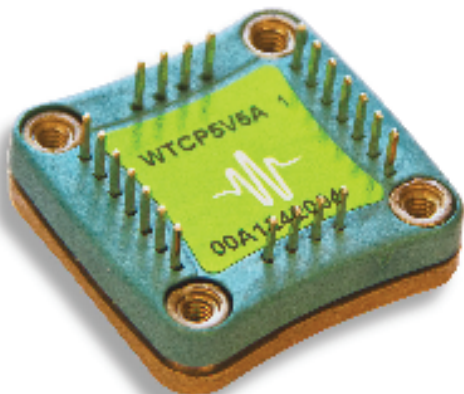# DATASHEET AND OPERATING GUIDE
WTCP5V5A
5 A PWM Temperature Controller

FEATURES AND BENEFITS

- Drive up to ±5.0 A of TEC current
- High efficiency Pulse Width Modulated controller
- Single 5 VDC supply operation
- Separate electronics and load power supplies can be used when lower noise is required
- Small package: 1.3" x 1.28" x 0.31"
- Short term stability: 0.001°C
- Long term stability: 0.002°C
- Adjustable current and voltage limits
- Comprehensive and easy-to-use evaluation board

COMPACT, POWERFUL, EFFICIENT

The WTCP5V5A PWM Temperature Controller delivers all the advantages of Pulse Width Modulated (PWM) control in a compact PCB-mounted package.

High efficiency, low power dissipation, high stability, and high accuracy are the hallmarks of the WTCP design. The WTCP is perfect for electro-optical systems, airborne instrumentation, medical diagnostic equipment, and other applications where compact size and high efficiency are critical.

VALUABLE SAFETY FEATURES

Built-in safety features such as current limit and voltage limit make the WTCP robust to real-world operating conditions. Long-term reliability means better up-time, fewer service calls, and more satisfied and successful customers.

DESIGNED FOR EASY INTEGRATION

The WTCP5V5A can operate from a single 5 V power supply, or the WTCP and load can be driven from separate power supplies for even lower output current noise.

The available WTCPEVAL evaluation circuit board includes everything needed to quickly configure the WTCP for a wide range of applications and load conditions. The onboard feedback loop adjustment switches simplify tuning, and dramatically reduce your development time.

Few passive external components are required to operate the WTCP. And thanks to the high efficiency output stage, the WTCP does not normally require additional heatsinking.

CONTENTS

ORDERING INFORMATION

PART NO	DESCRIPTION
WTCP5V5A	±5 A PWM Temperature Controller
WTCPEVAL	Evaluation board for WTCP5V5A
WTCPOEM	OEM PCB for WTCP5V5A
WEV300	Thermal Management Kit -- Thermal Washer and Heatsink
WEV301	Thermal Management Kit -- Washer, Heatsink and +5 V Fan
WEV302	Thermal Management Kit -- Washer, Heatsink and +12 V Fan

RoHS Compliant

SENSOR TYPES SUPPORTED

406-587-4910
www.teamWavelength.com

Applies to Product Revisions A - B
© December 2016

WAVELENGTH ELECTRONICS

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	MAX	UNIT	NOTE
ABSOLUTE MAXIMUM RATINGS				
Power Supply Voltage, Load Power Supply[1]	V_{DD_P}	5.5	VDC	
Power Supply Voltage, Chip Power Supply[1]	V_{DD_A}	5.5	VDC	
Maximum Output Power	P_{MAX}	22.5	W	
Efficiency		85 to 95	%	Depending on Load Impedance
Case Operating Temperature	T_{OPR}	-40 to 85	ºC	
Maximum Safe Case Operating Temperature	T_{SCOT}	85	ºC	See **page 18**.
Case Storage Temperature	T_{STG}	-40 to 125	ºC	
Weight		0.6	oz	17 g
Size		1.28 x 1.3 x 0.31	inches	32.5 x 33.0 x 7.9 mm

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
OUTPUT CURRENT						
Max Output Current	I_{MAX}		4.5		A	V_{DD_P} = 5 V
Max Output Current	I_{MAX}		5.0		A	V_{DD_P} = 5.5 V, 0.9 Ω Load
Minimum Compliance Voltage	V_{COMP}		$V_{DD\_P} - 0.35$		V	V_{DD_P} = 5.0 V, 1 Ω Load
Short Term Stability, 1 hr			< 0.001		ºC	Using 10 kΩ thermistor
Long Term Stability, 24 hr			< 0.002		ºC	Using 10 kΩ thermistor
Temperature Coefficient			< 200		ppm / ºC	
POWER SUPPLY						
Load Power Supply, high current[1]	V_{DD_P}	4.5	5.0	5.5	VDC	
Electronics Power Supply, low current[1]	V_{DD_A}	4.5	5.0	5.5	VDC	Must source > 15 mA
Quiescent Current, V_{DD_P}			3		mA	Output Disabled, WTCP in Standby mode
Minimum Current Rating, V_{DD_P}			1.1 x I_{OUT}		A	
TEMPERATURE SENSOR						
Sensor Compatibility			Thermistor			
Resistance Range of Setpoint		2		200	kΩ	WTCP absolute maximum
		2		50	kΩ	WTCP for best stability
		2		17	kΩ	with WTCPEVAL[3]
SETPOINT, LIMIT INPUTS						
Cooling Current Limit Voltage Range	V_{ILIMC}	V_{REF} / 2		V_{REF}	V	See Note 2
Heating Current Limit Voltage Range	V_{ILIMH}	0.1		V_{REF} / 2	V	See Note 2
Heating / Cooling Voltage Limit	V_{LIM}	0		V_{DD_A}	V	
External Setpoint Input Range	$V_{TempSet}$		0 to V_{REF}		V	See Note 2
External Setpoint Damage Threshold			($V_{TempSet}$ < 0) or ($V_{TempSet}$ > V_{REF})		V	See Note 2
OUTPUTS						
TempGood, Logic Signal	$V_{TempGood}$		LOW = 0.2; Temp is Out of Range HIGH = (V_{DD_A} – 0.2); Temp is In Range		V	
Reference Voltage[2]	V_{REF}	2.35		2.56	V	V_{REF} = 2.45 V Nominal

1. Separate power supplies can be used for V_{DD_P} and V_{DD_A} to reduce electrical noise on the thermal load.
2. When configuring the WTCP in your application, the best results will be achieved by measuring the actual value of V_{REF}.
3. Range can be extended to match WTCP. Contact factory for details.