

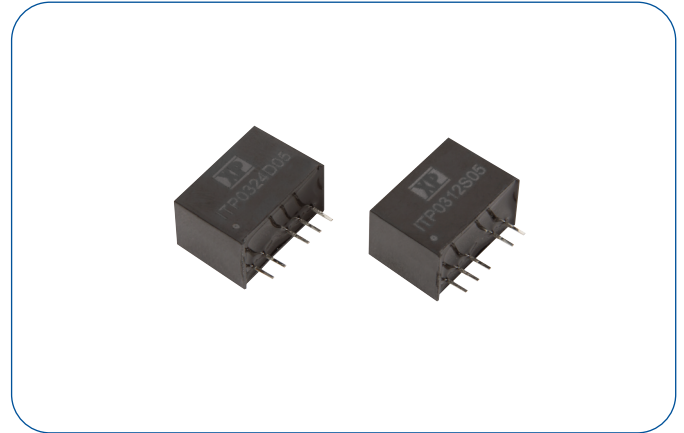


**THE DATASHEET OF  
ITP0324D15**



### 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 <sup>(1)</sup>		Maximum Capacitive Load <sup>(2)</sup>	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.

### 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 $\mu$ H inductor and 47 $\mu$ F 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			$\pm 1$	%	
Minimum Load	0			A	No minimum load required
Line Regulation			$\pm 0.2$	%	
Load Regulation			$\pm 1$	%	From 0 to 100% load
Cross Regulation			$\pm 5$	%	On dual output models when one load is varied between 25% and 100% and other is fixed at 100%
Transient Response Deviation			$\pm 5$	% deviation	Recovery time 500 $\mu$ s, 25% load step change
Ripple & Noise			150	mV pk-pk	Single Output. 20 MHz bandwidth. Measured using 0.1 $\mu$ F ceramic capacitor and 10 $\mu$ F electrolytic capacitor
			100		Dual Output. 20 MHz bandwidth. Measured using 0.1 $\mu$ F ceramic capacitor and 10 $\mu$ F 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	%/ $^{\circ}$ 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 1k $\Omega$ 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 <sup>9</sup>			$\Omega$	
Isolation Capacitance			40	pF	
Power Density			24	Win <sup>3</sup>	
Mean Time Between Failure	0.95			Mhrs	MIL-HDBK-217F, +25 $^{\circ}$ 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 $^{\circ}$ 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	$^{\circ}$ C	Derate from 100% load at +70 $^{\circ}$ C to no load at +75 $^{\circ}$ C
Storage Temperature	-55		+125	$^{\circ}$ C	
Case Temperature			+100	$^{\circ}$ 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	

### EMC: Immunity

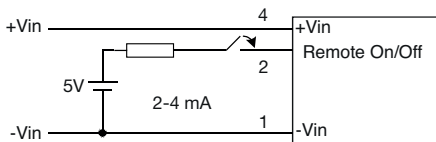
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV Air Discharge	A	
Radiated	EN61000-4-3	10 V/M	A	
EFT/Burst	EN61000-4-4	±2 kV	A	External input capacitor required 220 µF/100 V
Surge	EN61000-4-5	±2 kV	A	External input capacitor required 220 µF/100 V
Conducted	EN61000-4-6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

### Safety

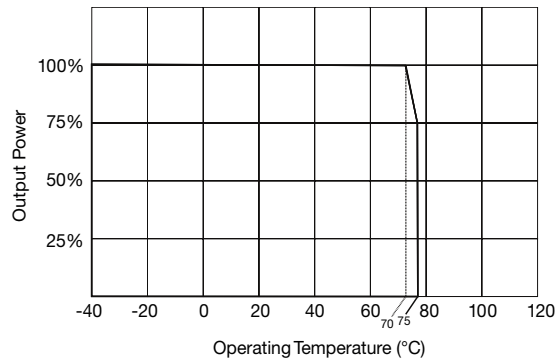
Safety Standard	Notes & Conditions
UL62368-1	ITE
CE	Meets LVD, evaluated to EN62368-1

### Application Notes

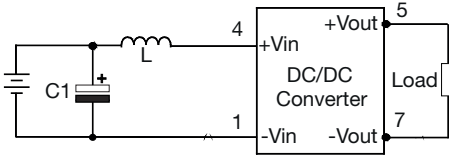
#### Remote On/Off



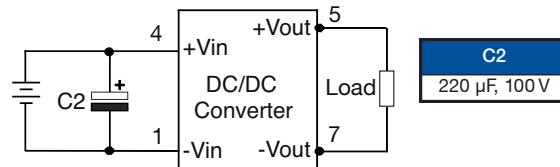
#### Derating Curve



#### EMI Filter

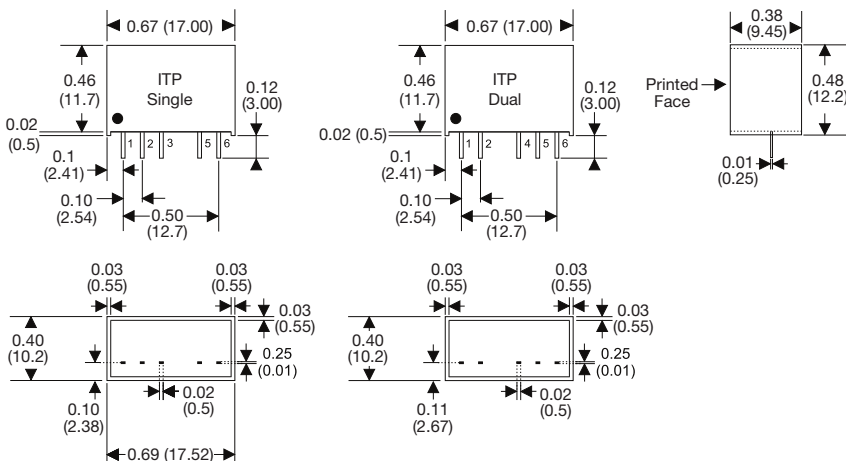


#### EFT & Surge



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

### 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







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

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