COSEL

TEST DATA OF SNDHS200A12

Regulated DC Power Supply
April 10, 2012

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COSEL CO.,LTD.

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Item	Input Current (by Input Voltage)
Object	+12V16.7A

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1. Graph

——△—— Load 100%
---☐--- Load 50%
—·—○—·· Load 0%

Input Current [A] vs Input Voltage [V]

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

2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
40	0.008	0.008	0.008
50	0.005	0.005	0.005
55	0.004	0.004	0.004
56	0.029	2.064	4.234
60	0.028	1.912	3.924
66	0.024	1.730	3.543
80	0.019	1.431	2.917
95	0.018	1.208	2.446
110	0.017	1.049	2.114
125	0.015	0.928	1.861
140	0.013	0.833	1.662
160	0.012	0.736	1.461
170	0.011	0.716	1.409
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS200A12
Item	Input Current (by Load Current)
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

     ——△—— Input Volt.   60V
     - - -▣- - - Input Volt.   110V
     —·—◯—·— Input Volt.   160V

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

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	0.028	0.017	0.012
3.0	0.721	0.395	0.279
6.0	1.386	0.762	0.540
9.0	2.070	1.130	0.792
12.0	2.776	1.506	1.050
15.0	3.506	1.894	1.312
16.7	3.924	2.114	1.461
18.4	4.351	2.336	1.612
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS200A12
Item	Input Power (by Load Current)
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

—△— Input Volt.   60V
---☐--- Input Volt.   110V
—·—○—·· Input Volt.   160V

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	1.7	1.9	1.9
3.0	43.2	43.4	44.7
6.0	83.0	83.7	86.3
9.0	124.2	124.2	126.7
12.0	166.4	165.5	167.8
15.0	210.0	208.2	209.8
16.7	235.2	232.2	233.6
18.4	260.8	256.8	257.8
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	SNDHS200A12
Item	Efficiency (by Input Voltage)
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%
——— △ ——— Load 100%

Efficiency [%] vs Input Voltage [V]

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
56	88.4	86.3
60	88.9	86.8
66	89.6	87.3
80	89.5	87.7
95	89.2	87.9
110	88.8	87.9
125	88.2	87.9
140	87.7	87.8
160	86.8	87.4
170	86.4	87.2

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Model	SNDHS200A12
Item	Efficiency (by Load Current)
Object	+12V16.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

—△— Input Volt. 60V
--- ☐ --- Input Volt. 110V
— · —○— · — Input Volt. 160V

Efficiency [%] vs Load Current [A]

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	-	-	-
3.0	85.5	85.2	82.7
6.0	88.7	87.9	85.3
9.0	88.8	88.8	87.0
12.0	88.3	88.8	87.6
15.0	87.4	88.2	87.5
16.7	86.8	87.9	87.4
18.4	86.1	87.5	87.1
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	SNDHS200A12
Item	Line Regulation
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%
—— △ —— Load 100%

Output Voltage [V] vs Input Voltage [V]

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

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
56	12.264	12.259
60	12.264	12.259
66	12.264	12.259
80	12.264	12.259
95	12.264	12.259
110	12.264	12.259
125	12.264	12.259
140	12.263	12.259
160	12.263	12.259
170	12.263	12.259

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Model	SNDHS200A12
Item	Load Regulation
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

———△——— Input Volt.   60V
- - -☐- - - Input Volt.   110V
—·—O—·— Input Volt.   160V

Output Voltage [V] vs Load Current [A]

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

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	12.270	12.271	12.271
3.0	12.268	12.269	12.270
6.0	12.267	12.268	12.268
9.0	12.266	12.267	12.267
12.0	12.265	12.266	12.266
15.0	12.264	12.265	12.266
16.7	12.264	12.264	12.265
18.4	12.264	12.264	12.265
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS200A12
Item	Dynamic Load Response
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

Input Volt.   110   V
Cycle   1000 ms

Load Current ⎍⎍⎍
16.7A/50μs

Min. Load (0A) ←→
   Load 100% (16.7A)

0.5 V/div
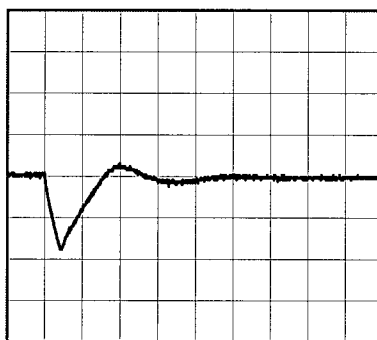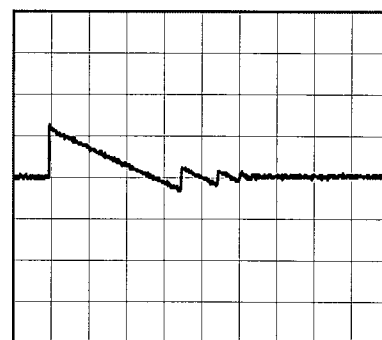
400μs/div   40ms/div

Min. Load (0A) ←→
   Load 50% (8.35A)

0.5 V/div
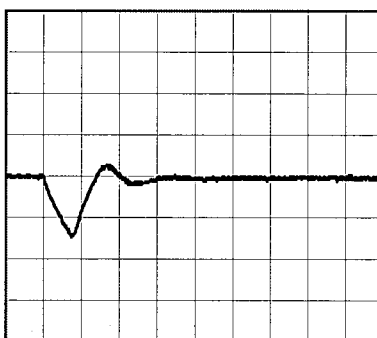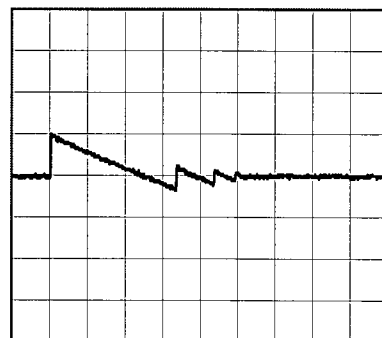
400μs/div   40ms/div

Load 10% (1.67A) ←→
   Load 100% (16.7A)

0.5 V/div

400μs/div   40ms/div

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Model	SNDHS200A12
Item	Ripple Voltage (by Load Current)
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure B

1.Graph

——△—— Input Volt.   60V
—·—○—·— Input Volt.   160V

Ripple Voltage [mV]

Load Current [A]

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0	5	5
3	15	20
6	15	20
9	15	20
12	15	20
15	15	20
16.7	15	20
18.4	15	20
--	-	-
--	-	-
--	-	-

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.

Ripple [mVp-p]

Fig.Complex Ripple Wave Form

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Model	SNDHS200A12
Item	Ripple-Noise
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure B

1.Graph

——△——— Input Volt.   60V
—··—○—··— Input Volt.   160V

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0	5	15
3	20	25
6	20	25
9	20	25
12	15	25
15	15	25
16.7	15	25
18.4	15	30
---	-	-
---	-	-
---	-	-
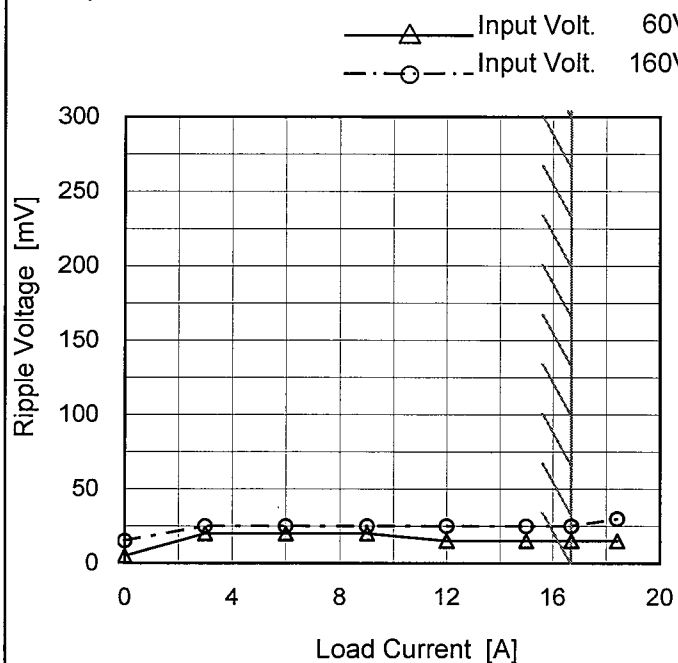
Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
       load current.
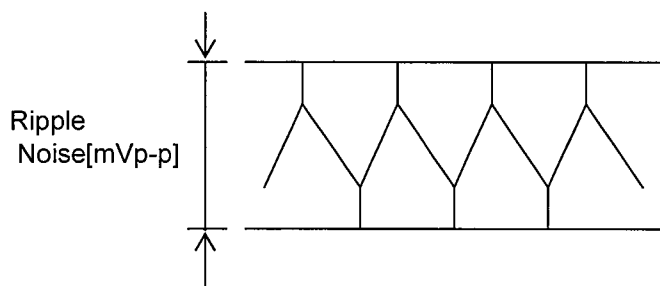
Ripple
Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form

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Model	SNDHS200A12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V16.7A

Testing Circuitry   Figure B

1.Graph

- - - ⊟ - - -   Load 50%
——△——   Load 100%

Ambient Temperature [°C]

Input Volt.   110V
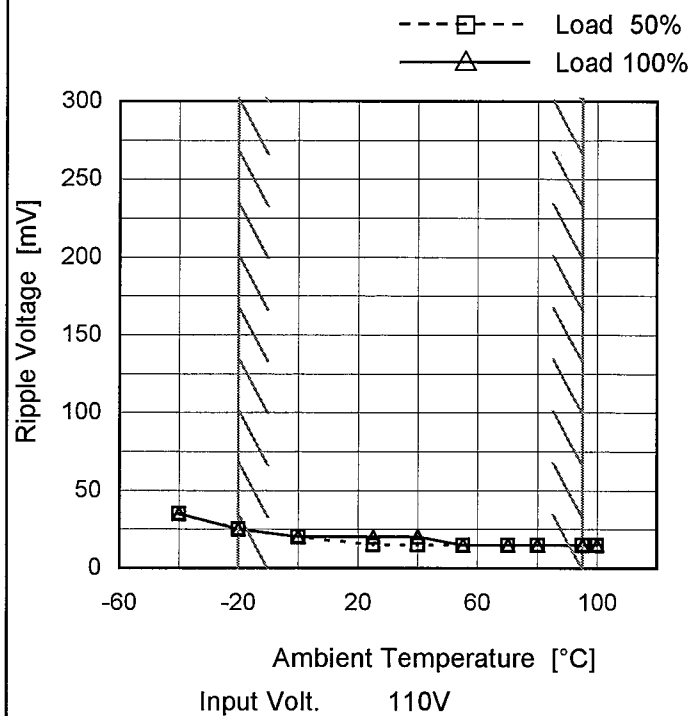
Measured by 100 MHz Oscilloscope.

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

Ripple [mVp-p]
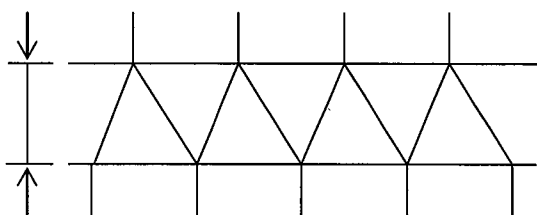
Fig.Complex Ripple Wave Form

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	35	35
-20	25	25
0	20	20
25	15	20
40	15	20
55	15	15
70	15	15
80	15	15
95	15	15
100	15	15
--	-	-

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Model	SNDHS200A12
Item	Ambient Temperature Drift
Object	+12V16.7A

Testing Circuitry   Figure A

1.Graph

———△——— Input Volt.   60V
--- ⊟ --- Input Volt.   110V
—·—○—·— Input Volt.   160V

Ambient Temperature [°C]

Load 100%

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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
-40	12.211	12.212	12.213
-20	12.233	12.233	12.234
0	12.247	12.248	12.248
25	12.261	12.261	12.261
40	12.270	12.270	12.270
55	12.270	12.270	12.270
70	12.271	12.271	12.271
80	12.272	12.272	12.272
95	12.273	12.273	12.274
100	12.274	12.274	12.275
--	-	-	-

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Model	SNDHS200A12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V16.7A	

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   : -20 - 95°C

Input Voltage : 60 - 160V
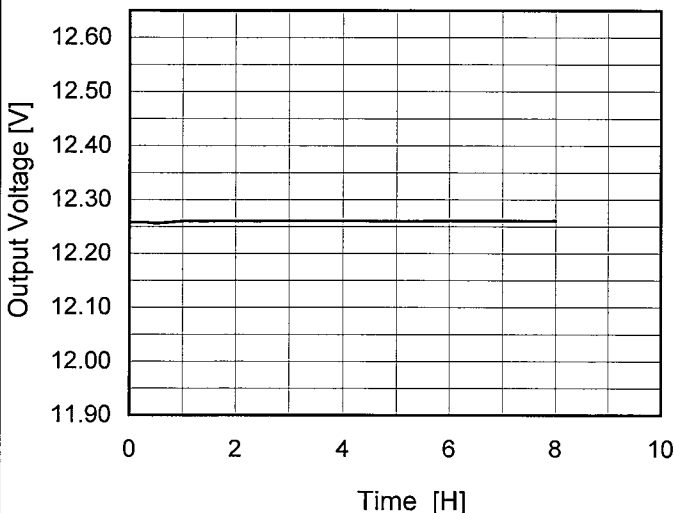
Load Current   : 0 - 16.7A

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

* Output Voltage Accuracy (Ration) = $\dfrac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}}$ × 100

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	95	60	0	12.285	±26	±0.2
Minimum Voltage	-20	60	16.7	12.233		

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Model	SNDHS200A12
Item	Time Lapse Drift
Object	+12V16.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 110V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.258
0.5	12.256
1.0	12.260
2.0	12.260
3.0	12.261
4.0	12.261
5.0	12.260
6.0	12.261
7.0	12.261
8.0	12.261

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Model	SNDHS200A12
Item	Rise and Fall Time
Object	+12V16.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 110 V

Load 50%

Output Volt. [2V/div]

0

Load 100%

Output Volt. [2V/div]

0

Input Volt. [25V/div]

0

Time [50ms/div]

Time [20ms/div]

2.Values

[ms]

Load ╲ Time	Td	Tr	Ts	Th	Tf
50 %	52.8	2.3	55.1	2.9	12.5
100 %	52.8	2.8	55.6	1.5	6.3

Output Volt.

90%

10%

Input Volt.

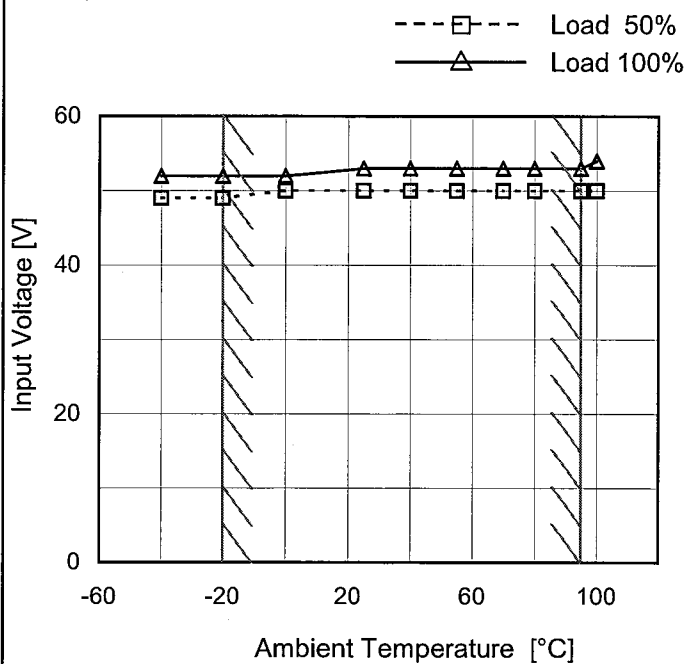Td | Tr | Th | Tf

Ts

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Model	SNDHS200A12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V16.7A

Testing Circuitry   Figure A

1.Graph
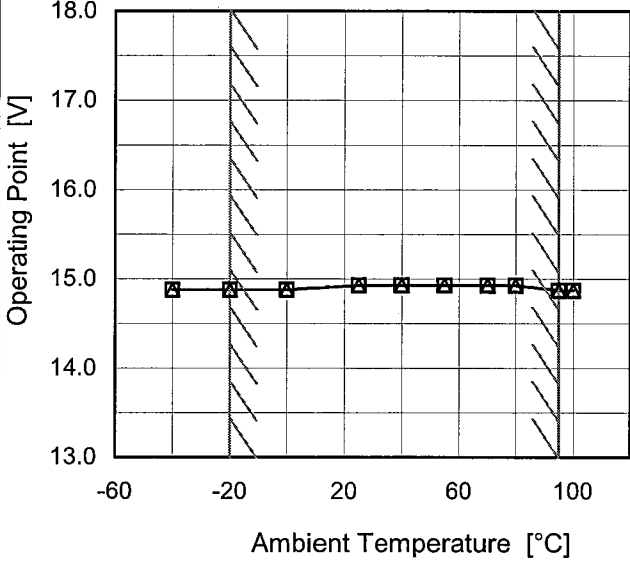
```
- - -⊟- - -  Load  50%
———△———  Load 100%
```


Input Voltage [V] vs Ambient Temperature [°C]

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

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	49	52
-20	49	52
0	50	52
25	50	53
40	50	53
55	50	53
70	50	53
80	50	53
95	50	53
100	50	54
--	-	-

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Model	SNDHS200A12
Item	Overcurrent Protection
Object	+12V16.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

—————— Input Volt.   60V
—————— Input Volt.   110V
~~~~~~ Input Volt.   160V

Load Current [A]

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

Intermittent operation occurs when overcurrent
protection is activated.

Intermittent operation occurs when the output
voltage is from 6V to 0V.

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
11.4	19.94	19.86	19.03
10.8	19.94	20.32	19.11
9.6	20.68	20.42	19.28
8.4	20.72	20.28	19.63
7.2	21.40	21.49	20.04
6.0	21.96	22.04	20.27
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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COSEL

Model	SNDHS200A12
Item	Overvoltage Protection
Object	+12V16.7A

Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   60V
- - -☐- - - Input Volt.   160V

Ambient Temperature [°C]

Load 0%

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

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 60[V]	Input Volt. 160[V]
-40	14.88	14.88
-20	14.88	14.88
0	14.88	14.88
25	14.93	14.93
40	14.93	14.93
55	14.93	14.93
70	14.93	14.93
80	14.93	14.93
95	14.87	14.87
100	14.87	14.87
--	-	-

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Figure A

Figure A

- DC Power Supply
- Electronic Switch
- Power Meter
- Temperature Chamber — Power Supply
- Electronic DC Load
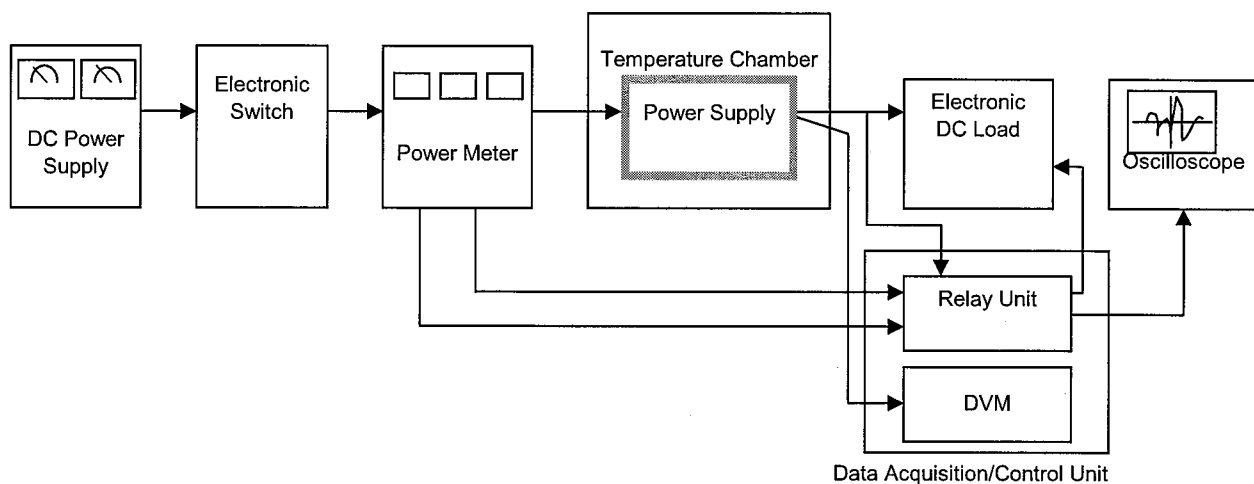- Oscilloscope
- Relay Unit
- DVM
- Data Acquisition/Control Unit

Figure A

Figure B (Ripple and Ripple noise Characteristic)

- DC Input
- +Vin
- -Vin
- +Vout
- +M
- +S
- -S
- -M
- -Vout
- Load
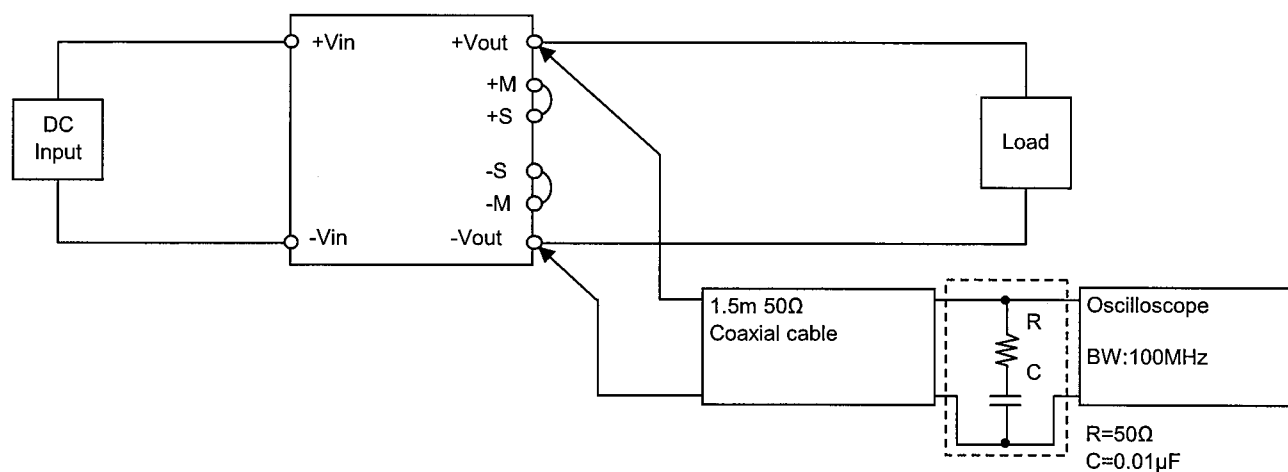- 1.5m 50Ω Coaxial cable
- R
- C
- Oscilloscope BW:100MHz
- R=50Ω
- C=0.01μF

Figure B (Ripple and Ripple noise Characteristic)

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