参考資料

TEST DATA OF MGFS400512

Regulated DC Power Supply
November 29, 2018

Approved by : Junichi Hatagishi
Junichi Hatagishi Design Manager

Prepared by : Shohei Mukaide
Shohei Mukaide Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

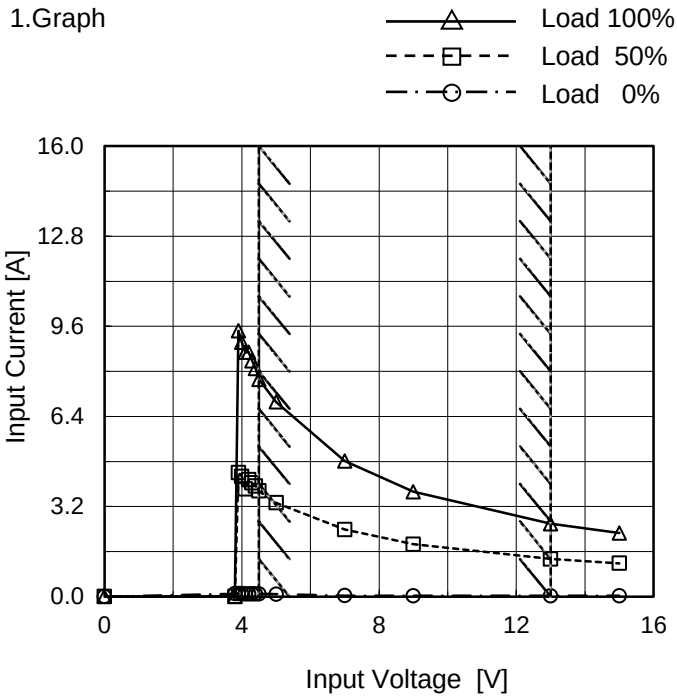
(Final Page 20)

COSEL

Model	MGFS400512
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	0.000	0.000	0.000
3.8	0.105	0.004	0.004
3.9	0.103	4.405	9.442
4.0	0.102	4.273	9.027
4.1	0.100	3.829	8.682
4.2	0.098	4.153	8.680
4.3	0.097	4.037	8.376
4.4	0.095	3.931	8.100
4.5	0.095	3.755	7.717
5.0	0.088	3.333	6.911
7.0	0.037	2.383	4.814
9.0	0.030	1.861	3.723
13.0	0.028	1.336	2.587
15.0	0.028	1.184	2.260
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

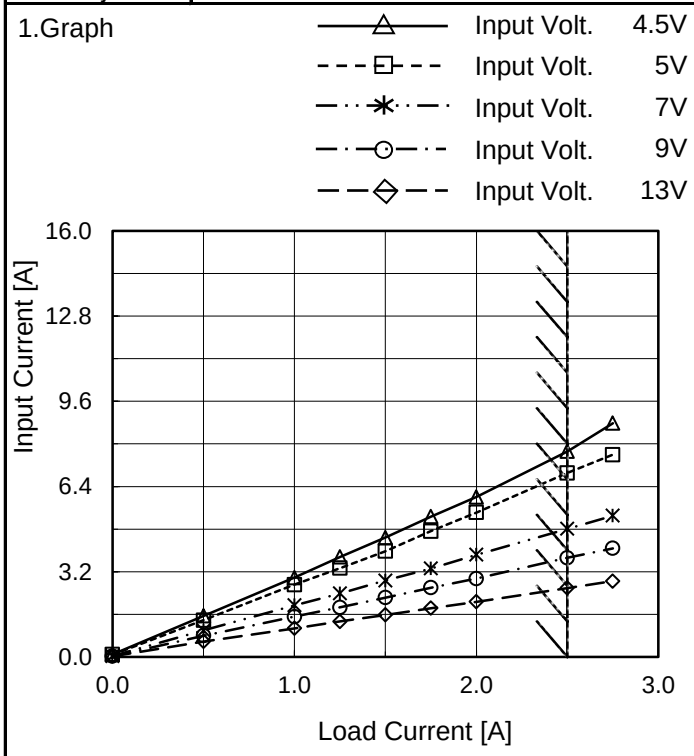
BC-11311

COSEL

Model	MGFS400512
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

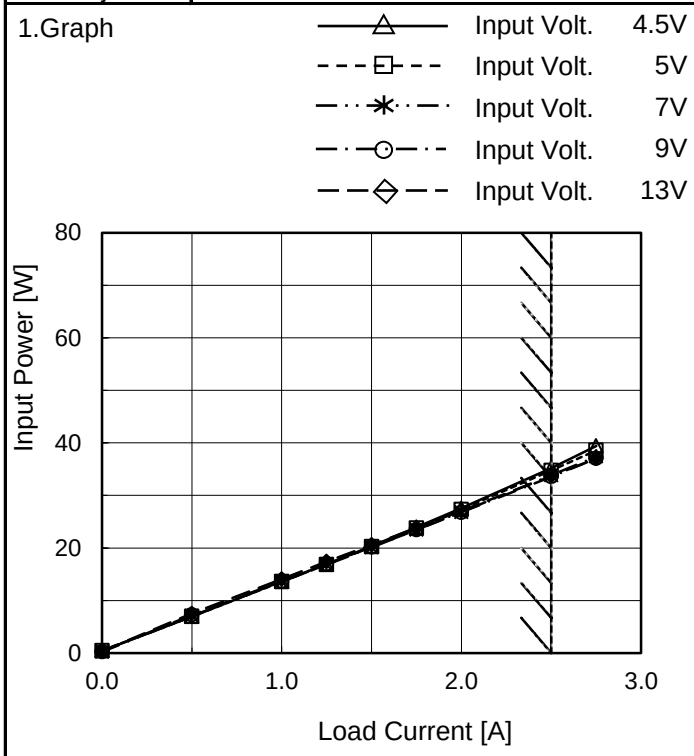
Load Current [A]	Input Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.00	0.095	0.088	0.037	0.030	0.028
0.50	1.541	1.379	0.999	0.800	0.580
1.00	2.979	2.714	1.937	1.515	1.076
1.25	3.755	3.333	2.383	1.861	1.336
1.50	4.479	3.971	2.871	2.227	1.581
1.75	5.271	4.721	3.320	2.599	1.832
2.00	6.006	5.427	3.836	2.944	2.072
2.50	7.717	6.911	4.814	3.723	2.587
2.75	8.774	7.591	5.304	4.077	2.848
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400512
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

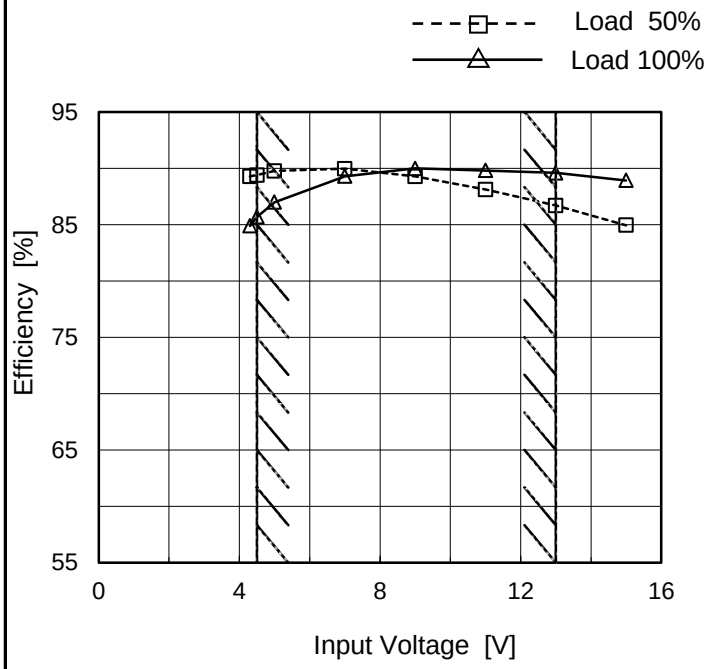
Load Current [A]	Input Power [W]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.00	0.43	0.45	0.26	0.27	0.37
0.50	6.96	6.96	7.09	7.26	7.54
1.00	13.62	13.59	13.56	13.67	14.07
1.25	16.92	16.85	16.80	16.93	17.42
1.50	20.37	20.25	20.10	20.16	20.60
1.75	23.95	23.75	23.45	23.45	23.81
2.00	27.56	27.34	26.85	26.78	27.08
2.50	35.22	34.76	33.84	33.58	33.68
2.75	39.42	38.57	37.41	37.04	37.05
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400512
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

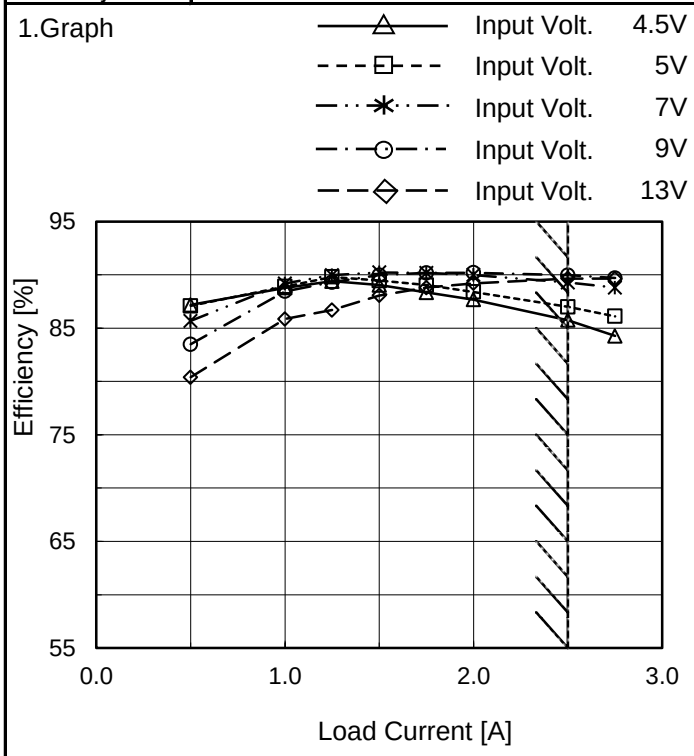
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
4.3	89.3	84.9
4.5	89.4	85.7
5.0	89.8	87.0
7.0	90.0	89.3
9.0	89.3	90.0
11.0	88.1	89.8
13.0	86.7	89.6
15.0	85.0	88.9
--	-	-

COSEL

Model	MGFS400512
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

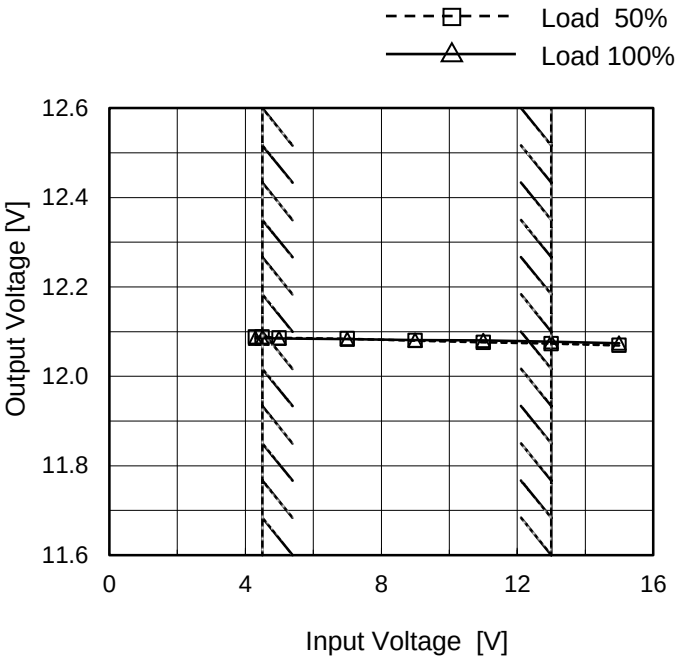
Load Current [A]	Efficiency [%]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.00	-	-	-	-	-
0.50	87.2	87.1	85.7	83.5	80.4
1.00	88.8	88.9	89.2	88.5	85.9
1.25	89.4	89.8	90.0	89.3	86.7
1.50	89.0	89.5	90.2	90.0	88.1
1.75	88.3	89.0	90.2	90.2	88.8
2.00	87.7	88.4	90.0	90.2	89.2
2.50	85.7	87.0	89.3	90.0	89.6
2.75	84.3	86.1	88.8	89.7	89.6
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400512
Item	Line Regulation
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

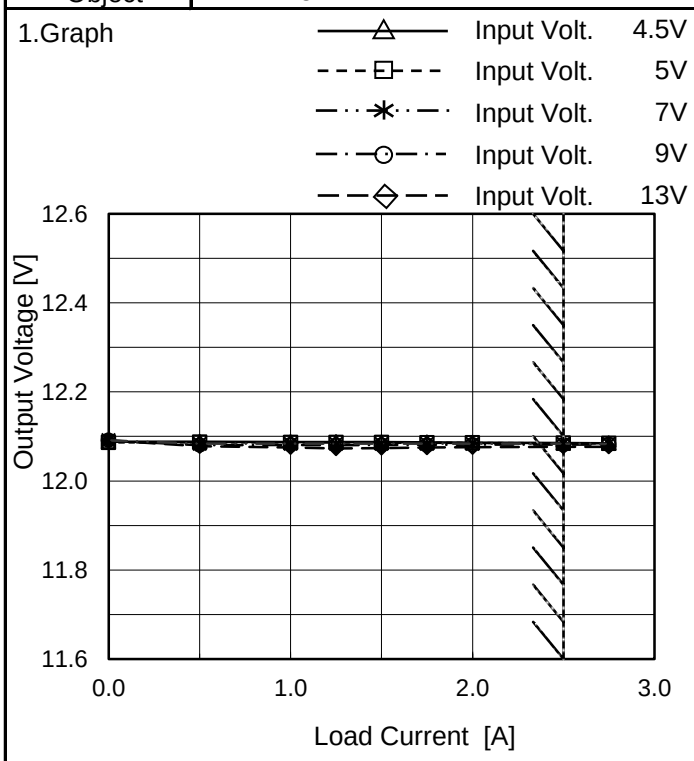
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.3	12.088	12.085
4.5	12.088	12.085
5.0	12.086	12.085
7.0	12.084	12.083
9.0	12.080	12.081
11.0	12.076	12.080
13.0	12.073	12.077
15.0	12.069	12.074
--	-	-

COSEL

Model	MGFS400512
Item	Load Regulation
Object	+12V2.5A

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. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.00	12.088	12.087	12.091	12.091	12.091
0.50	12.088	12.087	12.084	12.080	12.078
1.00	12.088	12.086	12.084	12.081	12.075
1.25	12.088	12.086	12.084	12.080	12.073
1.50	12.087	12.086	12.084	12.081	12.074
1.75	12.087	12.086	12.084	12.081	12.075
2.00	12.086	12.086	12.083	12.081	12.076
2.50	12.085	12.085	12.083	12.081	12.077
2.75	12.085	12.084	12.083	12.082	12.077
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400512
Item	Dynamic Load Response
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

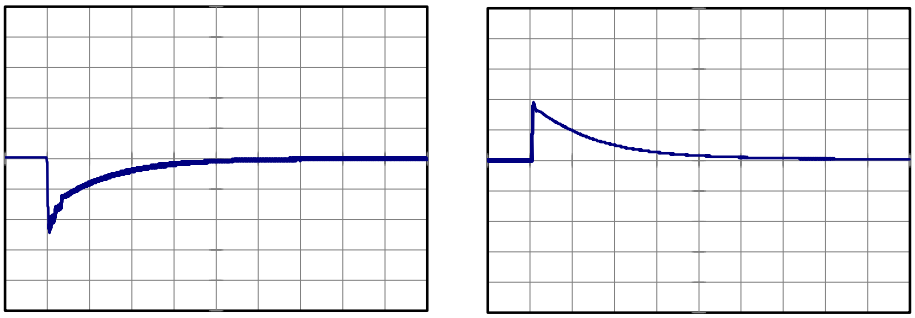
Input Volt. 5 V
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

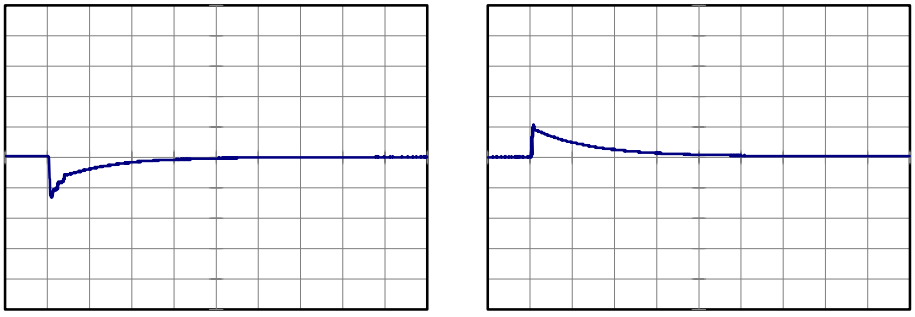
Min.Load (0A)←→
Load 100% (2.5A)



200 mV/div

2 ms/div 2 ms/div

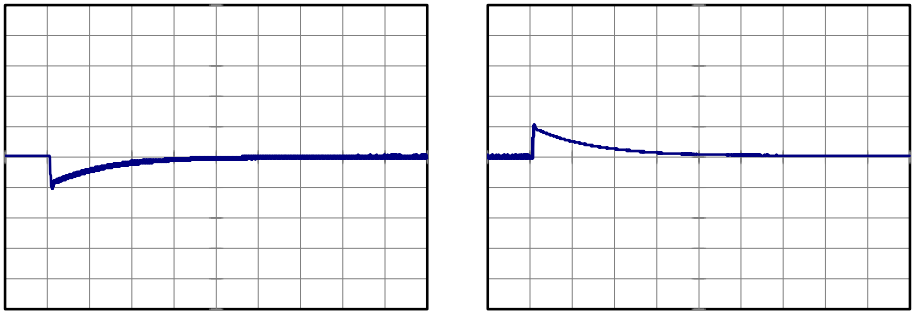
Min.Load (0A)←→
Load 50% (1.25A)



200 mV/div

2 ms/div 2 ms/div

Load 50% (1.25A)←→
Load 100% (2.5A)



200 mV/div

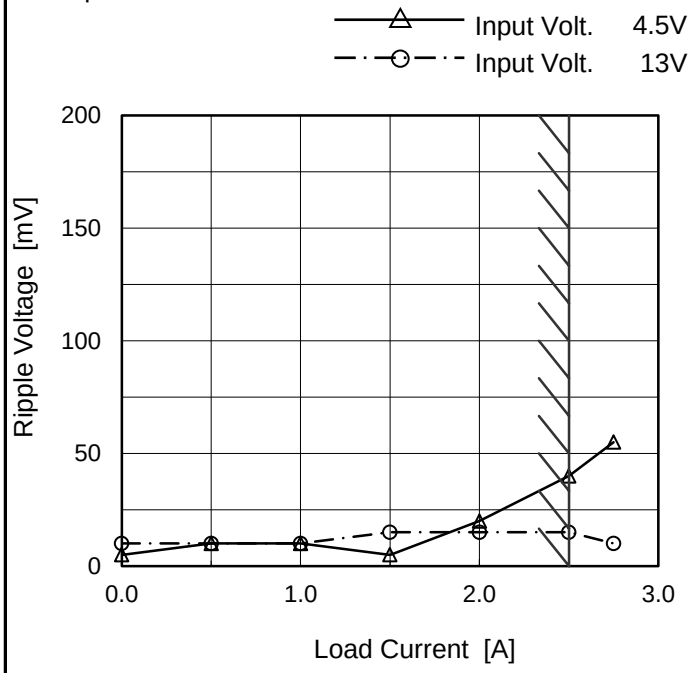
2 ms/div 2 ms/div

COSEL

Model	MGFS400512
Item	Ripple Voltage (by Load Current)
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure B

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.

Ripple [mVp-p]

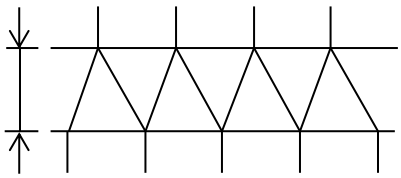


Fig.Complex Ripple Wave Form

2.Values

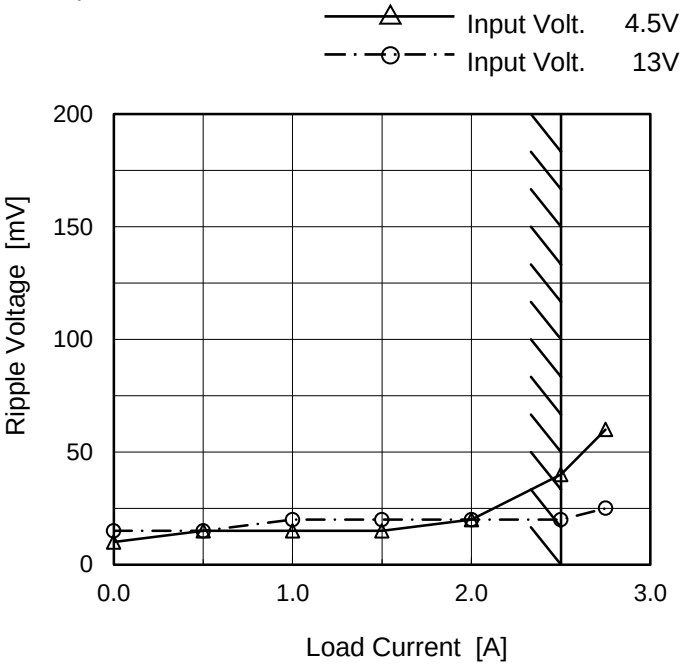
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.00	5	10
0.50	10	10
1.00	10	10
1.50	5	15
2.00	20	15
2.50	40	15
2.75	55	10
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400512
Item	Ripple-Noise
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure B

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.

Ripple Noise[mVp-p]

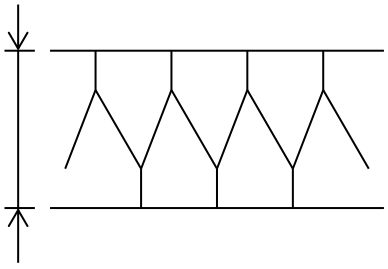


Fig.Complex Ripple Noise Wave Form

2.Values

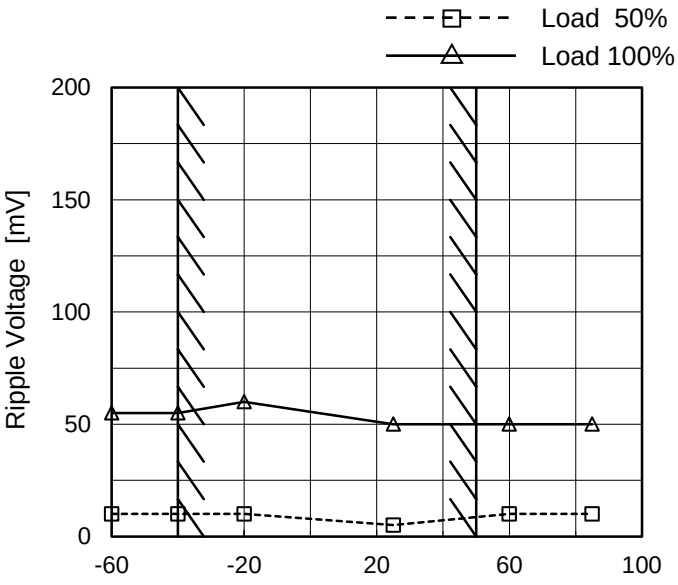
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.00	10	15
0.50	15	15
1.00	15	20
1.50	15	20
2.00	20	20
2.50	40	20
2.75	60	25
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400512
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V2.5A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

Measured by 100 MHz Oscilloscope.

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

2.Values

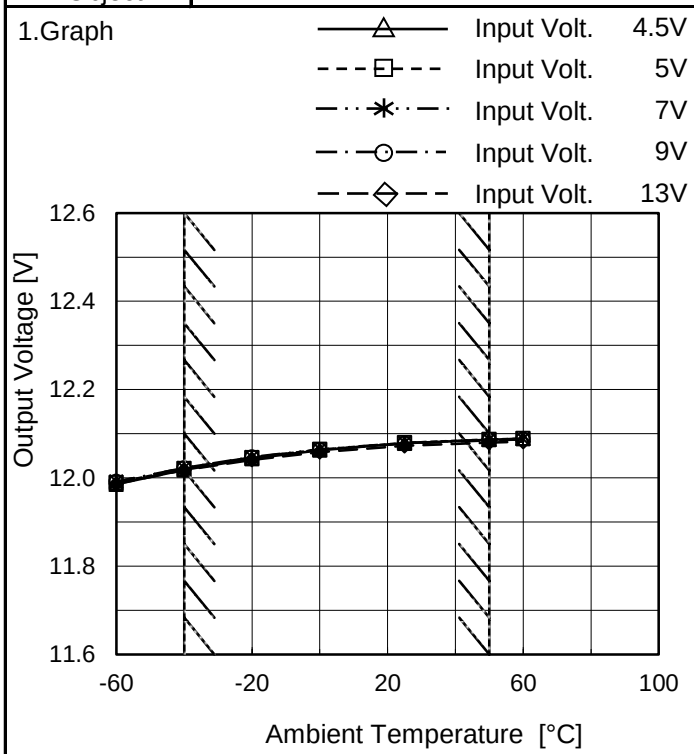
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	55
-40	10	55
-20	10	60
25	5	50
60	10	50
85	10	50
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400512
Item	Ambient Temperature Drift
Object	+12V2.5A

Testing Circuitry Figure A

1.Graph



Load 100%

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

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
-60	11.985	11.989	11.992	11.992	11.986
-40	12.018	12.021	12.022	12.022	12.017
-20	12.044	12.046	12.047	12.047	12.041
0	12.063	12.064	12.064	12.064	12.058
25	12.078	12.079	12.079	12.078	12.072
50	12.086	12.087	12.086	12.085	12.080
60	12.089	12.089	12.088	12.087	12.082
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Model	MGFS400512	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+12V2.5A	

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 - 50°C
Input Voltage : 4.5 - 13V
Load Current : 0 - 2.5A

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

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

2.Values

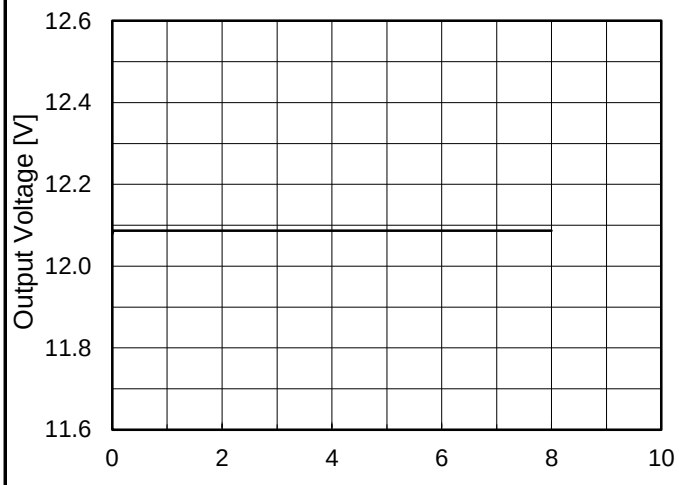
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	9	0	12.095	±40	±0.3
Minimum Voltage	-40	5	0	12.015		

COSEL

Model	MGFS400512
Item	Time Lapse Drift
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 5V
Load 100%

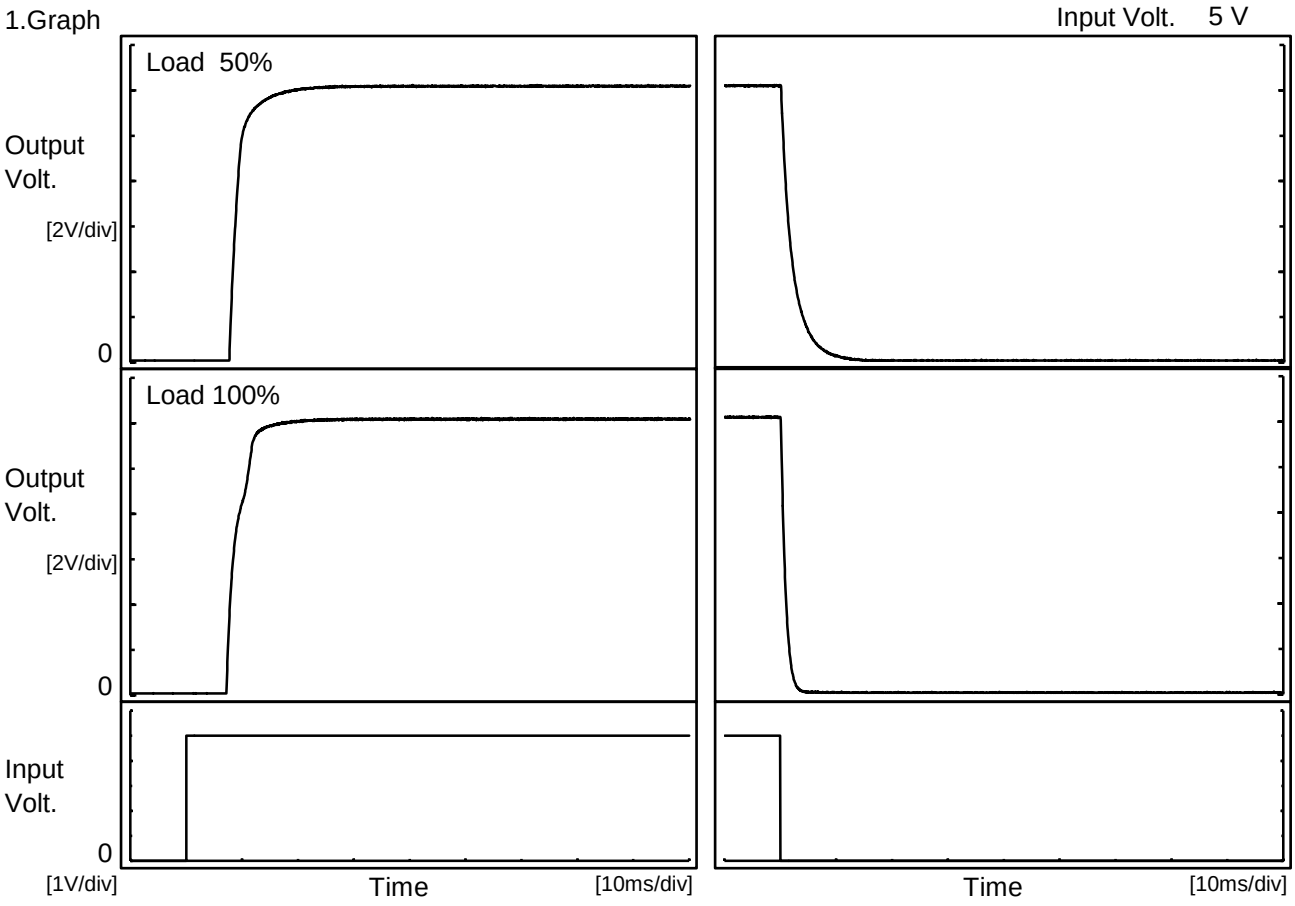
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.079
0.5	12.087
1.0	12.087
2.0	12.087
3.0	12.087
4.0	12.087
5.0	12.087
6.0	12.087
7.0	12.087
8.0	12.087

COSEL

Model	MGFS400512	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+12V2.5A	

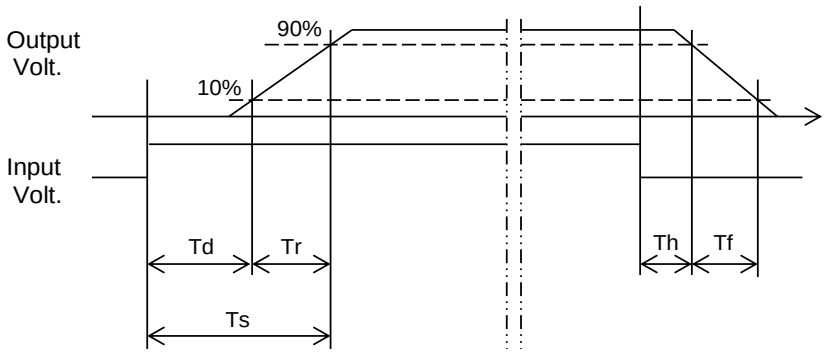
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	7.9	3.4	11.3	0.3	4.9
100 %	7.4	4.4	11.8	0.2	1.7

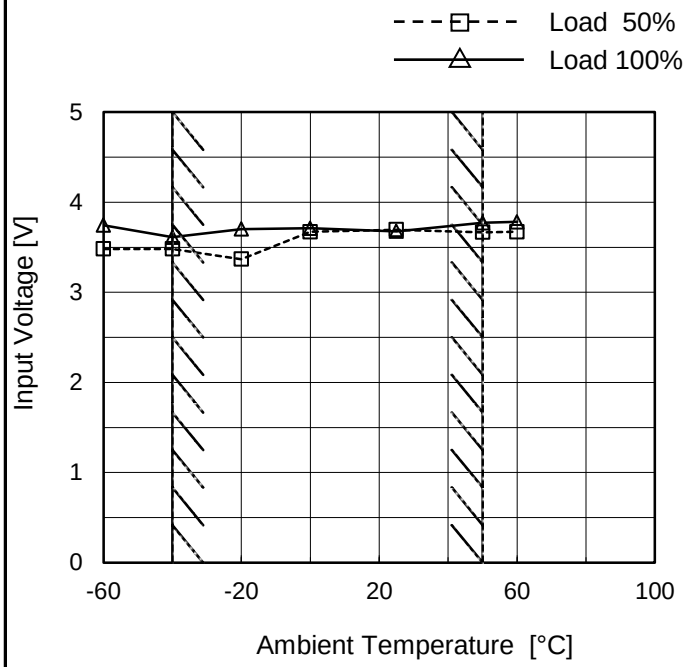


COSEL

Model	MGFS400512
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V2.5A

Testing Circuitry Figure A

1.Graph



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

2.Values

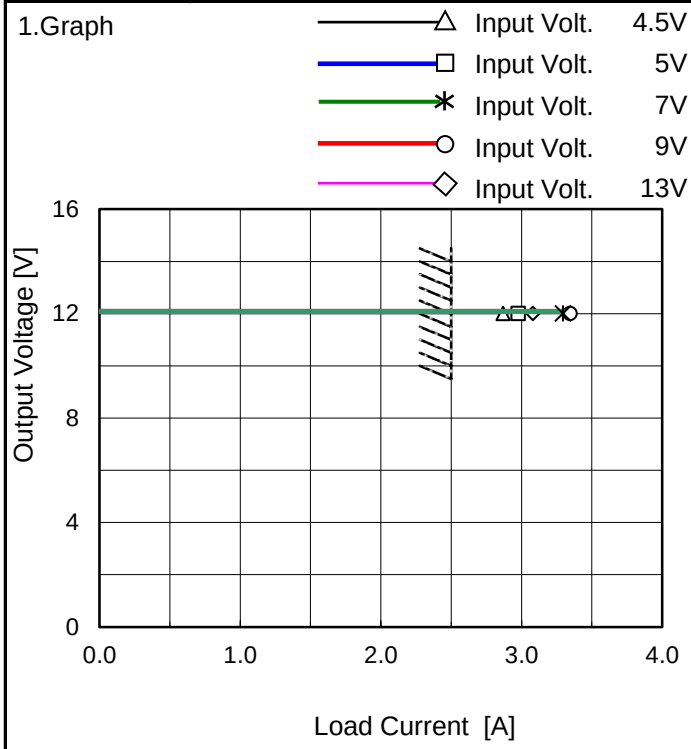
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.5	3.8
-40	3.5	3.7
-20	3.4	3.7
0	3.7	3.8
25	3.7	3.7
50	3.7	3.8
60	3.7	3.8
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400512
Item	Overcurrent Protection
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation activates when overcurrent protection is activated.

2.Values

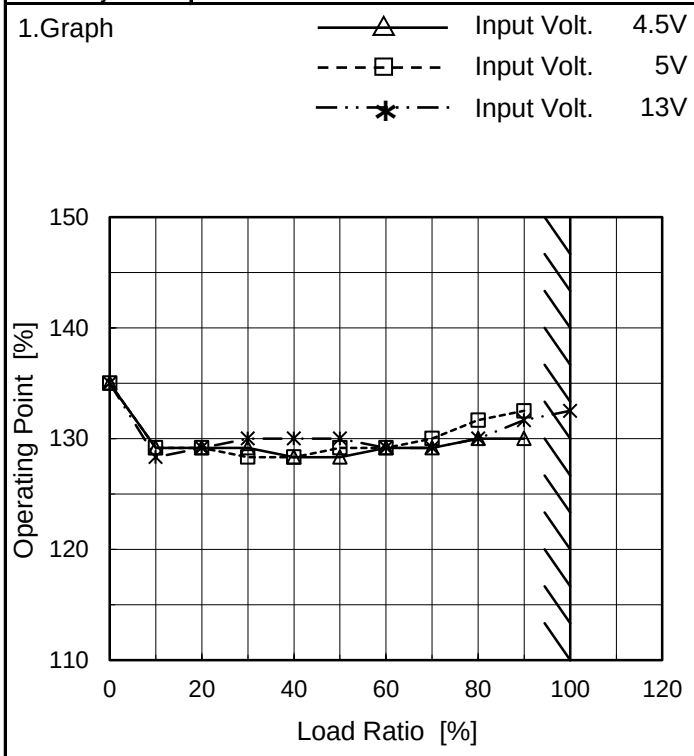
Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
12.000	2.870	2.978	3.296	3.345	3.082
11.400	-	-	-	-	-
10.800	-	-	-	-	-
9.600	-	-	-	-	-
8.400	-	-	-	-	-
7.200	-	-	-	-	-
6.000	-	-	-	-	-
4.800	-	-	-	-	-
3.600	-	-	-	-	-
2.400	-	-	-	-	-
1.200	-	-	-	-	-
0.000	-	-	-	-	-

COSEL

Model	MGFS400512
Item	Overvoltage Protection
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



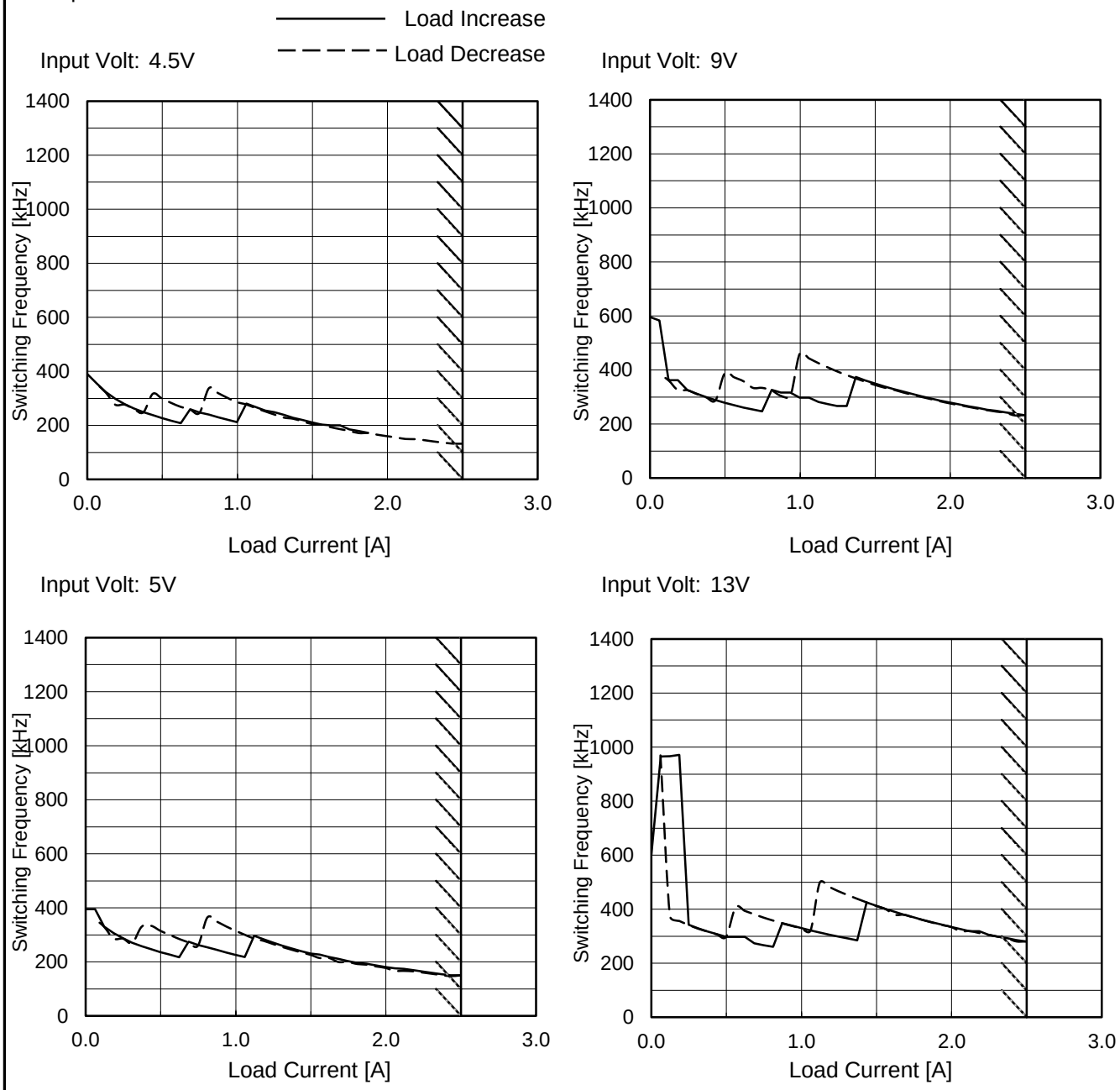
2.Values

Load Ratio [%]	Operating Point [%] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 13[V]
0	135	135	135
10	129	129	128
20	129	129	129
30	129	128	130
40	128	128	130
50	128	129	130
60	129	129	129
70	129	130	129
80	130	132	130
90	130	133	132
100	- ※	- ※	133

※During this area, overcurrent protection activates.

Model	MGFS400512	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	12V2.5A	

1.Graph



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

-switching frequency of MG40 changes depending on load current and input voltage.
When load current is low, switching frequency becomes high and step down to low frequency at certain point.
There is hysteresis, so characteristic is different between load increase (sweep from 0% to 100%) and load decrease (sweep from 100% to 0%).

-When load current is low, MG40 operates intermittently, so switching frequency can not be stable.

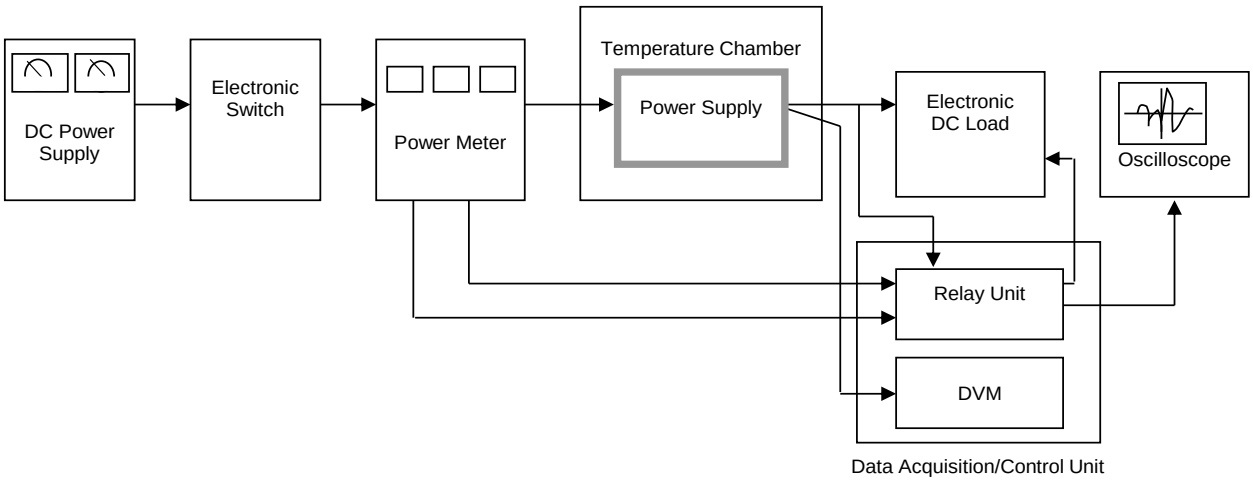


Figure A

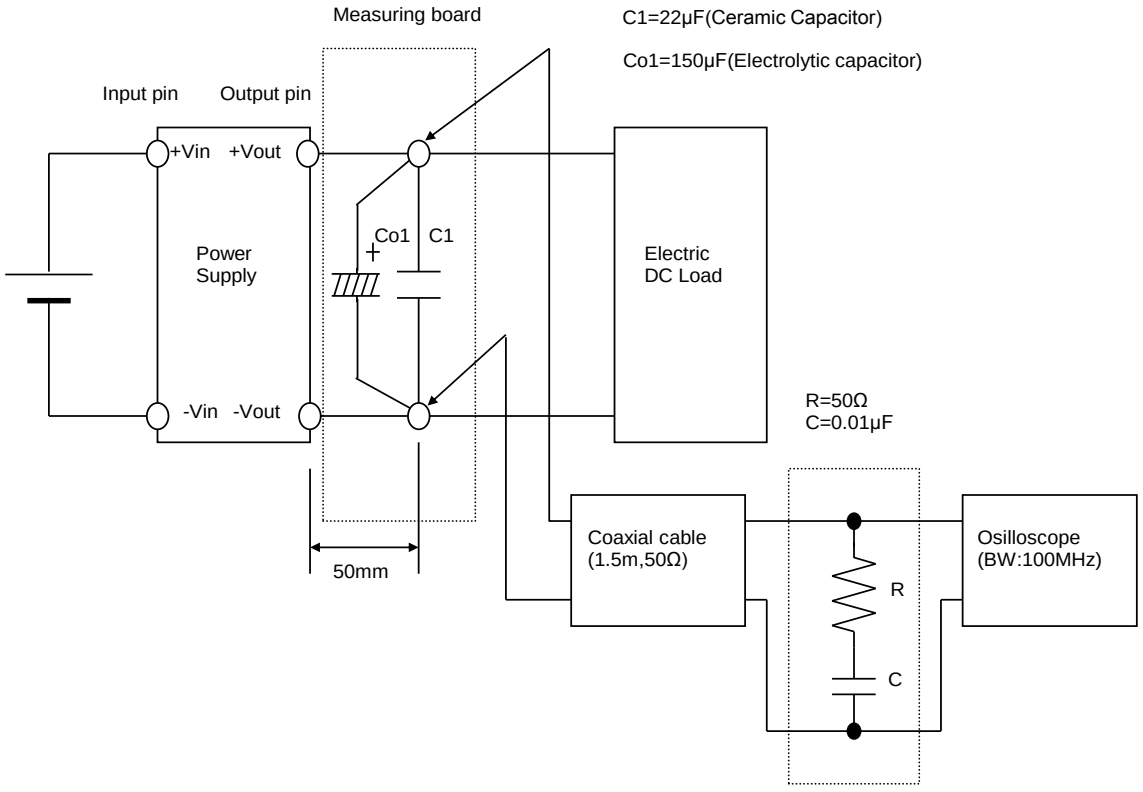


Figure B（Ripple and Ripple noise Characteristic）