

P R B X

POWERBOX Industrial Line PMD20W Series 20W 4:1 Single and Dual Output High Performance DC/DC Converter

Features

Output current up to 5.5A
4:1 wide input voltage range
International safety standard approval
Six-sided continuous shield
High efficiency up to 89%
Standard 2" x 1" x 0.4" package
Fixed switching frequency

Input

Voltage range	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Input filter	Pi type	
Input surge voltage	24V input	50VDC
	100ms max 48V input	100VDC
Reflected ripple	20mA p-p, nominal Vin and full load	
Start up time	Power up 20ms typ. Remote on/off 20ms typ Nominal Vin and constant resistive load	
Start up voltage	24V input	9VDC
	48V input	18VDC
Shutdown voltage	24V input	9VDC
	48V input	15VDC
Remote ON/OFF ⁶	Positive logic (standard): DC/DC ON: Open or $3V < V_r < 12V$ DC/DC OFF: Short or $0V < V_r < 1.2V$ Negative logic (option): DC/DC ON: Short or $0V < V_r < 1.2V$ DC/DC OFF: Open or $3V < V_r < 12V$ Remote off input current: 2.5mA, nominal Vin.	

Output

Power	20W max	
Voltage accuracy	$\pm 1\%$, FL and nominal Vin.	
Voltage adjustability	$\pm 10\%$, single output	
Min load	0%	
Line regulation	Single $\pm 0.2\%$. Dual $\pm 0.5\%$. LL to HL at full load	
Load regulation	Single $\pm 0.5\%$. Dual $\pm 1\%$. No load to full load	
Cross regulation (dual)	$\pm 5\%$, asymmetrical load 25%/100% FL	
Ripple and noise	At 20MHz bandwidth, see table (measured with a 0.1 μ F/50V MLCC)	
Temperature coefficient	$\pm 0.02\%/^{\circ}\text{C}$ max	
Transient response	250 μ s, recovery time 25% load step change	
Overload protection	3.3V output	3.9V
	5V output	6.2V
	12V output	15V
	15V output	18V
	(zener diode clamp)	



Overload protection	150% max, % of FL at nominal input
Short circuit protection	Hiccup, automatic recovery

Environmental

Operating ambient temp	-40 $^{\circ}\text{C}$ to +66 $^{\circ}\text{C}$ (without derating)
	-66 $^{\circ}\text{C}$ to +105 $^{\circ}\text{C}$ (with derating)
Max case temperature	+105 $^{\circ}\text{C}$
Storage temperature	-55 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
Thermal impedance ⁷⁾	Nature convection: 12 $^{\circ}\text{C}/\text{W}$
	Nature convection with heat-sink: 10 $^{\circ}\text{C}/\text{W}$
Thermal shock	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 ⁹ ohms, min
Isolation capacitance	1500pF, max
Switching frequency	400KHz typ
Case material	Nickel-coated copper
Base material	FR4 PCB
Potting material	Epoxy (UL 94 V-0)
Dimensions	50.8 x 25.4 x 10.2 mm
Weight	27g
MTBF ¹⁾	BELLCORE-TR-NWT-000332 1.620 x 10 ⁶ h MIL-HDBK-217F 6.590 x 10 ⁵ h

Standards

EMI ⁸⁾	EN55022 Class A.		
ESD	EN61000-4-2	Air $\pm 8\text{kV}$	Criteria B
Radiated immunity	EN61000-4-3	10V/m	Criteria A
Fast transient ⁹⁾	EN61000-4-4	$\pm 2\text{kV}$	Criteria B
Surge ⁹⁾	EN61000-4-5	$\pm 1\text{kV}$	Criteria A
Conducted immunity	EN61000-4-6	10Vr.m.s.	Criteria A

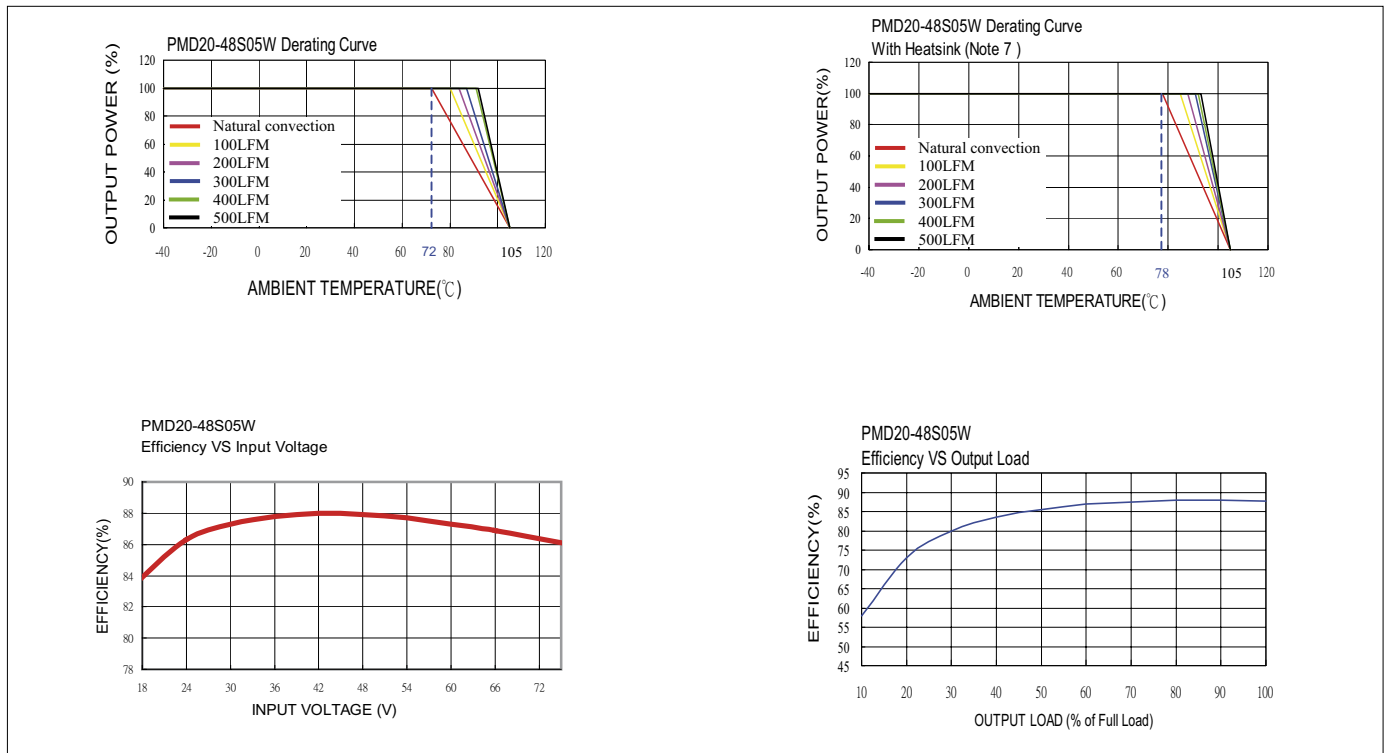
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PMD20W Series
20W 4:1 Single and Dual Output
High Performance
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Model Number	Input Range	Output Voltage	Output Current	Output Ripple&Noise	Input ⁸ Current	Efficiency ⁹	Capacitor ⁹ Load Max
PMD20-24S3P3W	9 – 36VDC	3.3VDC	5500mA	60mV p-p	934mA	85%	18000μF
PMD20-24S05W	9 – 36VDC	5VDC	4000mA	75mV p-p	992mA	88%	9600μF
PMD20-24S12W	9 – 36VDC	12VDC	1670mA	75mV p-p	1018mA	86%	1650μF
PMD20-24S15W	9 – 36VDC	15VDC	1330mA	75mV p-p	1014mA	86%	1050μF
PMD20-24D05W	9 – 36VDC	±5VDC	±2000mA	100mV p-p	992mA	88%	±4800μF
PMD20-24D12W	9 – 36VDC	±12VDC	±833mA	100mV p-p	1004mA	87%	±825μF
PMD20-24D15W	9 – 36VDC	±15VDC	±667mA	100mV p-p	1005mA	87%	±525μF
PMD20-48S3P3W	18 – 75VDC	3.3VDC	5500mA	60mV p-p	467mA	85%	18000μF
PMD20-48S05W	18 – 75VDC	5VDC	4000mA	75mV p-p	496mA	88%	9600μF
PMD20-48S12W	18 – 75VDC	12VDC	1670mA	75mV p-p	503mA	87%	1650μF
PMD20-48S15W	18 – 75VDC	15VDC	1330mA	75mM p-p	501mA	87%	1050μF
PMD20-48D05W	18 – 75VDC	±5VDC	±2000mA	100mV p-p	490mA	89%	±4800μF
PMD20-48D12W	18 – 75VDC	±12VDC	±833mA	100mV p-p	496mA	88%	±825μF
PMD20-48D15W	18 – 75VDC	±15VDC	±667mA	100mV p-p	496mA	88%	±525μF

Notes:

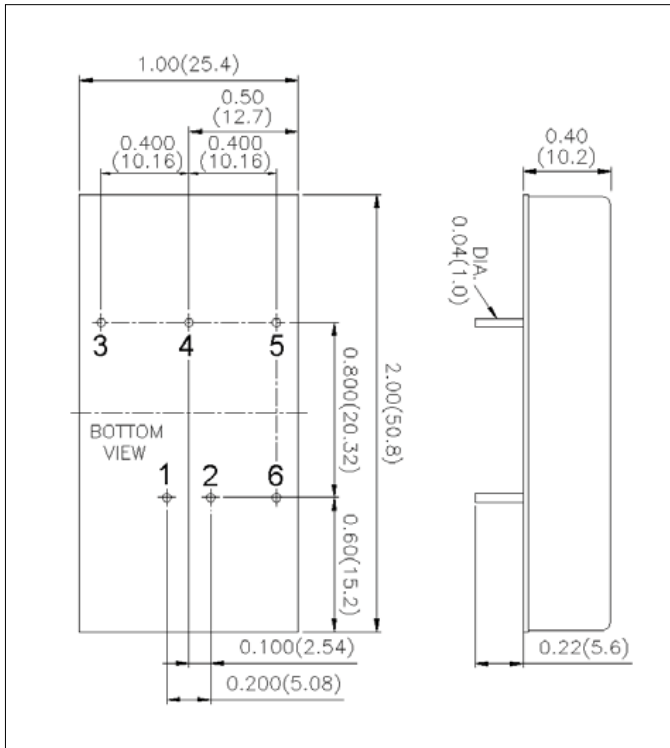
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C. MIL-HDBK-217F Notice2 @Ta=25°C, full load (Ground, Benign, controlled environment).
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The ON/OFF control pin voltage is referenced to -Vin.To order negative logic ON-OFF control add the suffix-N.
- Heat sink is optional and P/N: 7G-0020C-F.
- The T20AW series can meet EN55022 class B with parallel an external capacitor to the input pins. Recommend: 24Vin:NA. 48Vin: 1μF/100V 1210 MLCC.
- An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Powerbox suggest: Nippon chemi-con KY series, 220μF/100V, ESR 48mΩ.

Derating Curve



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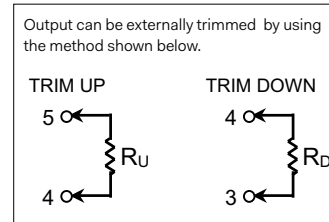
Mechanical



Pin Connection

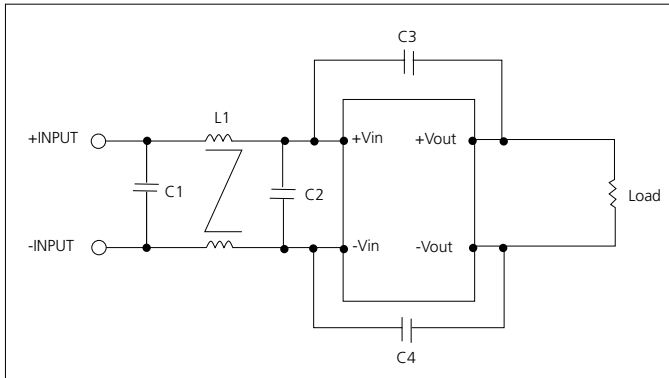
Pin	Single	Dual
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	+OUTPUT	+OUTPUT
4	TRIM	COMMON
5	-OUTPUT	-OUTPUT
6	CTRL	CTRL

External Output Trimming



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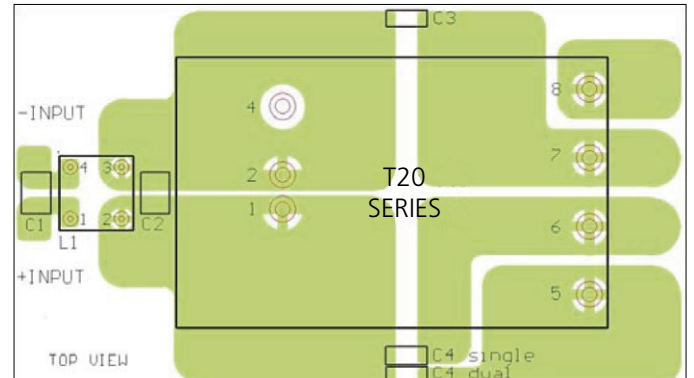
Filter



Recommended filter for EN55022 Class B compliance

The components used in the above figure, together with the manufacturer's part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
PME20-12xxx	4.7uF/50V 1812 MLCC	N/A	1000pf/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048
PME20-24xxxW	2.2uF/100V 1812 MLCC	N/A	1000pf/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048
PME20-48xxxW	2.2uF/100V 1812 MLCC	2.2uF/100V 1812 MLCC	1000pf/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048



Recommended EN55022 Class B Filter Circuit Layout

Specifications are subject to change without notice.