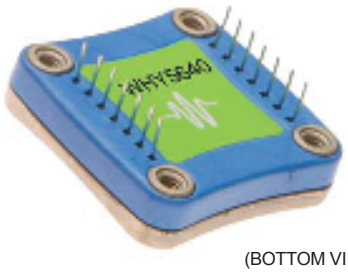
May, 2014

WAVELENGTH ELECTRONICS

WHY5640

Subminiature Temperature Controller



(BOTTOM VIEW)

RoHS Compliant

GENERAL DESCRIPTION:

The WHY5640 is a general purpose analog PI (Proportional, Integral) control loop for use in thermoelectric or resistive heater temperature control applications. The WHY5640 maintains precision temperature regulation using an active resistor bridge circuit that operates directly with thermistors or RTD temperature sensors. Supply up to 2.2 Amps of heat and cool current to your thermoelectric from a single +5 Volt power supply.

Connect two or more WHY5640 units together and drive higher output currents.

FEATURES:

- +5 to +26 V Control Electronics Supply
- +4.5 to +30 V Power Drive Supply
- Low Cost
- 0.008˚C Stability (typical)
- PI Temperature Control
- High ±2.2 Amps Output Current
- Control Above and Below Ambient
- Small Package Size

Online SOA Calculator at

http://www.teamwavelength.com/support/calculator/soa/soatc.php

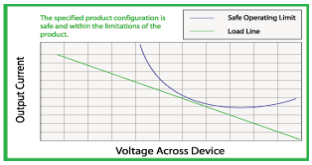
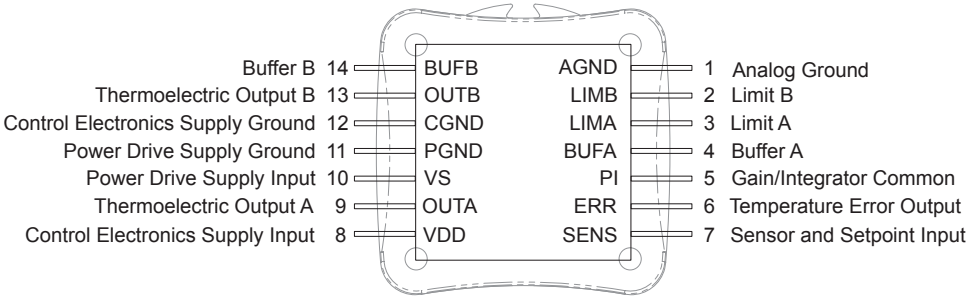


Figure 1
Top View Pin Layout and Descriptions

TOP VIEW



IF YOU ARE UPGRADING FROM THE WHY5640 to the WTC3243: The position of Pin 1 on the WHY5640 is reversed (or mirrored) relative to the position of Pin 1 on the WTC3243.

ELECTRICAL AND OPERATING SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS RATING	SYMBOL	VALUE	UNIT
Supply Voltage 1 (Voltage on Pin 8)	V_{DD}	+5 to +26	Volts DC
Supply Voltage 2 (Voltage on Pin 10)	V_S	+4.5 to +30	Volts DC
Output Current (See SOA Chart)	I_S	±2.2	Amperes
Power Dissipation, $T_{AMBIENT}$ = +25˚C	P_{MAX}	9	Watts
Operating Temperature, case	T_{OPR}	-40 to +85	˚C
Storage Temperature	T_{STG}	-65 to +150	˚C

PARAMETER TEMPERATURE CONTROL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Short Term Stability, 1 hour	T_{SET} = 25˚C using 10 kΩ thermistor	0.001	0.005	0.01	˚C
Long Term Stability, 24 hour	T_{SET} = 25˚C using 10 kΩ thermistor	0.003	0.008	0.01	˚C
Setpoint vs. Actual Temp Accuracy	T_{SET} = 25˚C using 10 kΩ thermistor		<1%		
Control Loop		P	PI		
P (Proportional Gain)		1		100	A/V
I (Integrator Time Constant)		1		10	Sec.
OUTPUT					
Current, peak, see SOA chart			± 2.0	± 2.2	Amps
Compliance Voltage, Pin 9 to Pin 13	Full Temp. Range, I_S = 100 mA	| V_S - 0.7 |	| V_S - 0.5 |		Volts
Compliance Voltage, Pin 9 to Pin 13	Full Temp. Range, I_S = 1 Amp	| V_S - 1.2 |	| V_S - 1.0 |		Volts
Compliance Voltage, Pin 9 to Pin 13	Full Temp. Range, I_S = 2 Amps	| V_S - 1.6 |	| V_S - 1.4 |		Volts
POWER SUPPLY					
Voltage, V_S		4.5		30	Volts
Voltage, V_{DD}		5		26	Volts
Current, V_S supply, Quiescent			45	90	mA
Current, V_{DD} supply, Quiescent			10	15	mA
INPUT					
Offset Voltage, initial	Pin 5 and 7		1	2	mV
Bias Current	Pins 5 and 7, $T_{AMBIENT}$ = 25˚C		20	50	nA
Offset Current	Pins 5 and 7, $T_{AMBIENT}$ = 25˚C		2	10	nA
Common Mode Range	Pins 5 and 7, Full Temp. Range	0		V_{DD}-1.5	V
Common Mode Rejection	Full Temperature Range	60	85		dB
Power Supply Rejection	Full Temperature Range	60	80		dB
Input Impedence			500		kΩ
THERMAL					
Heatspreader Temperature Rise	$T_{AMBIENT}$ =25˚C	28	30	33	˚C/W
Heatspreader Temperature Rise	With WHS302 Heatsink, WTW002 Thermal Washer	18	21.5	25	˚C/W
Heatspreader Temperature Rise	With WHS302 Heatsink, WTW002 Thermal Washer, and 3.5 CFM Fan	3.1	3.4	3.9	˚C/W