

# P R B X

## POWERBOX Industrial Line T31W Series 30W 4:1 Single and Dual Output High Performance DC/DC Converter

### Features

Output current up to 8.5A  
Standard 2.00 x 1.00 x 0.40 inch  
High efficiency up to 91%  
4:1 ultra wide input voltage range  
Six-sided continuous shield  
Fixed switching frequency  
UL60950-1, EN60950-1 and IEC60950-1 safety approvals  
CE marked  
Compliant to RoHS II & REACH

### Input

Voltage range	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Input filter	Pi type.	
Input surge voltage	24V input	50VDC
	48V input	100VDC
Reflected ripple current	20mA p-p, nominal Vin and full load.	
Start up time	Power up	30mS typ
	Remote on/off	30mS typ
	Nominal Vin and constant resistive load.	
Start-up voltage	24V input	9VDC
	48V input	18VDC
Shutdown voltage	24V input	8VDC
	48V input	16VDC
Remote ON/OFF <sup>6</sup>	Positive logic (standard):	
	DC/DC ON: Open or 3V < Vr < 12V	
	DC/DC OFF: Short or 0V < Vr < 1.2V	
	Negative logic (option):	
	DC/DC ON: Short or 0V < Vr < 1.2V	
	DC/DC OFF: Open or 3V < Vr < 12V	
	Input current of Ctr pin	±0.5mA
Remote off input current	3mA	

### Output

Power	30W max.	
Voltage accuracy	±1%, full load and nominal Vin.	
Voltage adjustability	±10% single output.	
Minimum load	0%.	
Line regulation	±0.2%, LL to HL at full load.	
Load regulation	Single: ±0.5%	
	No load to full load	
	Dual: ±1%	
Cross regulation (dual)	±5%, asymmetrical load 25%/100% FL.	
Ripple and noise	1.5-5.1Vo	100mVp-p
	12-15Vo	150mVp-p
	20 MHz bandwidth (measured with a 0.1µF/50V MLCC).	
Temperature coefficient	±0.02%/°C max.	
Transient response	250µS, recovery time 25% load step change.	



Overvoltage protection (zener diode clamp)	1.5V output	2.0V
	2.5V output	3.3V
	3.3V output	3.9V
	5V & 5.1V & ±5V output	6.2V
	12V & ±12V output	15V
	15V & ±15V output	18V
Overload protection	150% max, % of FL at nominal input.	
Short circuit protection	Continuous, automatic recovery.	

### Environmental

Operating temperature	-40°C to +50°C (without derating).	
	-50°C to +85°C (with derating).	
Max case temperature	+105°C.	
Overtemp. protection	115°C typ.	
Storage temperature	-55°C to +125°C.	
Thermal impedance <sup>7</sup>	Nature convection 12°C/Watt.	
	Nature convection with heatsink 10°C/Watt.	
Thermal shock	MIL-STD-810F.	
Vibration	MIL-STD-810F.	
Relative humidity	5-95% RH.	

### General

Efficiency	See table.	
Isolation voltage	1600VDC min, input to output.	
	1600VDC min, input (output) to case.	
Case grounding	Connect case to -Vin with decoupling Y Cap.	
Isolation resistance	10 <sup>9</sup> ohms, min.	
Isolation capacitance	1500pF, max.	
Switching frequency	430KHz typ ±10%.	
Case material.	Nickel-coated copper.	
Base material	FR4 PCB.	
Potting material	Epoxy (UL94-V0).	
Dimensions	50.8 x 25.4 x 10.2 mm.	
Weight	30.5g.	
MTBF <sup>1</sup>	MIL-STD-217F, 1.288 x 10 <sup>5</sup> hrs.	

### Standards

Safety standards	IEC60950-1, UL60950-1, EN60950-1.	
EMC		
EMI <sup>7</sup>	EN55022 Class A.	
ESD	EN61000-4-2 Criteria A, air ±8kV, contact ±6kV.	
Radiated immunity	EN61000-4-3 Criteria A, 10V/m.	
Fast transient <sup>8</sup>	EN61000-4-4 Criteria A, ±2kV.	
Surge <sup>8</sup>	EN61000-4-5 Criteria A, ±1kV.	
Conducted immunity	EN61000-4-6 Criteria A, 10 Vr.m.s.	

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**T31W Series**  
**30W 4:1 Single and Dual Output**  
**High Performance**  
**DC/DC Converter**

Model Number	Input Range	Output Voltage	Output Current		Output <sup>4</sup> Ripple&Noise	Input Current		Eff <sup>4</sup>	Capacitor <sup>5</sup> Load Max
			Min Load <sup>8</sup>	Full Load		No Load <sup>3</sup>	Full Load <sup>2</sup>		
PMC30-24S1P5W	9 – 36 VDC	1.5 VDC	0mA	8500mA	100mVp-p	70mA	700mA	80%	20000µF
PMC30-24S2P5W	9 – 36 VDC	2.5 VDC	0mA	8000mA	100mVp-p	70mA	1054mA	83%	20000µF
PMC30-24S3P3W	9 – 36 VDC	3.3 VDC	0mA	7500mA	100mVp-p	70mA	1258mA	86%	20000µF
PMC30-24S05W	9 – 36 VDC	5.0 VDC	0mA	6000mA	100mVp-p	105mA	1488mA	88%	14400µF
PMC30-24S5P1W	9 – 36 VDC	5.1 VDC	0mA	6000mA	100mVp-p	105mA	1517mA	88%	14400µF
PMC30-24S12W	9 – 36 VDC	12 VDC	0mA	2500mA	150mVp-p	20mA	1471mA	89%	3000µF
PMC30-24S15W	9 – 36 VDC	15 VDC	0mA	2000mA	150mVp-p	30mA	1471mA	89%	2000µF
PMC30-24D05W	9 – 36 VDC	±5VDC	0mA	±3000mA	100mVp-p	90mA	1488mA	88%	±3000µF
PMC30-24D12W	9 – 36 VDC	±12VDC	0mA	±1250mA	150mVp-p	25mA	1506mA	87%	±2000µF
PMC30-24D15W	9 – 36 VDC	±15VDC	0mA	±1000mA	150mVp-p	25mA	1506mA	87%	±1300µF
PMC30-48S1P5W	18 – 75 VDC	1.5 VDC	0mA	8500mA	100mVp-p	30mA	350mA	80%	20000µF
PMC30-48S2P5W	18 – 75 VDC	2.5 VDC	0mA	8000mA	100mVp-p	45mA	520mA	84%	20000µF
PMC30-48S3P3W	18 – 75 VDC	3.3 VDC	0mA	7500mA	100mVp-p	45mA	629mA	86%	20000µF
PMC30-48S05W	18 – 75 VDC	5.0 VDC	0mA	6000mA	100mVp-p	65mA	744mA	88%	14400µF
PMC30-48S5P1W	18 – 75 VDC	5.1 VDC	0mA	6000mA	100mVp-p	65mA	759mA	88%	14400µF
PMC30-48S12W	18 – 75 VDC	12 VDC	0mA	2500mA	150mVp-p	60mA	727mA	90%	3000µF
PMC30-48S15W	18 – 75 VDC	15 VDC	0mA	2000mA	150mVp-p	50mA	718mA	91%	2000µF
PMC30-48D05W	18 – 75 VDC	±5VDC	0mA	±3000mA	100mVp-p	50mA	744mA	88%	±3000µF
PMC30-48D12W	18 – 75 VDC	±12VDC	0mA	±1250mA	150mVp-p	15mA	744mA	88%	±2000µF
PMC30-48D15W	18 – 75 VDC	±15VDC	0mA	±1000mA	150mVp-p	15mA	744mA	88%	±1300µF

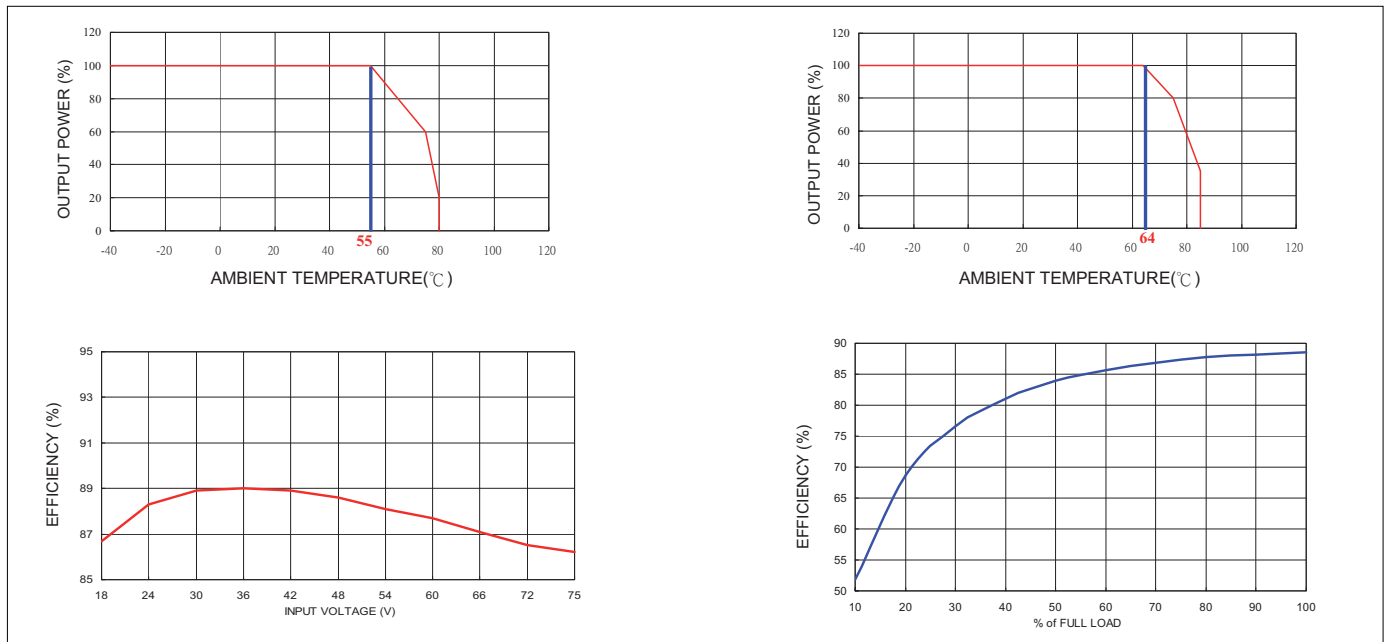
**Notes:**

- MIL-HDBK-217F @Tc=70 °C, full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum input and constant resistive load.
- The CTRL pin voltage is referenced to -INPUT.
- Heat-sink is optional and P/N: 7G-0020C-F.
- The T31W series standard module meets EN55022 Class A and Class B with external components.

- For more detail information, please contact with Powerbox.
- An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Powerbox suggest:  
 24 VDC INPUT : Nippon chemi-con KY series, 330µF/50V.  
 48 VDC INPUT : Nippon chemi-con KY series, 220µF/100V.

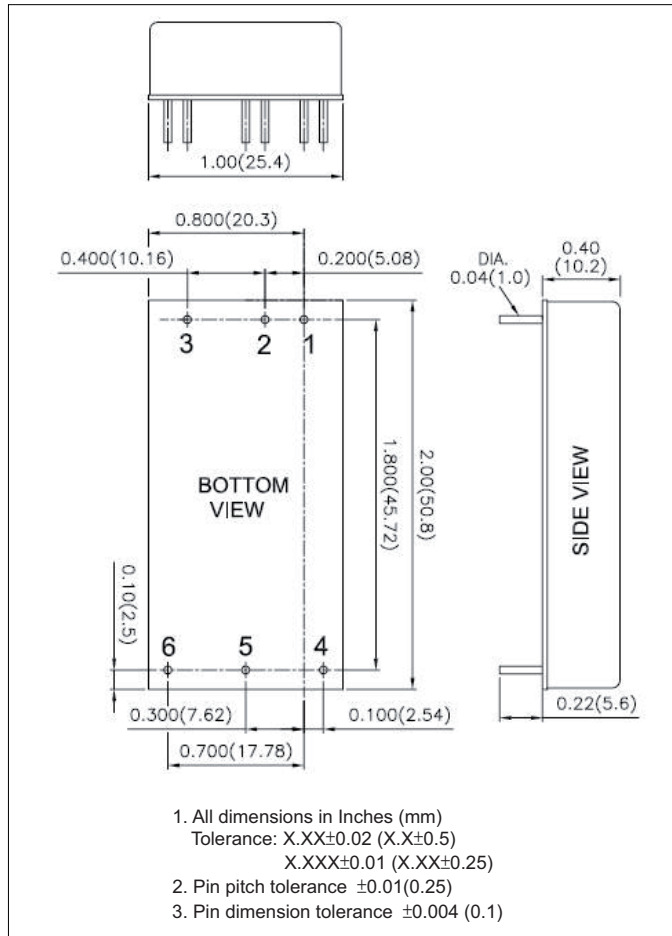
CAUTION: This power module is not internally fused. An input line fuse must always be used.

**Derating Curve**



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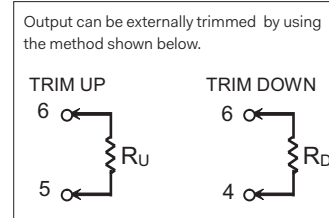
Mechanical



Pin Connection

Pin	Single	Dual
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	CTRL	CTRL
4	+OUTPUT	+OUTPUT
5	-OUTPUT	COMMON
6	TRIM	-OUTPUT

External Output Trimming



Specifications are subject to change without notice.