9S8W_1.6RP series

9W - Dual/Single Output - Wide Input - Isolated & Regulated DC-DC Converter

DC-DC Converter 9 Watt

- Highest power density in SIP8 package
- Operation temperature range: -40°C ~+ 85°C
- 2:1 wide input voltage range
- Isolation 1600VDC
- High Efficiency up to 90%
- Short circuit protection (SCP)
- Remote On/Off control
- Internal SMD construction
- RoHS Compliance
- Smallest footprint 9W converter

The 9S8W_1.6RP series is a family of high performanced 9W single & dual output DC-DC converters. These converters are built in copper package in a 8-pin SIP miniature compact case with high performance. Featured wide range devices operate over 2:1 input voltage range, providing stable output voltage, which is much smaller than package of DIP 24 - same power rating but only 43% of the traditional volume. Devices are encapsulated using flame retardant resin. Featuring new PWM construction, no minimum load required and precise 1% output voltage accuracy.

UL-62368-1 (E347551)

Common specifications

Short circuit protection:	Continuous, automatic recovery
Case temperature:	100°C max.
Cooling:	Nature convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Storage humidity range:	< 95%
Soldering temperature:	260°C max, 1.5mm from case for 10 sec
Switching frequency:	• 24V: 400kHz typ. • 48V: 500kHz typ.
Operating Frequency:	200kHz min
Safety standard:	IEC60950-1
Case material:	Copper
Potting material:	Epoxy [UL94-V0]
Pin material:	C5191R-H Solder-coated
MTBF (MIL-HDBK 217F):	+25°C: >900 Khours
Dimensions:	21.8x9.6x11.2mm
Weight:	7.3g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Start up time	Nominal Vin and constant resistive load		50		ms
Input filter	Capacitor				
Input reflected ripple current				30	mApk-pk
Surge voltage	100ms max. • 12V models • 24V • 48V			 25 50 100	 VDC VDC VDC
Remote on/off	• Device ON • Device OFF • Device OFF (Stand by input current)			open or high impedance 2-4mA input current (via 1KΩ) 2.5mA max.	
Under voltage lockout	• 12V module ON/OFF • 24V module ON/OFF • 48V module ON/OFF			9.0VDC / 7.0VDC 18.0VDC / 14.0VDC 36.0VDC / 28.0VDC	

* Measured with a simulated source inductance Lin (12uH) and a source capacitor Cin (47uF, ESR<1.0Ω at 100KHz).

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output accuracy				±1	%
Line regulation				±0.2	%
Load regulation*	0% to 100% full load • Single output • 3.3V • Dual output			 ±0.5 ±1.0 ±1.0	 % % %
Cross regulation	Dual output, full load, 25%-100% load, output voltage variable rate within 5%			±5	%
Temperature drift			±0.02		%/°C
Ripple & Noise*	20MHz Bandwidth		75		mVpk-pk
Transient recovery time	Normal Vin, 100%-25% load, 25% load step change		250		µs
Transient response deviation	Normal Vin, 100%-25% load, 25% load step change • Single output 3.3V • Others			 ±5 ±3	 % %

* Measured with a 1µF ceramic capacitor and a 10µF electrolytic capacitor.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	60 seconds • Input/output • Case/input&output	 1600 1000			 VDC VDC
Isolation resistance		1			GΩ
Isolation capacitance				50	pF

Example:
9S8W_1205S1.6RP
9 = 9Watt; S8 = SIP8; W = wide input (2:1); 18-36Vin; 5Vout;
S = Single output; 1.6 = 1600VDC; R = Regulated output;
P = Short circuit protection

Note:
1. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
2. In this datasheet, all the test methods of indications are based on corporate standards.

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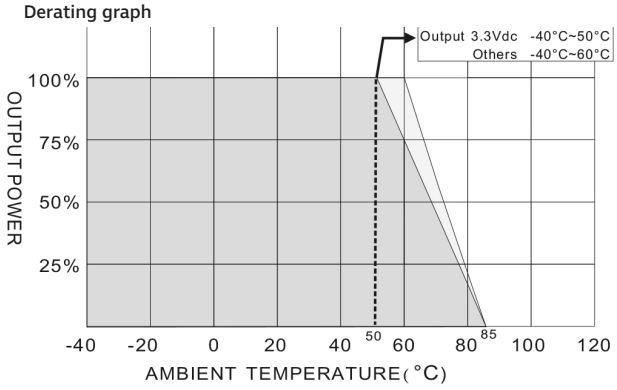
DC-DC Converter

Part Number	Input Voltage [VDC] Nominal	Range	Input Current [mA, typ. @full load]	Output Voltage [VDC]	Output Current [mA, max.]	Efficiency [%, typ.]	Capacitive Load* [µF, max.]
9S8W_1203S1.6RP	12	9-18	679	3.3	2000	81	2600
9S8W_1205S1.6RP	12	9-18	784	5	1600	85	1300
9S8W_1209S1.6RP	12	9-18	862	9	1000	87	800
9S8W_1212S1.6RP	12	9-18	852	12	750	88	560
9S8W_1215S1.6RP	12	9-18	843	15	600	89	560
9S8W_1224S1.6RP	12	9-18	843	24	375	89	200
9S8W_2403S1.6RP	24	18-36	335	3.3	2000	82	2600
9S8W_2405S1.6RP	24	18-36	392	5	1600	85	1300
9S8W_2409S1.6RP	24	18-36	426	9	1000	88	800
9S8W_2412S1.6RP	24	18-36	421	12	750	89	560
9S8W_2415S1.6RP	24	18-36	417	15	600	90	560
9S8W_2424S1.6RP	24	18-36	417	24	375	90	200
9S8W_4803S1.6RP	48	36-75	168	3.3	2000	82	2600
9S8W_4805S1.6RP	48	36-75	196	5	1600	85	1300
9S8W_4809S1.6RP	48	3675	213	9	1000	88	800
9S8W_4812S1.6RP	48	36-75	211	12	750	89	560
9S8W_4815S1.6RP	48	36-75	211	15	600	89	560
9S8W_4824S1.6RP	48	36-75	211	24	375	89	200
9S8W_1205D1.6RP	12	9-18	784	±5	±800	85	±800
9S8W_1212D1.6RP	12	9-18	852	±12	±375	88	±390
9S8W_1215D1.6RP	12	9-18	843	±15	±300	89	±200
9S8W_2405D1.6RP	24	18-36	388	±5	±800	86	±800
9S8W_2412D1.6RP	24	18-36	421	±12	±375	89	±390
9S8W_2415D1.6RP	24	18-36	431	±15	±300	87	±200
9S8W_4805D1.6RP	48	36-75	194	±5	±800	86	±800
9S8W_4812D1.6RP	48	36-75	216	±12	±375	87	±390
9S8W_4815D1.6RP	48	36-75	216	±15	±300	87	±200

* Test by minimal Vin and constant resistive load.

Typical characteristics

Derating graph



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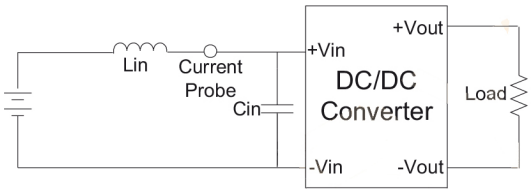
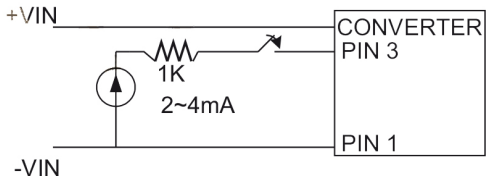
Test configurations

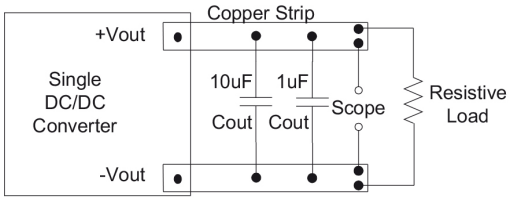
Input Reflected Ripple Current Test Step
Input reflected ripple current is measured through a source inductor Lin (12μH)
and a source capacitor Cin (47μF, ESR<1.0Ω at 100KHz) at nominal input and full load.

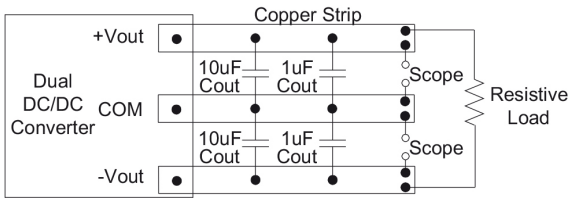


Input Reflected Ripple Current Test Step
Input current(2~4mA) via 1K Ω to Pin3 , converter OFF.
Open or high impedance , converter ON.

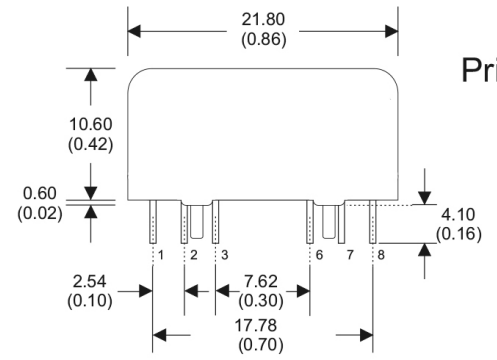


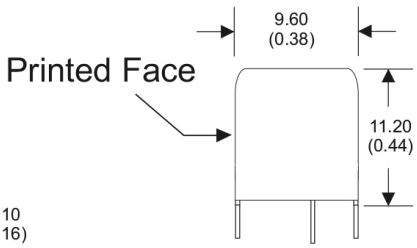
Output ripple & noise measurement test
To reduce ripple and noise, it is recommended to use a 1.0μF ceramic disk capacitor and a 10μF electrolytic capacitor to at the output.

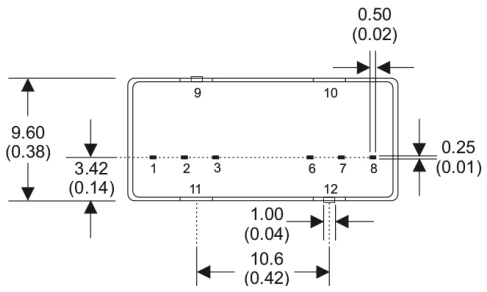




Mechanical dimensions/foot-







Pin connections		
Pin	Single	Dual
1	-V input	-V input
2	+V input	+V input
3	Remote On/ Off	Remote On/ Off
6	+V output	+V output
7	-V output	Common
8	N.C.	-V output
9	Case	Case
10	Stand Off	Stand Off
11	Stand Off	Stand Off
12	Case	Case

Note:
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)