

## *C Series C650*

### *650 W Five Module Multi-Output Power Supply*

### General Description

The C Series are flexible multi-output power supplies that enable simple combination of various modules.

### 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)

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### Sample Test Conditions

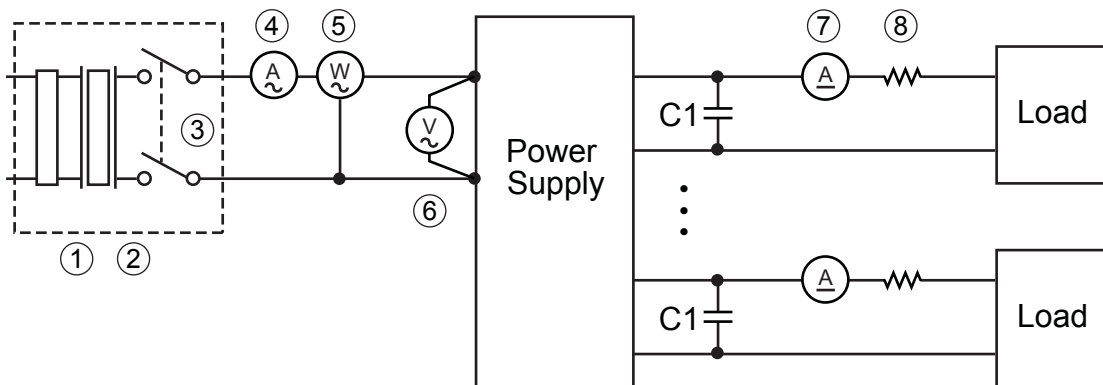
#### Input Voltage, $V_{IN}$

Min. (V)	Nom. (V)		Max. (V)
85	100	240	264

#### Load Current, $I_{LOAD}$

Min. (A)	Nom. (A)	Max. (A)
-	-	-

### Sample Test Circuit Diagram



Key	Description	Remarks
-	Measuring instrument	Output voltage is measured with a digital multimeter
1	Variable autotransformer	-
2	Isolation transformer	-
3	Circuit breaker	-
4	Ammeter	-
5	Watt meter	-
6	Volt meter	-
7	Ammeter	-
8	Shunt resistor	-
C1	Load capacitor	Electrolytic capacitor: 47 $\mu$ F Film capacitor: 0.1 $\mu$ F

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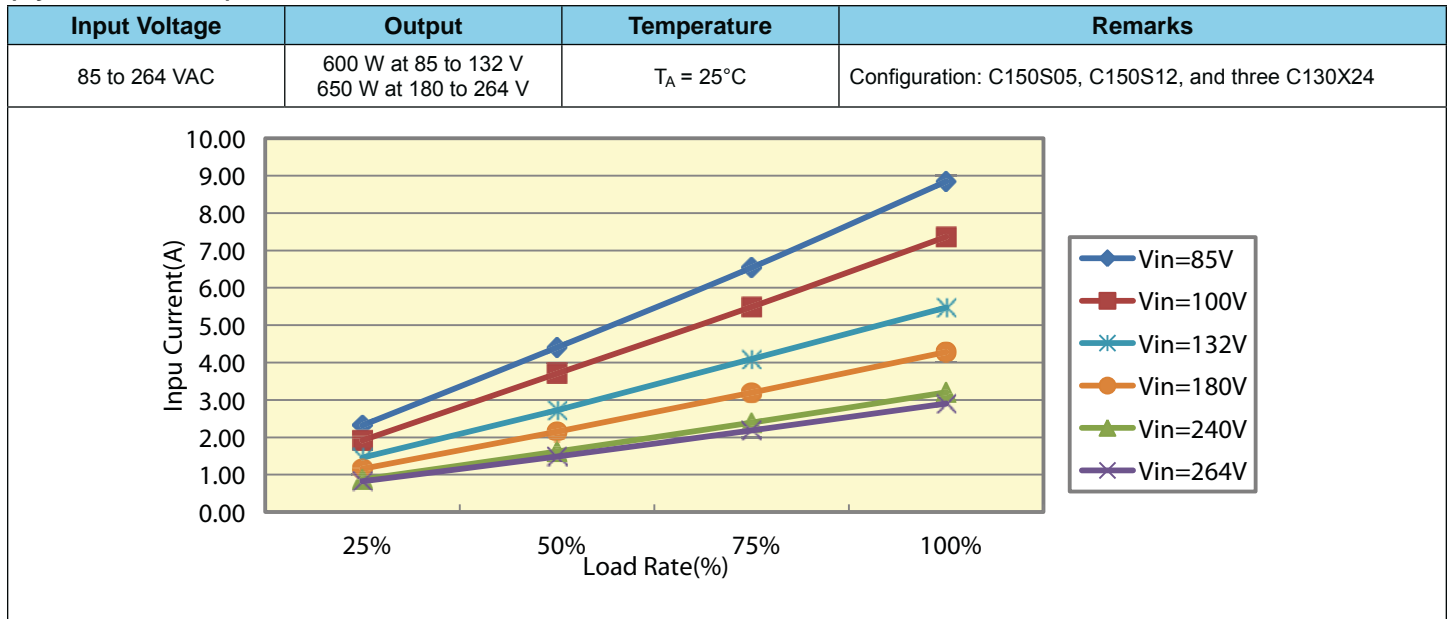
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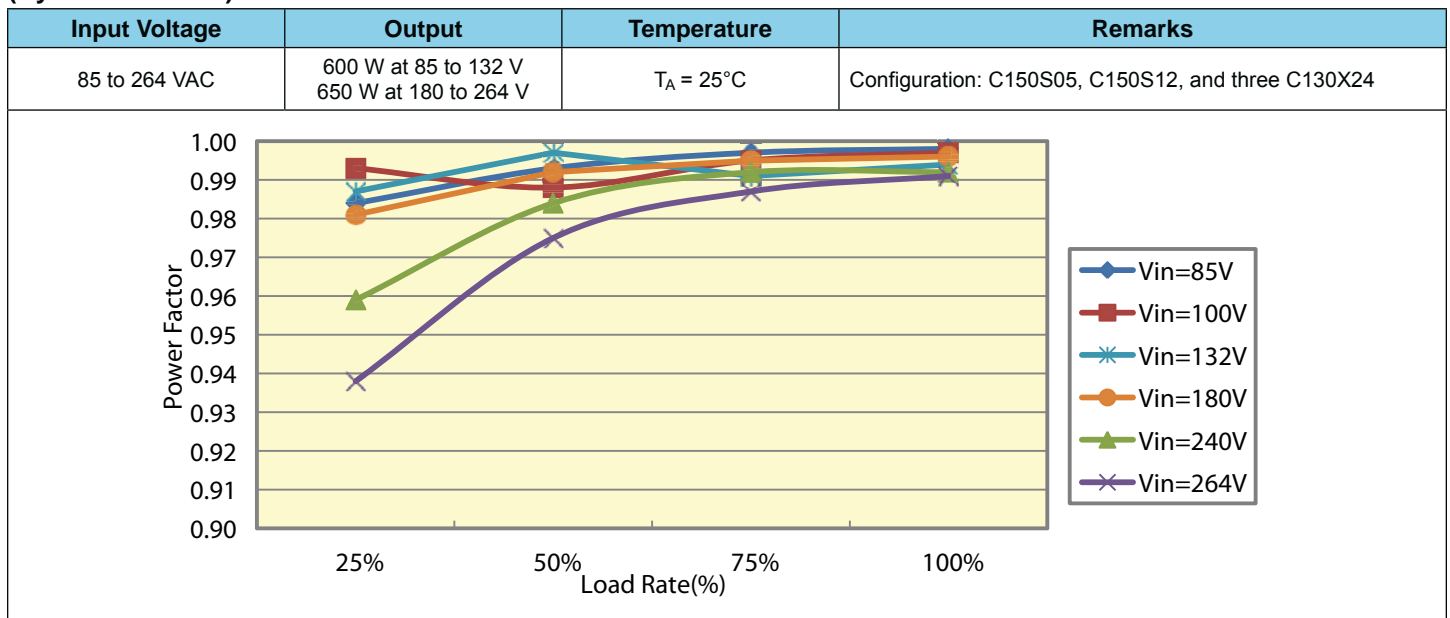
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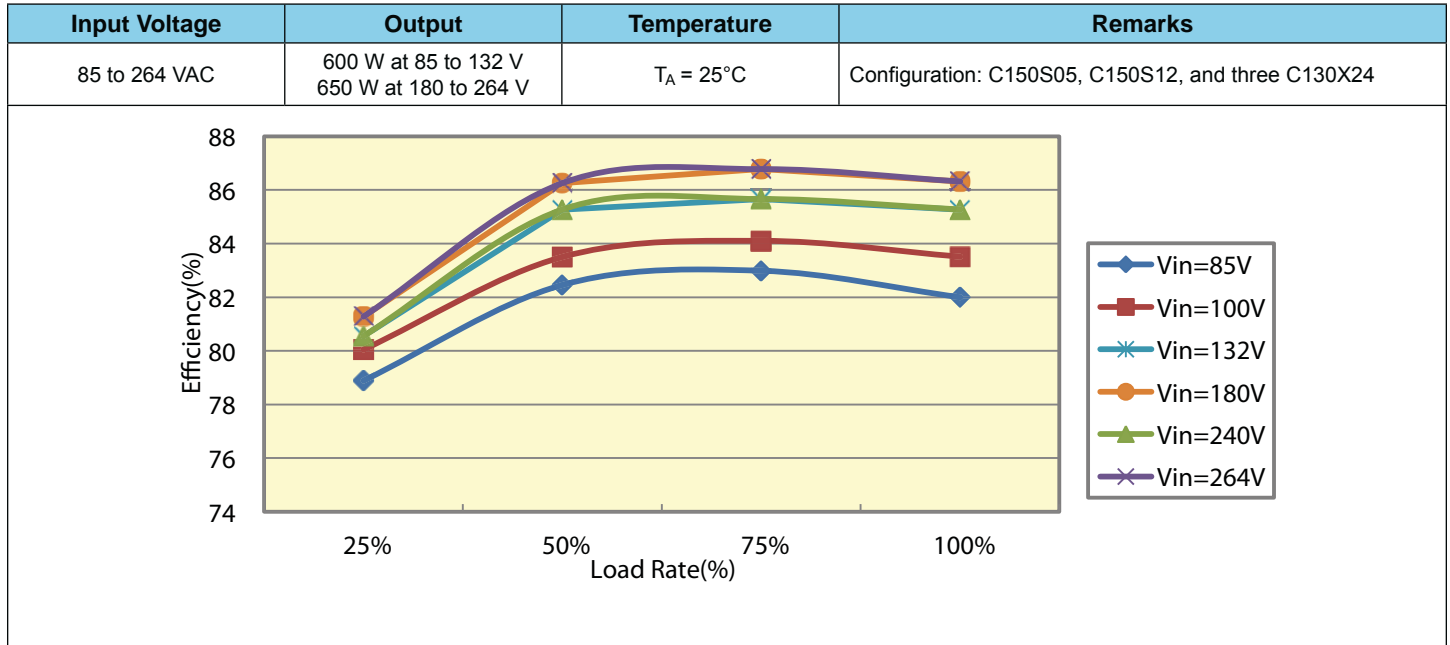
**Figure 1. Input Current  
(By Load Current)**



**Figure 2. Power Factor  
(By Load Current)**



**Figure 3. Efficiency (By Load Current)**



**Figure 4. Inrush Current (By Input Voltage)**

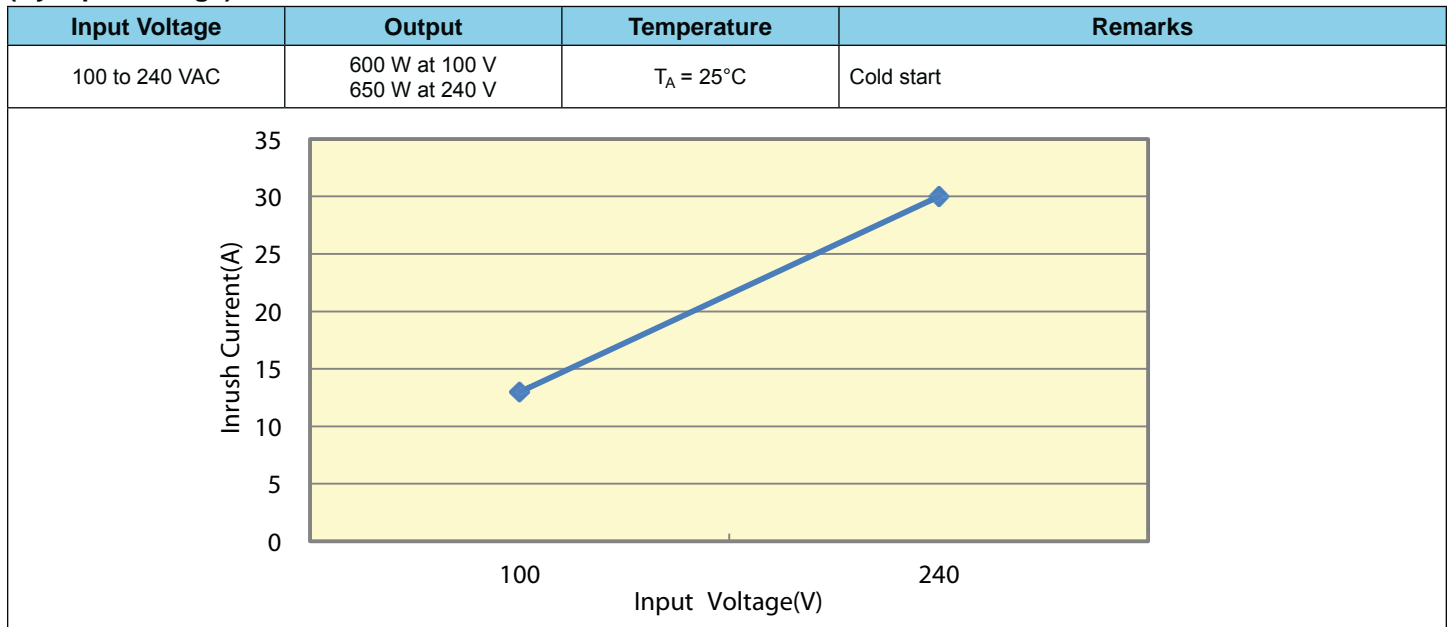


Figure 5. Inrush Current

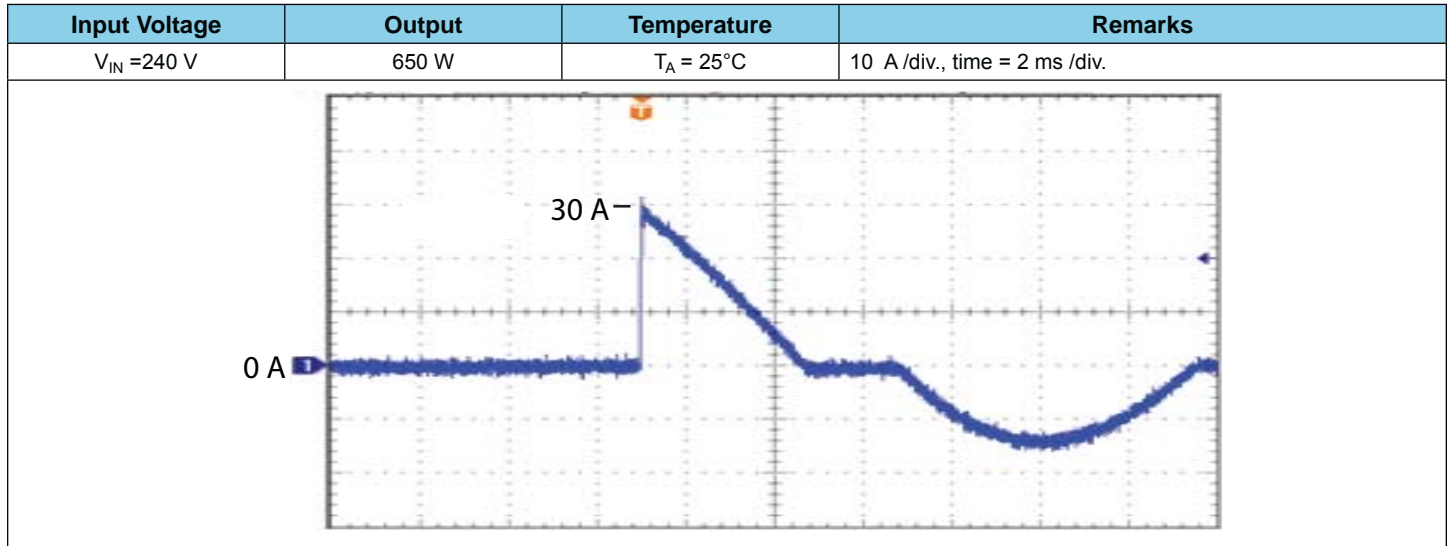
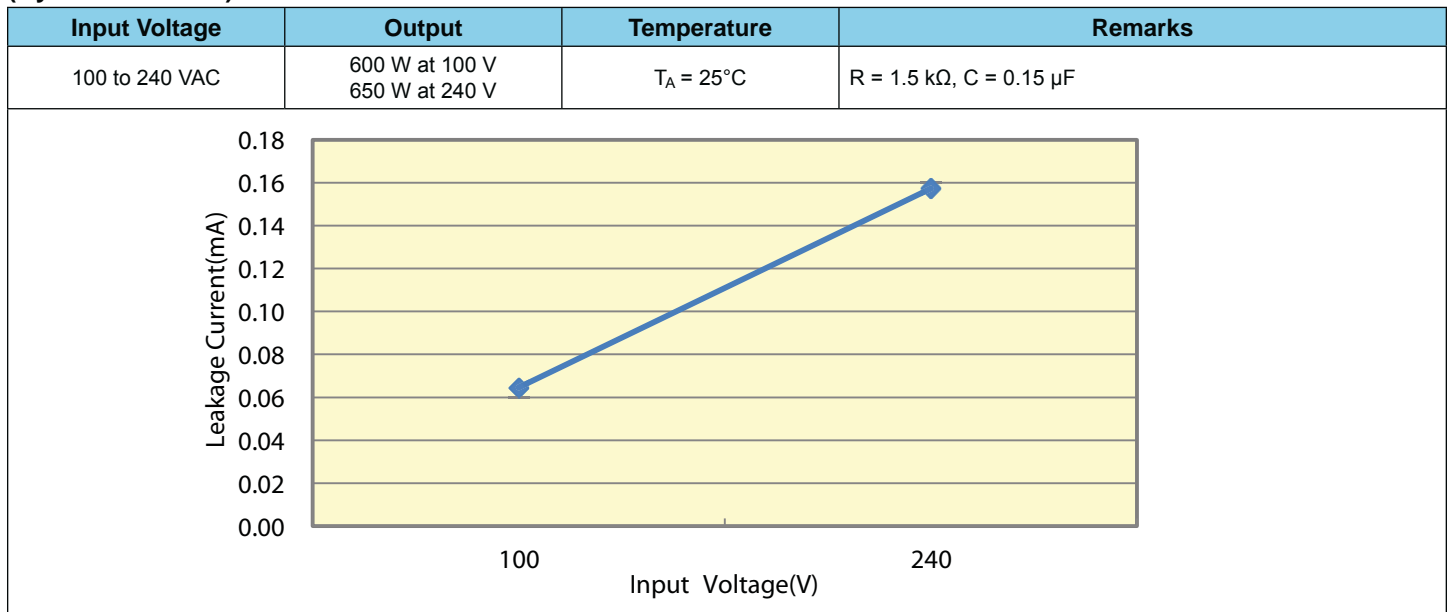
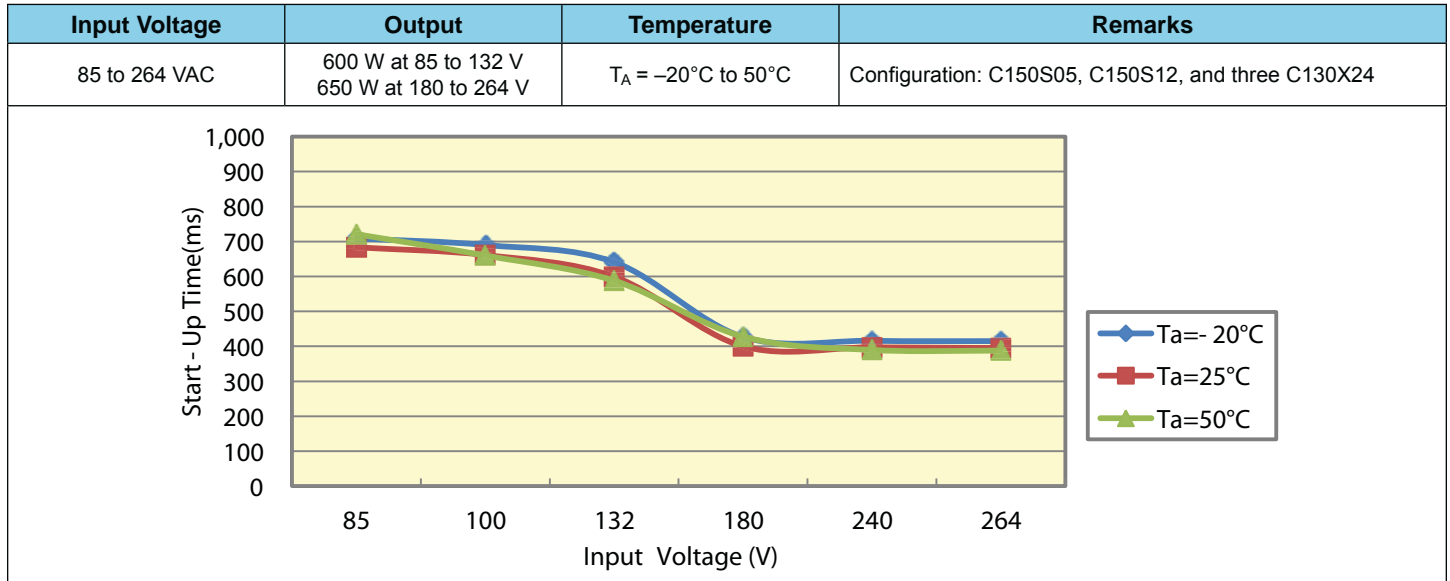


Figure 6. Leakage Current (By Load Current)



**Figure 7. Start-Up Time (By Input Voltage)**



**Figure 8. Hold-Up Time (By Load Rate)**

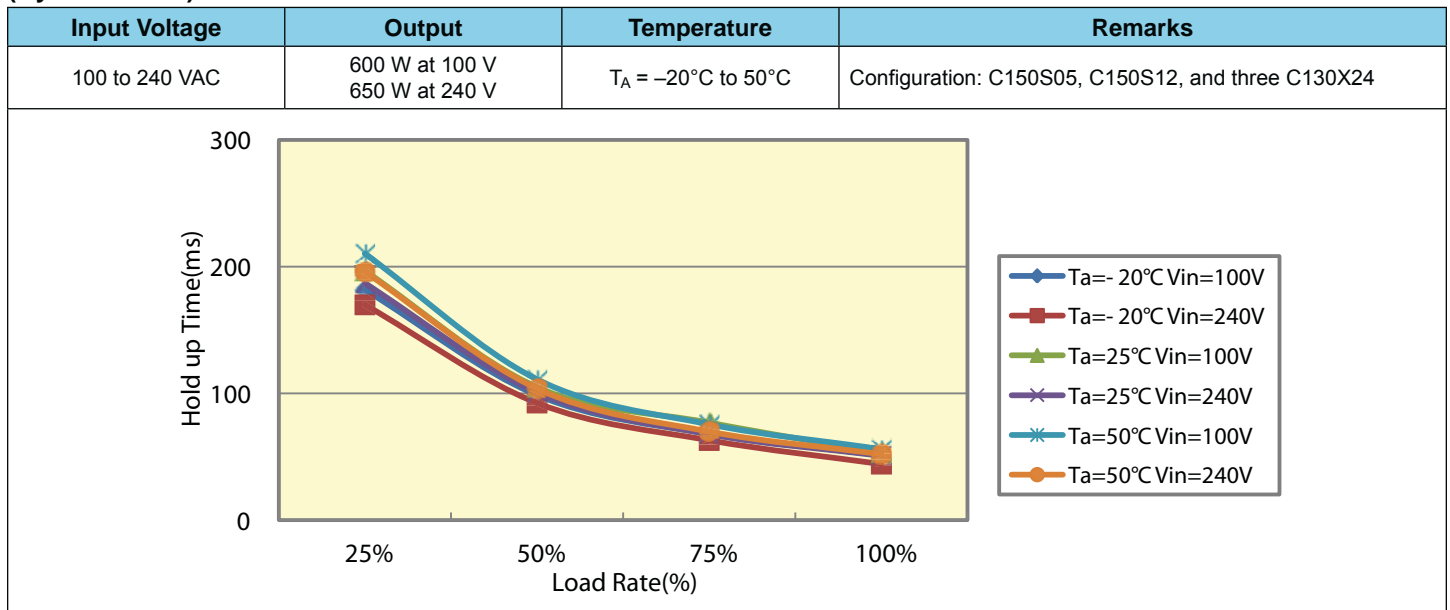


Figure 9. Conduction Noise 100 V/600 W

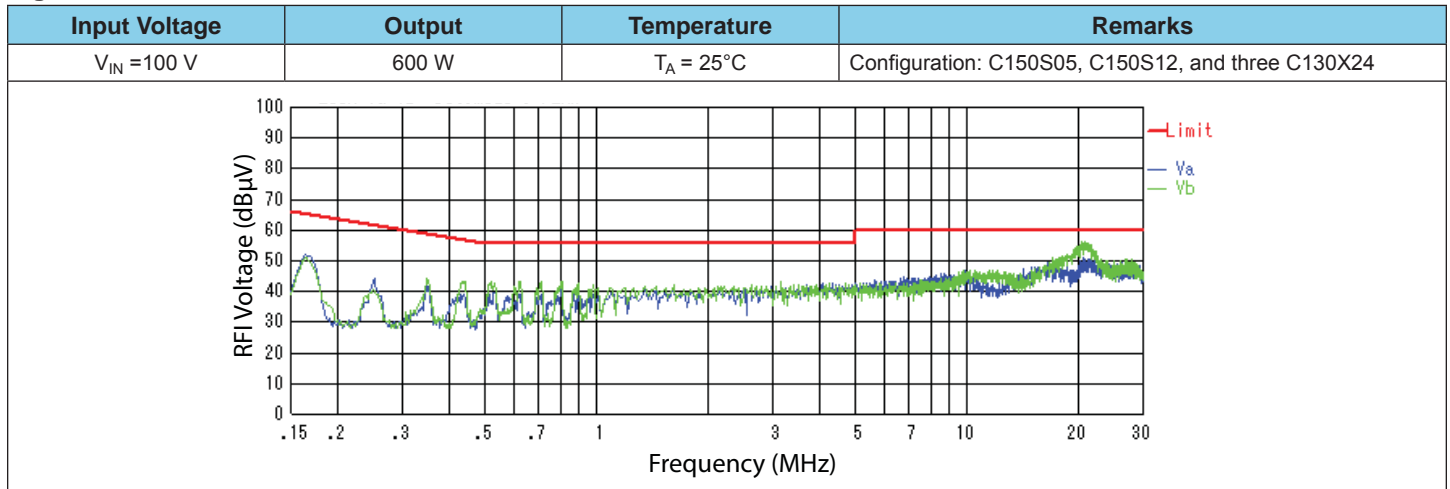
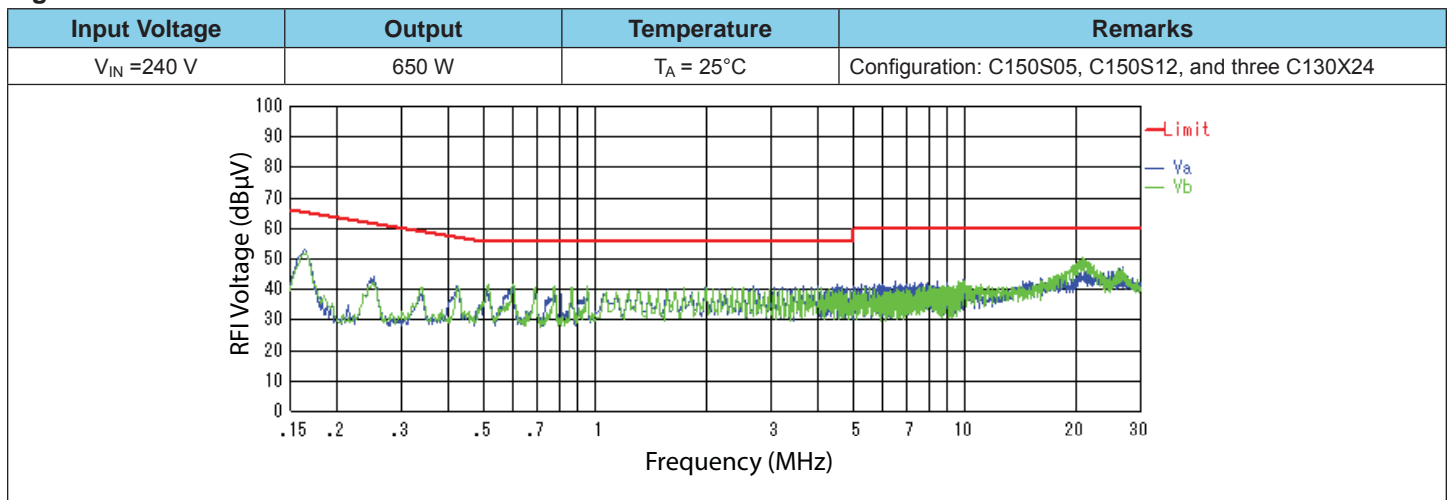


Figure 10. Conduction Noise 240 V/650 W



## Tables

**Table 1. Input Characteristics**  
(At  $T_A = 25^\circ\text{C}$ )

Test Item	Conditions		Test Results			Specification	Remarks
	$V_{IN}$	$I_{LOAD}$	$V_{IN} = 100\text{ V}$	$V_{IN} = 240\text{ V}$			
Input Current	Nom	Nom	7.4 A	3.2 A	–	8.0 A/ 4.0 A	Figure 1
Input Power	Nom	Nom	736.1 W	767.8 W	–	–	–
Power Factor	Nom	Nom	0.997	0.992	–	–	Figure 2
Efficiency	Nom	Nom	83.51%	86.83%	–	–	Figure 3
Inrush Current	Nom	Nom	13.0 A	30.0 A	–	20 A/ 40 A	Figure 4
Leakage Current	Nom	Nom	0.06 mA	0.16 mA	R = 1.5 k $\Omega$ , C = 0.15 $\mu\text{F}$	0.30 mA/ 0.50 mA	Figure 6
Hold-Up Time	–	Nom	–	–	53 ms at $T_A = 25^\circ\text{C}$	10 ms	Figure 8

**Table 2. Environment Tests**  
(At  $T_A = 25^\circ\text{C}$ )

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 <sup>2</sup> , 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 <sup>2</sup> ) 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 3. Noise Tolerance Characteristics**  
(At  $T_A = 25^\circ\text{C}$ )

Test Item	Conditions		Test Results	Specification	Remarks
	$V_{IN}$	$I_{LOAD}$			
AC Line Noise (50 to 1000 ns)	Min to Max	Min to Max	Line to Line $\pm 3.0\text{ kV OK}$	L–L 2.0 kV	–
	Min to Max	Min to Max	Line to Frame Ground $\pm 2.1\text{ kV OK}$	L–FG 2.0 kV	–
Lightning Surge (1.2 $\times$ 50 $\mu\text{s}$ )	Nom	Min to Max	Line to Line $\pm 2.4\text{ kV OK}$	L–L 2.0 kV	–
	Nom	Min to Max	Line to Frame Ground $\pm 2.4\text{ kV OK}$	L–FG 2.0 kV	–
Electrostatic Discharge	Min to Max	Min to Max	$\pm 8.4\text{ kV OK}$ at R = 330 $\Omega$ , C = 150 pF	6.0 kV	–



**Table 4. Other Characteristics**  
(At  $T_A = 25^\circ \text{C}$ )

Test Item	Conditions		Test Results			Specification	Remarks
	$V_{IN}$	$I_{LOAD}$	P-S	P-E	S-E		
Withstand Voltage	-	-	4.0 kV	2.4 kV	0.6 kV	P-S: 4.0 kV for 1 minute P-E: 2.0 kV for 1 minute 2.4 kV for 1 second S-E: 500 V for 1 minute 600 V for 1 second	-
Leakage Current at Withstand Voltage	-	-	3.12 mA	2.58 mA	1.13 mA	$\leq 15 \text{ mA}$	-
Insulation Resistance	-	-	$\geq 1000 \text{ M}\Omega$	$\geq 1000 \text{ M}\Omega$	$\geq 1000 \text{ M}\Omega$	$\geq 100 \text{ M}\Omega$ 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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