

# NTC Thermistor (SMD type)

-Temperature sensor-

NCU-series / NCP-series

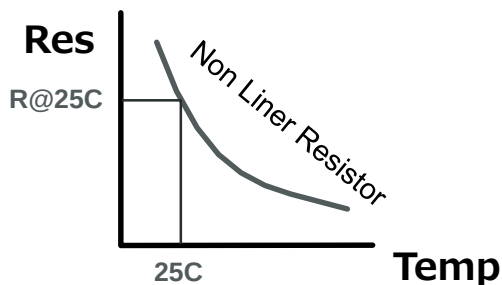


# Murata NTC Thermistor

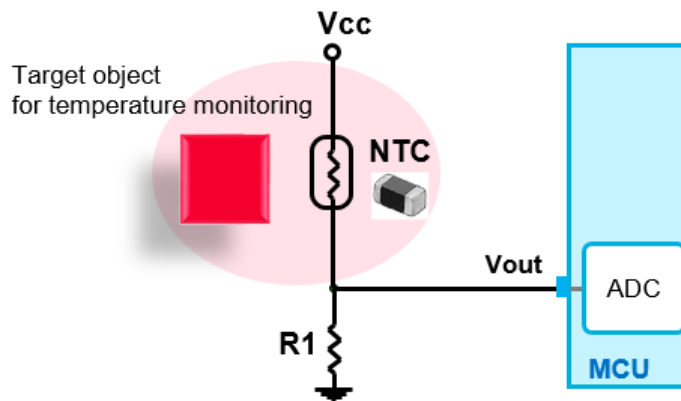
## Function

### Temperature sensing

by identifying resistance value



## Reference circuit



## Application

- Cellphone / Laptop
- Wearable / Wireless Audio
- Server / Data Center
- Automotive / Motorcycle
- White goods / TVs
- Industrial
- Healthcare

## Murata covers both SMD & Leaded

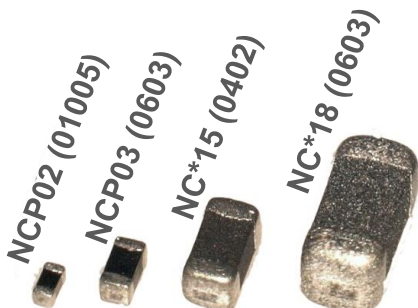
## Feature

### NCU-series

for high reliable application  
(Automotive / datacenter)

### NCP-series

for genial consumer application



### NXF-series



### NXR-series



- The Highest standard QCDS from Various Line up
- High Accuracy  
(R Tolerance : +/-1%, +/- 0.5%)
- Good Reliability to be available in Automotive/Industrial market.
- UL / cUL Approved for consumer grade  
(Ask Murata and check availability)
- AEC-Q200 comply for Automotive Grade

# NCU-series lineup for high reliable application



**muRata**  
INNOVATOR IN ELECTRONICS

\*\* □: "S" Automotive grade, "0": Consumer grade

| Size (inch) | Murata P/N      | Resistance (at 25°C) | B-constant (25/50°C) | Operating Temp.                                                                      |
|-------------|-----------------|----------------------|----------------------|--------------------------------------------------------------------------------------|
| 0402        | NCU15XH103J6□RB | 10kohm+/-5%          | 3380K +/- 1%         | Consumer grade<br>-40degC to +125degC<br><br>Automotive grade<br>-40degC to +150degC |
|             | NCU15XH103E6□RB | 10kohm+/-3%          |                      |                                                                                      |
|             | NCU15XH103F6□RB | 10kohm+/-1%          |                      |                                                                                      |
|             | NCU15XH103D6□RB | 10kohm+/-0.5%        | 3380K +/- 0.7%       |                                                                                      |
|             | NCU15WB473J6□RC | 47kohm+/-5%          | 4050K +/- 1%         |                                                                                      |
|             | NCU15WB473E6□RC | 47kohm+/-3%          |                      |                                                                                      |
|             | NCU15WB473F6□RC | 47kohm+/-1%          |                      |                                                                                      |
|             | NCU15WB473D6□RC | 47kohm+/- 0.5%       | 4050K +/- 0.5%       |                                                                                      |
|             | NCU15WF104J6□RC | 100kohm+/-5%         | 4250K +/- 1%         |                                                                                      |
|             | NCU15WF104E6□RC | 100kohm+/-3%         |                      |                                                                                      |
|             | NCU15WF104F6□RC | 100kohm+/-1%         |                      |                                                                                      |
|             | NCU15WF104D6□RC | 100kohm+/-0.5%       | 4250K +/- 0.5%       |                                                                                      |

| Size (inch) | Murata P/N      | Resistance (at 25°C) | B-constant (25/50°C) | Operating Temp.                                                                      |
|-------------|-----------------|----------------------|----------------------|--------------------------------------------------------------------------------------|
| 0603        | NCU18XH103J6□RB | 10kohm+/-5%          | 3380K +/- 1%         | Consumer grade<br>-40degC to +125degC<br><br>Automotive grade<br>-40degC to +150degC |
|             | NCU18XH103E6□RB | 10kohm+/-3%          |                      |                                                                                      |
|             | NCU18XH103F6□RB | 10kohm+/-1%          |                      |                                                                                      |
|             | NCU18XH103D6□RB | 10kohm+/-0.5%        | 3380K +/- 0.7%       |                                                                                      |
|             | NCU18WB473J6□RB | 47kohm+/-5%          | 4050K +/- 1%         |                                                                                      |
|             | NCU18WB473E6□RB | 47kohm+/-3%          |                      |                                                                                      |
|             | NCU18WB473F6□RB | 47kohm+/-1%          |                      |                                                                                      |
|             | NCU18WB473D6□RB | 47kohm+/- 0.5%       | 4050K +/- 0.5%       |                                                                                      |
|             | NCU18WF104J6□RB | 100kohm+/-5%         | 4250K +/- 2%         |                                                                                      |
|             | NCU18WF104E6□RB | 100kohm+/-3%         |                      |                                                                                      |
|             | NCU18WF104F6□RB | 100kohm+/-1%         |                      |                                                                                      |
|             | NCU18WF104D6□RB | 100kohm+/- 0.5%      | 4250K +/- 0.5%       |                                                                                      |

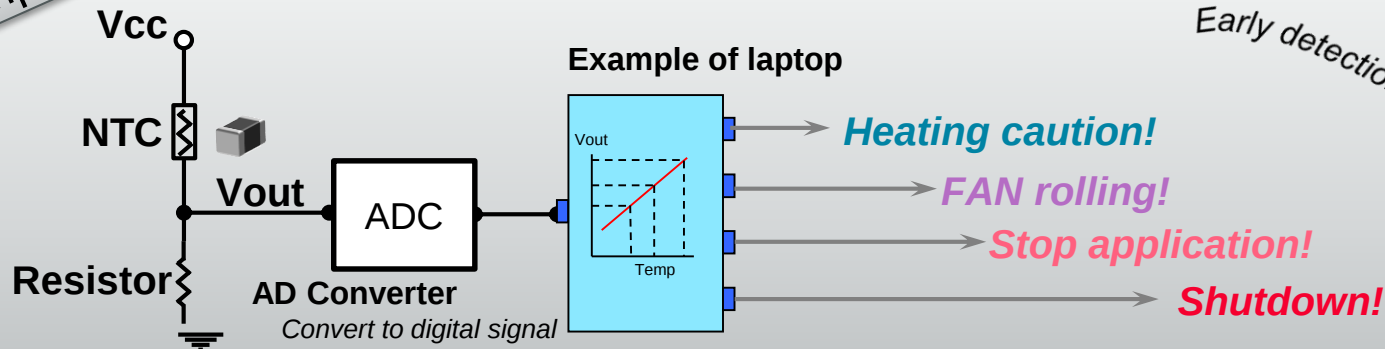
# NCP-series lineup for general consumer



| Size (inch) | Resistance @25C / B-constant (25C/50C)                                                                                                                                                           |                                                                                                                                                                                             |                                                                                                                                                          | Detail on Datasheet                                                                                                                                                                                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0201        | 1.0k ohm / 3500K<br>1.5k ohm / 3500K<br>2.2k ohm / 3500K<br>3.3k ohm / 3500K<br>4.7k ohm / 3500K<br>6.8k ohm / 3380K<br>10k ohm / 3380K                                                          | 10k ohm / 3900K<br>15k ohm / 3380K<br>22k ohm / 3380K<br>33k ohm / 4250K<br>47k ohm / 4050K<br>47k ohm / 4485K<br>68k ohm / 4250K                                                           | 68k ohm / 4485K<br>100k ohm / 4250K<br>100k ohm / 4485K<br>150k ohm / 4485K<br>220k ohm / 4485K                                                          | <a href="https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp03.ashx?la=en&amp;cvid=20180509062659421200">https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp03.ashx?la=en&amp;cvid=20180509062659421200</a> |
| 0402        | 220 ohm / 3500K<br>330 ohm / 3500K<br>470 ohm / 3650K<br>680 ohm / 3650K<br>1.0k ohm / 3650K<br>1.5k ohm / 3950K<br>2.2k ohm / 3950K<br>3.3k ohm / 3950K<br>4.7k ohm / 3500K<br>4.7k ohm / 3950K | 6.8k ohm / 3950K<br>10k ohm / 3380K<br>10k ohm / 3900K<br>15k ohm / 3950K<br>22k ohm / 3950K<br>22k ohm / 4485K<br>33k ohm / 4050K<br>33k ohm / 4485K<br>47k ohm / 4050K<br>47k ohm / 4485K | 68k ohm / 4150K<br>68k ohm / 4485K<br>100k ohm / 4250K<br>100k ohm / 4485K<br>150k ohm / 4500K<br>150k ohm / 4485K<br>220k ohm 4500K<br>470K ohm / 4500K | <a href="https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp15.ashx?la=en&amp;cvid=20180509071907018400">https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp15.ashx?la=en&amp;cvid=20180509071907018400</a> |
| 0603        | 220 ohm / 3500K<br>330 ohm / 3500K<br>470 ohm / 3650K<br>680 ohm / 3650K<br>1.0k ohm / 3650K<br>1.5k ohm / 3950K<br>2.2k ohm / 3950K<br>3.3k ohm / 3950K                                         | 4.7k ohm / 3500K<br>4.7k ohm / 3950K<br>6.8k ohm / 3950K<br>10k ohm / 3380K<br>10k ohm / 3900K<br>15k ohm / 3950K<br>22k ohm / 3950K<br>33k ohm / 4050K                                     | 47k ohm / 4050K<br>68k ohm / 4150K<br>100k ohm / 4250K<br>150k ohm / 4500K<br>220k ohm 4500K<br>470K ohm / 4500K                                         | <a href="https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp18.ashx?la=en&amp;cvid=20180509062916826000">https://www.murata.com/-/media/webrenewal/products/thermistor/ntc/ncp/ncp18.ashx?la=en&amp;cvid=20180509062916826000</a> |

# How NTC Thermistor works

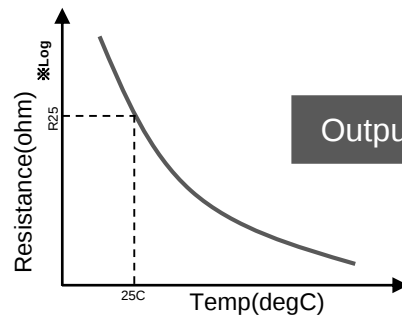
Example



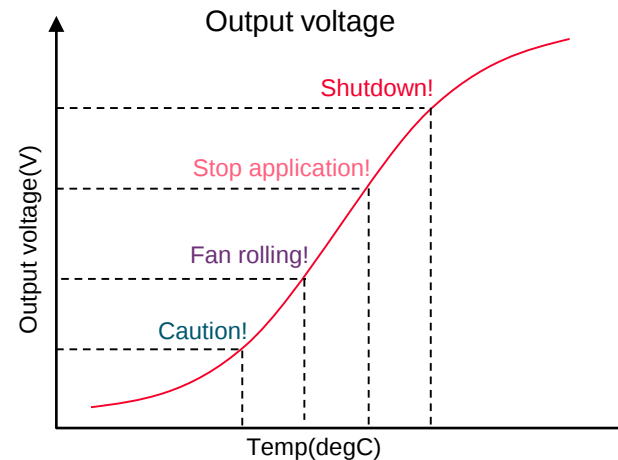
Early detection can contribute to safety

## <Working principle>

- NTC Thermistor resistance characteristic

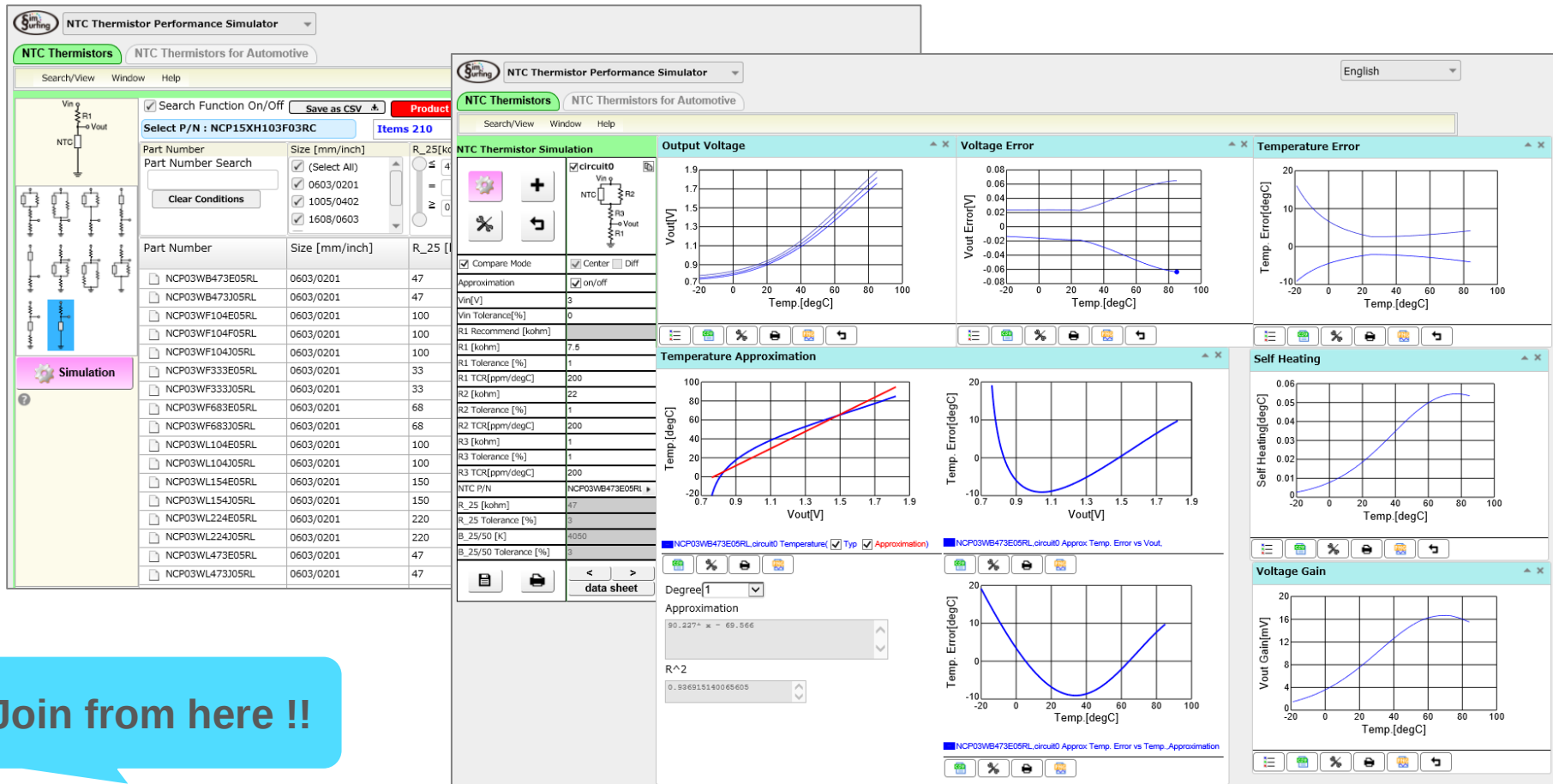


Output Voltage



# Murata Web Simulator to get Thermistor output

The SimSurfing NTC Thermistor Performance Simulator (hereafter called “this software”) is software for simulating the output voltage versus temperature characteristics. Each graph of the output voltage characteristics of the specified circuit, the output voltage error and the temperature error are displayed.



Join from here !!

<SimSurfing URL>

<https://ds.murata.co.jp/simsurfing/ntcthermistor.html?lcid=en-us>

# Application Ex) Automotive

mm-Wave

NC\*



Telematics

NC\*



HUD

NC\*



LCD Display

NC\*



Mirror

NC\*

Sensing Camera

NC\*



Lidar

NC\*



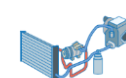
Car navigation/Audio

NC\*



HVAC/ Seat

NX\* NC\*



RKE/ Immobilizer

NC\*



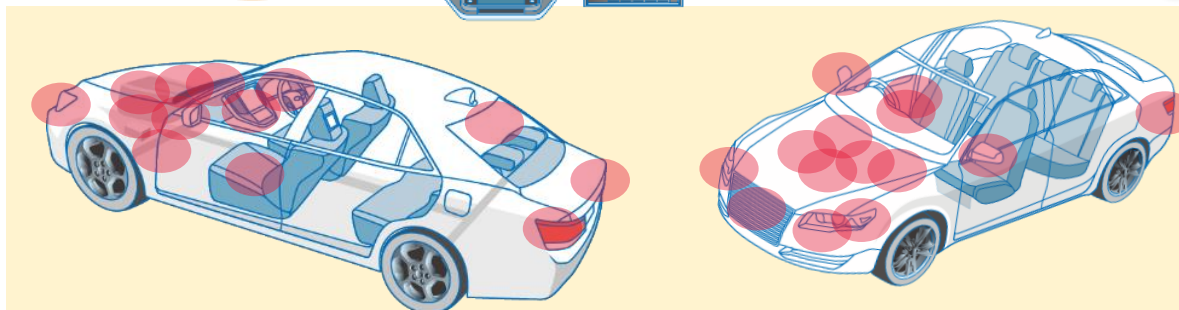
e-call

NC\*



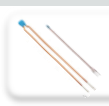
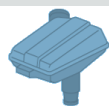
Lighting

NC\*



MAF/MAP

NX\* NC\*



Engine control unit

NC\*



DCDC converter

NC\*



EPS

NC\*



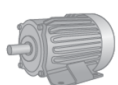
Vehicle stability control

NC\*



Motor

NX\* NC\*



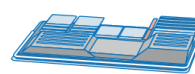
Transmission

NC\*



Inverter/BMS

NX\* NC\*



ISS

NC\*



Air bag

NC\*



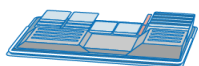
NX\*- Leaded NTC Thermistor for temp sensing

NC\*- SMD NTC Thermistor for temp sensing

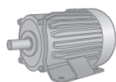
# Application Ex) Motorcycle

## EV 2 Wheeler

Battery Management system **NX\*** **NC\***



Motor **NX\*** **NC\***



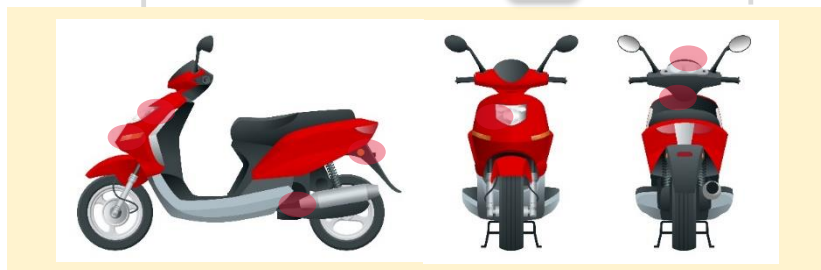
DCDC converter **NC\***



Lighting **NC\***



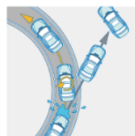
Instrument cluster **NC\***



Telematics **NX\*** **NC\***

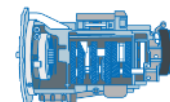


ABS **NC\***



## Gasoline 2 wheeler

Transmission **NC\***



Engine Control Unit **NC\***

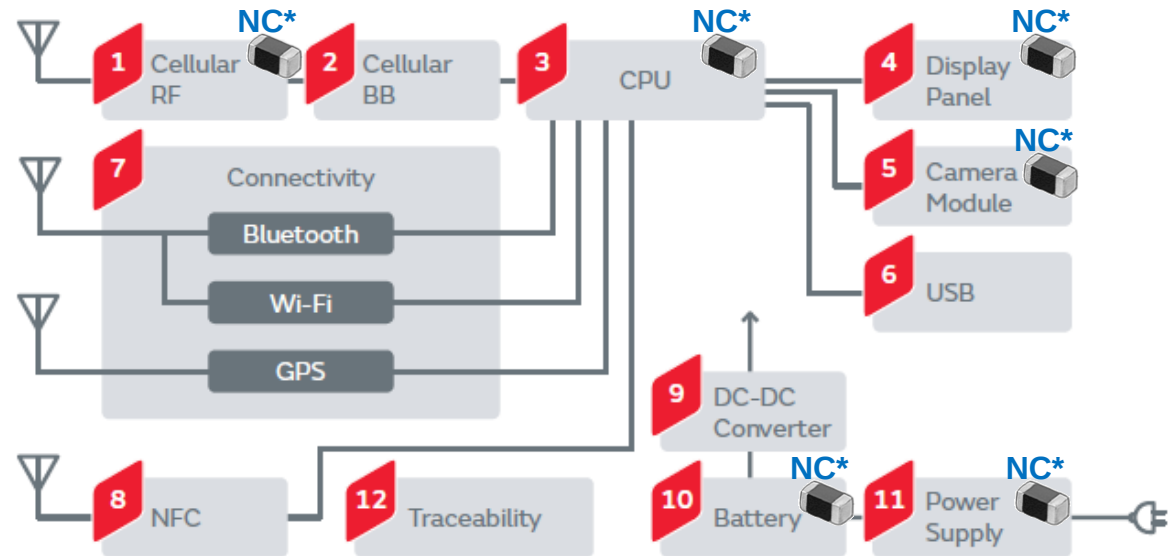


**NX\***- Leaded NTC Thermistor for temp sensing

**NC\***- SMD NTC Thermistor for temp sensing

# Application Ex) Mobile / Data Center

## Mobile



## Data Center

