

GENERAL DESCRIPTION

The DS600 is a $\pm 0.5^\circ\text{C}$ accurate analog-output temperature sensor. This accuracy is valid over its entire operating voltage range of 2.7V to 5.5V and the wide temperature range of -20°C to +100°C. The DS600 can also act as a thermostat, with user-programmable trip points. A shutdown mode enables the DS600 to be placed in a low-power standby state. The DS600 is available in an 8-pin μSOP package.

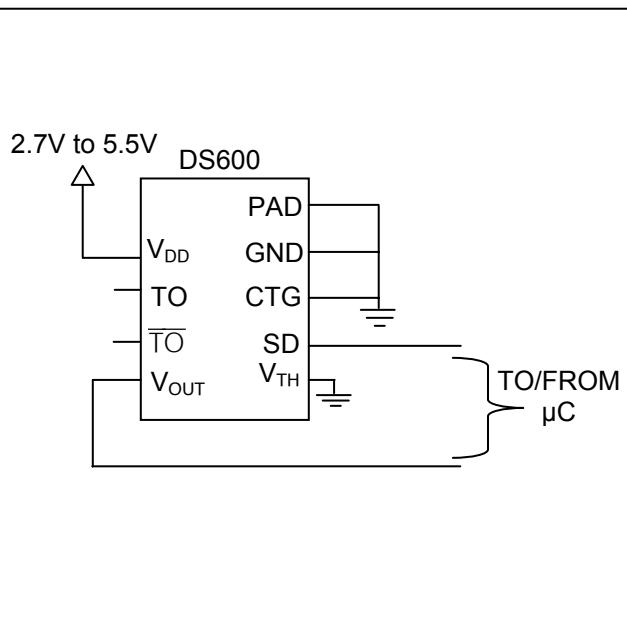
APPLICATIONS

Cold-Junction Thermocouple Compensation

Portable Medical Equipment

Thermally Sensitive Systems that Require a High-Accuracy Analog-Output Temperature Sensor

TYPICAL OPERATING CIRCUIT



DS600 ± 0.5 Accurate Analog-Output Temperature Sensor

FEATURES

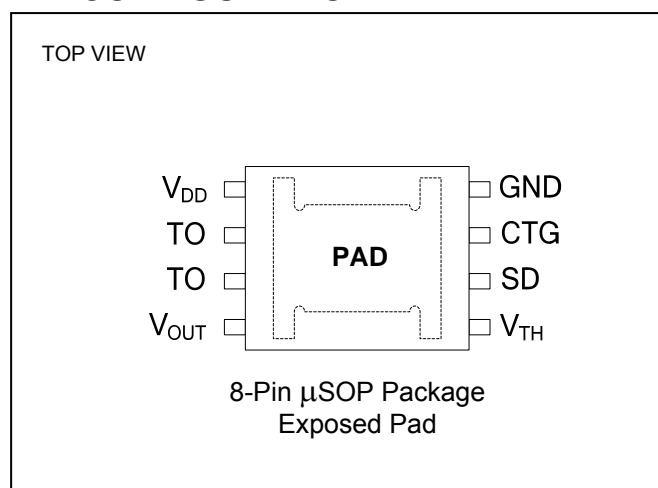
- $\pm 0.5^\circ\text{C}$ Accuracy (-20°C to +100°C)
- $\pm 0.75^\circ\text{C}$ Accuracy Over Entire Temperature Range of -40°C to +125°C
- Requires No External Components
- 6.45mV/°C Output Gain with 509mV Offset at 0°C
- 2.7V to 5.5V Supply Voltage Range
- User-Programmable Thermostat Function
- Shutdown Function Puts Device into a Low-Power Standby Mode
- Exposed Pad 8-Pin μSOP Package for Quick Thermal Response

ORDERING INFORMATION

PART	TEMP RANGE	PIN-PACKAGE
DS600U	-40°C to +125°C	Exposed Pad 8 μSOP
DS600U+	-40°C to +125°C	Exposed Pad 8 μSOP
DS600U/T&R	-40°C to +125°C	Exposed Pad 8 μSOP Tape-and-Reel
DS600U+/T&R	-40°C to +125°C	Exposed Pad 8 μSOP Tape-and-Reel

+ Denotes lead-free package.

PIN CONFIGURATION



Note: Some revisions of this device may incorporate deviations from published specifications known as errata. Multiple revisions of any device may be simultaneously available through various sales channels. For information about device errata, click here: www.maxim-ic.com/errata.

ABSOLUTE MAXIMUM RATINGS

Voltage Range on Any Pin (except CTG) Relative to Ground	-0.5V to +6.0V
Voltage Range on CTG Relative to Ground	-0.5 to +0.5V
Operating Temperature Range	-40°C to +125°C
Storage Temperature Range	-55°C to +125°C
Soldering Temperature (10s)	+260°C (See IPC/JEDEC J-STD-020A)
Reflow Oven Temperature	+220°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to the absolute maximum rating conditions for extended periods may affect device reliability.

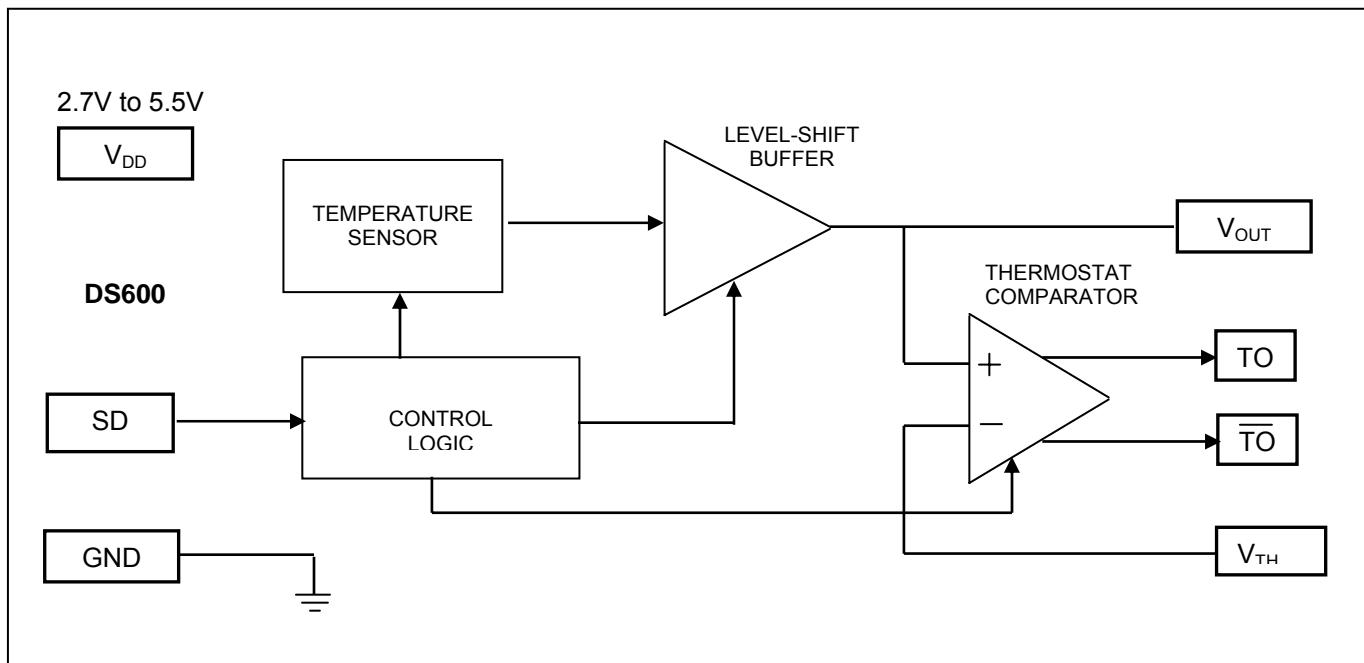
DC ELECTRICAL CHARACTERISTICS(V_{CC} = 2.7V to 5.5V, T_A = -40°C to +125°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	V _{DD}		2.7	5.5		V
Thermometer Error	T _{ERR}	-20°C to +100°C		± 0.5		°C
		-40°C to +125°C		± 0.75		
Output Gain	$\Delta V/\Delta T$		6.45			mV/°C
V _{OUT} DC Offset	V _{OS}	0°C	509			mV
Low-Level Input Voltage (SD)	V _{IL}		-0.5	0.3 x V _{DD}		V
High-Level Input Voltage (SD)	V _{IH}		0.7 x V _{DD}	V _{DD} + 0.5		V
SD Input Capacitance	C _{SD}		5			pF
V _{TH} Input Capacitance	C _{VTH}		5			pF
Low-Level Output Voltage (TO, \overline{TO})	V _{OL}	4mA sink current	0	0.4		V
Supply Current	I _{DD}			140		µA
Shutdown Current	I _{SD}			2.5		µA
Input Current (V _{TH})	I _{TH}		0.01	1		µA
Input Resistance (V _{TH})	R _{TH}		5			MΩ
Leakage Current (SD)	I _L		0.01	1		µA
External Load Capacitance on V _{OUT}	C _{EL}			50		pF
V _{OUT} Source Current	I _{OSO}		10			µA
V _{OUT} Sink Current	I _{OSI}		10			µA
Output Impedance (V _{OUT})	R _{OUT}			100		Ω
Power-Up Time	t _{POWERUP}			10		ms
Nonlinearity				± 0.2		°C
Comparator Offset				± 3		mV
Comparator Response Time	t _{COMP}			20		ms

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	V _{DD}	Supply Voltage. 2.7V to 5.5V
2	TO	Active-High Thermostat Output. Open-drain output transitions from low to high when the output voltage exceeds V _{TH} . In shutdown mode, (SD = 1), TO is low.
3	TO	Active-Low Thermostat Output. Open-drain output transitions from high to low when the output voltage exceeds V _{TH} . In shutdown mode, (SD = 1), TO is high.
4	V _{OUT}	Temperature Output. Outputs a voltage that is proportional to the die temperature in degrees centigrade. In shutdown mode, this pin goes high-Z.
5	V _{TH}	Thermostat Trip Voltage. User-selectable voltage that sets the thermostat trip-point temperature. TO and $\overline{\text{TO}}$ are asserted when V _{OUT} crosses this voltage. (No on-chip hysteresis is present).
6	SD	Shutdown. Power consumption and thermal sensor function are controlled through SD. This pin functions as an active-high input pin. Driving this pin high puts the device in a low-power state and discontinues thermal sensing.
7	CTG	Must be connected to GND.
8	GND	Ground.
	PAD	PAD. Connect to GND or float. DO NOT CONNECT TO SUPPLY. The exposed pad is the best way to conduct temperature into the package. Connecting PAD to a ground plane can assist in properly measuring the temperature of the circuit board.

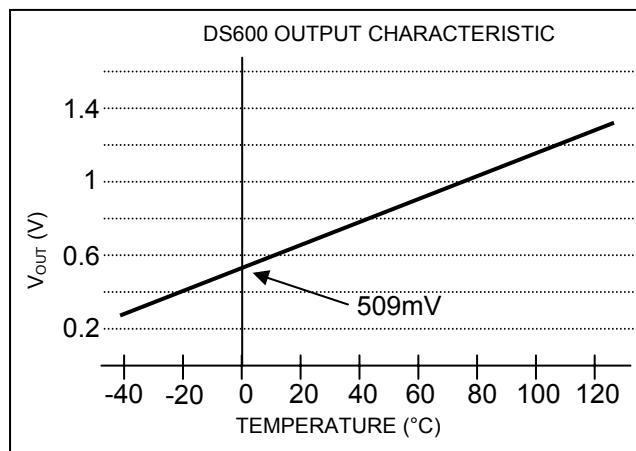
Figure 1. Block Diagram



TEMPERATURE MEASUREMENT

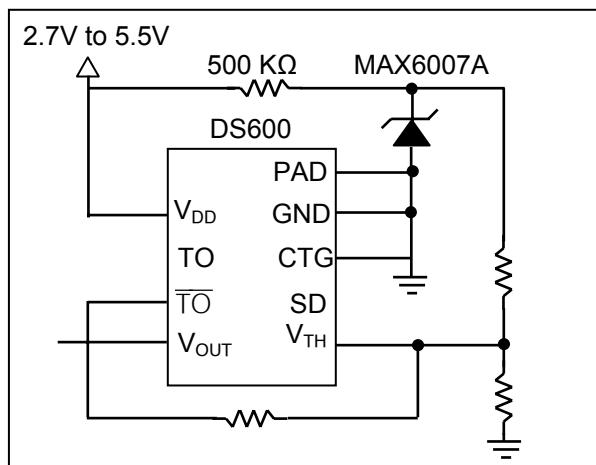
The DS600 analog temperature sensor measures its own temperature and provides these measurements to the user in the form of an output voltage, V_{OUT}, that is proportional to degrees centigrade. The output voltage characteristic is factory-calibrated for a typical output gain ($\Delta V/\Delta T$) of +6.45mV/ $^{\circ}\text{C}$ and a DC offset (V_{OS}) of 509mV. Its operating temperature range is -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$, corresponding to an output voltage range of 251mV to 1315mV. (V_{OUT} = Device Temperature ($^{\circ}\text{C}$) $\times \Delta V/\Delta T + V_{OS}$). The DS600 has $\pm 0.5^{\circ}\text{C}$ accuracy over a -20 $^{\circ}\text{C}$ to +100 $^{\circ}\text{C}$ temperature range and over the full 2.7V to 5.5V voltage range. Because the output voltage is positive for the entire temperature range, there is no need for a negative supply.

Figure 2 shows the output voltage characteristic for the DS600.

Figure 2. Output Voltage Characteristic

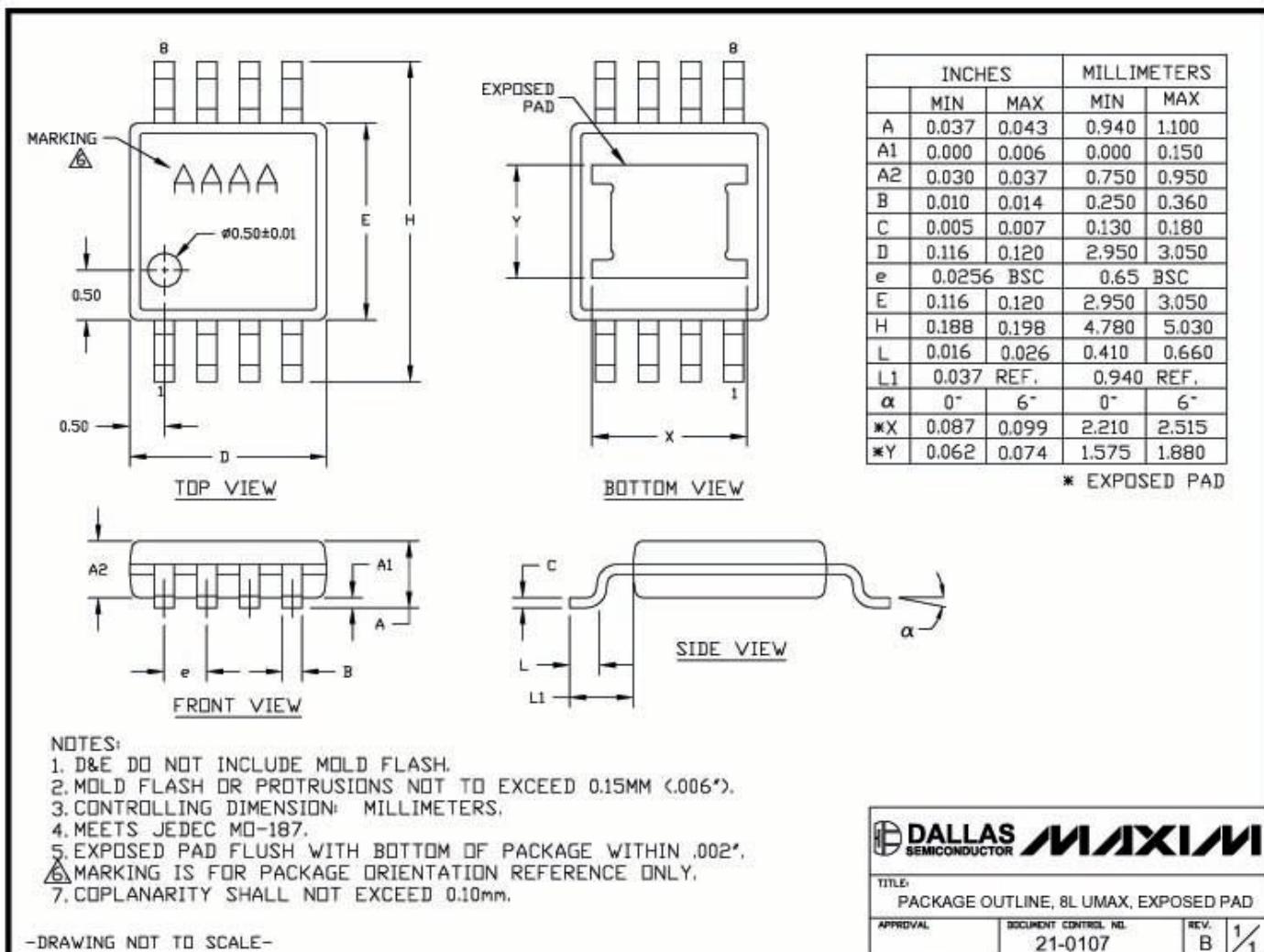
THERMOSTAT OPERATION

The DS600 can also be used as a thermostat with either an active-high (TO) or active-low ($\overline{\text{TO}}$) output. To function as a thermostat, a precise voltage reference equal to the desired threshold must be applied to the V_{TH} pin. When the temperature with the equivalent voltage value is reached (voltage on V_{OUT} = voltage on V_{TH}), thermostat outputs TO and $\overline{\text{TO}}$ become active. Figure 3 shows an example thermostat application circuit.

Figure 3. Thermostat Application Circuit

PACKAGE INFORMATION

For the latest package outline information, go to www.maxim-ic.com/DallasPackInfo.



Maxim/Dallas Semiconductor cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim/Dallas Semiconductor product. No circuit patent licenses are implied. Maxim/Dallas Semiconductor reserves the right to change the circuitry and specifications without notice at any time.

Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600

© 2007 Maxim Integrated Products • Printed USA



OCEAN CHIPS

Океан Электроники

Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибутором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибутором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А