



HTC 4000

Low Profile, Efficient Temperature Controller



GENERAL DESCRIPTION

The advanced and reliable circuitry of the HTC Series achieves 0.0009°C temperature stability. Its small, low profile package is ideal for designs with space constraints. The linear, PI control loop offers maximum stability while the bipolar current source has been designed for higher efficiency.

The HTC Temperature Controllers are easily configured for any design. Virtually any type of temperature sensor can be used with the HTC and a built in sensor bias current source simplifies use with resistive temperature sensors. The independently adjustable Proportional Gain (P) and Integrator Time Constant (I) can be modified to optimize temperature overshoot and stability.

Other features offer added flexibility. A single resistor sets the maximum output current to your load. An onboard reference voltage simplifies potentiometer control of the temperature setpoint. You can also choose to operate remotely with an external setpoint voltage. Two monitor pins provide access to the temperature setpoint voltage and the actual sensor voltage.

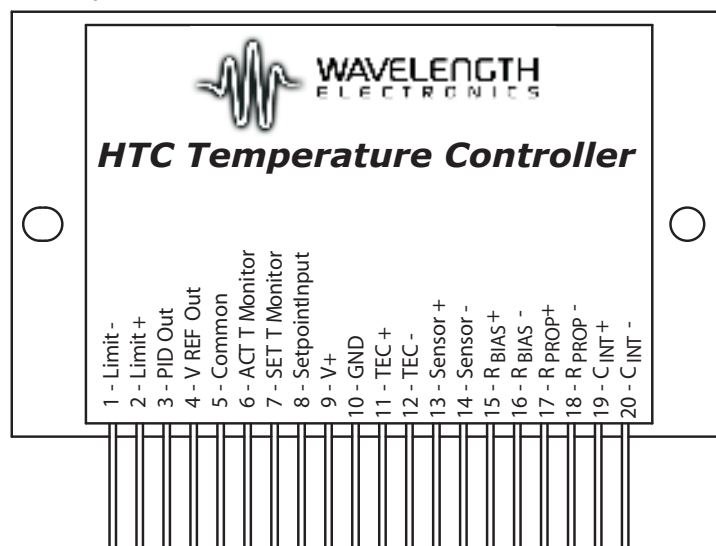
FEATURES

- Compact Size
- ± 4.0 A Output
- Interfaces with Thermistors, IC Sensors, & RTDs
- Single supply operation +5 V to +12 V
- +10.8 V compliance with +12 V input
- Stabilities as low as 0.0009°C
- Temperature Setpoint, Output Current Limit, Sensor Bias, Proportional Gain, and Integrator Time Constant are User Adjustable
- Monitor outputs for Temperature Setpoint and Actual Temperature
- Linear Bipolar Output operates thermoelectrics

ORDERING INFORMATION

Model	Description
HTC4000-62	± 4 A Temp Controller (for 0.062" board)
PWRPAK-5V	+5 V @ 8 A Power Supply
HTCEVAL PCB	Evaluation Board, 0.062" thick (Includes HTC Heatsink, and thermal grease)
THERM-PST	Thermal grease

Figure 1
HTC Series Pin-Out, Top View



ELECTRICAL AND OPERATING SPECIFICATIONS						PAGE 3
ABSOLUTE MAXIMUM RATINGS			SYMBOL	VALUE	UNIT	
Supply Voltage (Voltage on Pin 9 - contact factory for higher V operation) ❶			V+	+5 to +12	Volts DC	
Output Current (See SOA Chart)			I _{OUT}	±4.0	Amps	
Power Dissipation, T _{AMBIENT} = +25°C (See SOA Chart)			P _{MAX}	17	Watts	
Operating Temperature, case			T _{OPR}	0 to +50	°C	
Storage Temperature			T _{STG}	-40 to +125	°C	
OPERATING PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS
TEMPERATURE CONTROL						
Short Term Stability (1-hr) ❷	OFF ambient temperature			0.0009		°C
Short Term Stability (1-hr) ❷	ON ambient temperature			0.002		°C
Long Term Stability (24-hr) ❷	OFF ambient temperature			0.0015		°C
CONTROL LOOP			P	PI		
P (Proportional Gain) ❸			1		100	A / V
I (Integrator Time Constant) ❹			0		10	Sec.
Setpoint vs. Actual T Accuracy			0.2	2	5	mV
OUTPUT, THERMOELECTRIC						
Current, peak, see SOA Chart			±3.9	±4.0	±4.1	Amps
Compliance Voltage, ❺ Pin 11 to Pin 12	V+ = 5 V	I _{OUT} = 500 mA I _{OUT} = 2.0 A I _{OUT} = 4.0 A		V+ – 1.2 V+ – 0.8 V+ – 1.2		Volts Volts Volts
Temperature Range ❻						
Current Limit Range ❸ (±2% FS Accuracy)				0 - 4000		mA
Output Power ❼ contact factory for higher power operation					17	Watts
POWER SUPPLY						
Voltage, V+				5	12	V
Current, V+ supply, quiescent				200		mA
SENSORS						
Sensor Bias Current Range ❸			1μ		10m	A
Resistive Sensor Type	Thermistors, RTDs					
IC Sensor Types ❸	AD590, LM335					
<p>❶ If thermistor, TE module, or laser diode are case-common, the laser diode driver and TE controller power supplies must be isolated from each other.</p> <p>❷ Stability quoted for a typical 10 kΩ thermistor at 100 μA sensing current. For details, refer to <i>TN-TC02 : How is Temperature Stability Measured?</i>. (http://www.teamwavelength.com/downloads/notes/tn-tc02.pdf)</p> <p>❸ User configurable with external resistor.</p> <p>❹ User configurable with external capacitor.</p> <p>❺ Compliance voltage will vary depending on power supply voltage and output current.</p> <p>❻ Temperature Range depends on the physical load, sensor type, input voltage, and TE module used.</p> <p>❼ Output power is limited by internal power dissipation and maximum case temperature. See SOA chart to calculate internal power dissipation. Damage to the HTC will occur if case temperature exceeds 50°C.</p> <p>❽ AD590 requires an external bias voltage and 10 kΩ resistor.</p>						
Size (H x W x D) 0.34" x 2.65" x 1.6" [8.6 x 67 x 41 mm]	Weight < 1.5 oz.	Connectors 20 pin header, 0.1" spacing	Required Heatsink Capacity 5.6 °C / W / 3 in		Warm-up 1 hour to rated accuracy	