COSEL

TEST DATA OF SNDHS250B28

Regulated DC Power Supply
June 18, 2011

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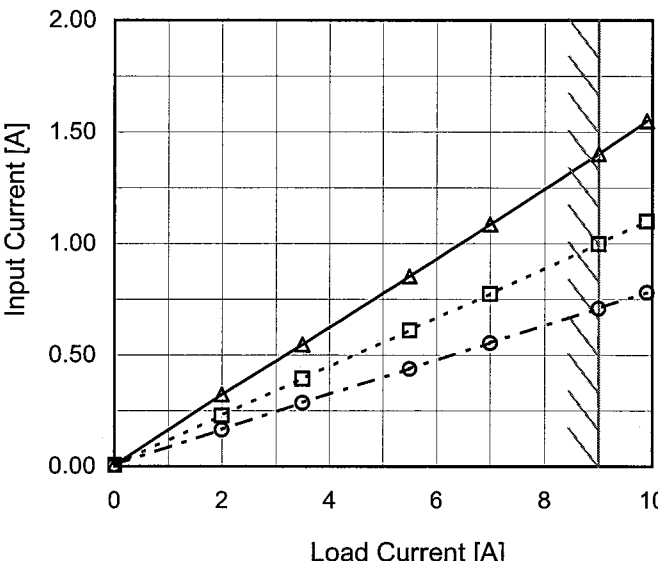Tadasi Arai   Design Engineer

COSEL CO.,LTD.

CONTENTS

(Final Page 19)

CO$EL

Model	SNDHS250B28
Item	Input Current (by Input Voltage)
Object	————

Temperature   25°C
Testing Circuitry   Figure A

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
50	0.004	0.004	0.000
100	0.002	0.002	0.002
150	0.000	0.000	0.000
170	0.000	0.000	0.000
180	0.000	0.000	0.000
190	0.006	0.740	1.481
195	0.006	0.718	1.440
200	0.006	0.698	1.401
250	0.006	0.557	1.113
280	0.006	0.501	0.998
300	0.006	0.470	0.933
350	0.006	0.408	0.806
400	0.006	0.362	0.710
410	0.006	0.354	0.694
420	0.006	0.346	0.679
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Model	SNDHS250B28
Item	Input Current (by Load Current)
Object	——————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph
——△—— Input Volt.   200V
- - -☐- - - Input Volt.   280V
— ·-○—·- Input Volt.   400V

Load Current [A]

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.0	0.005	0.006	0.006
2.0	0.323	0.229	0.165
3.5	0.548	0.394	0.286
5.5	0.853	0.610	0.439
7.0	1.086	0.775	0.554
9.0	1.403	0.998	0.710
9.9	1.550	1.100	0.781
--	-	-	-
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Note: Slanted line shows the range of the rated load current.

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Model	SNDHS250B28
Item	Input Power (by Load Current)
Object	

Temperature	25°C
Testing Circuitry	Figure A

1.Graph

———△——— Input Volt.   200V
− − −◻− − − Input Volt.   280V
— · —◯— · − Input Volt.   400V

Load Current [A]

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.0	1.1	1.6	2.5
2.0	64.6	64.1	66.1
3.5	109.7	110.4	114.6
5.5	170.5	171.0	175.6
7.0	217.2	217.1	221.8
9.0	280.6	279.6	284.2
9.9	309.8	308.2	312.7
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	SNDHS250B28
Item	Efficiency (by Input Voltage)
Object	————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
195	89.7	89.5
200	90.0	89.8
240	90.4	90.5
280	89.7	90.1
320	88.8	89.8
360	87.9	89.2
400	86.9	88.7
420	86.5	88.4
--	-	-

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Model	SNDHS250B28
Item	Efficiency (by Load Current)
Object	———————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   200V
– – –☐– – – Input Volt.   280V
—·—○—·· Input Volt.   400V

Efficiency [%] vs Load Current [A]

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

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.0	-	-	-
2.0	86.7	87.4	84.8
3.5	89.4	88.8	85.5
5.5	90.3	90.1	87.7
7.0	90.3	90.3	88.4
9.0	89.8	90.1	88.7
9.9	89.5	89.9	88.7
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS250B28
Item	Line Regulation
Object	+28V9A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

- - -◻- - - Load 50%
───△─── Load 100%

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

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
195	28.015	28.013
200	28.015	28.013
240	28.014	28.013
280	28.014	28.013
320	28.013	28.014
360	28.013	28.014
400	28.013	28.015
420	28.013	28.015
--	-	-

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Model	SNDHS250B28
Item	Load Regulation
Object	+28V9A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt. 200V
– – –☐– – – Input Volt. 280V
— · –○— · – Input Volt. 400V

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. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.0	27.999	28.001	28.004
2.0	27.999	28.002	28.004
3.5	27.999	28.002	28.004
5.5	28.000	28.002	28.005
7.0	28.000	28.003	28.005
9.0	28.001	28.003	28.005
9.9	28.001	28.004	28.006
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS250B28
Item	Dynamic Load Response
Object	+28V9A

Temperature 25°C
Testing Circuitry Figure A
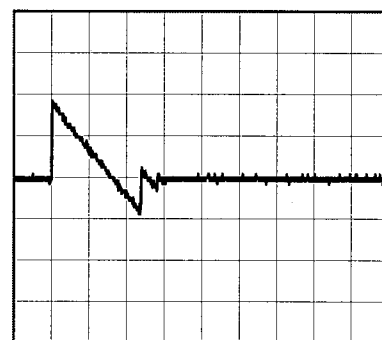
Input Volt. 280 V
Cycle 1000 ms

Load Current
9A/50 μ s

Min. Load (0A) $\longleftrightarrow$
Load 100% (9A)
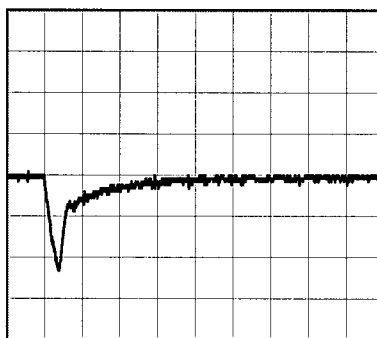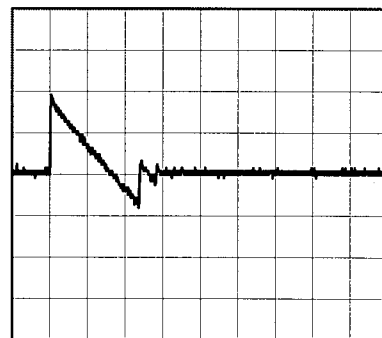
0.5 V/div
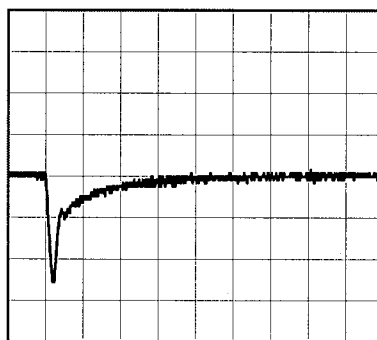
1ms/div   40ms/div

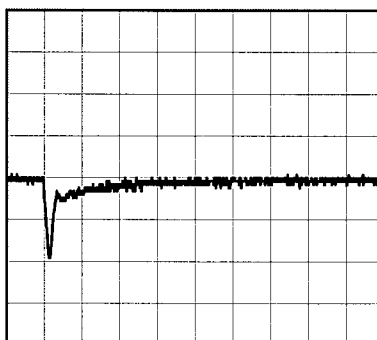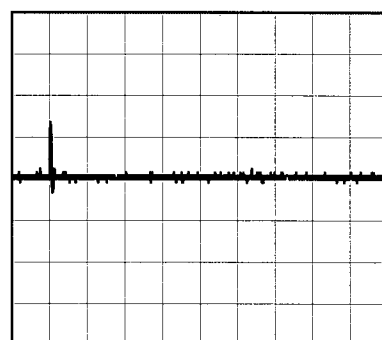Min. Load (0A) $\longleftrightarrow$
Load 50% (4.5A)

0.5 V/div

1ms/div   40ms/div

Load 10% (0.9A) $\longleftrightarrow$
Load 100% (9A)

0.5 V/div

1ms/div   40ms/div

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Model	SNDHS250B28
Item	Ripple Voltage (by Load Current)
Object	+28V9A

Temperature   25°C
Testing Circuitry   Figure B

1.Graph

——△—— Input Volt.   200V
—·—○—·— Input Volt.   400V

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

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.0	5	5
2.0	25	30
3.5	25	40
5.5	25	40
7.0	25	40
9.0	25	40
9.9	25	40
--	-	-
--	-	-
--	-	-
--	-	-

BC-10597

CO$EL

Model	SNDHS250B28
Item	Ripple-Noise
Object	+28V9A

Temperature 25°C
Testing Circuitry Figure B

1.Graph

——△—— Input Volt. 200V
—·—○—·— Input Volt. 400V

Load Current [A]

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.0	15	20
2.0	30	40
3.5	35	45
5.5	35	50
7.0	35	50
9.0	30	50
9.9	35	50
--	-	-
--	-	-
--	-	-
--	-	-

Ripple
Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form

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CO$EL

Model	SNDHS250B28
Item	Ripple Voltage (by Ambient Temp.)
Object	+28V9A

Testing Circuitry   Figure B

1.Graph

--- ☐ --- Load 50%
——△—— Load 100%

Ambient Temperature [°C]

Input Volt.   280V

Measured by 100 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%
-40	80	80
-20	60	60
0	40	40
25	30	30
40	30	30
55	30	30
70	30	30
85	30	30
95	30	30
---	-	-
---	-	-

BC-10597

CO$EL

Model	SNDHS250B28

Item	Ambient Temperature Drift

Object	+28V9A

1.Graph

——△—— Input Volt.   200V
‒ ‒ ‒ ◻ ‒ ‒ ‒ Input Volt.   280V
— · —○— · — Input Volt.   400V

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. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-40	27.933	27.935	27.939
-20	27.978	27.979	27.982
0	28.018	28.019	28.021
25	28.046	28.046	28.048
40	28.054	28.054	28.055
55	28.055	28.055	28.055
70	28.051	28.051	28.051
85	28.051	28.052	28.053
95	28.047	28.048	28.050
--	-	-	-
--	-	-	-

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Model	SNDHS250B28
Item	Output Voltage Accuracy
Object	+28V9A

Testing Circuitry   Figure A

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

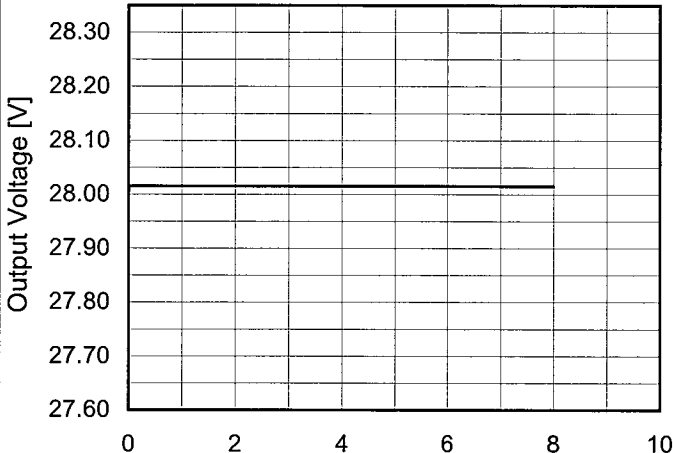Input Voltage : 200 - 400V

Load Current   : 0 - 9A

* 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	55	400	9	28.055	±39	±0.1
Minimum Voltage	-20	200	0	27.977		

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Model	SNDHS250B28
Item	Time Lapse Drift
Object	+28V9A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 280V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	28.006
0.5	28.016
1.0	28.016
2.0	28.016
3.0	28.016
4.0	28.016
5.0	28.016
6.0	28.016
7.0	28.016
8.0	28.016

BC-10597

COSEL

Model	SNDHS250B28
Item	Rise and Fall Time
Object	+28V9A

Temperature	25°C
Testing Circuitry	Figure A

1.Graph

Input Volt. 280 V

Load 50%

Output Volt.

[5V/div]

0

Load 100%

Output Volt.

[5V/div]

0

Input Volt.

0

[100V/div]

Time [50ms/div]

Time [20ms/div]
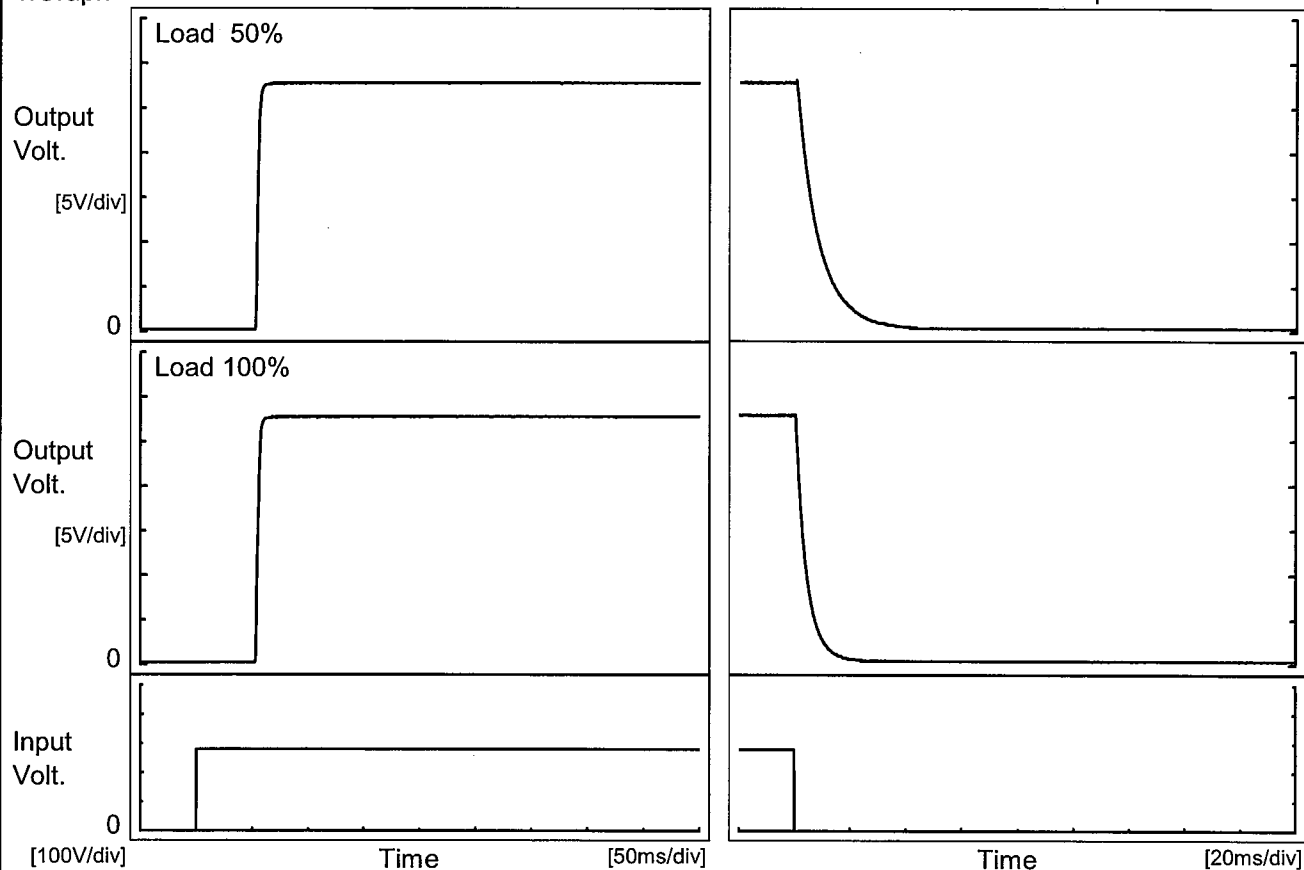
2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	53.5	3.8	57.3	1.4	17.9
100 %	53.5	4.0	57.5	0.7	9.1

Output Volt.

90%

10%

Input Volt.

Td   Tr   Th   Tf

Ts

BC-10597

CO$EL

Model	SNDHS250B28
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+28V9A

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	172	176
-20	171	175
0	171	176
25	171	176
40	171	176
55	171	177
70	170	177
85	170	177
95	171	178
--	-	-
--	-	-

BC-10597

COSEL

Model	SNDHS250B28
Item	Overcurrent Protection
Object	+28V9A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——————— Input Volt.   200V
——————— Input Volt.   280V
〰〰〰〰 Input Volt.   400V

Load Current [A]

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

Intermittent operation occurs when the output voltage is from 14V to 0V.

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
26.6	12.33	12.35	12.36
25.2	12.25	12.30	12.31
22.4	12.57	12.65	12.55
19.6	12.71	12.82	12.70
16.8	12.84	12.97	12.79
14.0	12.96	13.08	12.77
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-10597

COSEL

Model	SNDHS250B28
Item	Overvoltage Protection
Object	+28V9A

1.Graph

——△—— Input Volt.   200V

- - -□- - - Input Volt.   400V

Ambient Temperature [°C]

Load 0%

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

2.Values

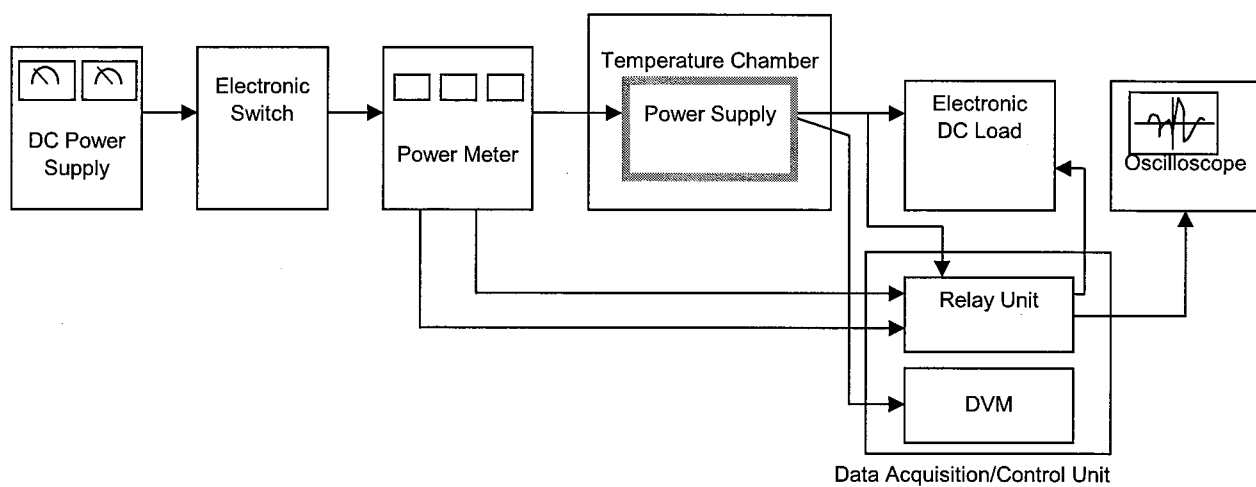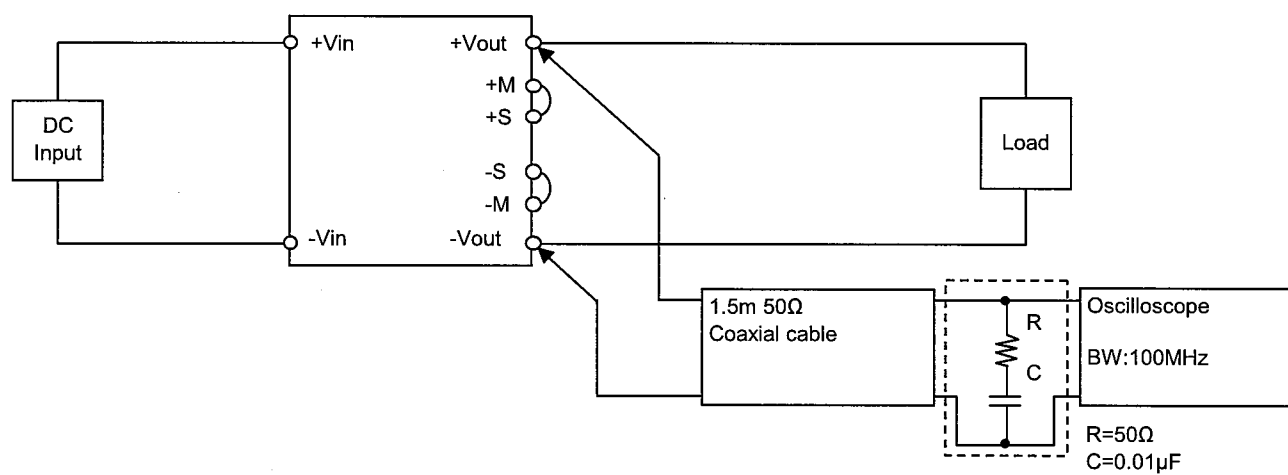| Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 200[V]	Input Volt. 400[V]
-40	34.36	34.36
-20	34.48	34.48
0	34.48	34.48
25	34.59	34.59
40	34.59	34.59
55	34.59	34.59
70	34.59	34.59
85	34.59	34.59
95	34.59	34.59
--	-	-
--	-	-

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Figure A

Figure B (Ripple and Ripple noise Characteristic)

BC-10597