POWER CONVERTIBLES™

PWR53XX SERIES
15 WATTS
REGULATED

DC/DC CONVERTERS

WIDE INPUT VOLTAGE RANGE, SINGLE, DUAL & TRIPLE OUTPUTS

FEATURES

- EXTENDED TEMPERATURE RANGE: -40° TO +85°
- HIGH EFFICIENCY: >80%
- SHORT-CIRCUIT PROTECTION
- SIX-SIDED SHIELDING
- REMOTE ON/OFF
- SURFACE MOUNT CONSTRUCTION

APPLICATIONS

- TELECOMMUNICATIONS EQUIPMENT
- BATTERY POWERED SYSTEMS
- PORTABLE INSTRUMENTS
- PROCESS CONTROL EQUIPMENT
- TRANSPORTATION EQUIPMENT

DESCRIPTION

The PWR53XX Series is a family of wide input range DC/DC converters that accept either 9.2 to 18VDC, 18 to 36VDC, or 36 to 72VDC depending on the model selected. A fixed-frequency, 200kHz-driven, push-pull oscillator input stage is used to ensure predictable and controlled performance. This eliminates the high peak voltages or currents present in other topologies, which reduce reliability.

A two-section pi-filter is used in the input stage to reduce reflected ripple current to a typical level of 30mAp-p. The design of this filter network also ensures stable frequency response of the PWR53XX Series, regardless of input voltage or output load current. Six-sided shielding suppresses electromagnetic radiation, which may disturb sensitive analog measurements or interfere with system timing signals.

All PWR53XX models will operate safely even at no load up to a temperature of 55°C, although there is a minimum load established for regulation measurements,

The controller used in the input stage of the PWR53XX Series has been designed to provide cycle-by-cycle current limiting for continuous short-circuit protection. In addition, it features soft-start, maximum duty cycle control, under-voltage lockout, and fully latched logic, which incorporates double pulse suppression. These features guarantee controlled, predictable operation to enhance unit reliability even under adverse operating conditions.

Rugged MOSPOWER transistors permit higher frequency operation (200kHz) with less complicated drive circuitry than is possible with bipolar power transistors. Reduced parts count adds to the PWR53XX Series' reliability.

The PWR53XX Series offers exceptional line and load regulation over the full input voltage and output load current range and not just some fractional portion. The output stage of the PWR53XX Series is designed to solve the problems associated with closing a control loop across a voltage isolation barrier. It is a more stable and reliable alternative to a simple optical coupler. Transformer isolation between the output stage and the input oscillator preserves barrier isolation without the degradation over time that is inherent with some optical couplers. The voltage reference and gain stage of this output circuit make it possible for the PWR53XX to offer such exceptional regulation.

ELECTRICAL SPECIFICATIONS

Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

MODEL	NOMINAL INPUT VOLTAGE (VDC)	RATED OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT		INPUT CURRENT		EFFICIENCY (%)
			MIN LOAD (A)	RATED LOAD (A)	MIN LOAD (mA)	RATED LOAD (mA)	
PWR5300	12	5	0.75	3	750	1540	81
PWR5301	12	12	0.32	1.25	750	1540	81
PWR5302	12	15	0.25	1	750	1540	81
PWR5303	24	5	0.75	3	375	750	83
PWR5304	24	12	0.32	1.25	375	750	83
PWR5305	24	15	0.25	1	375	750	83
PWR5306	48	5	0.75	3	185	375	83
PWR5307	48	12	0.32	1.25	185	375	83
PWR5308	48	15	0.25	1	185	375	83
PWR5309	12	±5	±0.375	1.5	750	1540	81
PWR5310	12	±12	±0.156	±0.625	750	1540	81
PWR5311	12	±15	±0.125	±0.5	750	1540	81
PWR5312	24	±5	±0.375	±1.5	375	750	83
PWR5313	24	±12	±0.156	±0.625	375	750	83
PWR5314	24	±15	±0.125	±0.5	375	750	83
PWR5315	48	±5	±0.375	±1.5	185	375	83
PWR5316	48	±12	±0.156	±0.625	185	375	83
PWR5317	48	±15	±0.125	±0.5	185	375	83
PWR5318	12	5,±12	0.375,±0.077	1.5,±0.31	750	1540	81
PWR5319	12	5,±15	0.375,±0.063	1.5,±0.25	750	1540	81
PWR5320	12	5,12,-5	0.375,0.077,-0.125	1.5,0.31,-0.75	750	1540	81
PWR5321	24	5,±12	0.375,±0.077,	1.5,±0.31	375	750	83
PWR5322	24	5,±15	0.375,±0.063,	1.5,±0.25	375	750	83
PWR5323	24	5,12,-5	0.375,0.077,-0.125	1.5,0.31,-0.75	375	750	83
PWR5324	48	5,±12	0.375,±0.077,	1.5,±0.31	185	375	83
PWR5325	48	5,±15	0.375,±0.063	1.5,±0.25	185	375	83
PWR5326	48	5,12,-5	0.375,0.077,-0.125	1.5,0.31,-0.75	185	375	83

COMMON SPECIFICATIONS

Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

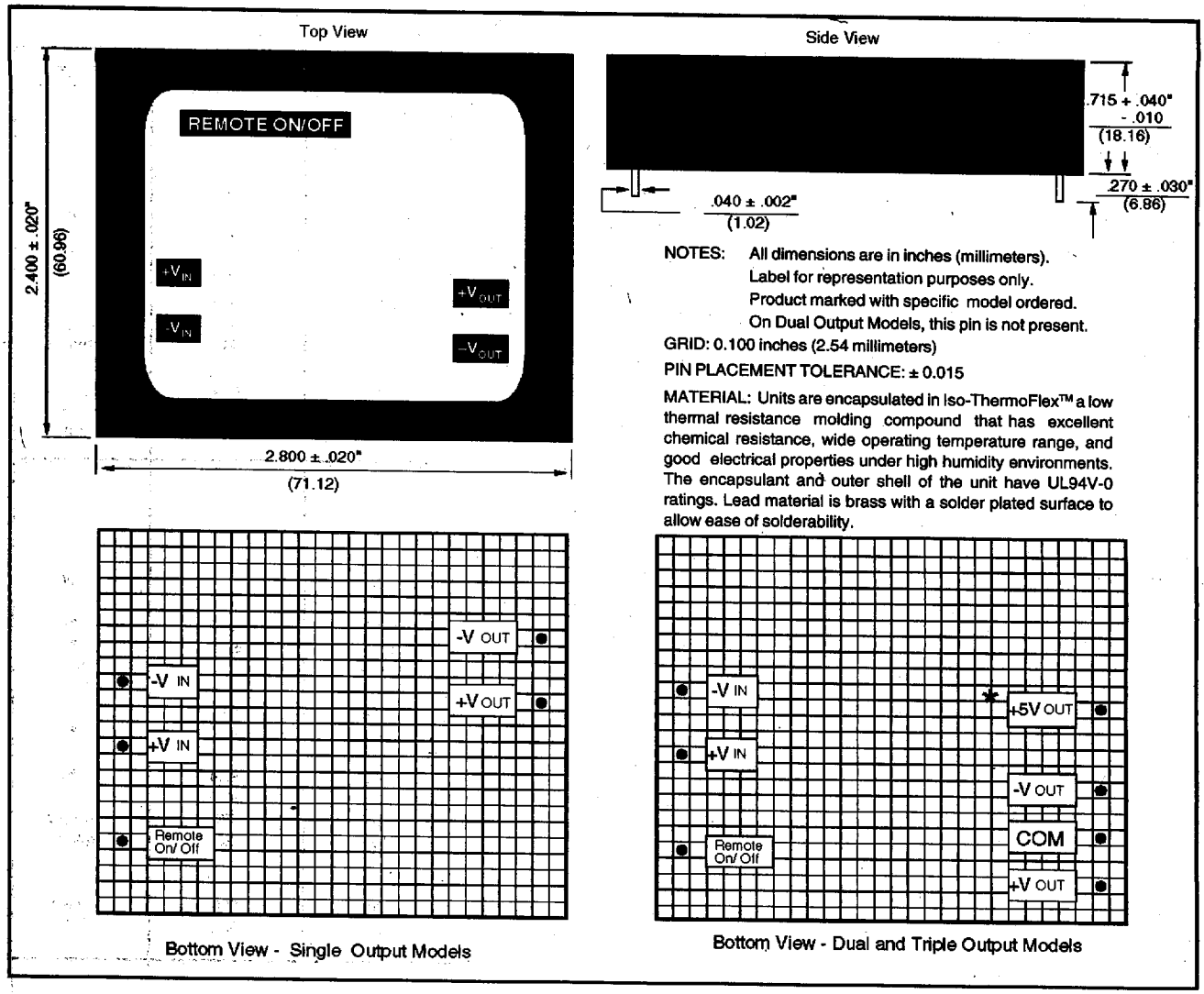
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT					
Voltage Range		9.2	12	18	VDC
		18	24	36	VDC
		36	48	72	VDC
Reflected Ripple Current			30		mAp-p
ISOLATION					
Rated Voltage		500			VDC
Test Voltage	60 Hz, 10 Seconds	500			Vpk
Resistance			10		GΩ
Capacitance			200		pF
Leakage Current	V_{ISO} = 240VAC, 60Hz		30		µArms
GENERAL					
Switching Frequency			200		kHz
Phase Margin			55		Degrees
Package Weight			130		g
MTTF per MIL-HDBK-217, Rev. E	Circuit Stress Method				
Ground Benign			400		kHr
Fixed Ground			140		kHr
Naval Sheltered			90		kHr
Airborne Uninhabited Fighter			26		kHr
TEMPERATURE	Minimum Load Required				
Specification	No Power Derating	-25		+85	°C
Operation		-40		+90	°C
Storage		-40		+110	°C

OUTPUT SPECIFICATIONS

Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

PARAMETER	CONDITIONS	TYP	MAX	UNITS
SINGLES				
PWR5300,5301,5302,5303,5304, PWR5305, 5306, 5307,5308				
Rated Power		15		W
Voltage Setpoint Accuracy	Rated Load, Nominal V_{IN}	±0.5	±1	%
Temperature Coefficient		±0.02		%/°C
Line Regulation	High Line to Low Line	±0.01	±0.1	%
Load Regulation	Min. Load to Rated Load	±0.2	±0.4	%
Ripple and Noise	BW =20Hz to 10MHz	40	75	mVp-p
	BW = 20Hzto 2MHz	10	20	mVrms
Transient Response	±1% Error Band,			
	Rated Load to Min Load	300	500	µs
	25% Step Load Change	20	50	µs
Peak Overshoot	Rated Load to Min Load	190	300	mV
DUALS				
PWR5309,5310,5311,5312,5313, PWR5314, 5315, 5316,5317				
Rated Power		15		W
Setpoint Accuracy				
$+V_{OUT}$		± 0.5	±1.0	%
$-V_{OUT}$		±2.0	±3.5	%
Temperature Coefficient		±0.02		%/°C
Line Regulation				
$+V_{OUT}$		±0.04	±0.2	%
$-V_{OUT}$		±0.3	±1.0	%
Load Regulation				
$+V_{OUT}$		±0.02	±0.4	%
$-V_{OUT}$		±1.2	±2.0	%
Ripple and Noise	BW =20Hz to 10MHz	40	75	mVp-p
	BW = 20Hz to 2MHz	10	20	mVrms
Transient Response	Step Rated Load to Min Load on one Output, Remaining Output at Rated Load	300	500	µsec
Peak Overshoot	Rated Load to Min Load Step	100	300	mV
TRIPLES				
PWR5318,5319, 5320,5321,5322 PWR5323, 5324, 5325,5326				
Rated Power		15		W
Voltage Setpoint Accuracy	Rated Load, Nominal V_{IN}			
+5V		±0.5	±1	%
All Other Outputs		±2	±3.5	%
Temperature Coefficient		±0.02		%/°C
Line Regulation	High Line to Low Line			
+5V		±0.02	±0.1	%
All Other Outputs		±0.3	±1	%
Load Regulation	5V Min. Load to Rated Load with a 60%Load on All Others			
+5V		±0.2	±0.4	%
$±V_{OUT}$		±1.2	±2	%
Ripple and Noise	BW = 20Hz to 10MHz	40	75	mVp-p
	BW = 20Hz to 2MHz	10	20	mVrms
Transient Response	Step Rated Load to Min Load on Indicated Output, Remaining Outputs at Rated Load	350	420	µsec
Peak Overshoot	Rated Load to Min Load Step			
+5V		600	825	mV

MECHANICAL



NOTES: All dimensions are in inches (millimeters).
Label for representation purposes only.
Product marked with specific model ordered.
On Dual Output Models, this pin is not present.

GRID: 0.100 inches (2.54 millimeters)

PIN PLACEMENT TOLERANCE: ± 0.015

MATERIAL: Units are encapsulated in Iso-ThermoFlex™ a low thermal resistance molding compound that has excellent chemical resistance, wide operating temperature range, and good electrical properties under high humidity environments. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is brass with a solder plated surface to allow ease of solderability.

ABSOLUTE MAXIMUM RATINGS

Output Short-Circuit Duration	Continuous
Internal Power Dissipation	4.5W
Lead Temperature (soldering, 10 seconds max)	+300°C

REMOTE ON/OFF

Logic Compatibility	CMOS or Open Collector TTL
E_c On	+5VDC or Open Circuit
E_c Off	1.7VDC
Shutdown Idle Current	35mA
Input Resistance To Remote On/Off	100kΩ
Control Common	Referenced to Input Minus

ORDERING INFORMATION

PWR 53XX /H

Device Family
PWR indicates DC/DC converter

Model Number
Selected from Electrical SpecificationTable

Screening Option