Features

RoHS compliant

- Wide 4 : 1 Input Voltage Range(9~36V,18~75V)
- High Efficiency up to 91%
- Remote On/Off
- Input / Output Isolation Voltage: 1.5K VDC
- Extended Operating Temperature Range: -40℃ to+85℃
- Output Short Circuit Protection:
  Hiccup, continuous & Auto Recovery
- Over Voltage Protection: Clamp Mode
- Shielded Metal Case with Insulated Baseplate
- Lead Free Design, RoHS Compliant
- 6 pin DIP Package with Industry-Standard Footprint
- Standard 1"X1" Package
- Customer Design Available
- Safety Standard / Approval : IEC / EN 60950-1

Description

The BRA20W Series are isolated 20W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40℃ to +85℃ (with derating) in a 6 pin DIP package with industry-standard footprint. Further features include wide 4 : 1 input voltage range, remote on/off control, trimmable output, short-circuit protection and over voltage protection.

Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

Technical Specification

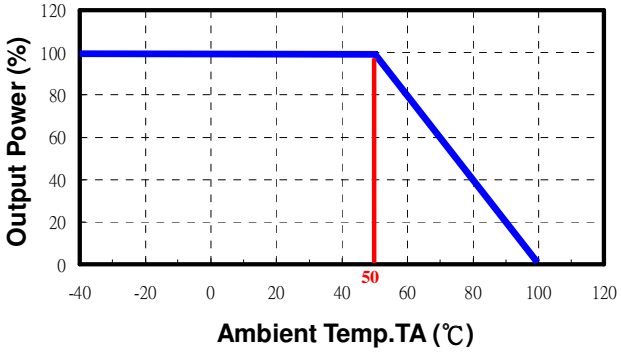
All specifications are typical at nominal input, full load and 25℃ unless otherwise stated.

Model Number	Input Voltage Range	Output Voltage (V)	Output Current (mA)		Input Current (mA)		Eff.(2) (%)	Capacitive Load, max.(3) (uF)
			Min. Load(1)	Full. Load	No Load	Full Load		
BRA20-24S0W	9~36V Nominal:24V	3.3	0	4500	63	755	86	24700
BRA20-24S1W		5	0	4000	65	992	88	14700
BRA20-24S2W		12	0	1670	83	970	90	4700
BRA20-24S3W		15	0	1330	70	967	90	2200
BRA20-24D2W		±12	±40	±833	60	992	88	2200
BRA20-24D3W		±15	±60	±667	83	981	89	1000
BRA20-48S0W	18~75V Nominal:48V	3.3	0	4500	29	373	87	32200
BRA20-48S1W		5	0	4000	30	490	89	23300
BRA20-48S2W		12	0	1670	38	486	90	3300
BRA20-48S3W		15	0	1330	32	477	91	1000
BRA20-48D2W		±12	0	±833	35	490	89	680
BRA20-48D3W		±15	0	±667	36	490	89	470

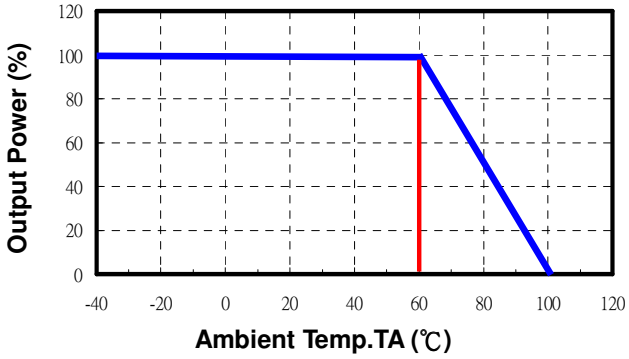
Input Specifications		
Input Voltage	24V nominal input	9-36V
	48V nominal input	18-75V
Input filter		Pi Type
Input surge voltage	24V nominal input	50V
(100ms max.)	48V nominal input	100V
Input reflected ripple current	Nominal Vin and full load	60mAp-p max.
Start up time	Nominal Vin and constant resistive load	76ms typ.
Remote ON/OFF	Converter: ON	Open or 3.5V＜Vr＜12V
	Converter: OFF	Short (4) or 0V＜Vr＜0.7V
Sourcing current of remote control pin	Nominal Vin	＜0.2 mA
Idle input current (at Remote OFF state)	Nominal Vin	＜12 mA
Environmental Specifications		
Operating ambient temperature		-40℃ to +85℃ (with derating)
Maximum case temperature		+105℃ max.
Storage temperature range		-55℃ to +125℃
Relative humidity		95% RH max.
Temperature coefficient		±0.02% / ℃ max.
Output Specifications		
Output power		20 Watts max.
Voltage accuracy	Full load and nominal Vin	±1%
Minimum load		See table
Line regulation	LL to HL at full load	±1.0%
Load Regulation	25% load to full load Single	±1.0%
	Balanced load Dual	±0.5%
	Unbalanced load 25% to 100% full load	±5%
Ripple and Noise	20MHz bandwidth	80mVp-p max.
Over voltage protection (Zener Diode Clamp)	3.3Vout models	3.9V
	5.1Vout models	6.2V
	12Vout models	15V
	15Vout models	18V
Capacitive load		See table
Over load protection	% of full load at nominal input	110% min.
Short circuit protection		Hiccup, continuous (Auto Recovery)
Transient response settling time	50% load step change	700μs max.
		(1.4ms for 3.3Vout)
Transient response over shoot	di/dt=0.8A/μs	≤ ±5% of Vo
		(≤ ±6% for 3.3Vout)

General Specifications		
Efficiency	Nominal input	See table
Isolation voltage	Input to output	1500VDC
Isolation resistance	500VDVC	10^9 Ohms min.
Isolation capacitance		450pF typ.
Switching frequency		330kHz typ.
Reliability, calculated MTBF		0.35 × 10^6 Hrs
Physical Specifications		
Case material		Nickel-coated copper
Base material		Non conductive FR4
Potting material		Silicon rubber (UL94V-0)
Dimensions		1.0 × 1.0 × 0.4 Inch (25.4 × 25.4 × 10.2 mm)
Weight		19.2g (0.68oz) typ.

Power Derating Curve (Without Heatsink)

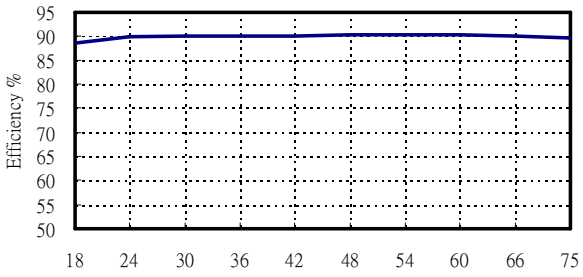


Power Derating Curve (With Heatsink)



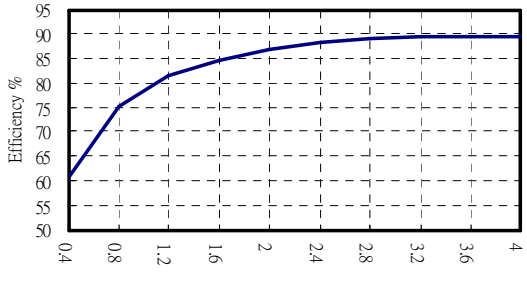
BRA20-48S1W

Input voltage vs. Efficiency



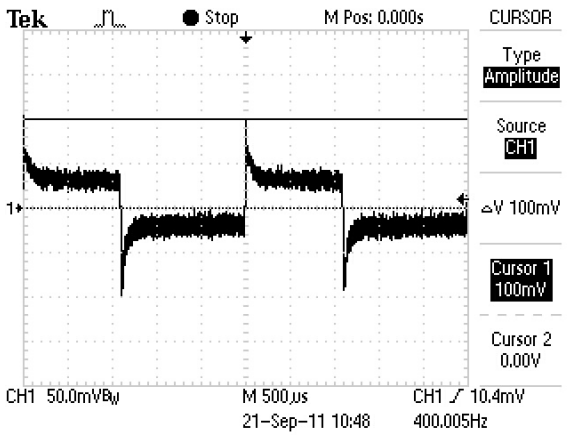
BRA20-48S1W

Output Current vs. Efficiency



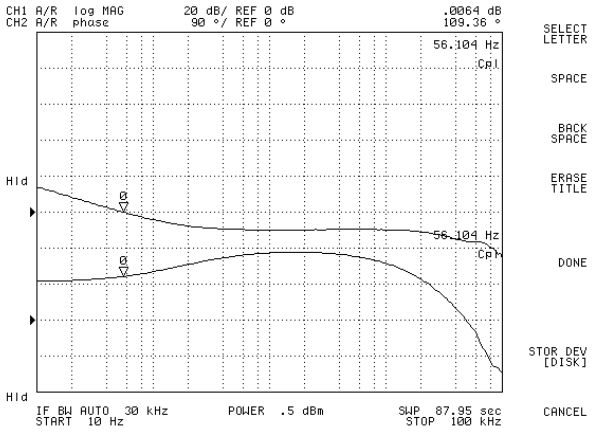
BRA20-48S1W

Transient Response at 50%~100% Max Load



BRA20-48S1W

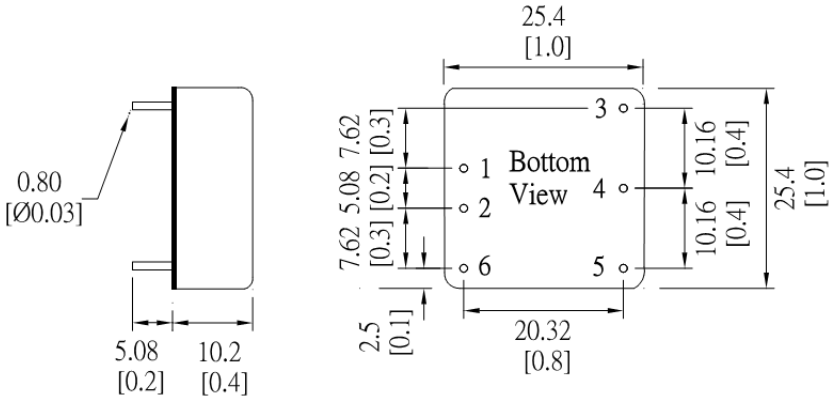
Loop Gain & Phase at Vi=48V,Full Load



Note

1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Short to -Vin (Pin 2).

Mechanical Dimensions



Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Remote On/Off (optional)	

Unit: mm [inch]
Tolerance:±0.5[0.02]

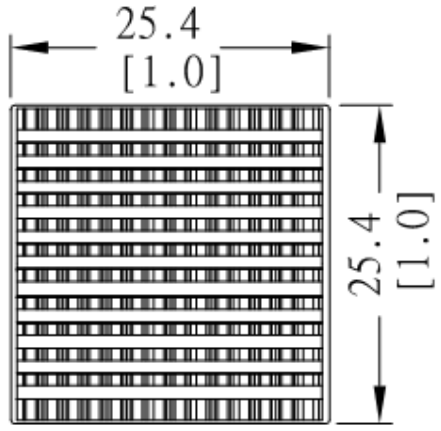
Specifications subject to change without noticed.

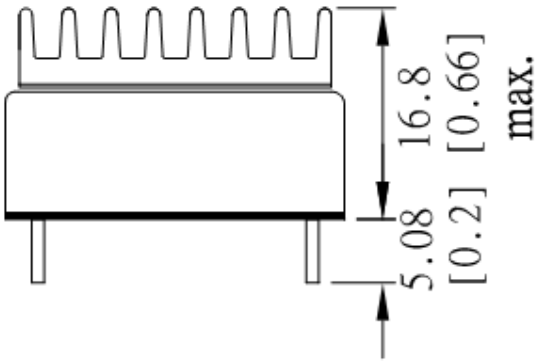
Heat-sink

Material: Aluminum

Weight: 4.2g (0.15oz)

Note:
The product label on converter has to be removed before mounting the heat-sink.
For volume orders, converters will be supplied with heat-sink already mounted. Please contact factory for quotation.
Separate heat-sinks are only available for prototypes and small quantity orders.

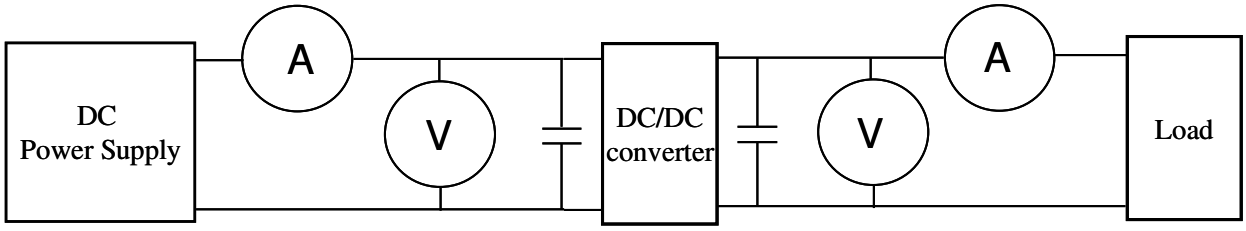




Specifications subject to change without notice.

Test Configurations

All specifications are typical at nominal input, full load and 25℃ unless otherwise stated.



◎DC Power Supply: It offers a wide voltage and current range precisely.

◎Current meter (A): Accuracy➔ 200μA ~ 200mA 4 ranges±(0.2% rdg + 2 digits)

2000mA ~ 20A 2 ranges±(0.3% rdg + 2 digits).

◎Voltage meter (V): Accuracy➔ ±(0.03% rdg + 4 digits).

◎Load: At full load.

◎Wires: The resistance of the wires must be small.

1. Input voltage range: Narrow input voltage range（±10%）、wide input voltage range (2:1 and 4:1）。

EX: Narrow input voltage range（±10%）

5V nominal input	➔	4.5~5.5V
12V nominal input	➔	10.8~13.2V
24V nominal input	➔	21.6~26.4V

Wide input voltage range 2:1

5V nominal input	➔	4.5~9V
12V nominal input	➔	9~18V
24V nominal input	➔	18~36V
48V nominal input	➔	36~75V

Wide input voltage range 4:1 (W)

24V nominal input	➔	9~36V
48V nominal input	➔	18~75V

2. Input power :

Pin = Vin x Iin

Vin：Input voltage
Iin：Input current

3. Output power :

Pout = Vout x Iout

Vout：Output voltage
Iout：Output current

4. Efficiency :

$$\text{Efficiency} = \frac{\text{Pout}}{\text{Pin}} \times 100\%$$

Pout: Output power
Pin: Input power

5. Voltage accuracy:

$$\frac{|\text{Vout-Vout(nominal)}|}{\text{Vout}} \times 100\%$$

Vout：Output voltage
Vout(nominal)：Nominal output voltage

6. Line regulation: (1) Wide input voltage range and regulated output voltage series.

$$\frac{|\,Vout(LL)-Vout(HL)\,|}{Vout(LL)} \times 100\%$$

LL: Low Line input voltage
HL: High Line input voltage

(2) Narrow input voltage range（±10%）and unregulated output voltage series.

$$\text{Line regulation} = \left| \frac{\Delta Vout}{\Delta Vin} \right|$$

$$\Delta Vout = \frac{Vout(+10\%)-Vout(-10\%)}{Vout} \times 100\%$$

Vout(+10%)：Output voltage at Vin = 1.1xVin(nominal)&full load

Vout(-10%)：Output voltage at Vin = 0.9xVin(nominal)&full load

Vout：Output voltage at Vin = Vin(nominal)&full load

$$\Delta Vin = \frac{Vin(+10\%)-Vin(-10\%)}{Vin(nominal)} \times 100\%$$

Vin(+10%)：Input voltage = 1.1xVin(nominal)

Vin(-10%)：Input voltage = 0.9xVin(nominal)

Vin(nominal)：Nominal Input voltage

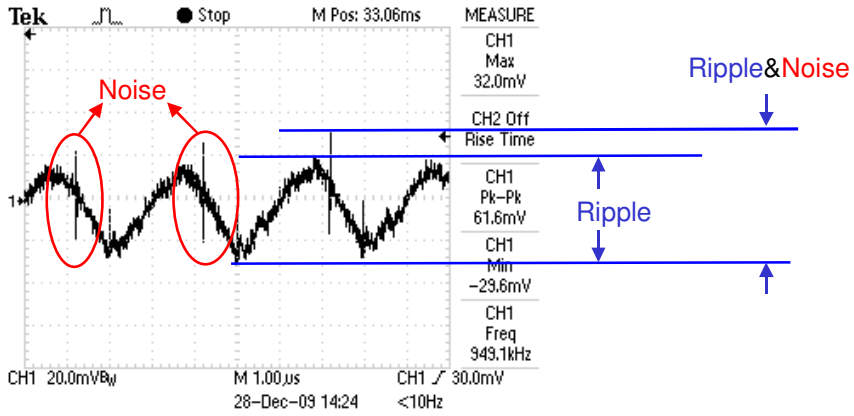
7. Load regulation :

$$\frac{|\,Vout(FL)-Vout(NL)\,|}{Vout(FL)} \times 100\%$$

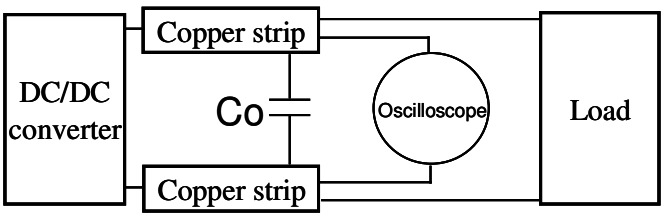
Vout(FL): Output voltage at full load

Vout(NL): Output voltage at 25% full load or 10% full load

8. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

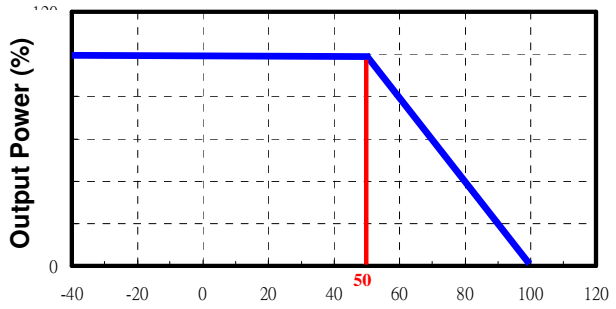


Output Ripple&Noise measurement test circuit: as shown below.



Co: usually 0.47uF.

9. Temperature derating curve: The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below



10. Switching frequency: The nominal operating frequency of the DC-DC converters.

11. Input to output isolation: The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.