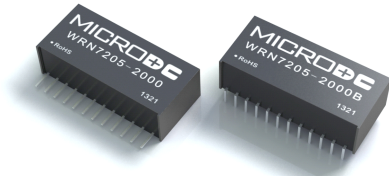


MICRODC

Professional Power Module

WRN72XX-2000(B)&WRN73XX-3000(B)&WRN74XX-4000(B) Series

WIDE INPUT NON-ISOLATED & REGULATED SINGLE OUTPUT



FEATURES

- ◆ Efficiency up to 97%, No heat-sink required
- ◆ 2 AMP adjustable positive step down Integrated Switching Regulator
- ◆ Operating temperature : -40°C ~ +85°C
- ◆ Continuous short circuit protection (Very low short current $I_{in} < 50\text{mA}$)
- ◆ Over load protection (125% full load typical)
- ◆ SIP12 package style
- ◆ Synchronous rectification design
- ◆ Adjustable Output voltage
- ◆ Remote ON/OFF control (Ground off)
- ◆ Wide input range
- ◆ Input voltage range 4.5V-28V

MODEL SELECTION

WRN72^① 05^② -2000^③ (B)^④

- ① Product Series ② Output Voltage
③ Output Current ④ Bend 90° pins

APPLICATIONS

This WRN series is a high performance 2.5V to 15V, 2Amp, 12-Pin SIP (single in-line package). Integrated switching regulator (ISR), Synchrotron-rectified design yields excellent efficiencies up to 97%. Short circuit protection with crowbar function to reduce the short circuit current to under 50mA of input current.



CE REACH
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Product Program

Part Number	Output Voltage Nominal	Input (VDC) Voltage Range	Output		Efficiency(% Typ)	
			Adjust (VDC)	Current (MA)	Vin (min.)	Vin (max.)
WRN7203-2000(B)	3.3	4.5-28	2.5-5.5	2000	95	89
WRN7205-2000(B)	05	6.5-28	3.0-6.0	2000	96	91
WRN7206-2000(B)	6.5	8.5-28	5.0-8.0	2000	97	93
WRN7209-2000(B)	09	12-28	7.0-11	2000	96	93
WRN7212-2000(B)	12	15-28	10-14	2000	97	95
WRN7215-2000(B)	15	19-28	13-17	2000	97	95
WRN7303-3000(B)	3.3	4.5-28	2.5-5.5	3000	94	89
WRN7305-3000(B)	05	6.5-28	3.0-6.0	3000	95	92
WRN7306-3000(B)	6.5	8.5-28	5.0-8.0	3000	97	93
WRN7309-3000(B)	09	12-28	7.0-11	3000	96	94
WRN7312-3000(B)	12	15-28	10-14	3000	97	96
WRN7315-3000(B)	15	19-28	13-17	3000	97	96
WRN7403-4000(B)	3.3	4.5-28	2.5-5.5	4000	93	88
WRN7405-4000(B)	05	6.5-28	3.0-6.0	4000	95	91
WRN7406-4000(B)	6.5	8.5-28	5.0-7.5	4000	96	93

Note: Vin-Vout ≥ 1.5V-4.0V depending on Vout if adjust function is used!
Add suffix "B" for 90° bend pins, for example: WRN7205-2000B.

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output voltage accuracy	100% full load, input voltage range		±1	±2	%
Line regulation	Vin= min. to max., at full load		±0.5	±1.0	
Load regulation	10% to 100% load		±0.5	±1.0	
Ripple & Noise*	20MHz bandwidth		40	70	mVp-p
Short circuit input current			50	100	mA
Short circuit protection		Continuous, auto-recovery			
Shutdown current	ON / OFF Pin pulled low			100	µA
Switching frequency	Full load, input voltage range	270	300	330	KHz
Quiescent current	Vin = min. to max. at 0% load			30	mA
Temperature coefficient	-40°C ~ +85°C ambient			±0.03	%/°C
Output voltage range		2.5		17	V
Remote ON / OFF **	Open or High (Power ON)	4.5		28	V
	Low (Power OFF)			0.8	V
Output current limit	WRN72XX-2000&WRN72XX-2000B		2500	3000	mA
	WRN73XX-3000&WRN73XX-3000B		3750	4250	
	WRN74XX-4000&WRN74XX-4000B		5000	5500	

*Test ripple and noise by "Parallel cable" method.

**ON / OFF pin driven by TTL (logic gate), open-collector bipolar transistor or open-drain MOSFET.

COMMON SPECIFICATIONS

Case material	Plastic(UL94-V0)
MTBF (Nominal Vout, 100% load)	Tamb.=+25°C ≤ 749kHrs , Tamb.=+85°C ≤ 150kHrs
Weight	10.7g
Operating Case Temperature	+110°C (max)
Thermal Impedance	Natural Convection 25°C/W (max)
Internal Power Dissipation	Ta < 60°C 1.4W (max)

MICRODC

Professional Power Module

WRN72XX-2000(B)&WRN73XX-3000(B)&WRN74XX-4000(B) Series

OUTPUT CURRENT vs INPUT VOLTAGE

How to calculating the max output current

The internal power dissipation(PD)follows the equation:

$$PD = I_o \times V_o \times (1-\eta)$$

$$I_o = PD / V_o \times (1-\eta)$$

Where PD = Internal power dissipation
 I_o = Output current
 V_o = Output voltage
 η = Efficiency

Example:R-745.0P ,at Vin = 28Vdc ,Vo = 5Vdc ,η=91% (see table 1)

(a) When Ta = 60°C ,PD = 1.4 Watt (see fig-1)

$$I_o = 1.4(W) / 5(V) \times (1-0.91) = 3.11(A)$$

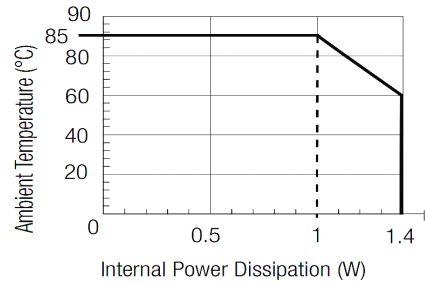
(b) When Ta = 85°C ,PD = 1 Watt (see fig-1)

$$I_o = 1(W) / 5(V) \times (1-0.91) = 2.222(A)$$

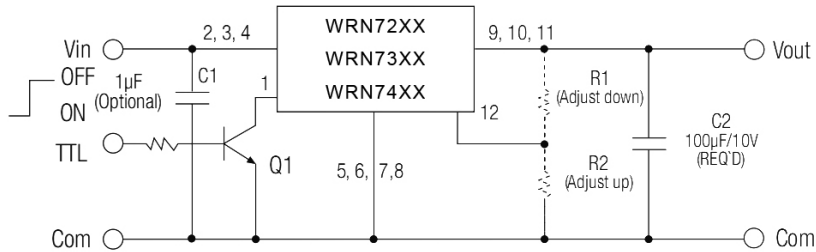
(c) At Vin = 12Vdc efficiency = 94% (see table 1)

When Ta = 85°C ,PD = 1 Watt (see fig-1)

$$I_o = 1(W) / 5(V) \times (1-0.94) = 3.33(A)$$



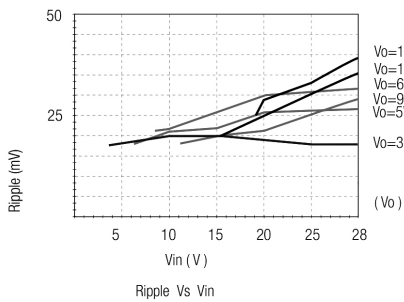
STANDARD APPLICATION CIRCUIT



CHARACTERISTICS

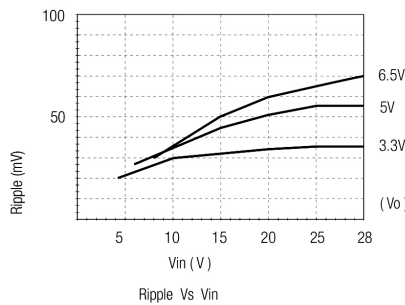
WRN72XX / WRN73XX

Ripple VS Vin



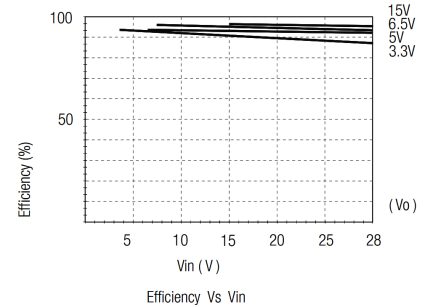
WRN74XX

Ripple VS Vin



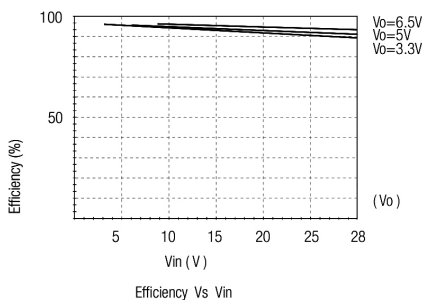
WRN72XX / WRN73XX

Efficiency VS Vin



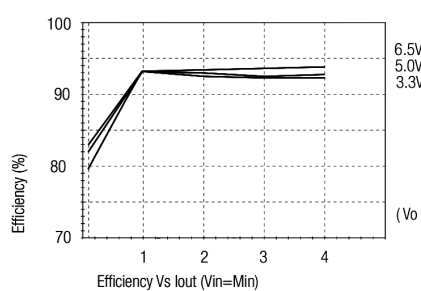
WRN74XX

Efficiency VS Vin



WRN72XX / WRN73XX / WRN74XX

Efficiency / Load Vin=Min



WRN72XX / WRN73XX / WRN74XX

Efficiency / Load Vin=Max

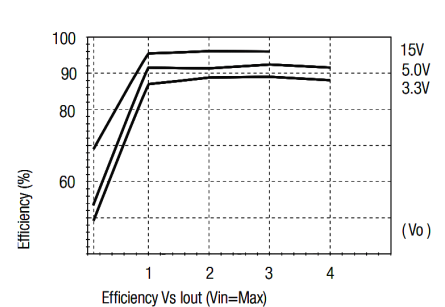
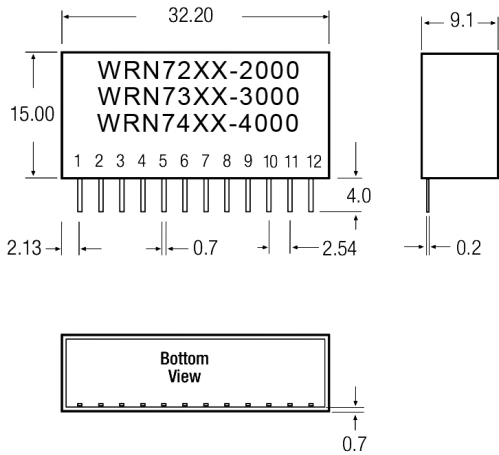


Table1:Adjustment Resistor Values

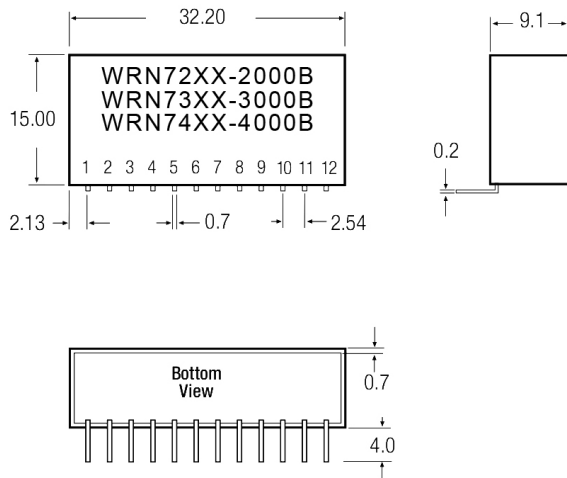
2000mA DC	WRN7203-2000(B)		WRN7205-2000(B)		WRN7206-2000(B)		WRN7209-2000(B)		WRN7212-2000(B)		WRN7215-2000(B)	
3000mA DC	WRN7303-3000(B)		WRN7305-3000(B)		WRN7306-3000(B)		WRN7309-3000(B)		WRN7312-3000(B)		WRN7315-3000(B)	
4000mA DC	WRN7403-4000(B)		WRN7405-4000(B)		WRN7406-4000(B)		-----		-----		-----	
Vout (nominal)	3.3VDC		5VDC		6.5VDC		9VDC		12VDC		15VDC	
Vout (adj)	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
2.5	8.5KΩ											
3.0	33KΩ		470Ω									
3.2	110KΩ		1.6KΩ									
3.3			2.2KΩ									
3.4		36KΩ	3.0KΩ									
3.6		11KΩ	4.7KΩ									
3.9		4.7KΩ	8.5KΩ									
4.5		1.6KΩ	30KΩ									
4.9		820Ω	220KΩ									
5.0		680Ω			11KΩ							
5.1		560Ω		28KΩ	12KΩ							
5.5		190Ω		2.6KΩ	20KΩ							
6.0					47KΩ							
6.5												
7.0						560Ω	13KΩ					
8.0						330Ω	31KΩ					
9.0												
10								2.2KΩ	20KΩ			
11								390Ω	47KΩ			
12												
13										2.4KΩ	36KΩ	
14										390Ω	76KΩ	
15												
16												2.6KΩ
17												860Ω
18												

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS



Note:
Unit:mm[inch]
Pin section tolerances: $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$
General tolerances: $\pm 0.25\text{mm}[\pm 0.010\text{inch}]$



Note:
Unit:mm[inch]
Pin section tolerances: $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$
General tolerances: $\pm 0.25\text{mm}[\pm 0.010\text{inch}]$

RECOMMENDED FOOTPRINT

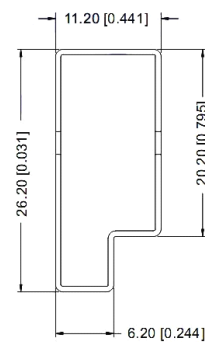
Pin Connections

Pin	Name	Description
1	ON/OFF	Input pin :Active low (less than 0.8V) to disable the device
2,3,4	Vin	Power input
5,6,7,8	GND	Input and output ground (common)
9,10,11	Vout	Power output
12	Vout-Adj	With external resistors R1,R2 to selected output voltage

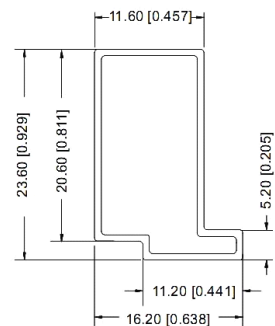
Tolerance: $\pm 0.25\text{mm}$

TUBE OUTLINE DIMENSIONS

WRN72XX-2000



WRN72XX-2000B



Note:
Unit :mm[inch]
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$
L=530mm[20.866inch] Devices per tube quantity: 15pcs
L=220mm[8.661inch] Devices per tube quantity: 6pcs
Short tube inner packaging dimensions: L*W*H=255*170*80mm
Short tube outer packaging dimensions(with six inner packaging boxes):
L*W*H=375*280*270mm
Long tube inner packaging dimensions: L*W*H=580*200*100mm
Long tube outer packaging dimensions(with two inner packaging boxes):
L*W*H=600*215*220mm
Long tube outer packaging dimensions(with three inner packaging boxes):
L*W*H=600*215*325mm

Note:

- All specifications measured at $T_a=25^\circ\text{C}$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- Only typical models listed, other models may be different, please contact our technical person for more details.
- In this data sheet, all the test methods of indications are based on corporate standards.