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

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

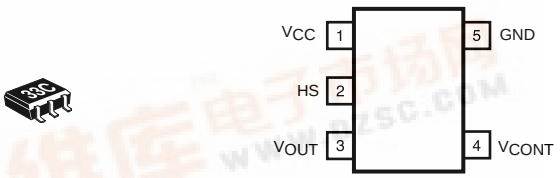
The TK11033 is a temperature sensor IC with a linear output of 5 mV/°C over the range of -30 to + 105 °C. Its wide operating voltage range of 2.4 to 10.0 V makes it suitable for a number of applications requiring accurate temperature control, such as electronic thermostats for climate control, refrigerators, 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.

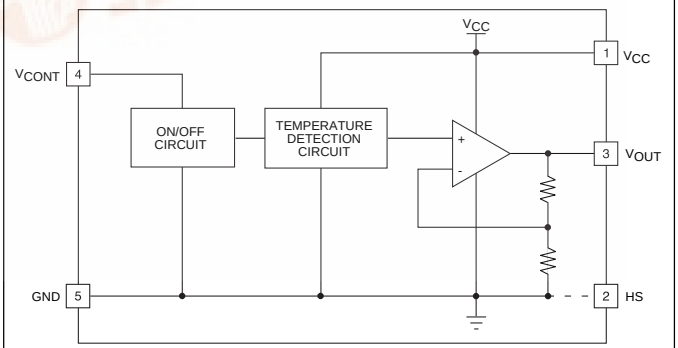
The TK11033 is available in a miniature SOT-25 surface mount package.

TK11033



Note: Connect Pin 2 to GND

BLOCK DIAGRAM



ORDERING INFORMATION

TK11033M □□

Tape/Reel Code

TAPE/REEL CODE
TL: Tape Left

ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... 12 V
Operating Voltage ..... 2.4 to 10 V
Power Dissipation (Note 1) ..... 150 mW
Junction Temperature ..... 150 °C
Storage Temperature Range ..... -55 to +150 °C
Operating Temperature Range ..... -30 to +105 °C
Lead Soldering Temperature (10 s) ..... 235 °C

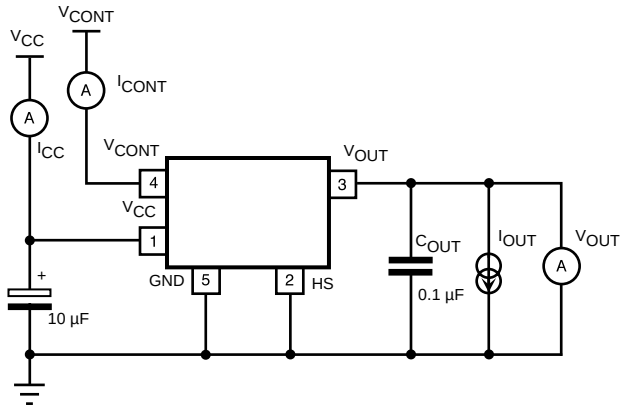
TK11033 ELECTRICAL CHARACTERISTICS

Test Conditions: V_{CC} = 3.0 V, V_{CONT} = 2.4 V, I_{OUT} = 0 µA, T_A = 25 °C, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{OUT}	Output Voltage	T_A = 25 ° C	1.4760	1.4910	1.5060	V
		T_A = 85 ° C	1.7755	1.7955	1.8155	V
		T_A = -30 ° C		1.2175		V
T_C	Temperature Coefficient	T_A = 25 ° C to 85 ° C	4.675	5.075	5.475	mV/° C
Line Reg	Line Regulation	V_{CC} = 3 to 10 V	-10	2.5	10	mV
Load Reg	Load Regulation	I_{OUT} = 0 to 400 µA		3	20	mV
I_{CC}	Supply Current			85	150	µA
I_{OUT}	Output Current	$\Delta V_{OUT} \leq$ 20 mV			400	µA
$I_{CC(STBY)}$	Standby Supply Current	$V_{CONT} \leq$ 0.6 V			1	µA
CONTROL TERMINAL SPECIFICATIONS						
$V_{CONT(ON)}$	Control Voltage (ON)	V_{OUT} = 1.4760 to 1.5060 V, Output ON	1.8	2.4	V_{CC}	V
$V_{CONT(OFF)}$	Control Voltage (OFF)	$V_{OUT} \leq$ 0.1 V, Output OFF	GND		0.6	V
I_{CONT}	Control Current			4.5	7.5	µA

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

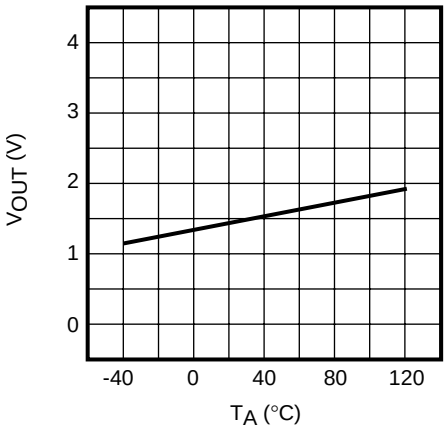
TEST CIRCUIT



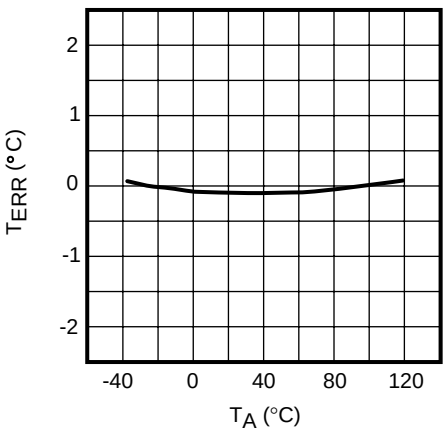
TYPICAL PERFORMANCE CHARACTERISTICS

V_{CC} = 3 V, V_{CONT} = 2.4 V, I_{OUT} = 0 µA, T_A = 25 °C, unless otherwise specified.

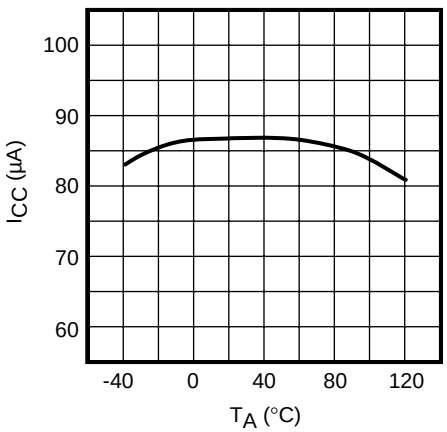
OUTPUT VOLTAGE vs. TEMPERATURE



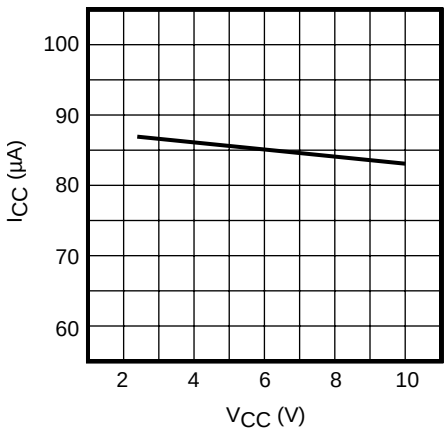
LINEARITY ERROR vs. TEMPERATURE



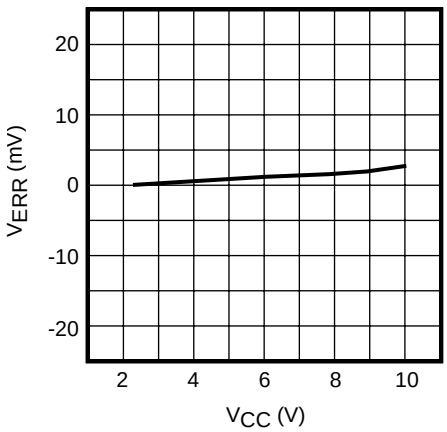
INPUT CURRENT vs. TEMPERATURE



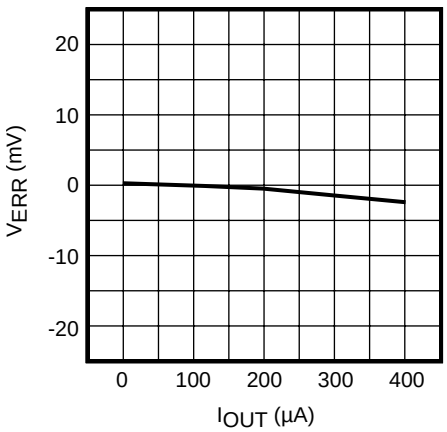
INPUT CURRENT vs. INPUT VOLTAGE



LINE REGULATION



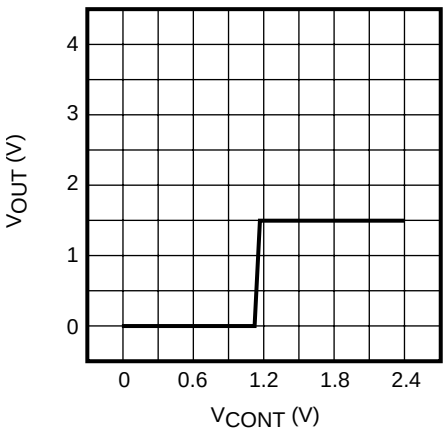
LOAD REGULATION



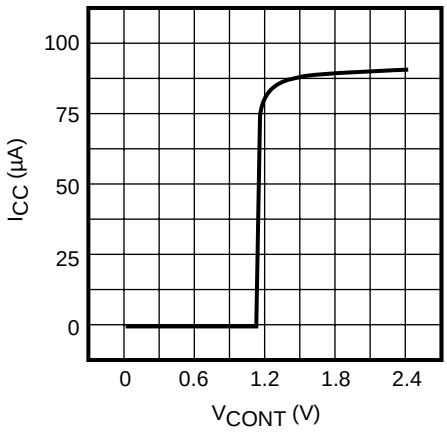
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

V_{CC} = 3 V, V_{CONT} = 2.4 V, I_{OUT} = 0 µA, T_A = 25 °C, unless otherwise specified.

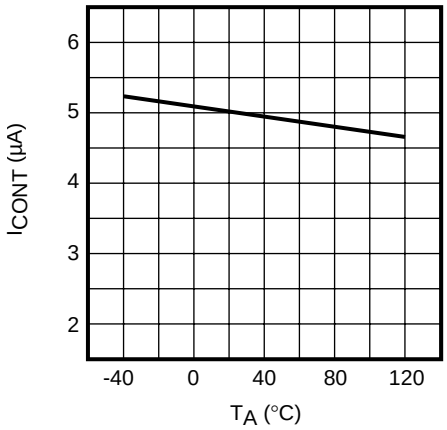
OUTPUT VOLTAGE vs. CONTROL VOLTAGE



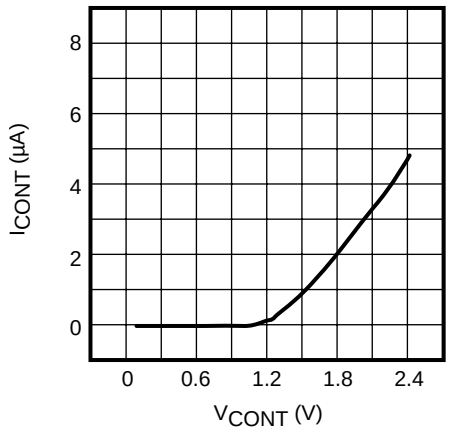
INPUT CURRENT vs. CONTROL VOLTAGE



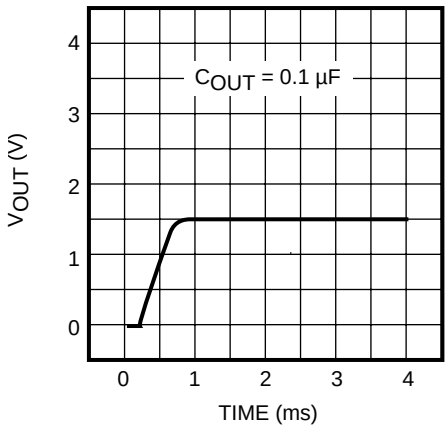
CONTROL CURRENT vs. TEMPERATURE



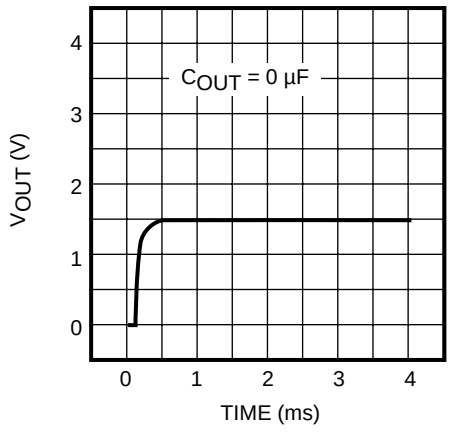
CONTROL CURRENT vs. CONTROL VOLTAGE



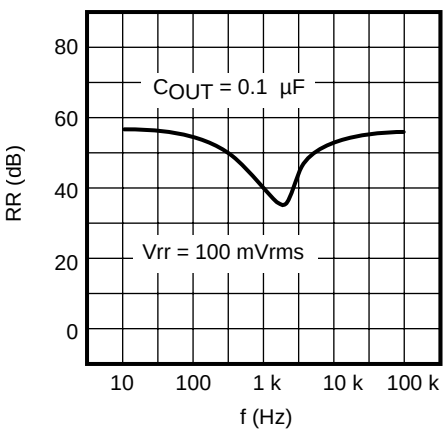
CONTROL VOLTAGE RESPONSE A



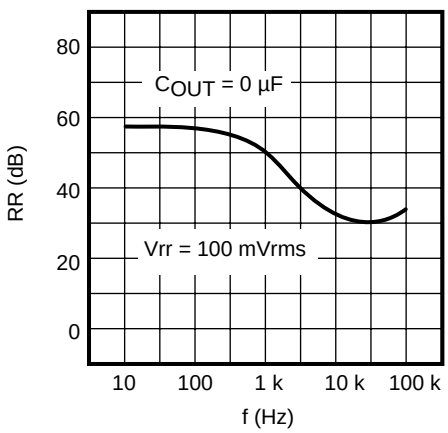
CONTROL VOLTAGE RESPONSE B



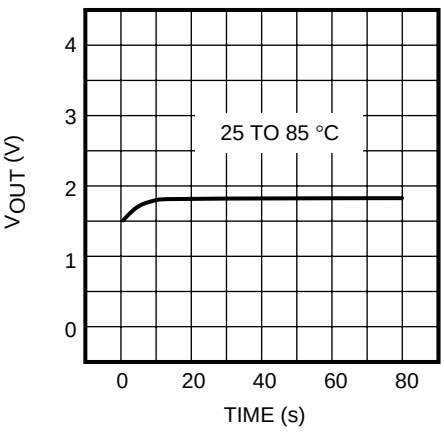
RIPPLE REJECTION RATIO A



RIPPLE REJECTION RATIO B



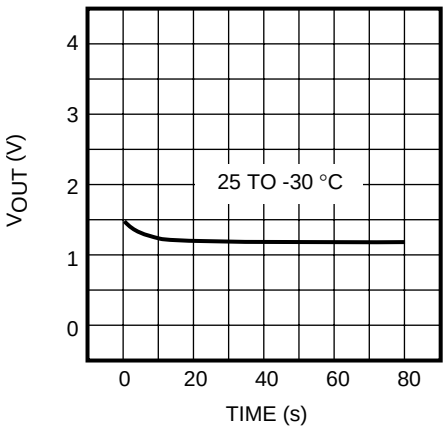
TEMPERATURE RESPONSE A



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

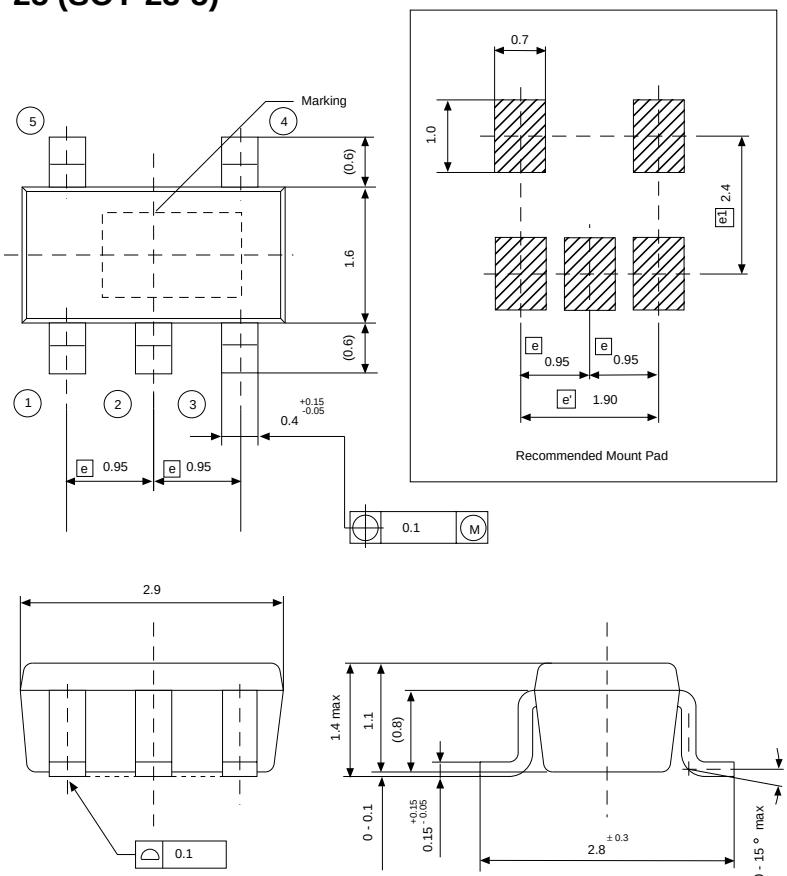
V_{CC} = 3 V, V_{CONT} = 2.4 V, I_{OUT} = 0 µA, T_A = 25 °C, unless otherwise specified.

TEMPERATURE RESPONSE B



PACKAGE OUTLINE

SOT-25 (SOT-23-5)



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

Marking Information

	Marking
TK11033	33C

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