NCT47

High Precision Temperature-to-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°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.

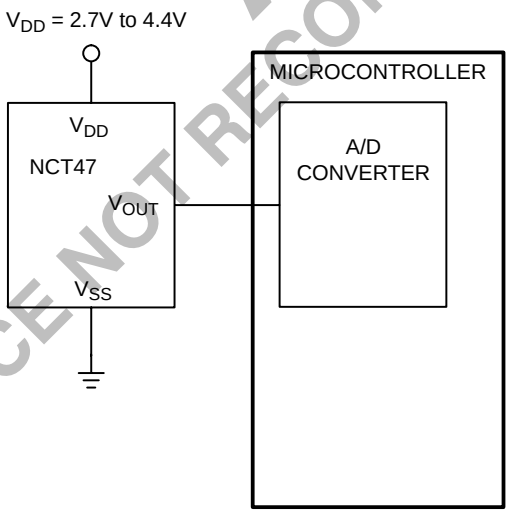
Features

- 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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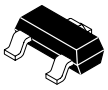
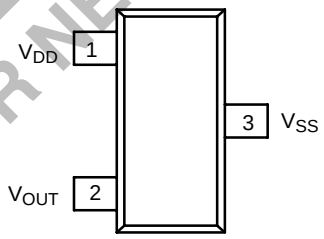


SOT–23B
(TO–236)
CASE TBD

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

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	+7.0	V
V_{SS}	Voltage 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°C to +125°C, V_{DD} = 2.7V to 4.4V, unless otherwise noted.)

Symbol	Characteristic		Min	Typ	Max	Unit
V_{DD}	Supply Voltage		2.7	—	4.4	V
I_Q	Supply Current, Operating		—	35	60	μA
A_V	Average Slope of Output Voltage		—	10	—	mV/°C
TMP_{ACY25}	Temperature Accuracy at 25°C	T_A = 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
V_{OUT+25}	Output Voltage at 25°C		730	750	770	mV
$V_{OUT+125}$	Output Voltage at 125°C		1720	1750	1780	mV
I_{OUT}	Output Source and Sink Current		100	—	—	μA

PIN DESCRIPTION

Pin No.	Symbol	Description
1	V_{DD}	Input Supply Voltage
2	V_{OUT}	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/°C, and the output voltage at 0°C is 500 mV.

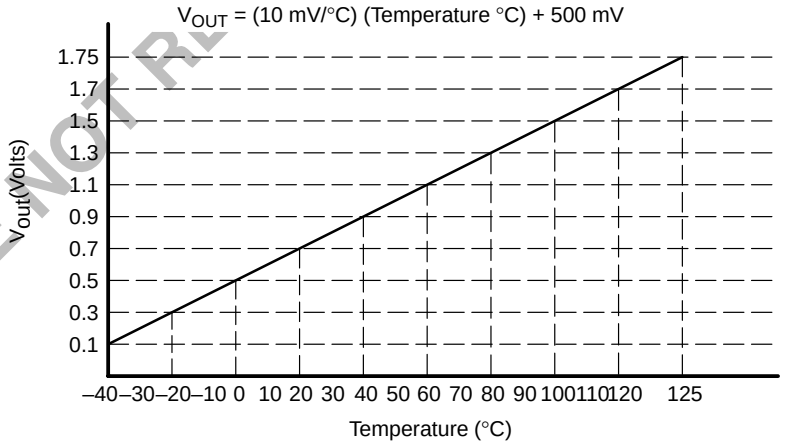


Figure 1. Output Voltage vs. Temperature

TYPICAL CHARACTERISTICS

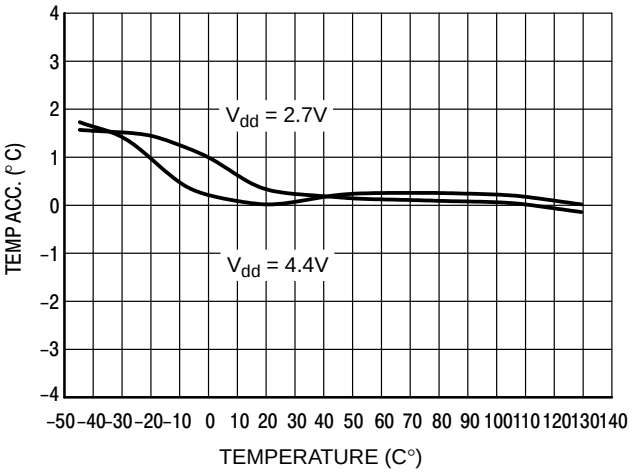


Figure 2. Temperature Accuracy vs Temperature

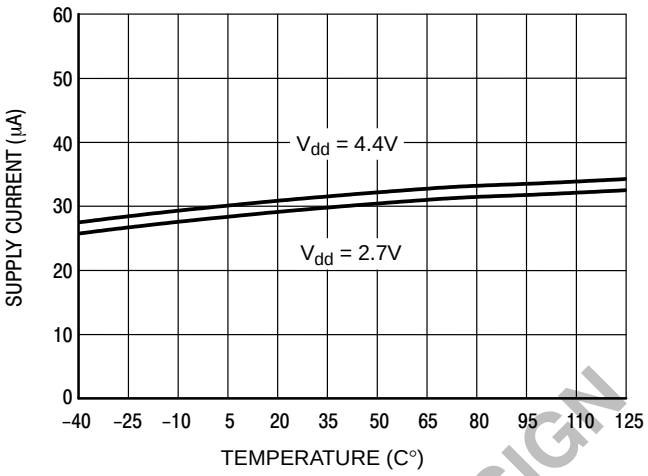
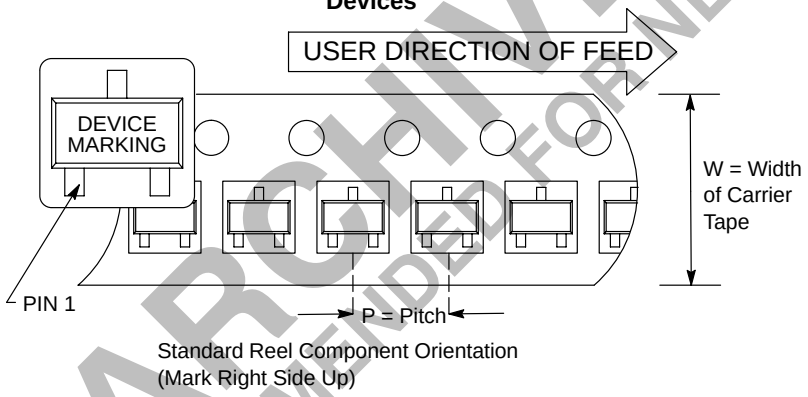


Figure 3. Supply Current vs Temperature

TAPING FORM

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



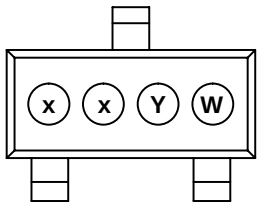
Standard Reel Component Orientation
(Mark Right Side Up)

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

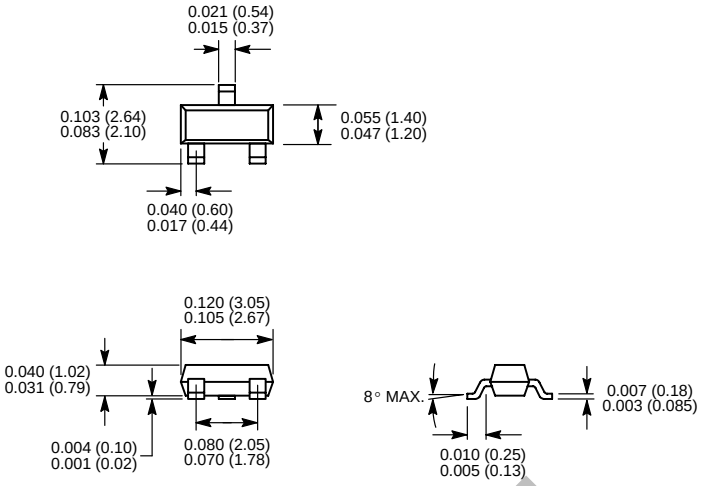
SOT–23B



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

PACKAGE DIMENSIONS

3–Pin SOT–23B (JEDEC TO–236)



PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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