

## TEMPERATURE SENSOR IC

### FEATURES

- Linear Output Voltage 10 mV/°C Output
- 4.5 to 10.0 V Supply Range
- Miniature Package (SOT-25)
- Minimum External Parts Count
- Low Power Consumption

### APPLICATIONS

- Home and Industrial Thermostats
- Automotive Climate Control
- Battery Charger Temperature Monitor
- Notebook Computer Temperature Monitor
- Electronic Thermometers
- Fish Finder Water Temperature
- Industrial Process Controllers
- Home Appliance Temperature Control

### DESCRIPTION

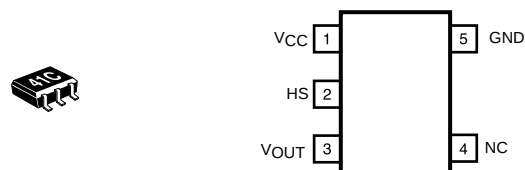
The TK11041 is a temperature sensor IC with a linear output of 10 mV/°C over the range of -30 to +105 °C. Its wide operating voltage range of 4.5 to 10.0 V makes it suitable for a number of applications requiring accurate temperature control, such as electronic thermostats for climate control, refrigerators, and industrial process controls.

A typical application is to make a digital representation of temperature with an A/D converter, or to make a thermal detector with a comparator.

The TK11041 has a compensation pin for a 0.1 μF capacitor that ensures stability over the IC's operating temperature range.

The TK11041 is available in a miniature SOT-25 surface mount package.

**TK11041**



Note: Connect pin 2 to GND

### ORDERING INFORMATION

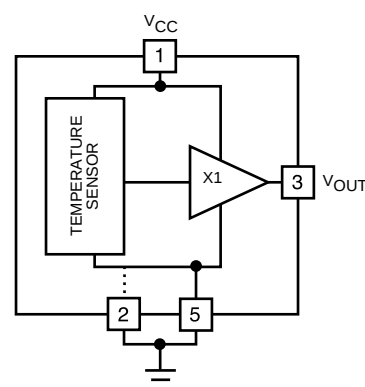
TK11041M-1



Tape/Reel Code

TAPE/REEL CODE  
TL: Tape Left

### BLOCK DIAGRAM



# TK11041

## ABSOLUTE MAXIMUM RATINGS

|                                  |             |                                         |                |
|----------------------------------|-------------|-----------------------------------------|----------------|
| Supply Voltage .....             | 12 V        | Storage Temperature Range .....         | -55 to +150 °C |
| Operating Voltage .....          | 4.5 to 10 V | Operating Temperature Range .....       | -30 to +105 °C |
| Power Dissipation (Note 1) ..... | 150 mW      | Lead Soldering Temperature (10 s) ..... | 235 °C         |
| Junction Temperature .....       | 150 °C      |                                         |                |

## TK11041 ELECTRICAL CHARACTERISTICS

Test Conditions:  $V_{CC} = 5.0\text{ V}$ ,  $I_{OUT} = 0\text{ }\mu\text{A}$ ,  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

| SYMBOL    | PARAMETER               | TEST CONDITIONS                                                | MIN   | TYP   | MAX   | UNITS                |
|-----------|-------------------------|----------------------------------------------------------------|-------|-------|-------|----------------------|
| $V_{OUT}$ | Output Voltage          | $T_A = 25\text{ }^\circ\text{C}$                               | 2.952 | 2.982 | 3.012 | V                    |
|           |                         | $T_A = 85\text{ }^\circ\text{C}$                               | 3.543 | 3.583 | 3.623 | V                    |
|           |                         | $T_A = -30\text{ }^\circ\text{C}$                              |       | 2.431 |       | V                    |
| $T_C$     | Temperature Coefficient | $T_A = 25\text{ }^\circ\text{C}$ to $85\text{ }^\circ\text{C}$ | 9.2   | 10.02 | 10.8  | mV/ $^\circ\text{C}$ |
| Line Reg  | Line Regulation         | $V_{CC} = 5$ to $10\text{ V}$                                  | -15   | 2     | 15    | mV                   |
| Load Reg  | Load Regulation         | $I_{OUT} = 0$ to $100\text{ }\mu\text{A}$                      | 0     | 2     | 15    | mV                   |
| $I_{CC}$  | Supply Current          | $T_A = 25\text{ }^\circ\text{C}$                               |       | 110   | 180   | $\mu\text{A}$        |
| $I_{OUT}$ | Output Current          | $\Delta V_{OUT} \leq 20\text{ mV}$                             |       |       | 400   | $\mu\text{A}$        |

Note 1: Power dissipation is 150 mW when mounted as recommended. Derate at 1.2 mW/ $^\circ\text{C}$  for operation above 25  $^\circ\text{C}$ .

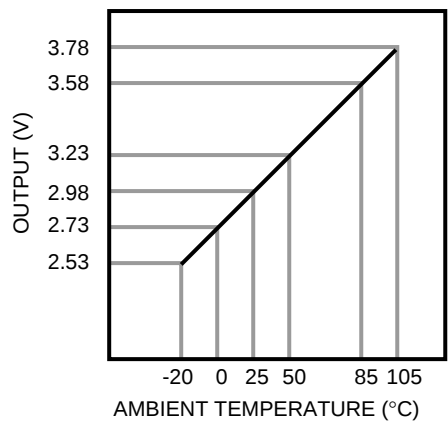
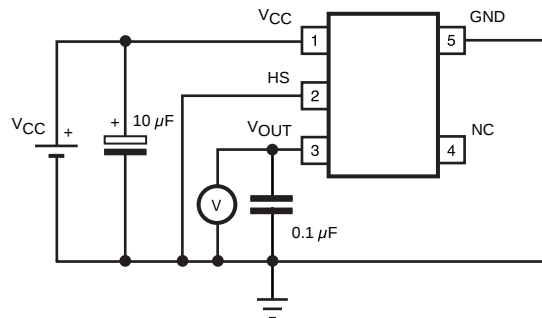


FIGURE 1. OUTPUT CHARACTERISTICS

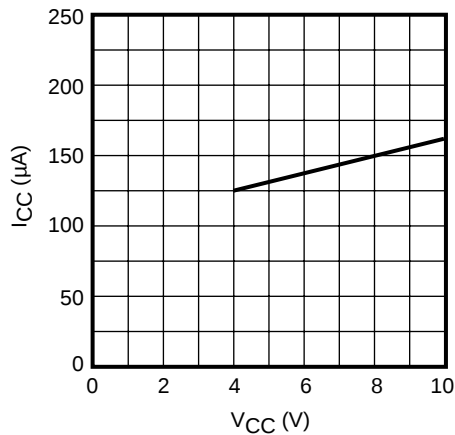
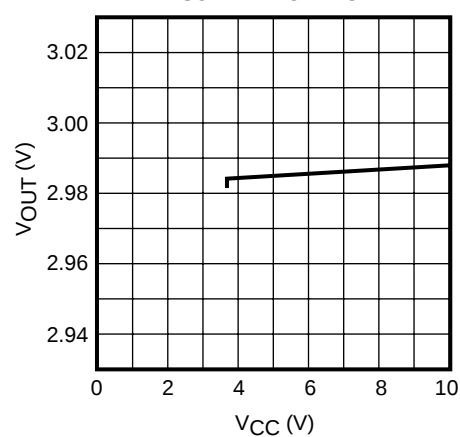
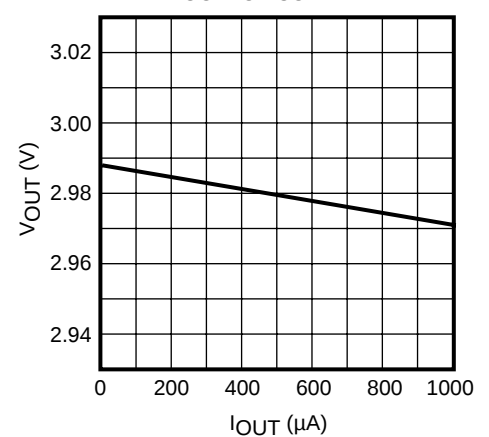
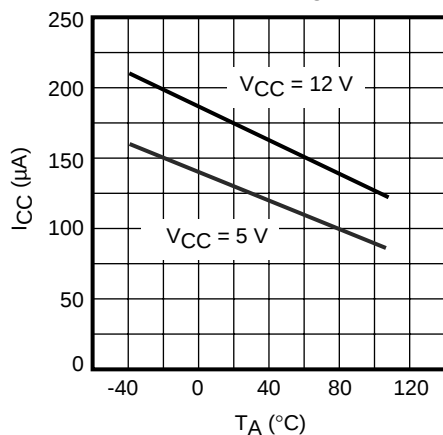
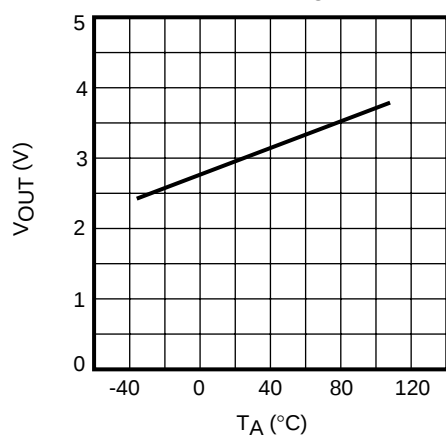
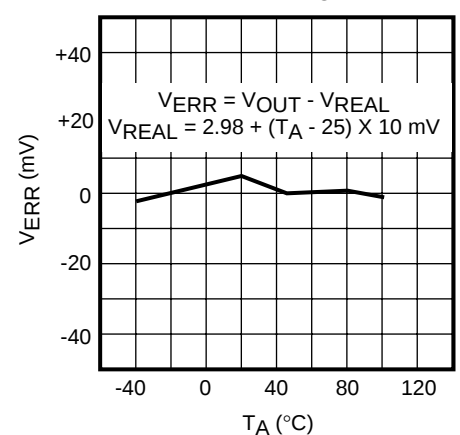
## TEST CIRCUIT



Note: Connect pin 2 to ground

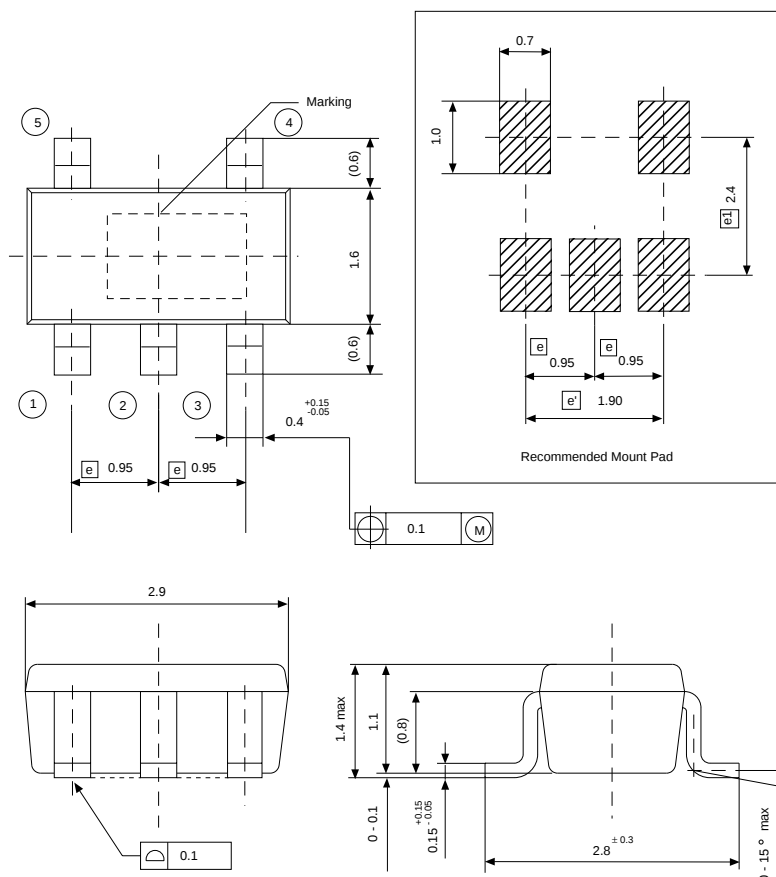
## TYPICAL PERFORMANCE CHARACTERISTICS

$V_{CC} = 5\text{ V}$ ,  $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified.

SUPPLY CURRENT vs.  
SUPPLY VOLTAGEOUTPUT VOLTAGE vs.  
SUPPLY VOLTAGEOUTPUT VOLTAGE vs.  
OUTPUT CURRENTSUPPLY CURRENT vs.  
TEMPERATUREOUTPUT VOLTAGE vs.  
TEMPERATURELINEARITY ERROR vs.  
TEMPERATURE

## PACKAGE OUTLINE

## SOT-25 (SOT-23-5)



Dimensions are shown in millimeters  
Tolerance: x.x =  $\pm 0.2$  mm (unless otherwise specified)

## Marking Information

TK11041

Marking  
41C

Toko America, Inc. Headquarters  
1250 Feehanville Drive, Mount Prospect, Illinois 60056  
Tel: (847) 297-0070 Fax: (847) 699-7864

## TOKO AMERICA REGIONAL OFFICES

Midwest Regional Office  
Toko America, Inc.  
1250 Feehanville Drive  
Mount Prospect, IL 60056  
Tel: (847) 297-0070  
Fax: (847) 699-7864

Western Regional Office  
Toko America, Inc.  
2480 North First Street, Suite 260  
San Jose, CA 95131  
Tel: (408) 432-8281  
Fax: (408) 943-9790

Eastern Regional Office  
Toko America, Inc.  
107 Mill Plain Road  
Danbury, CT 06811  
Tel: (203) 748-6871  
Fax: (203) 797-1223

Semiconductor Technical Support  
Toko Design Center  
4755 Forge Road  
Colorado Springs, CO 80907  
Tel: (719) 528-2200  
Fax: (719) 528-2375

Visit our Internet site at <http://www.tokoam.com>

The information furnished by TOKO, Inc. is believed to be accurate and reliable. However, TOKO reserves the right to make changes or improvements in the design, specification or manufacture of its products without further notice. TOKO does not assume any liability arising from the application or use of any product or circuit described herein, nor for any infringements of patents or other rights of third parties which may result from the use of its products. No license is granted by implication or otherwise under any patent or patent rights of TOKO, Inc.