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POWERBOX Industrial Line PMF20 Series 20W 2:1 Single and Dual Output DC/DC Converter

Features

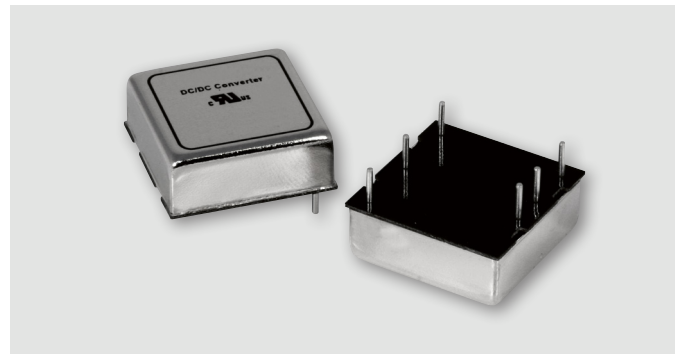
No minimum load required
1600VDC input to output isolation
Small size and low profile
Six-sided continuous shield
Meet EN55022 Class A without external components
Remote control
Undervoltage protection, over current protection, short circuit protection, over voltage protection
Low standby power
UL60950-1, EN60950-1, IEC60950-1 safety approvals
CE marked
Compliant to RoHS II and REACH

Input

Voltage range	12Vin(nom)	9-18VDC
	24Vin(nom)	18-36VDC
	48Vin(nom)	36-75VDC
Reflected ripple current	Nominal input, full load	30mA p-p typ
Start-up voltage	12Vin(nom)	9VDC max
	24Vin(nom)	18VDC max
	48Vin(nom)	36VDC max
Shutdown voltage	12Vin(nom)	8VDC typ
	24Vin(nom)	16VDC typ
	48Vin(nom)	33VDC typ
Start up time	Power up	30mS max
	Remote ON/OFF	30mS max
	Constant resistive load.	
Input surge voltage	12Vin(nom)	25VDC, 1 sec max
	24Vin(nom)	50VDC, 1 sec max
	48Vin(nom)	100VDC, 1 sec max
Remote ON/OFF	Positive logic (option)	
	DC-DC ON Open or 3~15VDC	
	DC-DC OFF Short or 0~1.2V	
	Negativ logic (standard)	
	DC-DC ON Short or 0~1.2V	
	DC-DC OFF Open or 3~15VDC	
	Input current of Ctrl pin	-0.5mA +1.0mA
	Remote off input current	2.0mA typ

Output

Voltage accuracy	±1%.	
Line regulation	Single	±0.2%
	Dual	±0.5%
Low line to high line at full load.		



Load regulation	Single	±0.2%	
	Dual	±1.0%	
	No load to full load.		
	Single	±0.1%	
	Dual	±0.8%	
	10% load to 90% load.		
Cross regulation	Dual	±5.0%	
	Asymmetrical load 25%/100% FL.		
Voltage adjustability ²	Single output	24Vout	−10% +20%
		Others	±10%
Ripple and noise	Measured by 20MHz BW.		
	With a 1μF M/C X7R and a 10μF T/C:		
	Single 3.3, 5, 12, 15Vout	75mV p-p	
	With 2 pcs of 6.8μF/50V X7R MLCC:		
	Single 24Vout	75mV p-p	
	With a 1μF M/C X7R and a 10μF T/C for each output:		
	Dual 12Vout, 15Vout	100mV p-p	
	With a 4.7μF/50V X7R MLCC for each output:		
	Dual 24Vout	100mV p-p	
Temperature coefficient	±0.02%/°C.		
Transient response	250μS, recovery time 25% load step change,		
Over voltage protection	3.3Vout	3.7VDC min	5.4VDC max
	5Vout	5.6VDC min	7.0VDC max
	12Vout	13.5VDC min	19.6VDC max
	15Vout	16.8VDC min	20.5VDC max
	24Vout	29.1VDC min	32.5VDC max
Over load protection	150% of Iout rated; hiccup mode.		
Short circuit protection	Continuous, automatics recovery.		

Environmental

Operating ambient temp.	-40°C to +60°C (without derating).	
	+60°C to +101°C (with derating).	
Max case temperature	105°C.	
Storage temperature	-55°C to +125°C.	
Thermal impedance	Natural convection (20LFM).	
	Without heat-sink	17.6°C/W
	With heat-sink	14.8°C/W
Thermal shock	MIL-STD-810F.	
Vibration	MIL-STD-810F.	
Relative humidity	5-95% RH.	

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General

Isolation voltage	Input to output, 1 minute	1600VDC min
	Input(output) to case	1000VDC min
Isolation resistance	500VDC	1 GΩ min
Isolation capacitance	1500pF typ.	
Switching frequency	3.3Vout, 5Vout	275kHz typ
	Others	330kHz typ
Case material	Nickel-coated copper.	
Base material	FR4 PCB.	
Potting material	Silicone (UL94 V-0).	
Weight	15g.	
MTBF	MIL-HDBK-217F	1.477 x 10 ⁶ hrs.

Standards

Safety standards	UL60950-1, EN60950-1, IEC60950-1.
EMC specifications	
EMI ³	EN55022 Class A, Class B.
Radiated immunity	EN61000-4-3, 10V/m Criteria A.
Fast transient ⁴	EN61000-4-4, ±2KV Criteria A.
Surge ⁴	EN61000-4-5, ±2KV Criteria A.
Conducted immunity	EN61000-4-6, 10 Vr.m.s Criteria A.

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @No Load	Efficiency	Max Capacitor Load
PMF20-12S3P3	9 ~ 18 VDC	3.3 VDC	4500 mA	10 mA	89%	7000 μF
PMF20-12S05	9 ~ 18 VDC	5 VDC	4000 mA	10 mA	89%	5000 μF
PMF20-12S12	9 ~ 18 VDC	12 VDC	1670 mA	10 mA	89%	850 μF
PMF20-12S15	9 ~ 18 VDC	15 VDC	1330 mA	10 mA	89%	700 μF
PMF20-12S24	9 ~ 18 VDC	24 VDC	833 mA	12 mA	89%	220 μF
PMF20-12D12	9 ~ 18 VDC	±12 VDC	±833 mA	10 mA	89%	±500 μF
PMF20-12D15	9 ~ 18 VDC	±15 VDC	±667 mA	10 mA	90%	±350 μF
PMF20-12D24	9 ~ 18 VDC	±24 VDC	±417 mA	14 mA	90%	±100 μF
PMF20-24S3P3	18 ~ 36 VDC	3.3 VDC	4500 mA	10 mA	90%	7000 μF
PMF20-24S05	18 ~ 36 VDC	5 VDC	4000 mA	10 mA	91%	5000 μF
PMF20-24S12	18 ~ 36 VDC	12 VDC	1670 mA	6 mA	90%	850 μF
PMF20-24S15	18 ~ 36 VDC	15 VDC	1330 mA	6 mA	91%	700 μF
PMF20-24S24	18 ~ 36 VDC	24 VDC	833 mA	10 mA	91%	220 μF
PMF20-24D12	18 ~ 36 VDC	±12 VDC	±833 mA	6 mA	90%	±500 μF
PMF20-24D15	18 ~ 36 VDC	±15 VDC	±667 mA	6 mA	90%	±350 μF
PMF20-24D24	18 ~ 36 VDC	±24 VDC	±417 mA	12 mA	91%	±100 μF
PMF20-48S3P3	36 ~ 75 VDC	3.3 VDC	4500 mA	10 mA	90%	7000 μF
PMF20-48S05	36 ~ 75 VDC	5 VDC	4000 mA	10 mA	90%	5000 μF
PMF20-48S12	36 ~ 75 VDC	12 VDC	1670 mA	4 mA	90%	850 μF
PMF20-48S15	36 ~ 75 VDC	15 VDC	1330 mA	4 mA	90%	700 μF
PMF20-48S24	36 ~ 75 VDC	24 VDC	833 mA	8 mA	91%	220 μF
PMF20-48D12	36 ~ 75 VDC	±12 VDC	±833 mA	4 mA	89%	±500 μF
PMF20-48D15	36 ~ 75 VDC	±15 VDC	±667 mA	4 mA	90%	±350 μF
PMF20-48D24	36 ~ 75 VDC	±24 VDC	±417 mA	10 mA	91%	±100 μF

Notes:

1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class A without external components and meet Class B with external components.

For further information, please contact with Powerbox.

4. An external input 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.

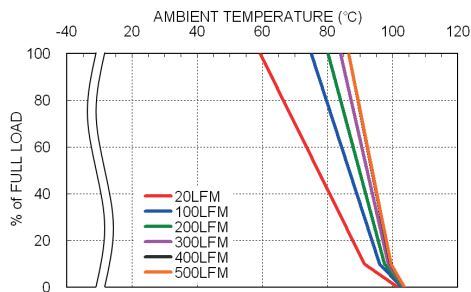
CAUTION: This power module is not internally fused. An input line fuse must always be used.

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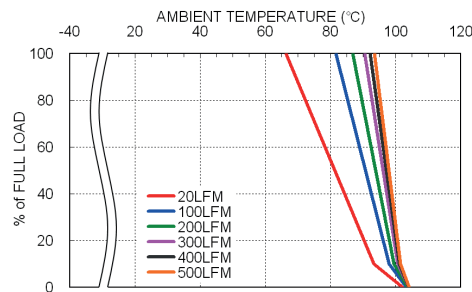
Part Number Structure

PMF20	-	48	S	05	-	A	HS
Series		Input	Output	Output			Option
Name		Voltage	Quantity	Voltage			
		12: 9-18VDC	S: Single	3P3: 3.3VDC		☐ : Negative logic remote ON/OFF (Standard)	☐ : No assembly
		24: 18-36VDC		05: 5VDC		A: Positive logic remote ON/OFF	HS: Heat-sink
		48: 36-75VDC		12: 12VDC		B: Without CTRL pin	HC: Heat-sink with Clamp
				15: 15VDC		C: Negative logic remote ON/OFF without Trim pin	
				24: 24VDC		D: Without CTRL pin & Trim pin	
						E: Positive logic remote ON/OFF without Trim pin	
			D: Dual	12: ±12VDC			
				15: ±15VDC			
				24: ±24VDC			

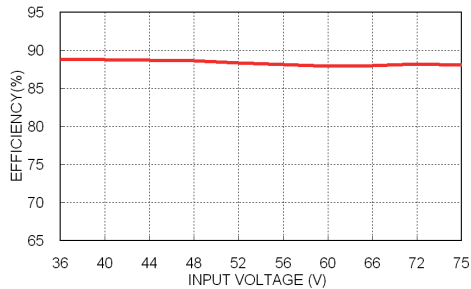
Derating Curve



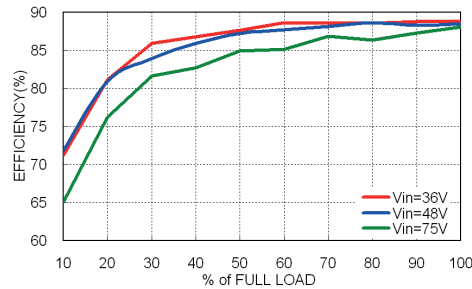
PMF20-48S05 Derating Curve



PMF20-48S05 Derating Curve With Heat-sink



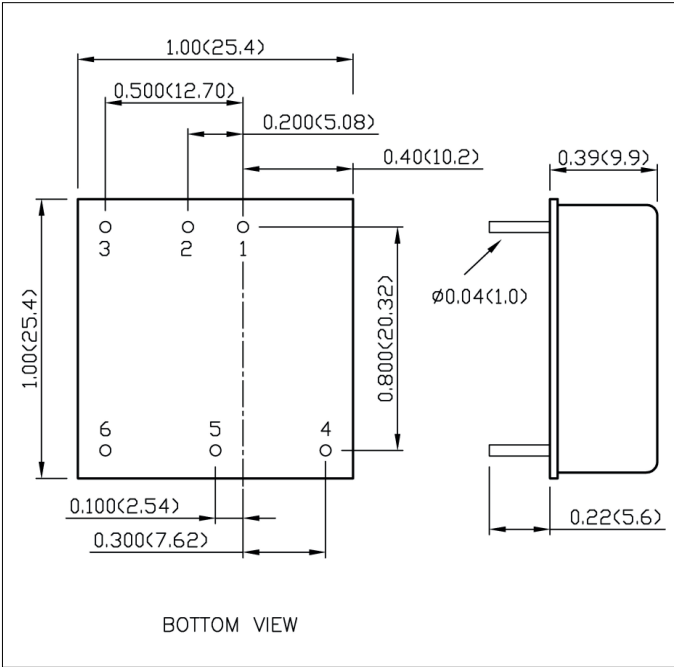
PMF20-48S05 Efficiency vs. Input Voltage



PMF20-48S05 Efficiency vs. Output Load

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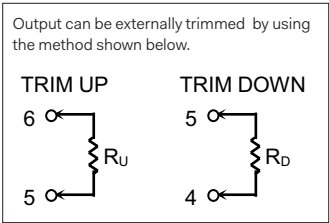
Mechanical



Pin Connection

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout

External Output Trimming



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)