

## TEMPERATURE SENSOR IC

### FEATURES

- Linear Output Voltage 5mV/°C Output
- Active High On/Off Control
- 2.4 to 10.0 V Supply Range
- Miniature Package (SOT-25)
- Minimum External Parts Count
- Low Power Consumption

### DESCRIPTION

The TK11033 is a temperature sensor IC with a linear output of 5 mV/°C over the range of -30 to + 105 °C. Its wide operating voltage range of 2.4 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. The device is in the "on" state when the control pin is pulled to a logic high level.

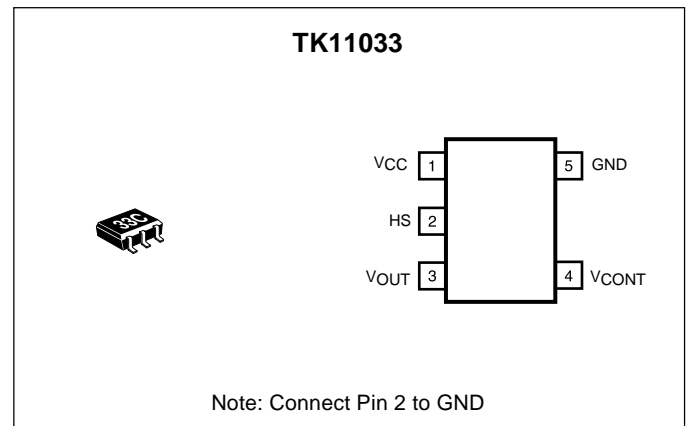
A typical application is to make a digital representation of temperature with an A/D converter, or to make a thermal detector with a comparator.

The TK11033 has a compensation pin for a 0.1 μF capacitor that ensures stability over the IC's operating temperature range.

The TK11033 is available in a miniature SOT-25 surface mount package.

### 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

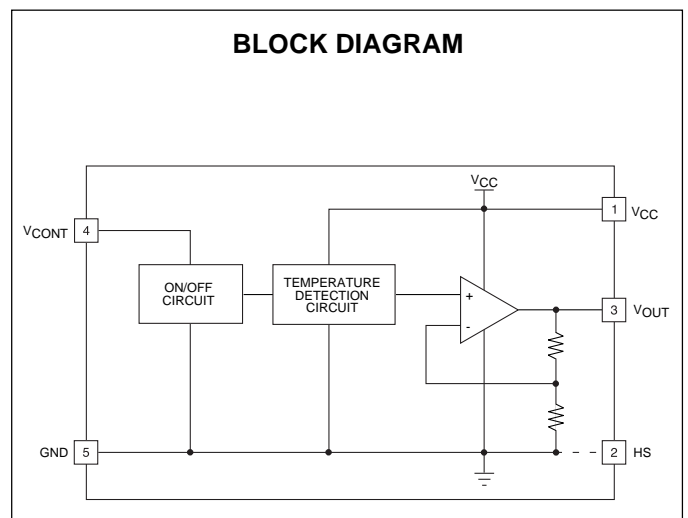


**ORDERING INFORMATION**

TK11033M

Tape/Reel Code

TAPE/REEL CODE  
TL: Tape Left



# TK11033

## ABSOLUTE MAXIMUM RATINGS

Supply Voltage .....	12 V	Storage Temperature Range .....	-55 to +150 °C
Operating Voltage .....	2.4 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		

## TK11033 ELECTRICAL CHARACTERISTICS

Test Conditions:  $V_{CC} = 3.0\text{ V}$ ,  $V_{CONT} = 2.4\text{ V}$ ,  $I_{OUT} = 0\text{ }\mu\text{A}$ ,  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

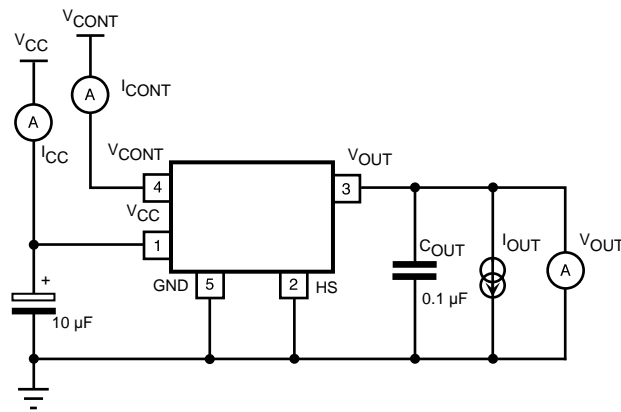
SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$V_{OUT}$	Output Voltage	$T_A = 25\text{ }^\circ\text{C}$	1.4760	1.4910	1.5060	V
		$T_A = 85\text{ }^\circ\text{C}$	1.7755	1.7955	1.8155	V
		$T_A = -30\text{ }^\circ\text{C}$		1.2175		V
$T_C$	Temperature Coefficient	$T_A = 25\text{ }^\circ\text{C}$ to $85\text{ }^\circ\text{C}$	4.675	5.075	5.475	mV/°C
Line Reg	Line Regulation	$V_{CC} = 3$ to $10\text{ V}$	-10	2.5	10	mV
Load Reg	Load Regulation	$I_{OUT} = 0$ to $400\text{ }\mu\text{A}$		3	20	mV
$I_{CC}$	Supply Current			85	150	$\mu\text{A}$
$I_{OUT}$	Output Current	$\Delta V_{OUT} \leq 20\text{ mV}$			400	$\mu\text{A}$
$I_{CC(STBY)}$	Standby Supply Current	$V_{CONT} \leq 0.6\text{ V}$			1	$\mu\text{A}$

### CONTROL TERMINAL SPECIFICATIONS

$V_{CONT(ON)}$	Control Voltage (ON)	$V_{OUT} = 1.4760$ to $1.5060\text{ V}$ , Output ON	1.8	2.4	$V_{CC}$	V
$V_{CONT(OFF)}$	Control Voltage (OFF)	$V_{OUT} \leq 0.1\text{ V}$ , Output OFF	GND		0.6	V
$I_{CONT}$	Control Current			4.5	7.5	$\mu\text{A}$

Note 1: Power dissipation is 150 mW when mounted as recommended. Derate at 1.2 mW/°C for operation above 25 °C.

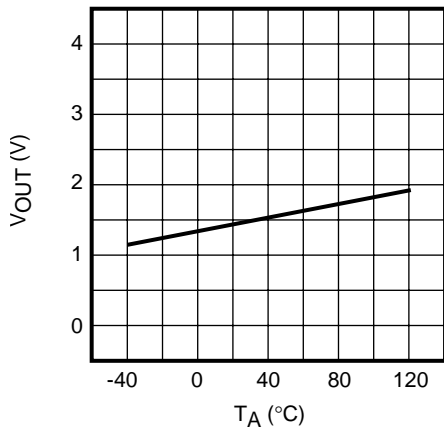
**TEST CIRCUIT**



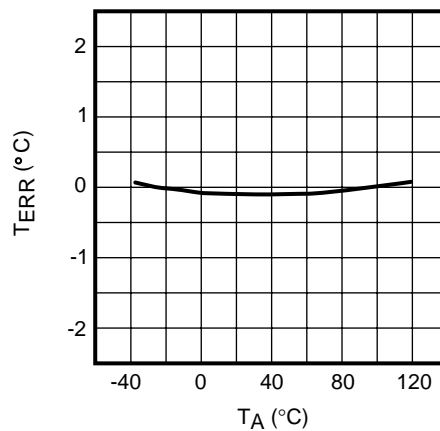
**TYPICAL PERFORMANCE CHARACTERISTICS**

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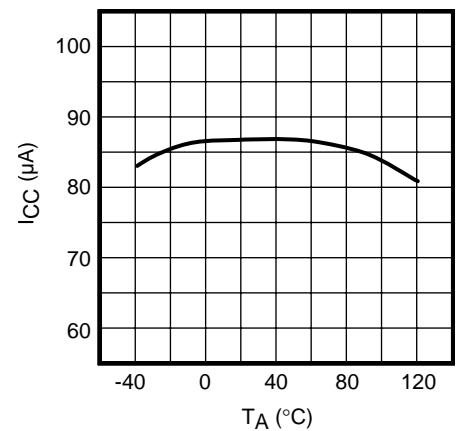
**OUTPUT VOLTAGE vs. TEMPERATURE**



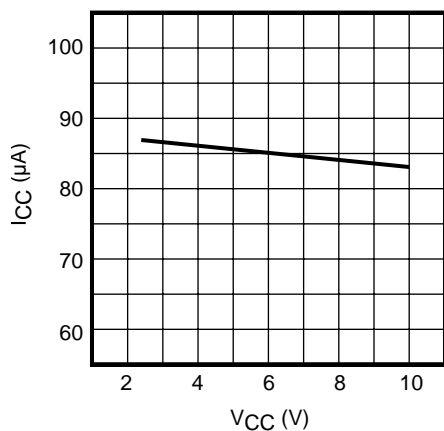
**LINEARITY ERROR vs. TEMPERATURE**



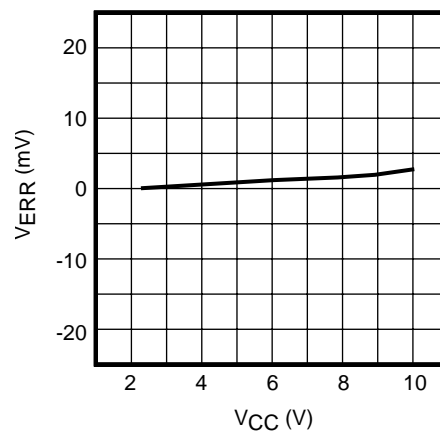
**INPUT CURRENT vs. TEMPERATURE**



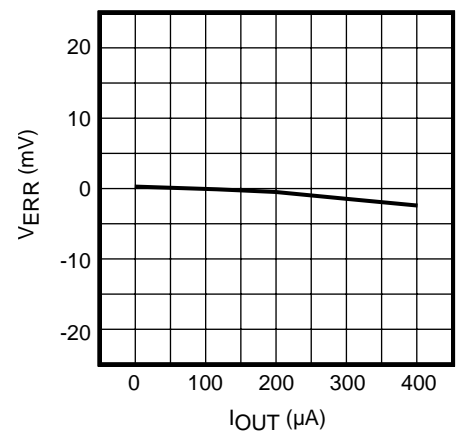
**INPUT CURRENT vs. INPUT VOLTAGE**



**LINE REGULATION**

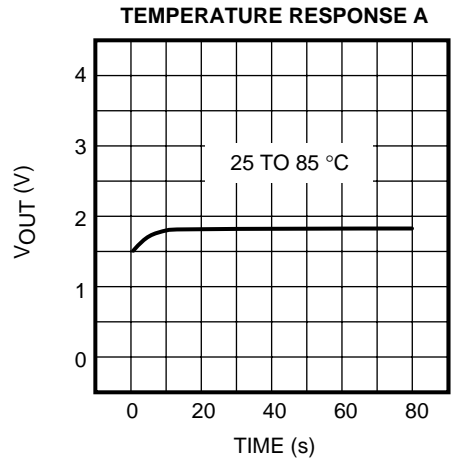
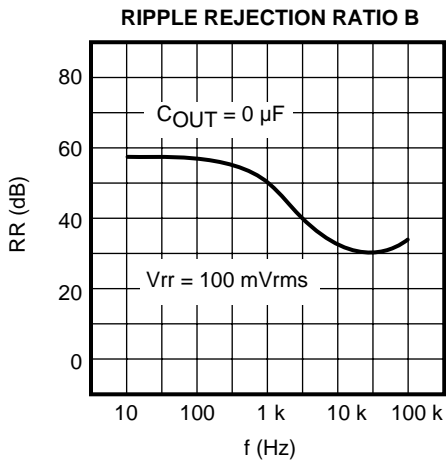
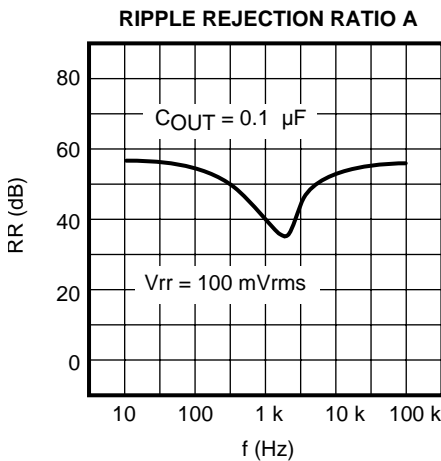
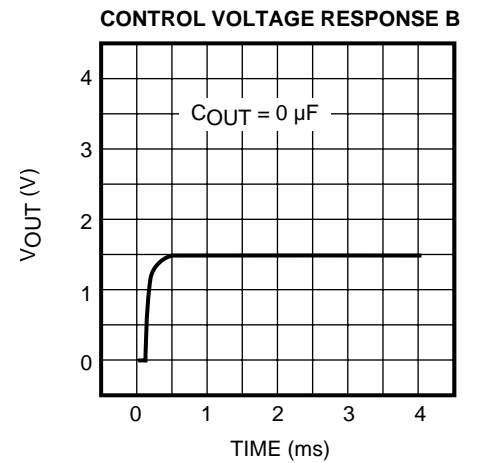
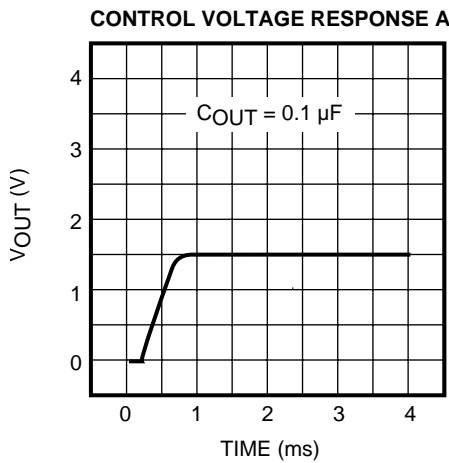
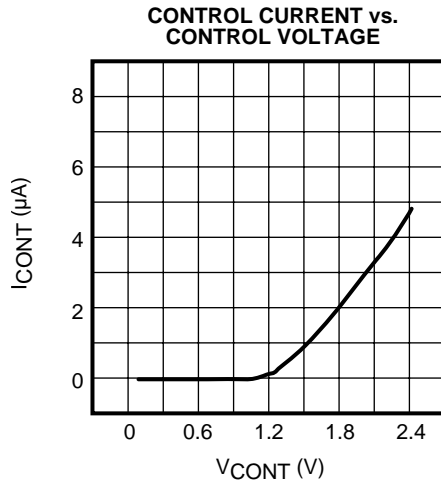
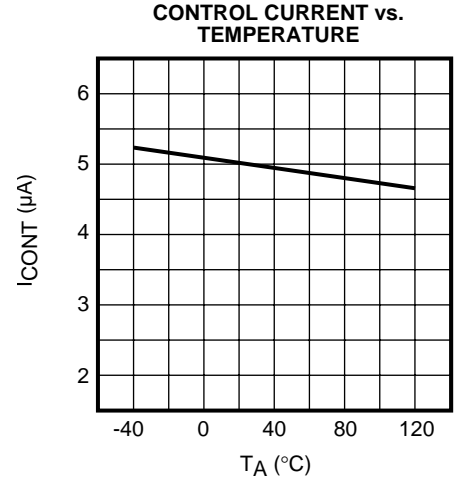
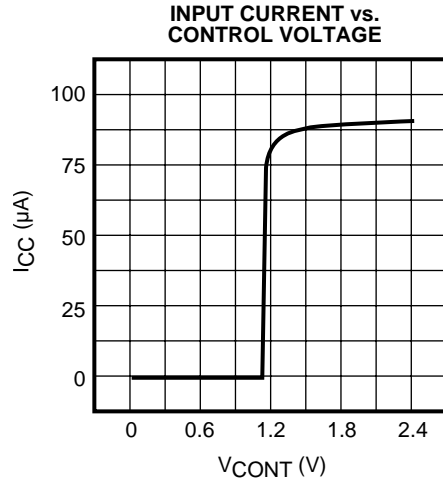
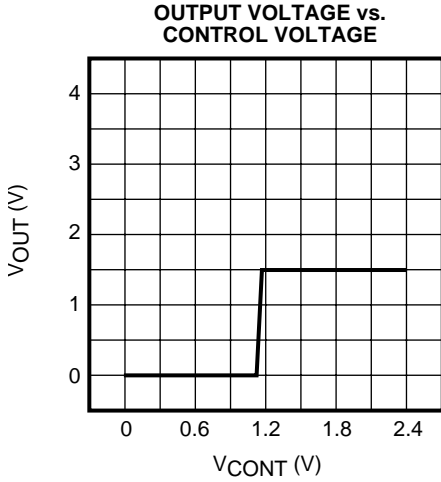


**LOAD REGULATION**



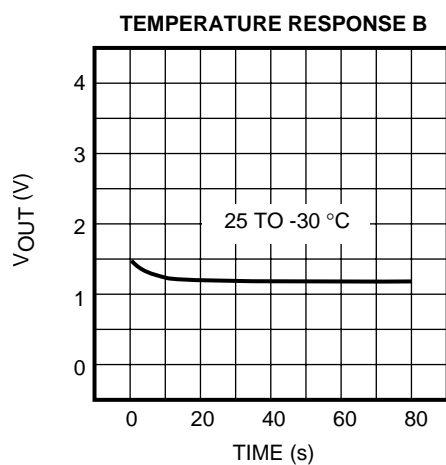
**TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)**

$V_{CC} = 3\text{ V}$ ,  $V_{CONT} = 2.4\text{ V}$ ,  $I_{OUT} = 0\text{ }\mu\text{A}$ ,  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

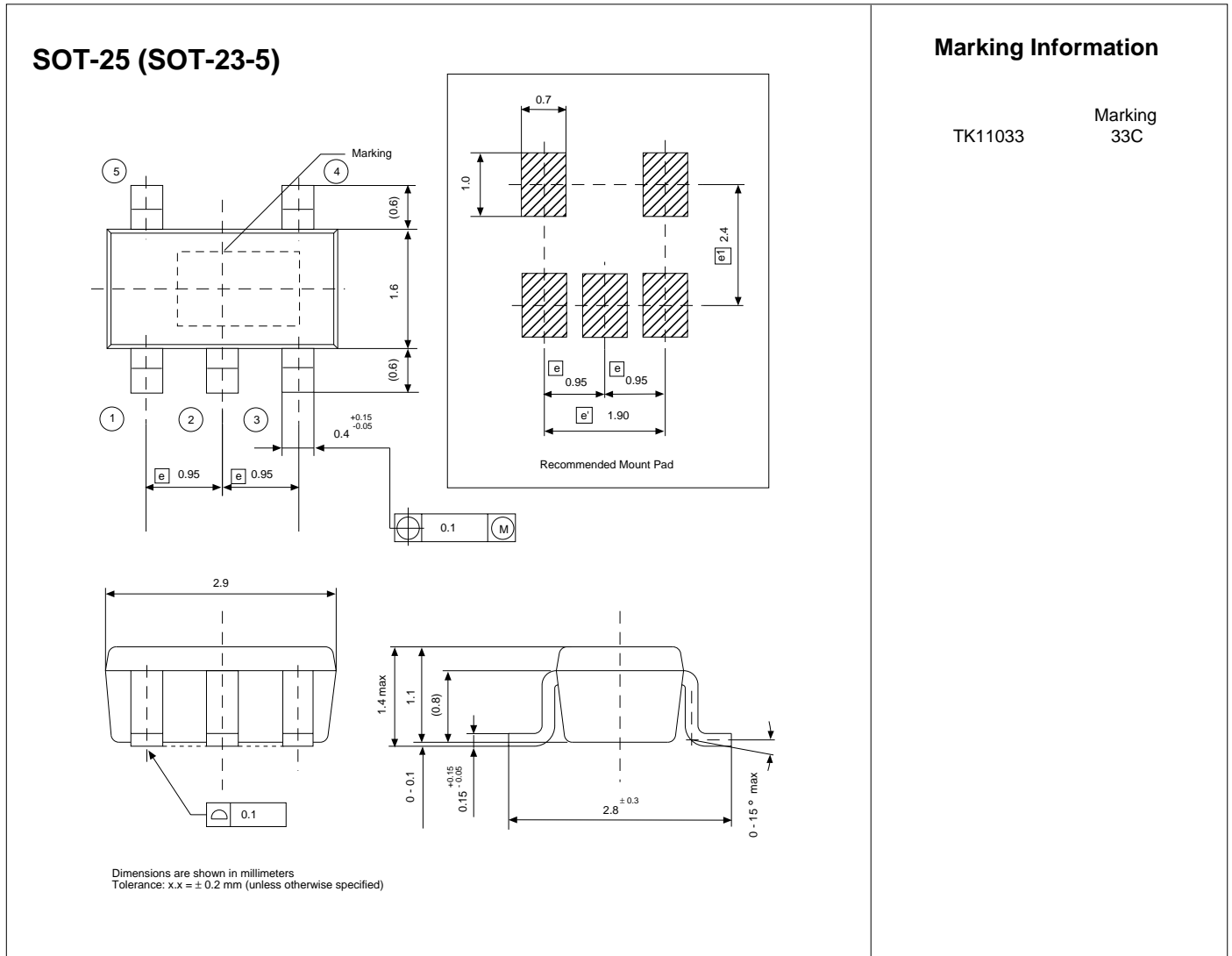


**TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)**

$V_{CC} = 3\text{ V}$ ,  $V_{CONT} = 2.4\text{ V}$ ,  $I_{OUT} = 0\ \mu\text{A}$ ,  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.



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