

5 Watt Single Output, 5 V Input Series DC/DC Converters

Features

- Low Profile Copper Case (0.375" High)
- Six-side Shielded Case
- Low Input/Output Noise Operation
- Wide Input Voltage Range
- Highly Regulated/Low Drift Output
- 100% Burn-in, 100% Tested

Description

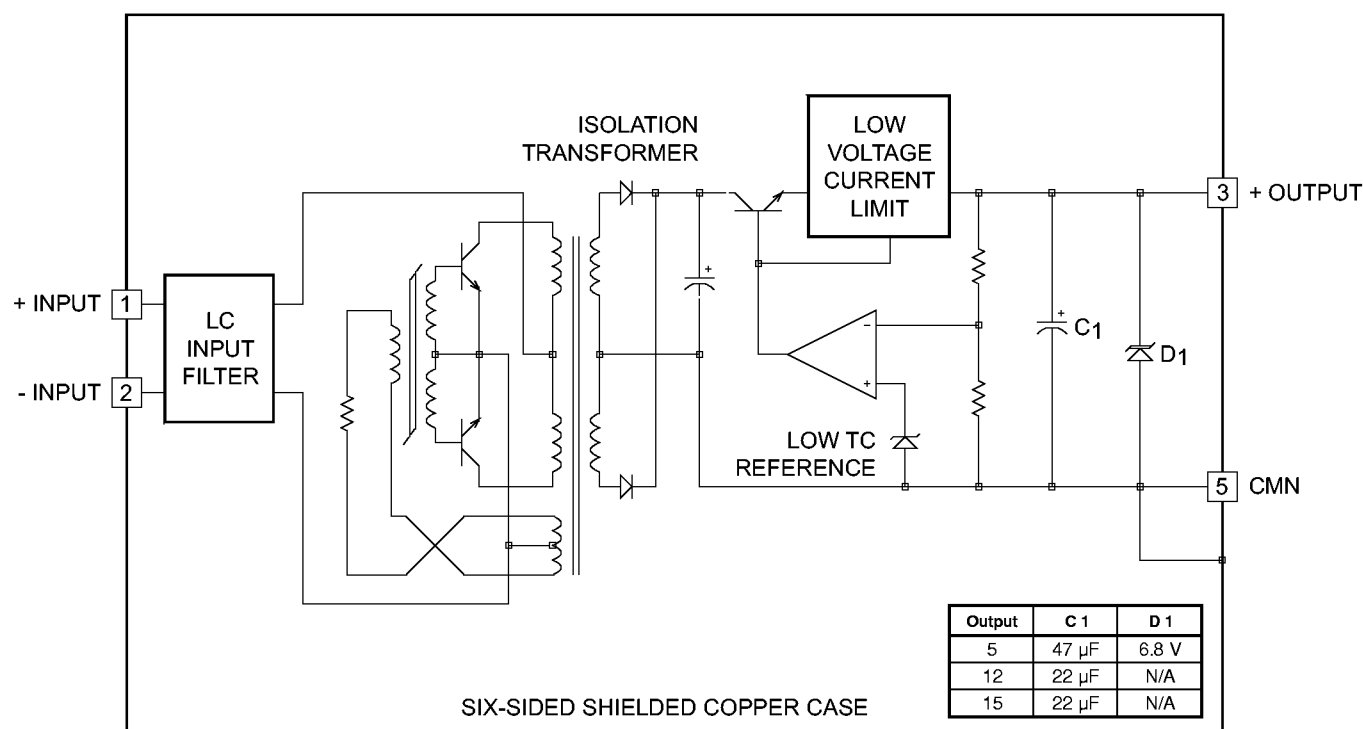
The CALEX 5 Watt DC/DC converters are ideal for use in high performance computer data acquisition systems and board level products. They are designed for systems that require a regulated and isolated 5, 12 or 15 Volt auxiliary power source.

The converters have efficiencies typically greater than 60%. A linear post regulator provides highly stable DC outputs while minimizing noise.

Every unit is 100% tested prior to shipment and is guaranteed under the CALEX 5 Year Warranty.

5 Watt Single Output, 5 Volt Input				
Selection Chart				
Model	Input Range VDC		Output VDC	Output mA
	MIN	MAX		
5S5.1000	4.75	5.5	5	1000
5S12.450	4.75	12.5	12	450
5S15.350	4.75	15	15	350

5 Watt Single Output, 5 Volt Input Series Block Diagram



5 Watt Single Output, 5 V Input Series DC/DC Converters

Input Parameters*					
Model		5S5.1000	5S12.450	5S15.350	Units
Voltage Range	MIN	4.75			VDC
	MAX	5.25			
Reflected Ripple, 0-20MHz bw	TYP	50			mA P-P
	MAX	75			
Input Current Full Load No Load	TYP	1750	1800	1700	mA
	TYP	220	225	230	
Efficiency	TYP	59	60	62	%
Switching Frequency	TYP	25			kHz
Maximum Input Overvoltage, 100ms No Damage	MAX	6.2			VDC
Turn-on Time, 1% Output Error	TYP	1			ms
Recommended Fuse		(2)			

Output Parameters*					
Model		5S5.1000	5S12.450	5S15.350	Units
Output Voltage		5	12	15	VDC
Rated Load (3)	MIN	0	0	0	mA
	MAX	1000	450	350	
Voltage Range 100% Load	MIN	4.95	11.90	14.90	VDC
	TYP	5.00	12.00	15.00	
	MAX	5.05	12.10	15.10	
Load Regulation 0-100% Load	TYP	0.05			%
	MAX	0.20			
Line Regulation Vin = Min-Max VDC	TYP	0.05			%
	MAX	0.20			
Short Term Stability (4)	TYP	0.10			%
Long Term Stability	TYP	0.30			%/kHrs
Transient Response (5)	TYP	50	70	70	μs
Dynamic Response (6)	TYP	170	75	70	mV peak
Noise, 0-20MHz bw	TYP	10			mV P-P
	MAX	40			
Temperature Coefficient	TYP	50			ppm/°C
	MAX	200			
Overvoltage Clamp (7)	TYP	6.8	-	-	VDC
Short Circuit Protection to Common for all Outputs		Short Term, 1 Minute Maximum (2)			

NOTES:

* **All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the CALEX Application Notes for the definition of terms, measurement circuits and other information.**

- (2) For long term short circuit protection of the converters, install a slow blow fuse in the input circuit. Choose a fuse size that is 125% of your applications actual input current and does not exceed 115% of the full load input current.
- (3) No minimum load required.
- (4) Short term stability is specified after a 30 minute warm-up at full load, and with constant line, load and ambient conditions.
- (5) After a 100% step change of the load, the output voltage will be within $\pm 1\%$ of the final value within the transient response time.

(6) Dynamic response is the peak overshoot voltage during the transient response time defined in note 5 above.

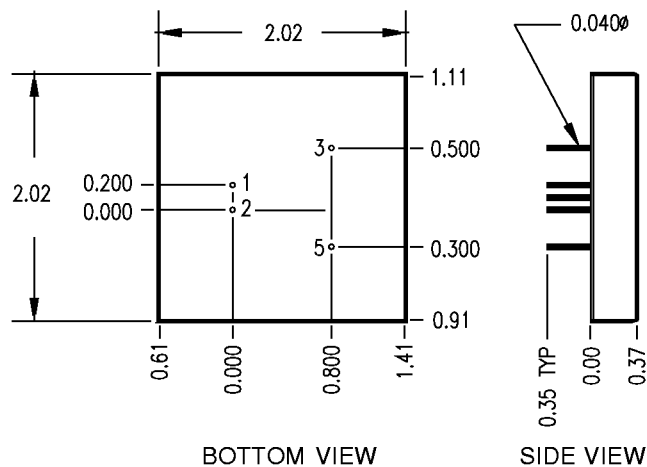
(7) For module protection only, see also note 2.

(8) The functional temperature range is intended to give an additional data point for use in evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed over the functional temperature range.

(9) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.

5 Watt Single Output, 5 V Input Series DC/DC Converters

General Specifications*			
All Models			Units
Isolation			
Isolation Voltage 10µA Leakage Input-Output	MIN	500	VDC
Input to Output Capacitance	TYP	75	pF
Environmental			
Case Operating Range No Derating	MIN MAX	-25 80	°C
Case Functional Range (9)	MIN MAX	-30 85	°C
Storage Range	MIN MAX	-55 100	°C
Thermal Impedance (10)	TYP	10	°C/Watt
General			
Unit Weight	TYP	1.7	oz
Mounting Kits		MS6 & MS15	



Mechanical tolerances unless otherwise noted:

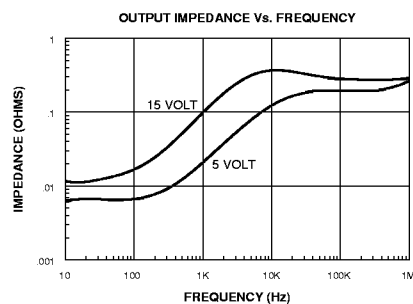
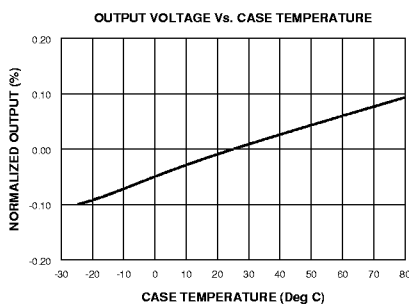
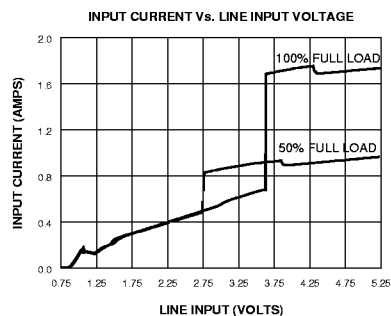
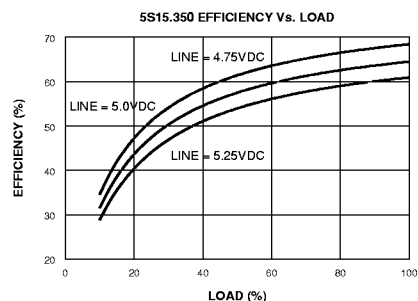
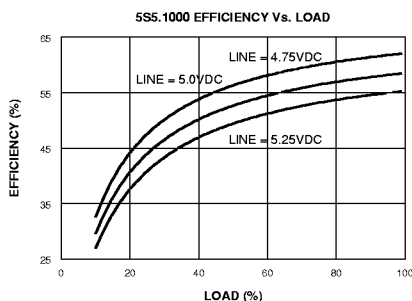
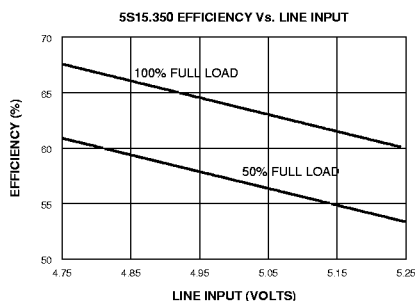
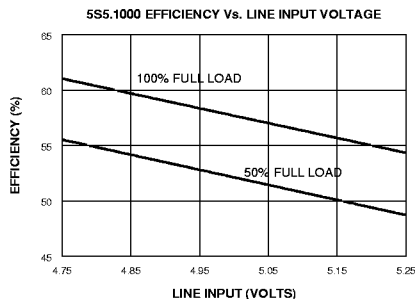
X.XX dimensions: ± 0.020 inches

X.XXX dimensions: ± 0.005 inches

Seal around terminals is not hermetic. Do not immerse units in any liquid.

Typical Performance (Tc=25°C, Rated Load).

Pin	Function
1	+INPUT
2	-INPUT
3	+OUTPUT
5	CMN



5 Watt WF Single Output Series DC/DC Converters

Features

- Ultra Wide Input Voltage Range
- Low Noise, Trimable, Highly Stable Output
- Efficiency > 74% For All Line Conditions
- No Derating to 80°C Case Temperature
- Six-sided Shielded, Low Thermal Gradient Copper Case
- Overvoltage Protected Output
- Pulse By Pulse Digital Current Limit

Description

This single output converter is designed for wide input range, low noise industrial and instrument applications. The ultra wide input range is ideal for battery or unregulated input applications.

The converter features a 55kHz switching frequency that provides outstanding regulation and efficiency at full load.

The output is regulated with high loop gain pulse width modulation control which provides linear regulator type performance.

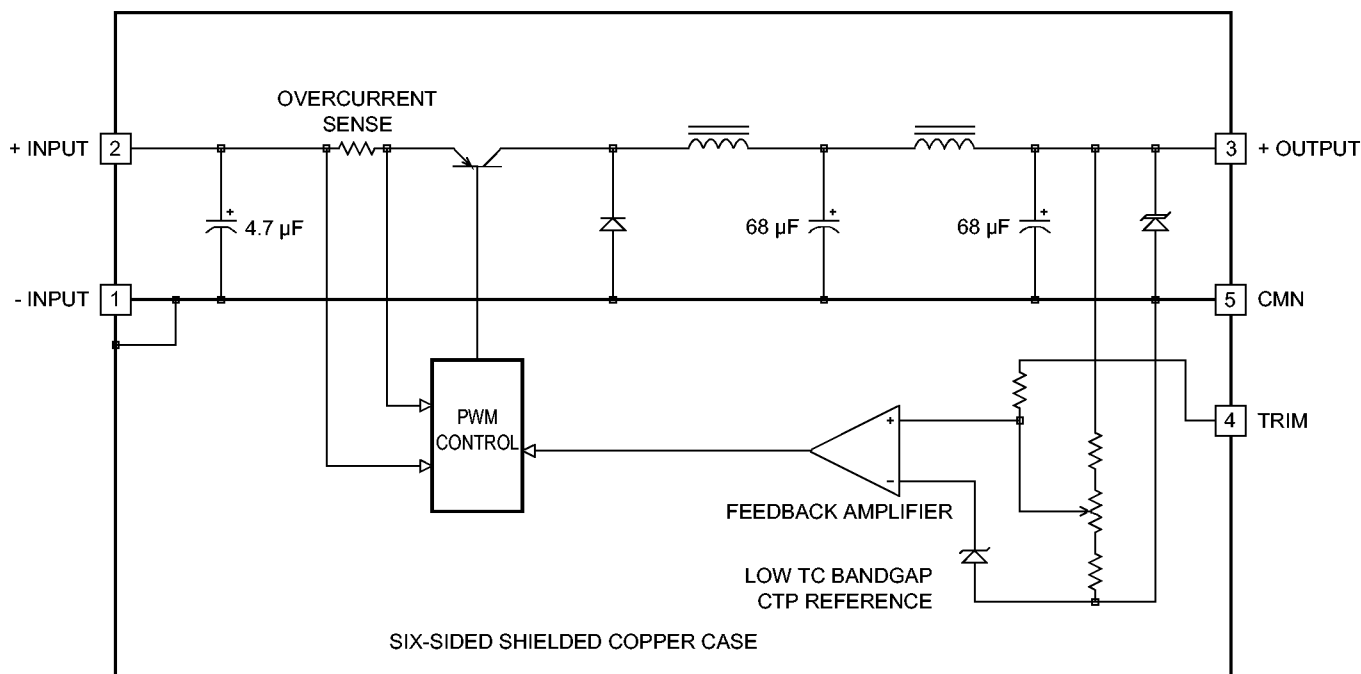
The output is resistor or trimpot trimable by $\pm 10\%$, which allows the WF to be set for +5.2 VDC in ECL applications.

The WF is protected from output shorts to ground by a high speed digital, current limit circuit. The output is overvoltage protected.

5 Watt Single WF				
Selection Chart				
Model	Input Range VDC		Output VDC	Output mA
	MIN	MAX		
12S5.1000WF	7.0	32.0	5.0	1000

Input Parameters*			
Model		12S5.1000WF	Units
Voltage Range	MIN	7.0	VDC
	TYP	12.0	
	MAX	32.0	
Reflected Ripple, 0-20MHz bw (2)	MAX	1000	mA P-P
Input Current Full Load	TYP	550	mA
	No Load	10	
Efficiency	TYP	75	%
Switching Frequency	TYP	55	kHz
Maximum Input Overvoltage, 100ms No Damage	MAX	40	VDC
Turn-on Time, to 1% Output Error	TYP	75	ms
Recommended Fuse		(3)	

5 Watt Single WF Series Block Diagram



5 Watt WF Single Output Series DC/DC Converters

Output Parameters*			
Model		12S5.1000WF	Units
Output Voltage		5	VDC
Rated Current (4)	MIN	0	mA
	MAX	1000	
Voltage Range 100% Load	MIN	4.950	VDC
	TYP	5.000	
	MAX	5.050	
Load Regulation 0-100% Full Load	TYP	0.05	%
	MAX	0.20	
Line Regulation Vin = Min-Max VDC	TYP	0.05	%
	MAX	0.20	
Short Term Stability (5)	TYP	0.05	%
Long Term Stability	TYP	0.20	%/kHrs
Transient Response (6)	TYP	500	μs
Dynamic Response (7)	TYP	200	mV peak
Input Ripple Rejection (8)	TYP	23	dB
Noise, 0-20MHz bw	TYP	20	mV P-P
	MAX	40	
Temperature Coefficient	TYP	50	ppm/°C
	MAX	150	
Overvoltage Clamp (9)	TYP	6.8	VDC
Short Circuit Protection to Common		Continuous, 8 Hours Minimum Current Limit	

General Specifications*			
All Models			Units
Output Trim Function			
Input Resistance	TYP	100	kohms
Trim Range	MIN	±10	%
Isolation			
Isolation (10)		None	
Environmental			
Case Operating Range No Derating	MIN MAX	-25 80	°C
Case Functional Range (11)	MIN MAX	-40 90	°C
Storage Range	MIN MAX	-55 105	°C
Thermal Impedance (12)	TYP	10	°C/Watt
General			
Unit Weight	TYP	1.5	oz
Mounting Kits		MS6 & MS15	

NOTES:

- * All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the CALEX Application Notes for the definition of terms, measurement circuits and other information.
- Peak to Peak input reflected ripple is equal to the DC output current when measured into a zero impedance source resistance. For reduced input ripple use the suggested input filter circuit.
 - For long term short circuit protection of the converters, install a slow blow fuse in the input circuit. Choose a fuse size that is 125% of your applications actual input current and does not exceed 115% of the full load input current.
 - No minimum load required.
 - Short term stability is specified after a 30 minute warmup at full load, constant line and recording the drift over a 24 hour period.
 - After a 25% step change of the load, the output voltage will be within ±1% of the final value within the transient response time.
 - Dynamic response is the peak overshoot during a transient as defined in note 4 above.
 - The input ripple rejection is specified for DC to 120 Hz ripple with a modulation amplitude of 1% of Vin.
 - For module protection only, see also note 3.
 - Case is tied to pin 1. Input and output commons are connected internally.
 - The functional temperature range is intended to give additional data for evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed over the functional temperature range.
 - The case thermal impedance is the case temperature rise over ambient per watt dissipated.

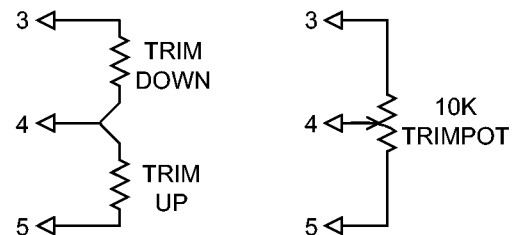


Figure 1. CONNECTIONS FOR OUTPUT TRIM

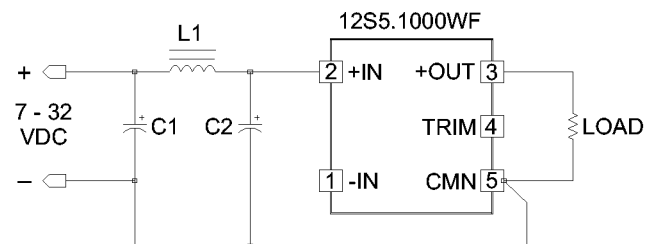


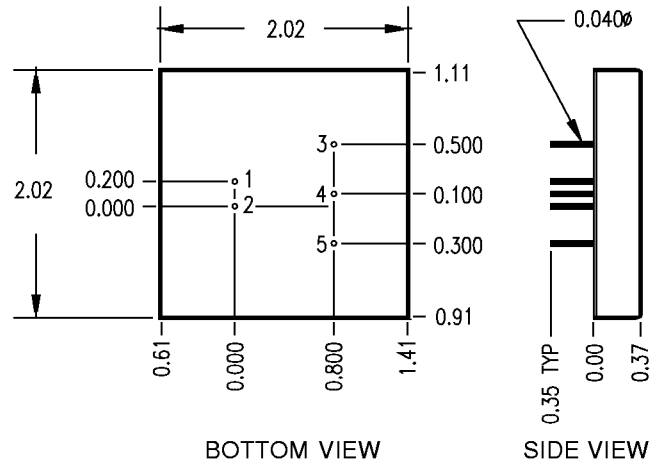
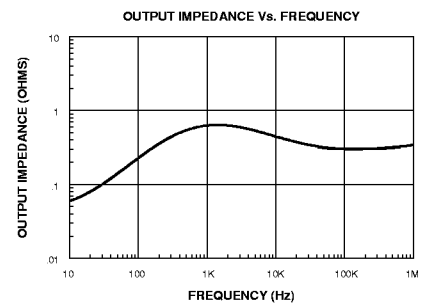
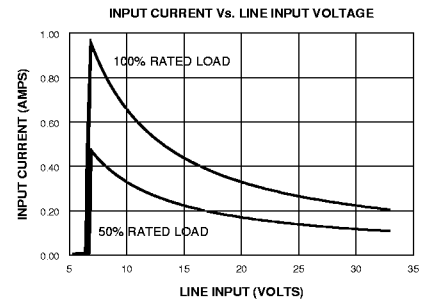
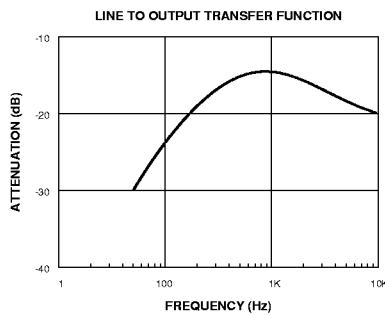
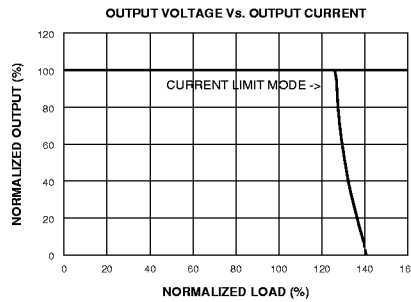
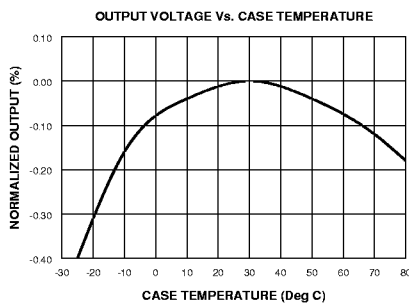
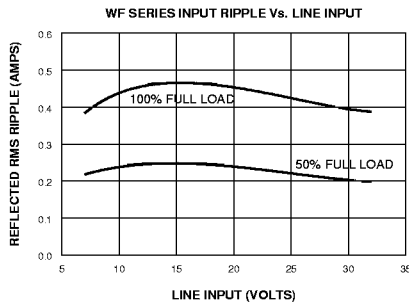
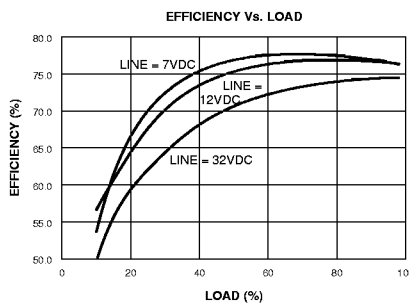
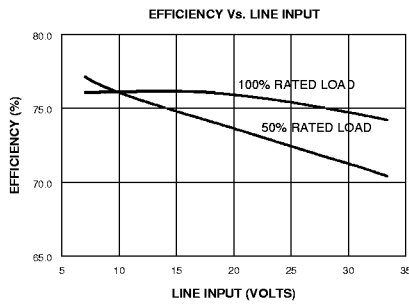
Figure 2. INPUT FILTER CIRCUIT

This circuit will reduce the input reflected ripple of the WF Series to 30 mA P-P (0-20 MHz bw). L1 is 10 turns wound on a MICROMETALS T30-26 core or any 6-10 μH, 1 amp inductor. C1 and C2 are Panasonic 47μF, 35V, HF capacitors (ECE-A1VF470R) or equivalent.

NOTE: For lowest noise operation use single point grounding to pin 5 for both input and output circuits.

5 Watt WF Single Output Series DC/DC Converters

Typical Performance ($T_c=25^\circ\text{C}$, Rated Load).



Mechanical tolerances unless otherwise noted:

X.XX dimensions: ± 0.020 inches

X.XXX dimensions: ± 0.005 inches

Seal around terminals is not hermetic. Do not immerse units in any liquid.

Pin	Function
1	+INPUT
2	-INPUT
3	+OUTPUT
4	TRIM
5	OUT CMN