

Wide Input Voltage Range 30 Watt Dc-Dc Converter



FEATURES:

- 30W DIL PACKAGE
- 100% BURNED IN
- 2:1 WIDE INPUT RANGE
- HIGH EFFICIENCY UP TO 89%
- UL 94V-0 PACKAGE MATERIAL
- CUSTOM SOLUTIONS AVAILABLE
- Remote 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	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
96D-12S03R5NL	9-18	100	2398	3.3	7500	100	20000	86
96D-12S05R5NL	9-18	100	2841	5.0	6000	100	14400	88
96D-12S12R5NL	9-18	100	2809	12	2500	100	3000	89
96D-12S15R5NL	9-18	100	2809	15	2000	100	2000	89
96D-24S03R5NL	18-36	100	1200	3.3	7500	100	20000	86
96D-24S05R5NL	18-36	100	1420	5.0	6000	100	14400	88
96D-24S12R5NL	18-36	100	1404	12	2500	100	3000	89
96D-24S15R5NL	18-36	100	1404	15	2000	100	2000	89
96D-48S03R5NL	36-72	100	600	3.3	7500	100	20000	86
96D-48S05R5NL	36-72	100	710	5.0	6000	100	14400	88
96D-48S12R5NL	36-72	100	702	12	2500	100	3000	89
96D-48S15R5NL	36-72	100	702	15	2000	100	2000	89
96D-12D12R5NL	9-18	100	2873	±12	±1250	100	±2000	89
96D-12D15R5NL	9-18	100	2873	±15	±1000	100	±1300	89
96D-24D12R5NL	18-36	100	1437	±12	±1250	100	±2000	89
96D-24D15R5NL	18-36	100	1437	±15	±1000	100	±1300	89
96D-48D12R5NL	36-72	100	718	±12	±1250	100	±2000	89
96D-48D15R5NL	36-72	100	718	±15	±1000	100	±1300	89

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 96D-R5 series can meet EN55022 Class A with parallel an external capacitor to the input pins.Recommend: 24(12)Vin : 4.7uF/50V X7R 1812 MLCC. 48Vin : 2.2uF/100V X7R 1812 MLCC.

8. An external filter capacitor is required if the module has to meet EN61000-4-4,EN61000-4-5. The filter capacitor YDS suggest:

24(12)Vin : Nippon chemi-con KY series, 330uF/50V, ESR 55mΩ. 48Vin : Nippon chemi-con KY series, 220uF/100V, ESR 48mΩ

Input Specifications						
Parameters	Conditions	Min	Typ	Max	Units	
Voltage Types			2:1			
Filter	Pi Type					
Input surge voltage 100mS max	(12V)24V input		50		Vdc	
	48V input		100		Vdc	
Input reflected ripple current	Nominal Vin and full load		20		mA _{p-p}	
Start up time	Nominal Vin and constant resistive load	Power up	30		mS	
		Remote ON/OFF	30		mS	
Start-up voltage	12V input		9		Vdc	
Start-up voltage	24V input		18		Vdc	
Start-up voltage	48V input		36		Vdc	
Shutdown voltage	12V input		8		Vdc	
Shutdown voltage	24V input		17		Vdc	
Shutdown voltage	48V input		35		Vdc	
Protection	Fuse Recommended					
Remote ON/OFF (Note 6)	DC-DC ON			OPEN		
(Negative logic)(Option)	DC-DC OFF			Short to ground		
Input current of Remote control pin	Nominal Vin		-0.5mA ~ +0.5mA (TYP)			
Remote off state input current	Nominal Vin		3mA (Typ)			

Yuan Dean Scientific CO.,LTD

96D-R5 SERIES

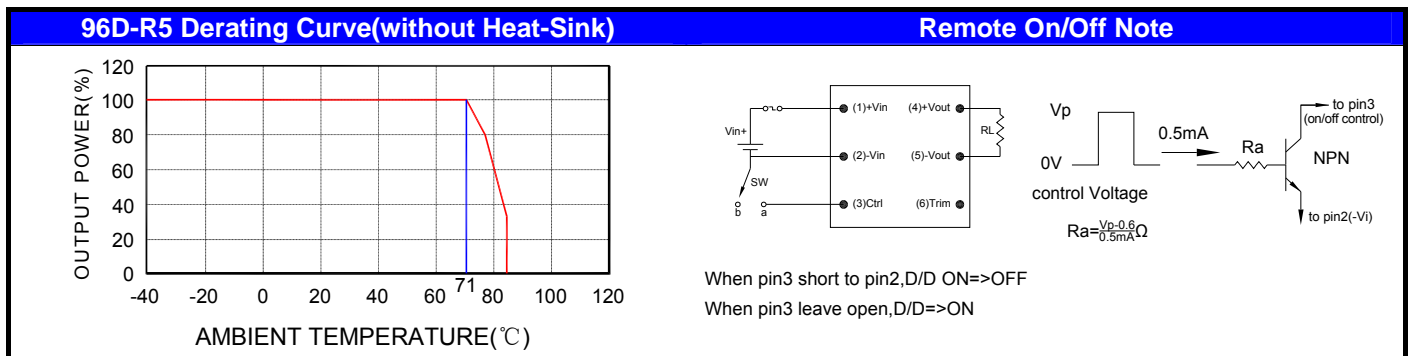
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Output Specifications (Temperature Coefficient : ±0.05%/°C)					
Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	LL to HL at Full Load			±2	%
Short Circuit/ Restart	Hiccup, automatics recovery				
Over Load Protection	% of FL at nominal input		150		%
Over voltage protection Zener diode clamp	3.3V Output		3.9		V
	5.0V		6.2		V
	12V & ±12V Output		15 & ±15		V
	15V & ±15V Output		18 & ±18		V
Line Regulation	LL to HL at Full Load			±0.5	%
Load Regulation	Single No load to Full load			±0.5	%
Load Regulation	Dual 1/4 load to Full load			±1.0	%
Minimum Load				10	%
Ripple & Noise	20MHz bandwidth			100	mVp-p
Transient response recovery time	25% load step change		250	350	us
External Trim Adj. Range			±10% of Output		
Temperature coefficient				±0.05	% / °C

General Specifications					
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency			300		KHz
Isolation Capacitance			2200		pF
Base material	FR4 PCB				
Potting material	Epoxy (UL94-V0)				
Isolation Voltage	For 10 seconds			1600	VDC
Design meets safety				IEC60950-1, UL60950-1, EN60950-1	
Case material				(Black)Nickel Coated With Non-Conductive Base	
Dimensions	Appearance size		50.8X 25.4 X 11		mm
Weight			36.5		g
MTBF (Note 1)	BELLCORE-TR-NWT-000332		3.163 x 10 ⁶		hrs
	MIL-HDBK-217F		4.347 x 10 ⁵		hrs

ENVIRONMENTAL SPECIFICATIONS					
Parameters	Conditions	Min	Typ	Max	Units
Operating Temperature		-40		85	°C
Maximum case temperature				110	°C
Storage Temperature		-55		125	°C
Over temperature			115		°C
Thermal impedance	Nature convection		12		°C/Watt
	Nature convection with heat-sink		10		°C/Watt
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

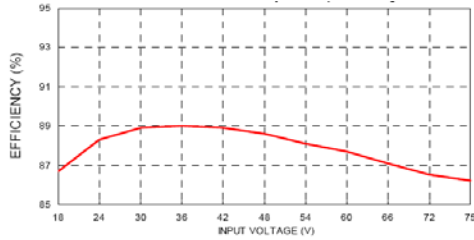
EMC CHARACTERISTICS					
Parameters	Conditions	Min	Typ	Max	Units
EMI (Note 7)	EN55022			Class A	
ESD	EN61000-4-2			Air +8KV Perf. Criteria A	
				Contact +6KV Perf. Criteria A	
Radiated immunity	EN61000-4-3			10 V/m Perf. Criteria A	
Fast transient (Note 8)	EN61000-4-4			± 2KV Perf. Criteria A	
Surge (Note 8)	EN61000-4-5			± 1KV Perf. Criteria A	
Conducted immunity	EN61000-4-6			10 Vr.m.s Perf. Criteria A	



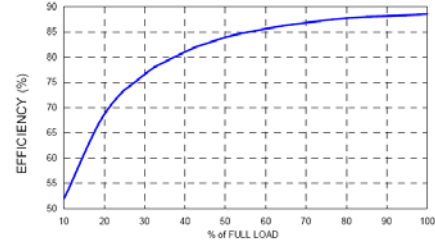


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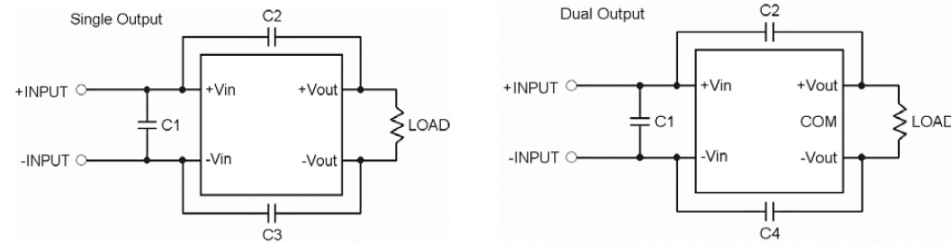
96D-R5 Efficiency VS Input voltage



96D-R5RNL Efficiency VS Output Load



Recommended Filter for EN5022 Class A Compliance



Part Number

96D - 12 S 03 R 5 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

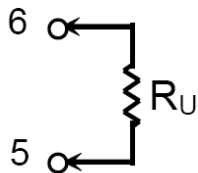
The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

Single Output	C1	C2/C3
(-12S)-24S	4.7μF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
-48S	2.2μF/100V 1812 MLCC	1000pF/2KV 1808 MLCC
Dual Output	C1	C2/C4
(-12D)-24D	4.7μF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
-48D	2.2μF/100V 1812 MLCC	1000pF/2KV 1808 MLCC

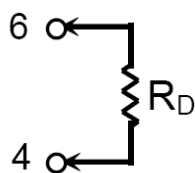
EXTERNAL OUTPUT TRIMMING

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

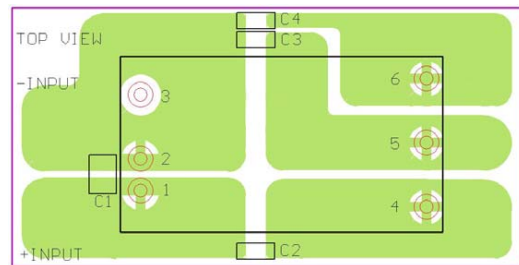
TRIM UP



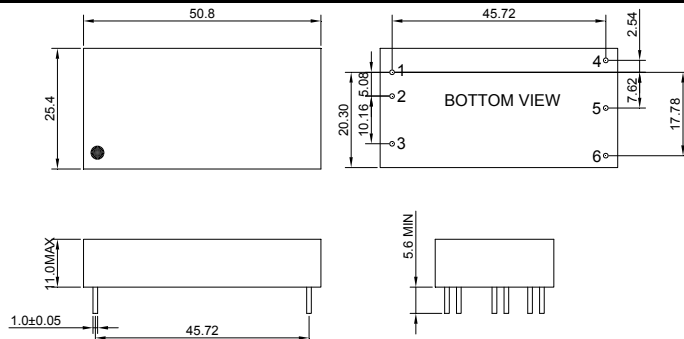
TRIM DOWN



Recommended EN5022 Class A Filter Circuit Layout

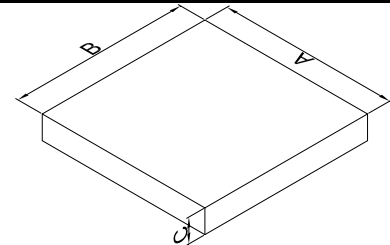


Markings and dimensions



UNIT:mm XX.X±0.5 XX.XX±0.25

Packaging



Size(mm)		
A	B	C
210.00	210.00	30.00

PIN Connection

PIN	1	2	3	4	5	6
SINGLE	+Vin	-Vin	Ctrl	+Vout	-Vout	Trim
DUAL	+Vin	-Vin	Ctrl	+Vout	COM	-Vout