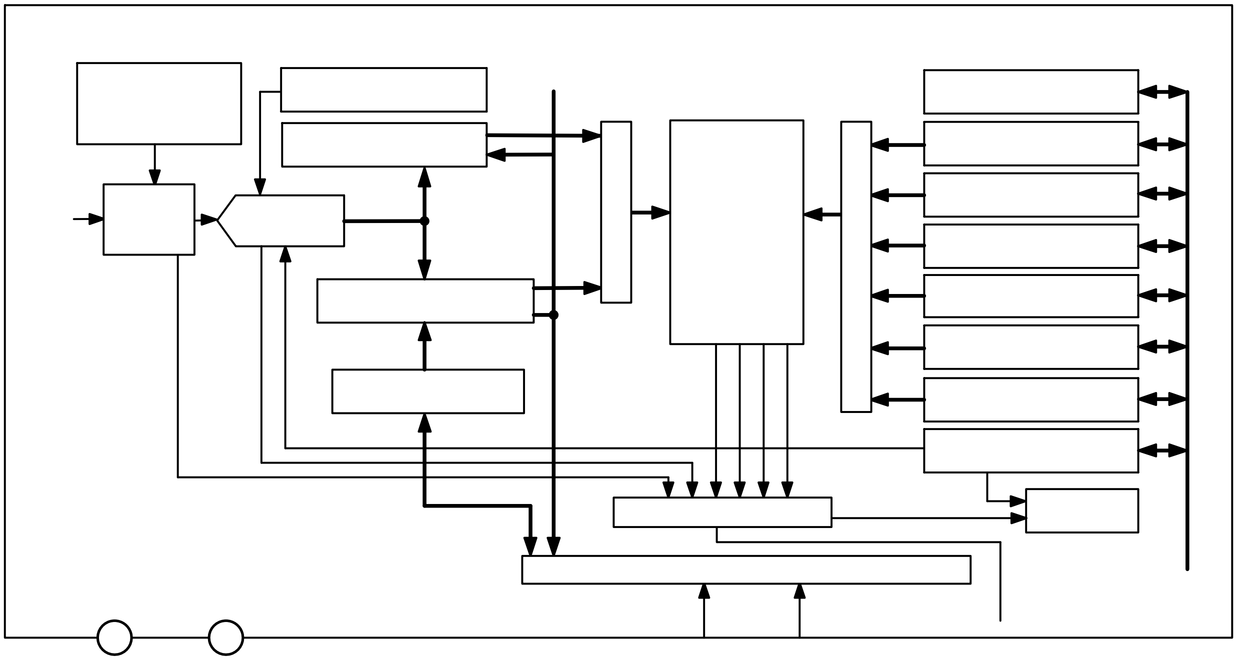


Figure 1. Functional Block Diagram

Table 3. PIN ASSIGNMENT

Pin No.	Mnemonic	Description
1	V_{DD}	Positive Supply, 3.0 V to 5.5 V.
2	D+	Positive Connection to Remote Temperature Sensor.
3	D ï	Negative Connection to Remote Temperature Sensor.
4	$\overline{\text{THERM}}$	Open-Drain output that can be used to turn a fan on/off or throttle a CPU clock in the event of an overtemperature condition. Requires pullup to V_{DD}.
5	GND	Supply Ground Connection.
6	$\overline{\text{ALERT}}$/$\overline{\text{THERM2}}$	Open-Drain Logic Output Used as Interrupt or SMBus Alert. This may also be configured as a second $\overline{\text{THERM}}$ output. Requires pullup resistor.
7	SDATA	Logic Input/Output, SMBus Serial Data. Open-Drain output. Requires pullup resistor.
8	SCLK	Logic Input, SMBus Serial Clock. Requires pullup resistor.

Table 4. SMBus TIMING SPECIFICATIONS (Note 1)

Parameter	Limit at T_{MIN} and T_{MAX}	Unit	Description
f_{SCLK}	400	kHz max	ï
t_{LOW}	1.3	s min	Clock low period, between 10% points.
t_{HIGH}	0.6	s min	Clock high period, between 90% points.
t_R	300	ns max	Clock/data rise time.
t_F	300	ns max	Clock/data fall time.
$t_{SU; STA}$	600	ns min	Start condition setup time.
$t_{HD; STA}$ (Note 2)	600	ns min	Start condition hold time.
$t_{SU; DAT}$ (Note 3)	100	ns min	Data setup time.
$t_{HD; DAT}$	300	ns min	Data hold time.
$t_{SU; STO}$ (Note 4)	600	ns min	Stop condition setup time.
t_{BUF}			

TYPICAL PERFORMANCE CHARACTERISTICS

Figure 3. Temperature Error vs. Leakage Resistance

Figure 4. Temperature Error vs. Actual Temperature Using 2N3906

Figure 5. Temperature Error vs. Differential Mode

Functional Description

Ω

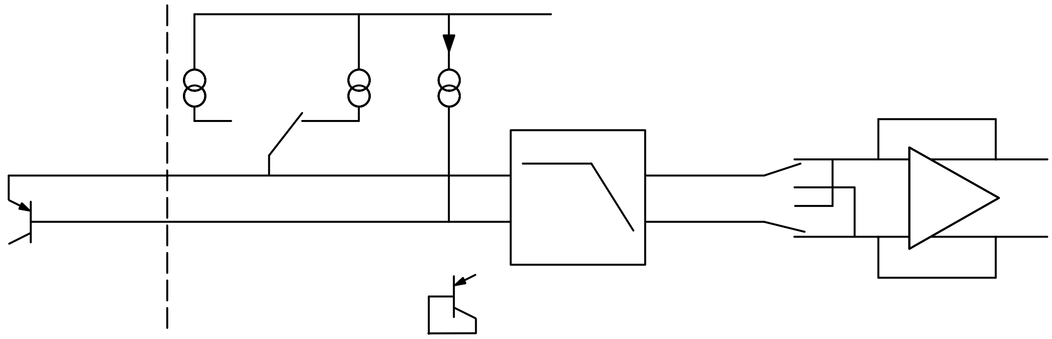


Figure 15. Input Signal Conditioning

Table 7. TEMPERATURE DATA FORMAT (LOCAL AND REMOTE TEMPERATURE HIGH BYTE)

Temperature	Binary	Offset Binary (Note 1)
–55°C	0 000 0000 (Note 2)	0 000 1001
0°C	0 000 0000	0 100 0000
+1°C	0 000 0001	0 100 0001
+10°C	0 000 1010	0 100 1010
+25°C	0 001 1001	0 101 1001
+50°C	0 011 0010	0 111 0010
+75°C	0 100 1011	1 000 1011
+100°C	0 110 0100	1 010 0100
+125°C	0 111 1101	1 011 1101
+127°C	0 111 1111	1 011 1111
+150°C	0 111 1111 (Note 3)	1 101 0110

1. Offset binary scale temperature values are offset by 64°C.
2. Binary scale temperature measurement returns 0°C for all temperatures < 0°C.
3. Binary scale temperature measurement returns 127°C for all temperatures > 127°C.

Conversion Rate Register

Table 10. STATUS REGISTER BIT ASSIGNMENTS

Bit	Name	Function
7	BUSY (Note 1)	1 when ADC is converting
6	LHIGH (Note 2)	1 when local high temperature limit is tripped
5	LLOW (Note 2)	1 when local low temperature limit is tripped
4	RHIGH (Note 2)	1 when remote high temperature limit is tripped
3	RLOW (Note 2)	1 when remote low temperature limit is tripped
2	OPEN (Note 2)	1 when remote sensor is an open circuit
1		

Table 13. LIST OF REGISTERS

Read Address (Hex)	Write Address (Hex)	Name	Power-On Default
Not Applicable	Not Applicable	Address Pointer	

Sensor Fault Detection

Thermal Inertia and Self-Heating

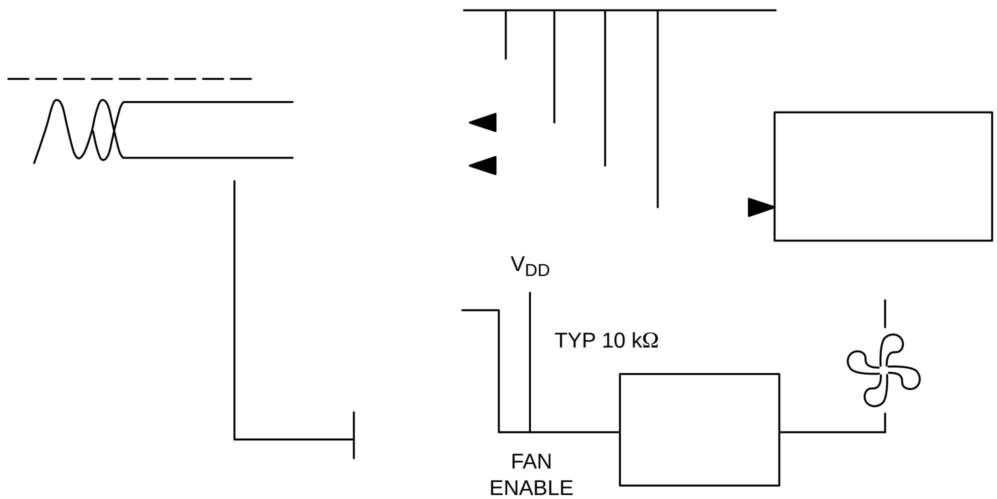
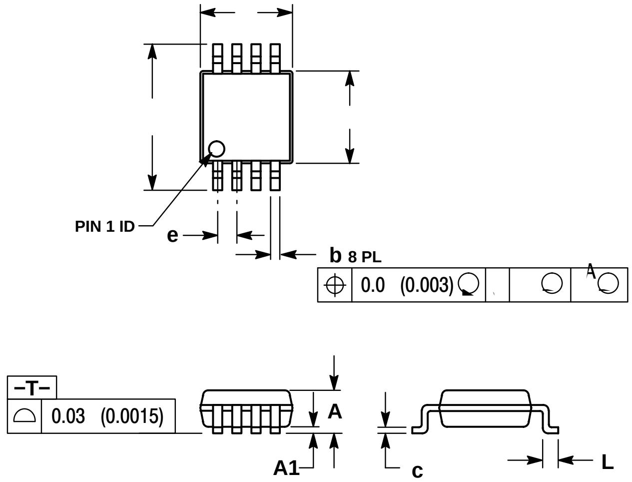


Figure 24. Typical Application Circuit

PACKAGE DIMENSIONS

SOIC−8 NB
CASE 751−07
ISSUE AK

PACKAGE DIMENSIONS



1. 14.5 , 1 2.
2.
3.
0.15 (0.006)
4. 0.25 (0.010)
5. 46 -01 46 -02.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	−−	−−	1.10	−−	−−	0.043
A1	0.05	0.08	0.15	0.002	0.003	0.006
b	0.25	0.33	0.40	0.010	0.013	0.016
c	0.13	0.18	0.23	0.005	0.007	0.009
D	2.90	3.00	3.10	0.114	0.118	0.122
E	2.90	3.00	3.10	0.114	0.118	0.122
e	0.65 BSC			0.026 BSC		
L	0.40	0.55	0.70	0.016	0.021	0.028