

# P R B X

## POWERBOX Industrial Line PMD15W Series 15W 4:1 Single and Dual Output High Performance DC/DC Converter

### Features

Output current up to 4.5A
Standard 2" x 1" x 0.4" package
High efficiency up to 88%
4:1 wide input voltage range
Six-sided continuous shield
Fixed switching frequency
International safety standard approval
Compliant to RoHS EU Directive 2002/95/EC

### Input

Voltage range	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Input filter	Pi type	
Voltage variation dv/dt	5V/ms max,	
	(complies with ETS300-132 part 4.4)	
Input surge voltage	24V input	50VDC
	100mS max	48V input
Reflected ripple current	20mA p-p, nominal Vin and full load	
Start up time	Power up	20ms typ
	Nominal Vin and constant resistive load	
Start-up voltage	24V input	9VDC
	48V input	18VDC
Shutdown voltage	24V input	7.5VDC
	48V input	15VDC
Remote ON/OFF <sup>6</sup>	Positive logic:	
	DC/DC ON: Open or $3V < V_r < 12V$	
	DC/DC OFF: Short or $0V < V_r < 1.2V$	
	Negative logic:	
	DC/DC ON: Short or $0V < V_r < 1.2V$	
	DC/DC OFF: Open or $3V < V_r < 12V$	
	Input current of remote control pin:	
	-0.5mA to +0.5mA, nominal Vin	
Remote off state input current:	2.5mA, nominal Vin	

### Output

Power	15W max	
Voltage accuracy	$\pm 1\%$ , full load and nominal Vin	
Min load	0%	
Line regulation	Single:	$\pm 0.2\%$ , LL to HL at full load
	Dual:	$\pm 0.5\%$ , LL to HL at full load
Load regulation	Single:	$\pm 0.5\%$ , no load to full load
	Dual:	$\pm 1\%$ , no load to full load
Cross regulation (dual)	$\pm 5\%$ , asymmetrical load 25% / 100% FL	
Ripple and noise	See table (measured with a 0.1uF/50V MLCC)	
Temperature coefficient	$\pm 0.02\%/^{\circ}C$ max	
Transient response	250uS, recovery time 25% load step change	



Over voltage protection (zener diode clamp)	3.3V output	3.9V
	5V output	6.2V
	12V output	15V
	15V output	18V
Overload protection	150% typ, % of FL at nominal input	
Short circuit protection	Hiccup, automatic recovery	

### Environmental

Operating temperature	-40°C to +76°C (without derating)
	+76°C to +105°C (with derating)
Max case temperature	+105°C
Storage temperature	-55°C to +125°C
Thermal impedance <sup>7</sup>	Nature convection: 12°C/W
	Nature convection with heat-sink: 10°C/W
Thermal shock	MIL-STD-810F
Vibration	10-55Hz, 10G, 30 minutes along x, y and z
Relative humidity	5-95% RH

### General

Efficiency	See table
Isolation voltage	Input to output: 1600VDC min
	Input (output) to case: 16000VDC min
Case grounding	Connect case to -Vin with decoupling Y cap
Isolation resistance	$10^9$ ohms, min
Isolation capacitance	1500pF, max.
Switching frequency	400KHz typ
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	27g
MTBF <sup>1</sup>	Bellcore TR-NWT-000332: $1.819 \times 10^6$ h
	MIL-HDBK-217F: $9.205 \times 10^5$ h

### Standards

Safety standards	IEC60950-1, UL60950-1, EN60950-1
EMC	
EMI <sup>8</sup>	EN55022 Class A
ESD	EN61000-4-2 Criteria B, air $\pm 8kV$ , contact $\pm 6kV$
Radiated immunity	EN61000-4-3 Criteria A, 10V/m
Fast transient	EN61000-4-4 Criteria B, $\pm 2kV$
Surge <sup>9</sup>	EN61000-4-5 Criteria B, $\pm 1kV$
Conducted immunity	EN61000-4-6 Criteria A, 10 Vr.m.s.

**POWERBOX Industrial Line**  
**PMD15W Series**  
**15W 4:1 Single and Dual Output**  
**High Performance**  
**DC/DC Converter**

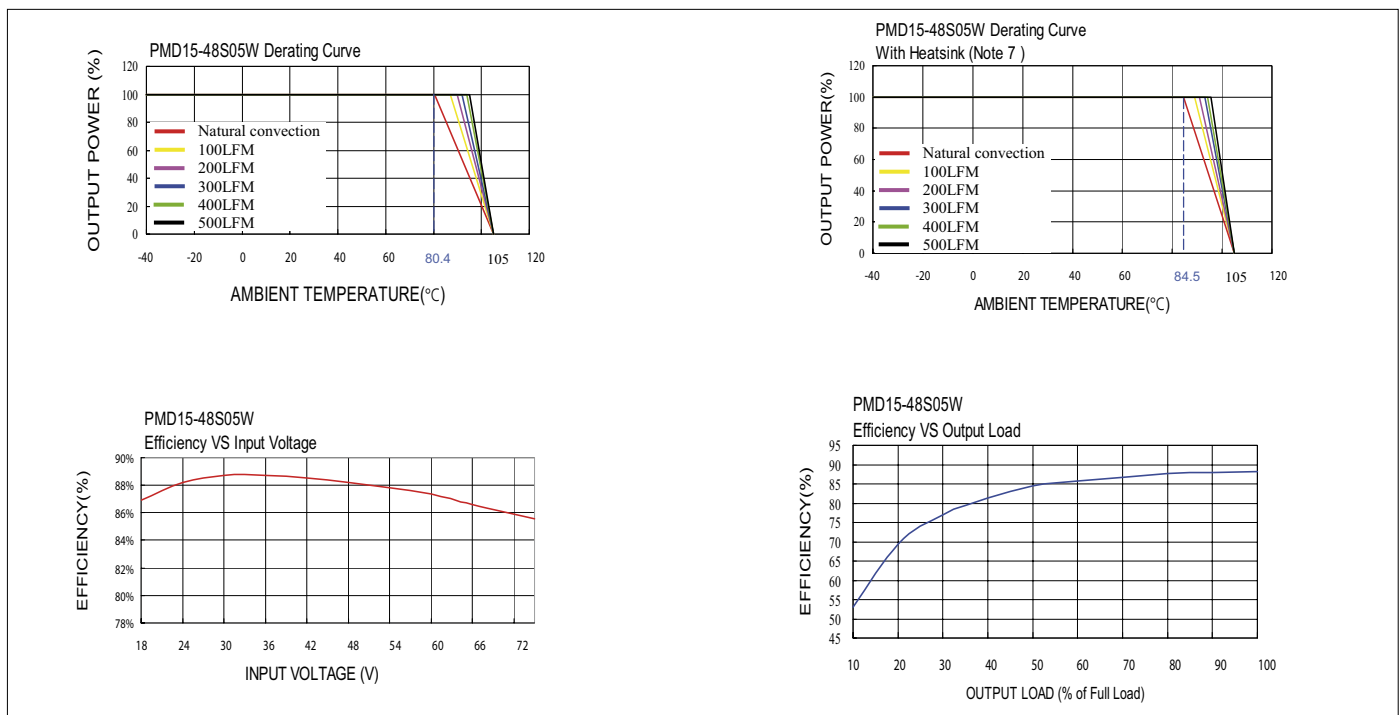
Model Number	Input Range	Output Voltage	Output Min Load	Output Full Load	Output <sup>4</sup> Ripple&Noise	Input No Load <sup>3</sup>	Input Full Load <sup>2</sup>	Eff <sup>4</sup>	Cap. <sup>5</sup> Load Max
PMD15-24S3P3W	9 – 36 VDC	3.3 VDC	0mA	4500mA	50mVp-p	50mA	755mA	86%	14700uF
PMD15-24S05W	9 – 36 VDC	5 VDC	0mA	3000mA	50mVp-p	65mA	753mA	87%	7200uF
PMD15-24S5P1W	9 – 36 VDC	5.1 VDC	0mA	3000mA	50mVp-p	65mA	768mA	87%	7200uF
PMD15-24S12W	9 – 36 VDC	12 VDC	0mA	1250mA	75mVp-p	22mA	753mA	87%	1250uF
PMD15-24S15W	9 – 36 VDC	15 VDC	0mA	1000mA	75mVp-p	22mA	753mA	87%	800uF
PMD15-24D05W	9 – 36 VDC	±5 VDC	0mA	±1500mA	75mVp-p	55mA	753mA	87%	±3600uF
PMD15-24D12W	9 – 36 VDC	±12 VDC	0mA	±625mA	75mVp-p	30mA	744mA	88%	±625uF
PMD15-24D15W	9 – 36 VDC	±15 VDC	0mA	±500mA	75mVp-p	30mA	744mA	88%	±400uF
PMD15-48S3P3W	18 – 75 VDC	3.3 VDC	0mA	4500mA	50mVp-p	35mA	377mA	86%	14700uF
PMD15-48S05W	18 – 75 VDC	5 VDC	0mA	3000mA	50mVp-p	35mA	372mA	88%	7200uF
PMD15-48S5P1W	18 – 75 VDC	5.1 VDC	0mA	3000mA	50mVp-p	35mA	379mA	88%	7200uF
PMD15-48S12W	18 – 75 VDC	12 VDC	0mA	1250mA	75mVp-p	15mA	377mA	87%	1250uF
PMD15-48S15W	18 – 75 VDC	15 VDC	0mA	1000mA	75mVp-p	15mA	377mA	87%	800uF
PMD15-48D05W	18 – 75 VDC	±5 VDC	0mA	±1500mA	75mVp-p	35mA	372mA	88%	±3600uF
PMD15-48D12W	18 – 75 VDC	±12 VDC	0mA	±625mA	75mVp-p	17mA	372mA	88%	±625uF
PMD15-48D15W	18 – 75 VDC	±15 VDC	0mA	±500mA	75mVp-p	17mA	372mA	88%	±400uF

**Notes:**

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40oC. MIL-HDBK-217F Notice2 @Ta=25 oC, Full load(Ground, Benign, controlled environment)
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The ON/OFF control pin voltage is referenced to -Vin. To order positive logic ON/OFF control add the suffix-P (Ex: PMD15-48S05W-P).

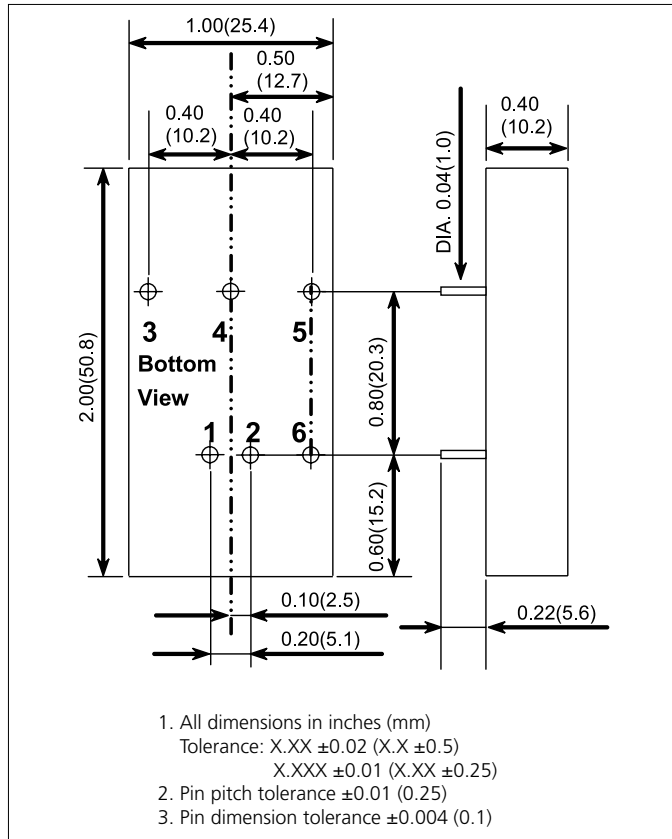
7. Heat sink is optional and P/N: 7G-0020A
8. The PMD15W series can meet EN55022 Class A with parallel an external capacitor to the input pins.  
Recommend : 24Vin : NA.  
48Vin : 1µF/100V 1210 MLCC.
9. An external filter capacitor is required if the module has to meet EN61000-4-5.  
The filter capacitor Powerbox suggest: Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.

**Derating Curve**



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Mechanical



Pin Connection

Pin	Single	Dual
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	+OUTPUT	+OUTPUT
4	NO PIN	COMMON
5	-OUTPUT	-OUTPUT
6	CTRL (Option)	CTRL (Option)

Specifications are subject to change without notice.