



## QS4A\_1.5UP series

0.25W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated

### DC-DC Converter

0.25 Watt

- ⊕ Compact SIP Package
- ⊕ 1.5kVDC Isolation
- ⊕ Temperature Range: -40°C ~ +105°C
- ⊕ No Heatsink Required
- ⊕ Continuous short-circuit protection
- ⊕ Internal SMD Construction
- ⊕ No External Component Required
- ⊕ Industry Standard Pinout
- ⊕ RoHS Compliance
- ⊕ IEC60950, UL60950, EN60950 approved

The QS4A\_1.5UP series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for. These products apply to:

- 1) Where the voltage of the input power supply is stable (Voltage variation  $\leq \pm 10\%$ )
- 2) Where isolation is necessary between input and output (Isolation voltage  $\leq 1500\text{VDC}$ )
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.
- 4) Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit and data switching circuit condition, etc.



Common specifications	
Short circuit protection:	Continuous, self-recovery
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C
Storage temperature range:	-55°C~+125°C
Casing temperature rise at full load:	5°C TYP
Lead temperature:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Case material:	Plastic [UL94-V0]
MTBF (MIL-HDFK-217F@25°C):	>3,500,000 hours
Weight:	1.2g
Dimensions:	11.60*6.00*10.16 mm

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy	See tolerance envelope graph					
Line regulation	For Vin change of $\pm 1\%$ • 3.3V output • others output			$\pm 1.5$ $\pm 1.2$	%	
Load regulation	10% to 100% load • 3.3V output • 5V/9V/12V output		7 5	15 10	%	
Ripple & Noise*	20MHz Bandwidth		25	75	mVp-p	
Temperature drift	100% full load		$\pm 0.02$		%/°C	
Switching frequency	Full load, nominal input		110		KHz	

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 3.3VDC input		103/20	-/40	mA
	• 5VDC input		66/15	-/30	mA
	• 9VDC input		27/10	-/20	mA
	• 12VDC input		25/5	-/15	mA
	• 15VDC input		15/4	-/10	mA
Reflected ripple current	• 3.3V/5V input		20		mA
	• 12V/15V/24V input		5		mA
Surge voltage	• 3.3VDC input	-0.7		5	VDC
	• 5VDC input	-0.7		9	VDC
	• 9VDC input	-0.7		18	VDC
	• 12VDC input	-0.7		21	VDC
	• 15VDC input	-0.7		30	VDC
Input filter	Filter capacitor				
Hot plug	Unavailable				

EMC specifications					
EMI	CE	CISPR22/EN55022 CLASS B (see EMC recommended circuit)			
EMI	RE	CISPR22/EN55022 CLASS B (see EMC recommended circuit)			
EMS	ESD	IEC/EN61000-4-2	Contact $\pm 8\text{KV}$	perf. Criteria B	

#### Example SIP4 Case:

##### QS4A\_0505S1.5UP

Q = 0,25 Watt; S4 = SIP4; A = Pinning; 05 = 5 Vin; 05 = 5Vout; S = Single Output; 1.5 = 1.5kVDC isolation; U = Unregulated Output; P = Short circuit protection (SCP)

#### Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
3. Only typical models listed, other models may be different, please contact our technical person for more details.
4. In this datasheet, all the test methods of indications are based on corporate standards.

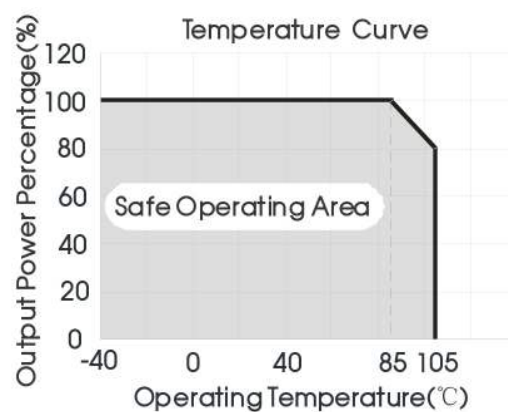
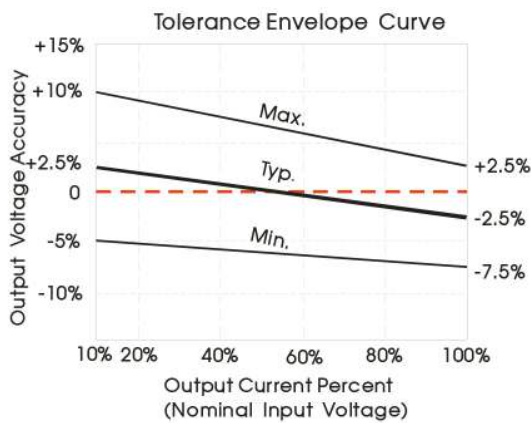
Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100KHz/0.1V		20		pF

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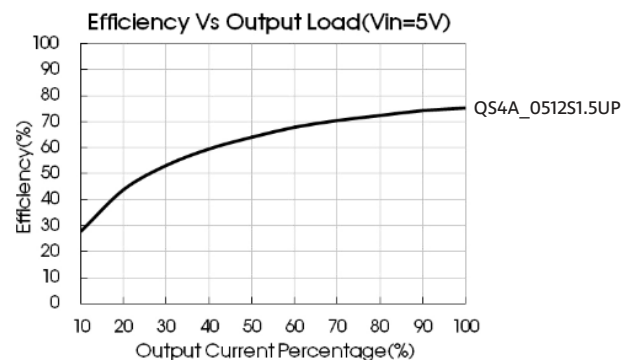
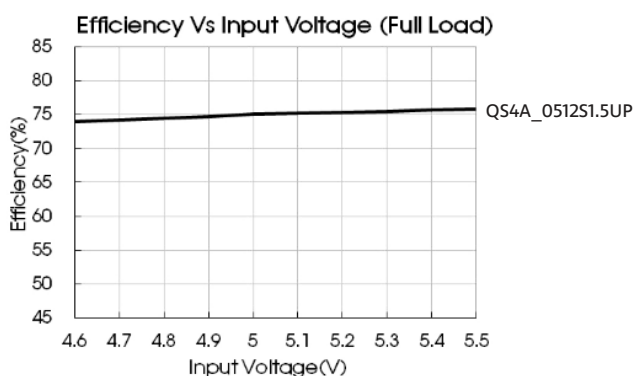
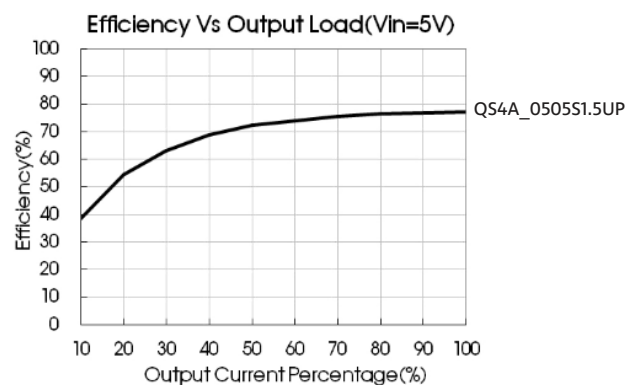
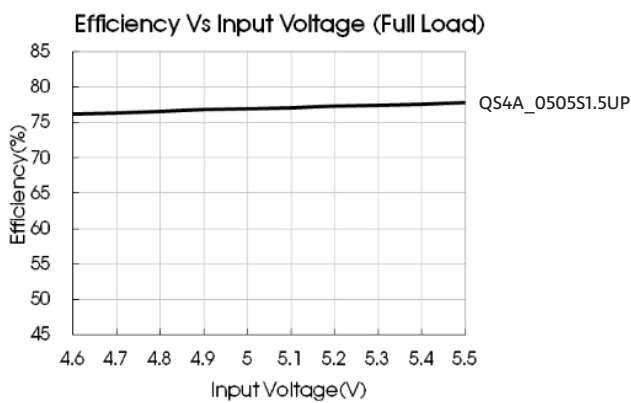
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Part Number	Input Voltage [V]	Output Voltage [VDC]	Current [mA, max]	Efficiency [%, typ]	Capacitive load $\mu$ F max]
QS4A_0303S1.5UP	3.3	3.3	76	74	220
QS4A_0305S1.5UP	3.3	5	50	75	220
QS4A_0503S1.5UP	5	3.3	76	74	220
QS4A_0505S1.5UP	5	5	50	76	220
QS4A_0512S1.5UP	5	12	21	77	220
QS4A_1205S1.5UP	12	5	50	66	220
QS4A_1505S1.5UP	15	5	50	66	220
QS4A_2405S1.5UP	24	5	50	69	220
QS4A_2409S1.5UP	24	9	28	66	220

## Typical characteristics



## Efficiency

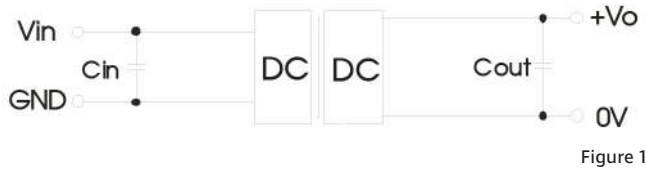


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### Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.



#### Output load requirements

In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

Recommended capacitive load value table (Table 1)

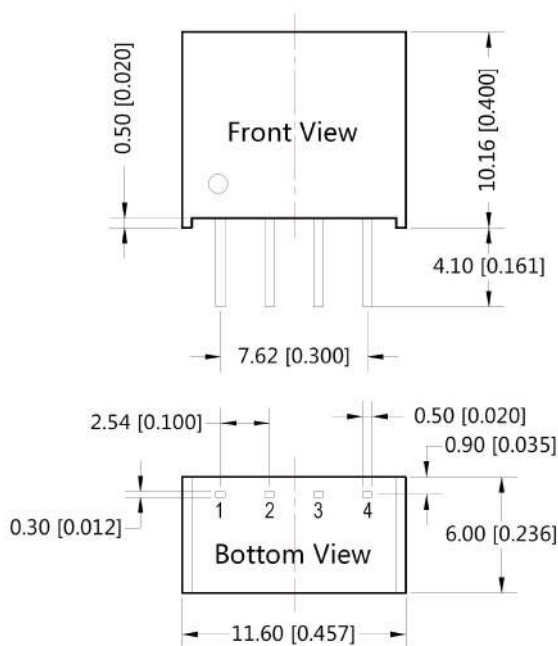
Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10
12/15	2.2	12	4.7
24	1	12	2.2

### EMC typical recommended circuit (Class B)



Input voltage (VDC)		3.3/5/12/15/24
EMI	C1	4.7μF /50V
EMI	C2	Refer to the Cout in typical application circuit
EMI	LDM	6.8μH

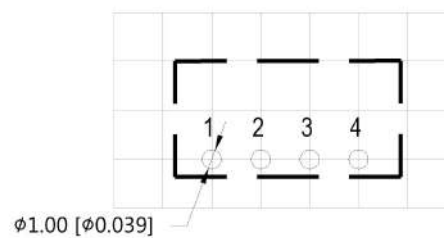
### Mechanical dimensions



Note:  
Unit: mm[inch]  
Pin section tolerances: ± 0.10mm [± 0.004inch]  
General tolerances: ± 0.25mm [±0.010inch]

### Recommended footprint

THIRD ANGLE PROJECTION



Note : Grid 2.54\*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
3	0V
4	+Vo