QS4A1_1.5UP series

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

DC-DC Converter 0.25 Watt

- SIP4 Package
- 1.5kVDC ssolation
- Operating temperature: -40°C ~ +105°C
- No heatsink required
- Short circuit protection (SCP)
- Internal SMD construction
- No external component required
- Industry Standard Pinout
- RoHS compliance
- Meets IEC60950, UL60950, EN60950 standards

Introducing our new compact and reliable SIP4 DC-DC converter QS4A1_1.5UP series. Designed for space-sensitive applications without compromising safety or performance. With 1.5kVDC isolation and full short circuit protection, this converter ensures stable and secure operation across a wide temperature range from -40°C to +105°C. Thanks to its efficient internal SMD construction, no external components or heatsinks are required. Housed in a space-saving SIP4 package with an industry-standard pinout, it meets international safety approvals (IEC60950, UL60950, EN60950) and is fully RoHS compliant - making it the ideal solution for streamlined, dependable designs.

Common specifications

Short circuit protection:	Continuous, self-recovery
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C (with derating)
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

Input specifications

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

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

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope graph				
Line regulation	For Vin change of ±1% • 3.3V output • others output			±1.5 ±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		±0.02		%/°C
Switching frequency	Full load, nominal input		110		KHz

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 ±8kV	perf. Criteria B

Example SIP4 Case:
QS4A1_0505S1.5UP
Q = 0,25 Watt; S4 = SIP4; A1 = 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.

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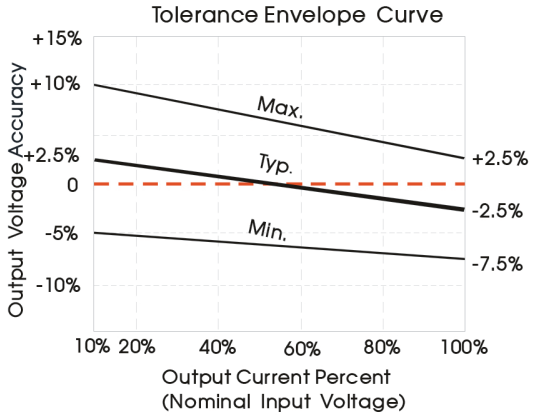
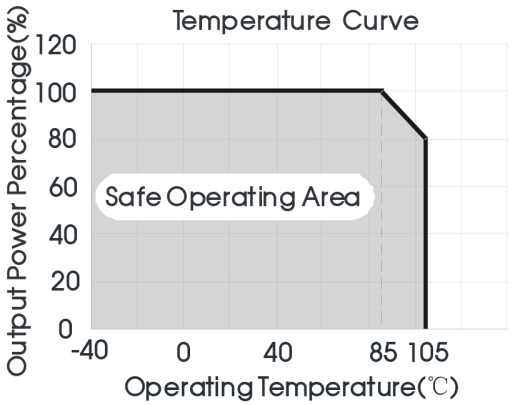
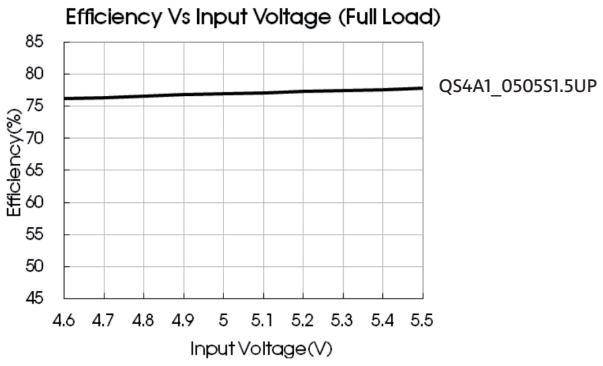
Part Number	Input Voltage [V]	Output Voltage [VDC]	Current [mA, max]	Efficiency [%, typ]	Capacitive load µF max]
QS4A1_0303S1.5UP	3.3	3.3	76	74	220
QS4A1_0305S1.5UP	3.3	5	50	75	220
QS4A1_0503S1.5UP	5	3.3	76	74	220
QS4A1_0505S1.5UP	5	5	50	76	220
QS4A1_0512S1.5UP	5	12	21	77	220
QS4A1_1205S1.5UP	12	5	50	66	220
QS4A1_1212S1.5UP	12	12	21	77	220
QS4A1_1505S1.5UP	15	5	50	66	220
QS4A1_2405S1.5UP	24	5	50	69	220
QS4A1_2409S1.5UP	24	9	28	66	220

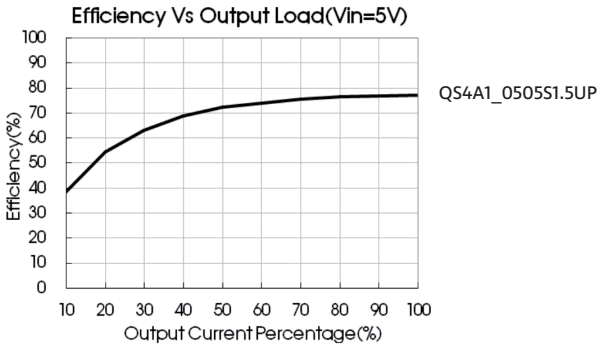
Typical characteristics

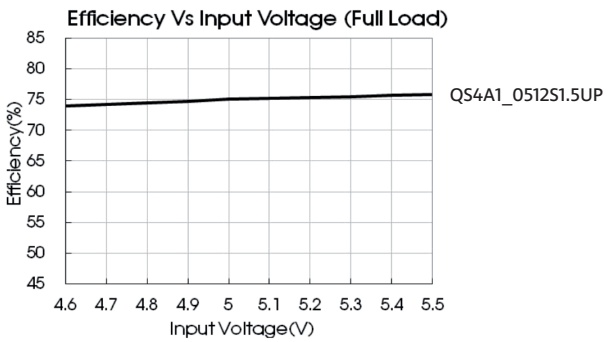


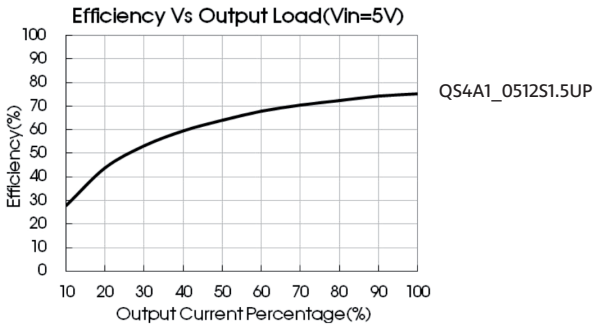


Efficiency









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.

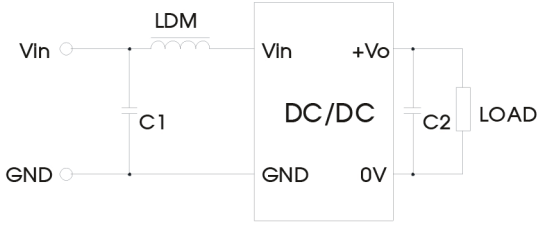
Figure 1

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)

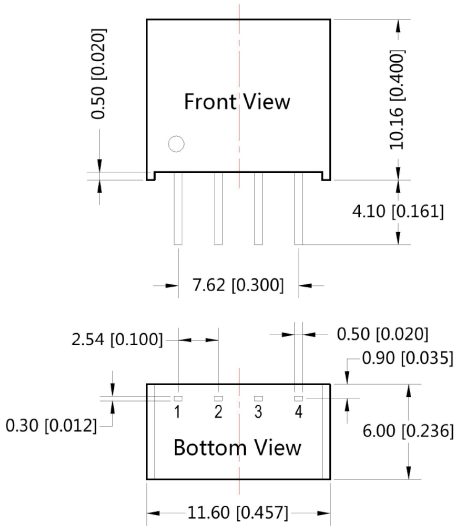
Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10
12/15	2.2	12	4.7
24	1	12	2.2

EMC typical recommended circuit (Class B)

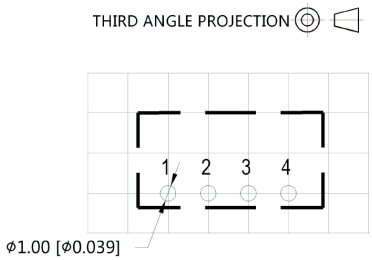


Input voltage (VDC)		3.3/5/12/15/24
EMI	C1	4.7μF /50V
EMI	C2	Refer to the Cout in typical application circuit
EMI	LDM	6.8μH

Mechanical dimensions



Recommended footprint



Note : Grid 2.54*2.54mm

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

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