



## 257WB\_3RPR series

2W - Single Output DC-DC Converter - Isolated & Regulated

### DC-DC Converter 2 Watt

- ⊕ SIP7 package
- ⊕ 2:1 input voltage range
- ⊕ Operating temperature range: -40°C to +100°C
- ⊕ 3000VDC isolation voltage
- ⊕ Up to 83% efficiency
- ⊕ Input under voltage protection
- ⊕ Short circuit protection (SCP)
- ⊕ Over current protection
- ⊕ MTBF: 1,000,000 hours

Introducing our new 257WB\_3RPR series, a compact and robust isolated DC-DC converter platform designed for reliable operation in industrial and embedded applications. Housed in a space-efficient SIP7 package, the series features a wide 2:1 input voltage range, ensuring stable performance even under fluctuating supply conditions. With reinforced 3000 VDC isolation and efficiencies of up to 83%, the 257WB\_3RPR series delivers dependable power conversion for demanding environments. It operates across an extended temperature range from -40°C to +100°C, supporting reliable functionality in harsh industrial conditions. Integrated protection features including input under-voltage protection, short circuit protection (SCP), and overcurrent protection enhance system safety and operational stability. An MTBF of 1,000,000 hours further underlines the long-term reliability of the series, making it an ideal solution for applications requiring compact isolated power with strong electrical robustness.



Common specifications	
Short circuit protection	Continuous self recovery
Switching frequency	300 kHz (PWM)
Operation temperature	-40°C ~+100°C (with derating)
Storage temperature	-55°C ~+125°C
Soldering Profile	Wave-soldering, 260°C (±5°C); time: 5 - 10s Manual-welding, 360°C (±10°C); time: 3 - 5s
Storage humidity	5~95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	>1,000,000 hours
Input filter	Capacitance filter
Hot plug	Unavailable
Case material	Black plastic, flame-retardant and heat-resistant (UL 94V-0 rated)
Package dimensions	19.60 x 7.05 x 10.10mm
Weight	2.7g (typ.)
Cooling method	Free air convection

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC	
Isolation resistance	Input-output, resistance at 500VDC	1000			MΩ	
Isolation capacitance	Input-output, 100kHz/0.1V		1000		pF	

**Example:**  
**257WB\_2405S3RPR**  
 2 = 2Watt; S7 = SIP; WB = Series; 24 = 24Vin; 05 = 5Vout; S = Single Output;  
 3 = 3000VDC isolation; R = Regulated Output; P = Short circuit protection;  
 R = Revised

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our company's corporate standards;
- For specific requirements please contact our technical team directly;
- Product specifications are subject to change without prior notice.

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy	0% - 100% Load		±3.0	±5.0	%	
Linear regulation	Vin = min. to max. at full load		±1.0	±3.0	%	
Load regulation	0% - 100% load		±3.0	±5.0	%	
Transient recovery time	25% load step change, nominal input voltage		0.5	2	ms	
Transient response deviation	25% load step change, nominal input voltage		±3.0	±5.0	%	
Temperature coefficient	Full load			±0.03	%/°C	
Ripple & noise*	20MHz bandwidth, 5%-100% load, parallel line test method		60	100	mVp-p	
Over-current protection	Input voltage range	110	160		%Io	

Note: \*Under 0% - 5% load conditions, ripple & noise does not exceed 5% Vo.

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input current (full load/ no load)	<b>5VDC Nominal input</b>					
	• 3.3V Output		388/15	400/25		
	• 5V Output		571/15	588/25		
	• 9V Output		556/15	571/25		
	• 12V Output		533/15	548/25		
	• 15V Output		513/20	526/40		
	• 24V Output		500/20	513/40		
	<b>12VDC Nominal input</b>					
	• 3.3V Output		151/10	155/20		
	• 5V Output		222/10	228/20		
	• 9V Output		214/10	219/20		
	• 12/15V Output		208/15	214/30		
	• 24V Output		201/15	206/30		
<b>24VDC Nominal input</b>						
• 3.3V Output		74/5	76/15			
• 5V Output		110/5	113/15			
• 9V Output		107/10	110/20			
• 12/15V Output		104/10	107/20			
• 24V Output		100/15	103/25			
Reflected ripple current	5VDC nominal input series		20			
	12VDC nominal input series		30		mA	
	24VDC nominal input series		45			
Impulse voltage (1 sec. max)	5VDC nominal input series	-0.7		12		
	12VDC nominal input series	-0.7		25	VDC	
	24VDC nominal input series	-0.7		50		
Starting voltage	5VDC nominal input series			4.5		
	12VDC nominal input series			9	VDC	
	24VDC nominal input series			18		
Input under-voltage protection	5VDC nominal input series	3.5	4			
	12VDC nominal input series	5.5	6.5		VDC	
	24VDC nominal input series	12	15.5			

## 2S7WB\_3RPR series

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### EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see fig. 3-2 for recommended circuit)	
EMI	RE	CISPR32/EN55032 CLASS B (see fig. 3-2 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2 Contact $\pm 4\text{kV}$	Perf. criteria B
EMS	RS	IEC/EN61000-4-3 10V/m	Perf. criteria A
EMS	EFT	IEC/EN61000-4-4 $\pm 2\text{kV}$ (see fig. 3-1 for recommended circuit)	Perf. criteria B
EMS	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{kV}$ (see fig. 3-1 for recommended circuit)	Perf. criteria B
EMS	CS	IEC/EN61000-4-6 3Vr.m.s	Perf. criteria A

## Product Selection Guide

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Input Voltage max. (VDC)*	Output Voltage (VDC)	Output Current max. (mA)	Full Load Efficiency (%) typ.**	Capacitive Load max. ( $\mu\text{F}$ )
	2S7WB_0503S3RPR	5 (4.5-9)	11	3.3	400	68	1200
	2S7WB_0505S3RPR	5 (4.5-9)	11	5	400	70	1000
	2S7WB_0509S3RPR	5 (4.5-9)	11	9	222	72	680
	2S7WB_0512S3RPR	5 (4.5-9)	11	12	167	75	560
	2S7WB_0515S3RPR	5 (4.5-9)	11	15	133	78	470
	2S7WB_0524S3RPR	5 (4.5-9)	11	24	84	80	220
	2S7WB_1203S3RPR	12 (9-18)	20	3.3	400	73	1200
	2S7WB_1205S3RPR	12 (9-18)	20	5	400	75	1000
	2S7WB_1209S3RPR	12 (9-18)	20	9	222	78	680
	2S7WB_1212S3RPR	12 (9-18)	20	12	167	80	560
	2S7WB_1215S3RPR	12 (9-18)	20	15	133	80	470
	2S7WB_1224S3RPR	12 (9-18)	20	24	84	83	220
	2S7WB_2403S3RPR	24 (18-36)	40	3.3	400	74	1200
	2S7WB_2405S3RPR	24 (18-36)	40	5	400	76	1000
	2S7WB_2409S3RPR	24 (18-36)	40	9	222	78	680
	2S7WB_2412S3RPR	24 (18-36)	40	12	167	80	560
	2S7WB_2415S3RPR	24 (18-36)	40	15	133	80	470
	2S7WB_2424S3RPR	24 (18-36)	40	24	84	83	220

Note: \*Exceeding the maximum input voltage may cause permanent damage;

\*\*Efficiency is measured at nominal input voltage and rated output load.

## Typical characteristics

### Temperature derating graph

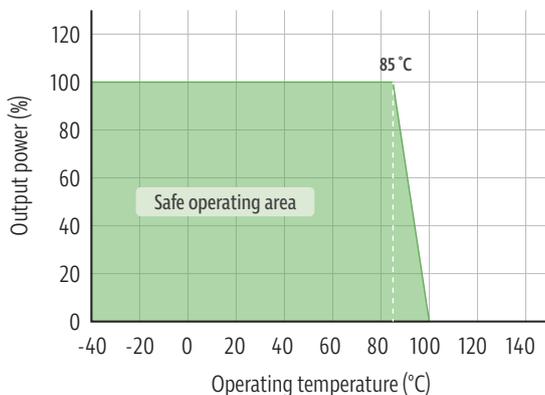


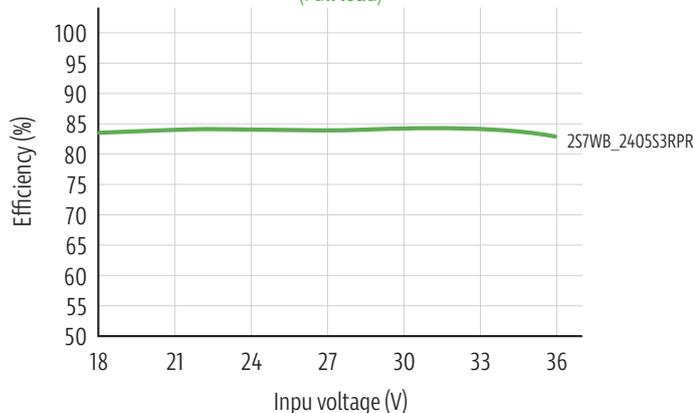
Figure 1

## 2S7WB\_3RPR series

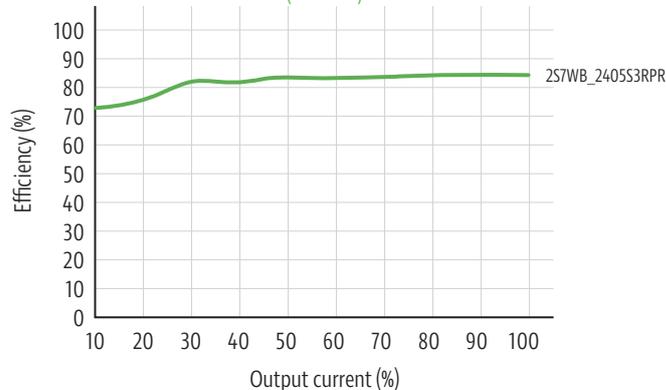
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### Typical characteristics

**Efficiency vs input voltage**  
(Full load)



**Efficiency vs output load**  
( $V_{in}=24V$ )



### Typical circuit design and application

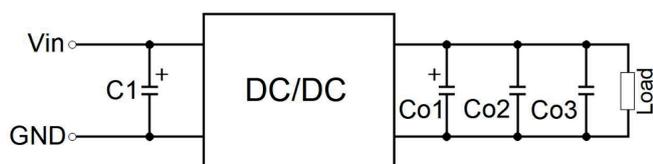


Figure 2

Recommended capacitive load value table

Vout	C1	Co1	Co2	Co3
3.3/5VDC	100 $\mu$ F/100V	47 $\mu$ F/16V	10 $\mu$ F/50V	0.1 $\mu$ F/16V
9/12/15VDC	100 $\mu$ F/100V	47 $\mu$ F/25V	10 $\mu$ F/50V	0.1 $\mu$ F/25V
24VDC	100 $\mu$ F/100V	47 $\mu$ F/50V	10 $\mu$ F/50V	0.1 $\mu$ F/50V

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C1 and Co1/Co2/Co3 and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

### Recommended EMC circuit diagram

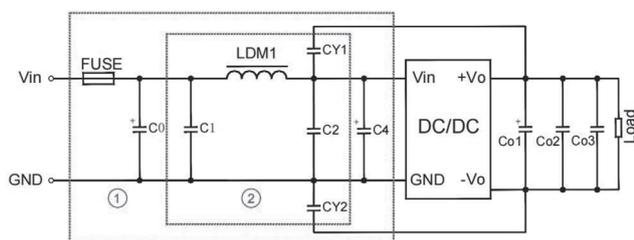


Figure 3

EMI Recommended Parameter Table

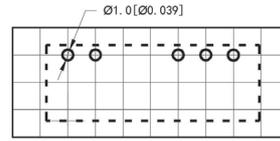
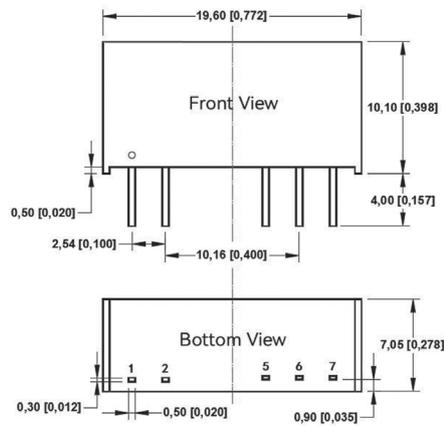
Model	Vin: 5VDC	Vin: 12VDC	Vin: 24VDC
FUSE	Select according to the actual input current of the customer		
Co/C4	680 $\mu$ F/25V	680 $\mu$ F/25V	330 $\mu$ F/50V
C1/C2	4.7 $\mu$ F/50V		
LDM1	12 $\mu$ H		
Co1/Co2/Co3	Refer fig. 2 capacitive load value table		
CY1/CY2	1nF/3kV		

Note: We use part ① in fig. 3 for immunity tests and part ② for emissions test. Selecting based on needs.

## 2S7WB\_3RPR series

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### Mechanical dimensions



The grid distance is 2.54mm x2.54mm

Pin definition table

Pin	Function
1	Vin
2	GND
5	-Vo
6	No pin
7	+Vo

No Pin: No pin

Note:

Unit: mm [inch]

Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]

General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]