



Wide Input Voltage Range 40 Watt Dc-Dc Converter



FEATURES:

- 4:1 Wide Input Voltage Range.
- High Efficiency Up To 88%.
- Under Voltage Lockout.
- Over Temperature Protection.
- Six-Sided Shield.
- Remote Control: On/Off.

RoHS
Compliant

APPLICATIONS:

- Industry Control System
- Semiconductor Equipment
- Wireless Network
- Telecom/Datacom
- Measurement

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Input Voltage	Input Current		Output Voltage	Output Current	Efficiency ⁽⁴⁾
	Vdc	No-Load ⁽³⁾ (mA TYP)	Full Load ⁽²⁾ (mA TYP)	Vdc	mA	%TYP
99DW-24S03R2NL	9-36	100	1598	3.3	10000	86
99DW-24S05R2NL	9-36	100	1915	5	8000	87
99DW-24S12R2NL	9-36	100	1875	12	3300	88
99DW-24S15R2NL	9-36	100	1882	15	2650	88
99DW-24D12R2NL	9-36	60	1897	± 12	± 1670	88
99DW-24D15R2NL	9-36	60	1903	± 15	± 1340	88
99DW-48S03R2NL	18-75	60	799	3.3	10000	86
99DW-48S05R2NL	18-75	60	957	5	8000	87
99DW-48S12R2NL	18-75	40	937	12	3300	88
99DW-48S15R2NL	18-75	40	941	15	2650	88
99DW-48D12R2NL	18-75	40	948	± 12	± 1670	88
99DW-48D15R2NL	18-75	40	951	± 15	± 1340	88

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types				4:1	
Start-up voltage / under voltage lockout	24 Vin		9 / 8		VDC
	48 Vin		18 / 16		VDC
Surge voltage (100 msec. max.)	24 Vin			50	V
	48 Vin			100	V
Filter	Pi TYPE				

Output Specifications (Temperature Coefficient : ±0.05%/°C)

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance				± 2	%
Output voltage adjustment				± 10	%
Line Regulation	Vin min. to Vin max			± 0.5	%
Load Regulation (10 - 100%)	Single output			± 0.5	%
	Dual output			± 1	%
Load cross variation	25 %~100 % (Dual output)			± 5	%
Ripple and noise ⁽⁴⁾ (20 MHz bandwidth)	Single output			100	mVp-p
	Dual output			± 150	mVp-p
Start up time	nominal Vin and constant resistive load		25		ms
Transient response time	25% load step change		350		us
Short circuit protection			automatic recovery		
Over load protection			150 % of Iout max.typ. foldback		
Thermal shutdown			110		°C
Over voltage protection	3.3VDC		3.9		V
	5VDC		6.2		V
	12VDC		15		V
	15VDC		18		V
Minimum load	All models	0		10	%
Capacitive load output models⁽⁵⁾	3.3 VDC			16000	uF
	5 VDC			10000	uF
	12 VDC			2000	uF
	15 VDC			1000	uF
	± 12 VDC			± 1000	uF
	± 15 VDC			± 680	uF



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General Specifications					
Parameters	Conditions	Min	Typ	Max	Units
Temperature ranges	Operating(see derating)	-40		+85	°C
	Case temperature			105	°C
	Storage	-55		+125	°C
Derating	see graphs on page 3 to 3				
Humidity	non condensing			95	%
Reliability, calculated MTBF ⁽¹⁾	BELLCORE TR-NWT-000332	1100000			Hours
	MIL-HDBK-217F	151100			Hours
Isolation voltage	For 60 seconds(Input/Output)			1500	VDC
Isolation resistance	Input/Output	1000			MΩ
Isolation capacity	Input/Output			2500	pF
Remote On/Off ⁽⁶⁾	On	Open			
	Off	Short to Ground			
	Off idle current			2.5	mA
Switching frequency (fixed)	Pulse width modulation PWM		300		KHz
Case material		Metal			
Baseplate material		none conductive FR4			
Potting material		epoxy (UL 94V-0 -rated)			
Weight		60 g (2.1 oz)			
Soldering temperature		max. 265 °C / 10 sec.			

Note: 1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)

MIL-STD-217F Notice2 @Ta=25 °C, Full load (Ground, Benign, controlled environment)

2. Maximum value at nominal input voltage.

3. Typical value at nominal input voltage and no load.

4. Typical value at nominal input voltage and full load.

5. Test by normal Vin and constant resistive load.

6. The ON/OFF control pin voltage is referenced to -Input.(Leave open if not used.)

7. The 99DW-R2 series can meet EN55022 Class A with parallel an external capacitor to the input pins.Recommend:

24Vin : 4.7μF/50V X7R 1812 MLCC.

48Vin : 2.2μF/100V X7R 1812 MLCC.

8. EN 55022 level B, FCC part 15, level B with external capacitor(see on the page 3 of 3)

9. For the single output Maximum output deviation is 10% inclusive of remote sense and trim.if remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding -OUTPUT

10. ESD (input) : EN 61000-4-2, Air±8KV/Contact±6KV, perf. criteria A.

12. Radiated immunity : EN 61000-4-3, 10V/m, perf. criteria A.

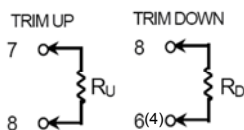
13. Fast transient (input) : EN 61000-4-4, ±2KV, perf. criteria B.

14. Surge (input) : EN 61000-4-5, ±1KV, perf. criteria A.

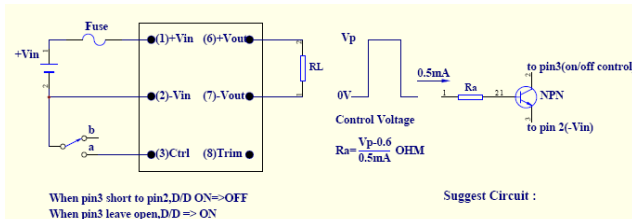
15. Conducted immunity : EN 61000-4-6, 10Vr.m.s, perf. criteria A.

Output Voltage Adjustment

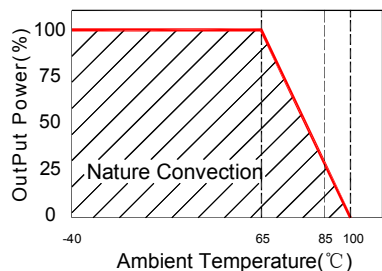
Output can be externally trimmed by using the method shown below.



Remote On/Off Note



Temperature Derating Graph



Part Number

99DW - 24 S 05 R 2 NL
A B C D E F G

A:Series

B:Input Voltage

C:Single(S)Dual(D)

D:Output Voltage

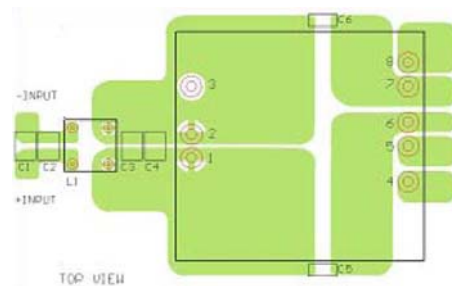
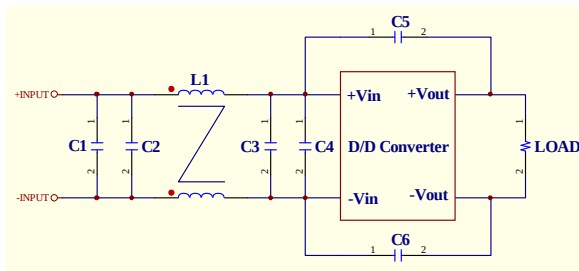
E:Regulated(R)

F:Types

G:RoHS Version

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EMC Considerations



Suggested Schematic to comply with Conducted Noise according to EN55022 Class B

Recommended Layout with input Filter

Following components are needed to comply with EN55022 Class B conducted noise:

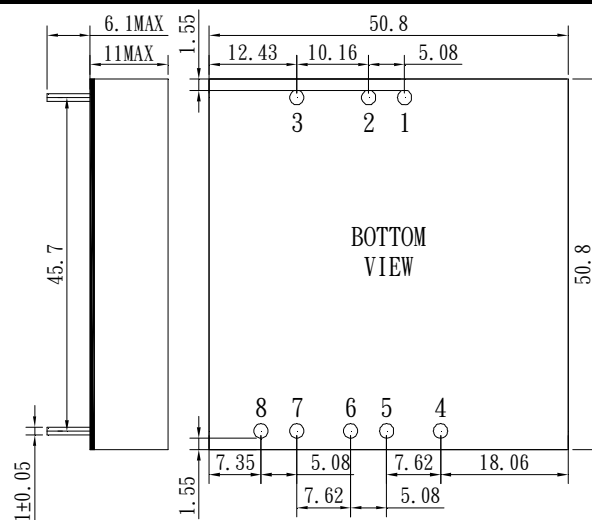
99DW-24xxxR2NL

Componet	Value	Voltage	Reference
C1,C2	4.7uF	50V	1812 MLCC
C3,C4	1000pF	2KV	1206 MLCC
L1	450uH		Common Mode Choke

99DW-48xxxR2NL

Componet	Value	Voltage	Reference
C1,C2	2.2uF	100V	1812 MLCC
C3,C4	1000pF	2KV	1206 MLCC
L1	830uH		Common Mode Choke

Markings and dimensions



UNIT:mm XX.X±0.5 XX.XX±0.25

Pin Size Tolerance: Φ1.0 ±0.05mm

PIN Connection

PIN	1	2	3	4	5	6	7	8
SINGLE	+Vin	-Vin	Remote On/Off	-Sense*	+Sense*	+Vout	-Vout	Trim
DUAL	+Vin	-Vin	Remote On/Off	+Vout	Com	Com	-Vout	Trim