参考資料

TEST DATA OF MGFS400515

Regulated DC Power Supply
November 29, 2018

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COSEL CO.,LTD.

COSEL

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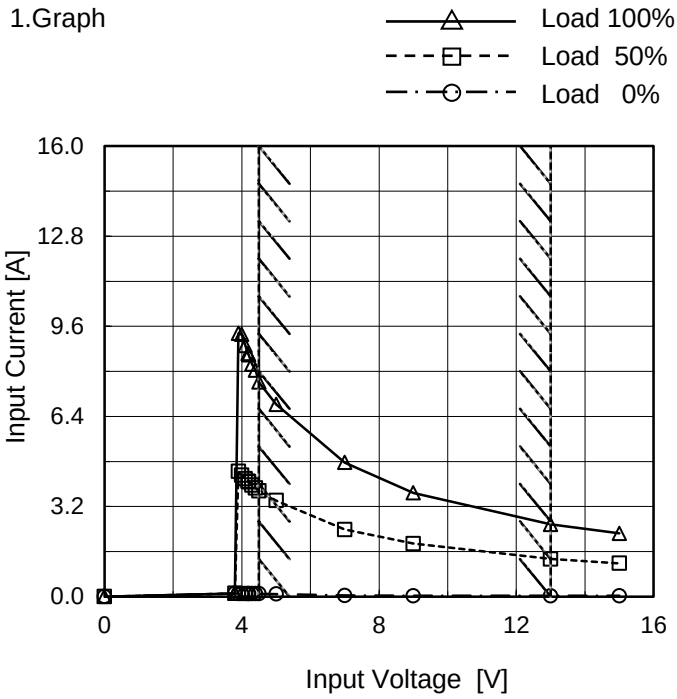
Model	MGFS400515
Item	Input Current (by Input Voltage)
Object	————————

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%
0.00	0.000	0.000	0.000
3.80	0.113	0.113	0.113
3.90	0.111	4.454	9.343
4.00	0.109	4.311	9.312
4.10	0.107	4.183	8.917
4.18	0.105	4.094	8.636
4.20	0.105	4.074	8.589
4.30	0.103	3.959	8.257
4.40	0.102	3.853	8.037
4.50	0.101	3.752	7.618
5.00	0.093	3.414	6.830
7.00	0.041	2.383	4.765
9.00	0.032	1.881	3.687
13.00	0.030	1.338	2.567
15.00	0.030	1.185	2.247
--	-	-	-
--	-	-	-
--	-	-	-

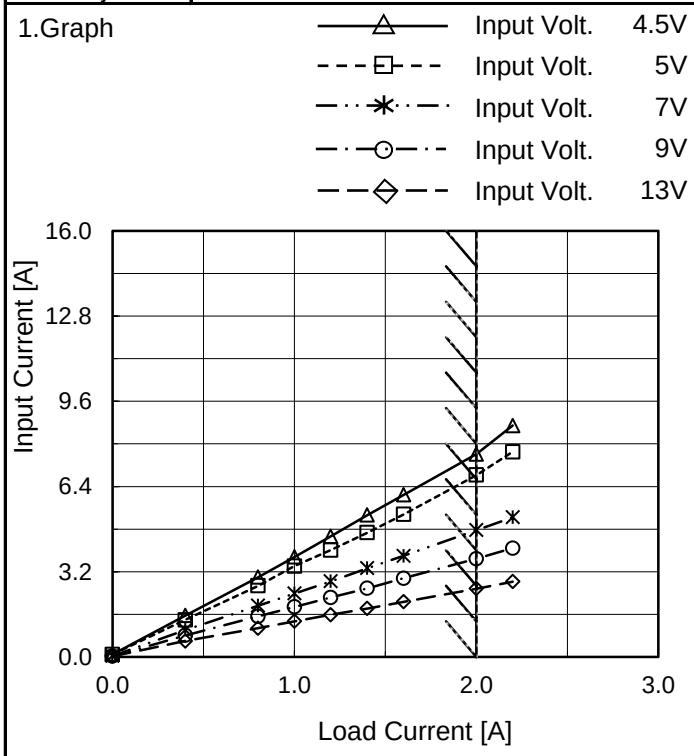
BC-11312

COSEL

Model	MGFS400515
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

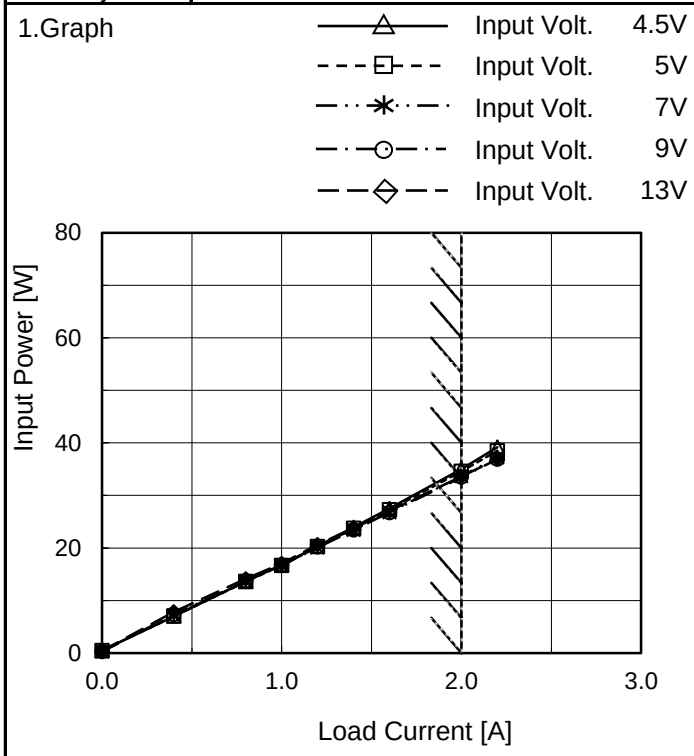
Load Current [A]	Input Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	0.101	0.093	0.041	0.032	0.030
0.4	1.555	1.394	1.014	0.810	0.598
0.8	2.995	2.674	1.926	1.523	1.082
1.0	3.752	3.414	2.383	1.881	1.338
1.2	4.529	4.011	2.840	2.233	1.588
1.4	5.328	4.667	3.336	2.576	1.821
1.6	6.083	5.354	3.794	2.954	2.073
2.0	7.618	6.830	4.765	3.687	2.567
2.2	8.686	7.700	5.246	4.082	2.829
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400515
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

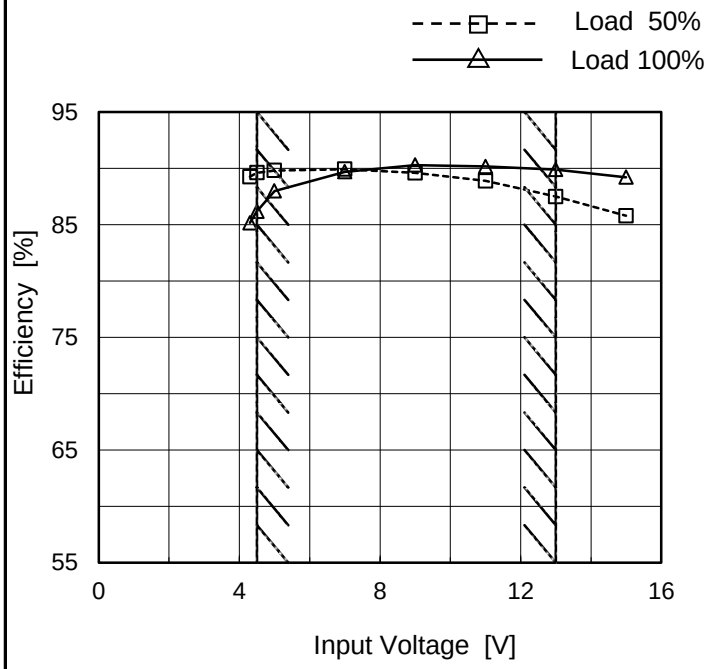
Load Current [A]	Input Power [W]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	0.45	0.47	0.29	0.29	0.39
0.4	7.00	7.01	7.16	7.34	7.83
0.8	13.63	13.59	13.61	13.70	14.11
1.0	16.80	16.68	16.66	16.70	17.03
1.2	20.36	20.23	20.08	20.17	20.63
1.4	23.91	23.69	23.41	23.43	23.83
1.6	27.52	27.24	26.78	26.73	27.05
2.0	35.03	34.58	33.68	33.45	33.61
2.2	39.19	38.47	37.23	36.88	36.94
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS400515
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	85.2
4.5	89.6	86.2
5.0	89.8	88.0
7.0	89.9	89.7
9.0	89.6	90.3
11.0	88.9	90.2
13.0	87.5	89.9
15.0	85.8	89.2
--	-	-

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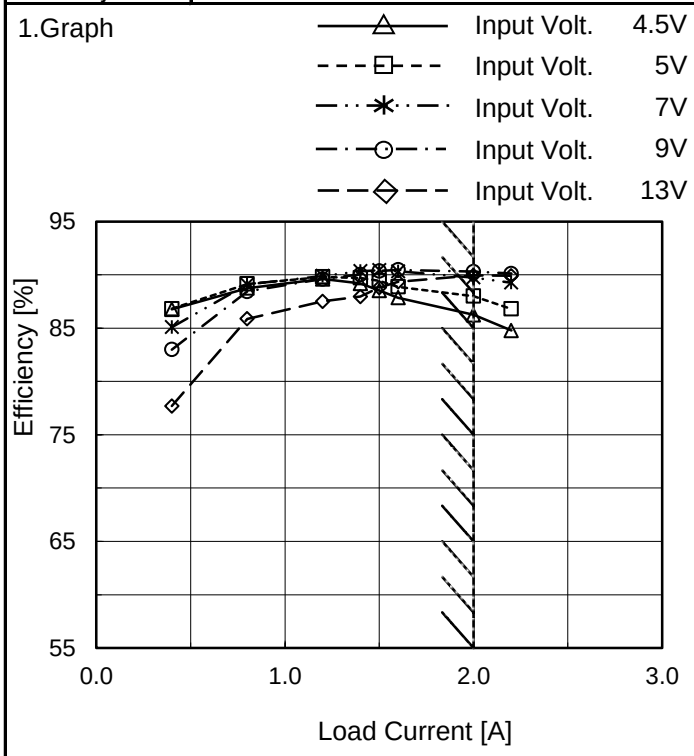
Model	MGFS400515
Item	Efficiency (by Load Current)
Object	————————

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]
0.0	-	-	-	-	-
0.4	86.8	86.8	85.1	83.0	77.7
0.8	88.8	89.1	89.1	88.4	85.9
1.0	89.6	89.8	89.9	89.6	87.5
1.2	89.2	89.7	90.3	90.0	88.0
1.4	88.5	89.4	90.4	90.4	88.8
1.6	87.9	88.9	90.3	90.5	89.3
2.0	86.2	88.0	89.7	90.3	89.9
2.2	84.8	86.8	89.3	90.1	89.9
--	-	-	-	-	-
--	-	-	-	-	-

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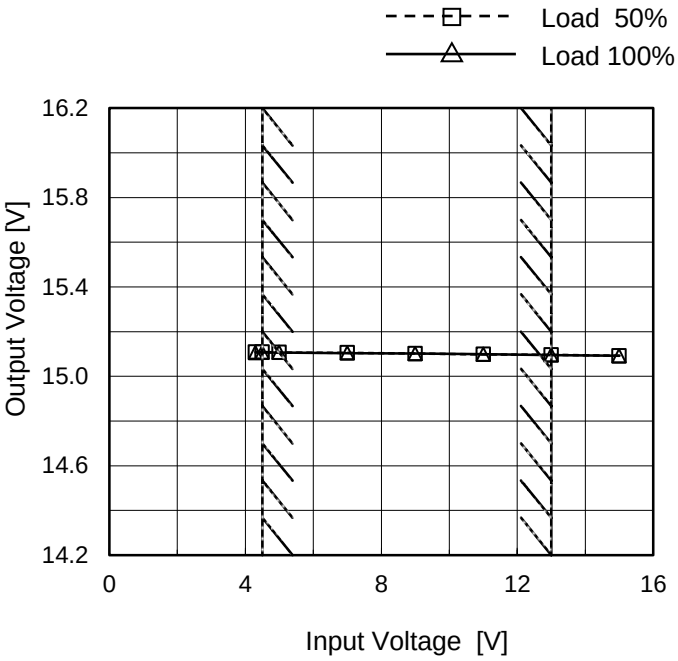
Model	MGFS400515
Item	Line Regulation
Object	+15V2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

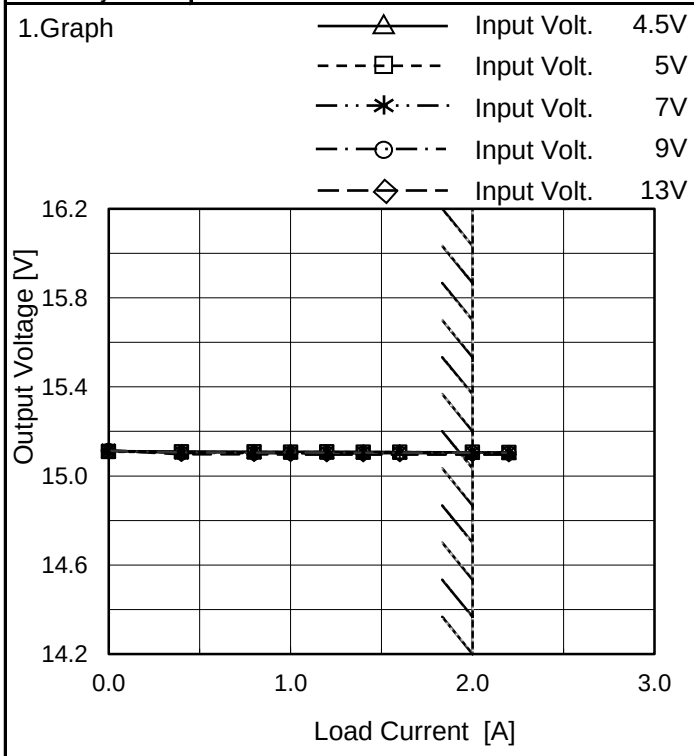
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.3	15.109	15.106
4.5	15.109	15.106
5.0	15.107	15.106
7.0	15.105	15.104
9.0	15.102	15.102
11.0	15.098	15.099
13.0	15.096	15.095
15.0	15.092	15.092
--	-	-

COSEL

Model	MGFS400515
Item	Load Regulation
Object	+15V2A

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]
0.0	15.112	15.109	15.113	15.114	15.114
0.4	15.110	15.108	15.105	15.103	15.097
0.8	15.109	15.107	15.105	15.102	15.097
1.0	15.109	15.107	15.105	15.102	15.096
1.2	15.109	15.107	15.105	15.102	15.096
1.4	15.108	15.107	15.104	15.102	15.095
1.6	15.107	15.106	15.104	15.102	15.095
2.0	15.106	15.106	15.104	15.102	15.095
2.2	15.106	15.105	15.104	15.102	15.095
--	-	-	-	-	-
--	-	-	-	-	-

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Model	MGFS400515
Item	Dynamic Load Response
Object	+15V2A

Temperature 25°C
Testing Circuitry Figure A

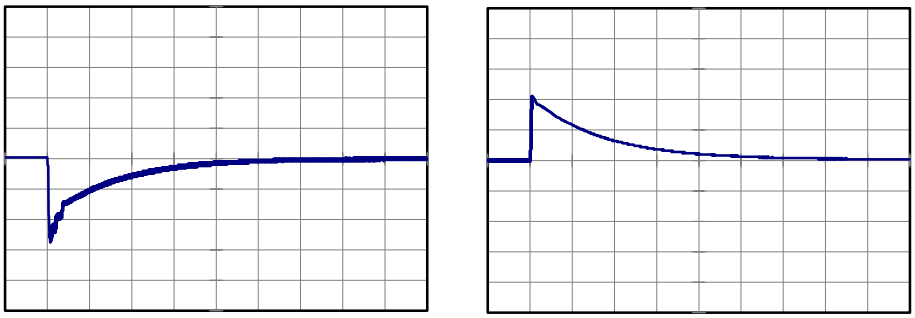
Input Volt. 5 V
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

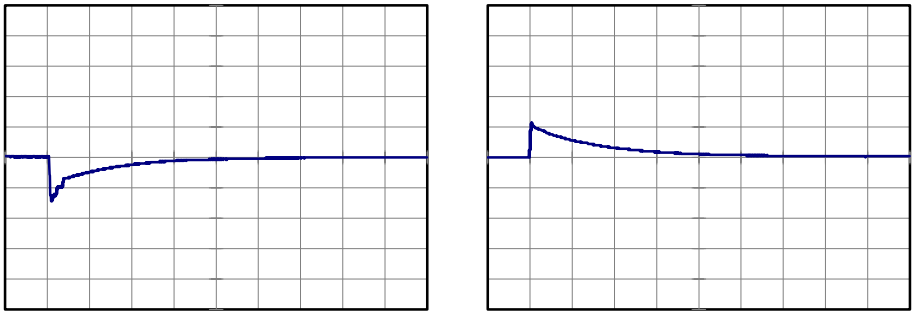
Min.Load (0A)←→
Load 100% (2A)



200 mV/div

2 ms/div 2 ms/div

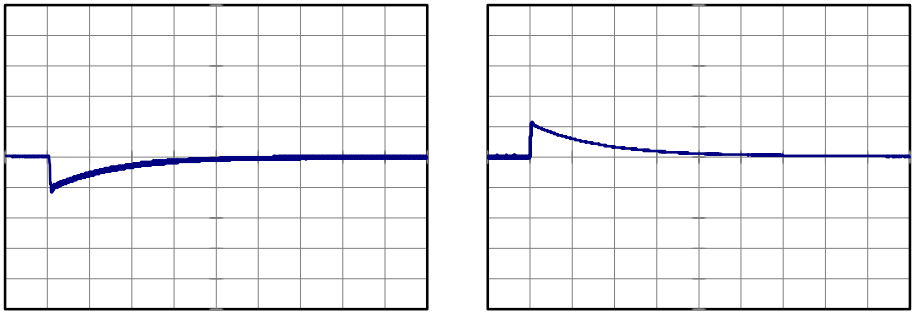
Min.Load (0A)←→
Load 50% (1A)



200 mV/div

2 ms/div 2 ms/div

Load 50% (1A)←→
Load 100% (2A)



200 mV/div

2 ms/div 2 ms/div

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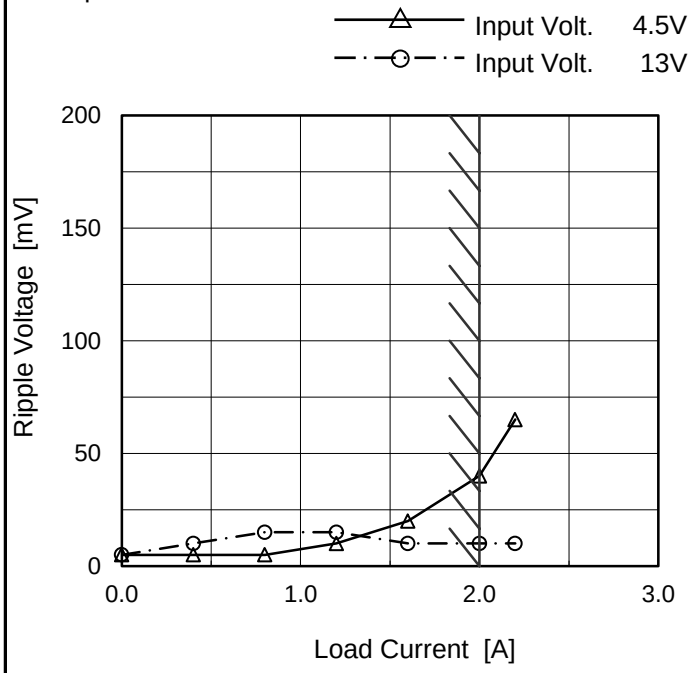
Model	MGFS400515
Item	Ripple Voltage (by Load Current)
Object	+15V2A

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]

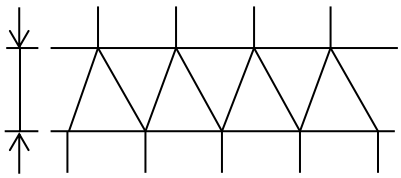


Fig.Complex Ripple Wave Form

2.Values

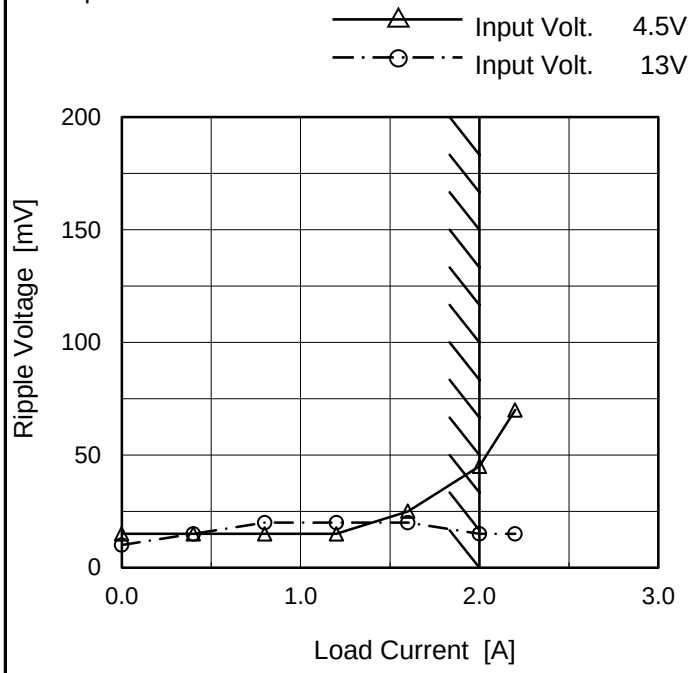
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	5	5
0.4	5	10
0.8	5	15
1.2	10	15
1.6	20	10
2.0	40	10
2.2	65	10
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400515
Item	Ripple-Noise
Object	+15V2A

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]

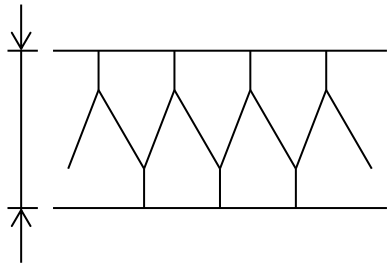


Fig.Complex Ripple Noise Wave Form

2.Values

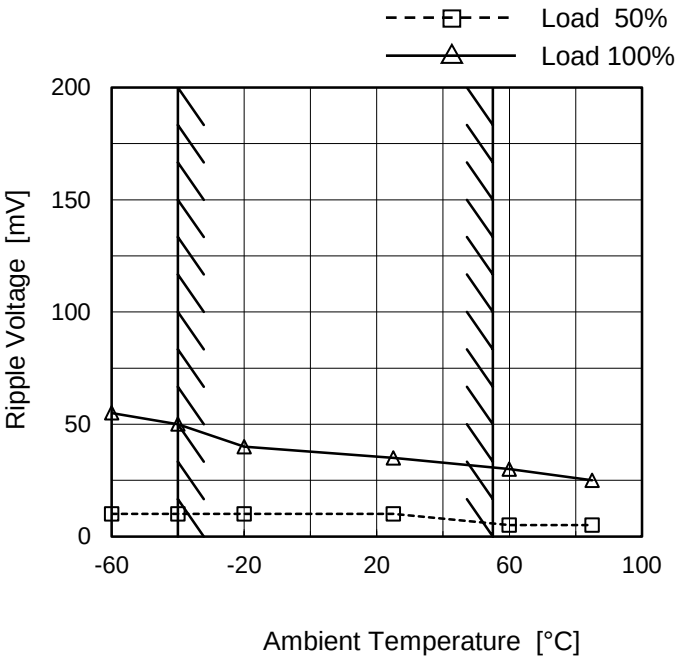
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	15	10
0.4	15	15
0.8	15	20
1.2	15	20
1.6	25	20
2.0	45	15
2.2	70	15
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400515
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V2A

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	50
-20	10	40
25	10	35
60	5	30
85	5	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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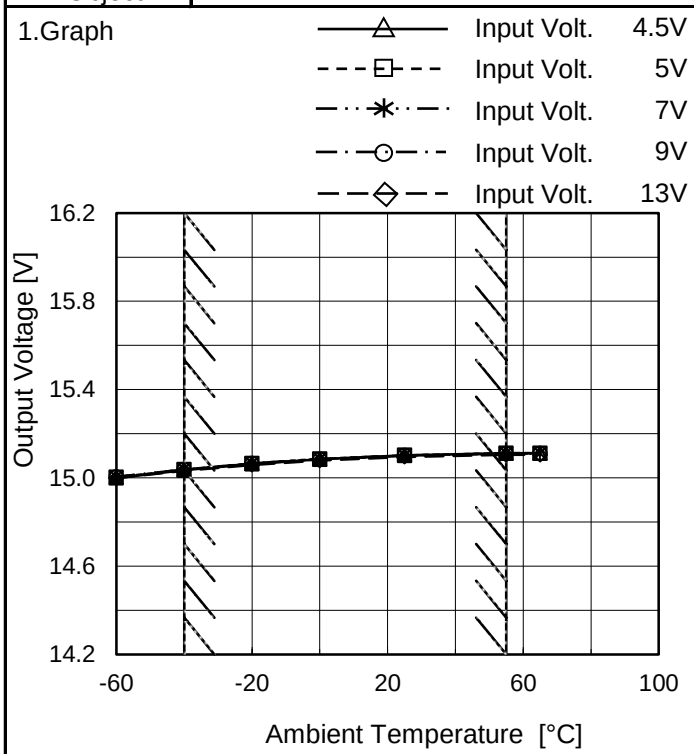
Model	MGFS400515
Item	Ambient Temperature Drift
Object	+15V2A

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	14.999	15.002	15.004	15.004	14.998
-40	15.035	15.037	15.038	15.038	15.032
-20	15.063	15.065	15.065	15.064	15.059
0	15.084	15.085	15.085	15.084	15.078
25	15.101	15.102	15.102	15.100	15.095
55	15.111	15.112	15.111	15.110	15.104
65	15.111	15.111	15.111	15.109	15.104
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Model	MGFS400515	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+15V2A	

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 - 55°C
Input Voltage : 4.5 - 13V
Load Current : 0 - 2A

* 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]		Ratio [%]
Maximum Voltage	55	13	0	15.121	±45	±0.3
Minimum Voltage	-40	13	2	15.032		

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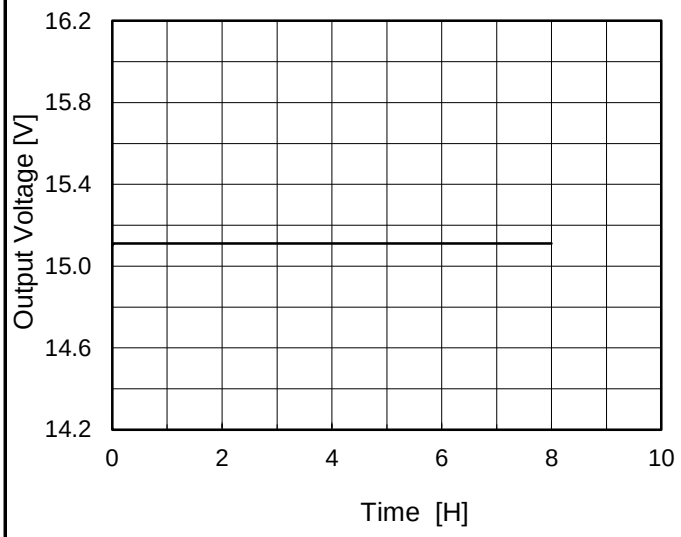
Model	MGFS400515
Item	Time Lapse Drift
Object	+15V2A

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	15.102
0.5	15.112
1.0	15.112
2.0	15.112
3.0	15.112
4.0	15.112
5.0	15.112
6.0	15.112
7.0	15.112
8.0	15.112

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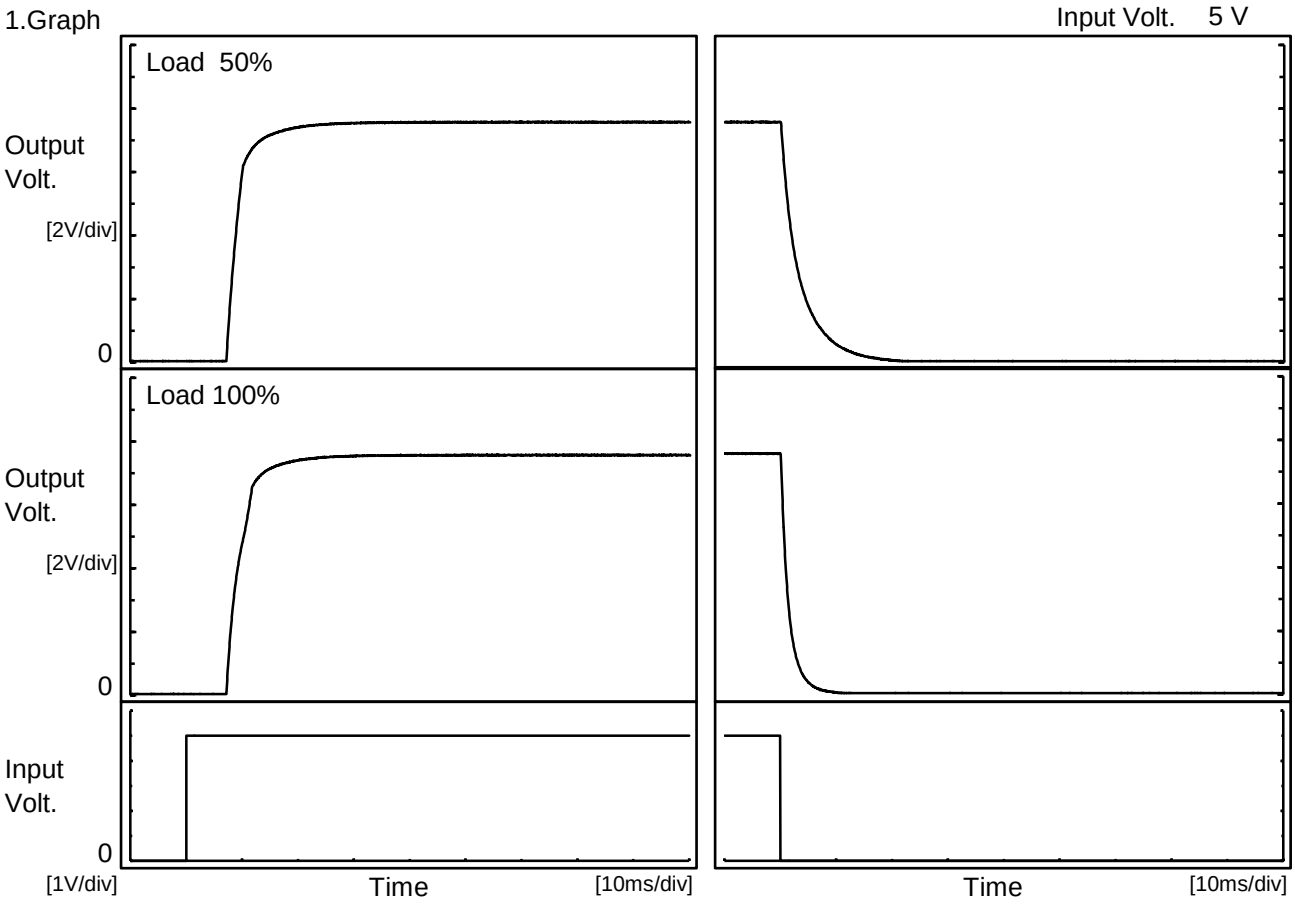
Model	MGFS400515	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+15V2A	

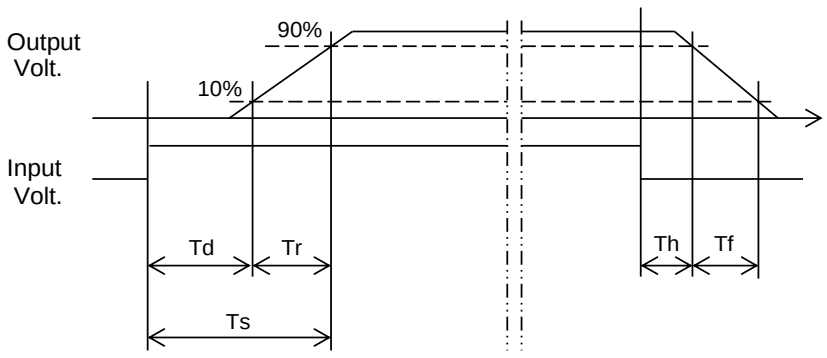
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	7.5	4.6	12.1	0.4	8.1
100 %	7.5	5.1	12.6	0.3	3.3



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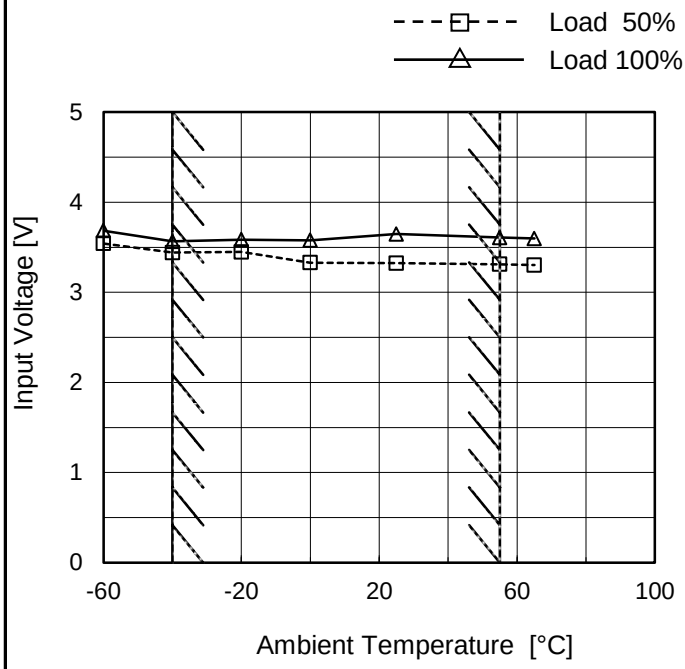
Model	MGFS400515
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V2A

Testing Circuitry Figure A

1.Graph



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

2.Values

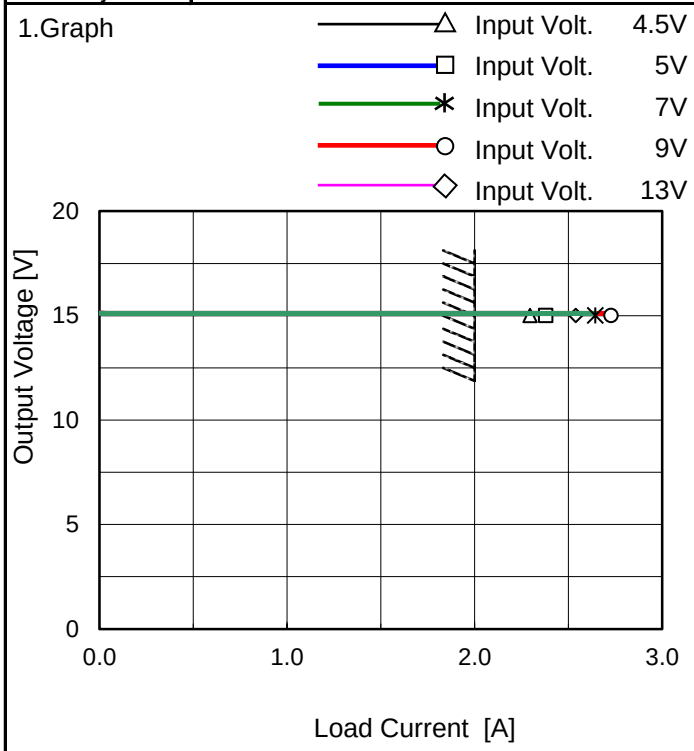
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.6	3.7
-40	3.5	3.6
-20	3.5	3.6
0	3.4	3.6
25	3.4	3.7
55	3.4	3.6
65	3.3	3.6
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS400515
Item	Overcurrent Protection
Object	+15V2A

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

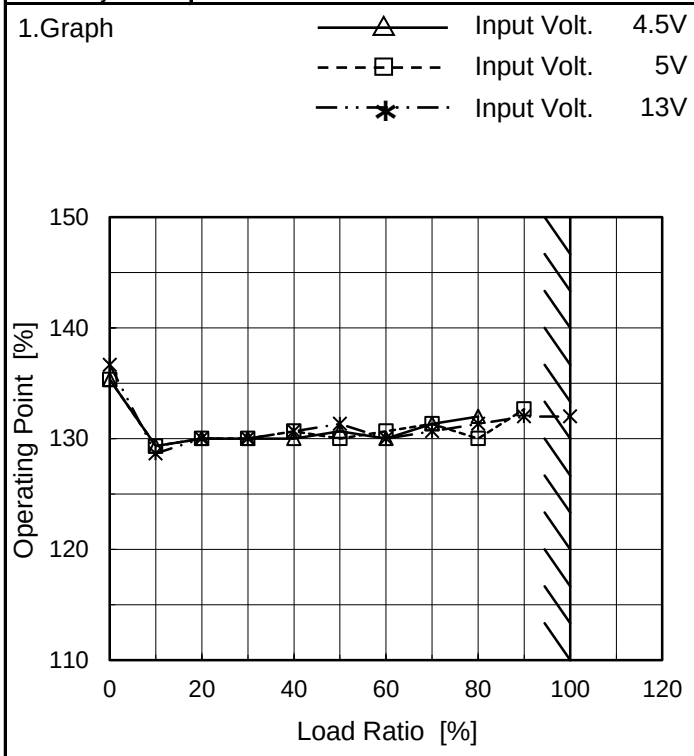
Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
15.0	2.296	2.380	2.644	2.728	2.540
14.3	-	-	-	-	-
13.5	-	-	-	-	-
12.0	-	-	-	-	-
10.5	-	-	-	-	-
9.0	-	-	-	-	-
7.5	-	-	-	-	-
6.0	-	-	-	-	-
4.5	-	-	-	-	-
3.0	-	-	-	-	-
1.5	-	-	-	-	-
0.0	-	-	-	-	-

COSEL

Model	MGFS400515
Item	Overvoltage Protection
Object	+15V2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



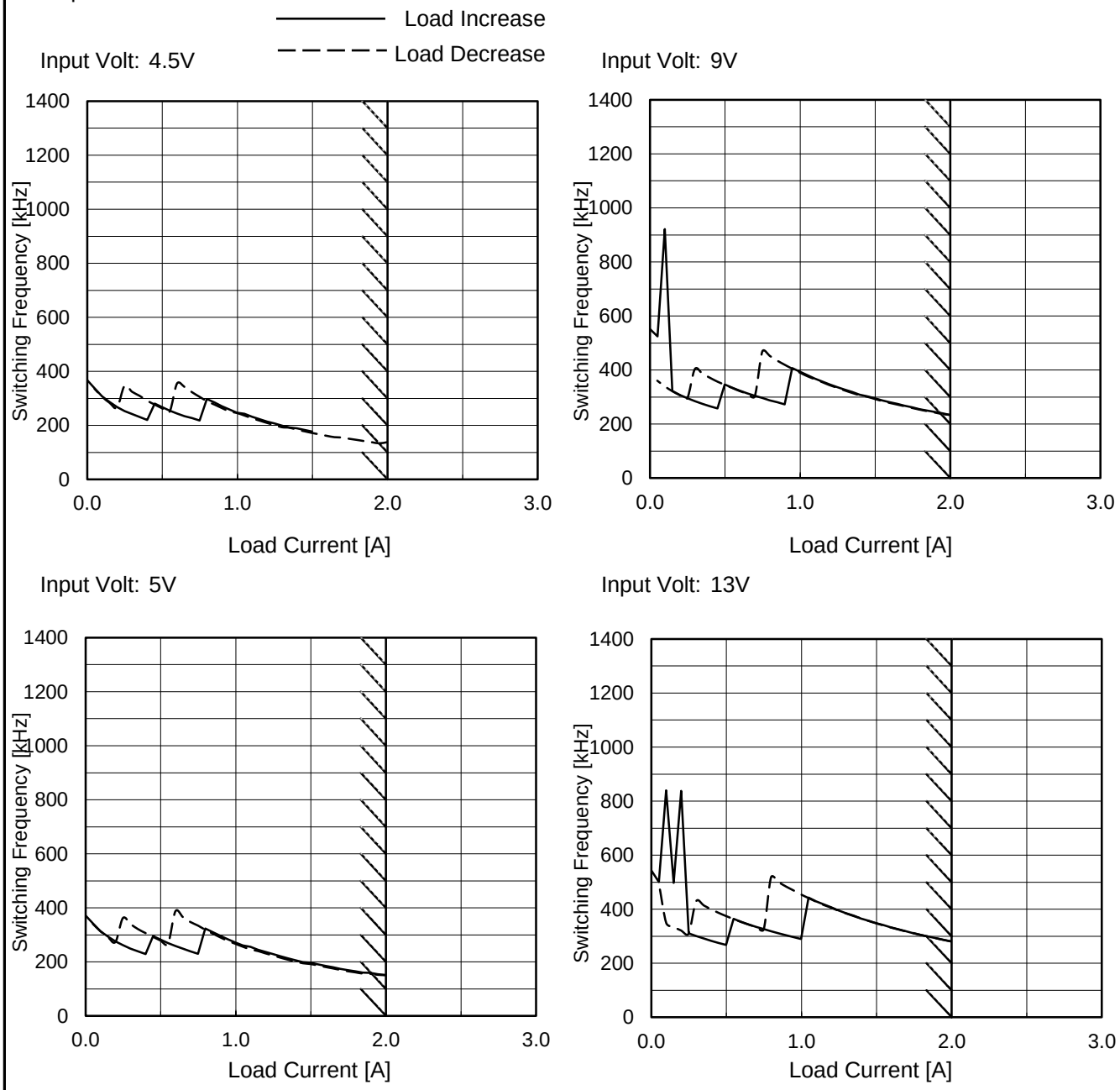
2.Values

Load Ratio [%]	Operating Point [%] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 13[V]
0	135	135	137
10	129	129	129
20	130	130	130
30	130	130	130
40	130	131	131
50	131	130	131
60	130	131	130
70	131	131	131
80	132	130	131
90	- ※	133	132
100	- ※	- ※	132

※During this area, overcurrent protection activates.

Model	MGFS400515	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	15V2A	

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.

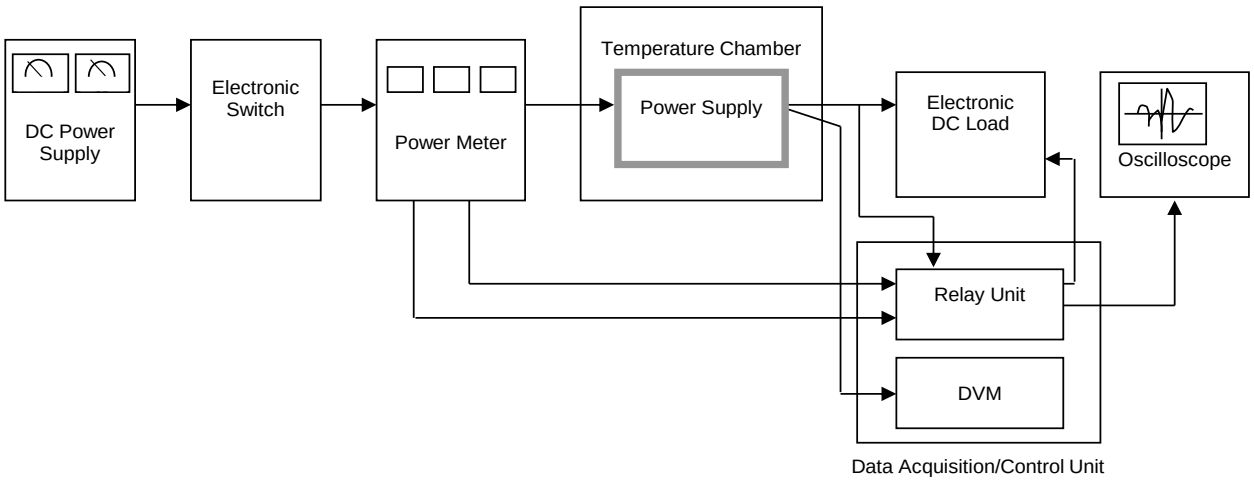


Figure A

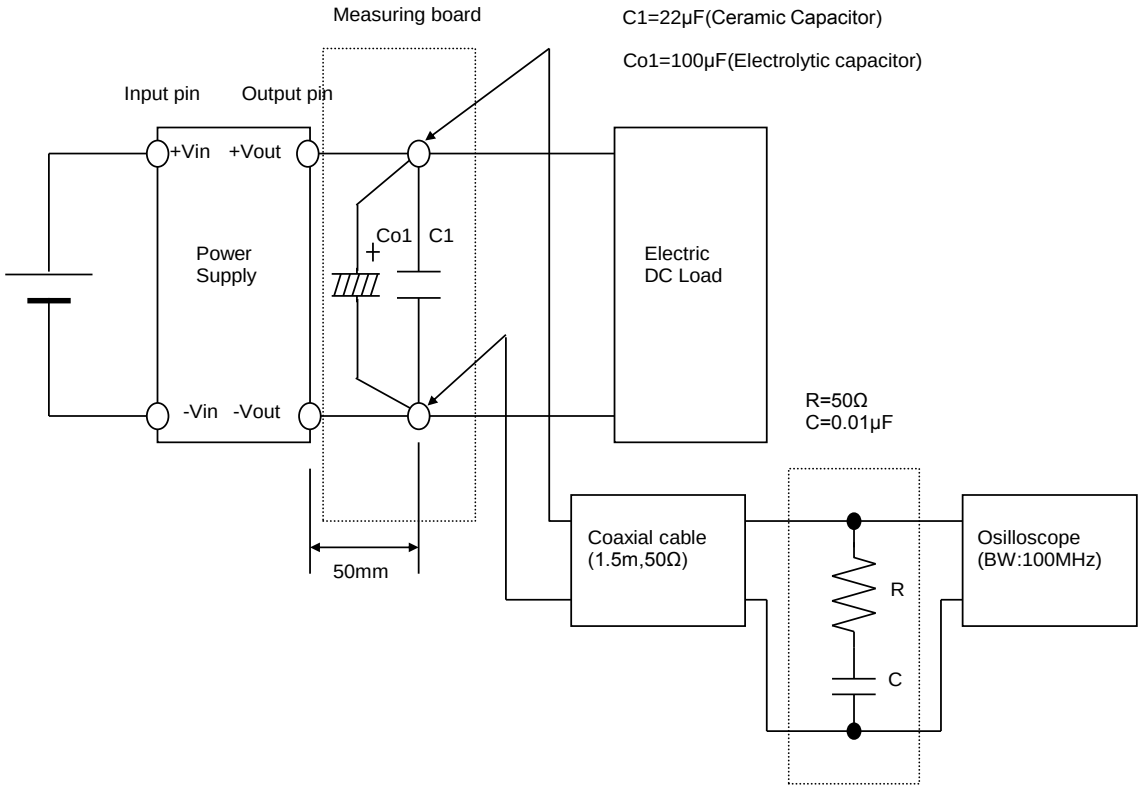


Figure B（Ripple and Ripple noise Characteristic）