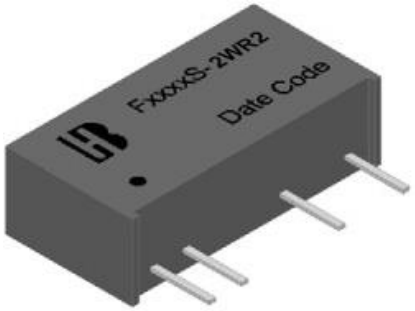
F_S-2WR2 Series

7 pin SIP Package, 2 Watt, Isolated, Unregulated

BOTHHAND

Features

- 7pin SIP Package with Industry-Standard Footprint
- Input / Output Isolation Voltage: 3kVDC
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +105°C
- Meet Safety Standard / Approval: IEC / EN60950-1



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°C unless otherwise stated.

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) (1)	Input Current (mA) Typ.		Eff .(%) (2) Typ.	Capacitive Load, max. (3) (uF)
			Full Load	No Load	Full Load		
F0503S-2WR2	4.5-5.5 Nominal:5	3.3	400	35	338	78	68
F0505S-2WR2		5	400		500	80	47
F0509S-2WR2		9	220		477	83	33
F0512S-2WR2		12	166		475	84	22
F0515S-2WR2		15	133		475	84	22
F0524S-2WR2		24	83		475	84	10
F1203S-2WR2	10.8-13.2 Nominal:12	3.3	400	15	143	77	68
F1205S-2WR2		5	400		208	80	47
F1209S-2WR2		9	220		199	83	33
F1212S-2WR2		12	166		198	84	22
F1215S-2WR2		15	133		198	84	22
F1224S-2WR2		24	83		198	84	10

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) (1)	Input Current (mA) Typ.		Eff .(%) (2) Typ.	Capacitive Load, max. (3) (uF)
			Full Load	No Load	Full Load		
F1503S-2WR2	13.5-16.5 Nominal:15	3.3	400	12	114	77	68
F1505S-2WR2		5	400		167	80	47
F1509S-2WR2		9	220		159	83	33
F1512S-2WR2		12	166		158	84	22
F1515S-2WR2		15	133		158	84	22
F1524S-2WR2		24	83		158	84	10
F2403S-2WR2	21.6-26.4 Nominal:24	3.3	400	8	71	77	68
F2405S-2WR2		5	400		104	80	47
F2409S-2WR2		9	220		99	83	33

F2412S-2WR2		12	166	99	84	22
F2415S-2WR2		15	133	99	84	22
F2424S-2WR2		24	83	99	84	10

Input Specifications

	5V nominal input	4.5-5.5V
	12V nominal input	10.8-13.2V
	15V nominal input	13.5-16.5V
	24V nominal input	21.6-26.4V
Input filter		Capacitor

Environmental Specifications

Operating ambient temperature	-40°C to +105°C
Maximum case temperature	+125°C
Storage temperature range	-55°C to +125°C
Relative humidity	95% RH max.

Output Specifications

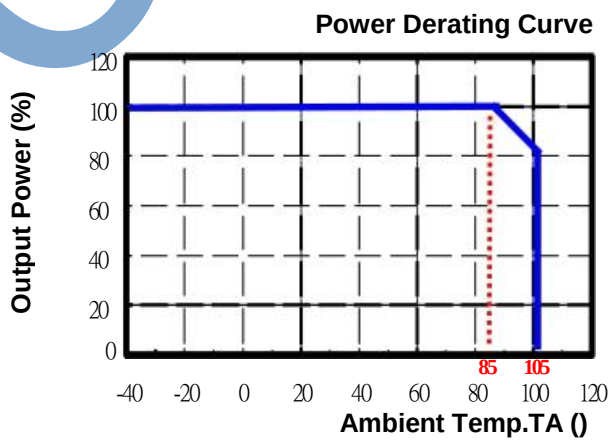
Output power		2Watts max.
Voltage accuracy	Nominal Vin and full load	
	3.3Vdc	3.135-3.399V
	5Vdc	4.75-5.15V
	9Vdc	8.73-9.18V
	12Vdc	11.64-12.24V
	15Vdc	14.55-15.30V
	24Vdc	23.52-24.36V
	25Vdc	24.50-25.37V
Voltage balance	Dual output	±1% max.
Minimum load		10% load of full load
Line regulation	For Vin charge of 1%	±1.2% Typ.
Load regulation	Nominal Vin and 10%-100% load	
	3.3Vdc	15% Typ.
	5Vdc	13% Typ.
	9Vdc	9% Typ.
	12Vdc	8% Typ.
	15Vdc	7% Typ.
	24Vdc	6% Typ.
	25Vdc	6% Typ.
Ripple and Noise (20MHz Bandwidth)		100mVp-p Typ. 150mVp-p Max.

Maximum capacitive load		See table
Output short circuit protection	F24XXS-2W2R	3S Max.
	Other models	Continuous, Automatic recovery
Temperature coefficient		±0.03%/°C Typ.
General Specifications		
Efficiency	Nominal input and full load	See table
Isolation voltage	Input to output	3000VDC (60 second)
Isolation resistance	500VDC	1000MÙ min.
Isolation capacitance		30pF typ.
Switching frequency		150kHz typ. 300kHz max.
Reliability, calculated MTBF		2×10 6 Hrs
Physical Specifications		
Case material		Plastic (UL94 V-0)
Potting material		PU (UL94 V-0)
Dimensions		19.6× 10.1× 7.0 mm
Weight		2.5g Typ.

Note

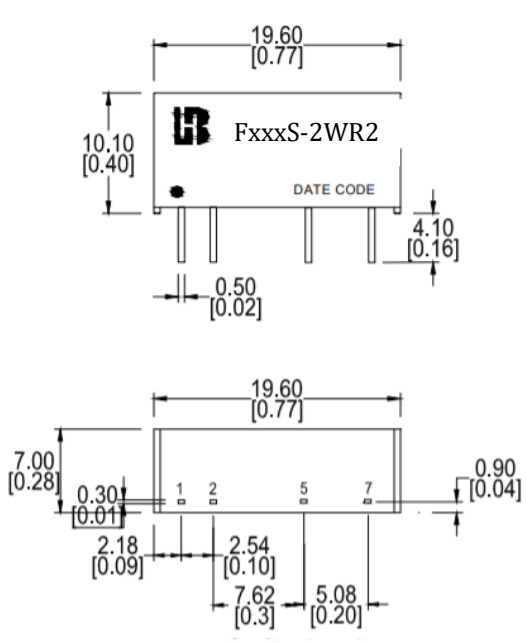
1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Specifications subject to change without notice.
5. This series of products do not support CC mode, CR mode is recommended.
6. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's input pins.

Power Derating Curve

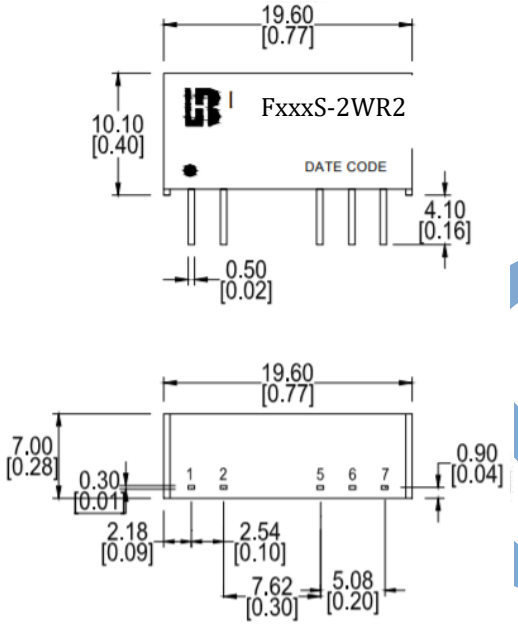


Mechanical Dimensions

Single output



Dual output

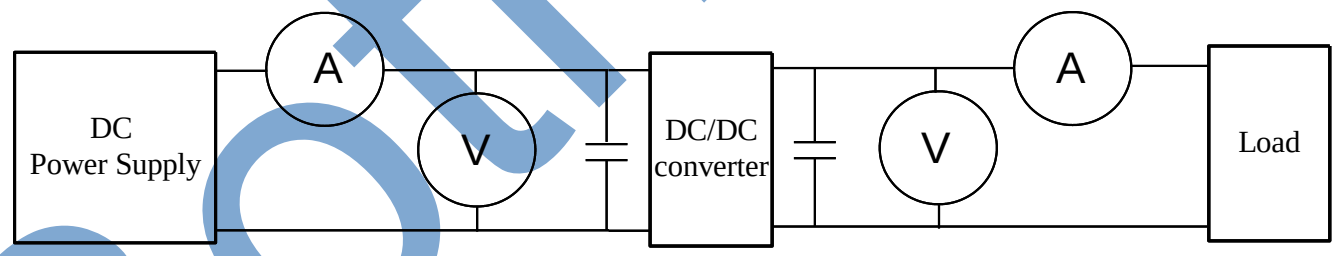


Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No pin	Common
7	+Vout	+Vout

Unit: mm (inch)
Pin section tolerances:±0.1(±0.004)
General tolerances:±0.5(±0.02)

Test Configurations

All specifications are typical at nominal input, full load and 25°C 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 :

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

Pout: Output power
Pin: Input power

5. Voltage accuracy:

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

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

6. Line regulation:

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

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

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

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

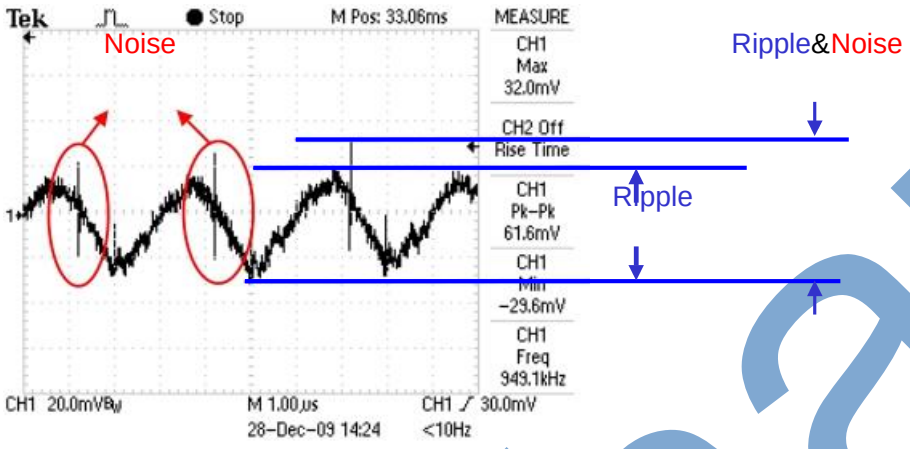
7. Load regulation :

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

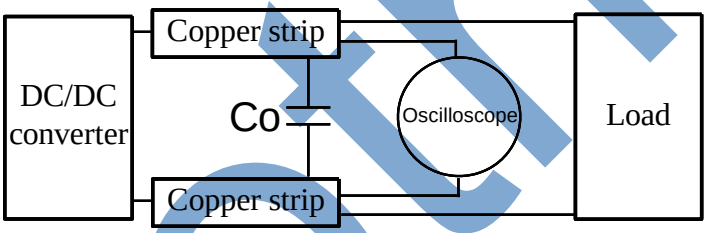
Vout(FL): Output voltage at full load

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

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

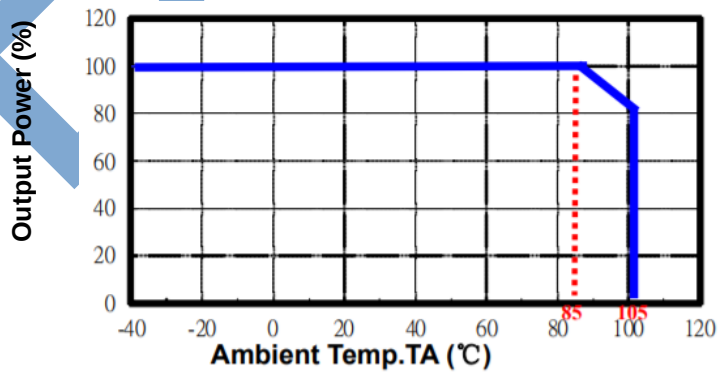


Output Ripple&Noise measurement test circuit: as shown below.



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.

12. Input souce impedance: The power module should be connected to low ac-impedance input souce.

    Highly inductive souce impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high , it maybe necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit , it is commended to use a good quality low Equivalent Series Resistance (ESR < 0.1Ù at 100KHz) capacitor of a 22uF for the power module.