

TEST DATA OF MGFS62415

Regulated DC Power Supply
December 16, 2016

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(Final Page 19)

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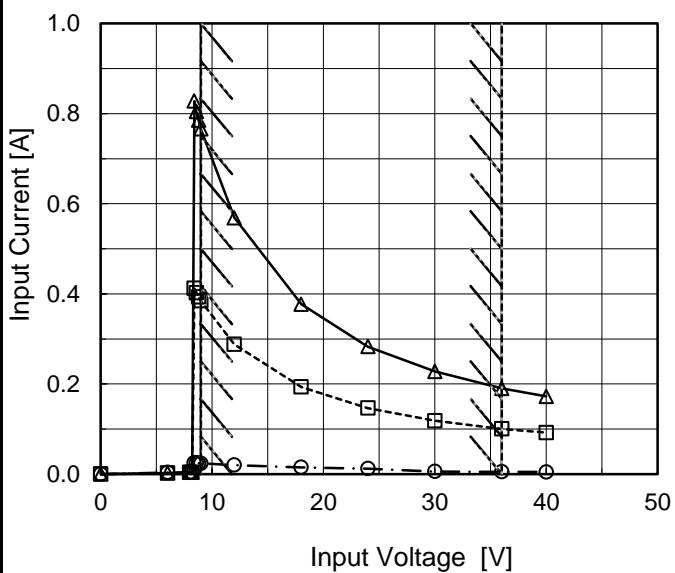
Model MGFS62415

Item Input Current (by Input Voltage)

Object _____

1.Graph

—△— Load 100%
 - -□--- Load 50%
 - -○--- Load 0%



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

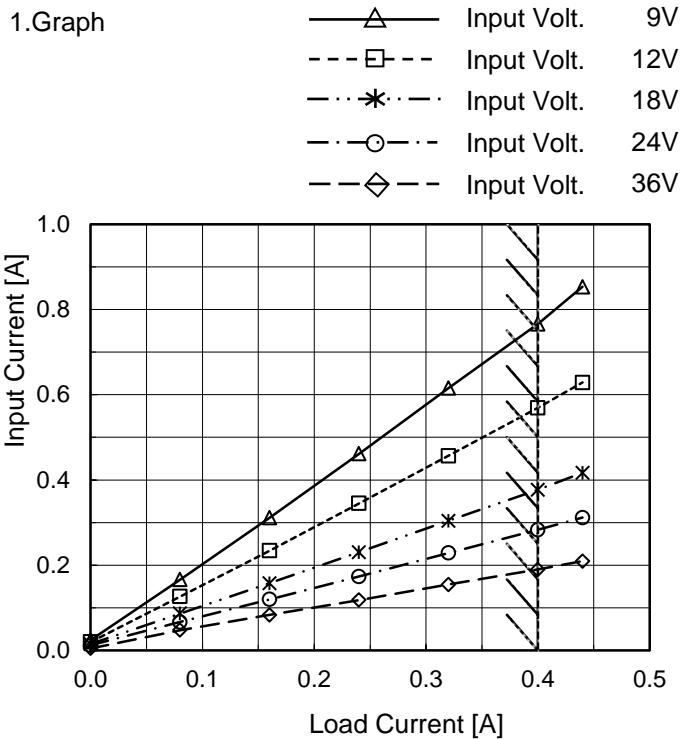
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
6.0	0.004	0.002	0.002
8.0	0.004	0.004	0.004
8.2	0.004	0.004	0.004
8.4	0.025	0.413	0.828
8.6	0.025	0.403	0.804
8.8	0.024	0.393	0.785
9.0	0.024	0.385	0.766
12.0	0.020	0.288	0.569
18.0	0.015	0.193	0.377
24.0	0.012	0.146	0.283
30.0	0.006	0.119	0.228
36.0	0.005	0.100	0.190
40.0	0.005	0.092	0.173
--	-	-	-
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COSEL

Model MGFS62415

Item Input Current (by Load Current)

Object _____



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

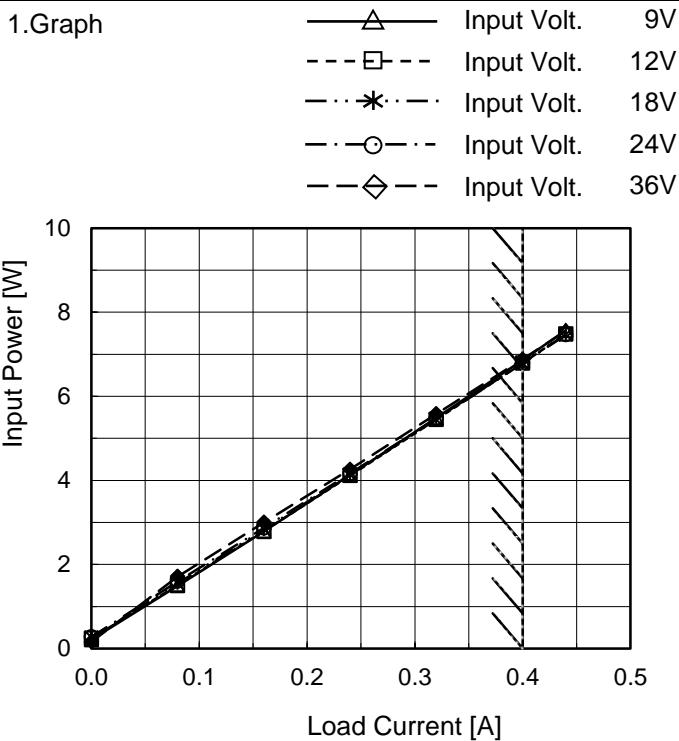
Load Current [A]	Input Current [A]				
	9[V]	12[V]	18[V]	24[V]	36[V]
0.00	0.024	0.020	0.015	0.012	0.005
0.08	0.166	0.127	0.087	0.067	0.048
0.16	0.311	0.234	0.158	0.120	0.083
0.24	0.461	0.345	0.231	0.174	0.118
0.32	0.615	0.457	0.304	0.229	0.155
0.40	0.766	0.569	0.377	0.283	0.190
0.44	0.853	0.628	0.417	0.312	0.210
--	-	-	-	-	-
--	-	-	-	-	-
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--	-	-	-	-	-

COSEL

Model MGFS62415

Item Input Power (by Load Current)

Object _____



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

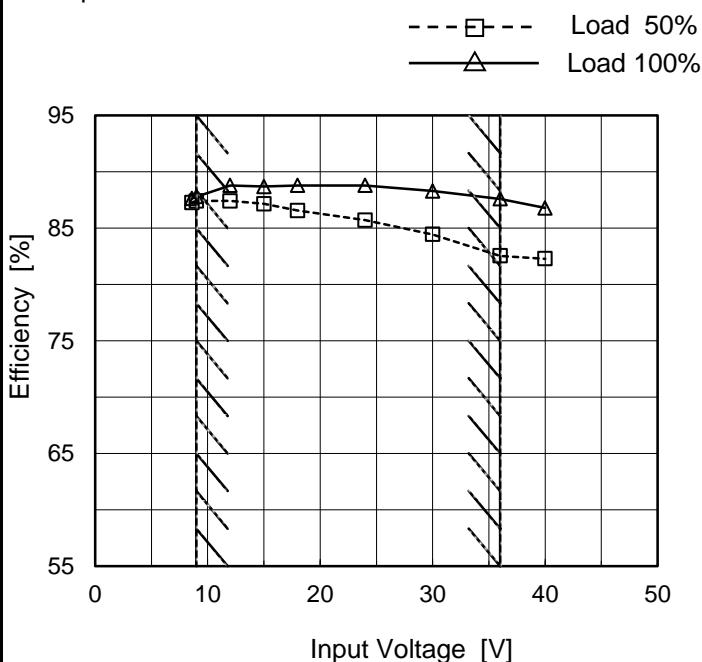
Load Current [A]	Input Power [W]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	0.21	0.24	0.26	0.27	0.16
0.08	1.49	1.52	1.55	1.60	1.71
0.16	2.78	2.80	2.83	2.87	3.00
0.24	4.13	4.11	4.14	4.16	4.26
0.32	5.49	5.45	5.45	5.48	5.58
0.40	6.86	6.79	6.79	6.79	6.88
0.44	7.57	7.48	7.47	7.46	7.55
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS62415
Item	Efficiency (by Input Voltage)
Object	_____

 Temperature 25°C
 Testing Circuitry Figure A

1.Graph



2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.6	87.3	87.6
9.0	87.4	87.8
12.0	87.4	88.8
15.0	87.2	88.7
18.0	86.6	88.8
24.0	85.7	88.8
30.0	84.5	88.3
36.0	82.5	87.6
40.0	82.3	86.8

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

COSEL

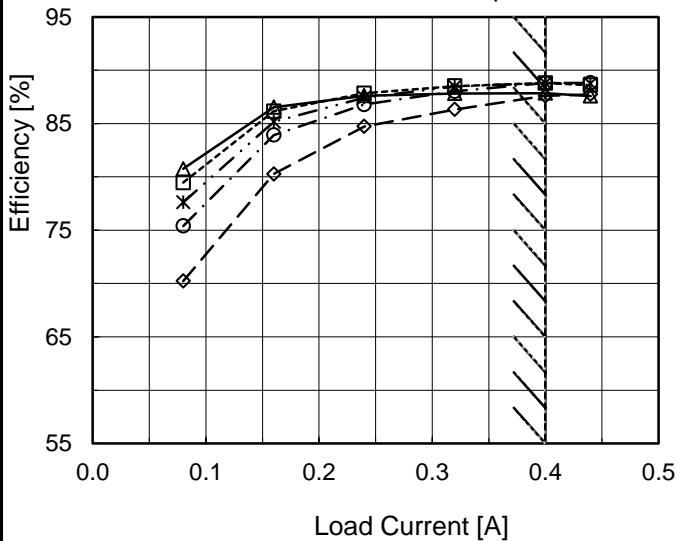
Model MGFS62415

Item Efficiency (by Load Current)

Object _____

1.Graph

- △— Input Volt. 9V
 - - - □ - - Input Volt. 12V
 - - * - - Input Volt. 18V
 - - ○ - - Input Volt. 24V
 - - ◇ - - Input Volt. 36V



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

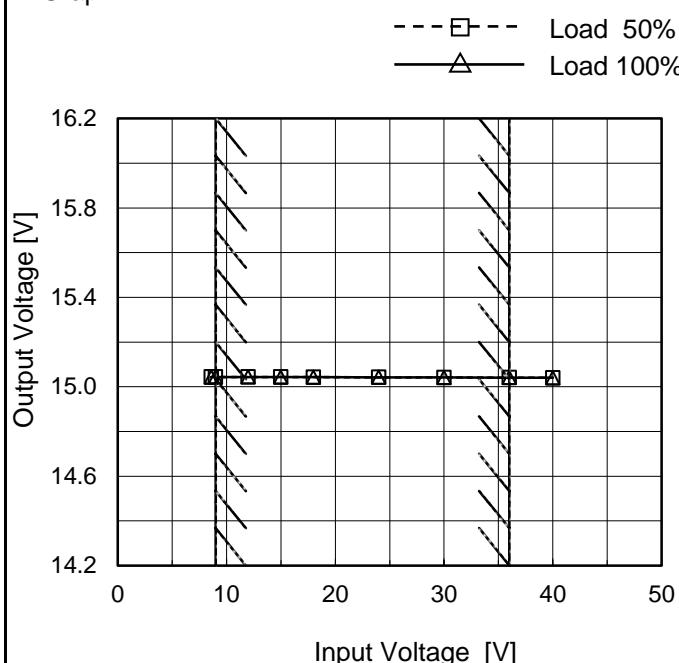
Load Current [A]	Efficiency [%]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	-	-	-	-	-
0.08	80.7	79.5	77.6	75.4	70.2
0.16	86.5	86.2	85.2	83.9	80.3
0.24	87.6	87.8	87.4	86.8	84.7
0.32	87.8	88.5	88.5	88.0	86.3
0.40	87.8	88.8	88.8	88.8	87.6
0.44	87.6	88.6	88.7	88.8	87.7
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS62415
Item	Line Regulation
Object	+15V0.4A

Temperature 25°C
 Testing Circuitry Figure A

1.Graph



2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	15.044	15.043
9.0	15.044	15.043
12.0	15.044	15.044
15.0	15.043	15.043
18.0	15.043	15.043
24.0	15.042	15.042
30.0	15.042	15.041
36.0	15.041	15.041
40.0	15.040	15.040

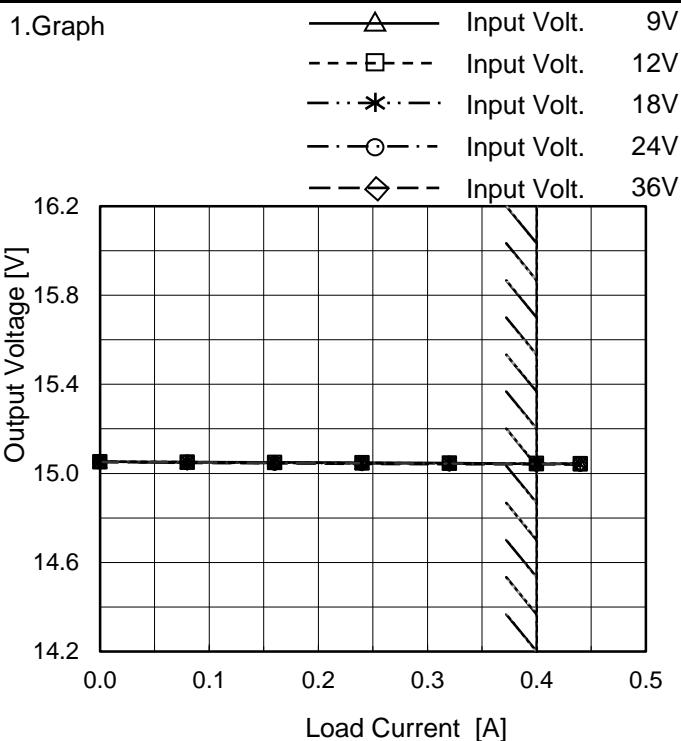
Note: Slanted line shows the range of the rated input voltage.

COSEL

Model MGFS62415

Item Load Regulation

Object +15V0.4A



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

 Temperature 25°C
 Testing Circuitry Figure A

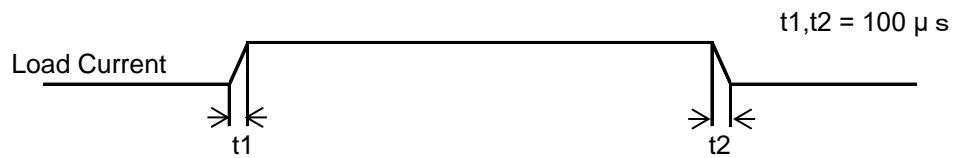
2. Values

Load Current [A]	Output Voltage [V]				
	9[V]	12[V]	18[V]	24[V]	36[V]
0.00	15.053	15.052	15.051	15.052	15.053
0.08	15.051	15.050	15.049	15.048	15.046
0.16	15.049	15.049	15.047	15.047	15.045
0.24	15.048	15.047	15.046	15.045	15.043
0.32	15.046	15.046	15.044	15.044	15.042
0.40	15.043	15.044	15.043	15.042	15.041
0.44	15.043	15.043	15.042	15.041	15.040
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS62415	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.4A		

Input Volt. 24 V
 Cycle 100 ms



Min.Load (0A)↔
 Load 100% (0.4A)

500 mV/div

2 ms/div

2 ms/div

Min.Load (0A)↔
 Load 50% (0.2A)

500 mV/div

2 ms/div

2 ms/div

Load 50% (0.2A)↔
 Load 100% (0.4A)

500 mV/div

2 ms/div

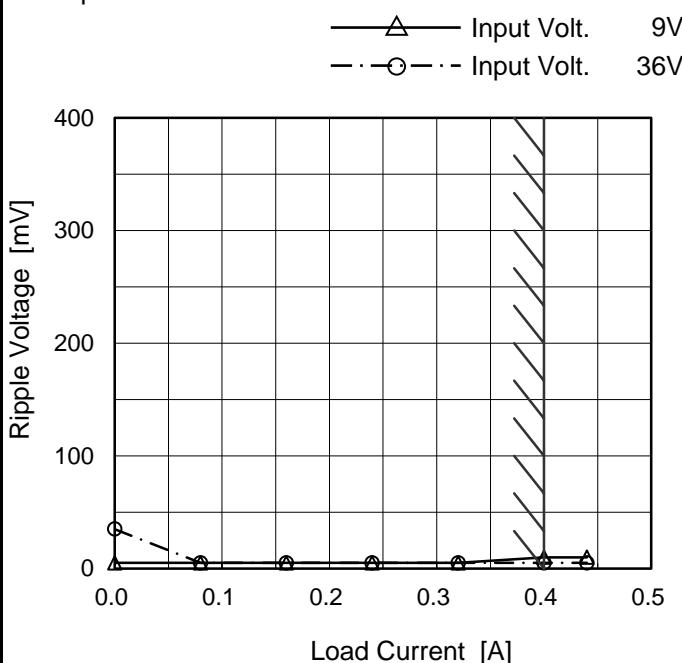
2 ms/div

COSEL

Model	MGFS62415
Item	Ripple Voltage (by Load Current)
Object	+15V0.4A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	35
0.08	5	5
0.16	5	5
0.24	5	5
0.32	5	5
0.40	10	5
0.44	10	5
--	-	-
--	-	-
--	-	-
--	-	-

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]

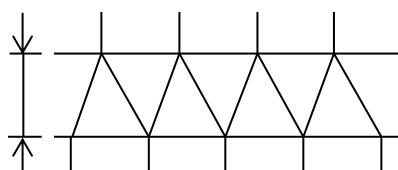


Fig.Complex Ripple Wave Form

COSEL

Model	MGFS62415																																							
Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure B																																						
Object	+15V0.4A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 400 mV, and the X-axis ranges from 0.0 to 0.5 A. Two sets of data points are plotted: Input Volt. 9V (solid line with open circles) and Input Volt. 36V (dashed line with open circles). A slanted line indicates the rated load current range from approximately 0.16A to 0.44A.</p>																																								
2.Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple-Noise [mV]</th> </tr> <tr> <th>Input Volt. 9 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td><td>5</td><td>35</td></tr> <tr> <td>0.08</td><td>10</td><td>10</td></tr> <tr> <td>0.16</td><td>10</td><td>10</td></tr> <tr> <td>0.24</td><td>10</td><td>10</td></tr> <tr> <td>0.32</td><td>15</td><td>10</td></tr> <tr> <td>0.40</td><td>15</td><td>15</td></tr> <tr> <td>0.44</td><td>20</td><td>15</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Ripple-Noise [mV]		Input Volt. 9 [V]	Input Volt. 36 [V]	0.00	5	35	0.08	10	10	0.16	10	10	0.24	10	10	0.32	15	10	0.40	15	15	0.44	20	15	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																							
	Input Volt. 9 [V]	Input Volt. 36 [V]																																						
0.00	5	35																																						
0.08	10	10																																						
0.16	10	10																																						
0.24	10	10																																						
0.32	15	10																																						
0.40	15	15																																						
0.44	20	15																																						
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<p>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.</p> <p>Ripple Noise[mVp-p]</p> <p>Fig.Complex Ripple Noise Wave Form</p>																																								

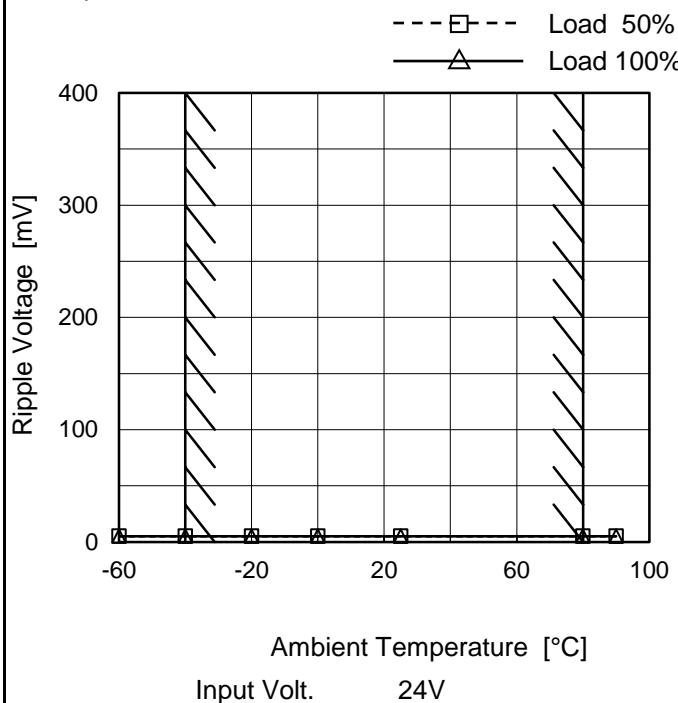
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Model MGFS62415

Item Ripple Voltage (by Ambient Temp.)

Object +15V0.4A

1.Graph



Measured by 100 MHz Oscilloscope.

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

Testing Circuitry Figure B

2.Values

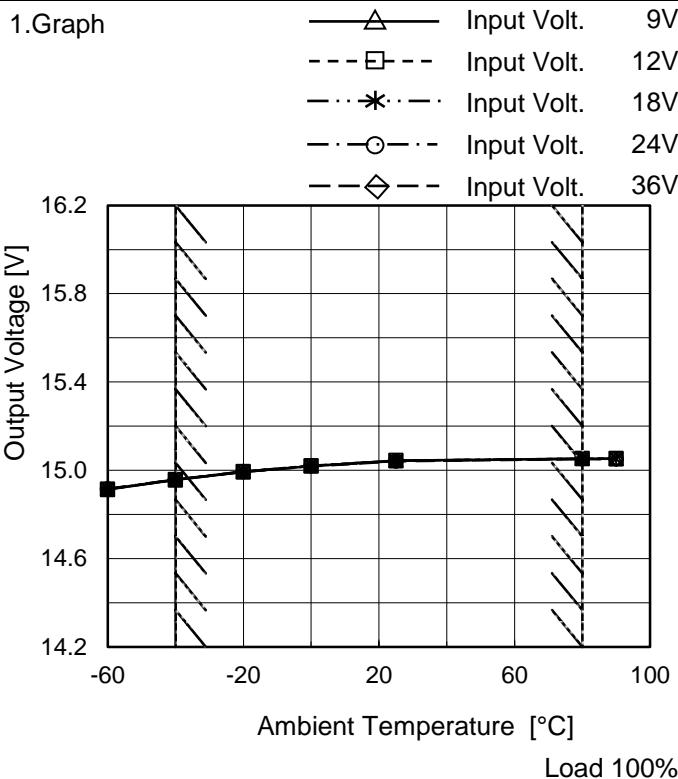
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
80	5	5
90	5	5
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model MGFS62415

Item Ambient Temperature Drift

Object +15V0.4A



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	9[V]	12[V]	18[V]	24[V]	36[V]
-60	14.912	14.914	14.915	14.915	14.914
-40	14.956	14.958	14.958	14.958	14.957
-20	14.993	14.994	14.993	14.994	14.992
0	15.020	15.020	15.020	15.020	15.018
25	15.043	15.044	15.043	15.042	15.041
80	15.052	15.053	15.052	15.052	15.050
90	15.052	15.053	15.052	15.051	15.050
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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



Model	MGFS62415	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+15V0.4A	

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 - 80°C

Input Voltage : 9 - 36V

Load Current : 0 - 0.4A

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

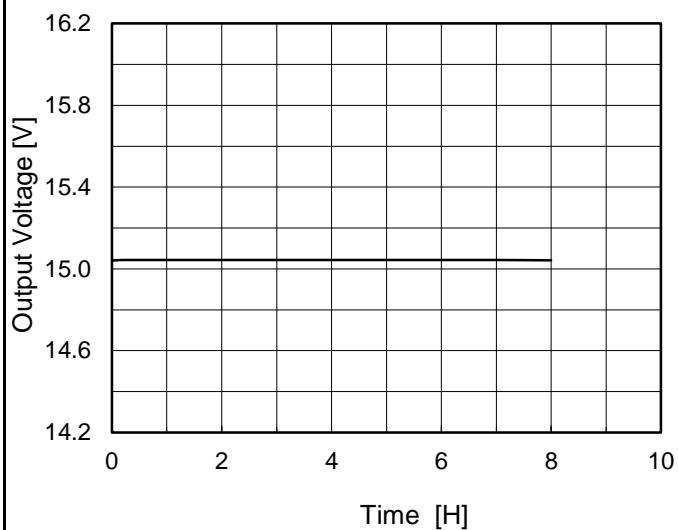
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	65	36	0	15.064	± 54	± 0.4
Minimum Voltage	-40	9	0.4	14.956		

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Model	MGFS62415
Item	Time Lapse Drift
Object	+15V0.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	15.036
0.5	15.043
1.0	15.043
2.0	15.043
3.0	15.043
4.0	15.043
5.0	15.043
6.0	15.043
7.0	15.043
8.0	15.043

COSEL

Model MGFS62415

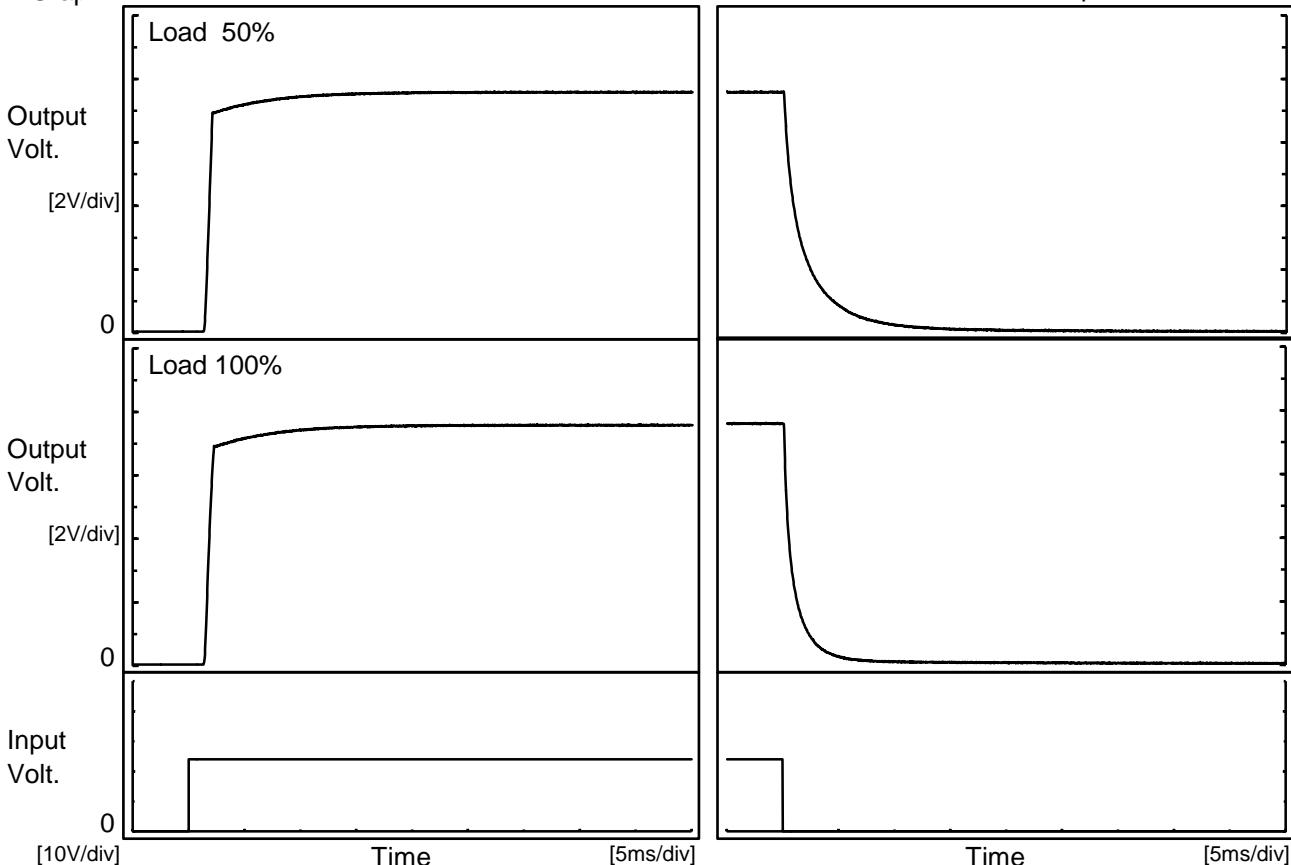
Item Rise and Fall Time

Object +15V0.4A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

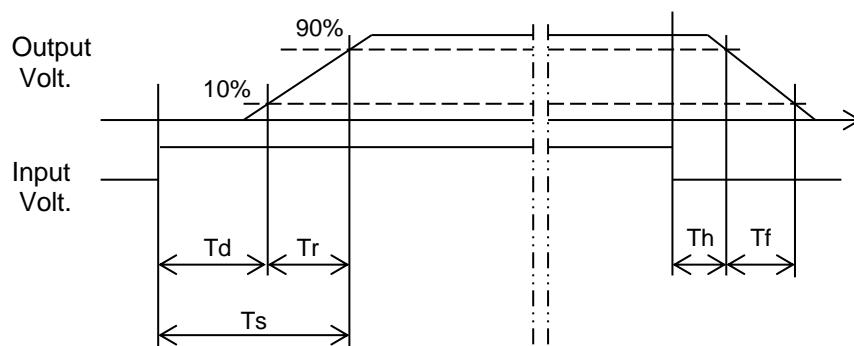
Input Volt. 24 V



2. Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.6	2.1	0.2	5.1
100 %	1.5	0.7	2.2	0.2	2.6



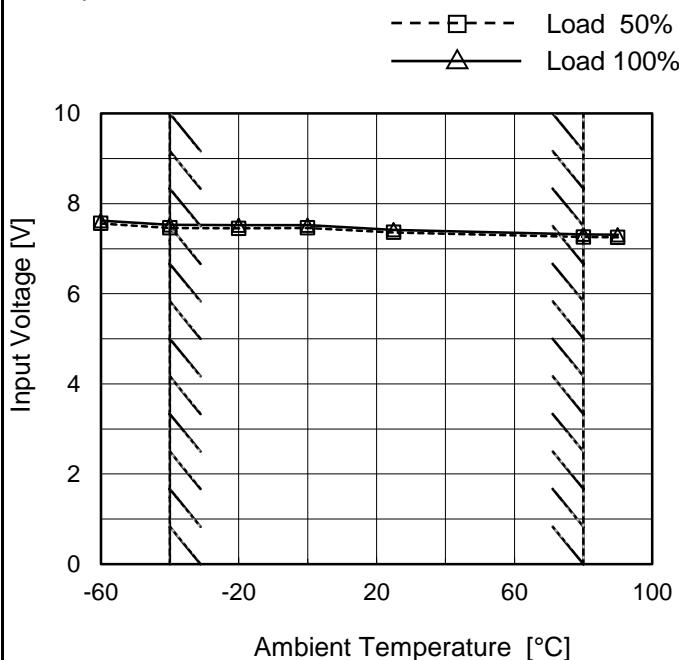
COSEL

Model MGFS62415

Item Minimum Input Voltage
for Regulated Output Voltage

Object +15V0.4A

1.Graph



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

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.6	7.7
-40	7.5	7.6
-20	7.5	7.6
0	7.5	7.6
25	7.4	7.5
80	7.3	7.4
90	7.3	7.4
--	-	-
--	-	-
--	-	-
--	-	-

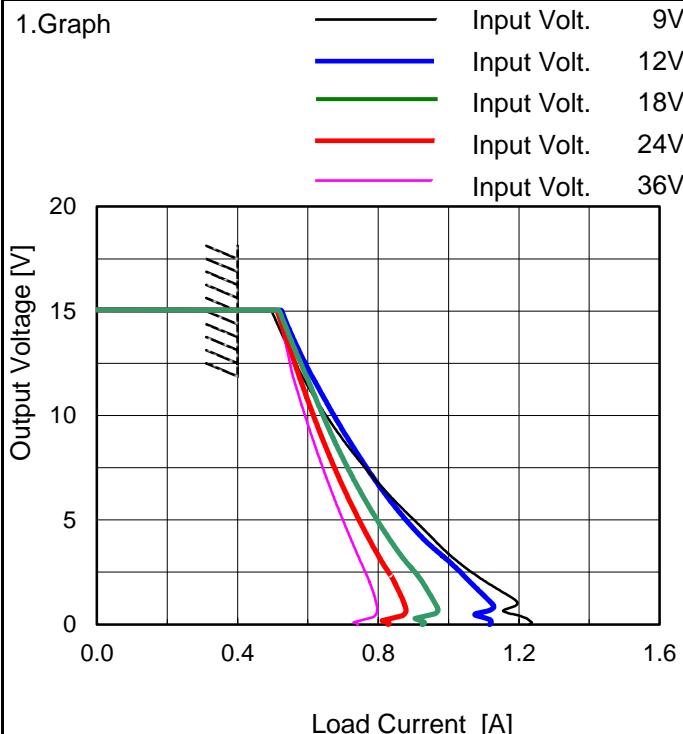
COSEL

Model MGFS62415

Item Overcurrent Protection

Object +15V0.4A

1.Graph



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

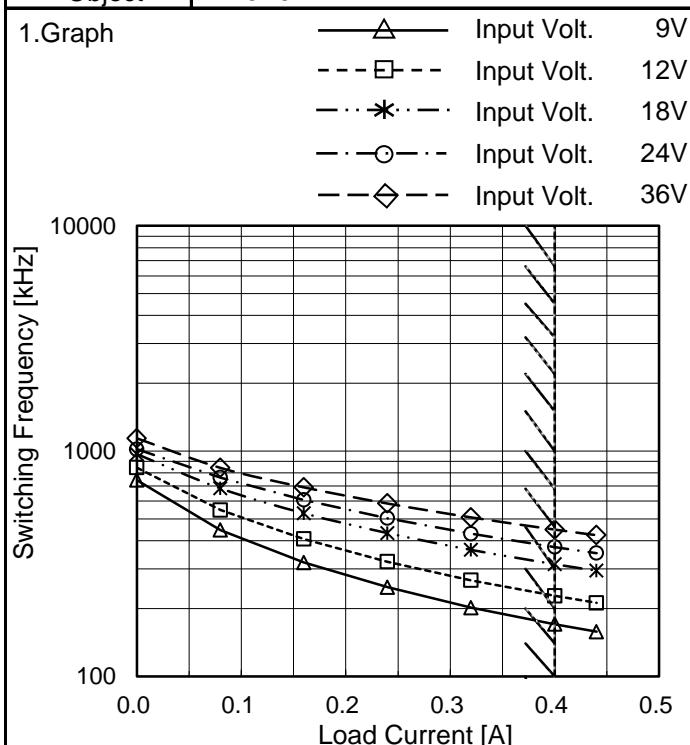
 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]				
	9[V]	12[V]	18[V]	24[V]	36[V]
14.3	0.517	0.543	0.537	0.528	0.525
13.5	0.537	0.563	0.554	0.542	0.535
12.0	0.579	0.606	0.593	0.572	0.555
10.5	0.631	0.657	0.630	0.605	0.582
9.0	0.692	0.710	0.669	0.638	0.610
7.5	0.762	0.765	0.712	0.674	0.642
6.0	0.842	0.830	0.760	0.716	0.675
4.5	0.932	0.905	0.814	0.760	0.711
3.0	1.026	1.002	0.879	0.809	0.749
1.5	1.157	1.093	0.944	0.861	0.786
0.0	1.229	1.117	0.926	0.828	0.741
--	-	-	-	-	-

COSEL

Model	MGFS62415
Item	Switching frequency (by Load Current)
Object	+15V0.4A


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Input Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	744	845	970	1020	1140
0.08	446	548	683	764	843
0.16	320	407	530	607	690
0.24	249	323	433	503	585
0.32	202	267	364	430	508
0.40	170	228	315	375	448
0.44	158	212	295	353	424
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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

When load current is low, MG operates intermittently, so switching frequency would not become constant.

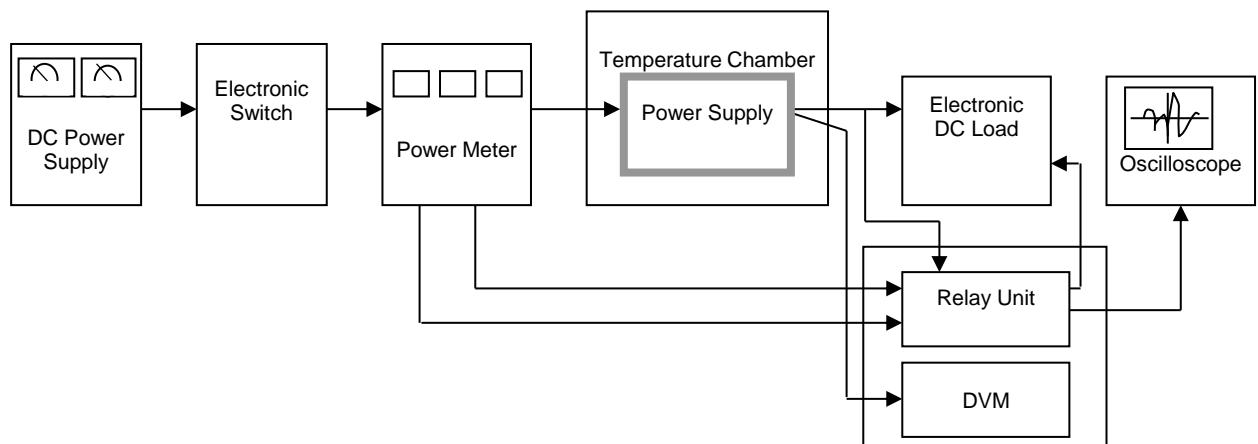


Figure A

Data Acquisition/Control Unit

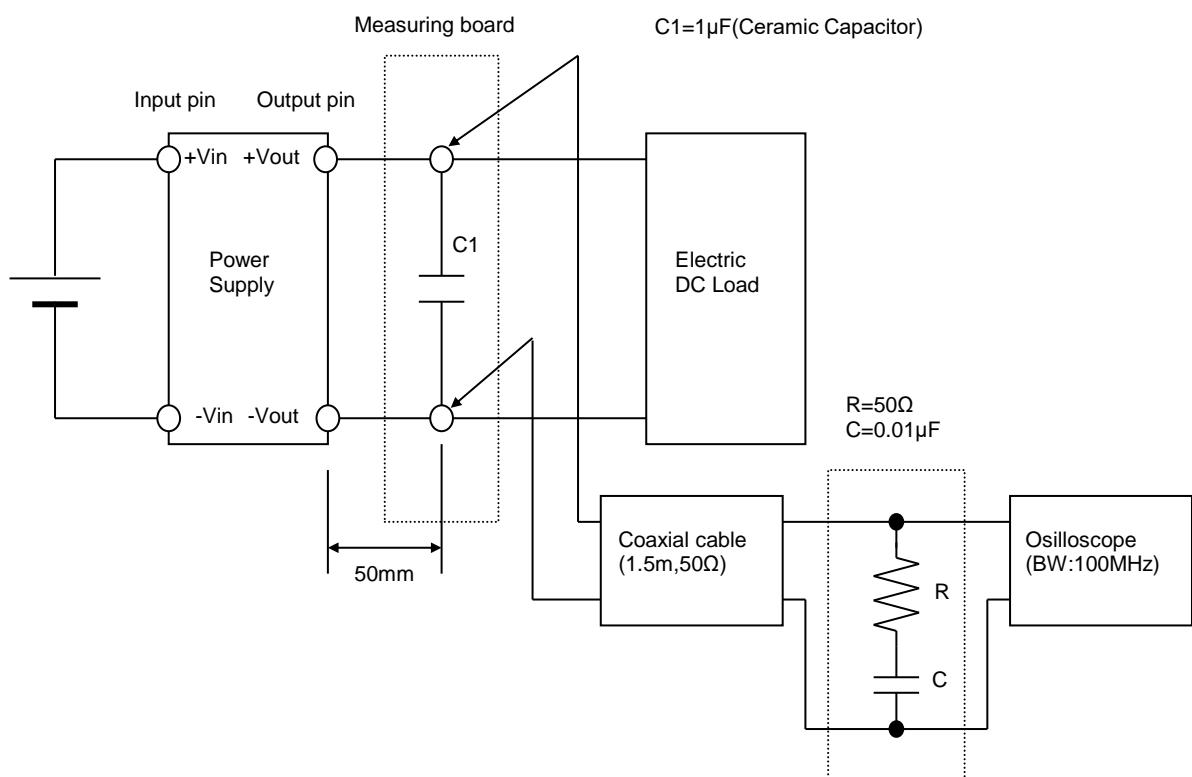


Figure B (Ripple and Ripple noise Characteristic)