



## FEATURES

- ◆ Efficiency up to 87%
- ◆ Wide (2:1) Input Range
- ◆ 1500 VDC I/O Isolation
- ◆ Short Circuit Protection (automatic recovery)
- ◆ Operating Temperature: -40°C to +85°C
- ◆ Internal SMD construction
- ◆ Metal Shielding Package
- ◆ Reg. Dual Output
- ◆ MTBF > 1,000,000 hours
- ◆ Soft Start and Remote Ctrl.
- ◆ Over Voltage/Current Protection
- ◆ RoHS Compliance

## MODEL SELECTION

**WRA<sup>①</sup>12<sup>②</sup>12<sup>③</sup>Y<sup>④</sup>MD<sup>⑤</sup>-20W(835)<sup>⑥</sup>**

- ① Product Series      ② Input Voltage
- ③ Output Voltage      ④ Wide (2:1) Input Range
- ⑤ package style
- ⑥ Rated Power(Output current)

## APPLICATIONS

The WRA-YMD-20W series is a family of cost effective 20W, dual output DC/DC converters with a wide 2:1 Input. These converters are encapsulated in nickel coated copper 2"x1" case with high performance technology like active clamp, high efficiency operation and output voltage accuracy of ±1% maximum. Precise controlled design provides tight line/load regulation .



## SELECTION GUIDE

Order code	Input			Output		Efficiency (%)	Capacitor Load (uF)
	Voltage* (VDC)	Current No Load (mA)	Current Full Load (mA)	Voltage (VDC)	Current (mA)		
WRA1212YMD-20W	9-18	30	1937	±12	±835	89	±470
WRA1215YMD-20W	9-18	30	1937	±15	±665	89	±330
WRA2412YMD-20W	18-36	30	957	±12	±835	90	±470
WRA2415YMD-20W	18-36	30	957	±15	±665	90	±330
WRA4812YMD-20W	36-75	20	478	±12	±835	90	±470
WRA4815YMD-20W	36-75	20	484	±15	±665	89	±330

\*Input voltage can't exceed this value, or will cause the permanent damage.

## Input Specifications

Voltage Range	2:1 Wide Input
Input Filter	PI Type
Input Reflected Ripple Current <sup>1</sup>	20 mA pk-pk
Start up Time (Nom. Vin and constant resistive load)	20mS, typ.

## Output Specifications

Voltage Accuracy	± 1%
Voltage Adjustability (Trim - only Single Output)	± 10%, max.
Short Circuit Protection	Indefinite (Hiccup, Automatic Recovery)
Over Current Protection	140% of max. lout
Line Regulation	± 0.2%
Load Regulation (0% - 100%)	± 1% (Dual)
Cross Regulation <sup>3</sup> (Dual Output)	± 5%
Ripple and Noise (20Mhz bandwidth)	75 mV pk-pk
Temperature Coefficient	± 0.02% / ° C
Transient Recovery Time <sup>4</sup>	250us, typ.
Transient Response Deviation <sup>4</sup>	± 3%, max.

## General Specifications

Efficiency	See Table
I/O Isolation Voltage (3 sec.)	1500 VDC
I/O Isolation Capacitance	1200 pF, typ.
I/O Isolation Resistance	1000 M Ohm
Switching Frequency	330 kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 0.684 Mhrs

## Physical Specifications

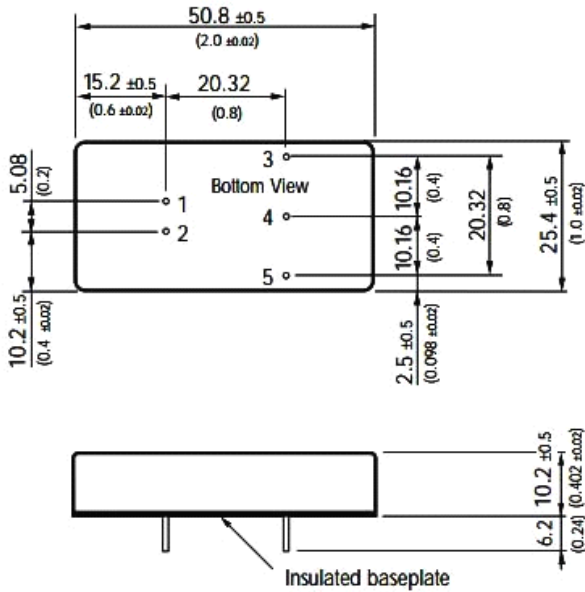
Case Material	Nickel Coated Copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	~ 30g, typ.

## Environment Specifications

Operating Temperature	-40 to +71° C (ambient)
Maximum Case Temperature	100° C
Storage Temperature	-40 to +125° C
Cooling	Free Air Convection
RoHS Conform	Soldering 260° C, max. (1.5mm from case 10s.)

### OUTLINE DIMENSIONS & FOOTPRINT DETAILS

#### MECHANICAL DIMENSIONS

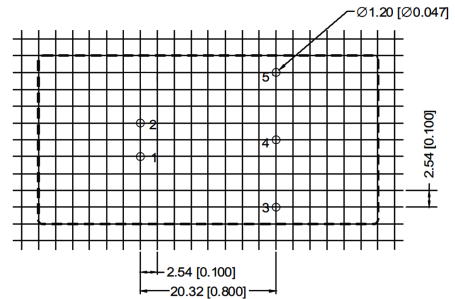


Note:  
Unit : mm[inch]  
Pin diameter tolerances:  $\pm 0.10\text{mm} [\pm 0.004 \text{ inch}]$   
General tolerances:  $\pm 0.25\text{mm} [\pm 0.010 \text{ inch}]$

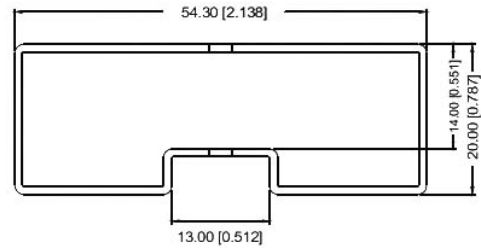
PIN CONNECTIONS	
#	DUAL
1	+Vin
2	- Vin
3	+Vout
4	Common
5	- Vout
6*	CTRL

\*CTRL can be added according to customers' need

#### RECOMMENDED FOOTPRINT

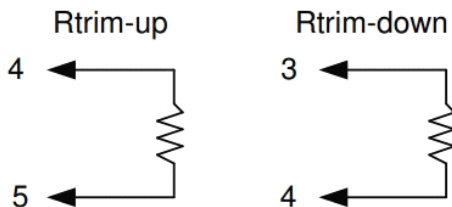


#### TUBE OUTLINE DIMENSIONS



Note:  
Unit : mm[inch]  
General tolerances:  $\pm 0.50\text{mm} [\pm 0.020 \text{ inch}]$   
L=230mm[9.055inch] Tube Quantity: 7pcs

#### OUTPUT VOLTAGE TRIM UP/DOWN



External Output Trimming  
Output can be externally trimmed.  
(Single output models only!)

#### Over Voltage Protection (Zener diode clamp)

$\pm 12 \text{ Vout}$	$\pm 15 \text{ V}$
$\pm 15 \text{ Vout}$	$\pm 18 \text{ V}$

#### Under Voltage Lockout (typ.)

12 Vin Models	Module ON/OFF 8.6V / 7.9V
24 Vin Models	Module ON/OFF 17.8V / 16V
48 Vin Models	Module ON/OFF 33.5V / 30.5V

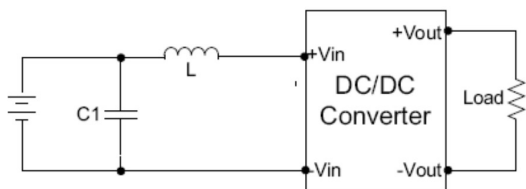
#### Remote ON/OFF Control

ON:	3 -12 VDC or open circuit
OFF:	0 - 1.2 VDC or Short circuit PIN2 and PIN6*
OFF idle current:	5mA, typ.

### EMC SPECIFICATIONS

Radiated Emissions	EN 55022	CLASS A
Conducted Emissions	EN 55022	CLASS A
ESD	EN 61000-4-2	Perf. Criteria B
RS	EN 61000-4-3	Perf. Criteria A
EFT <sup>6</sup>	EN 61000-4-4	Perf. Criteria B
Surge <sup>6</sup>	EN 61000-4-5	Perf. Criteria B
CS	EN 61000-4-6	Perf. Criteria A
PFMF	EN 61000-4-8	Perf. Criteria A

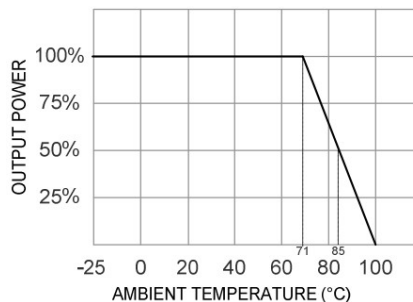
Part #	C1	L
WRA12xxYMD-20W	EN 61000-4-4	Perf. Criteria B
WRA24xxYMD-20W	EN 61000-4-5	Perf. Criteria B
WRA48xxYMD-20W	EN 61000-4-6	Perf. Criteria A



- 1 = Measured Input reflected ripple current with a simulated source inductance of 12uH.
- 2 = Tested by minimal Vin and constant resistive load.
- 3 = One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- 4 = Tested by nominal Vin and 25% load step change (75% - 50% - 25% of Io)
- 5 = Input filter components (C1, L) are used to help meet conducted emissions require for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.
- 6 = An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5
- Input filter components (C1, C2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

### DERATING & EFFICIENCY CURVE

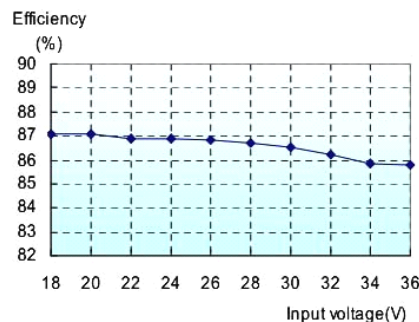
#### 1. Temperature derating curve



#### 2. Efficiency Vs Input voltage

WRA2412YMD-20W

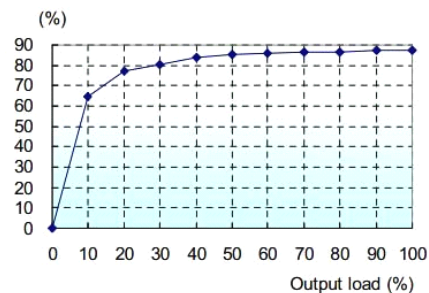
Efficiency VS Input voltage



#### 3. Efficiency Vs Output Power

WRA2412YMD-20W

Efficiency VS Output load



#### RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.



#### REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.