Sample Test Data

C Series C150S12
150 W/12 V DC Output Module for C-Series Power Supplies

General Description

The C Series power supplies are configurable with combinations of insertable DC modules for various single, multiple, or parallel output.

Features and Benefits

- High reliability with low noise and low leakage current
- Medical and information equipment approval to UL60950-1, C-UL, EN60950 and EN60601-1 3rd
- Higher withstand voltage and lower leakage current
- OCP, OVP and OHP, remote sensing, control, and alarm (AC power fail, fan alarm, and low output)

Table of Contents

Sample Test Conditions

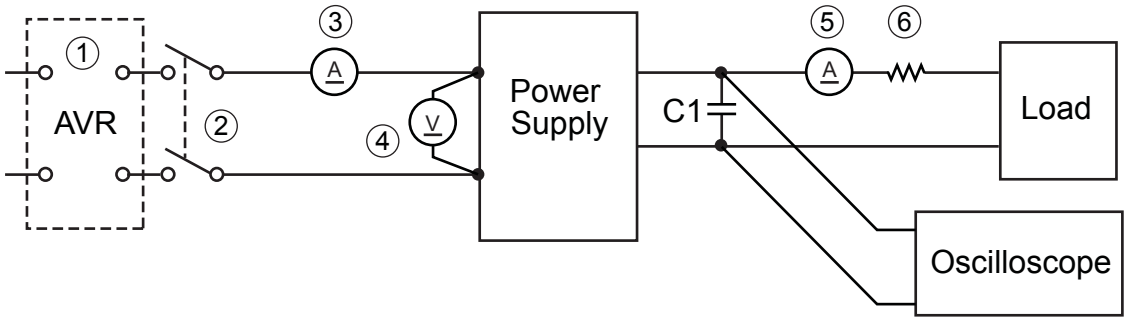
Input Voltage, V_{IN}

Min. (V)	Nom. (V)		Max. (V)
–	–	–	–

Load Current, I_{LOAD} (Output Circuit: 12 V)

Min. (A)	Nom. (A)	Max. (A)
0	13	13

Sample Test Circuit Diagram



Key	Description	Remarks
–	Measuring instrument	Output voltage is measured with a digital multimeter
1	Automatic Voltage Regulator	–
2	Circuit breaker	–
3	Ammeter	–
4	Volt meter	–
5	Ammeter	–
6	Shunt resistor	–
C1	Load capacitor	Electrolytic capacitor: 47 µF Film capacitor: 0.1 µF

List of Figures

List of Tables

Figures

Figure 1. Efficiency (By Load Current)

Input Voltage	Output Voltage	Temperature	Remarks
20 to 22 VDC	12 V, 25% to 100%	T_A = 25°C	–

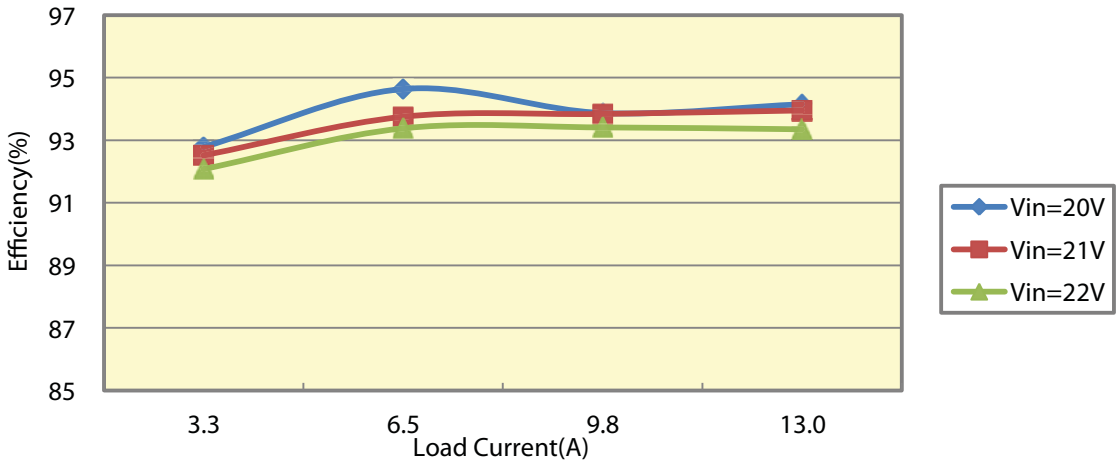


Figure 2. Output Voltage Accuracy (By Load Current)

Input Voltage	Output Voltage	Temperature	Remarks
20 to 22 VDC	12 V, 25% to 100%	T_A = –20°C to 70°C	–

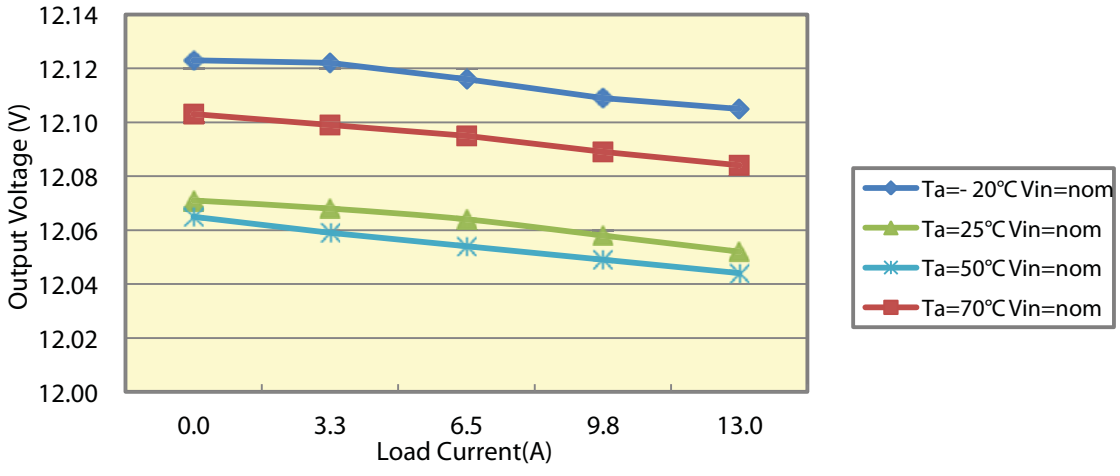


Figure 3. Warm-Up Drift

Input Voltage	Output Voltage	Temperature	Remarks
21 VDC	12 V, 13 A	T_A = 25°C	–

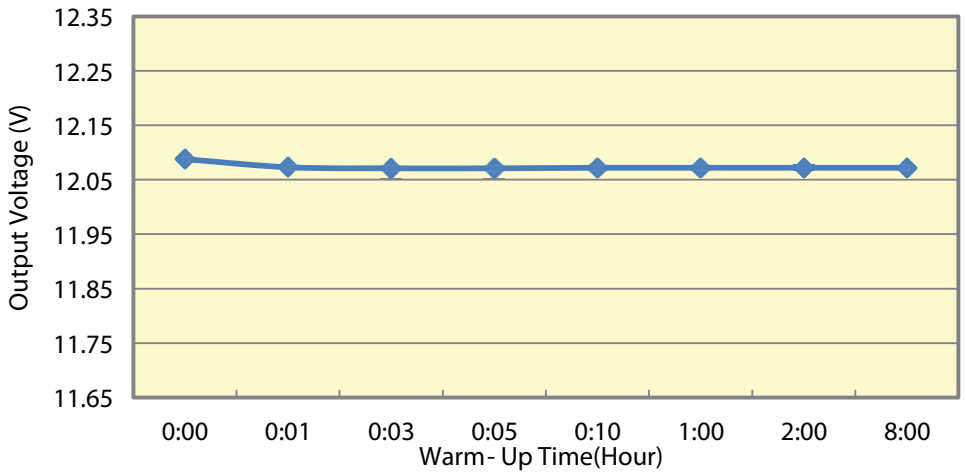


Figure 4. Ripple Voltage (By Load Current)

Input Voltage	Output Voltage	Temperature	Remarks
21 VDC	12 V, 25% to 100%	T_A = –20°C to 25°C	–

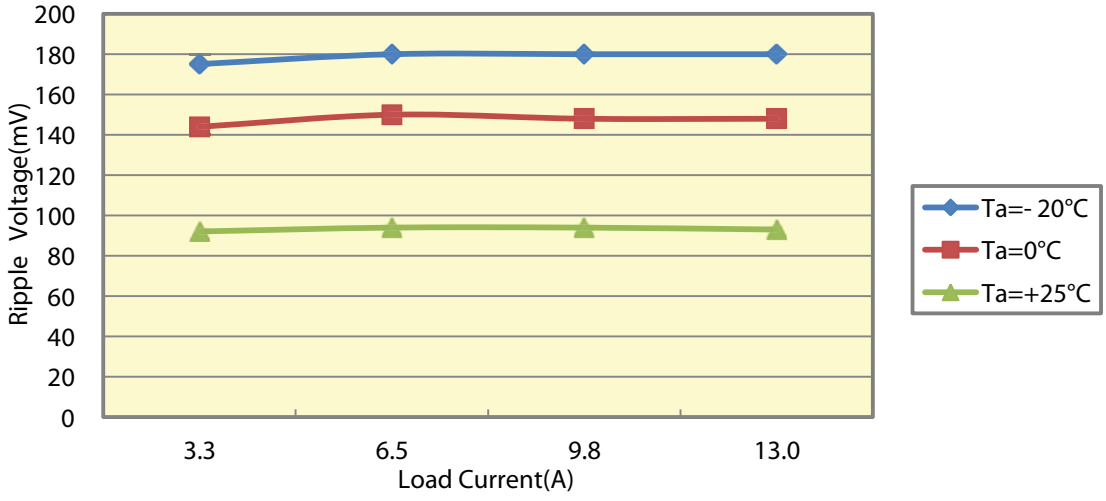


Figure 5. Ripple Noise Voltage (By Load Current)

Input Voltage	Output Voltage	Temperature	Remarks
21 VDC	12 V, 25% to 100%	T_A = –20°C to 25°C	–

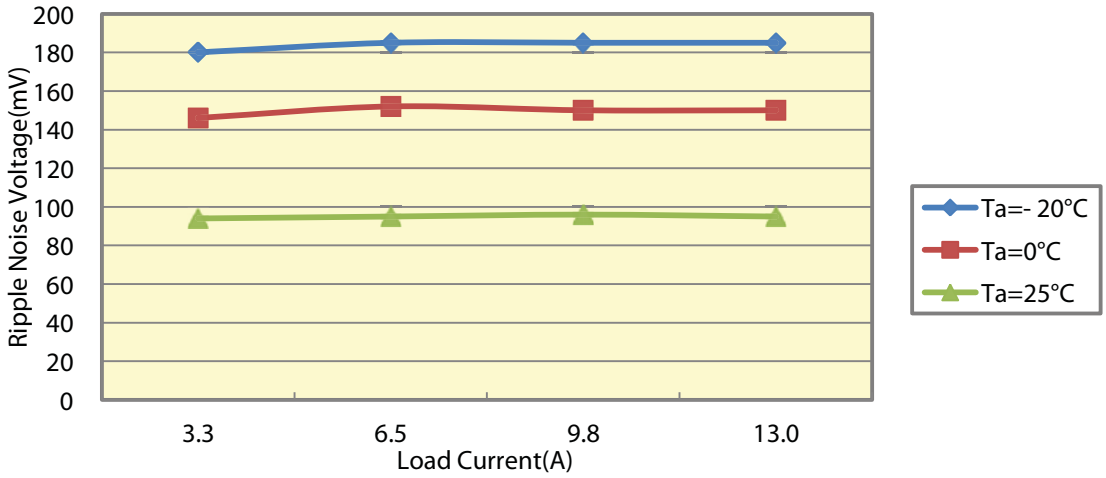


Figure 6. Overcurrent Protection (By Load Current)

Input Voltage	Output Voltage	Temperature	Remarks
21 VDC	12 V	T_A = –20°C to 70°C	–

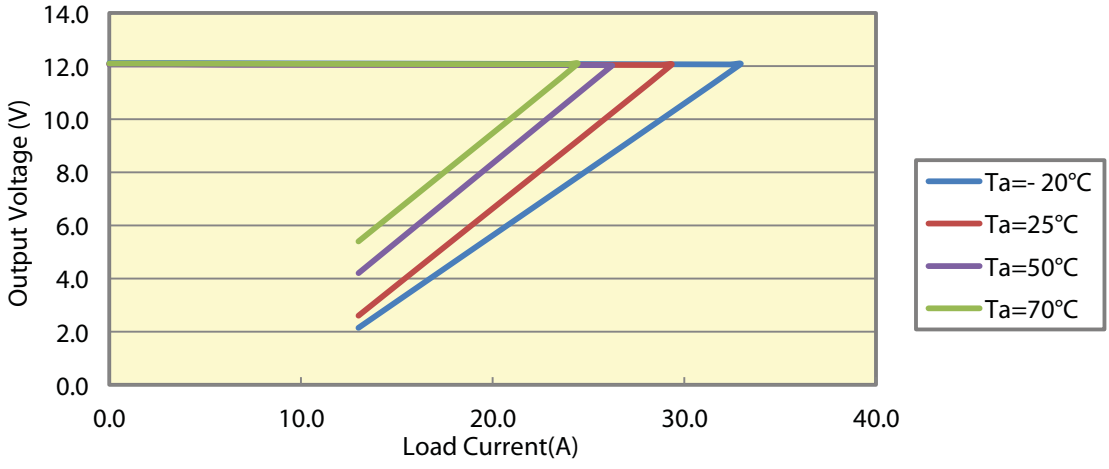
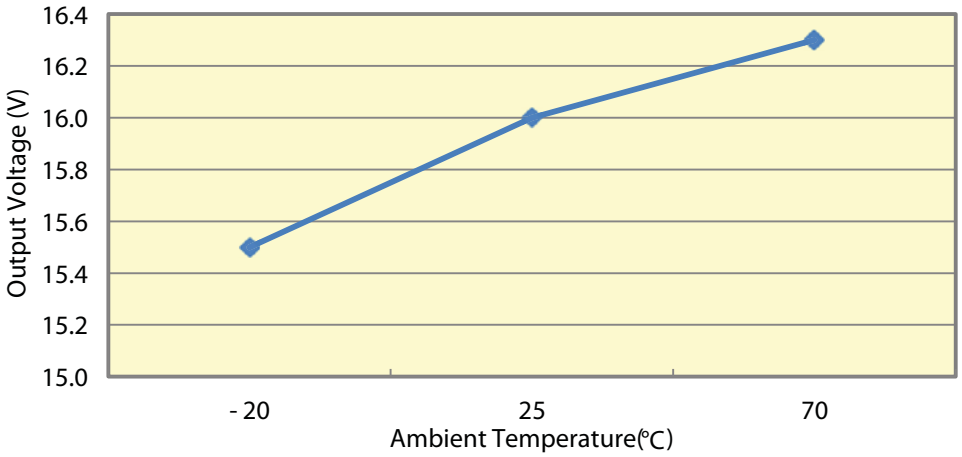


Figure 7. Overvoltage Protection (By Temperature)

Input Voltage	Output Voltage	Temperature	Remarks
21 VDC	12 V, 0 A	T_A = –20°C to 70°C	–



Tables

Table 1. Input Characteristics (At T_A = 25°C)

Test Item	Conditions		Test Results			Specification	Remarks
	V_{IN}	I_{LOAD}	V_{IN} = 21 V				
Efficiency	Nom	Nom	94.0%			92.0%	Figure 1

Table 2. Output Characteristics (At T_A = 25°C)

Test Item	Conditions		Test Results			Specification	Remarks
	V_{IN}	I_{LOAD}	V_{IN} = 12 V				
Output Setting Voltage	Nom	Nom	12.052 V				–
Input/Output Voltage Change Fluctuation	Min	Min	12.052 V				Note 1, figure 2
	Max	Max	12.071 V				
Temperature Drift	Nom	Nom	–8 mV to +54 mV				Note 1, figure 2
Warm-Up Drift	Nom	Nom	–15 mV				Note 1, figure 3
Total Regulation	–	–	12.028 to 12.12 V				Note 1
Static Load Regulation	–	–	±360 mV				Note 2
Ripple Voltage	Nom	Nom	93 mV at T_A = 25°C			200 mV	Note 3, figure 4
Ripple Noise Voltage	Nom	Nom	95 mV at T_A = 25°C			200 mV	Note 4, figure 5
Output Voltage Variable Range	–	–				9.0 to 13.2 V	–

1. Total Regulation (output regulation) is the sum of: Input/Output Voltage Change Fluctuation, Temperature Drift, and Warm-Up Drift.
2. This shows the static load regulation against the output voltage value set within the Output Variable Voltage Range.
3. Used probe = Ripple Voltage 1:1.
4. Used probe = Ripple Noise Voltage 1:1.

Table 3. Protection Characteristics (At V_{IN} = +12 V)

Test Item	Conditions		Test Results			Specification	Remarks
	V_{IN}	I_{LOAD}	T_A = –20°C	T_A = 25°C	Overcurrent T_A = 50°C Overvoltage T_A = 70°C		
Overcurrent Protection	Min	Max	32.4 A	28.8 A	26.2 A	≥ 13.7 A	Figure 6
Overvoltage Protection	Nom	Min	15.5 V	16.0 V	16.3 V	≥ 13.8 V	Figure 7

Table 4. Environment Tests
(At T_A = 25° C)

Test Item	Conditions		Test Results	Specification	Remarks
	V_{IN}	I_{LOAD}			
Vibration (Non-Operating)	–	–	Frequency = 10 to 55 Hz, Sweep Cycle = 3 minutes, Acceleration = 19.6 m/s^2, Direction = x,y, and z axes at 60 minutes per axis	Normal operation	–
Power-On at High Temperature	Nom	Max	Power-off for 1 hour at 65°C, then power-on	Normal operation	–
Power-On at Low Temperature	Nom	Max	Power-off for 1 hour at –15°C, then power-on	Normal operation	–
Shock	–	–	Product is dropped from a height of 50 mm (98 m/s^2) onto a flat surface of wood (10 mm or thicker); the test is performed three times on each edge of the bottom side of the product	Normal operation	–

Table 5. Other Characteristics
(At T_A = 25° C)

Test Item	Conditions		Test Results			Specification	Remarks
	V_{IN}	I_{LOAD}	P–S	P–E	S–E		
Withstand Voltage	–	–	–	–	0.6 kV	S–E 500 V for 1 minute, 600 V for 1 second	–
Leakage Current at Withstand Voltage	–	–	–	–	0 mA	S–E ≤15 mA	–
Insulation Resistance	–	–	–	–	≥1000 MΩ	≥50 MΩ at 500 VDC Megger	–

Important Information

- The products described in this document are built-in type DC stabilized power supplies with special structures and are designed for installation in equipment. Be sure to use the products only for installation in equipment.
- The products should be handled only by persons who have competent electrical knowledge.
- Be sure to read through all safety precaution and operation manuals before installation, operation, or maintenance and to use the products only for the intended use and in accordance with all applicable safety standards and regulations in the location of use.

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