

Wide Input Voltage Range 75 Watt Dc-Dc Converter



FEATURES:

- COMPACT 2.28 X 1.45 X 0.5 INCH PACKAGE
- NO MINIMUM LOAD
- 2:1 WIDE INPUT RANGE
- HIGH EFFICIENCY UP TO 89%
- ADJUSTABLE OUTPUT VOLTAGE
- INDUSTRY STANDARD FOOTPRINT
- Remote On/Off ● RoHS COMPLIANT



APPLICATIONS:

- Industry Control System ● Semiconductor Equipment
- Wireless Network ● Telecom/Datacom ● Distributed Power Architectures

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	Output ⁽⁴⁾ Ripple & Noise	Capacitor ⁽⁵⁾ Load MAX	Efficiency ⁽⁴⁾
	Vdc	No-Load ⁽³⁾ (mA TYP)	Full Load ⁽²⁾ (mA TYP)	Vdc	Full Load (mA)	mVp-p	uF	%TYP
94D-24S03RNL	18-36	130	3161	3.3	20000	100	10000 uF	87%
94D-24S05RNL	18-36	150	3551	5.0	15000	100	10000 uF	88%
94D-24S12RNL	18-36	50	3551	12	6250	100	3300 uF	88%
94D-24S15RNL	18-36	50	3551	15	5000	100	2200 uF	88%
94D-48S03RNL	36-75	130	1563	3.3	20000	100	10000 uF	88%
94D-48S05RNL	36-75	130	1755	5.0	15000	100	10000 uF	89%
94D-48S12RNL	36-75	50	1755	12	6250	100	3300 uF	89%
94D-48S15RNL	36-75	50	1755	15	5000	100	2200 uF	89%

Note: 1. BELCORE TR-NWT-000332. Case 1: 80% Stress, Temperature at 40°C.

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

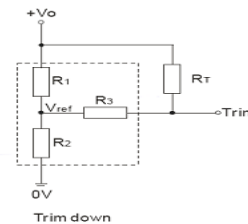
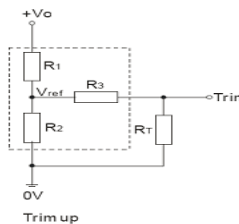
2. Maximum value at nominal input voltage and full load of standard type.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by nominal Vin and constant resistive load.
6. The ON/OFF control pin voltage is referenced to -Input.(can use negative or positive logic)
7. Maximum output deviation is 10% inclusive of 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.
8. The 94D series can meet EN55022 Class A and Class B only with external components before the input pin to the converter.
9. An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor YDS suggest: Nippon chemi-con KY series, 220uF/100V, ESR 48mΩ
10. TRIM calculation of the use and Resistance(Dashed line the interior of models)

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3$$

$$a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3$$

$$a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$



Input Specifications						
Parameters	Conditions	Min	Typ	Max	Units	
Voltage Types				2:1		
Filter	Pi Type					
Input surge voltage 100mS max	24V input		50		Vdc	
	48V input		100		Vdc	
Start up time	Nominal Vin and constant resistive load	Power up		25	mS	
		Remote ON/OFF		25	mS	
Start-up voltage	24V input		17		Vdc	
Start-up voltage	48V input		34		Vdc	
Shutdown voltage	24V input		15		Vdc	
Shutdown voltage	48V input		32		Vdc	
Protection	Fuse Recommended					
Remote ON/OFF (Note 6) (Negative logic)(Option)	DC-DC ON DC-DC OFF	Positive(standard) Open or(0.7V<Vr<12V) ,Negative(option) open or 0V<Vr<0.5 Positive short or(0V<Vr<0.7V) ,Negative(option) 0.6V<Vr<12				
Input current of Remote control pin	Nominal Vin			-0.5mA ~ +1mA		
Remote off state input current	Nominal Vin			2.5mA		

Yuan Dean Scientific CO.,LTD 94D SERIES

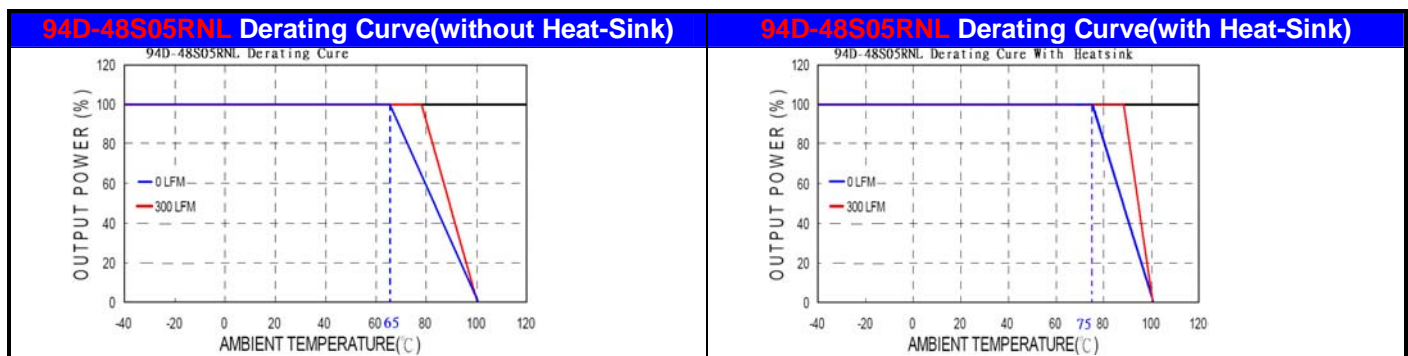
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Output Specifications (Temperature Coefficient : $\pm 0.02\%/^{\circ}\text{C}$)					
Parameters	Conditions	Min	Typ	Max	Units
Voltage Accuracy	Full load and nominal Vin			± 2	%
Short Circuit/ Restart	Hiccup, automatic recovery				
Over Current Protection	% of FL at nominal input	110		160	%
Over voltage protection Zener diode clamp	3.3V Output		5.0		V
	5.0V Output		6.0		V
	12V Output		15		V
	15V Output		18		V
Line Regulation	LL to HL at Full Load			± 0.5	%
Load Regulation ⁽⁴⁾	No load to Full load			± 0.5	%
Minimum Load			0		%
Ripple & Noise	20MHz bandwidth			100	mVp-p
Transient response recovery time	25% load step change		250		us
External Trim Adj. Range	$\pm 10\%$ of Output Voltage				
Temperature coefficient				± 0.02	% / $^{\circ}\text{C}$

General Specifications					
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance		10			M Ω
Switching Frequency			250		KHz
Isolation Capacitance			2500		pF
Base material	FR4 PCB				
Potting material	Epoxy (UL94-V0)				
Isolation Voltage				1600	VDC
Design meets safety				IEC60950-1, UL60950-1, EN60950-1	
Case material				(Black)Nickel Coated With Non-Conductive Base	
Dimensions	Appearance size		57.9X 36.8 X 12.7		mm
Weight			45		g
MTBF (Note 1)	BELLCORE-TR-NWT-000332		2.500x 10 ⁶		hrs
	MIL-HDBK-217F		4.422 x 10 ⁵		hrs

ENVIRONMENTAL SPECIFICATIONS					
Parameters	Conditions	Min	Typ	Max	Units
Operating Temperature	With derating	-40		100	$^{\circ}\text{C}$
Maximum case temperature				110	$^{\circ}\text{C}$
Storage Temperature		-55		125	$^{\circ}\text{C}$
Over temperature			120		$^{\circ}\text{C}$
Thermal impedance(Note 7)	Nature convection		10.5		$^{\circ}\text{C/Watt}$
	Nature convection with heat-sink		8.4		$^{\circ}\text{C/Watt}$
Thermal shock			MIL-STD-810F		
Vibration			MIL-STD-810F		
Relative humidity			5% to 95% RH		

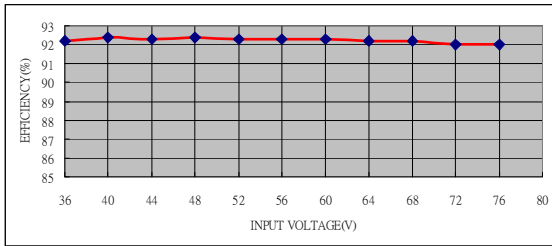
EMC CHARACTERISTICS					
Parameters	Conditions	Min	Typ	Max	Units
EMI (Note 8)	EN55022		Class A		
Radiated immunity	EN61000-4-3		10 V/m Perf. Criteria A		
Fast transient (Note 9)	EN61000-4-4		$\pm 2\text{KV}$ Perf. Criteria A		
Surge (Note 9)	EN61000-4-5		$\pm 1\text{KV}$ Perf. Criteria A		
Conducted immunity	EN61000-4-6		10 Vr.m.s Perf. Criteria A		



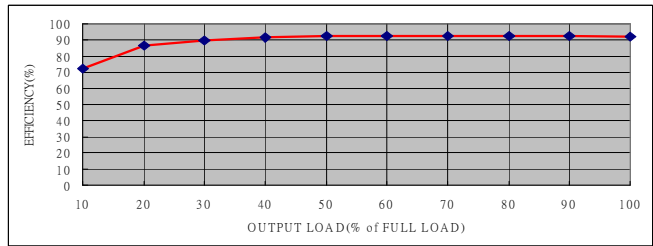
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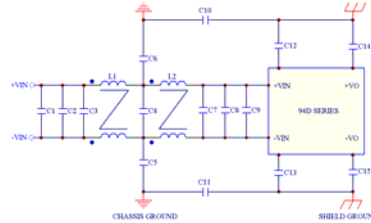
94D-48S05RNL Efficiency VS Input voltage



94D-48S05RNL Efficiency VS Output Load



Recommended Filter for EN55022 Class B Compliance



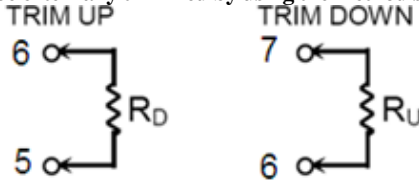
The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2	C3	C4	C5
94D-24Sxx	6.8μF/50V	6.8μF/50V	6.8μF/50V	6.8μF/50V	1.5nF/3kV
	C6	C7	C8	C9	C10
	1.5nF/3kV	6.8μF/50V	6.8μF/50V	6.8μF/50V	0.1μF/50V
	C11	C12	C13	C14	C15
	0.1μF/50V	1.0nF/3kV	1.0nF/3kV	1.0nF/3kV	1.0nF/3kV
	L1	L2			
	620μH	620μH			

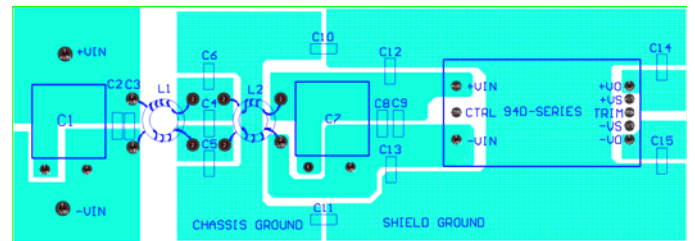
	C1	C2	C3	C4	C5
94D-48Sxx	100μF/100V	1.5μF/100V	1.5μF/100V	1.5μF/100V	1.5nF/3kV
	C6	C7	C8	C9	C10
	1.5nF/3kV	47μF/100V	1.5μF/100V	1.5μF/100V	0.1μF/50V
	C11	C12	C13	C14	C15
	0.1μF/50V	1.0nF/3kV	1.0nF/3kV	1.0nF/3kV	1.0nF/3kV
	L1	L2			
	620μH	620μH			

EXTERNAL OUTPUT TRIMMING

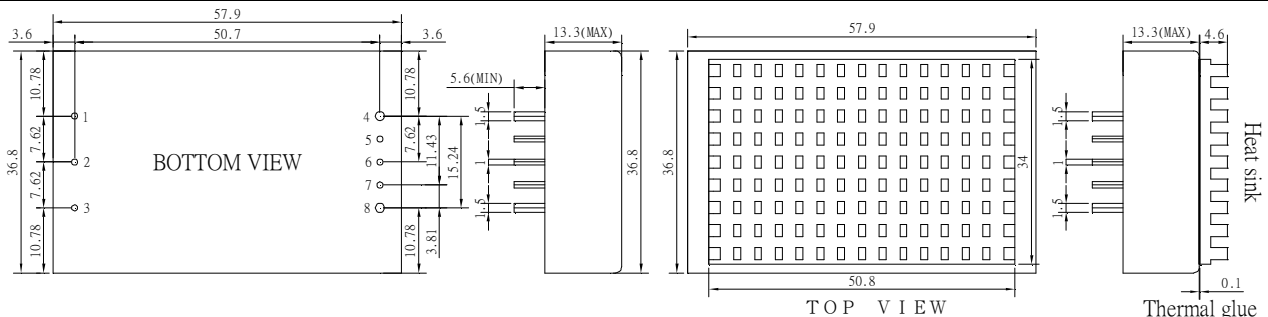
Output can be externally trimmed by using the method shown below.



Recommended EN55022 Class A Filter Circuit Layout



Markings and dimensions



UNIT:mm XX.X±0.5 XX.XX±0.25
 Pin1,2,3,5,6,7 size Tolerance:1.02±0.05mm
 Pin 4.8 Size Tolerance:1.52±0.05mm

PIN Connection

PIN	1	2	3	4	5	6	7	8
SINGLE	-Vin	Ctrl	+Vin	-Vout	-Sense	Trim	+Sense	+Vout