

SENSYLINK Microelectronics

(CT1820)

Single-Wire Digital Temperature Sensor

***CT1820 is a Digital Temperature Sensor with $\pm 0.5^{\circ}\text{C}$ Accuracy
Compatible with 1-wire Interface.
It is ideally used in HVAC, Thermal management and Smart Farm
etc.***

±0.5 °C Temperature Sensor with Single-Wire Digital Interface

Description

CT1820 is a digital temperature sensor with ±0.5°C accuracy. Temperature data can be read out directly via Single-Wire interface (compatible with 1-wire bus in protocol) by MCU.

It includes a high precision band-gap circuit, a 12-bit analog to digital converter that can offer 0.0625°C resolution, a calibration unit with non-volatile memory, 8-bit CRC generator and a digital interface block.

The chip is specially calibrated for ±0.5°C(Max.) accuracy over -10°C to 85°C range in factory before shipment to customers.

Each chip has a unique 64-bit ROM ID, which allows multiple devices to connect the same Single-Wire bus. MCU can distinguish and access each device individually by different ROM ID.

Also each chip has 3 bytes RFU (Reserved for User) scratchpad registers; User can store specific data into OTP memory by write memory command.

It has programmable temperature Alarm function for upper and lower trigger temperature.

Available Package: TO-92 package

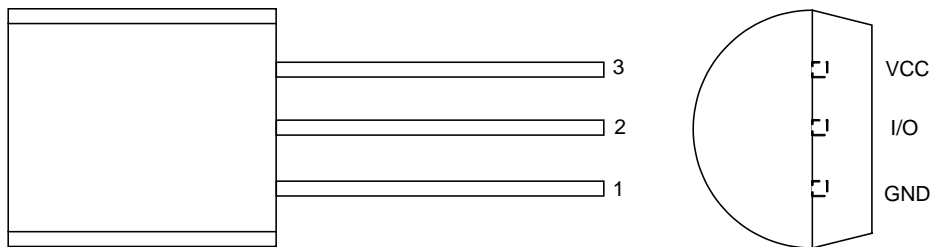
Features

- Operation Voltage: 3.0V to 5.5V
- Average Quiescent Current: 30uA during Temperature conversion;
- Standby Current: 5.0uA (Max.)
- Temperature Conversion time less than 40ms at 12-bit resolution
- Temperature Accuracy without calibration:
 - ±0.5°C(Max.) from -10°C to 85°C
 - ±1.0°C(Max.) from -10°C to 100°C
 - ±2.0°C(Max.) from -55°C to 125°C
- 12 bit ADC for 0.0625°C resolution
- Compatible with 1-wire interface
- Programmable Upper/Lower trigger Temperature
- Compatible with DS18B20 and performance improved.
- Temperature Range: -55°C to 125°C

Applications

- Smart HVAC System
- Thermal Management
- Smart Farm

PIN Configurations (Top View)



TO-92 (package code Z)

Typical Application

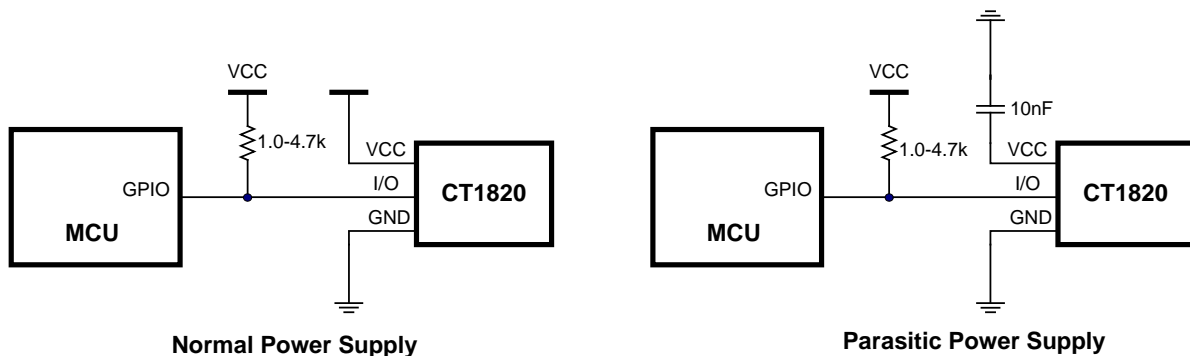


Figure 1. Typical Application of CT1820

±0.5 °C Temperature Sensor with Single-Wire Digital Interface

Pin Description

PIN No.	PIN Name	Description
1	GND	Ground pin.
2	I/O	Digital interface data input and output pin, Generally there needs a pull-up resistor to VCC in most applications, between 1.0k and 4.7k. Also this pin can be used as parasitic power pin if there is no power from VCC pin.
3	VCC	Power supply input pin, if I/O pin is used as parasitic power pin, VCC pin should connect a 10nF ceramic cap at least to ground.

Function Block

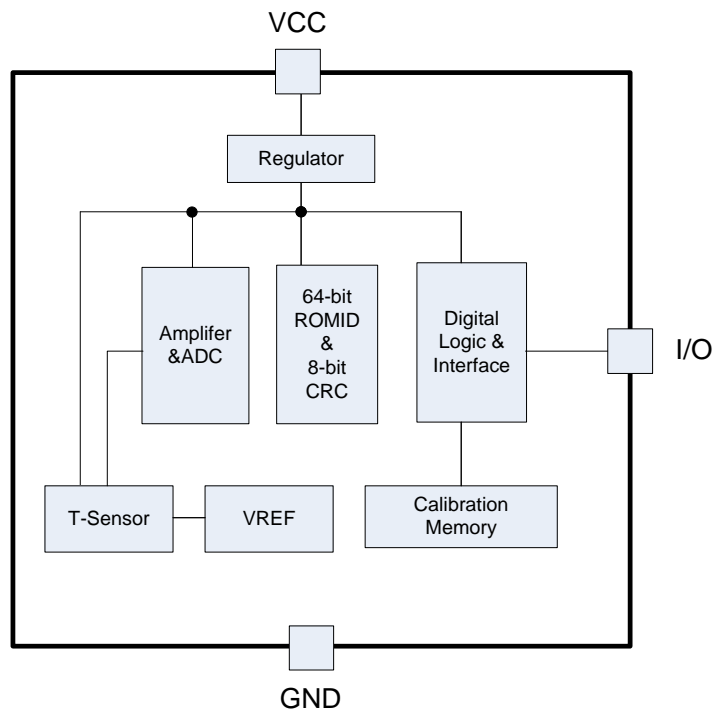
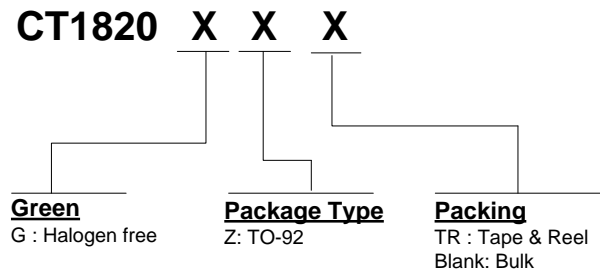


Figure 2. CT1820 function block

±0.5 °C Temperature Sensor with Single-Wire Digital Interface

Ordering Information



Order PN	Accuracy	Green ¹	Package	Marking ID ²	Packing	MPQ	Operation Temperature
CT1820GZ	±0.5°C	Halogen free	TO-92	1820 YWWA	Bulk	1,000	-55°C~+125°C
CT1820GZTR	±0.5°C	Halogen free	TO-92	1820 YWWA	Tape & Reel	2,000	-55°C~+125°C

Notes

1. Based on ROHS Y2012 spec, Halogen free covers lead free. So most package types Sensylink offers only states halogen free, instead of lead free.

2. Marking ID includes 2 rows of characters. In general, the 1st row of characters are part number, and the 2nd row of characters are date code plus production information.

- 1) Generally, date code is represented by one number and one letter. The number stands for year information, e.g. 5 stands for year 2015; 6 stands for year 2016. The capital letter (A-Z) stands for week information, e.g. A stands for 1st - 2nd week; B stands for 3rd - 4th week, and so on. Z stands for 51st - 54th week.
- 2) Right after the date code information, the next 2-3 numbers or letters are specified to stand for supplier or production location information.

±0.5 °C Temperature Sensor with Single-Wire Digital Interface

Absolute Maximum Ratings (Note 3)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC} to GND	-0.3 to 5.5	V
I/O pin Voltage	V_{IO} to GND	-0.3 to 5.5	V
Operation junction temperature	T_J	-50 to 150	°C
Storage temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{LEAD}	260	°C
ESD MM	ESD_{MM}	600	V
ESD HBM	ESD_{HBM}	6000	V
ESD CDM	ESD_{CDM}	1000	V

Note 3

- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at the "Absolute Maximum Ratings" conditions or any other conditions beyond those indicated under "Recommended Operating Conditions" is not recommended. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.
- Using 2oz dual layer (Top, Bottom) FR4 PCB with 4x4 mm² cooper as thermal PAD

Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	3.0 ~ 5.0	V
Ambient Operation Temperature Range	T_A	-55 ~ +125	°C

±0.5 °C Temperature Sensor with Single-Wire Digital Interface

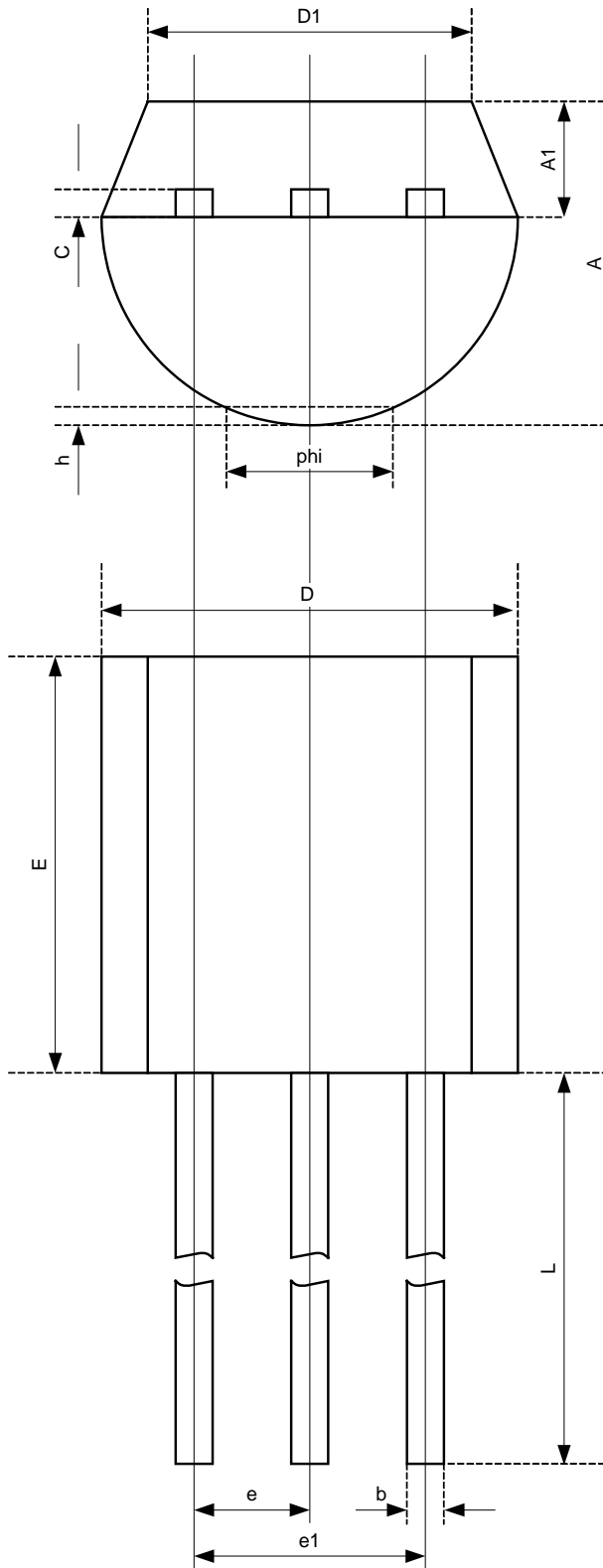
Electrical Characteristics (Note 4)

Test Conditions: $V_{CC} = 3.0V$ to $5.0V$, $T_A = -10$ to $85^\circ C$ unless otherwise specified. All limits are 100% tested at $T_A = 25^\circ C$.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		3.0		5.0	V
Temperature Accuracy	T_{AC}	$T_A = -10$ to $85^\circ C$	-0.5		0.5	$^\circ C$
		$T_A = -10$ to $100^\circ C$	-1.0		1.0	$^\circ C$
		$T_A = -55$ to $125^\circ C$	-2.0		2.0	$^\circ C$
Temperature Resolution			0.0625			$^\circ C$
Average Operating Current	I_{AOC}	$V_{IN} = 3.3V$, during Temperature conversion		40		μA
Shutdown Current	$I_{SHUTDOWN}$	Idle, not temperature conversion			5.0	μA
Conversion time	t_{CON}	From active to finish completely		20	40	ms
Digital Interface						
Logic Input Capacitance	C_{IL}	I/O pin		20		pF
Logic Input High Voltage	V_{IH}	I/O pin	1.0		$V_{CC} - 1.5V$	V
Logic Input Low Voltage	V_{IL}	I/O pin	0		0.5	V
Logic Input Current	I_{INL}	I/O pin	-2.0		2.0	μA
Communication Timing						
Single-Wire Communication Clock	T_{CLK}	default mode, [T2:T1:T0=1:1:1]		24		μs
Recovery time	t_{REC}		3.0			μs
Time slot for "0" or "1"	t_{SLOT}		$4 * T + t_{REC}$			μs
Power-on Reset Low Time	t_{POR}		2000			μs
Power-on Reset High Response Time	t_{EXR}		200			μs
Power-on Reset Low Response Time	t_{POROK}			$12 * T$		μs
Power-on Reset Response Sampling Time	t_{HSP_POR}		200		$200 + 12 * T$	μs
Device Reset Low Time	t_{RESET}			$32 * T$		μs
Device Reset High Response Time	t_{PDH}			$2 * T$		μs
Device Reset Low Response Time	t_{PDL}			$8 * T$		μs
Device Reset Response Sampling Time	t_{HSP}		$2 * T$		$10 * T$	μs
Write '0' Low Time'	t_{W0L}		$4 * T$		$8 * T$	μs
Write '1' Low Time'	t_{W1L}		2.0		$1 * T$	μs
Read bit Low Time	t_{RL}		2.5		$1 * T$	μs
Read bit sampling Time	t_{HSR}		t_{RL}		$2 * T$	μs
OTP Program Current	I_{PROG}		3.2		4.8	mA
OTP Program Time	t_{PROG}		200	300	400	μs
OTP Program Voltage	V_{PROG}		7.25	7.5	7.75	V
Data Retention	t_{DR}		10			Years

Note 4:

- All devices are 100% production tested at $T_A = +25^\circ C$; All specifications over the automotive temperature range is guaranteed by design, not production tested.
- No parasitic diode between EN pin and VIN pin.

Package Outline Dimensions
TO-92 Unit (mm)


Symbol	Min.	Max.
A	3.30	3.70
A1	1.10	1.40
b	0.38	0.55
c	0.36	0.51
D	4.30	4.70
D1	3.43	
E	4.30	4.70
e1	2.44	2.64
L	14.10	14.50
Phi		1.60
h	0.00	0.38
e	1.27	



SENSYLINK Microelectronics Co., Ltd

www.sensylink.com

IMPORTANT NOTICE

SENSYLINK Microelectronics Co., Ltd reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein or to discontinue any product or service. Customers should obtain the latest relevant information before placing orders and should verify the latest and complete information. SENSYLINK Microelectronics does not assume any responsibility for use of any product, nor does SENSYLINK Microelectronics any liability arising out of the application or use of this document or any product or circuit described herein. SENSYLINK Microelectronics assumes no liability for applications assistance or the design of Customers' products. Customers are responsible for their products and applications using SENSYLINK Microelectronics components. SENSYLINK Microelectronics does not convey any license under its patent or trademark rights nor the other rights.

SENSYLINK Microelectronics Co., Ltd © 2016.

单击下面可查看定价，库存，交付和生命周期等信息

[>>SENSYLINK](#)