



HTC Series

Low Profile, Efficient
Temperature Controllers



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. Add a diode to operate resistive heaters with a unipolar output current. 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.

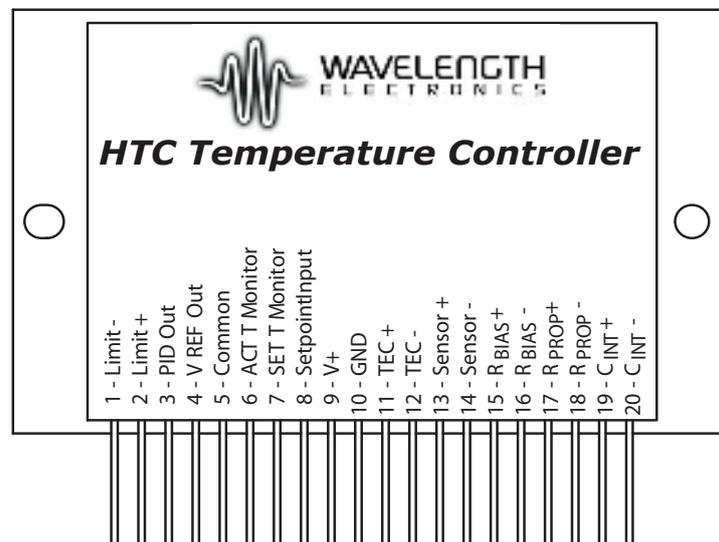
FEATURES

- Compact Size - 1.5 and 3.0 A Models
- Interfaces with Thermistors, IC Sensors, & RTDs
- Single supply operation +5 V to +12 VDC (contact factory for higher voltage operation)
- +11 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 or Unipolar Output operates thermoelectrics or resistive heaters

ORDERING INFORMATION

Model	Description
HTC1500-62	1.5 A Temp Controller (for 0.062" board)
HTC3000-62	3.0 A Temp Controller (for 0.062" board)
HTC1500	1.5 A Temp Controller (for 0.031" board)
HTC3000	3.0 A Temp Controller (for 0.031" board)
PWRPAK-5V	+5 V @ 8 A Power Supply
PWRPAK-12V	+12 V @ 3 A Power Supply
HTCEVAL PCB	Evaluation Board, 0.062" thick (Includes HTC Heatsink, and thermal grease)
HTCHTSK	Heatsink for HTC
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}	±1.5 (HTC1500) ±3.0 (HTC3000)	Amps	
Power Dissipation, T _{AMBIENT} = +25°C (See SOA Chart)			P _{MAX}	9	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 (Proportional Gain) ❸			P	PI		
I (Integrator Time Constant) ❹			1		100	A / V
Setpoint vs. Actual T Accuracy	Rev B		0		10	Sec.
	Rev C, D, & E		0.2	2	5	mV
OUTPUT, THERMOELECTRIC						
Current, peak, see SOA Chart	HTC1500		±1.4	±1.5	±1.6	Amps
	HTC3000		±2.8	±2.9	±3.0	Amps
Compliance Voltage, ❺ Pin 11 to Pin 12	Full Temp. Range	I _{OUT} = 500 mA I _{OUT} = 1.5 A I _{OUT} = 3 A		V+ - 0.13 V+ - 0.75 V+ - 1.33		Volts Volts Volts
TEMPERATURE RANGE ❻						
Current Limit Range ❸ (±2% FS Accuracy)	HTC1500			0-1500		mA
	HTC3000			0-3000		mA
Output Power ❷ contact factory for higher power operation	HTC1500				12	Watts
	HTC3000				24	Watts
POWER SUPPLY						
Voltage, V+ ❾				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 TN-TC02 : <i>How is Temperature Stability Measured?</i>. (http://www.teamwavelength.com/downloads/notes/tn-tc02.pdf#page=1)</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. A compliance voltage of ±10.7 V will be obtained with +12 volts input at 3 A. A compliance voltage of ± 3.7 V will be obtained with +5 V input and 3 A. +5 V operation will limit the setpoint voltage to 3.5 V, thus limiting the temperature range of the HTC. NOTE: Compliance voltage for Revision B was limited to ±8 volts for +12V input.</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> <p>❾ Contact factory for higher voltage operation up to 30V.</p>						
Size (H x W x D)	Weight	Connectors	Required Heatsink Capacity		Warm-up	
0.34" x 2.65" x 1.6" [8.6 x 67 x 41 mm]	< 1.5 oz.	20 pin header, 0.1" spacing	5.6 °C / W / 3 in		1 hour to rated accuracy	