

### Features

- 4:1 Wide input range voltage
- Compact size 1x1" package
- Efficiency up to 90%
- Wide operating temperature from -40°C to +105°C
- EMI class A without external circuit
- Continuous short circuit protection
- Ultra low standby power
- No minimum load required

### Application

- Regulated and low ripple noise is required
- Industry control application
- Tele-communication application
- Energy battery power application

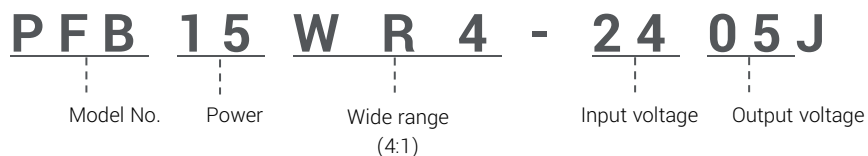


### Selection Guide

Part number	Input voltage	Output voltage	Output current @ full load	Input current @ no load	Efficiency <sup>(1)</sup> (typ.)	Capacitive load <sup>(2)</sup> (max.)
PFB15WR4-243.3J	9-36 VDC Nom. 24 VDC	3.3 VDC	4000mA	7mA	85%	12000uF
PFB15WR4-2405J		5 VDC	3000mA	7mA	88%	6400uF
PFB15WR4-2412J		12 VDC	1250mA	7mA	88.5%	1200uF
PFB15WR4-2415J		15 VDC	1000mA	7mA	89%	900uF
PFB15WR4-2424J		24 VDC	625mA	7mA	89.5%	240uF
PFB15WR4-2412DJ		±12 VDC	±625mA	7mA	87%	±520uF
PFB15WR4-2415DJ		±15 VDC	±500mA	7mA	89%	±330uF
PFB15WR4-483.3J	18-75 VDC Nom. 48 VDC	3.3 VDC	4000mA	5mA	85%	12000uF
PFB15WR4-4805J		5 VDC	3000mA	5mA	88%	6400uF
PFB15WR4-4812J		12 VDC	1250mA	5mA	89%	1200uF
PFB15WR4-4815J		15 VDC	1000mA	5mA	89.5%	900uF
PFB15WR4-4824J		24 VDC	625mA	5mA	90%	240uF
PFB15WR4-4812DJ		±12 VDC	±625mA	5mA	89.5%	±520uF
PFB15WR4-4815DJ		±15 VDC	±500mA	5mA	89.5%	±330uF

1. The efficiency is tested by nominal input and maximum full load @25°C.
2. The capacitive load is tested by minimum input and constant resistive load.

### Part Number



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## Specifications

	Parameter	Conditions	Min.	Typ.	Max.	Unit
Input	Input filter				Pi type	
	Input voltage range		9 18		36 75	VDC VDC
	Start-up time	Nom. Vin at 100% load		20	25	ms
	Start-up input voltage	24V input 48V input			9 18	VDC VDC
	Under voltage lockout	24V input 48V input		7.5 16		VDC VDC
	Input surge voltage (100ms max.)	24V input 48V input			50 100	VDC VDC
	Remote ON/OFF	DC-DC ON DC-DC OFF			Open or 3.5~15VDC Short or 0~1.2VDC	
		Input current (remote off mode)		2		mA
Output	Output voltage accuracy				±1	%
	Line voltage regulation	Single output			0.2	%
	LL to HL at full load	Dual output			0.5	%
	Load voltage regulation	Single output			0.5	%
	10%-100% full load	Dual output			1.0	%
	Cross regulation				±5	%
	Trim range				±10	%
	Ripple & Noise (20MHz) Io=Full load	24V input 48V input			60 100	mVp-p mVp-p
Operating frequency	others			350	KHz	
	Vout=3.3Vdc			400	KHz	
Environment	Operating temperature	with derating	-40		105	°C
	Storage temperature		-55		125	°C
	Case temperature				110	°C
	MTBF (MIL-HDBK-217F)	+25°C	1000			kHrs
	Vibration				MIL-STD-202G	
Function	Short Circuit Protection				Continuous, automatic recovery	
	Isolation voltage	60 sec	1600			VDC
	Isolation resistance		1000			MΩ
	Isolation capacitance			1200		pF
	Over load protection	24V input			170	%
		48V input			190	%
	Over voltage protection	3.3V output			4.6	
		5V output			6.8	
		12V output			15	
		15V output			18	VDC
		24V output			30	
±12V output			±15			
±15V output			±18			
Safety approvals				UL62368-1/ EN62368-1		
Over load protection				Hiccup mode		
Physical	Dimension	(L x W x H)			25.40x25.40x10.00 mm	
	Weight				17	g
	Cooling method				Free air convection	
	Case material				Nickel plated metal with FR-4 base	
	Potting material				Silicone	
EMC	EMI	EN55032			Class A/B	
	ESD	EN61000-4-2, Air±8kV; Contact±6kV			Perf. Criteria A	
	Radiated immunity <sup>(1)</sup>	EN61000-4-3			Criteria A	

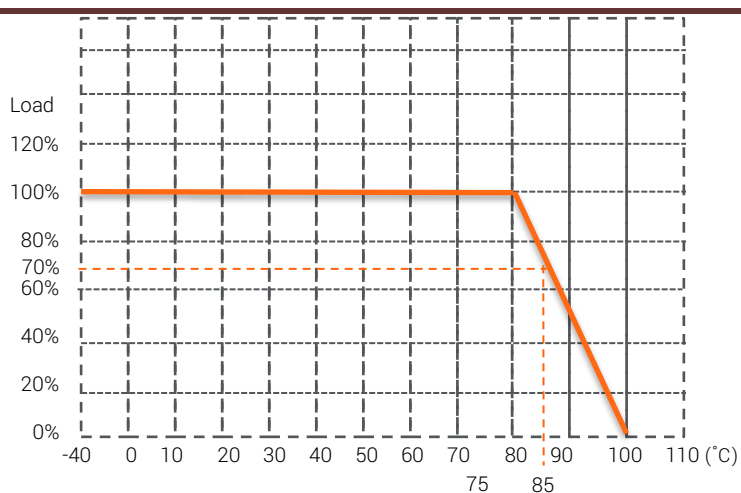
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Parameter	Conditions	Min.	Typ.	Max.	Unit
Fast transient <sup>(1)</sup>	EN61000-4-4, ±2kV			Criteria A	
Surge <sup>(1)</sup>	EN61000-4-5, ±2kV			Criteria A	
Conducted immunity <sup>(1)</sup>	EN61000-4-6			Criteria A	
Magnetic field immunity	EN61000-4-8			Criteria A	

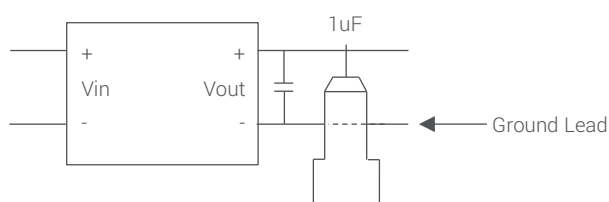
1. Test with E-CAP 220uF/100V at input terminal.
2. All specifications valid at nominal input voltage, full load and 25°C after warm-up time unless otherwise stated.
3. The product information and specifications are subject to change without prior notice.

## Derating Curve



Ambient temperature with natural convection

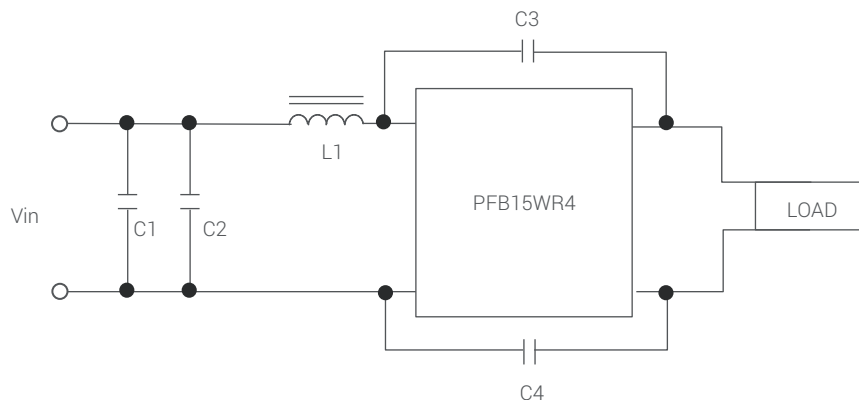
## Ripple & Noise Measure Method



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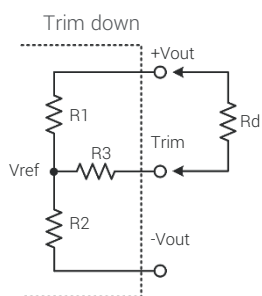
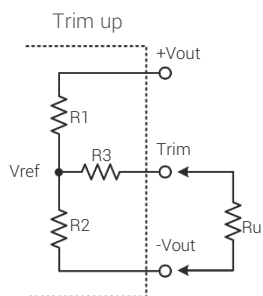
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## EMI Filtering-Suggestion for class B



	C <sub>1</sub>	C <sub>2</sub>	L <sub>1</sub>	C <sub>3</sub>	C <sub>4</sub>
PFB15WR4-24XXJ	2.2μF	2.2μF	4.7μH	1500pF	1500pF
PFB15WR4-48XXJ	2.2μF	2.2μF	4.7μH	1500pF	1500pF

## External Output Voltage Trimming



$$R_u = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V'_0 - V_{ref}} \cdot R_1$$

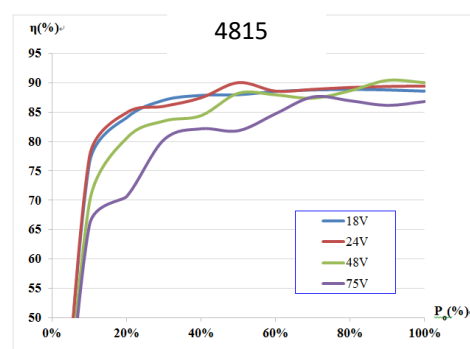
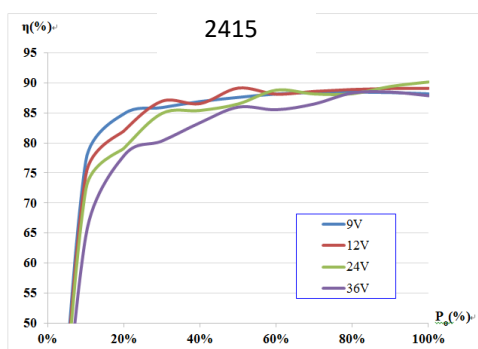
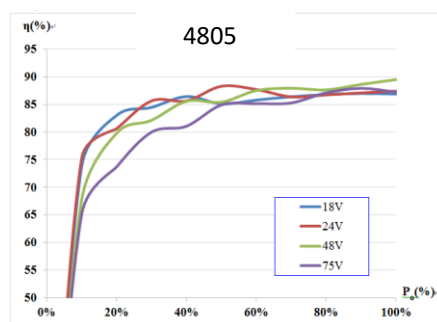
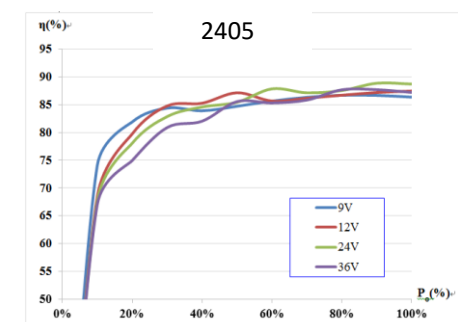
$$R_d = \frac{bR_1}{R_1 - b} - R_3 \quad b = \frac{V'_0 - V_{ref}}{V_{ref}} \cdot R_2$$

Model	R1	R2	R3	Vref
PFB15WR4-XX3.3J	16.6kΩ	10kΩ	52.3kΩ	1.24 V
PFB15WR4-XX05J	10kΩ	10kΩ	35.7kΩ	2.5 V
PFB15WR4-XX12J	38.1kΩ	10kΩ	48.7kΩ	2.5 V
PFB15WR4-XX15J	50.1kΩ	10kΩ	51kΩ	2.5 V
PFB15WR4-XX24J	86.32kΩ	10kΩ	73.2kΩ	2.5 V

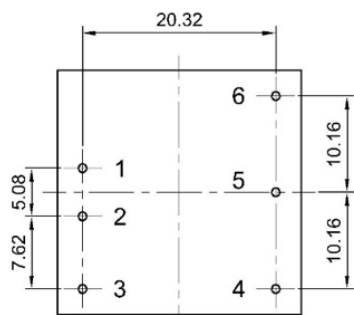
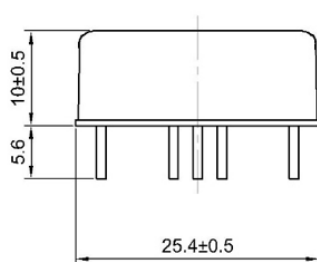
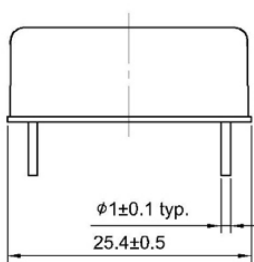
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## Efficiency curve



## Mechanical Dimension & Pinning



Bottom view

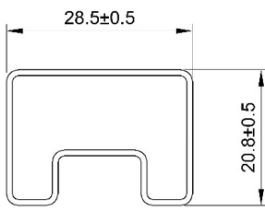
Tolerance : ±0.25mm

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

## Package

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UNIT:mm  
1 Tube = 8 pcs  
Length:260±2mm

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