NCT47

High Precision Temperatureto-Voltage Converter

The NCT47 is linear output temperature sensor whose output voltage is directly proportional to measured temperature. The NCT47 can accurately measure temperature from -40°C to $+125^{\circ}\text{C}$.

For the NCT47, the output voltage range is typically 100mV at -40°C, 500mV at 0°C, 750mV at +25°C, and 1.75V at +125°C. A 10mV/°C voltage slope allows for the wide temperature range. The NCT47 is packaged in space saving 3–Pin SOT–23B packages, making them ideal for space critical applications.

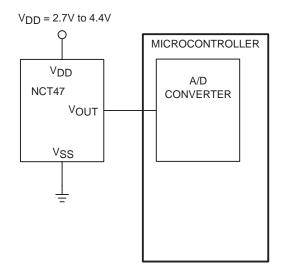
Features

- Wide Temperature Measurement Range: -40°C to 125°C
- High Temperature Converter Accuracy: ±2°C Max at 25°C
- Linear Temperature Slope: 10mV/°C
- 2.7V to 4.4V Operating Range
- Small 3-Pin SOT-23B Package
- Very Low Supply Current: 35µA typical

Typical Applications

- Cellular Phones
- Power Supply Thermal Shutdown
- Temperature-Controlled Fans
- Temperature Measurement / Instrumentation
- Temperature Regulators
- Consumer Electronic
- Portable Battery Powered Equipment

FUNCTIONAL BLOCK DIAGRAM





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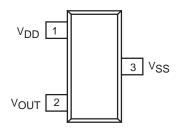
http://onsemi.com



SOT-23B (TO-236) CASE TBD

PIN CONFIGURATION

(Top View)



SOT-23B*

NOTE: *SOT-23B is equivalent to JEDEC (TO-236)

ORDERING INFORMATION

Device	Package	Shipping
NCT47SNT1	SOT-23B	3000 Tape/Reel

ABSOLUTE MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	+7.0	V
V _{SS}	oltage on Any Pin with Respect to Supplies $(V_{SS} - 0.3)$ to $(V_{DD} + 0.3)$		V
T _A	Operating Temperature Range	-40 to +125	°C
T _{stg}	Storage Temperature Range	−55 to +150	°C
T _{sol}	Lead Temperature (Soldering, 10 Seconds)	+260	°C

^{*} Maximum Ratings are those values beyond which damage to the device may occur.

ELECTRICAL CHARACTERISTICS ($T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, $V_{DD} = 2.7\text{V}$ to 4.4V, unless otherwise noted.)

Symbol	mbol Characteristic		Min	Тур	Max	Unit
V_{DD}	Supply Voltage		2.7	_	4.4	V
IQ	Supply Current, Operating		_	35	60	μΑ
Ay	Average Slope of Output Voltage		_	10	_	mV/°C
TMP _{ACY25}	Temperature Accuracy at 25°C T,	_Δ = 25°C	-2.0	±0.5	+2.0	°C
TMP _{ACY125}	Temperature Accuracy T _A	= 125°C	-3.0	_	+3.0	°C
TMP _{ACY-40}	Temperature Accuracy T _A	= -40°C	_	1.5	_	°C
V _{OUT-40}	Output Voltage at -40°C		_	100	_	mV
VOUT+25	Output Voltage at 25°C		730	750	770	mV
VOUT+125	Output Voltage at 125°C		1720	1750	1780	mV
lout	Output Source and Sink Current	·	100	_	_	μΑ

PIN DESCRIPTION

Pin No.	Symbol	Description	
1	V _{DD}	Input Supply Voltage	
2	Vout	Temperature Sensor Output Terminal	
3	V _{SS}	Ground Terminal	

DETAILED DESCRIPTION

The NCT47 has an output voltage that varies linearly with temperature in degrees Celsius. Figure 1 shows a plot of the output voltage versus temperature for the NCT47. The

temperature slope is fixed at 10 mV/ $^{\circ}$ C, and the output voltage at 0 $^{\circ}$ C is 500 mV.

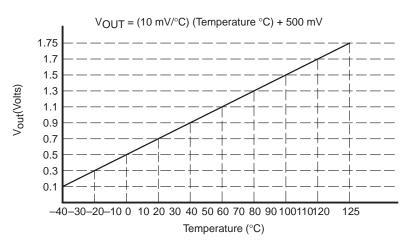
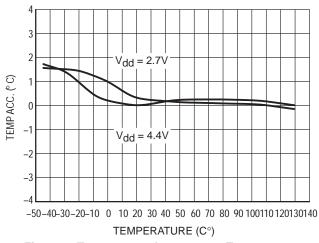


Figure 1. Output Voltage vs. Temperature

NCT47

TYPICAL CHARACTERISTICS



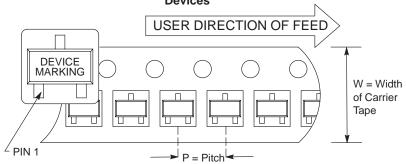
60 50 SUPPLY CURRENT (µA) $V_{dd} = 4.4V -$ 40 30 $V_{dd} = 2.7V$ 20 10 -40 -25 -10 5 20 35 50 65 95 110 125 TEMPERATURE (C°)

Figure 2. Temperature Accuracy vs Temperature

Figure 3. Supply Current vs Temperature

TAPING FORM

Component Taping Orientation for 3-Pin SOT-23B (JEDEC TO-236) Devices

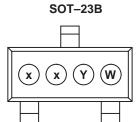


Standard Reel Component Orientation (Mark Right Side Up)

Tape & Reel Specifications Table

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-23B	8 mm	4 mm	3000	7 inches

MARKING DIAGRAM

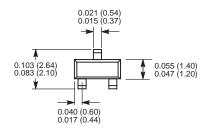


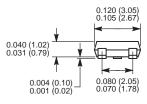
xx = part number code & temperature range YW = Date Code

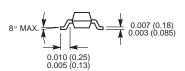
NCT47

PACKAGE DIMENSIONS

3-Pin SOT-23B (JEDEC TO-236)







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