



Wide Input Voltage Range 40 Watt Dc-Dc Converter



FEATURES:

- 2:1 Wide Input Voltage.
- Efficiency To 87%
- Under Voltage Lockout
- Over Temperature Protection
- Shielded metal Case with insulated Baseplate
- Remote Control:On/Off



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 Vdc	Input Current		Output Voltage Vdc	Output Current mA	Efficiency %TYP
		No-Load (mA TYP)	Full Load (mA TYP)			
99D-12S03R2NL	9-18	200	3235	3.3	10000	85
99D-12S05R2NL	9-18	200	3875	5	8000	86
99D-12S12R2NL	9-18	200	3837	12	3300	86
99D-12S15R2NL	9-18	200	3851	15	2650	86
99D-12D12R2NL	9-18	200	4235	±12	±1800	85
99D-12D15R2NL	9-18	200	4117	±15	±1400	85
99D-24S03R2NL	18-36	100	1598	3.3	10000	86
99D-24S05R2NL	18-36	100	1915	5	8000	87
99D-24S12R2NL	18-36	100	1896	12	3300	87
99D-24S15R2NL	18-36	100	1903	15	2650	87
99D-24D12R2NL	18-36	100	2068	±12	±1800	87
99D-24D15R2NL	18-36	100	2011	±15	±1400	87
99D-48S03R2NL	36-75	50	799	3.3	10000	86
99D-48S05R2NL	36-75	50	957	5	8000	87
99D-48S12R2NL	36-75	50	948	12	3300	87
99D-48S15R2NL	36-75	50	951	15	2650	87
99D-48D12R2NL	36-75	50	1034	±12	±1800	87
99D-48D15R2NL	36-75	50	1005	±15	±1400	87

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types				2:1	
Start-up voltage / under voltage lockout	12 Vin		9/ 8		VDC
	24 Vin		17.8/ 15.8		VDC
	48 Vin		36/ 33		VDC
Surge voltage (100 msec. max.)	12 Vin			25	V
	24 Vin			50	V
	48 Vin			100	V
Conducted noise⁽⁷⁾		EN 55022 level A, FCC part 15, level A with external capacitor			
Filter	Pi TYPE				



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Output Specifications (Temperature Coefficient : $\pm 0.05\%/^{\circ}\text{C}$)					
Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	$\pm 5\%$ for auxiliary outputs			± 2	%
Output voltage adjustment	only for single output models and symmetric dual output models			± 10	%
Line Regulation	Vin min. to Vin max			0.5	%
Load Regulation (10 - 100%)	single output			0.5	%
	dual output			1.0	%
Load cross variation	25 % /100 % (Dual output)			5.0	%
Ripple and noise ⁽⁴⁾ (20 MHz Bandwidth)	3.3 VDC & 5 VDC 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 change		300		us
Short circuit protection		automatic			
Over load protection		150 % typ.of			
Thermal shutdown			100		$^{\circ}\text{C}$
Over voltage protection	3.3VDC		3.9		V
	5VDC		6.2		V
	12VDC		15		V
	15VDC		18		V
Minimum load	only for dual output models	10% of rated			
Capacitive load output models ⁽⁵⁾	3.3 VDC			20000	μF
	5 VDC			13600	μF
	12 VDC			2360	μF
	15 VDC			1510	μF
	± 12 VDC			± 1200 (on each output)	μF
	± 15 VDC			± 750 (on each output)	μF

General Specifications					
Parameters	Conditions	Min	Typ	Max	Units
Temperature ranges	Operating	-40		+85	$^{\circ}\text{C}$
	Case temperature			100	$^{\circ}\text{C}$
	Storage	-55		+125	$^{\circ}\text{C}$
Derating		see graphs on page 3 to 4			
Humidity	non condensing			95	%
Reliability, calculated MTBF ⁽¹⁾	MIL-HDBK-217 E	510000			Hours
Isolation voltage	For 60 seconds(Input/Output)			1500	VDC
Isolation resistance	Input/Output	1000			M Ω
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		65 g (2.3 oz)			
Soldering temperature		max. 265 $^{\circ}\text{C}$ / 10 sec.			

Note: 1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40 $^{\circ}\text{C}$. (Ground fixed and controlled environment)

MIL-STD-217F Notice2 @Ta=25 $^{\circ}\text{C}$, 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:

12Vin : 10 μF /25V X7R 1812 MLCC

24Vin : 4.7 μF /50V X7R 1812 MLCC.

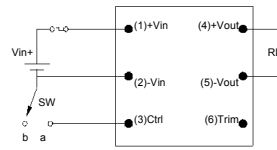
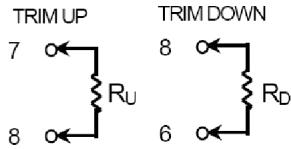
48Vin : 2.2 μF /100V X7R 1812 MLCC.



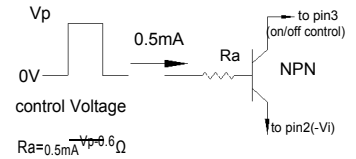
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Output Voltage Adjustment

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

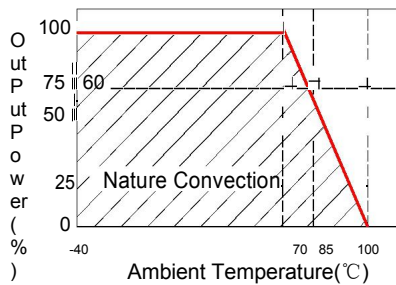


When pin3 short to pin2,D/D ON=>OFF
When pin3 leave open,D/D=>ON



Suggest Circuit:

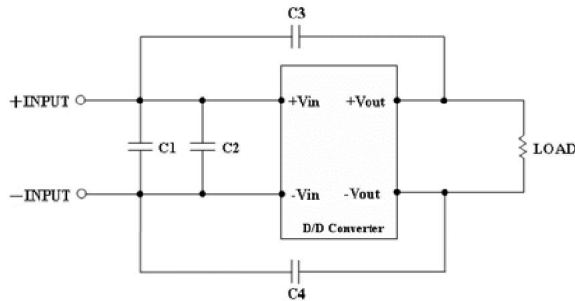
Temperature Derating Graph



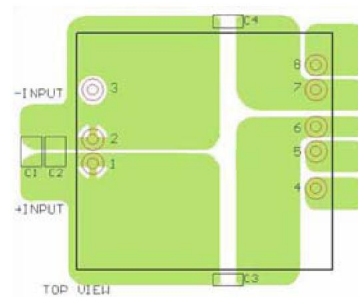
Part Number

99D - 12 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

EMC Considerations



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



Recommended Layout with input Filter

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

Componet	Value	Voltage	Reference
C1,C2	10uF	25V	1812 MLCC
C3,C4	1000pF	2KV	1206 MLCC

99D-24xxxR2NL

Componet	Value	Voltage	Reference
C1,C2	4.7uF	50V	1812 MLCC
C3,C4	1000pF	2KV	1206 MLCC

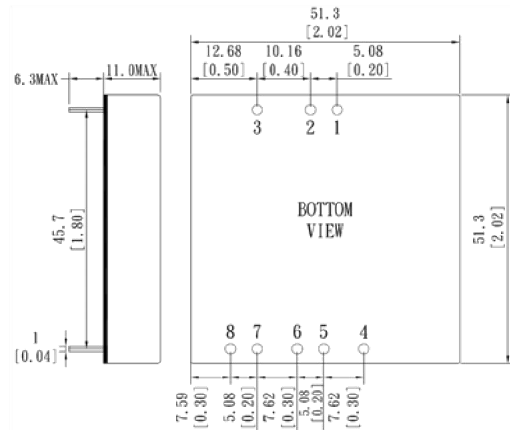
99D-48xxxR2NL

Componet	Value	Voltage	Reference
C1,C2	2.2uF	100V	1812 MLCC
C3,C4	1000pF	2KV	1206 MLCC



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Markings and dimensions



UNIT:mm XX.X±0.5 XX.XX±0.25

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

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