



1S6W_1.5RP series

1Watt - 2:1 Regulated Single & Dual output

DC-DC Converter 1 Watt

- ⊕ 6 Pins SIL Package
- ⊕ Wide 2:1 Input Range
- ⊕ Efficiency up to 81%
- ⊕ 1500VDC Isolation
- ⊕ Fully regulated output
- ⊕ No minimum load required
- ⊕ Continuous Short Circuit Protection
- ⊕ Low Ripple and Noise
- ⊕ Operating Temperature Range -40°C ~ +85°C

The 1S6W_1.5RP series is a family of cost effective 1W single & dual output DC-DC converters. These converters are consisted with Non-conductive Black Plastic in a 6-pin SIL package with high performance features such as 1500VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12, 24 and 48 with output voltage of 5, 12, 15, 24, ±12 and ±15Vdc. High performance features include high efficiency operation up to 81% and output voltage accuracy of ±2% maximum.



UL-60950-1 (E347551)

Common specifications					
Item	Test condition	Min	Typ	Max	Units
Short circuit protection:	Continuous (Automatic Recovery)				
Cooling:	Nature Convection				
Operating Temperature	See Derating Curve	+40		_85	°C
Max. Case Temperature				105	°C
Storage Temperature		-55		+125	°C
Humidity (rel H)				95	%
Soldering Temperature	1.5mm from case 10 sec. max.			260	°C
Safety Standard	UL/cUL 60950-1, EC/EN 60950-1				
Safety Approvals	UL/cUL 60950-1, IEC/EN 60950-1				
Reliability Calculated MTBF	MIL-HDBK-217 F			> 2.8 Mhrs	
Case Material	Non-conductive Black Plastic (UL94V-0 rated)				
Pin Material	C5191R-H Solder-coated				
Potting Material	Epoxy (UL94V-0 rated)				
Weight			3.0		g
Case Material	Non-conductive Black Plastic (UL94V-0 rated)				
Dimensions	0.67"x0.30"x0.43"				

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input voltage range		See table.			
Input Current	No-Load	See table, Max.			
Input Current	Full-Load	See table, Typ.			
Input filter	Capacitor				
Input Reflected Ripple Current		35			mApk-pk

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy				±2	%
Minimum Output Current		0			mA
Maximum Output Current					See table
Line regulation				0.2	%
Load regulation	Single Output (0 to 100%) Dual Output (0 to 100%) Dual Output (5 to 100%)			±1.0 ±2.0 ±1.0	% % %
Cross regulation	Dual Output			±5	%
Temperature Coefficient				±0.02	%/°C
Capacitive Load		See table			
Ripple & noise	20MHz Bandwidth			50	mVpk-pk
Switching frequency		150		550	KHz
Transient Recovery Time			500		us
Transient Response Deviation				±3	%

EMC specifications		
Radiated Emissions	EN55032	CLASS A
Conducted Emissions*	EN55032	CLASS A
ESD	IEC 61000-4-2	Perfect criteria A
RS	IEC 61000-4-3	Perfect criteria A
EFT**	IEC 61000-4-4	Perfect criteria A
Surge**	IEC 61000-4-5	Perfect criteria A
ESD	IEC 61000-4-6	Perfect criteria A
ESD	IEC 61000-4-8	Perfect criteria A

*Input filter components are required to help meet conducted emission class A, which application refer to The EMI Filter of Design & feature configuration.
 ** An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

Note:

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Ripple/Noise measured with a 1uF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12uH.
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

* Measured with a simulated source inductance of 12μH.

Example:

1S4E_0505S1U
 1 = 1Watt; S4 = SIP4; E = Pinning; 5Vin; 5Vout; S = Single Output;
 1 = 1kVDC; U = Unregulated Output

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	1500			VDC
Isolation capacitance			70		pF
Isolation resistance		1000			MΩ

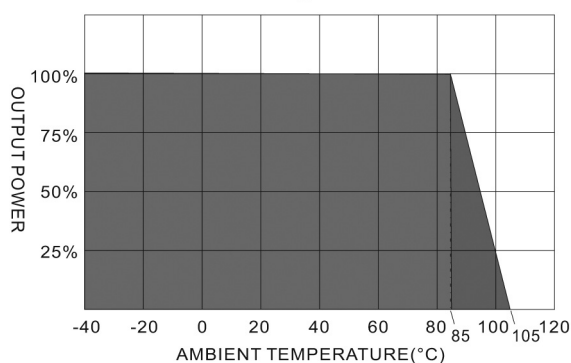
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Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA]	Efficiency [%, typ]	Capacitor load* [μF, max]
		no load (max)	full load (typ)				
1S6W_0505S1.5RP	4.5 - 9	35	263	5	200	76	1680
1S6W_0512S1.5RP	4.5 - 9	35	253	12	83	79	820
1S6W_0515S1.5RP	4.5 - 9	35	250	15	67	80	680
1S6W_0524S1.5RP	4.5 - 9	35	250	24	42	80	470
1S6W_1205S1.5RP	9-18	20	107	5	200	78	1680
1S6W_1212S1.5RP	9-18	20	105	12	83	80	820
1S6W_1215S1.5RP	9-18	20	103	15	67	81	680
1S6W_1224S1.5RP	9-18	20	105	24	42	80	470
1S6W_2405S1.5RP	18-36	10	54	5	200	78	1680
1S6W_2412S1.5RP	18-36	10	52	12	83	80	820
1S6W_2415S1.5RP	18-36	10	52	15	67	80	680
1S6W_2424S1.5RP	18-36	10	52	24	42	81	470
1S6W_4805S1.5RP	36-75	7	28	5	200	76	1680
1S6W_4815S1.5RP	36-75	7	27	15	67	78	680
1S6W_4824S1.5RP	36-75	7	27	24	42	77	470
1S6W_0512D1.5RP	4.5 - 9	35	259	±12	±42	77	±470
1S6W_0515D1.5RP	4.5 - 9	35	254	±15	±33	79	±330
1S6W_1212D1.5RP	9-18	20	106	±12	±42	79	±470
1S6W_1215D1.5RP	9-18	20	105	±15	±33	80	±330
1S6W_2412D1.5RP	18-36	10	52	±12	±42	80	±470
1S6W_2415D1.5RP	18-36	10	53	±15	±33	79	±330
1S6W_4812D1.5RP	36-75	7	27	±12	±42	77	±470
1S6W_4815D1.5RP	36-75	7	27	±15	±33	77	±330

Typical characteristics

Derating Curve



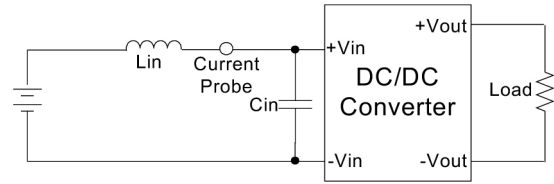
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Test configurations

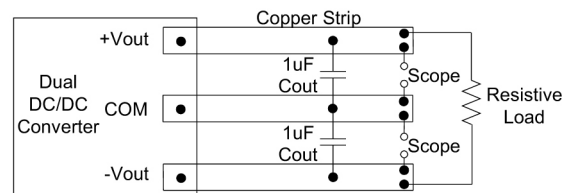
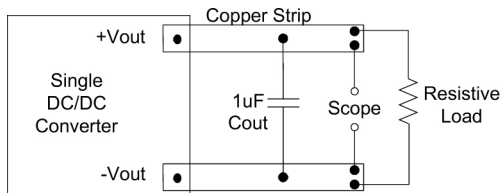
Input reflected ripple current test step

Input reflected ripple current is measured through a source inductor L_{in} (12uH) and a source capacitor C_{in} (47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



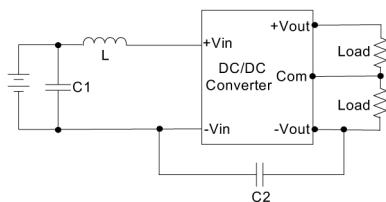
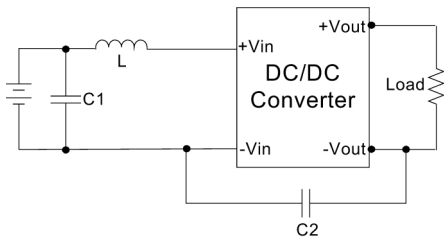
Output ripple & noise measurement test

Use a capacitor C_{out} (1.0uF) measurement. The Scope measurement bandwidth is 20MHz



EMI filter

Input filter components (C_1, C_2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



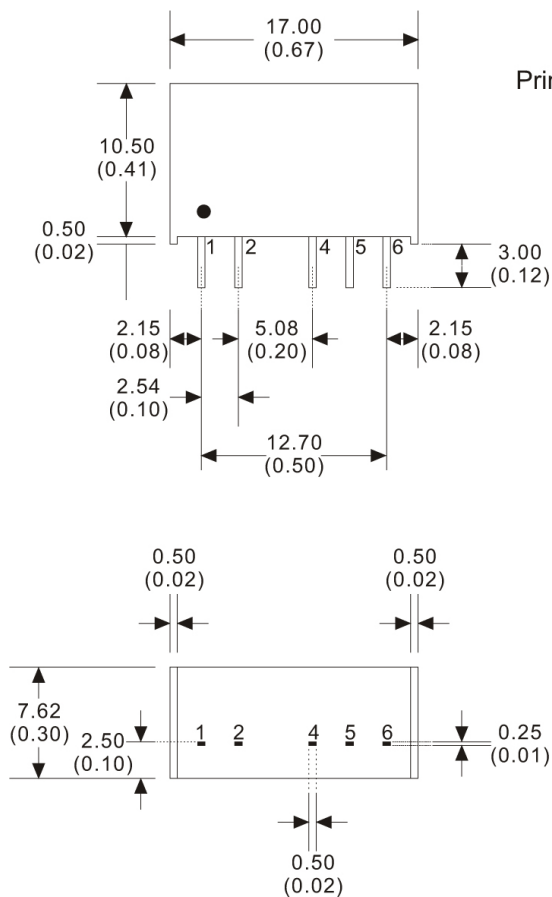
	C1	C2	L
1S6W_05XXS1.5RP	4.7uF/50V	220pF/3KV	4.7uH
1S6W_12XXS1.5RP	4.7uF/50V	220pF/3KV	4.7uH
1S6W_24XXS1.5RP	4.7uF/50V	220pF/3KV	18 uH
1S6W_48XXS1.5RP	4.7uF/100V	220pF/3KV	18 uH

	C1	C2	L
1S6W_05XXD1.5RP	4.7uF/50V	220pF/3KV	4.7uH
1S6W_12XXD1.5RP	4.7uF/50V	220pF/3KV	4.7uH
1S6W_24XXD1.5RP	4.7uF/50V	220pF/3KV	18 uH
1S6W_48XXD1.5RP	4.7uF/100V	220pF/3KV	18 uH

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Mechanical dimensions



Pin connections		
PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	+Vout	+Vout
4	N.P	N.P
5	-Vout	-Vout

- Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
 3. Pin to case tolerance: ± 0.5 (± 0.02)
 4. Case Tolerance: ± 0.5 (± 0.02)
 5. Stand-off tolerance: ± 0.1 (± 0.004)