COSEL

参考資料

TEST DATA OF DHS100A15

Regulated DC Power Supply
April 5, 2010

Approved by : Tatsuya Mano
Tatsuya Mano — Design Manager

Prepared by : Tetsuro Hirata
Tetsuro Hirata — Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

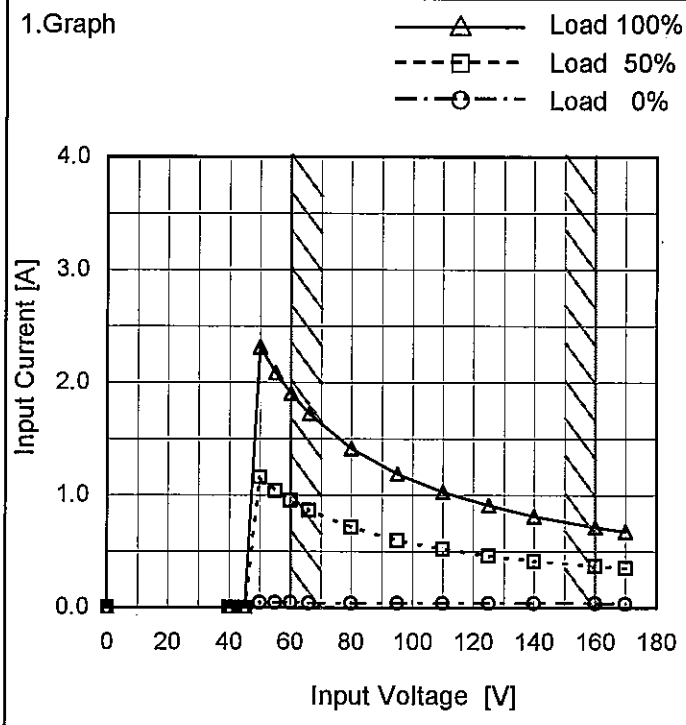
1.Input Current (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Current (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・ 2
3.Input Power (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Efficiency (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 5
6.Line Regulation ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 6
7.Load Regulation ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 7
8.Dynamic Load Response ・・・・・・・・・・・・・・・・・・・・・・・・・・・ 8
9.Ripple Voltage (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・ 9
10.Ripple-Noise ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 10
11.Ripple Voltage (by Ambient Temperature) ・・・・・・・・・・・・・・・・・・ 11
12.Ambient Temperature Drift ・・・・・・・・・・・・・・・・・・・・・・・・・ 12
13.Output Voltage Accuracy ・・・・・・・・・・・・・・・・・・・・・・・・・・ 13
14.Time Lapse Drift ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 14
15.Rise and Fall Time ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 15
16.Minimum Input Voltage for Regulated Output Voltage ・・・・・・・・・・・・ 16
17.Overcurrent Protection ・・・・・・・・・・・・・・・・・・・・・・・・・・・ 17
18.Overvoltage Protection ・・・・・・・・・・・・・・・・・・・・・・・・・・・ 18
19.Figure of Testing Circuitry ・・・・・・・・・・・・・・・・・・・・・・・・・ 19
(Final Page 19)

COSEL

Model	DHS100A15
Item	Input Current (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

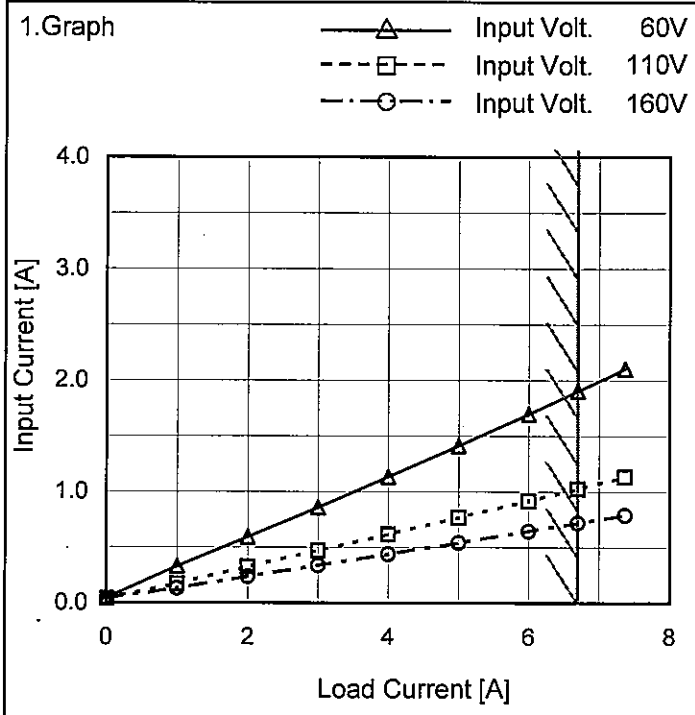
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
40	0.002	0.002	0.002
45	0.002	0.002	0.002
50	0.045	1.159	2.314
55	0.044	1.043	2.085
60	0.043	0.954	1.901
66	0.042	0.866	1.724
80	0.040	0.714	1.418
95	0.039	0.599	1.188
110	0.038	0.521	1.026
125	0.038	0.463	0.908
140	0.037	0.417	0.814
160	0.037	0.371	0.718
170	0.037	0.353	0.678
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	DHS100A15
Item	Input Current (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 Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.00	0.043	0.038	0.037
1.00	0.328	0.169	0.128
2.00	0.593	0.326	0.236
3.00	0.858	0.469	0.335
4.00	1.132	0.616	0.437
5.00	1.412	0.767	0.539
6.00	1.696	0.918	0.643
6.70	1.901	1.026	0.718
7.37	2.099	1.132	0.788
--	-	-	-
--	-	-	-

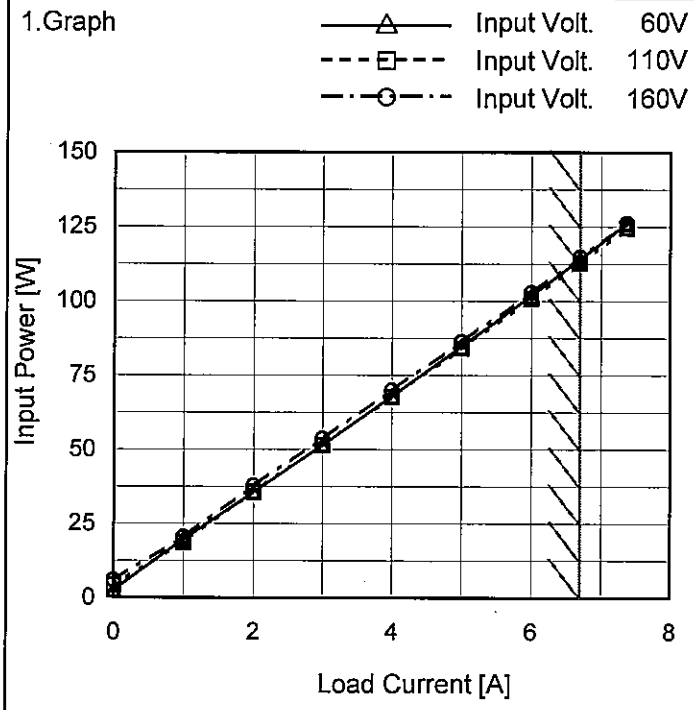
BC-10413

COSEL

Model	DHS100A15
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

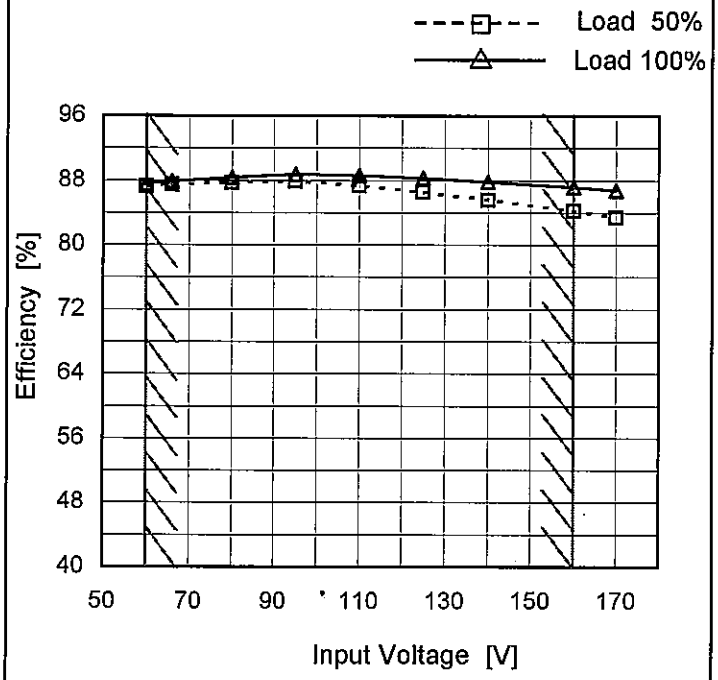
Load Current [A]	Input Power [W]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.00	2.6	4.2	5.9
1.00	19.6	18.6	20.5
2.00	35.6	35.8	37.8
3.00	51.4	51.5	53.7
4.00	67.9	67.7	69.9
5.00	84.7	84.1	86.3
6.00	101.8	100.9	103.0
6.70	114.1	112.9	114.7
7.37	126.0	124.5	126.2
--	-	-	-
--	-	-	-

COSEL

Model	DHS100A15
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

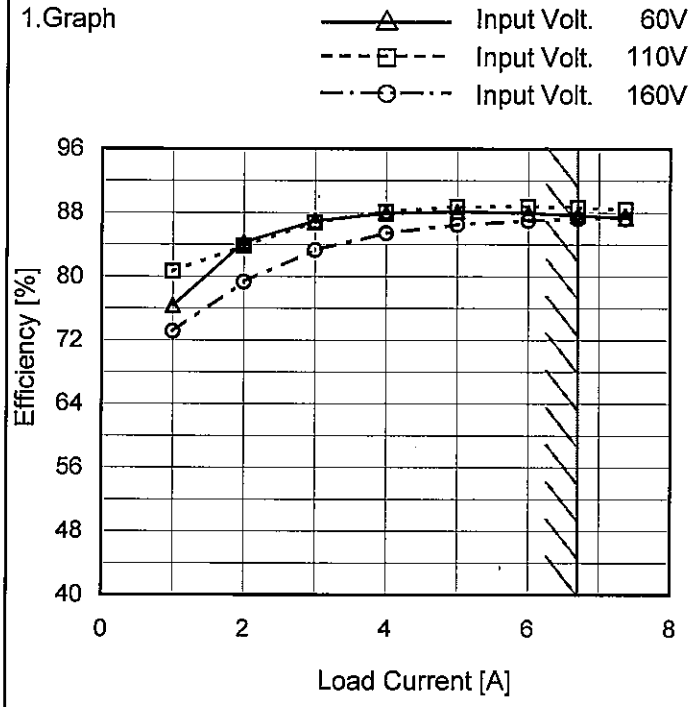
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
60	87.2	87.6
66	87.5	87.9
80	87.7	88.4
95	87.9	88.8
110	87.4	88.6
125	86.5	88.3
140	85.6	87.8
160	84.2	87.2
170	83.4	86.8

COSEL

Model	DHS100A15
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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.00	-	-	-
1.00	76.3	80.6	73.1
2.00	84.3	83.8	79.3
3.00	87.0	86.8	83.3
4.00	87.9	88.1	85.4
5.00	88.1	88.7	86.5
6.00	88.0	88.8	87.0
6.70	87.6	88.6	87.2
7.37	87.4	88.4	87.2
--	-	-	-
--	-	-	-

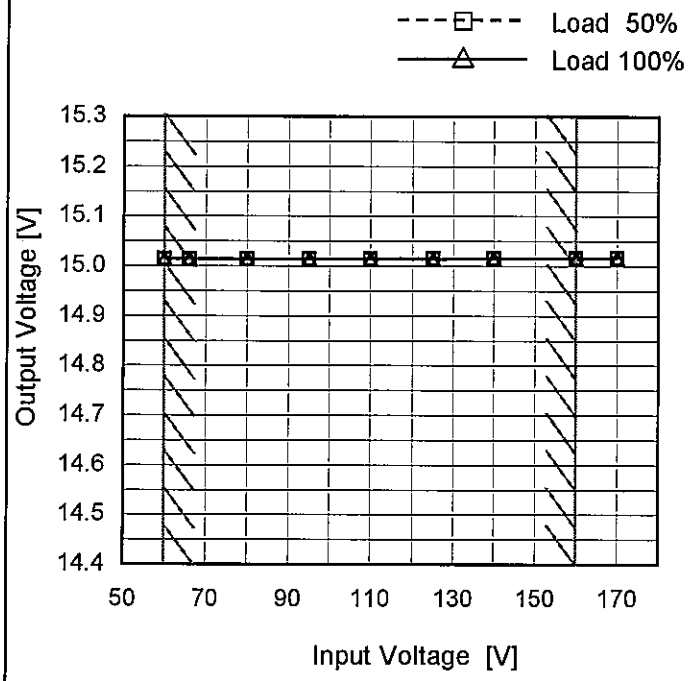
BC-10413

COSEL

Model	DHS100A15
Item	Line Regulation
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

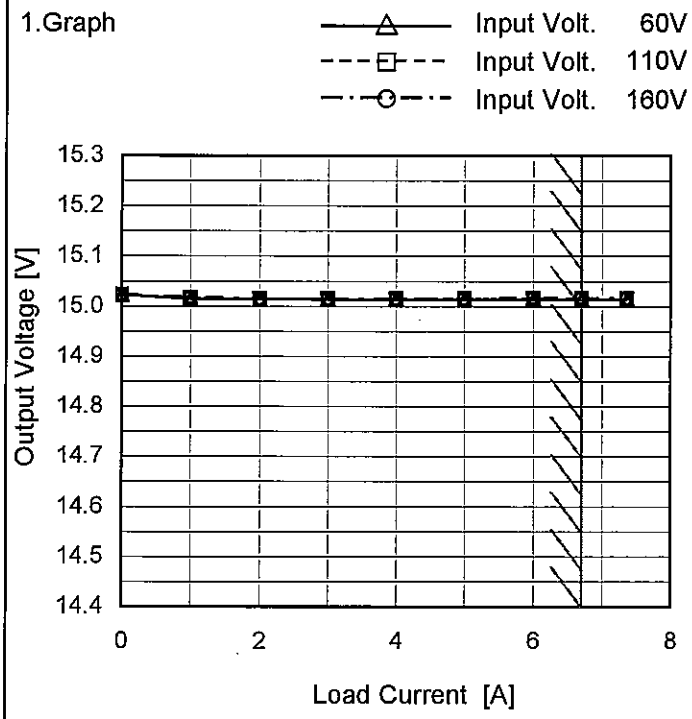
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
60	15.015	15.014
66	15.014	15.014
80	15.014	15.014
95	15.014	15.014
110	15.015	15.014
125	15.015	15.015
140	15.015	15.015
160	15.016	15.016
170	15.016	15.016

COSEL

Model	DHS100A15
Item	Load Regulation
Object	+15V6.7A

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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.00	15.022	15.022	15.022
1.00	15.015	15.016	15.017
2.00	15.015	15.014	15.016
3.00	15.014	15.014	15.016
4.00	15.014	15.014	15.016
5.00	15.014	15.014	15.016
6.00	15.014	15.014	15.016
6.70	15.014	15.014	15.016
7.37	15.014	15.014	15.016
--	-	-	-
--	-	-	-

COSEL

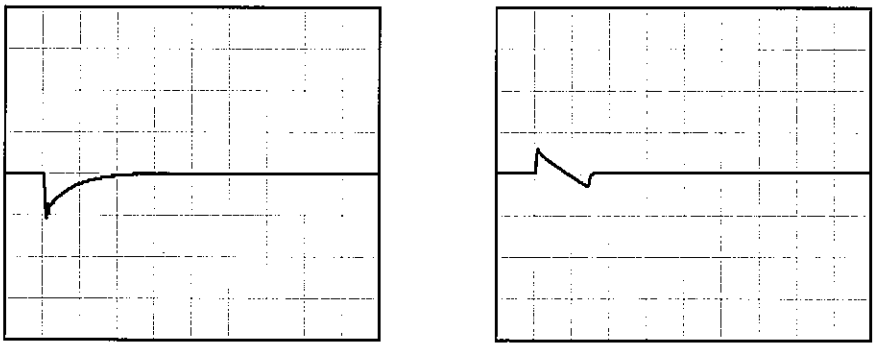
Model	DHS100A15
Item	Dynamic Load Response
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 110 V
Cycle 1000 ms

Load Current
6.7A /20μs

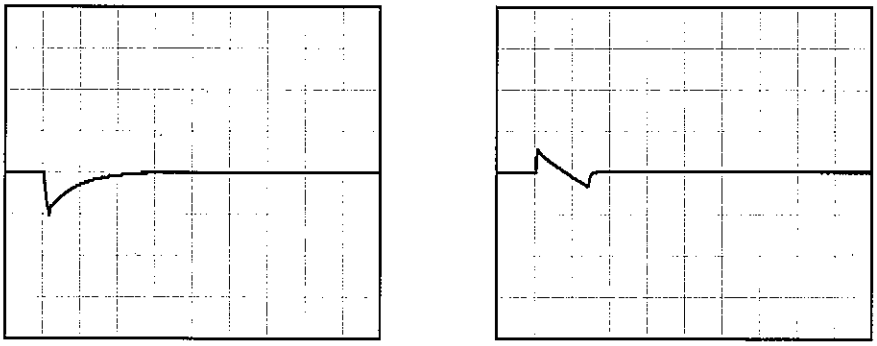
Min. Load (0A) ⟷
Load 100% (6.7A)



500mV/div

500 μ s/div 10 ms/div

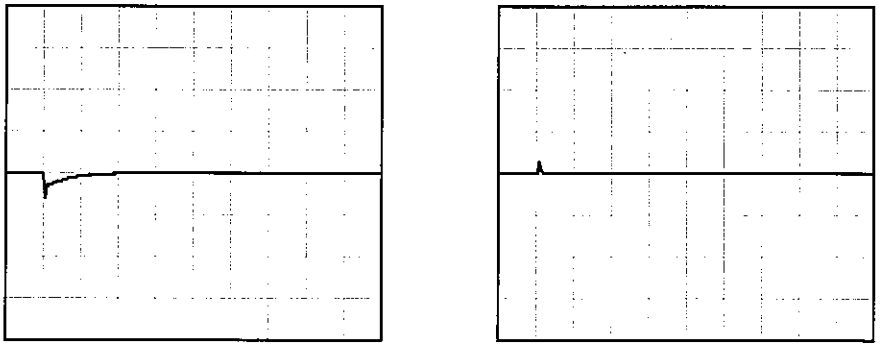
Min. Load (0A) ⟷
Load 50% (3.35A)



500mV/div

500 μ s/div 10 ms/div

Load 10% (0.67A) ⟷
Load 100% (6.7A)



500mV/div

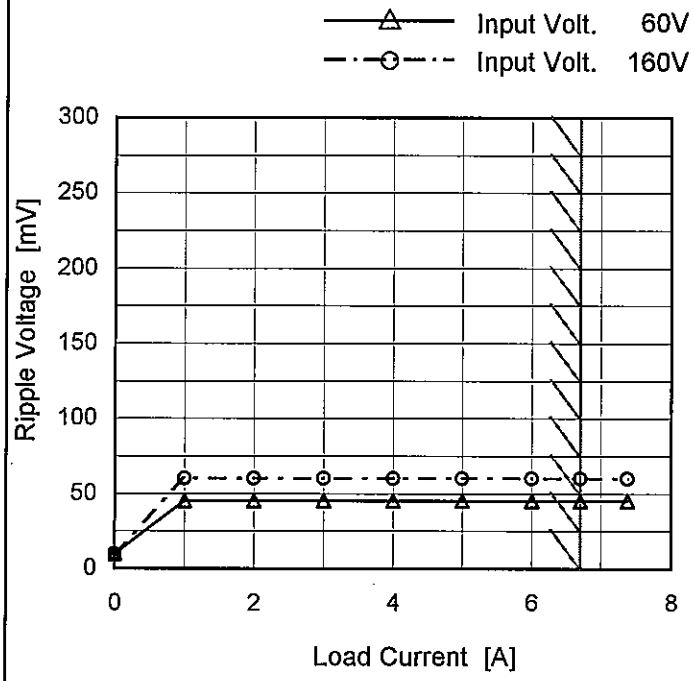
500 μ s/div 10 ms/div

COSEL

Model	DHS100A15
Item	Ripple Voltage (by Load Current)
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 500 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]

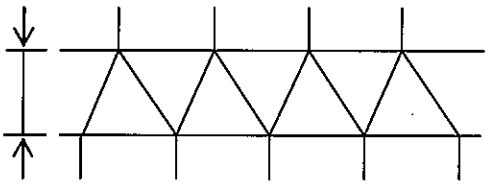


Fig.Complex Ripple Wave Form

2.Values

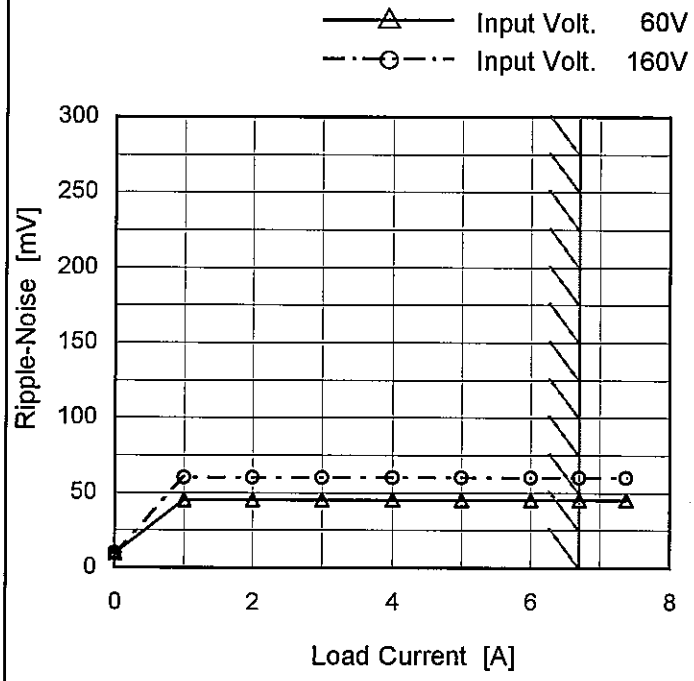
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.00	10	10
1.00	45	60
2.00	45	60
3.00	45	60
4.00	45	60
5.00	45	60
6.00	45	60
6.70	45	60
7.37	45	60
--	-	-
--	-	-

COSEL

Model	DHS100A15
Item	Ripple-Noise
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 500 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

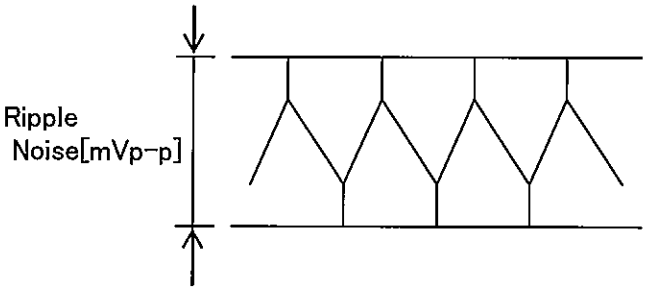


Fig.Complex Ripple Noise Wave Form

2.Values

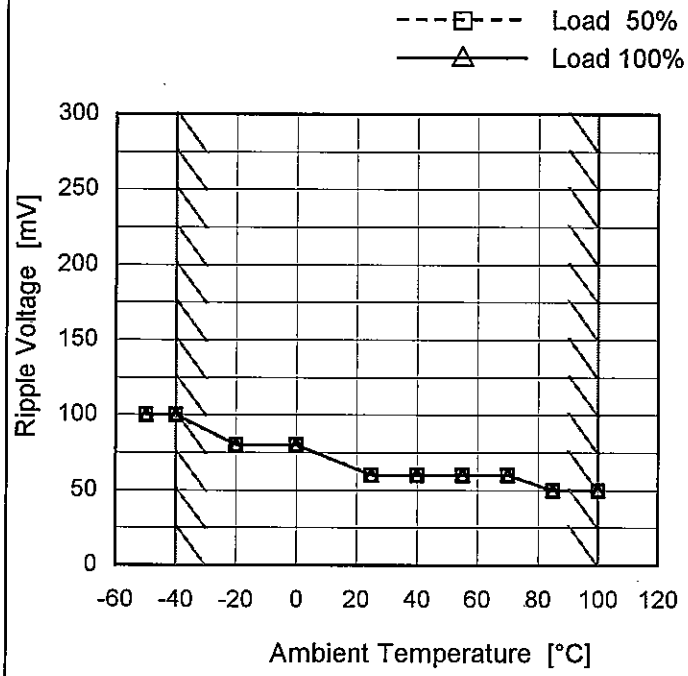
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.00	10	10
1.00	45	60
2.00	45	60
3.00	45	60
4.00	45	60
5.00	45	60
6.00	45	60
6.70	45	60
7.37	45	60
--	-	-
--	-	-

COSEL

Model	DHS100A15
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V6.7A

Testing Circuitry Figure B

1.Graph



Input Volt. 110V

Measured by 500 MHz Oscilloscope.

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

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	100	100
-40	100	100
-20	80	80
0	80	80
25	60	60
40	60	60
55	60	60
70	60	60
85	50	50
100	50	50
--	-	-

Ripple [mVp-p]

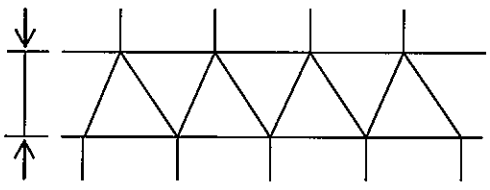


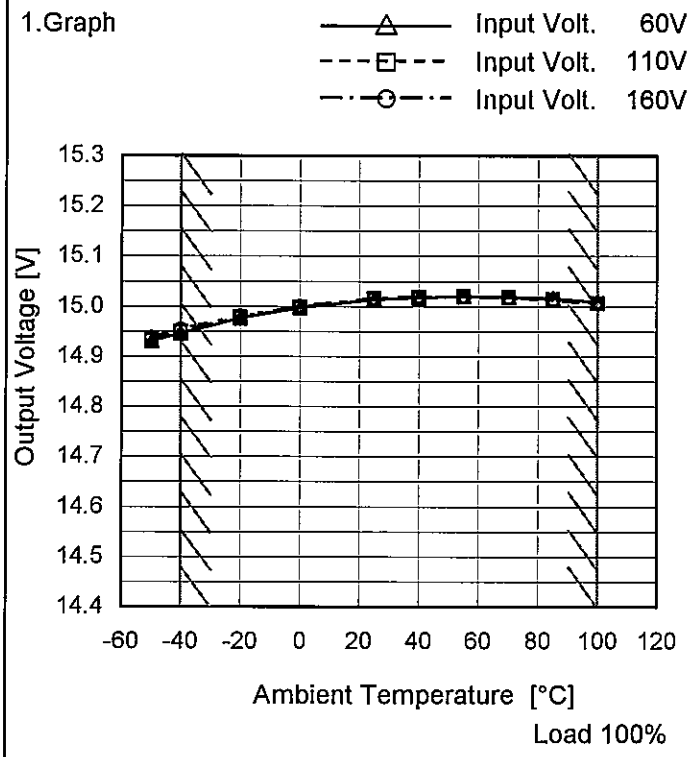
Fig.Complex Ripple Wave Form

COSEL

Model	DHS100A15
Item	Ambient Temperature Drift
Object	+15V6.7A

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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
-50	14.931	14.934	14.937
-40	14.946	14.950	14.954
-20	14.976	14.978	14.980
0	14.997	14.998	15.000
25	15.014	15.014	15.016
40	15.018	15.018	15.019
55	15.020	15.020	15.020
70	15.019	15.018	15.017
85	15.016	15.014	15.013
100	15.009	15.007	15.006
--	-	-	-

COSEL

Model	DHS100A15	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+15V6.7A	

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 : -40 - 100°C
Input Voltage : 60 - 160V
Load Current : 0 - 6.7A

* 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

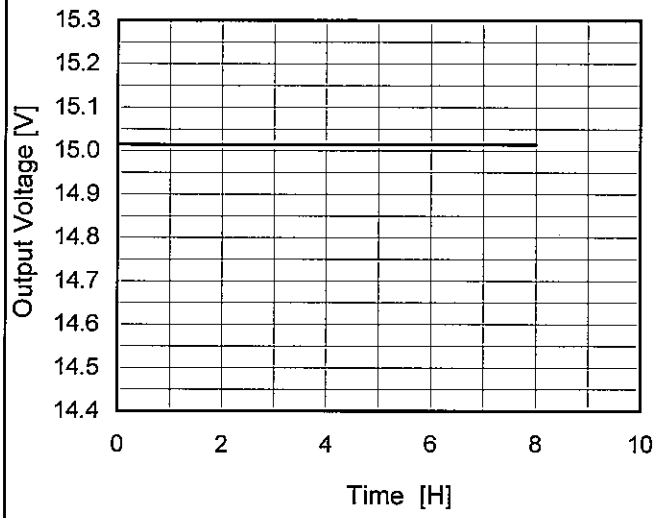
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	70	160	0	15.032	±43	±0.3
Minimum Voltage	-40	60	6.7	14.946		

COSEL

Model	DHS100A15
Item	Time Lapse Drift
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 110V
Load 100%

2.Values

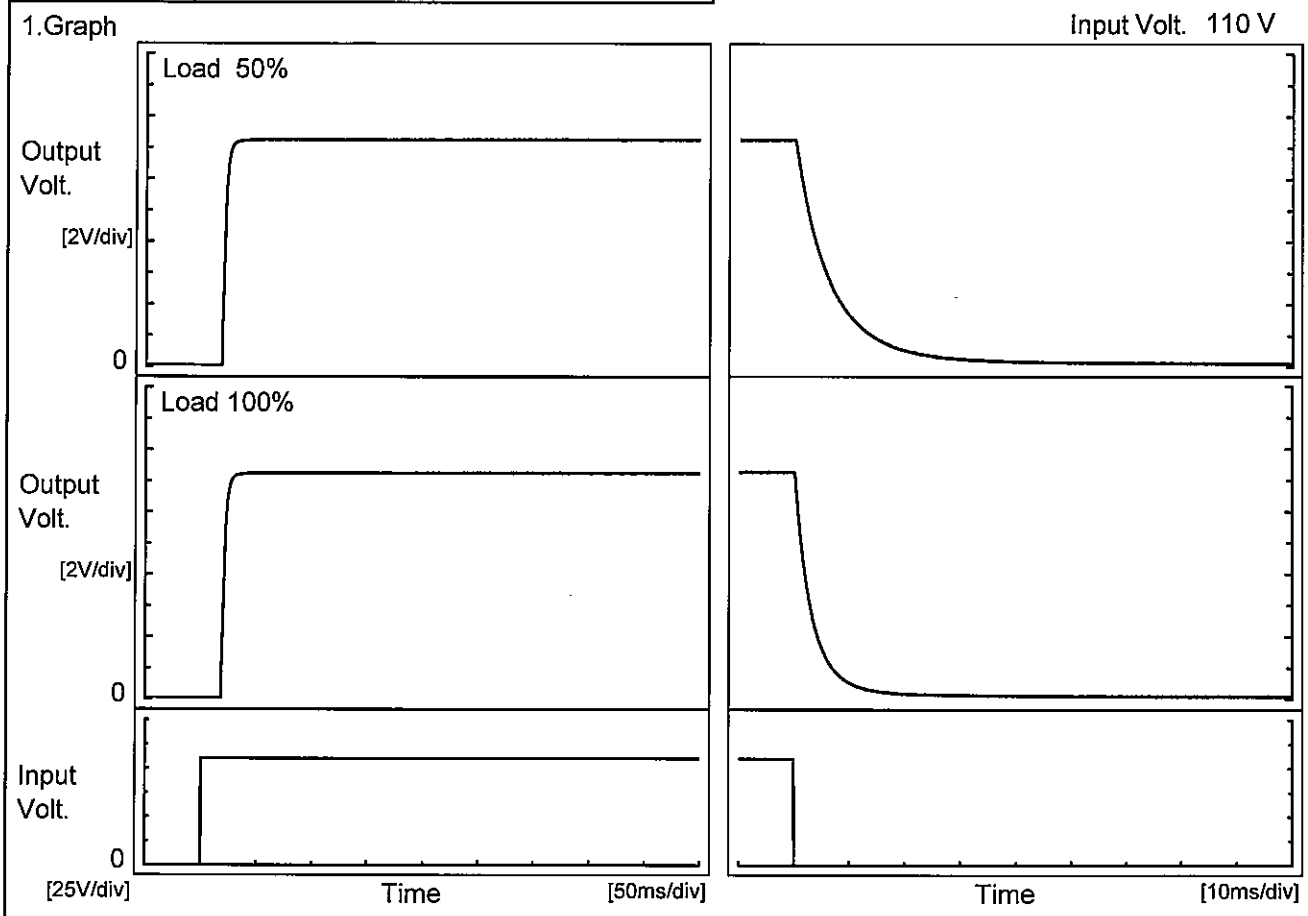
Time since start [H]	Output Voltage [V]
0.0	15.014
0.5	15.014
1.0	15.014
2.0	15.014
3.0	15.014
4.0	15.014
5.0	15.014
6.0	15.014
7.0	15.014
8.0	15.014

COSEL

Model	DHS100A15
Item	Rise and Fall Time
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure A

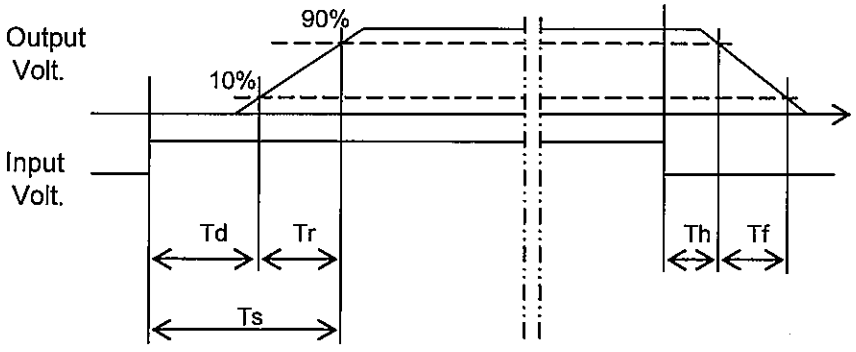
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	18.8	7.3	26.1	0.5	15.6
100 %	18.8	7.3	26.1	0.3	7.6



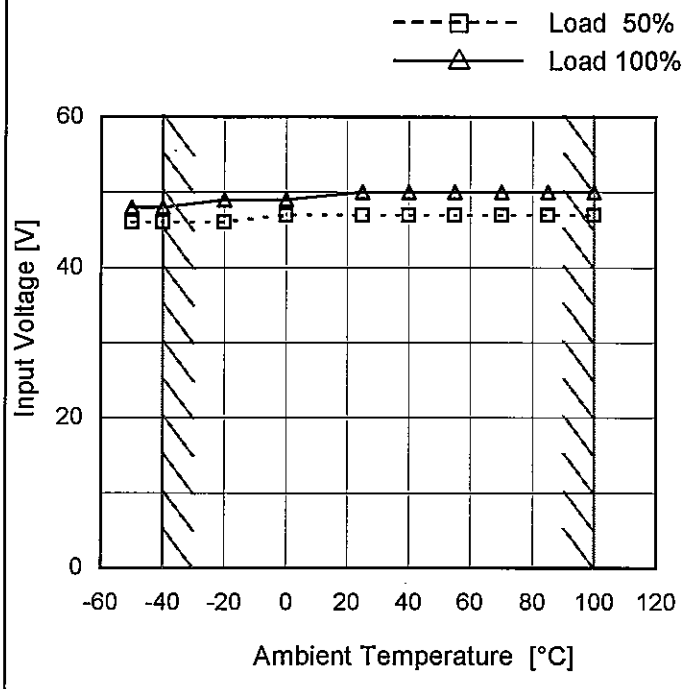
BC-10413

COSEL

Model	DHS100A15
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V6.7A

Testing Circuitry Figure A

1.Graph



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

2.Values

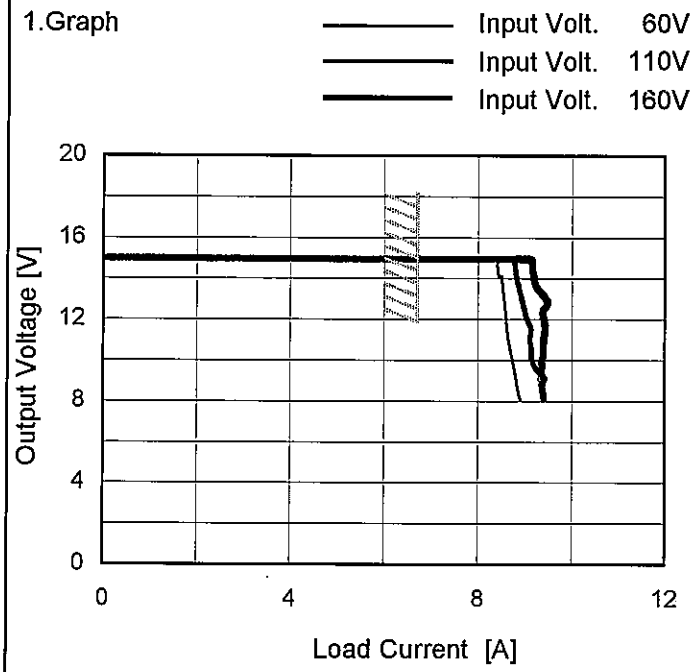
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	46	48
-40	46	48
-20	46	49
0	47	49
25	47	50
40	47	50
55	47	50
70	47	50
85	47	50
100	47	50
--	-	-

COSEL

Model	DHS100A15
Item	Overcurrent Protection
Object	+15V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when the output voltage is from 8V to 0V.

2.Values

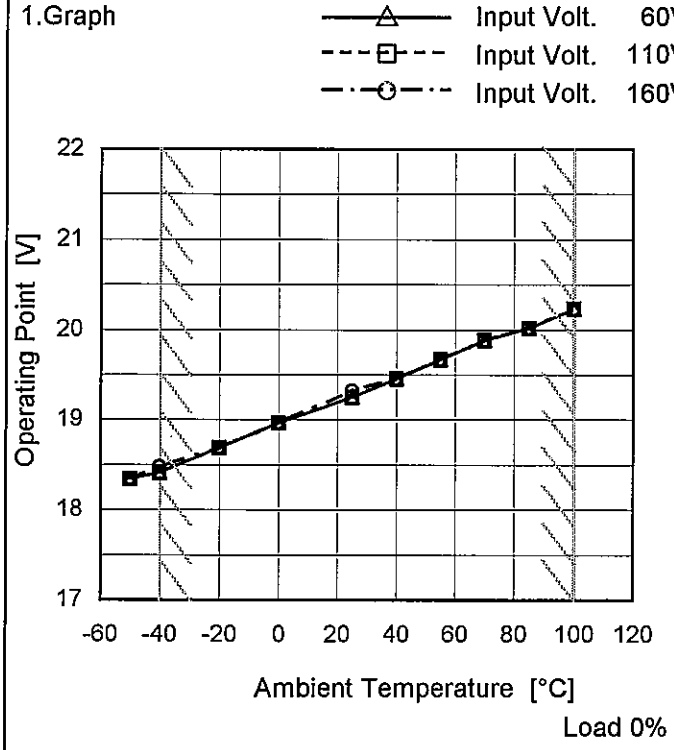
Output Voltage [V]	Load Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
15.0	6.70	6.72	6.72
14.3	8.43	8.81	9.18
13.5	8.52	8.87	9.27
12.0	8.60	9.04	9.41
10.5	8.69	9.13	9.39
9.0	8.81	9.41	9.35
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	DHS100A15
Item	Overvoltage Protection
Object	+15V6.7A

Testing Circuitry Figure A

1.Graph



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. 110[V]	Input Volt. 160[V]
-50	18.34	18.34	18.34
-40	18.41	18.41	18.48
-20	18.69	18.69	18.69
0	18.97	18.97	18.97
25	19.25	19.25	19.32
40	19.46	19.46	19.46
55	19.67	19.67	19.67
70	19.88	19.88	19.88
85	20.02	20.02	20.02
100	20.23	20.23	20.23
--	-	-	-

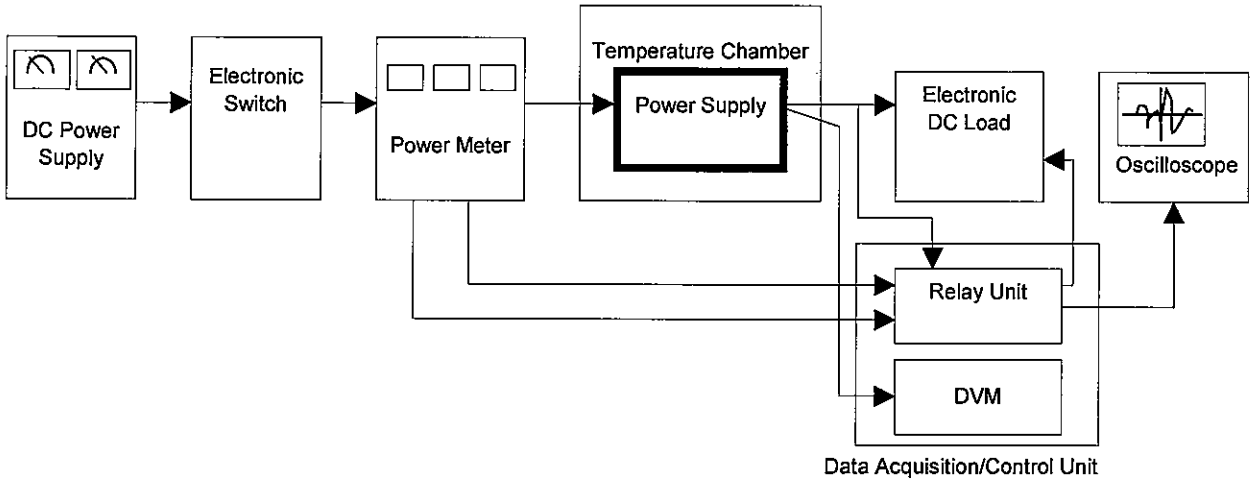
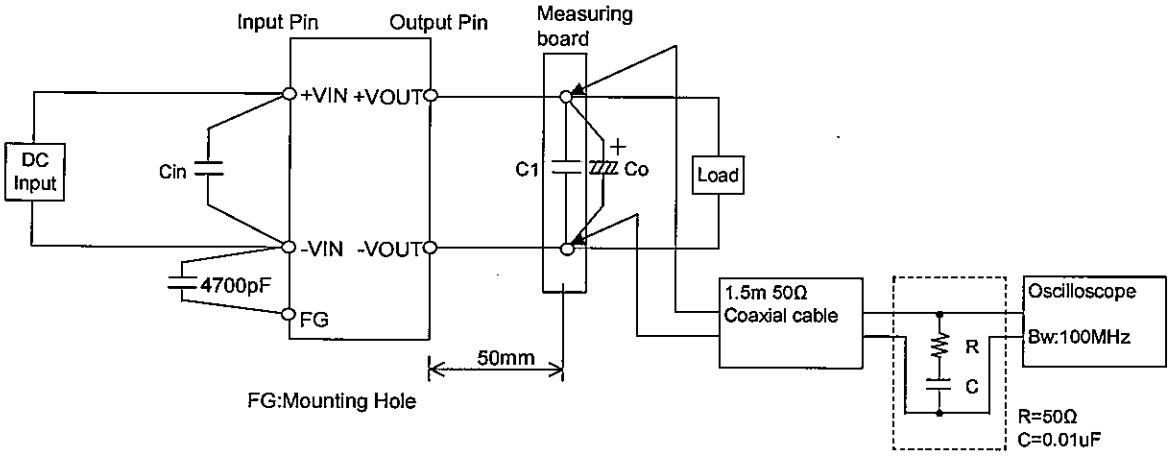


Figure A



C1 : DHS100A24 4.7uF
Others 10uF
Co : DHS100A05 2200uF
DHS100A12 470uF
DHS100A15 470uF
DHS100A24 220uF

Figure B