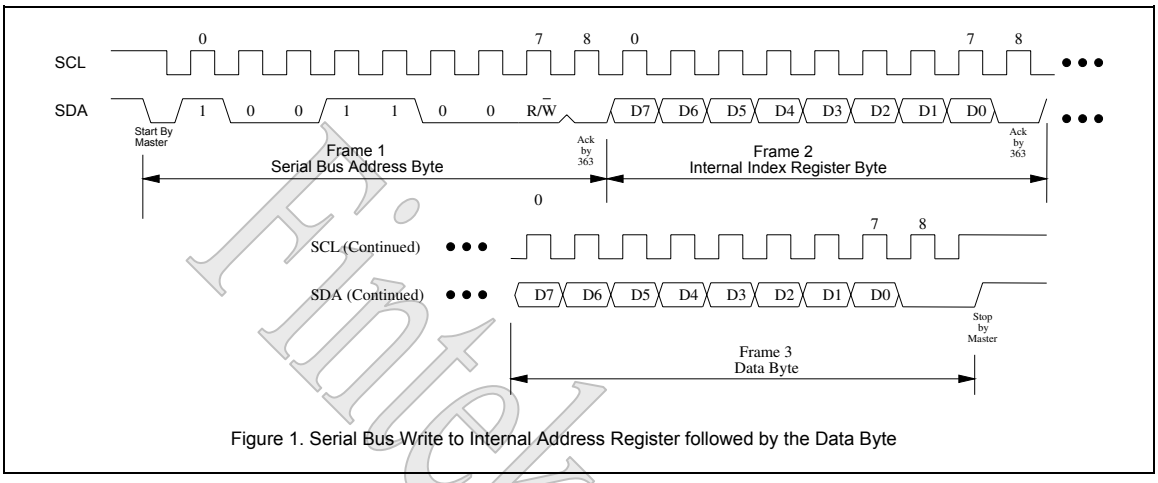


Figure 1. Serial Bus Write to Internal Address Register followed by the Data Byte

(b) Serial bus write to internal address register only

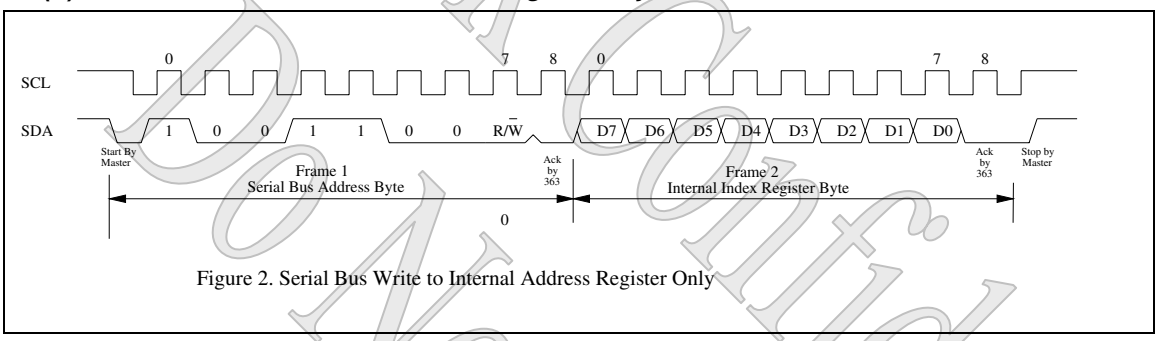


Figure 2. Serial Bus Write to Internal Address Register Only

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

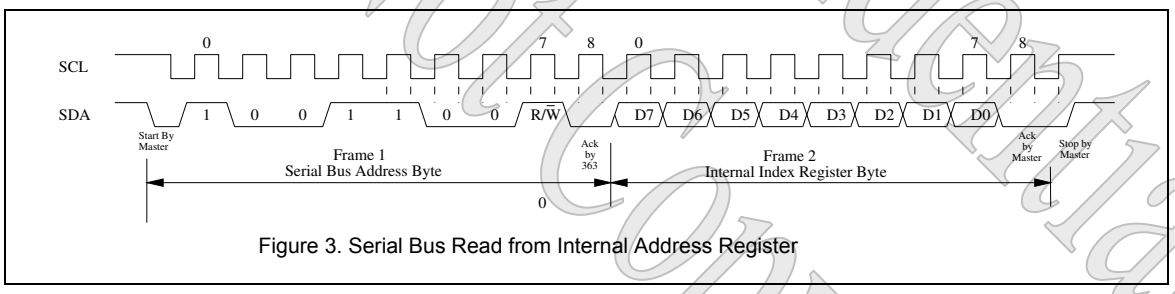


Figure 3. Serial Bus Read from Internal Address Register

(d) Alert Response Address

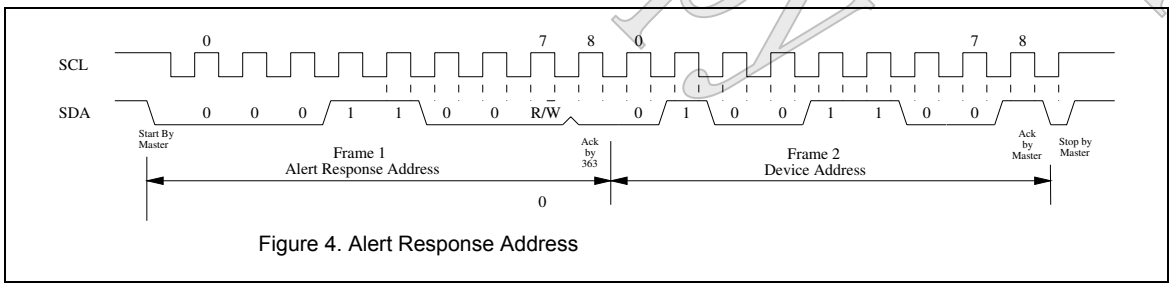


Figure 4. Alert Response Address

6.3 Typical Operating Characteristics

(a) Temperature Error vs.D+/D- Capacitance