



3S6W4_1.6RP Series

3W - Wide Input - Isolated & Regulated DC-DC Converter

DC-DC Converter

3 Watt

- ⊕ 4:1 wide input voltage range
- ⊕ 1.6KVDC isolation
- ⊕ Short circuit protection (SCP)
- ⊕ Smallest footprint 3W converter
- ⊕ Full SMD Technology
- ⊕ High efficiency up to 84%
- ⊕ Operating temperature: -40°C to +76°C
- ⊕ International standard pin-out
- ⊕ Remote on/off control

The 3S6W4_1.6RP series is a family of cost effective and high performed 3W single & dual output DC-DC converters.

These converters are built in non-conductive black plastic package in a 6-pin SIL miniature compact case with high performance features wide range devices operate over 4:1 input voltage range providing stable output voltage.

Devices are encapsulated using flame retardant resin. Input voltages of 12, 24, 48 Vdc with output voltage of 3.3, 5, 12, 15, ± 5 , ± 12 , ± 15 Vdc. High performance features include high efficiency operation up to 84% and output voltage accuracy of $\pm 1\%$ maximum.



Common specifications	
Short circuit protection:	Continuous, automatic recovery
Cooling:	Nature convection
Operation temperature range:	-40°C~+76°C (see derating curve) -40°C~+71°C (for 100% load)
Case temperature:	100°C MAX
Storage temperature range:	-55°C ~+125°C
Pin welding resistance temperature:	260°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Vibration:	10-55Hz, 10G, 30 Min. along X, Y and Z
Case material:	Plastic [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>956,000 hours
Safety standard (designed to meet):	IEC/UL/EN 60950-1 IEC/UL/EN 62368-1
Weight:	3.85g

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Voltage accuracy			± 1		%
Line regulation				± 0.2	%
Load regulation	0% to 100% load			± 1	%
Cross regulation*	Dual output			± 5	%
Temperature coefficient				± 0.02	%/°C
Ripple&Noise**	20MHz bandwidth • Single • Dual			150 100	mVpp mVpp
Transient recovery time***			500		μ s
Transient response deviation***	• Single output 3.3V/5V • Others			± 5 ± 3	% %
Switching frequency (PFM mode)	100% load, nominal input voltage	100			KHz

* One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within $\pm 5\%$.

** Ripple/Noise measured with a 10 μ F electrolytic capacitor and 0.1 μ F ceramic capacitor.

*** 25% load step change, min. Vin and 100%-25% load

Example:

3S6W4_1205S1.6RP

3= 3Watt; S6= SIP6; W4= wide input; 4.5-18Vin; 12Vout; S= Single Output; 1.6= 1600VDC; R= Regulated Output; P= Short Circuit Protection

EMC specifications			
EMI	CE*	CISPR25/EN55025	CLASS A
EMI	RE*	CISPR25/EN55025	CLASS A
EMS	ESD	IEC/EN61000-4-2	perf. Criteria A
EMS	RS	IEC/EN61000-4-3	perf. Criteria A
EMS	EFT**	IEC/EN61000-4-4	perf. Criteria A
EMS	Surge**	IEC/EN61000-4-5	perf. Criteria A
EMS	CS	IEC/EN61000-4-6	perf. Criteria A
EMS	PFMF	IEC/EN61000-4-8	perf. Criteria A

* Input filter components are required to help meet conducted emission and radiated emission class A, which application refer to the EMI filter configuration.

** An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Start-up time			30		mS
Reflected ripple current*			20		mApk-pk
Input filter	Capacitor				
Surge voltage	100ms max. • 12V models • 24V • 48V			25 50 100	VDC VDC VDC
Remote on/off	• ON • OFF • Off stand by input current (normal Vin)		open or high impedance 2-4mA input current (via 1K)	2.5	mA

* Measured Input reflected ripple current with a simulated source inductance of 27 μ H and a source capacitor Cin(47 μ F, ESR-1.0 Ω at 100KHz).

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute, leakage current less than 1 mA	1600			VDC
Isolation resistance	Test at 500VDC	1000			M Ω
Isolation capacitance	Input/Output, 100KHz/0.1V			40	pF

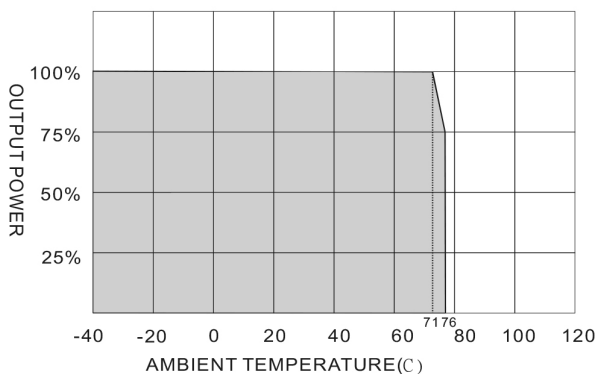
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Part Number	Input Voltage [VDC]		Output Voltage [VDC]	Output Current [mA]		Capacitive load [μF, Max.]	Efficiency [%, Typ.]
	Nominal	Range		Full load	Min. load		
3S6W4_1203S1.6RP	12	4.5-18	3.3	700	0	3300	75
3S6W4_1205S1.6RP	12	4.5-18	5	600	0	1680	81
3S6W4_1212S1.6RP	12	4.5-18	12	250	0	820	83
3S6W4_1215S1.6RP	12	4.5-18	15	200	0	680	83
3S6W4_2403S1.6RP	24	9-36	3.3	700	0	3300	76
3S6W4_2405S1.6RP	24	9-36	5	600	0	1680	82
3S6W4_2412S1.6RP	24	9-36	12	250	0	820	84
3S6W4_2415S1.6RP	24	9-36	15	200	0	680	84
3S6W4_4803S1.6RP	48	18-75	3.3	700	0	3300	74
3S6W4_4805S1.6RP	48	18-75	5	600	0	1680	81
3S6W4_4812S1.6RP	48	18-75	12	250	0	820	81
3S6W4_4815S1.6RP	48	18-75	15	200	0	680	82
3S6W4_1205D1.6RP	12	4.5-18	±5	300	0	±1000	80
3S6W4_1212D1.6RP	12	4.5-18	±12	125	0	±470	82
3S6W4_1215D1.6RP	12	4.5-18	±15	100	0	±330	83
3S6W4_2405D1.6RP	24	9-36	±5	300	0	±1000	81
3S6W4_2412D1.6RP	24	9-36	±12	125	0	±470	83
3S6W4_2415D1.6RP	24	9-36	±15	100	0	±330	84
3S6W4_4805D1.6RP	48	18-75	±5	300	0	±1000	79
3S6W4_4812D1.6RP	48	18-75	±12	125	0	±470	80
3S6W4_4815D1.6RP	48	18-75	±15	100	0	±330	80

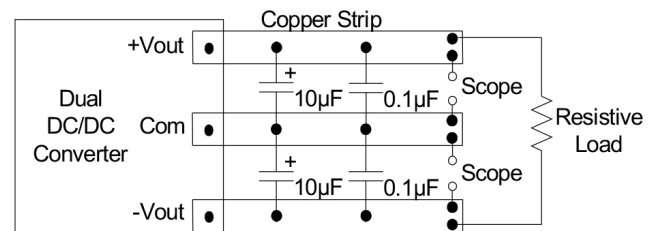
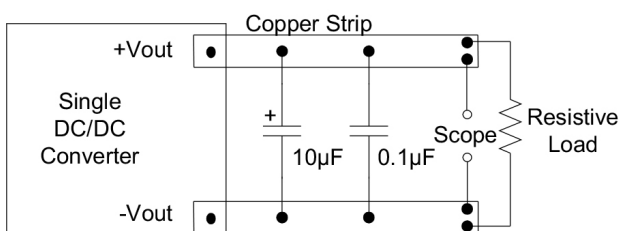
Typical characteristics

Derating Curve



Output ripple & noise measurement test

Use a 10μF electrolytic capacitor and 0.1μF ceramic capacitor. The Scope measurement bandwidth is 20MHz.

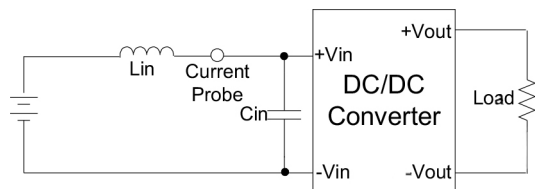


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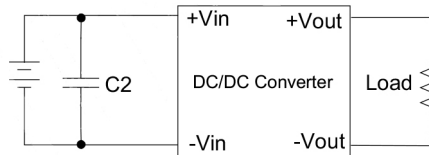
Input reflected current test step

Input reflected ripple current is measured through a source inductor L_{in} (27 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ω at 100KHz) at nominal input and full load.



EFT/Surge filter

Input filter components (C2) is used to help meet IEC61000-4-4 and IEC61000-4-5.



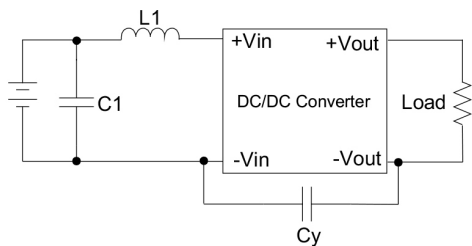
C2	
3S6W4_1.6RP	220 μ F, 100V

EMI filter

Conducted emissions

Input filter components (C1, L_1) are used to meet EMI test criterial A.

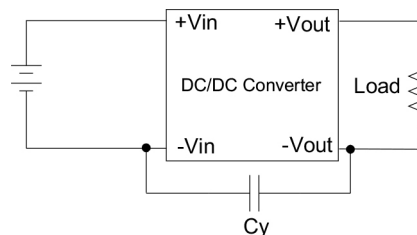
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L1	Cy
3S6W4_12xx_1.6RP	1210, 10 μ F, 35V	2.2 μ H	1206, 100pF, 1kV
3S6W4_24xx_1.6RP	1210, 2.2 μ F, 100V	10 μ H	1206, 100pF, 1kV
3S6W4_48xx_1.6RP	1210, 4.7 μ F, 100V	18 μ H	1206, 100pF, 1kV

Radiated emissions

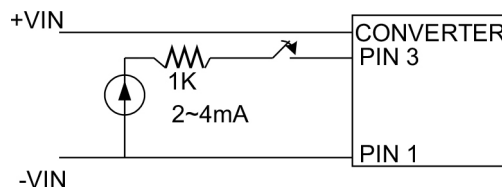
Input filter components (C_y) is used to meet EMI test criterial A. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



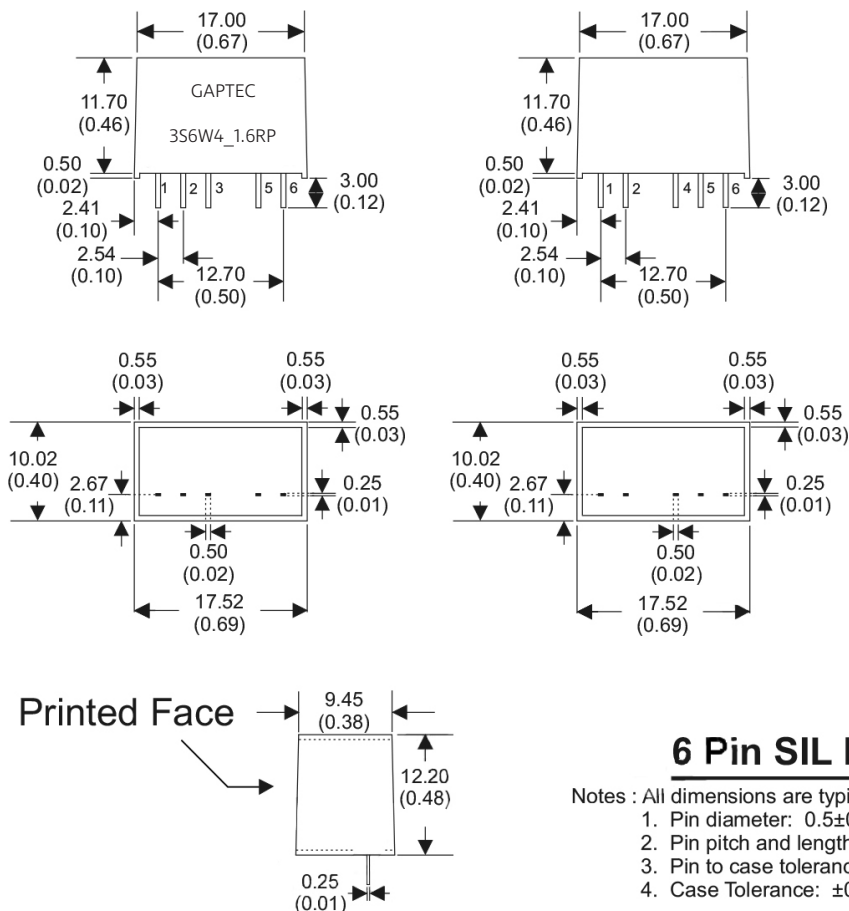
Cy	
3S6W4_1.6RP	1206, 100pF, 1kV

Remote on/off test step

Input current (2~4mA) via 1K to Pin3, converter OFF. open or high impedance, converter ON.



Mechanical dimensions



Note:

1. Recommended used in more than 5% load, if the load is lower than 5%, then the ripple index of the product may exceed the specification, but does not affect the reliability of the product;
2. The max. capacitive load should be tested within the input voltage range and under full load conditions;
3. Unless otherwise specified, data in this datasheet should be tested under the conditions of $T_a=25^\circ\text{C}$, humidity<75%RH, when inputting nominal voltage and outputting rated load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. We can provide product customization service;
6. Specifications of this product are subject to changes without prior notice.