COSEL

TEST DATA OF DHS50A05

Regulated DC Power Supply
April 8, 2010

Approved by : _Tatsuya Mano_
Tatsuya Mano   Design Manager

Prepared by : _Tetsuro Hirata_
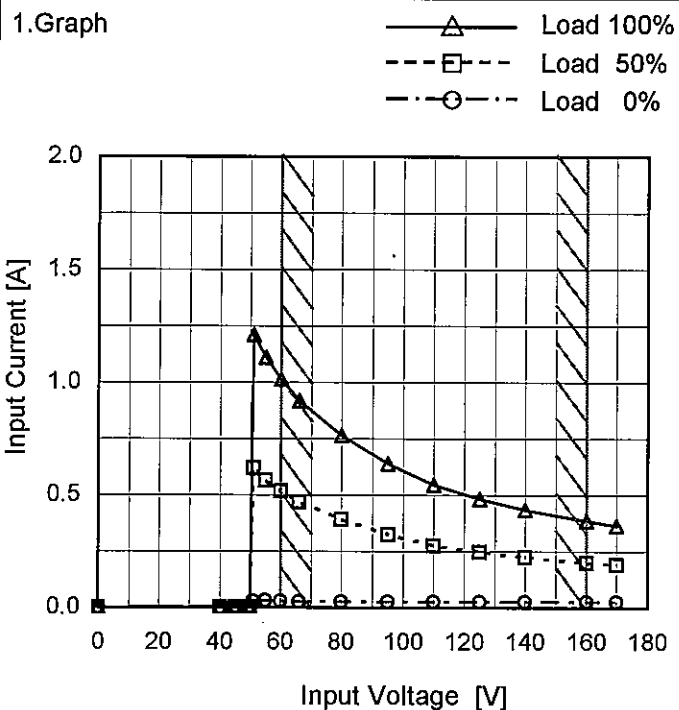Tetsuro Hirata   Design Engineer

COSEL CO.,LTD.

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Model	DHS50A05
Item	Input Current (by Input Voltage)
Object	————

Temperature　　25°C
Testing Circuitry　Figure A

1.Graph

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

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	0.001	0.001	0.002
45	0.002	0.002	0.002
50	0.003	0.003	0.003
51	0.029	0.619	1.210
55	0.030	0.566	1.112
60	0.027	0.516	1.014
66	0.027	0.469	0.919
80	0.027	0.391	0.764
95	0.026	0.325	0.638
110	0.026	0.276	0.545
125	0.026	0.246	0.483
140	0.026	0.223	0.436
160	0.026	0.200	0.385
170	0.026	0.191	0.365
--	-	-	-
--	-	-	-
--	-	-	-

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Model	DHS50A05
Item	Input Current (by Load Current)
Object	———————

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	0.026	0.026
1.5	0.189	0.091	0.071
3.0	0.327	0.172	0.129
4.5	0.469	0.250	0.182
6.0	0.613	0.329	0.236
7.5	0.760	0.409	0.292
9.0	0.911	0.489	0.347
10.0	1.014	0.545	0.385
11.0	1.115	0.600	0.422
--	-	-	-
--	-	-	-

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Model	DHS50A05
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph

————△———— Input Volt. 60V
———☐——— Input Volt. 110V
—·—○—·· Input Volt. 160V
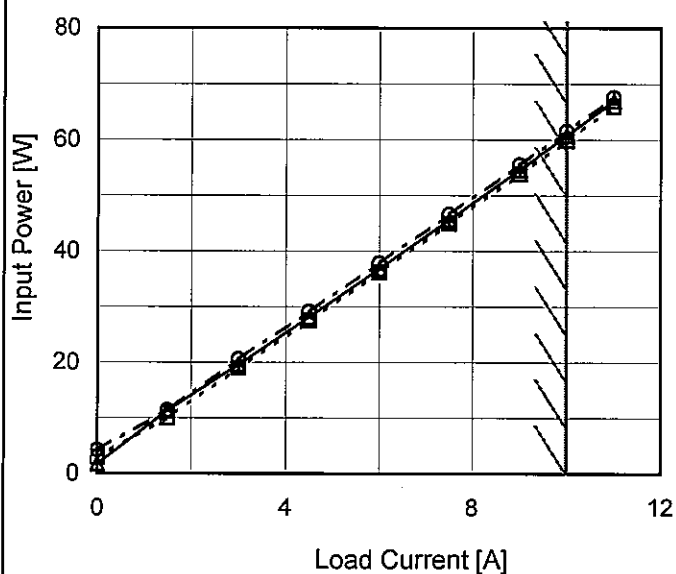
Load Current [A]

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

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	1.65	2.88	4.20
1.5	11.33	10.01	11.39
3.0	19.62	18.96	20.59
4.5	28.11	27.48	29.16
6.0	36.77	36.15	37.81
7.5	45.61	44.93	46.61
9.0	54.59	53.83	55.49
10.0	60.72	59.86	61.52
11.0	66.93	65.96	67.57
--	-	-	-
--	-	-	-

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Model	DHS50A05
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	Efficiency [%]	
[V]	Load 50%	Load 100%
60	81.4	83.2
66	81.4	83.3
80	80.4	82.7
95	81.6	83.3
110	83.1	84.4
125	81.8	83.8
140	80.5	83.1
160	78.8	82.1
170	77.8	81.6

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Model	DHS50A05
Item	Efficiency (by Load Current)
Object	

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.
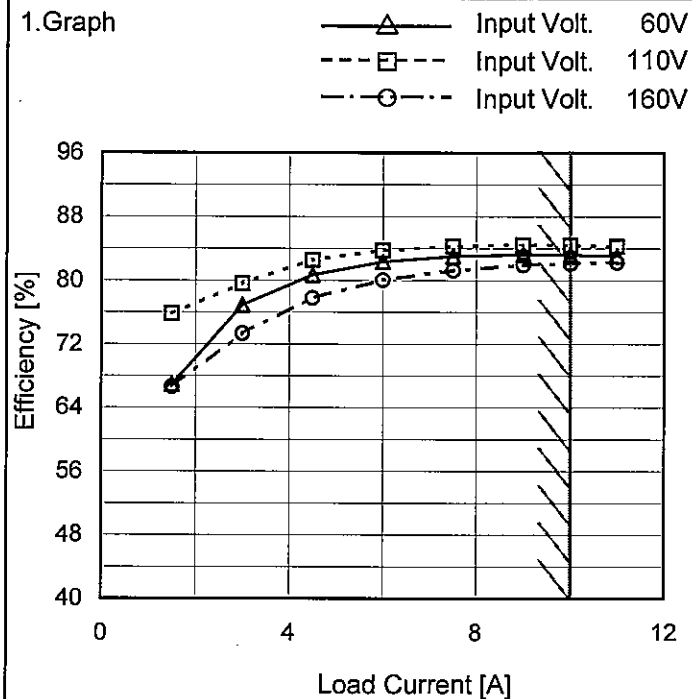
2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	-	-	-
1.5	66.9	75.8	66.6
3.0	76.9	79.6	73.3
4.5	80.7	82.5	77.8
6.0	82.3	83.7	80.0
7.5	83.0	84.3	81.2
9.0	83.3	84.4	81.9
10.0	83.2	84.4	82.1
11.0	83.0	84.3	82.3
---	-	-	-
--	-	-	-

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Model	DHS50A05
Item	Line Regulation
Object	+5V10A

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%
60	5.049	5.049
66	5.049	5.049
80	5.049	5.049
95	5.049	5.049
110	5.049	5.049
125	5.049	5.049
140	5.049	5.049
160	5.049	5.049
170	5.049	5.049

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Model	DHS50A05
Item	Load Regulation
Object	+5V10A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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

Output Voltage [V]

Load Current [A]

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

2.Values

Load Current	Output Voltage [V]		
	Input Volt.	Input Volt.	Input Volt.
[A]	60[V]	110[V]	160[V]
0.0	5.050	5.050	5.050
1.5	5.049	5.049	5.049
3.0	5.049	5.049	5.049
4.5	5.049	5.049	5.049
6.0	5.049	5.049	5.049
7.5	5.049	5.049	5.049
9.0	5.049	5.049	5.049
10.0	5.049	5.049	5.049
11.0	5.049	5.049	5.049
--	-	-	-
--	-	-	-

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Model	DHS50A05
Item	Dynamic Load Response
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 110 V
Cycle 1000 ms

Load Current   10A / 20µs

Min. Load (0A) ←→
   Load 100% (10A)

500mV/div
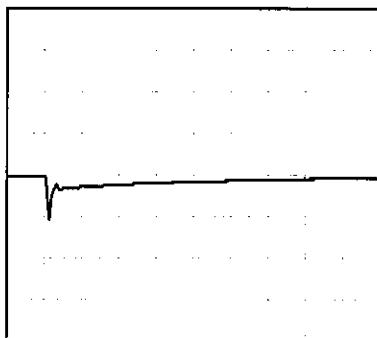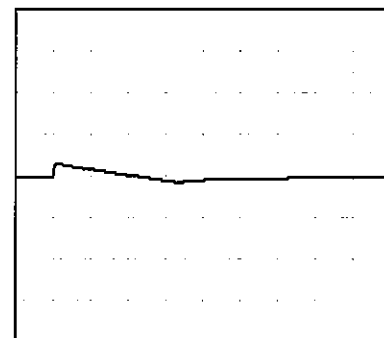
1ms/div   10 ms/div

Min. Load (0A) ←→
   Load 50% (5A)

500mV/div
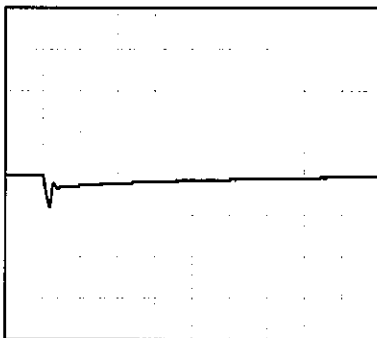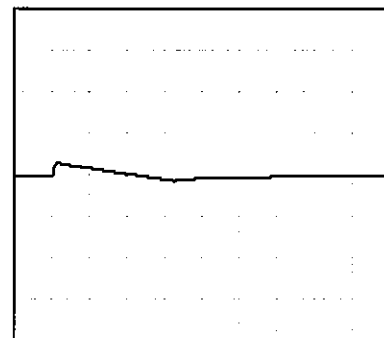
1ms/div   10 ms/div

Load 10% (1A) ←→
   Load 100% (10A)

500mV/div

1ms/div   10 ms/div

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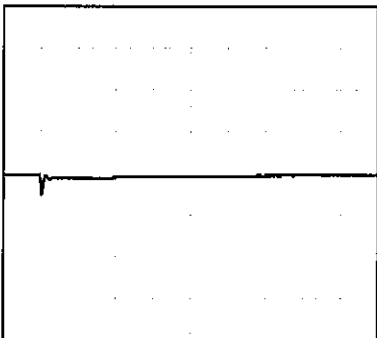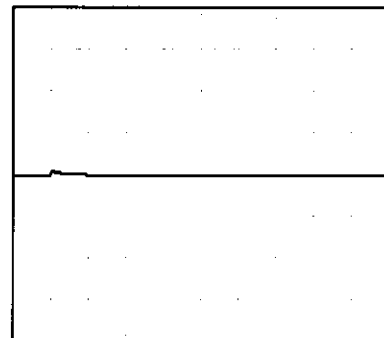
Model	DHS50A05
Item	Ripple Voltage (by Load Current)
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure B

1.Graph

— △ — Input Volt. 60V
— ○ — Input Volt. 160V
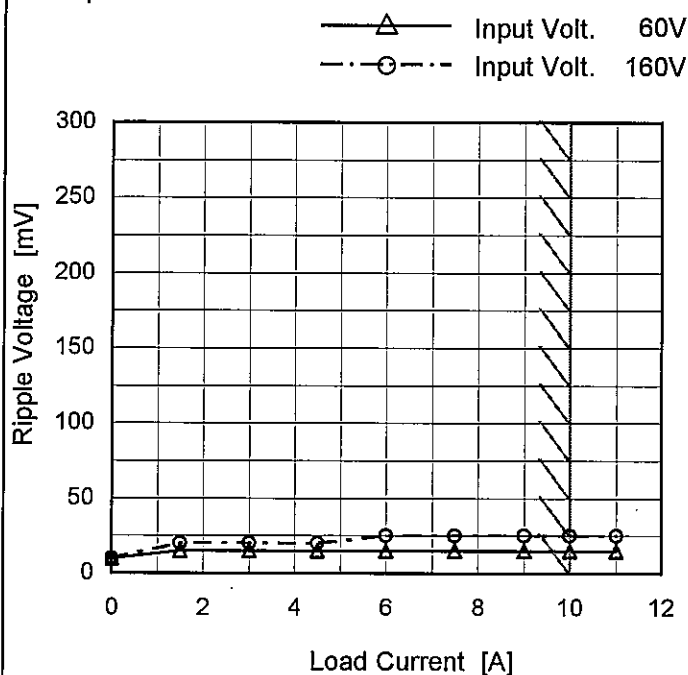
Measured by 500 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
load current.

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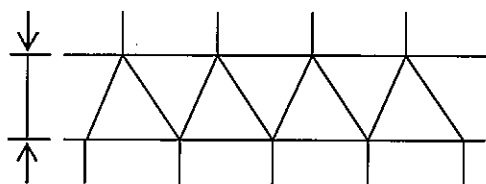
Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.0	10	10
1.5	15	20
3.0	15	20
4.5	15	20
6.0	15	25
7.5	15	25
9.0	15	25
10.0	15	25
11.0	15	25
---	-	-
---	-	-

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Model	DHS50A05
Item	Ripple-Noise
Object	+5V10A

Temperature   25°C
Testing Circuitry   Figure B

1.Graph

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

Load Current [A]

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.0	10	10
1.5	20	25
3.0	20	25
4.5	20	25
6.0	20	25
7.5	20	25
9.0	20	25
10.0	20	25
11.0	20	25
--	-	-
--	-	-

Ripple
Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form

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参考資料

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Model	DHS50A05
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V10A

Testing Circuitry   Figure B

1.Graph

--☐-- Load 50%
—△— Load 100%

Ambient Temperature [°C]

Input Volt.   110V
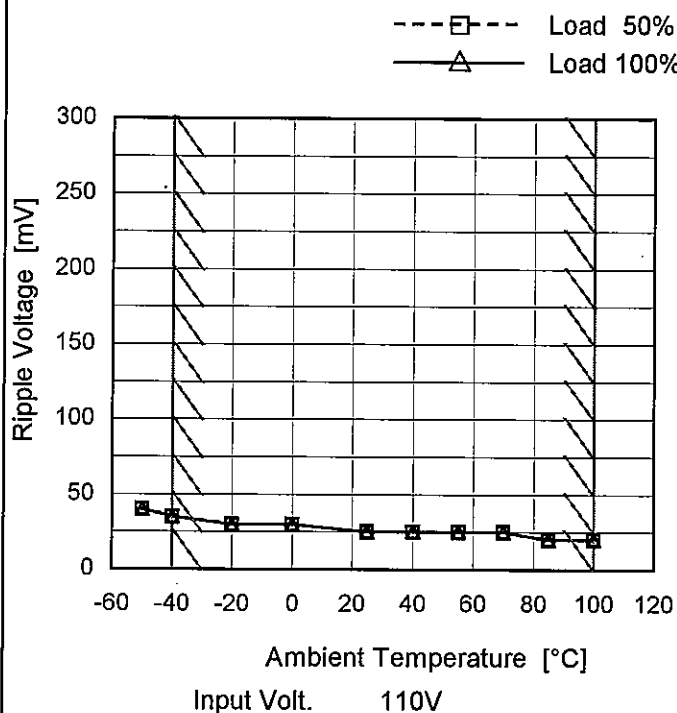
Measured by 500 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
       ambient temperature.

Ripple [mVp-p]

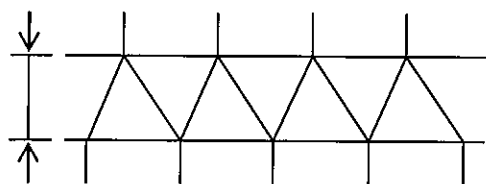Fig.Complex Ripple Wave Form

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	40	40
-40	35	35
-20	30	30
0	30	30
25	25	25
40	25	25
55	25	25
70	25	25
85	20	20
100	20	20
--	-	-

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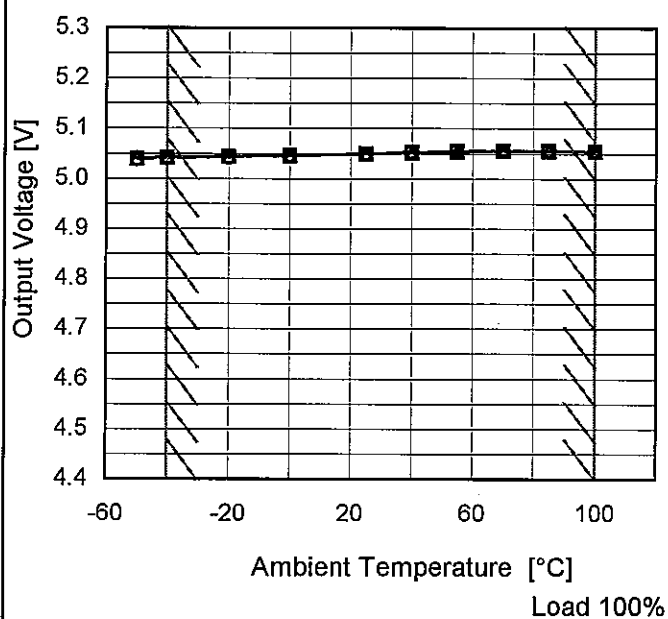| Model	DHS50A05
Item	Ambient Temperature Drift
Object	+5V10A

Testing Circuitry　Figure A

1.Graph

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

Output Voltage [V]

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]
-50	5.041	5.040	5.038
-40	5.043	5.042	5.040
-20	5.045	5.044	5.042
0	5.045	5.045	5.045
25	5.049	5.049	5.049
40	5.053	5.053	5.053
55	5.055	5.055	5.055
70	5.056	5.056	5.056
85	5.056	5.056	5.056
100	5.055	5.055	5.055
--	-	-	-

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Model	DHS50A05		
Item	Output Voltage Accuracy	Testing Circuitry	Figure A
Object	+5V10A		

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
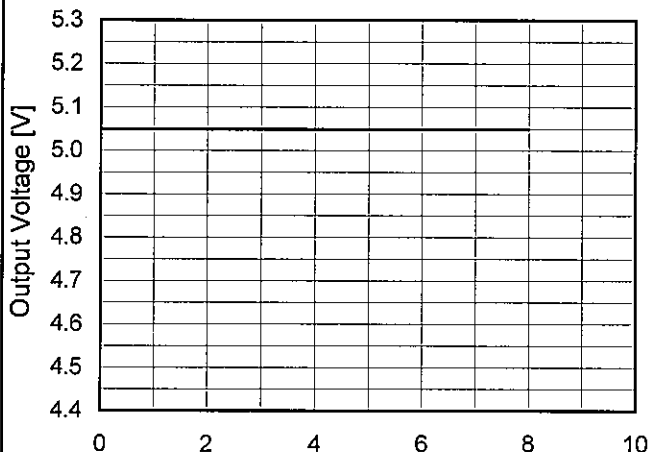
       Load Current   : 0 - 10A

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

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

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	70	60	0	5.057	±9	±0.2
Minimum Voltage	-40	160	10	5.040		

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Model	DHS50A05
Item	Time Lapse Drift
Object	+5V10A

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	5.049
0.5	5.049
1.0	5.049
2.0	5.049
3.0	5.049
4.0	5.049
5.0	5.049
6.0	5.049
7.0	5.049
8.0	5.049

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COSEL

Model	DHS50A05
Item	Rise and Fall Time
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 110 V

Load 50%

Output Volt. [1V/div]

0

Load 100%

Output Volt. [1V/div]

0

Input Volt.

0
[25V/div]

Time [50ms/div]

Time [10ms/div]

2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	39.8	22.8	62.6	0.6	18.1
100 %	39.8	22.5	62.3	0.3	8.8

Output Volt.

90%

10%

Input Volt.

Td Tr

Th Tf

Ts

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COSEL

Model	DHS50A05
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V10A

Testing Circuitry   Figure A

1.Graph

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

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

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	45	46
-40	45	46
-20	45	47
0	45	47
25	45	47
40	45	47
55	45	47
70	45	47
85	45	47
100	45	47
--	-	-

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Model	DHS50A05
Item	Overcurrent Protection
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

——————— Input Volt. 60V
——————— Input Volt. 110V
——————— Input Volt. 160V
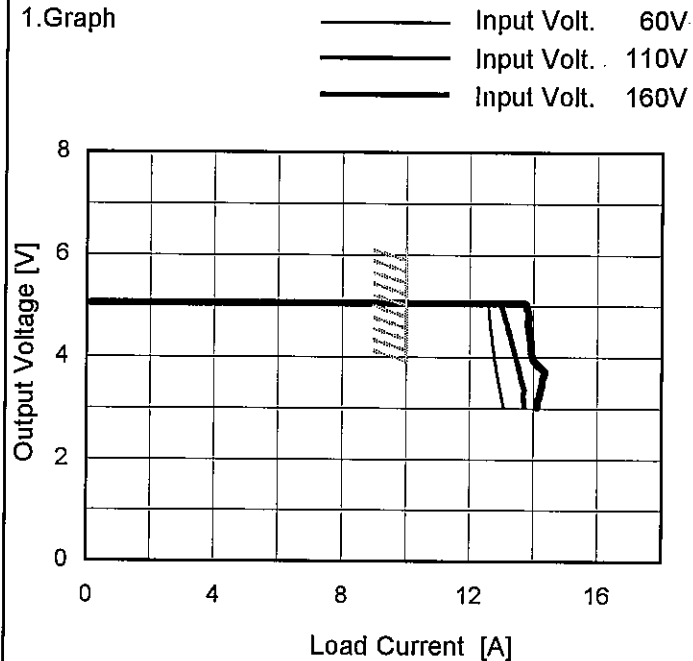
Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from 3V to 0V.

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
5.00	10.02	10.01	10.06
4.75	12.63	13.12	13.85
4.50	12.67	13.23	13.87
4.00	12.77	13.44	13.96
3.50	12.91	13.64	14.29
3.00	13.08	13.73	14.13
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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CO$EL

Model	DHS50A05
Item	Overvoltage Protection
Object	+5V10A

1.Graph

— △ — Input Volt.　60V
- - - ⊟ - - - Input Volt.　110V
— · —⊙— · · — Input Volt.　160V
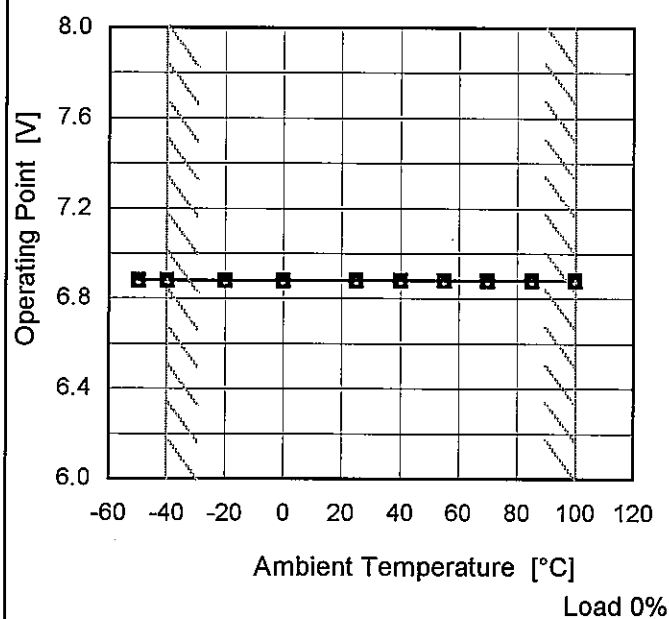
Ambient Temperature [°C]

Load 0%

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

2.Values

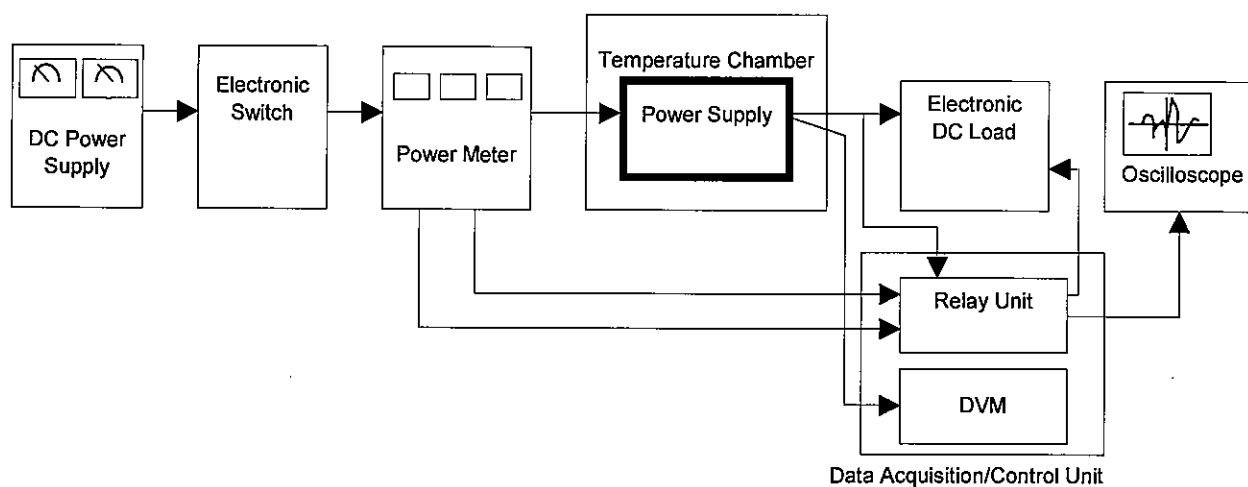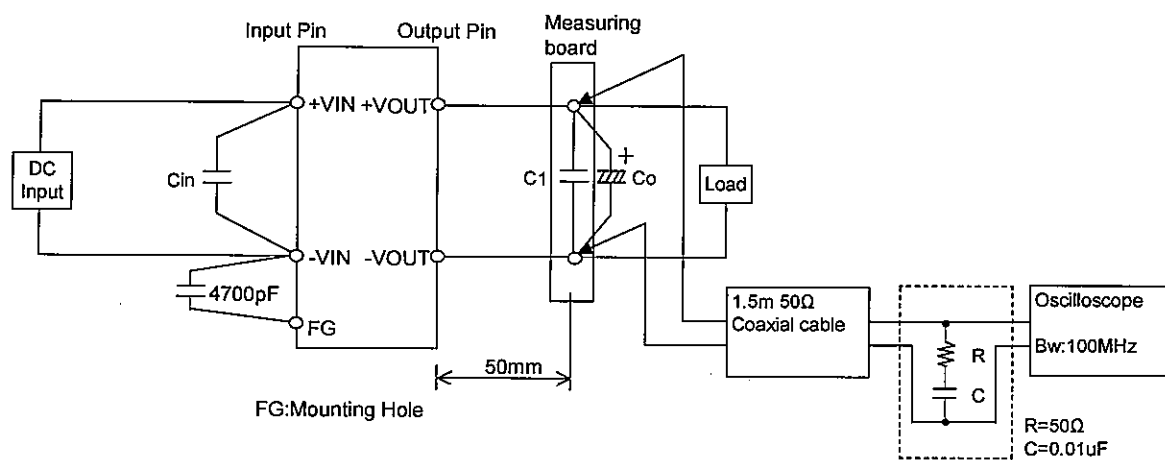| Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
-50	6.88	6.88	6.88
-40	6.88	6.88	6.88
-20	6.88	6.88	6.88
0	6.88	6.88	6.88
25	6.88	6.88	6.88
40	6.88	6.88	6.88
55	6.88	6.88	6.88
70	6.88	6.88	6.88
85	6.88	6.88	6.88
100	6.88	6.88	6.88
--	-	-	-

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Figure A

C1 : DHS50A24 4.7uF
Others 10uF
Co : DHS50A05 2200uF
DHS50A12 470uF
DHS50A15 470uF
DHS50A24 220uF

Figure B

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