COSEL

参考資料

TEST DATA OF TUNS50F12

Regulated DC Power Supply
April 6, 2012

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COSEL CO.,LTD.

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Object	————————

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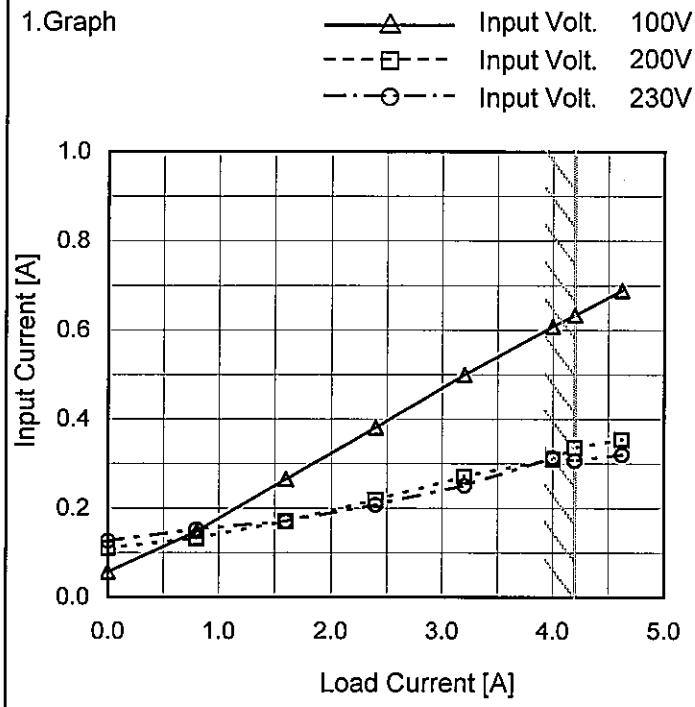

Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.057	0.110	0.127
0.8	0.148	0.132	0.152
1.6	0.265	0.170	0.170
2.4	0.381	0.218	0.207
3.2	0.500	0.271	0.250
4.0	0.608	0.310	0.313
4.2	0.633	0.336	0.307
4.6	0.689	0.354	0.320
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--	-	-	-
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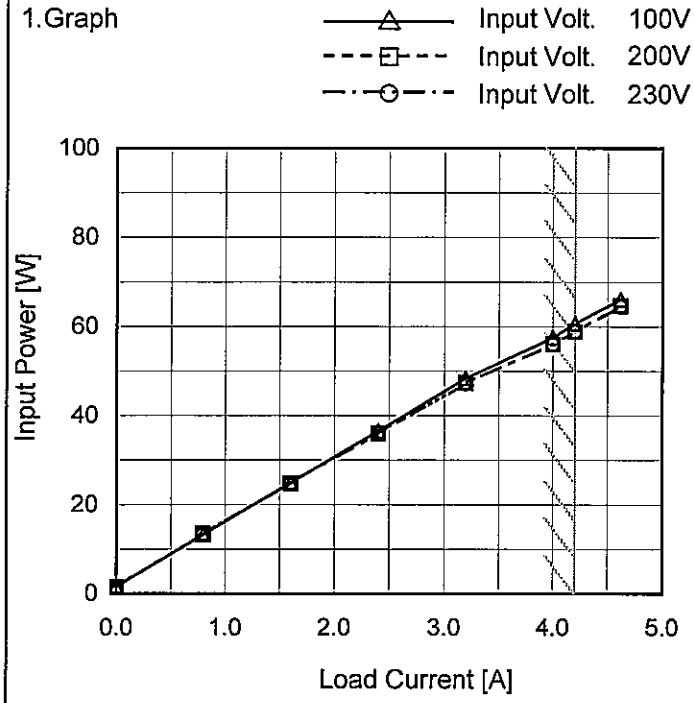
Model	TUNS50F12
Item	Input Power (by Load Current)
Object	———

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	1.60	1.41	1.37
0.8	13.30	13.42	13.37
1.6	24.89	24.79	24.86
2.4	36.54	35.99	36.03
3.2	48.45	47.32	47.30
4.0	57.52	56.04	56.01
4.2	60.71	58.86	58.81
4.6	66.12	64.66	64.59
--	-	-	-
--	-	-	-
--	-	-	-

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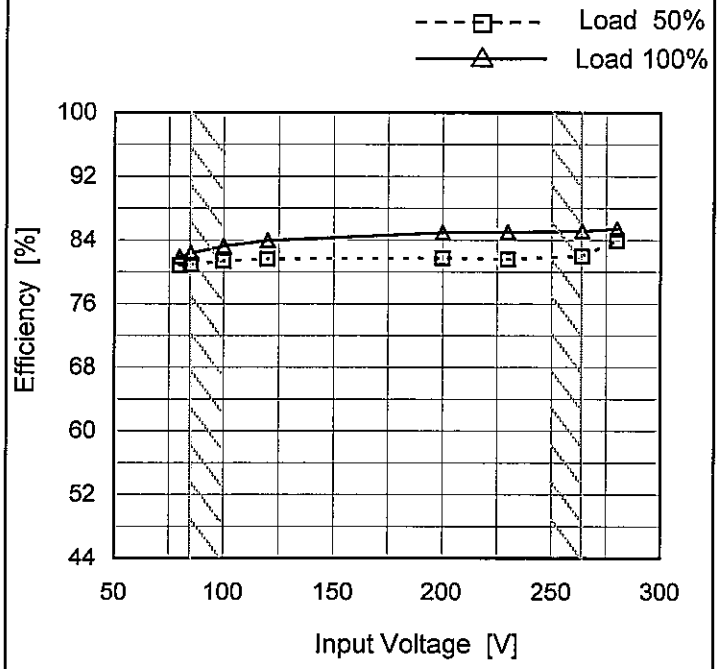
Model	TUNS50F12
Item	Efficiency (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
80	80.8	81.9
85	80.9	82.4
100	81.4	83.3
120	81.6	84.0
200	81.7	85.0
230	81.6	85.0
264	82.0	85.2
280	84.0	85.4
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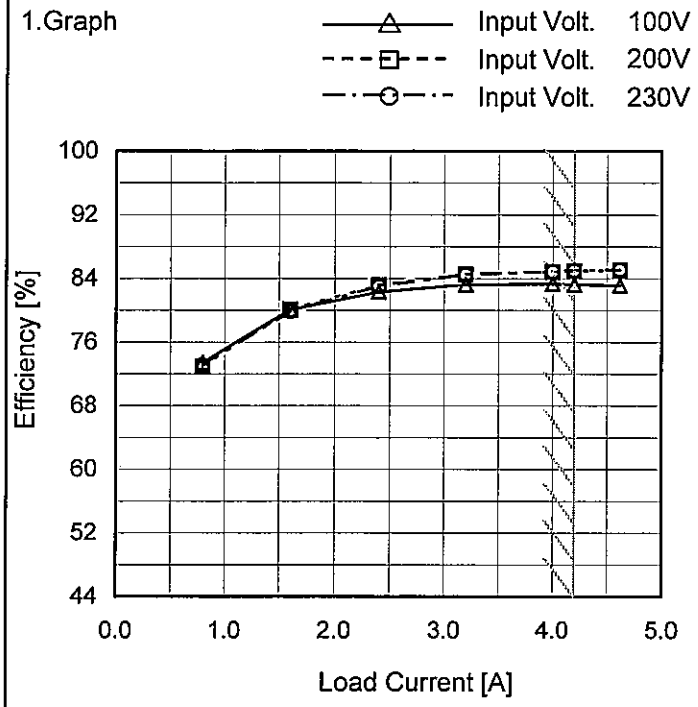
Model	TUNS50F12
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
0.8	73.5	72.9	73.1
1.6	80.1	80.1	79.9
2.4	82.3	83.1	83.0
3.2	83.2	84.5	84.5
4.0	83.4	84.8	84.9
4.2	83.3	85.0	85.0
4.6	83.1	85.0	85.1
--	-	-	-
--	-	-	-
--	-	-	-

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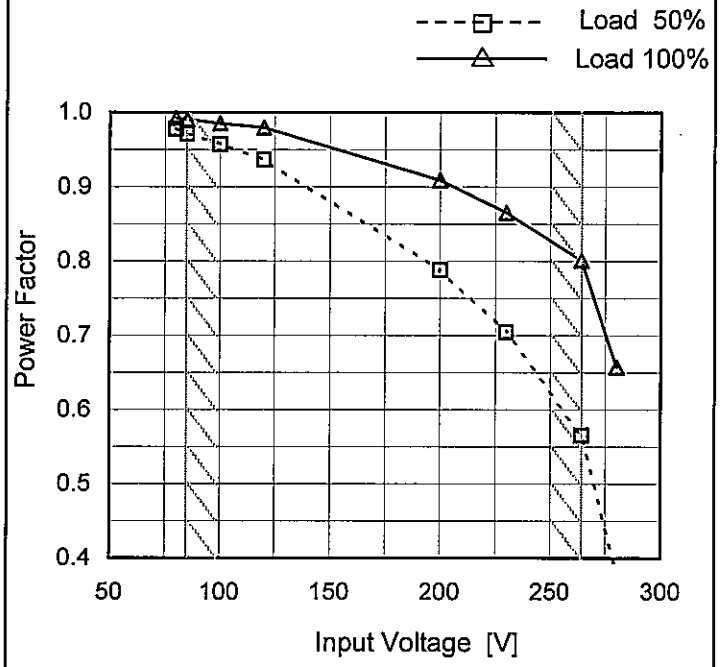
Model	TUNS50F12
Item	Power Factor (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
80	0.978	0.993
85	0.972	0.991
100	0.957	0.985
120	0.936	0.980
200	0.788	0.909
230	0.705	0.866
264	0.566	0.801
280	0.382	0.658
--	-	-

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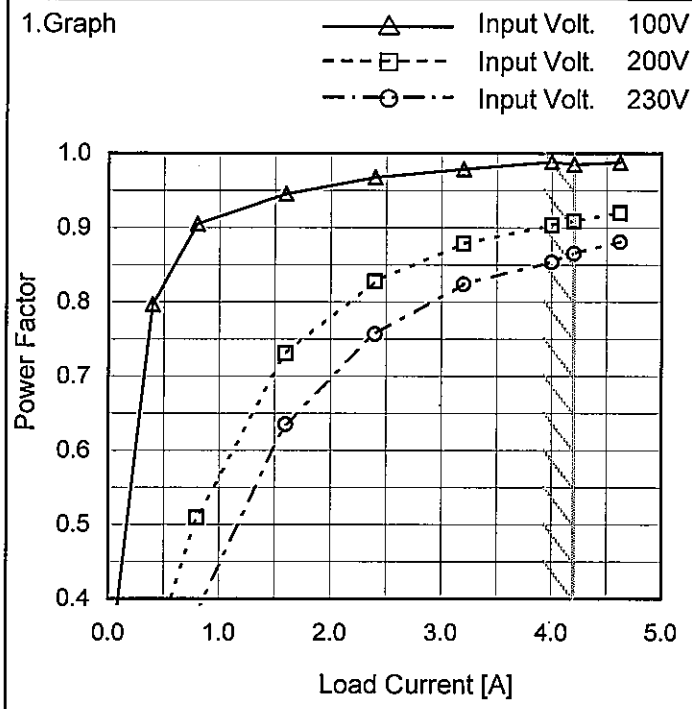
Model	TUNS50F12
Item	Power Factor (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.280	0.064	0.047
0.4	0.796	0.320	0.233
0.8	0.905	0.509	0.382
1.6	0.945	0.730	0.635
2.4	0.968	0.827	0.757
3.2	0.979	0.879	0.824
4.0	0.989	0.904	0.854
4.2	0.985	0.909	0.866
4.6	0.988	0.920	0.881
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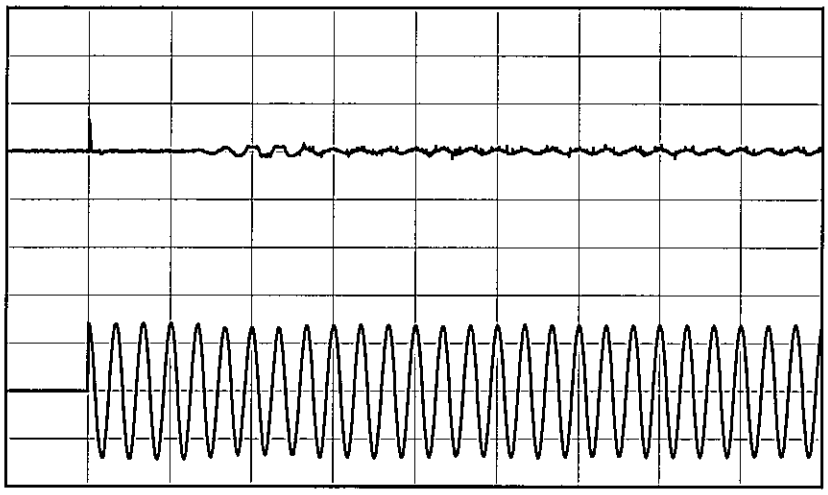
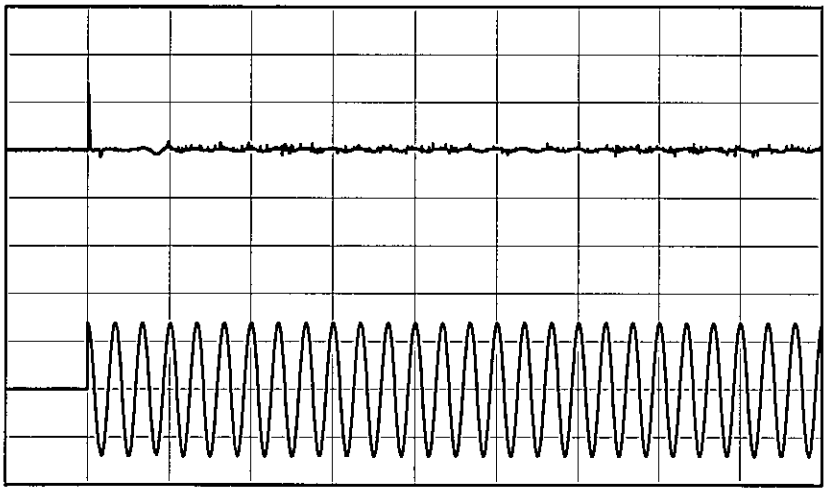
Model	TUNS50F12
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



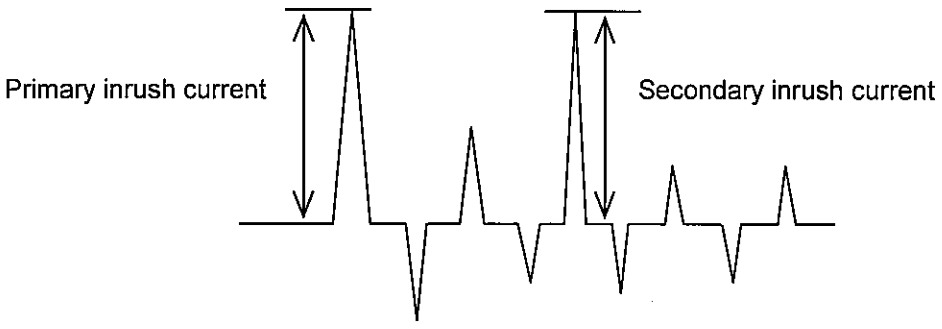
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
13.1 A
Secondary inrush current :
3.2 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
27.8 A
Secondary inrush current :
2.9 A



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Model	TUNS50F12		
Item	Leakage Current	Temperature	25°C
Object	———————	Testing Circuitry	Figure B

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	264 [V]	
IEC60950-1	Both phases	0.16	0.38	0.48	Operation
	One of phases	0.21	0.46	0.63	Stand by

The value for "One of phases" is the reference value only.

2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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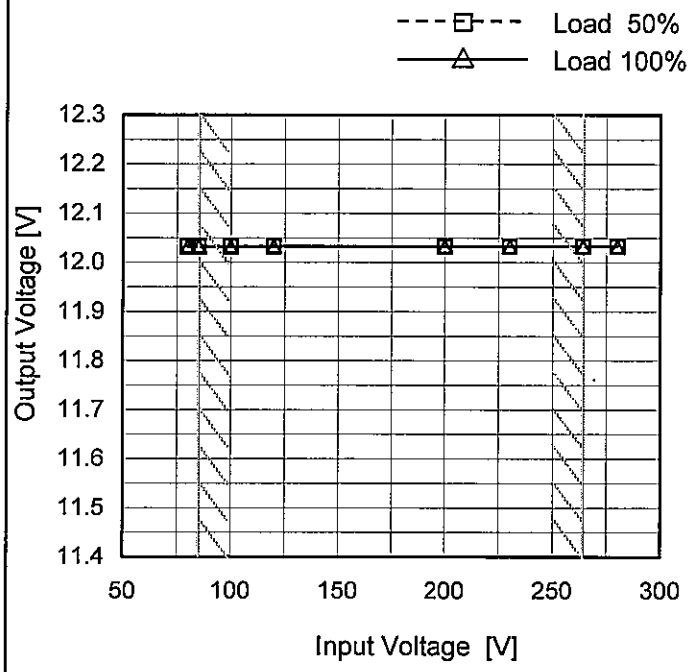
Model	TUNS50F12
Item	Line Regulation
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
80	12.033	12.032
85	12.033	12.032
100	12.033	12.032
120	12.033	12.033
200	12.033	12.033
230	12.033	12.033
264	12.033	12.033
280	12.033	12.033
--	-	-

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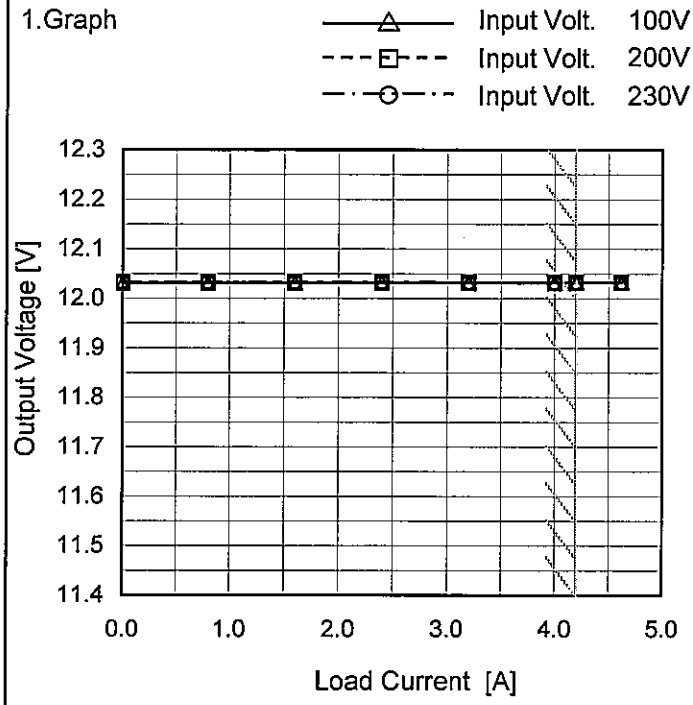
Model	TUNS50F12
Item	Load Regulation
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	12.032	12.032	12.033
0.8	12.032	12.032	12.033
1.6	12.032	12.032	12.033
2.4	12.032	12.033	12.033
3.2	12.032	12.032	12.033
4.0	12.032	12.032	12.032
4.2	12.032	12.032	12.032
4.6	12.032	12.032	12.032
--	-	-	-
--	-	-	-
--	-	-	-

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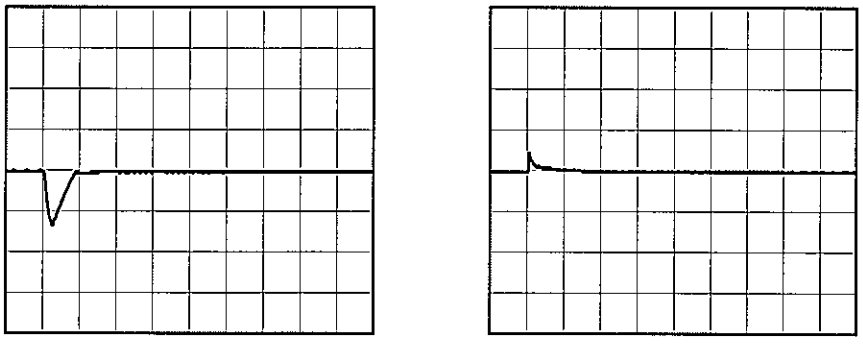
Model	TUNS50F12
Item	Dynamic Load Response
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

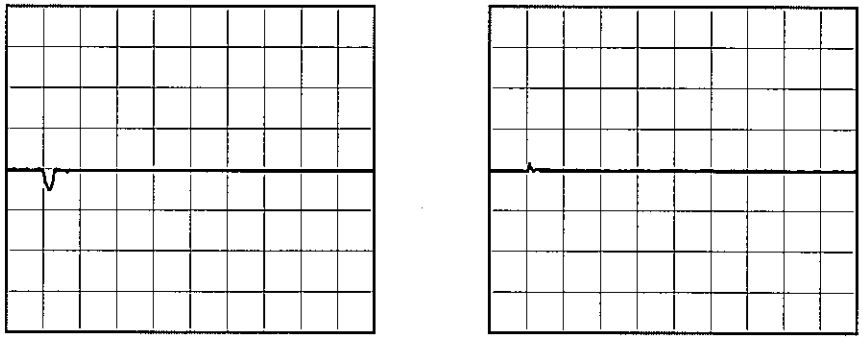
Input Volt. 100 V
Cycle 1000 mS

Load Current 4.2A/50 μs

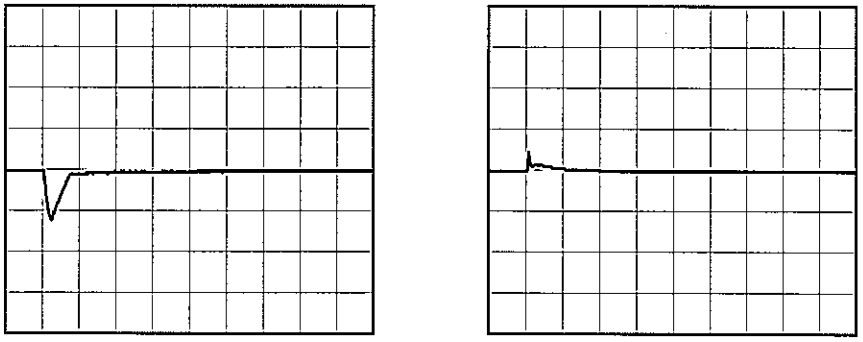
Min. Load (0A) ⟷ Load 100% (4.2A)



Min. Load (0A) ⟷ Load 50% (2.1A)



Load 10% (0.42A) ⟷ Load 100% (4.2A)



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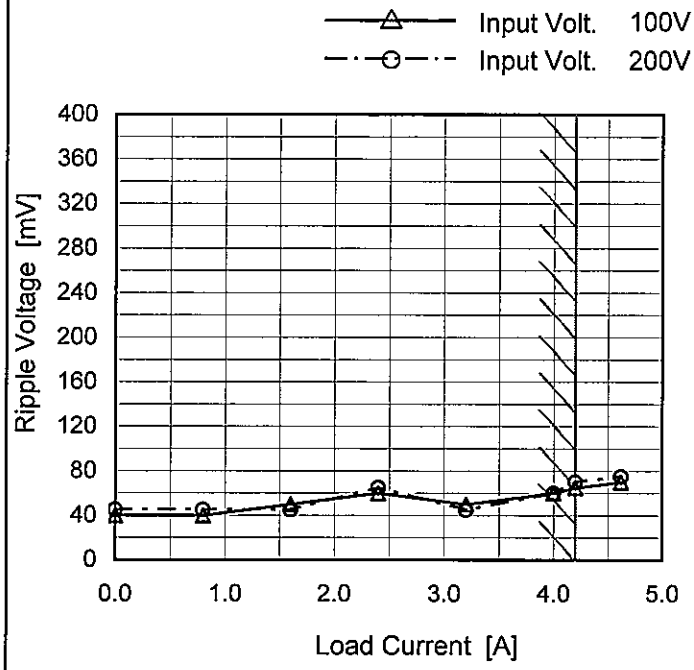
Model	TUNS50F12
Item	Ripple Voltage (by Load Current)
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	40	45
0.8	40	45
1.6	50	45
2.4	60	65
3.2	50	45
4.0	60	60
4.2	65	70
4.6	70	75
--	-	-
--	-	-
--	-	-

T1: Due to AC Input Line
T2: Due to Switching

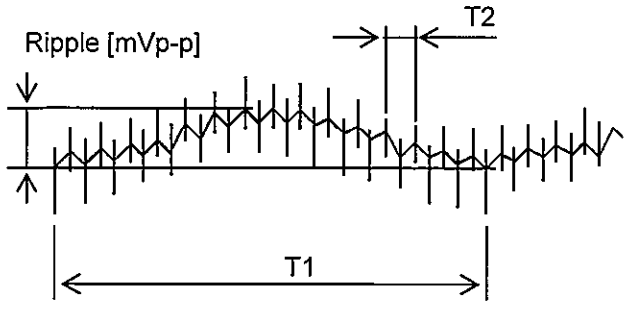


Fig. Complex Ripple Wave Form

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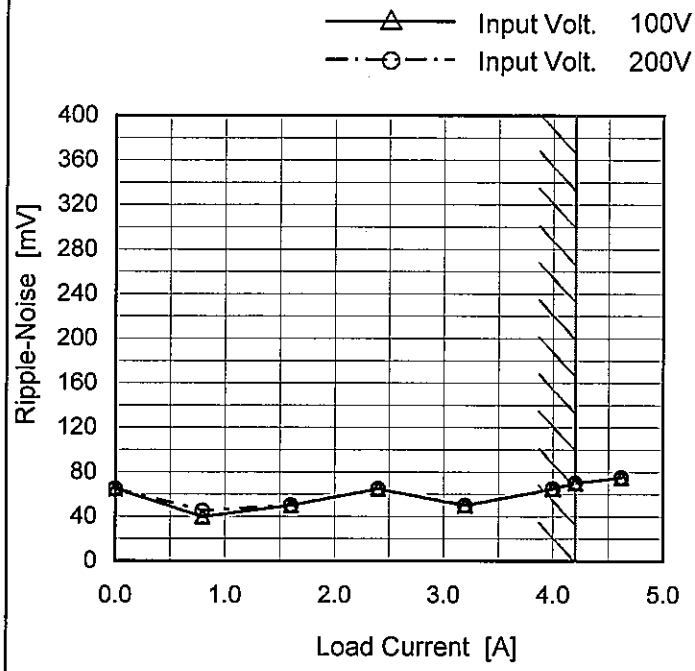
Model	TUNS50F12
Item	Ripple-Noise
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

T1: Due to AC Input Line
T2: Due to Switching

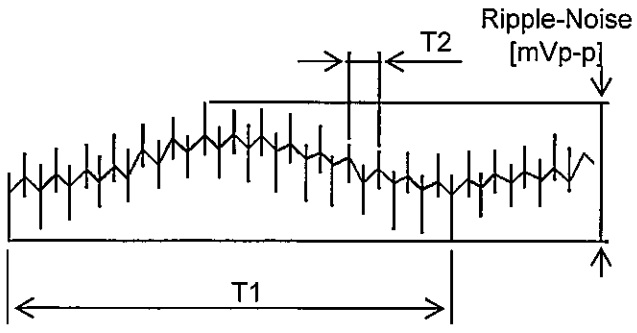


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV] Input Volt. 100 [V]	Ripple-Noise [mV] Input Volt. 200 [V]
0.0	65	65
0.8	40	45
1.6	50	50
2.4	65	65
3.2	50	50
4.0	65	65
4.2	70	70
4.6	75	75
--	-	-
--	-	-
--	-	-

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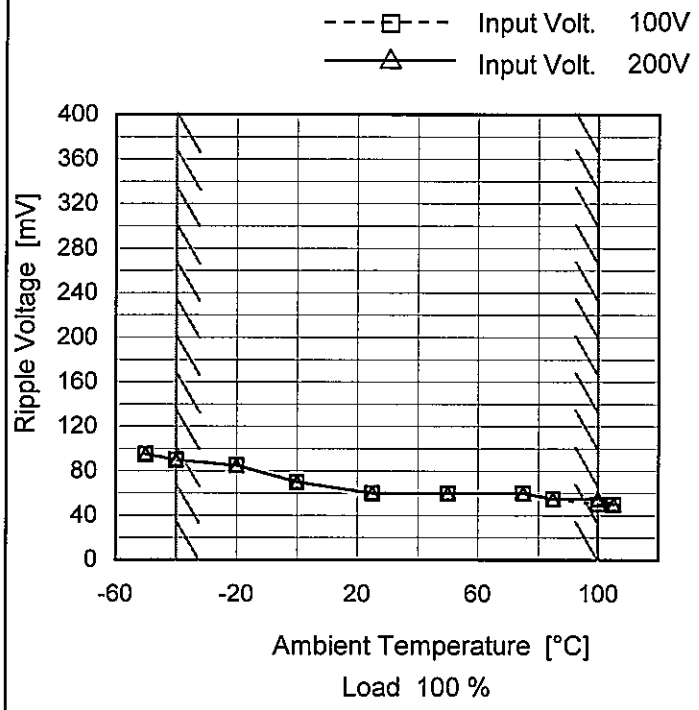
Model	TUNS50F12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V4.2A

Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.

Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-50	95	95
-40	90	90
-20	85	85
0	70	70
25	60	60
50	60	60
75	60	60
85	55	55
100	50	55
105	50	50
--	-	-

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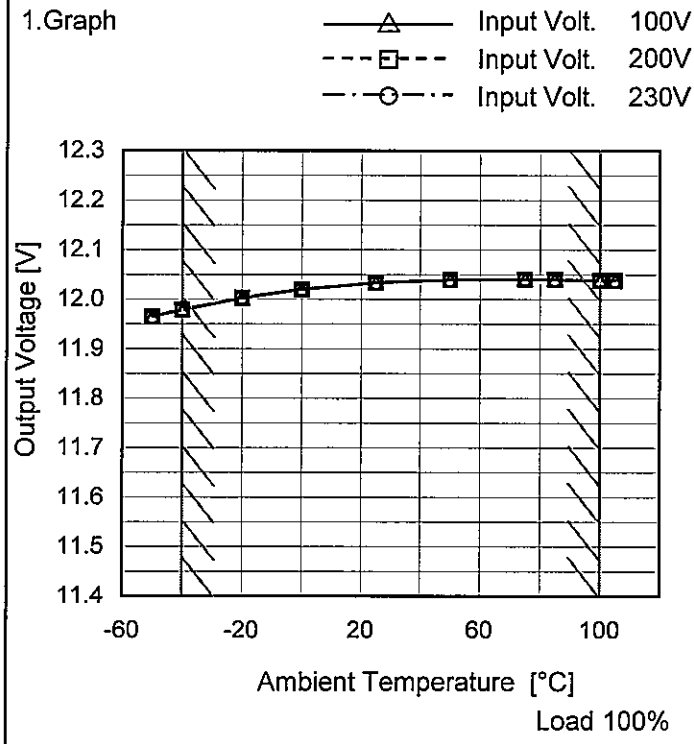
Model	TUNS50F12
Item	Ambient Temperature Drift
Object	+12V4.2A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-50	11.965	11.965	11.965
-40	11.979	11.979	11.979
-20	12.003	12.003	12.003
0	12.020	12.020	12.020
25	12.033	12.034	12.034
50	12.040	12.040	12.040
75	12.041	12.041	12.041
85	12.040	12.040	12.040
100	12.039	12.038	12.039
105	12.038	12.038	12.038
--	-	-	-

COSEL

Model	TUNS50F12	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+12V4.2A	

1.Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -40 - 100°C
Input Voltage : 85 - 264V
Load Current : 0 - 4.2A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	75	85	0	12.043	±33	±0.3
Minimum Voltage	-40	85	4.2	11.978		

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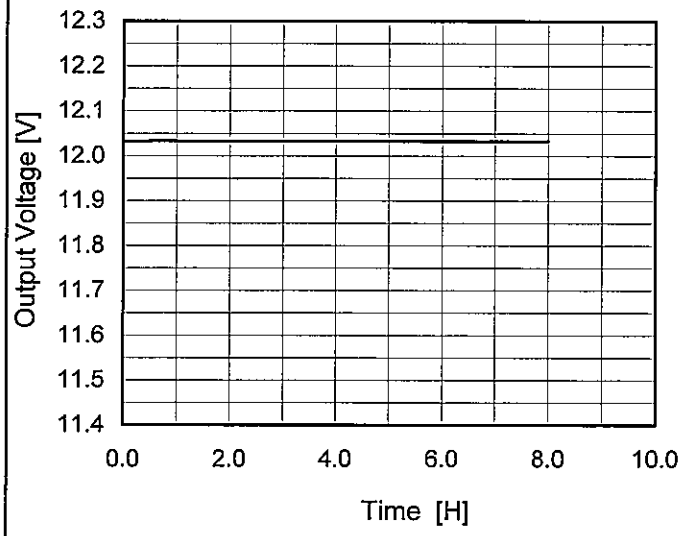
Model	TUNS50F12
Item	Time Lapse Drift
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.028
0.5	12.033
1.0	12.033
2.0	12.033
3.0	12.033
4.0	12.033
5.0	12.033
6.0	12.033
7.0	12.033
8.0	12.033

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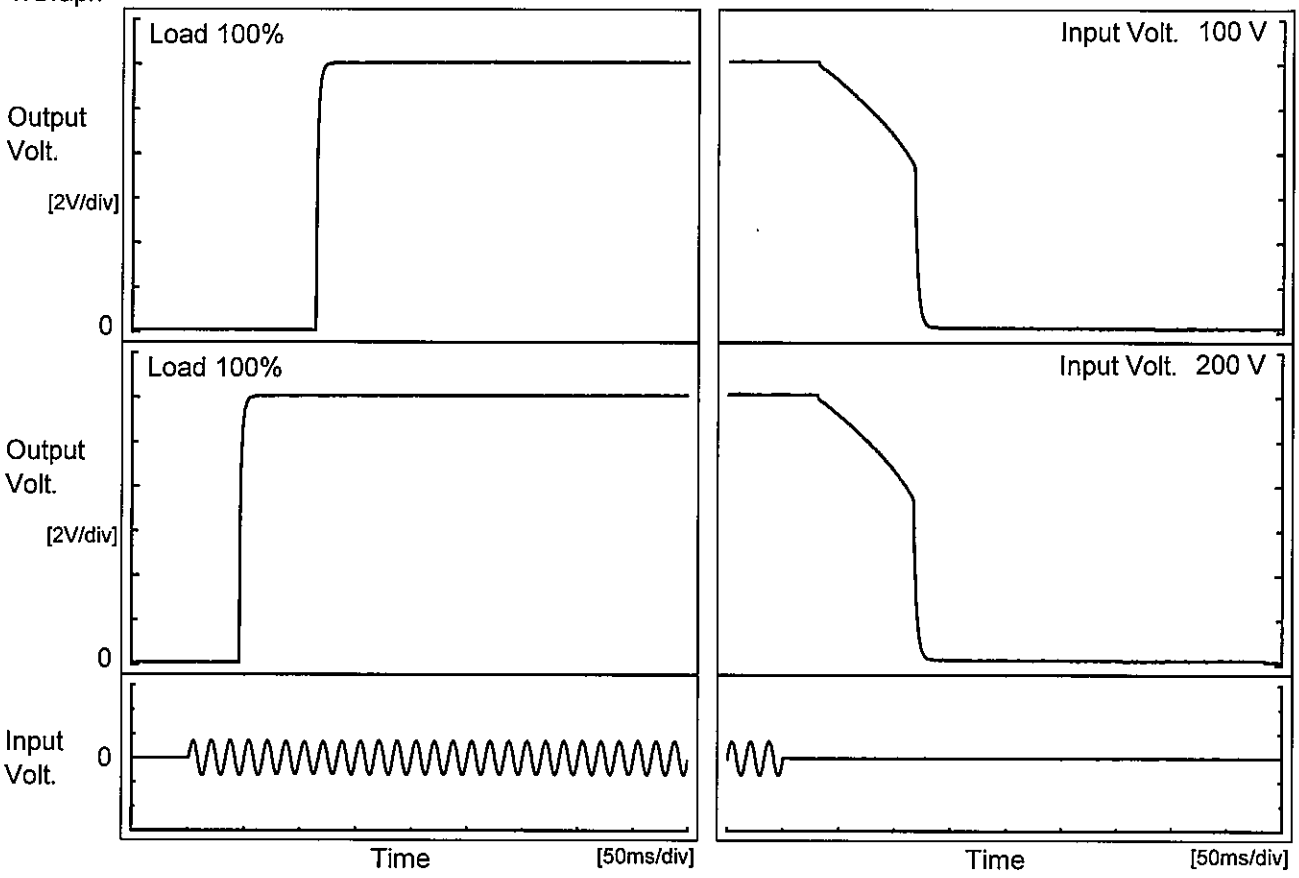
Model	TUNS50F12	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+12V4.2A	

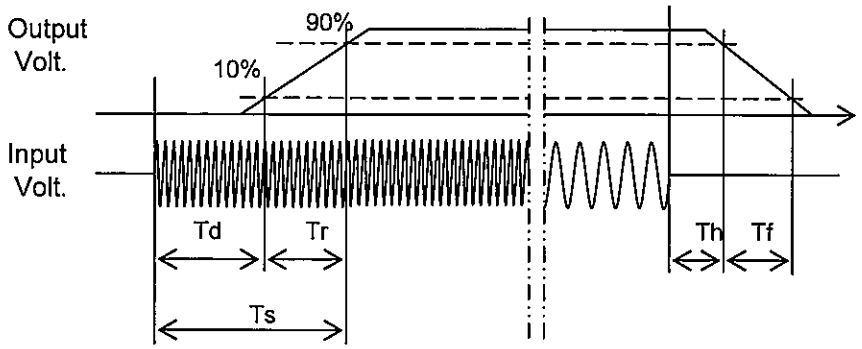
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	113.8	3.3	117.1	57.8	64.3
200 V	46.0	3.0	49.0	58.0	64.0



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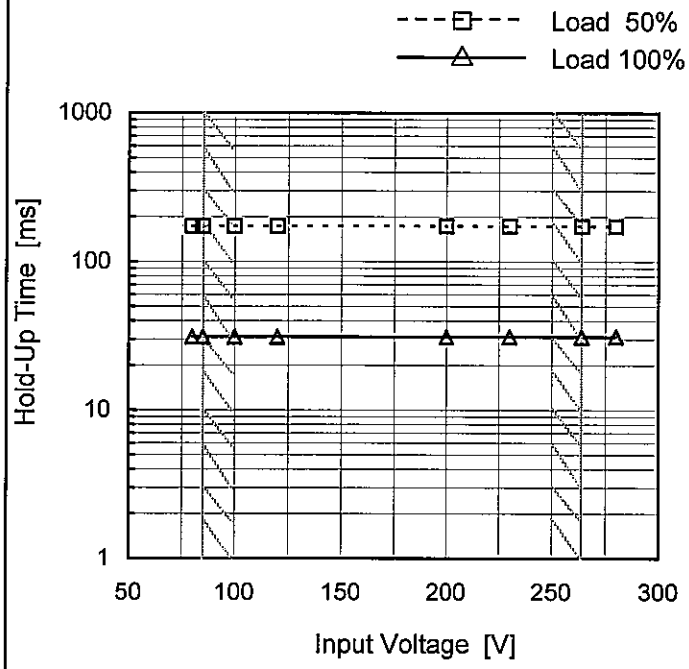
Model	TUNS50F12
Item	Hold-Up Time
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
80	173	31
85	173	31
100	173	31
120	173	31
200	173	31
230	173	31
264	173	31
280	173	31
--	-	-

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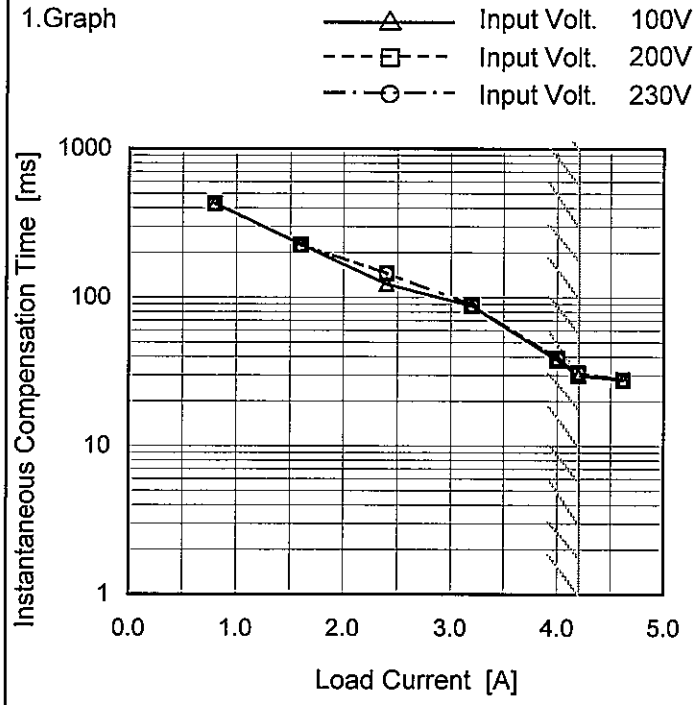
Model	TUNS50F12
Item	Instantaneous Interruption Compensation
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
0.8	431	427	427
1.6	228	227	226
2.4	123	145	145
3.2	88	89	89
4.0	38	39	39
4.2	30	31	31
4.6	28	28	28
--	-	-	-
--	-	-	-
--	-	-	-

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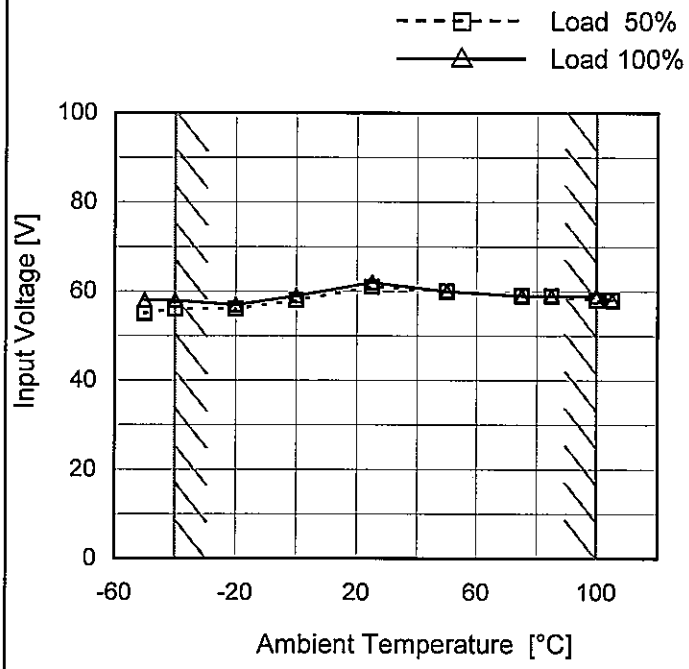
Model	TUNS50F12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V4.2A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	55	58
-40	56	58
-20	56	57
0	58	59
25	61	62
50	60	60
75	59	59
85	59	59
100	58	59
105	58	58
--	-	-

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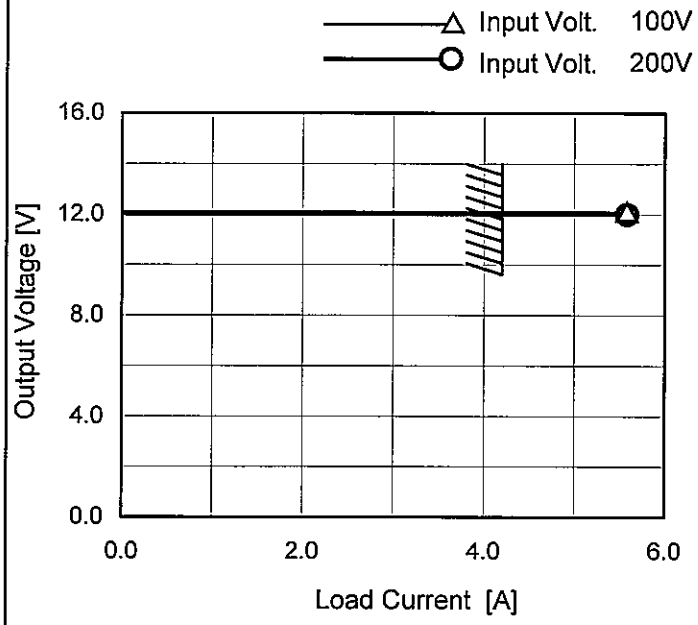
Model	TUNS50F12
Item	Overcurrent Protection
Object	+12V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when overcurrent protection is activated.

2.Values

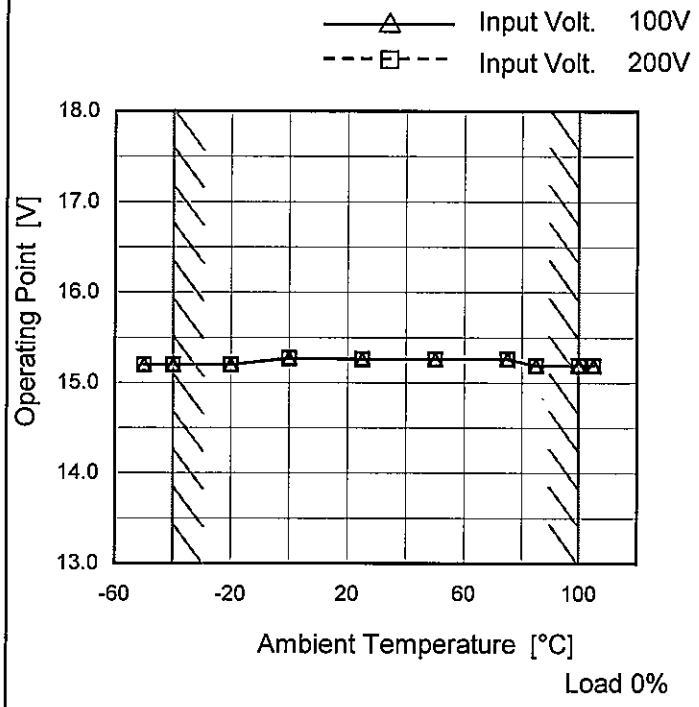
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
12.0	5.47	5.47
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	TUNS50F12
Item	Overvoltage Protection
Object	+12V4.2A

Testing Circuitry Figure A

1.Graph



Load 0%

Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-50	15.20	15.20
-40	15.20	15.20
-20	15.20	15.20
0	15.27	15.27
25	15.26	15.26
50	15.26	15.26
75	15.26	15.26
85	15.19	15.19
100	15.19	15.19
105	15.19	15.19
--	-	-

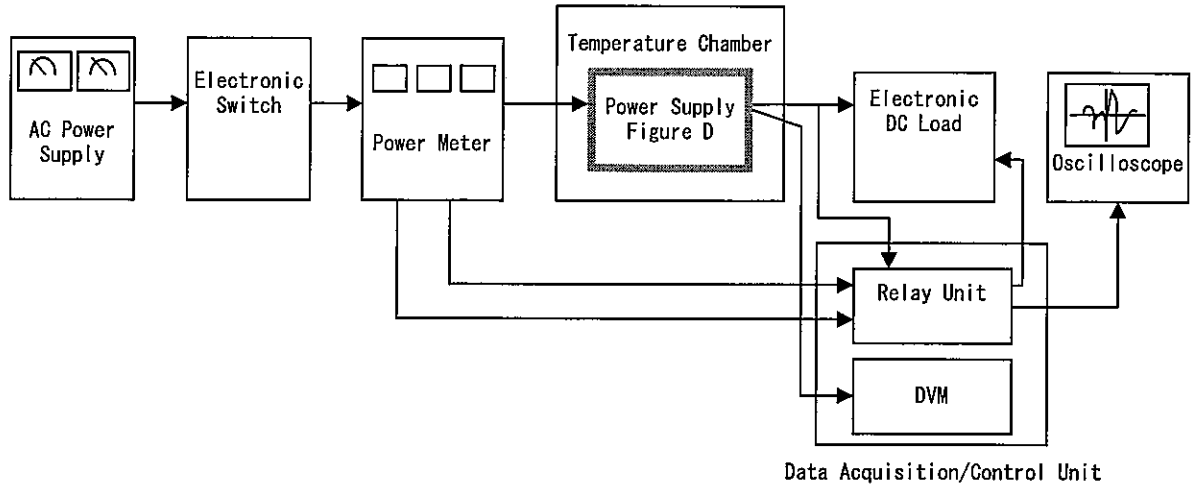


Figure A

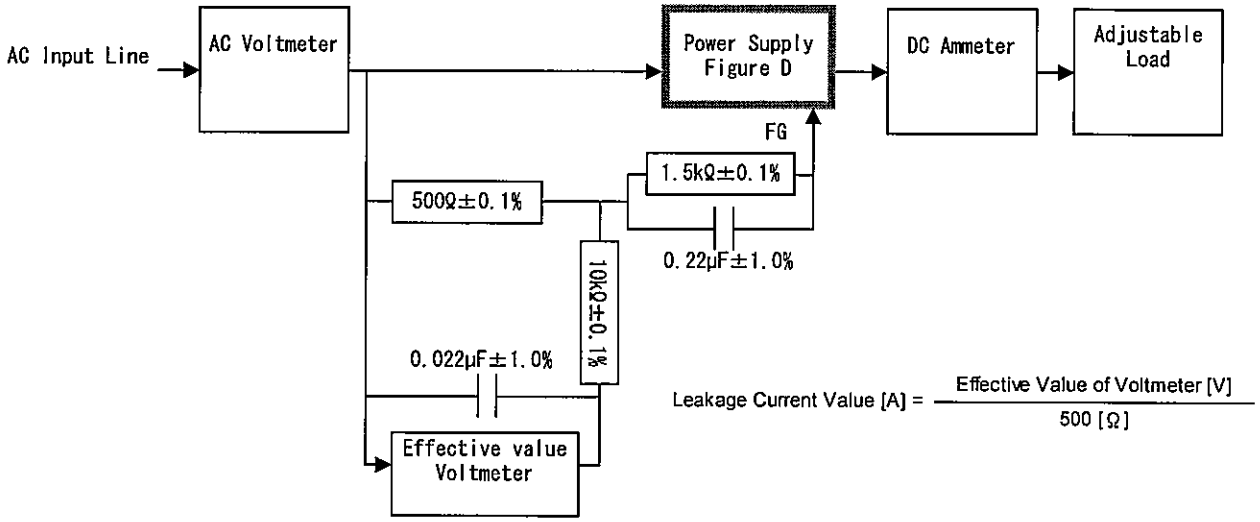
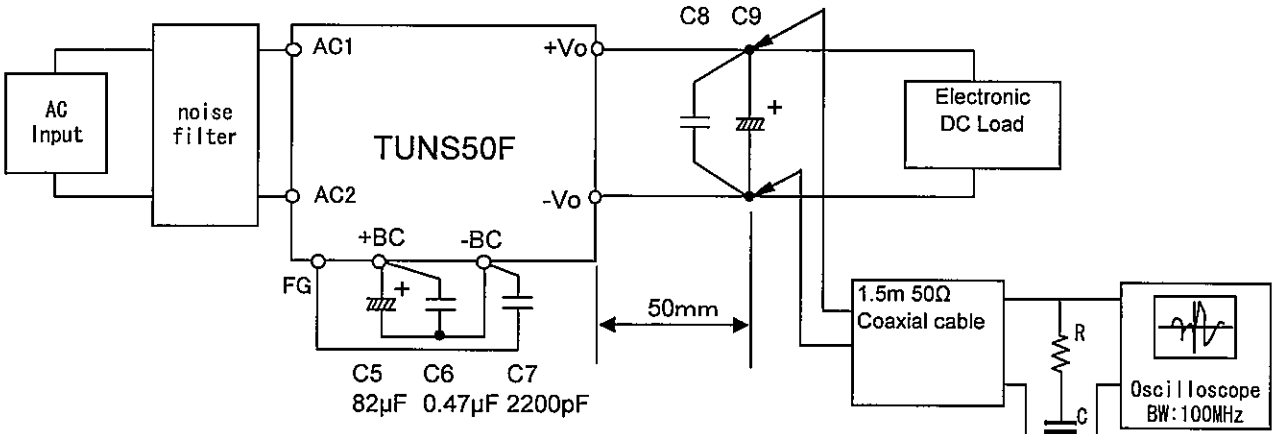


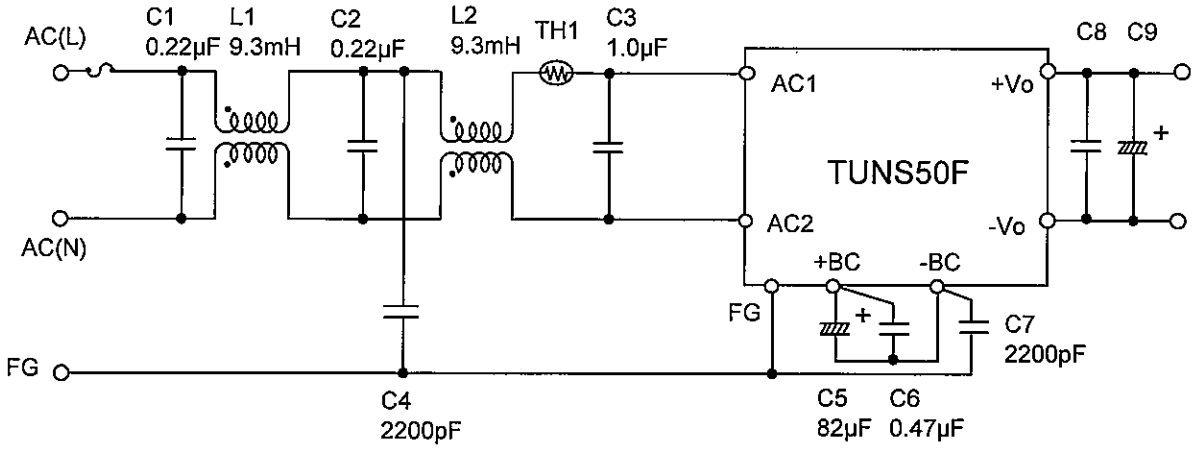
Figure B (IEC60950-1)



C8 : TUNS50F05	10μF	C9 : TUNS50F05	2200μF	(0≦Tc≦100)
TUNS50F12	10μF		2200μF×3	(-40≦Tc＜0)
TUNS50F24	4.7μF	TUNS50F12	470μF	(0≦Tc≦100)
			470μF×3	(-40≦Tc＜0)
		TUNS50F24	220μF	(0≦Tc≦100)
			220μF×3	(-40≦Tc＜0)

Tc : Base Plate Temp.

Figure C



L1,L2 : SS11VL-R10093(NEC TOKIN)		C9 : TUNS50F05	2200μF	(0≦Tc≦100)
TH1 : 5D2-08(SEMITEC)			2200μF×3	(-40≦Tc<0)
C8 : TUNS50F05	10μF	TUNS50F12	470μF	(0≦Tc≦100)
TUNS50F12	10μF		470μF×3	(-40≦Tc<0)
TUNS50F24	4.7μF	TUNS50F24	220μF	(0≦Tc≦100)
			220μF×3	(-40≦Tc<0)

Tc : Base Plate Temp.

Figure D