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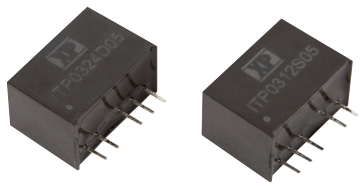
ITP Series

DC-DC Converter

XP Power

3 Watts

- Regulated single & dual outputs from 3.3 to 15VDC
- Wide 4:1 input range
- Input ranges 4.5 to 18, 9 to 36, 18 to 75VDC
- Ultra-compact SIP6 package
- 1.6kVDC input/output isolation
- High efficiency
- Complies with EN55032
- Short-circuit protection
- Remote On/Off (single output versions only)
- -40°C to +75°C operating temperature
- Full power to +70°C
- MTBF >0.95 Mhrs (MIL-HDBK-217F, +25°C GB)
- 3 year warranty



Dimensions:

ITP:
0.67 x 0.40 x 0.46" (17.0 x 10.1 x 11.7 mm)

The ITP series offers a compact 3W, cost effective DC-DC module with a wide range of input voltages and output voltages and regulation to 1%. Industrial temperature range with a robust encapsulated construction.

Models & Ratings

Input Voltage	Output Voltage	Output Current (Full Load)	Input Current[1]		Maximum Capacitive Load[2]	Efficiency	Model Number
			No Load	Full Load			
4.5-18 V	3.3 V	700 mA	45 mA	257 mA	3300 µF	75%	ITP0312S3V3
	5.0 V	600 mA	45 mA	309 mA	1680 µF	81%	ITP0312S05
	12.0 V	250 mA	50 mA	301 mA	820 µF	83%	ITP0312S12
	15.0 V	200 mA	55 mA	301 mA	680 µF	83%	ITP0312S15
	±5.0 V	±300 mA	40 mA	313 mA	±1000 µF	80%	ITP0312D05
	±12.0 V	±125 mA	50 mA	305 mA	±470 µF	82%	ITP0312D12
	±15.0 V	±100 mA	60 mA	301 mA	±330 µF	83%	ITP0312D15
9-36 V	3.3 V	700 mA	25 mA	127 mA	3300 µF	76%	ITP0324S3V3
	5.0 V	600 mA	25 mA	152 mA	1680 µF	82%	ITP0324S05
	12.0 V	250 mA	35 mA	149 mA	820 µF	84%	ITP0324S12
	15.0 V	200 mA	35 mA	149 mA	680 µF	84%	ITP0324S15
	±5.0 V	±300 mA	30 mA	154 mA	±1000 µF	81%	ITP0324D05
	±12.0 V	±125 mA	35 mA	151 mA	±470 µF	83%	ITP0324D12
	±15.0 V	±100 mA	40 mA	149 mA	±330 µF	84%	ITP0324D15
18-75 V	3.3 V	700 mA	15 mA	65 mA	3300 µF	74%	ITP0348S3V3
	5.0 V	600 mA	15 mA	77 mA	1680 µF	81%	ITP0348S05
	12.0 V	250 mA	15 mA	77 mA	820 µF	81%	ITP0348S12
	15.0 V	200 mA	20 mA	76 mA	680 µF	82%	ITP0348S15
	±5.0 V	±300 mA	15 mA	79 mA	±1000 µF	79%	ITP0348D05
	±12.0 V	±125 mA	20 mA	78 mA	±470 µF	80%	ITP0348D12
	±15.0 V	±100 mA	30 mA	78 mA	±330 µF	80%	ITP0348D15

Notes

1. Input currents measured at nominal input voltage.
2. Maximum capacitive load is per output.

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Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	4.5	12	18	VDC	ITP0312 series
	9	24	36		ITP0324 series
	18	48	75		ITP0348 series
Input Filter	Capacitor				
Input Reflected Ripple			20	mA pk-pk	Through 27 µH inductor and 47 µF capacitor
Input Surge			25	VDC for 100 ms	12 V models, ITP0312 series
			50		24 V models, ITP0324 series
			100		48 V models, ITP0348 series
Inhibit Mode Input Current		2.5		mA	Measured by Vin nominal, when inhibited

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		30	VDC	See Models and Ratings table
Initial Set Accuracy			±1	%	
Minimum Load	0			A	No minimum load required
Line Regulation			±0.2	%	
Load Regulation			±1	%	From 0 to 100% load
Cross Regulation			±5	%	On dual output models when one load is varied between 25% and 100% and other is fixed at 100%
Transient Response Deviation			±5	% deviation	Recovery time 500 µs, 25% load step change
Ripple & Noise			150	mV pk-pk	Single Output. 20 MHz bandwidth. Measured using 0.1 µF ceramic capacitor and 10 µF electrolytic capacitor
			100		Dual Output. 20 MHz bandwidth. Measured using 0.1 µF ceramic capacitor and 10 µF electrolytic capacitor
Over Current Protection		150		%	Overcurrent threshold
Short Circuit Protection					Continuous, with auto recovery
Maximum Capacitive Load					See Models and Ratings table
Temperature Coefficient			0.02	%/°C	
Remote On/Off	Output is on if Remote On/Off (pin 3) is open Output turns off if 2-4 mA is applied to Remote On/Off (pin 3). Via 1kΩ resistor. Applies to single output models.				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	74		84	%	See Models and Ratings table
Isolation: Input to Output		1600		VDC	Functional
Switching Frequency		100		kHz	
Isolation Resistance	10^9			Ω	
Isolation Capacitance			40	pF	
Power Density			24	Win^3	
Mean Time Between Failure	0.95			Mhrs	MIL-HDBK-217F, +25 °C GB
Case Material	Non conductive black plastic				
Potting Material	Epoxy (UL94V-0 rated)				
Pin Material	C5191R-H Solder-coated				
Solder Process	JEDEC J-STD 020D.1. 260 °C max. 1.5 mm from case 10s max.				
Weight		0.008 (3.85)		lb (g)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		75	°C	Derate from 100% load at +70 °C to no load at +75 °C
Storage Temperature	-55		+125	°C	
Case Temperature			+100	°C	
Humidity			95	%RH	Non-condensing
Cooling					Natural convection

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class A	External components required. See application notes.
Radiated	EN55032	Class A	

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EMC: Immunity

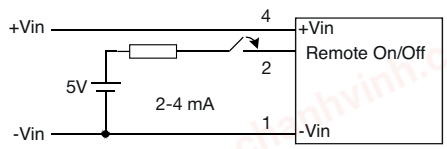
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV Air Discharge	A	
Radiated	EN61000-4-3	10 V/M	A	
EFT/Burst	EN61000-4-4	±2 kV	A	External input capacitor required 220 µF/100 V
Surge	EN61000-4-5	±2 kV	A	External input capacitor required 220 µF/100 V
Conducted	EN61000-4-6	10 V rms	A	
Magnetic Fields	EN61000-4-8	100 A/m	A	

Safety

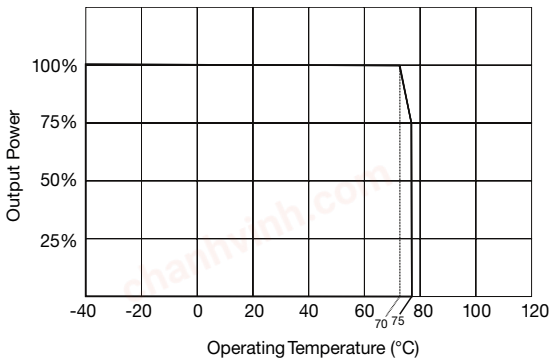
Safety Standard	Notes & Conditions
UL62368-1	ITE
CE	Meets LVD, evaluated to EN62368-1

Application Notes

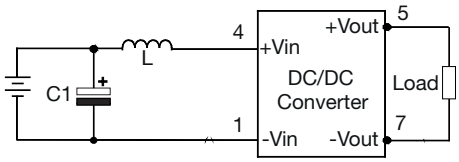
Remote On/Off



Derating Curve

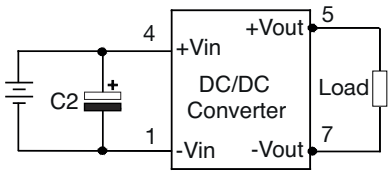


EMI Filter



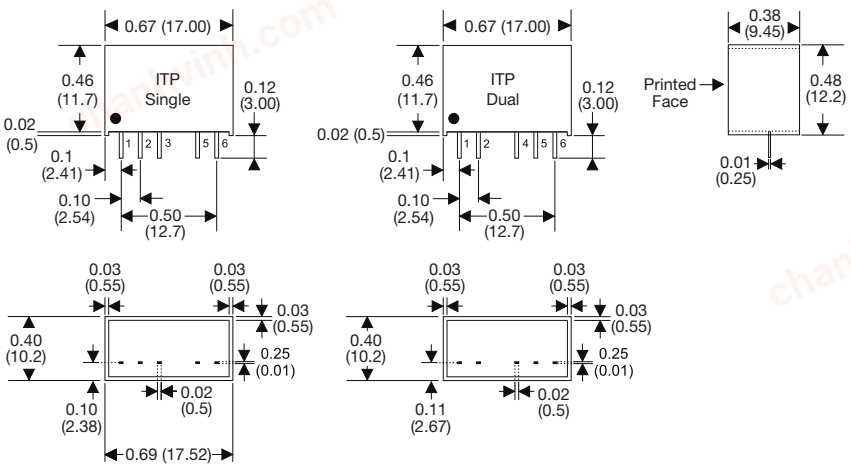
Model	C1	L	C3
ITP0312	1210, 10 µF, 35 V	2.2 µH	1206, 100 PF, 1kV
ITP0324	1210, 2.2 µF, 35 V	10 µH	1206, 100 PF, 1kV
ITP0348	1210, 4.7 µF, 35 V	18 µH	1206, 100 PF, 1kV

EFT & Surge



C2
220 µF, 100 V

Mechanical Details



Pin Connections		
Pin	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	N/C
4	N/C	+Vout
5	+Vout	Common
6	-Vout	-Vout

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.008lbs (3.85 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)