

TEST DATA OF MGW62415

Regulated DC Power Supply
October 27, 2016

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Takayuki Fukuda Design Manager

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.



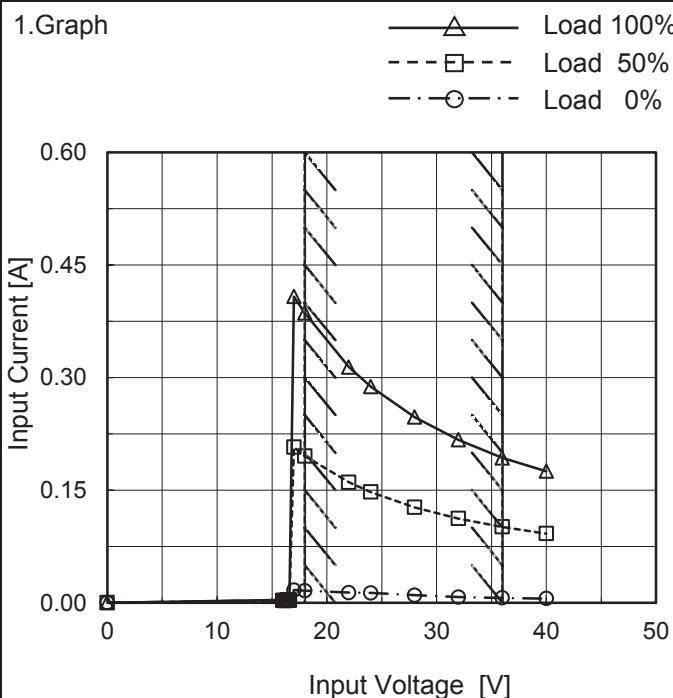
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(Final Page 23)

COSEL

Model	MGW62415
Item	Input Current (by Input Voltage)
Object	_____



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

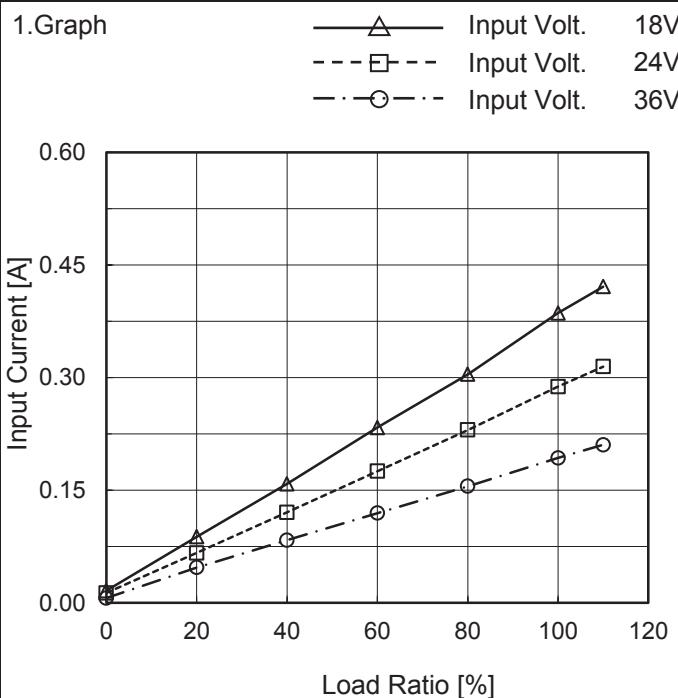
Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
16.0	0.003	0.003	0.004
16.2	0.004	0.003	0.003
16.4	0.004	0.004	0.004
16.5	0.003	0.003	0.003
16.6	0.003	0.003	0.003
17.0	0.017	0.207	0.408
18.0	0.016	0.195	0.386
22.0	0.013	0.161	0.314
24.0	0.013	0.148	0.288
28.0	0.010	0.127	0.247
32.0	0.008	0.112	0.217
36.0	0.006	0.101	0.193
40.0	0.006	0.092	0.175
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COSEL

Model	MGW62415
Item	Input Current (by Load Ratio)
Object	_____


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Ratio [%]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.016	0.013	0.006
20	0.088	0.066	0.047
40	0.158	0.120	0.083
60	0.233	0.175	0.119
80	0.304	0.230	0.155
100	0.386	0.288	0.193
110	0.421	0.315	0.211
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COSEL

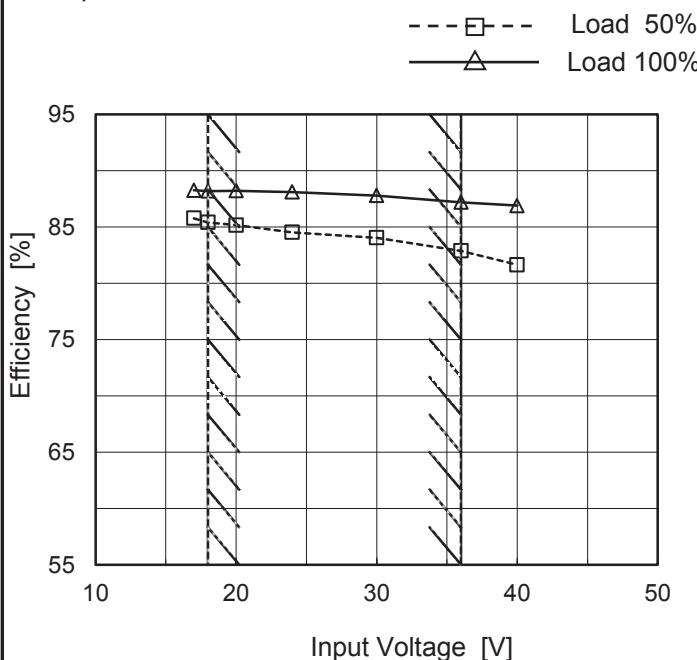
Model	MGW62415																																																					
Item	Input Power (by Load Ratio)																																																					
Object	_____																																																					
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COSEL

Model	MGW62415
Item	Efficiency (by Input Voltage)
Object	_____

Temperature 25°C
Testing Circuitry Figure A

1.Graph



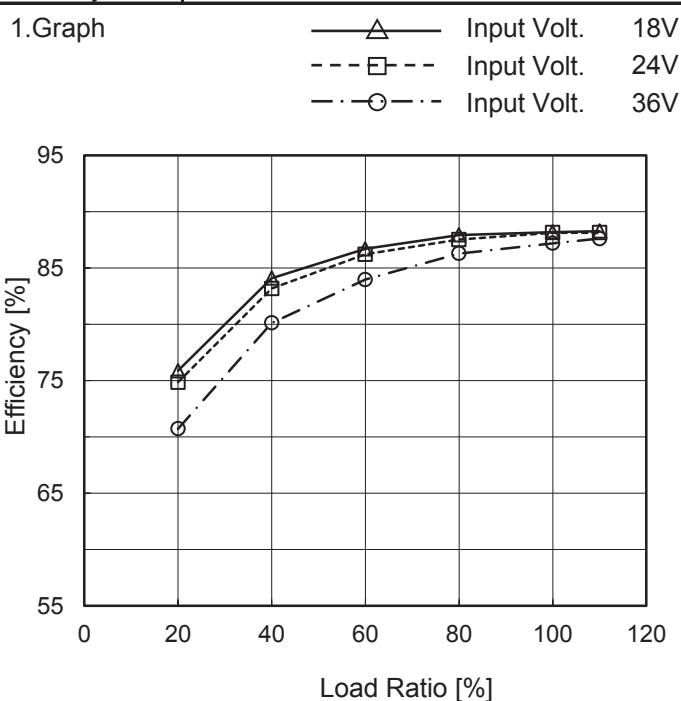
2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
17	85.8	88.3
18	85.4	88.2
20	85.2	88.2
24	84.5	88.1
30	84.0	87.8
36	82.9	87.2
40	81.6	86.9
--	-	-
--	-	-

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

COSEL

Model	MGW62415
Item	Efficiency (by Load Ratio)
Object	_____


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

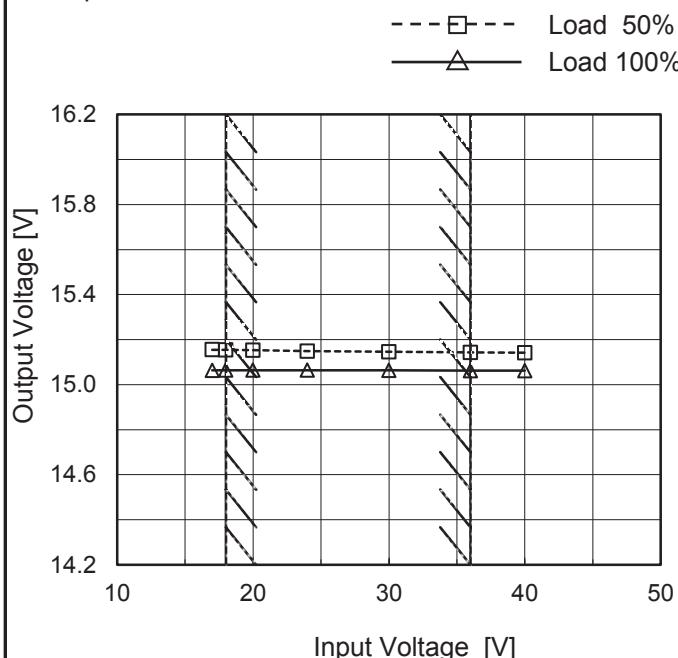
Load Ratio [%]	Efficiency [%]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	-	-	-
20	75.9	74.9	70.7
40	84.1	83.2	80.1
60	86.7	86.2	84.0
80	87.9	87.5	86.3
100	88.2	88.1	87.2
110	88.3	88.1	87.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	MGW62415
Item	Line Regulation
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



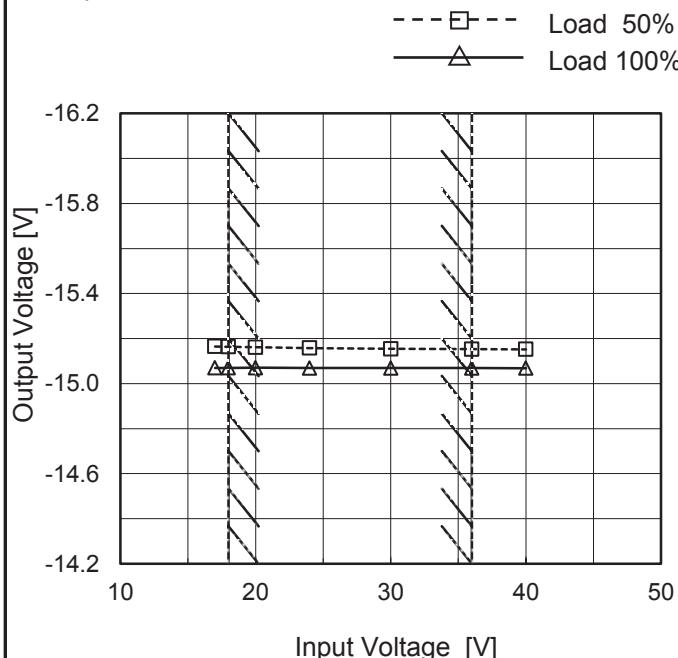
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	15.155	15.064
18	15.154	15.064
20	15.153	15.064
24	15.149	15.064
30	15.146	15.063
36	15.143	15.062
40	15.142	15.062
--	-	-
--	-	-

-15V: Rated Load Current

Object -15V0.2A

1.Graph

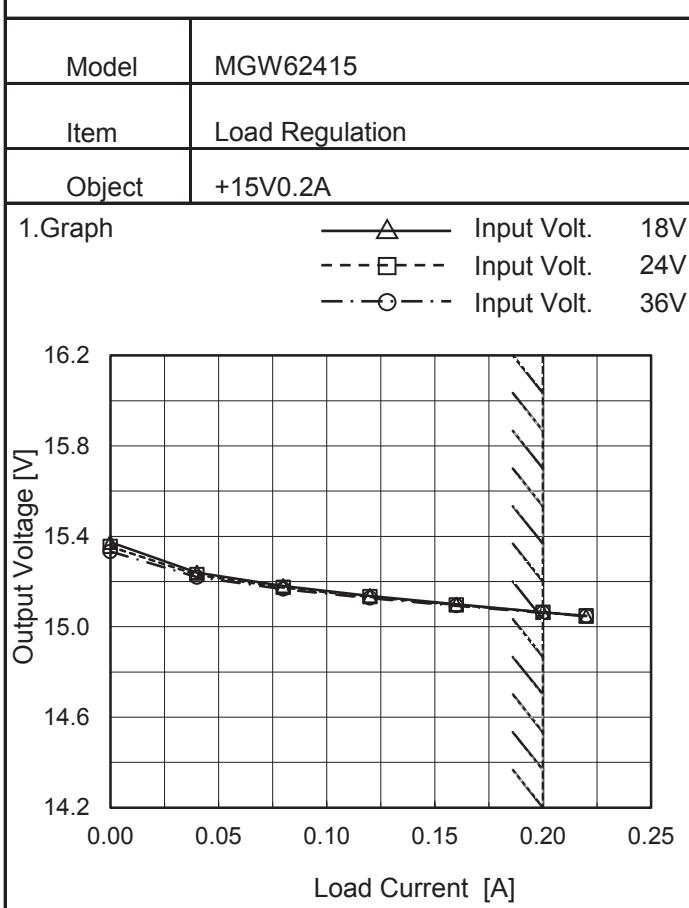


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	-15.165	-15.070
18	-15.164	-15.070
20	-15.162	-15.070
24	-15.158	-15.069
30	-15.155	-15.069
36	-15.153	-15.069
40	-15.152	-15.069
--	-	-
--	-	-

+15V: Rated Load Current

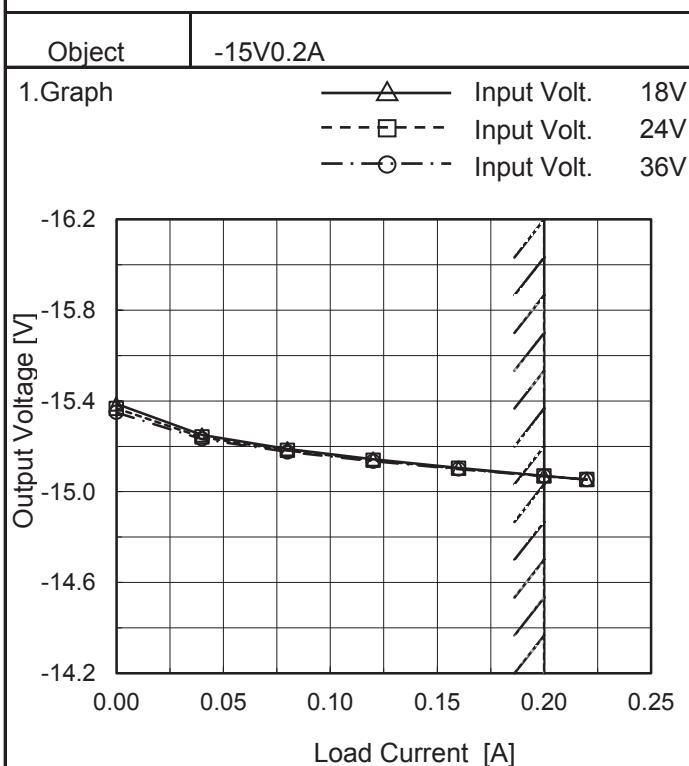
Note: Slanted line shows the range of the rated input voltage.

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 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	15.374	15.355	15.333
0.04	15.240	15.230	15.219
0.08	15.181	15.174	15.166
0.12	15.137	15.132	15.127
0.16	15.099	15.097	15.093
0.20	15.064	15.064	15.062
0.22	15.047	15.048	15.048
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current



2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	-15.387	-15.367	-15.350
0.04	-15.250	-15.240	-15.233
0.08	-15.188	-15.181	-15.176
0.12	-15.143	-15.138	-15.134
0.16	-15.105	-15.103	-15.100
0.20	-15.070	-15.069	-15.069
0.22	-15.053	-15.054	-15.054
--	-	-	-
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+15V: Rated Load Current

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

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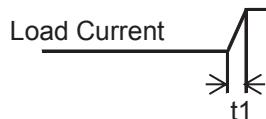
Model	MGW62415	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.2A		

Input Volt. 24 V

-15V:rated load current.

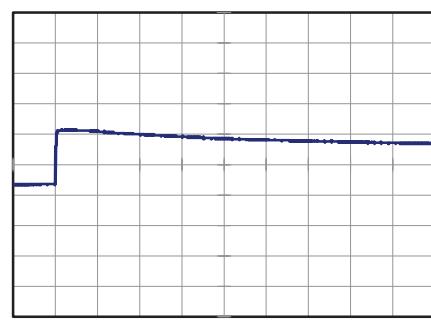
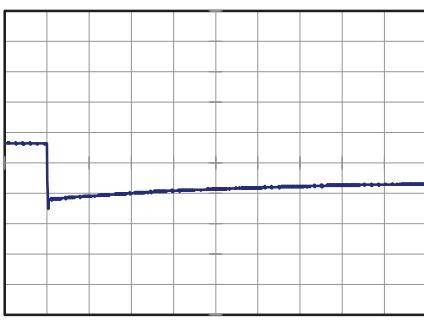
Cycle 100 ms

t1,t2 = 100 μ s



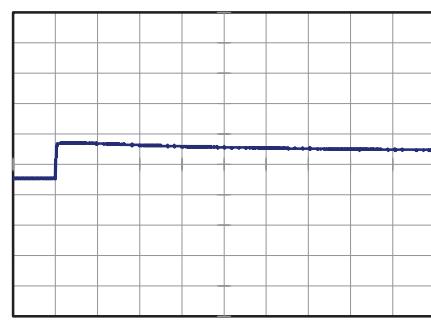
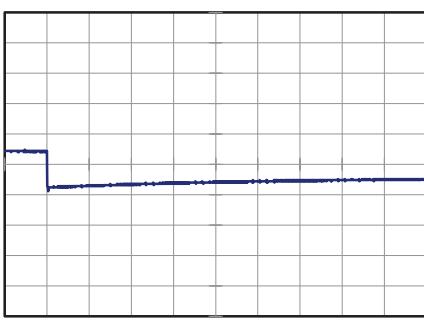
Min.Load (0A)↔
Load 100% (0.2A)

200 mV/div



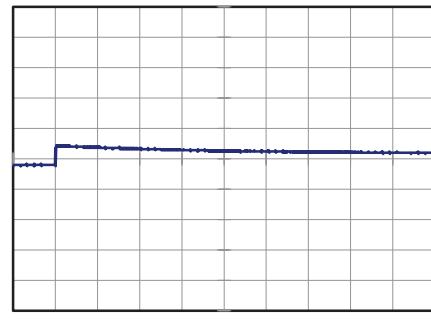
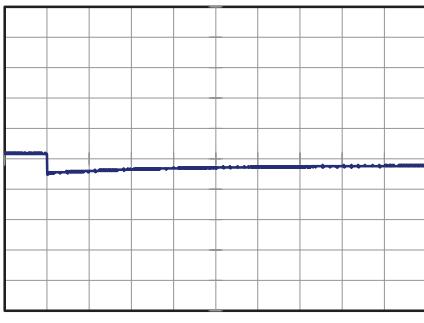
Min.Load (0A)↔
Load 50% (0.1A)

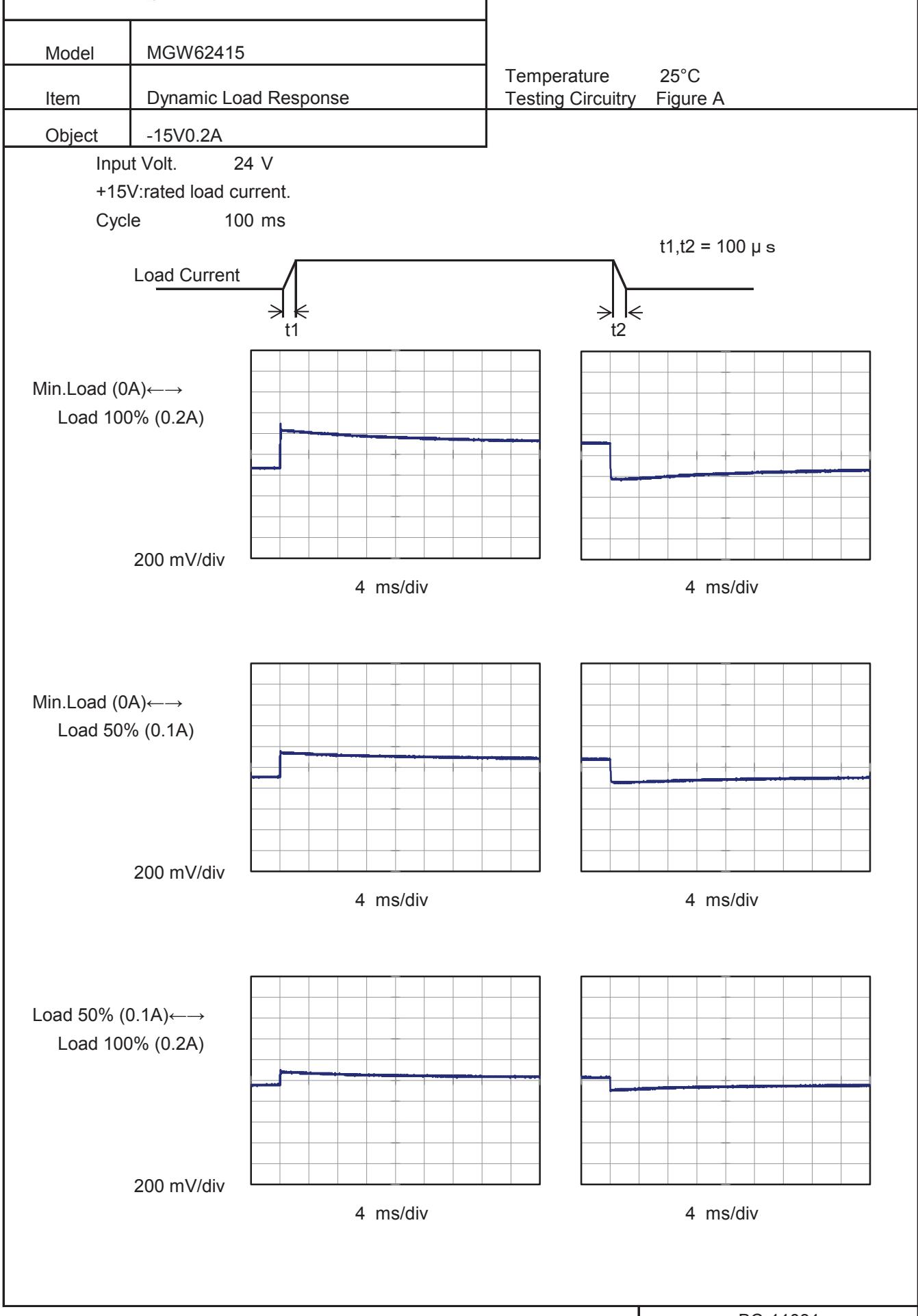
200 mV/div



Load 50% (0.1A)↔
Load 100% (0.2A)

200 mV/div



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Model	MGW62415																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	+15V0.2A																																							
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- 10 -		BC-11031																																						

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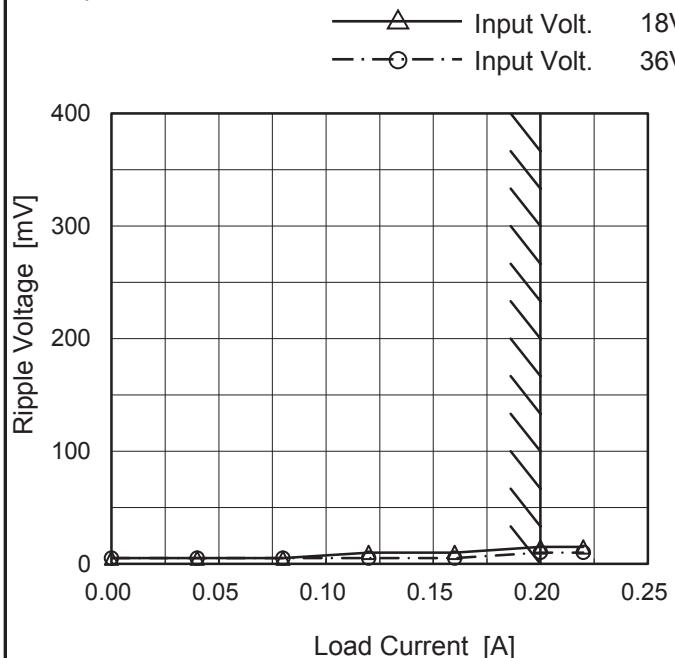
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<p>Fig.Complex Ripple Noise Wave Form</p>																																								

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Model	MGW62415
Item	Ripple-Noise
Object	-15V0.2A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	10	5
0.16	10	5
0.20	15	10
0.22	15	10
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

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]

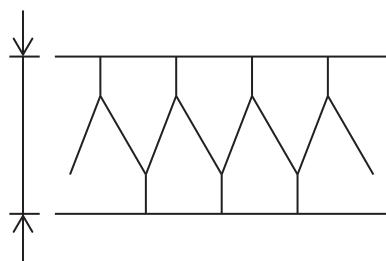
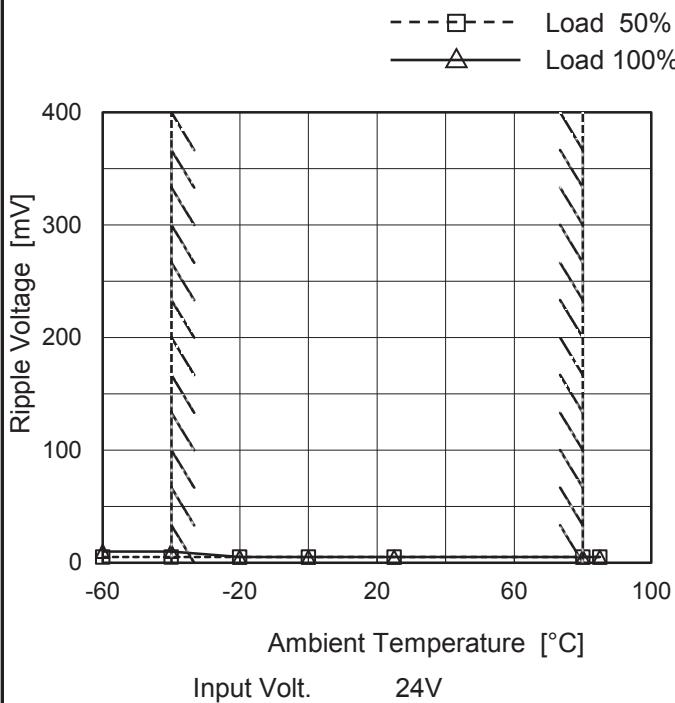


Fig.Complex Ripple Noise Wave Form

COSEL

Model	MGW62415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.2A

1.Graph



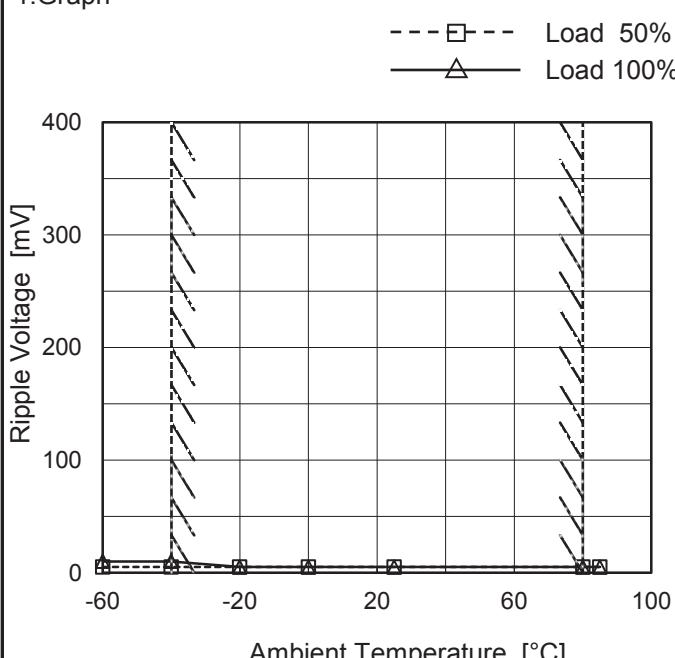
Testing Circuitry Figure B

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	10
-40	5	10
-20	5	5
0	5	5
25	5	5
80	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

1.Graph



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	10
-40	5	10
-20	5	5
0	5	5
25	5	5
80	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

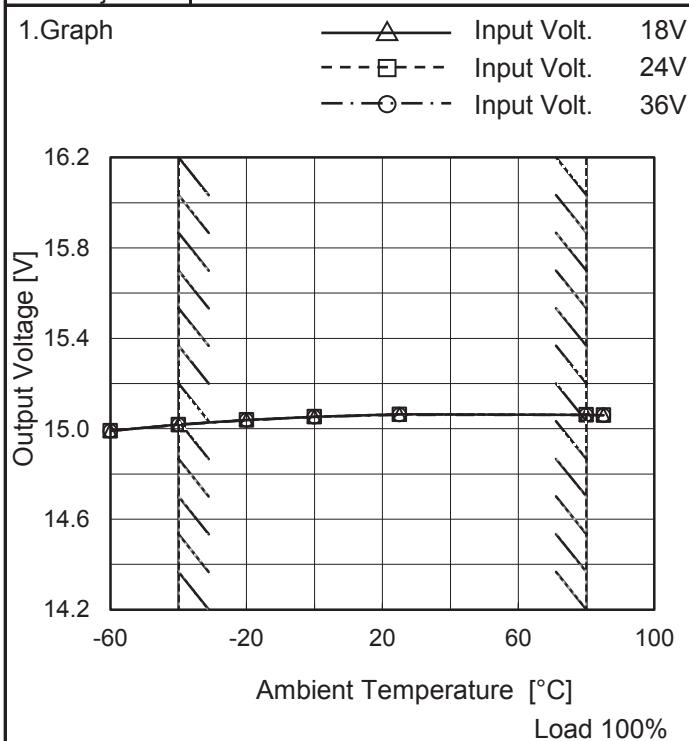
+15V: Rated Load Current

Measured by 100 MHz Oscilloscope.

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

COSEL

Model	MGW62415
Item	Ambient Temperature Drift
Object	+15V0.2A

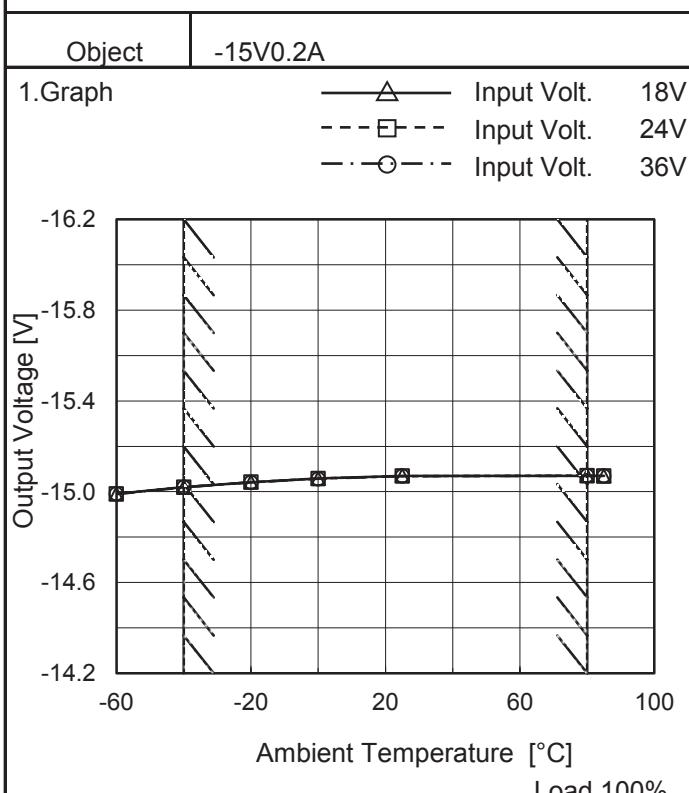


Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	14.991	14.991	14.990
-40	15.019	15.019	15.018
-20	15.039	15.039	15.038
0	15.054	15.054	15.053
25	15.064	15.064	15.062
80	15.062	15.062	15.061
85	15.060	15.060	15.060
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-14.991	-14.991	-14.990
-40	-15.020	-15.020	-15.019
-20	-15.042	-15.042	-15.041
0	-15.058	-15.058	-15.057
25	-15.070	-15.069	-15.069
80	-15.070	-15.071	-15.070
85	-15.069	-15.069	-15.069
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

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



Model	MGW62415	Testing Circuitry Figure A
Item	Output Voltage Accuracy	

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 : 18 - 36V

Load Current (AVR 1) : 0 - 0.2A (AVR 2) : 0 - 0.2A

* 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

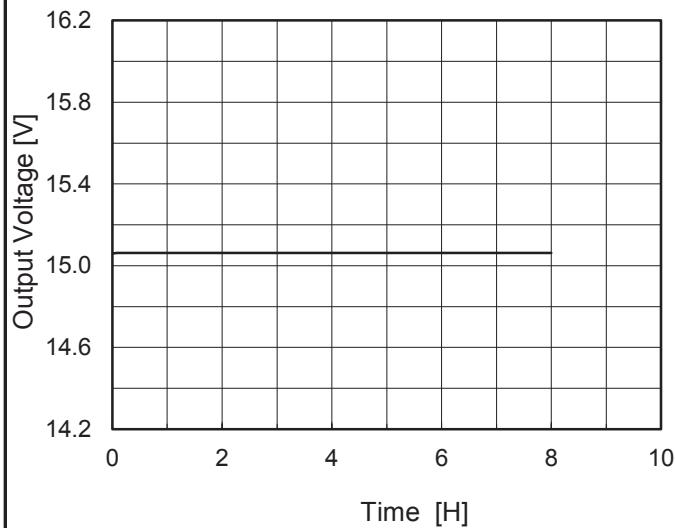
Object	+15V0.2A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	18		0	15.409		
Minimum Voltage	80	18		0.2	14.727	±341	±2.3

Object	-15V0.2A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	18		0	-15.424		
Minimum Voltage	80	18		0.2	-14.742	±341	±2.3

COSEL

Model	MGW62415
Item	Time Lapse Drift
Object	+15V0.2A

1.Graph



Temperature 25°C
Testing Circuitry Figure A

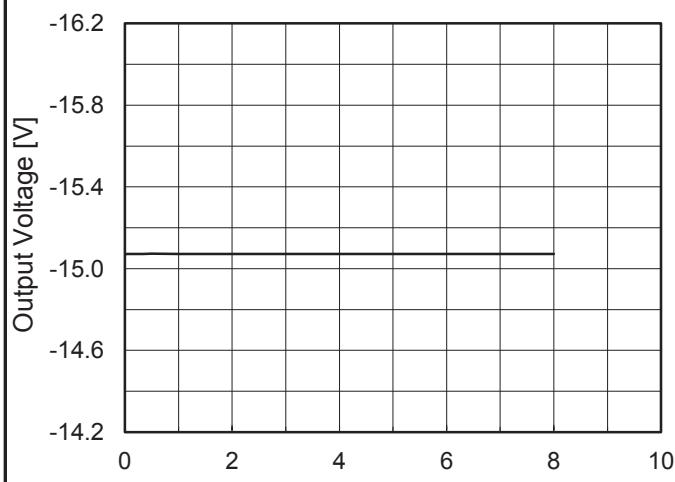
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.059
0.5	15.062
1.0	15.062
2.0	15.062
3.0	15.062
4.0	15.062
5.0	15.062
6.0	15.062
7.0	15.062
8.0	15.062

-15V: Rated Load Current

Object -15V0.2A

1.Graph



2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.068
0.5	-15.073
1.0	-15.073
2.0	-15.073
3.0	-15.073
4.0	-15.073
5.0	-15.073
6.0	-15.073
7.0	-15.073
8.0	-15.072

+15V: Rated Load Current

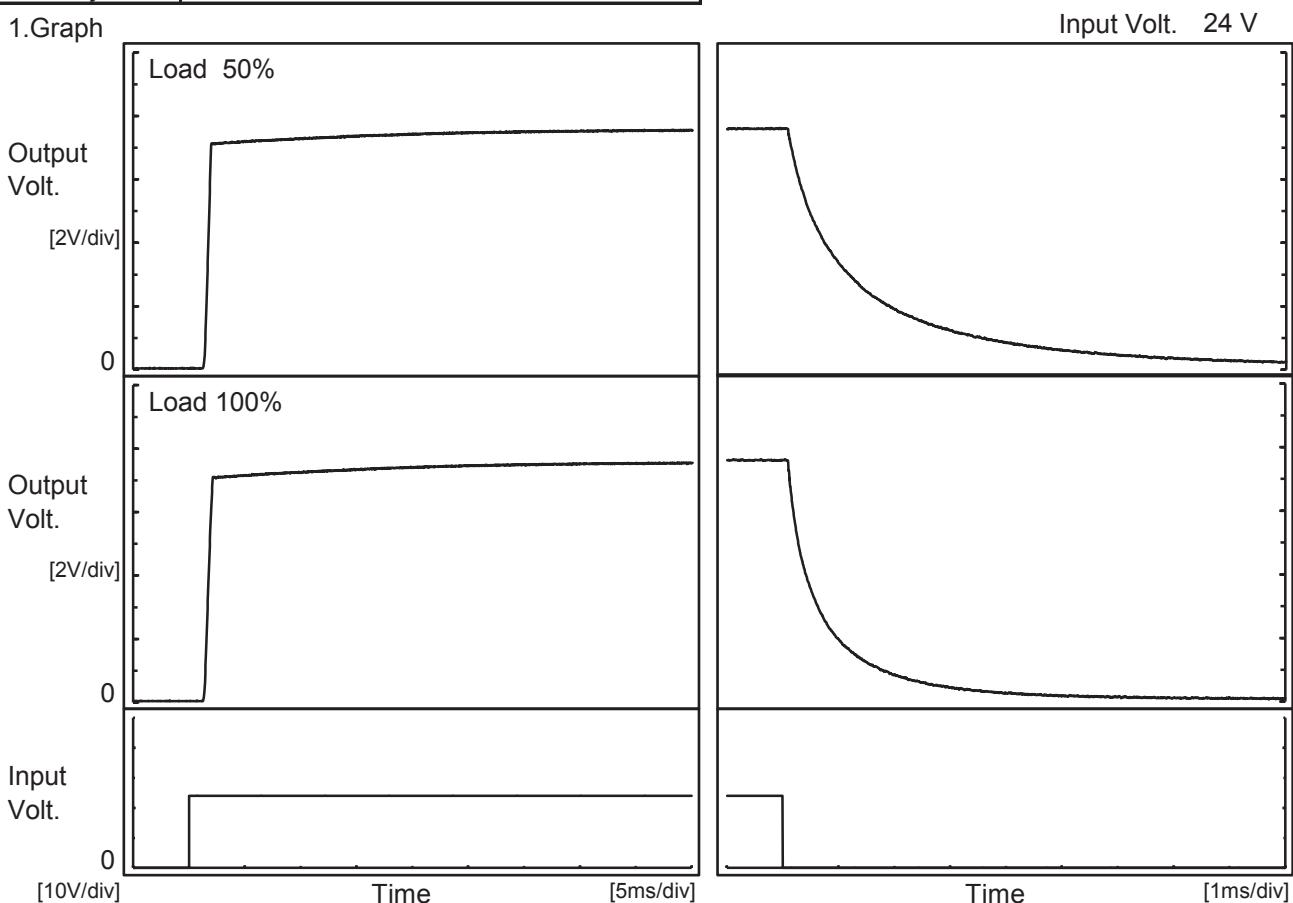
Input Volt. 24V
Load 100%

COSEL

Model	MGW62415
Item	Rise and Fall Time
Object	+15V0.2A

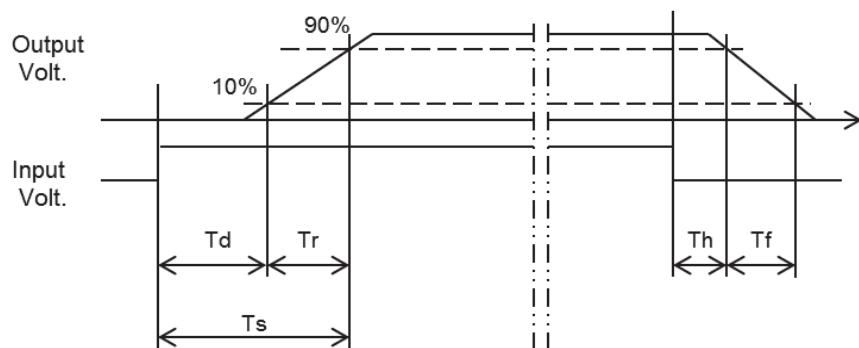
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		1.5	0.5	2.0	0.2	4.1	
100 %		1.5	0.7	2.2	0.1	2.0	

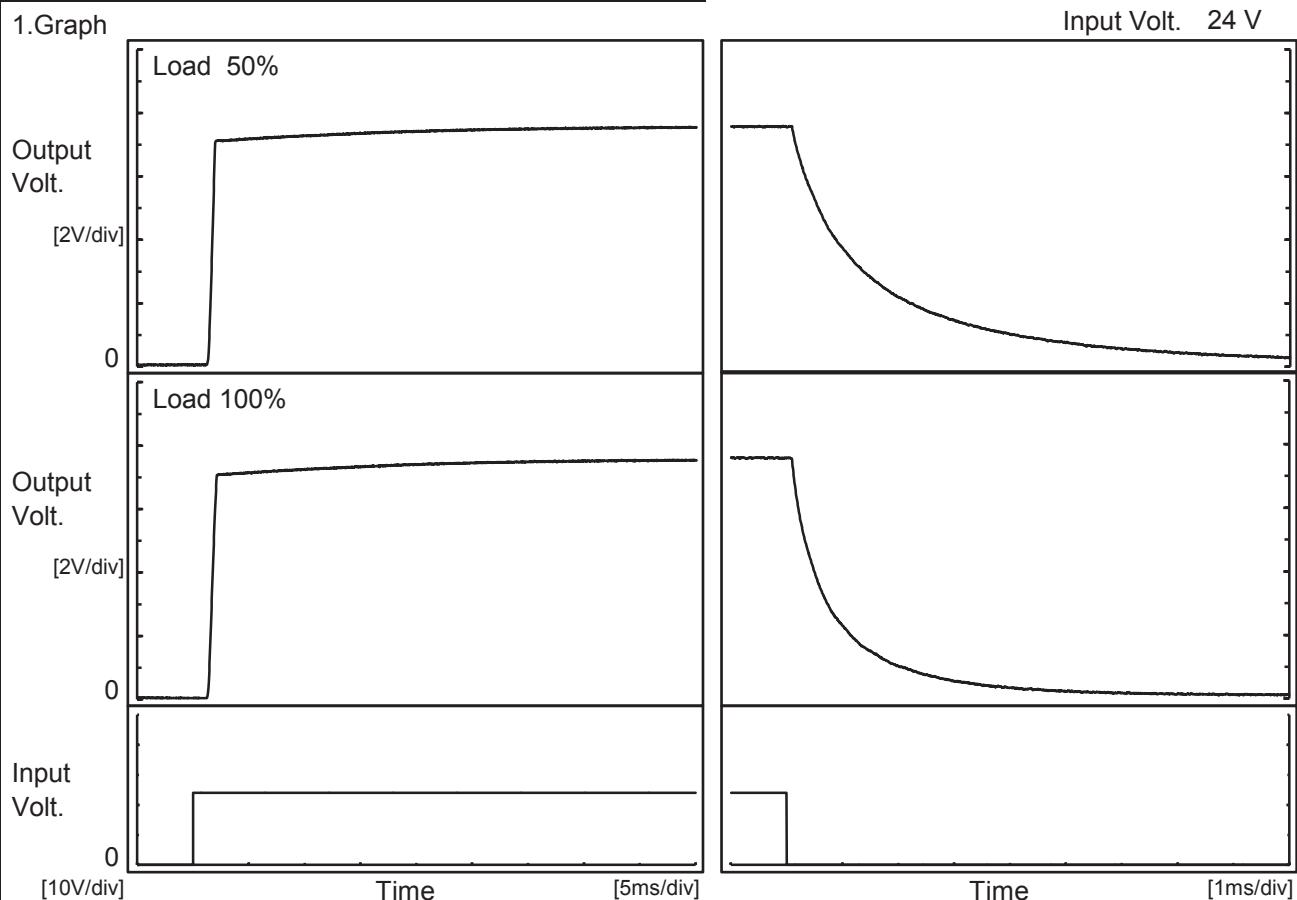


COSEL

Model	MGW62415
Item	Rise and Fall Time
Object	-15V0.2A

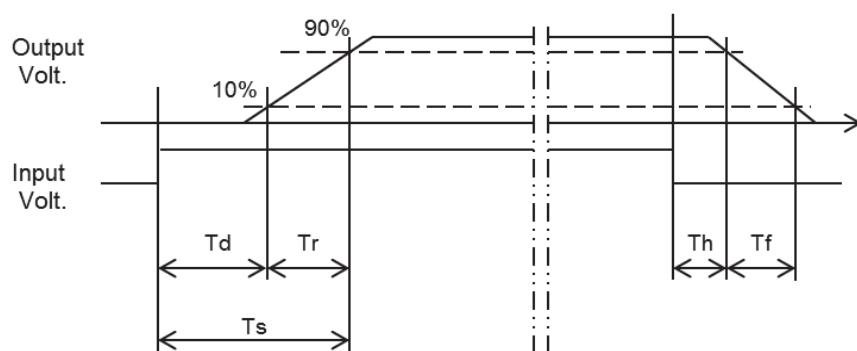
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

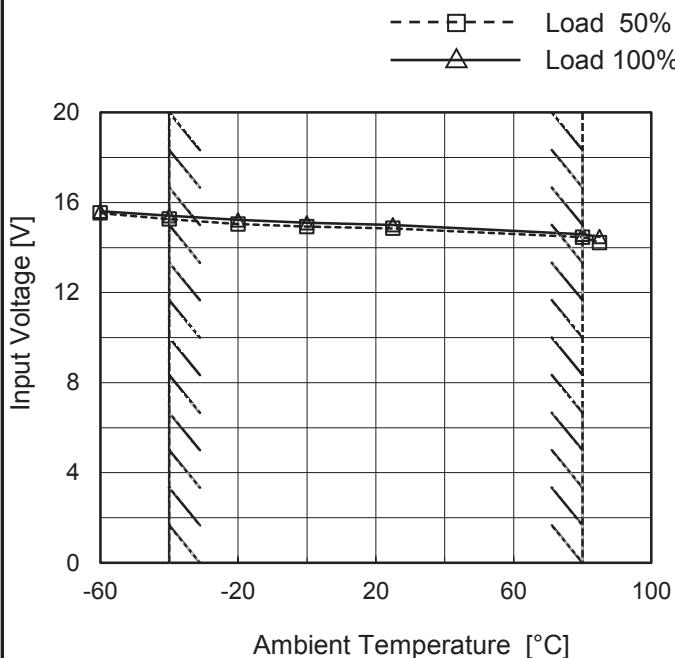
Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		1.5	0.5	2.0	0.2	4.7	
100 %		1.5	0.7	2.2	0.1	2.3	



COSEL

Model	MGW62415
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.2A

1.Graph



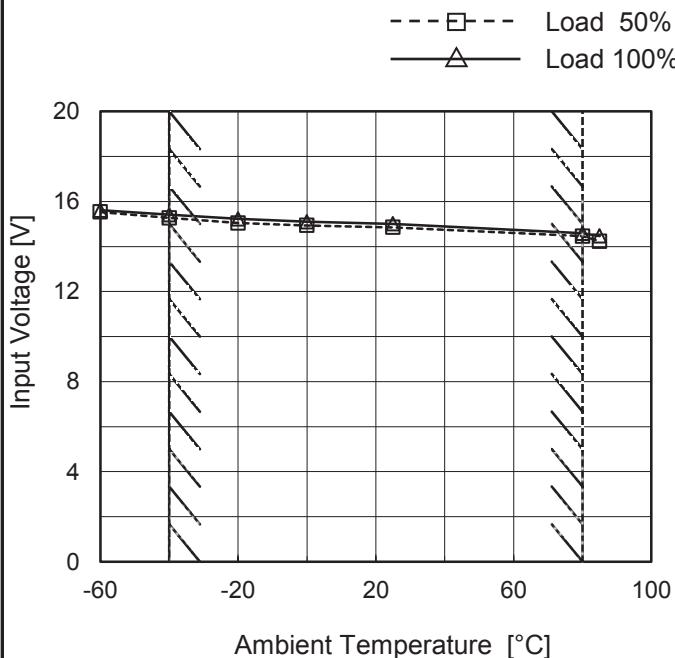
Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.6	15.7
-40	15.3	15.5
-20	15.1	15.3
0	15.0	15.1
25	14.9	15.1
80	14.5	14.6
85	14.3	14.5
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.2A
--------	----------

1.Graph



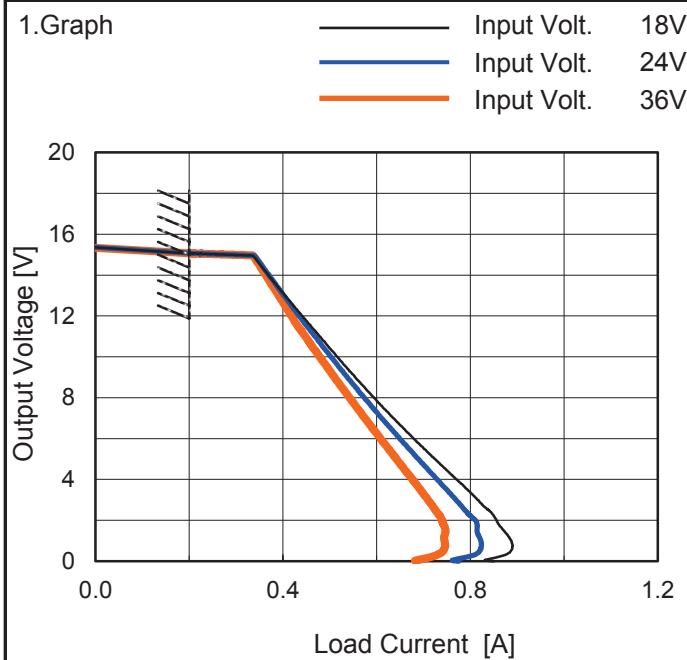
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.6	15.7
-40	15.3	15.5
-20	15.1	15.3
0	15.0	15.1
25	14.9	15.1
80	14.5	14.6
85	14.3	14.5
--	-	-
--	-	-
--	-	-
--	-	-

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

COSEL

Model	MGW62415
Item	Overcurrent Protection
Object	+15V0.2A

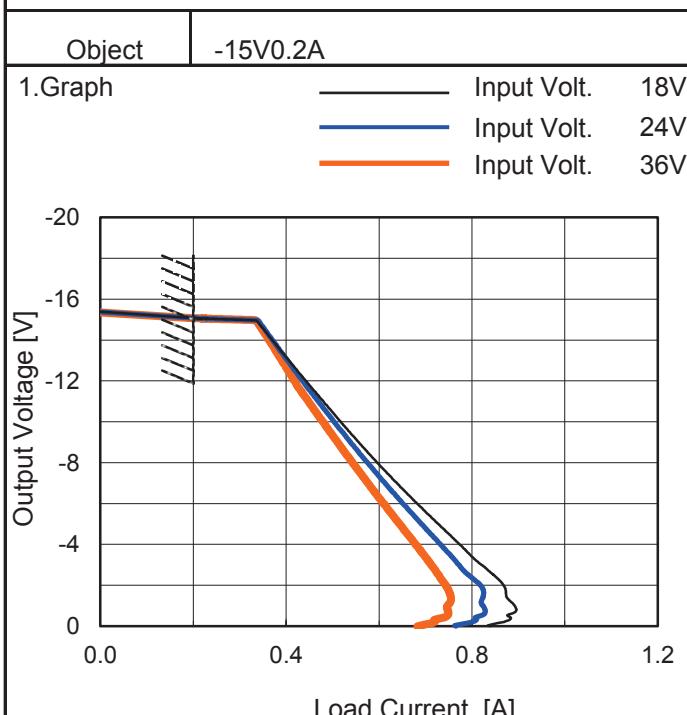


Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]		
	18[V]	24[V]	36[V]
14.25	0.36	0.36	0.36
13.50	0.39	0.39	0.38
12.00	0.44	0.43	0.42
10.50	0.50	0.48	0.46
9.00	0.55	0.54	0.51
7.50	0.61	0.59	0.56
6.00	0.68	0.65	0.61
4.50	0.75	0.71	0.66
3.00	0.82	0.77	0.71
1.50	0.87	0.81	0.75
0.00	0.85	0.78	0.69
--	-	-	-

-15V: Rated Load Current



2.Values

Output Voltage [V]	Load Current [A]		
	18[V]	24[V]	36[V]
-14.25	0.36	0.36	0.36
-13.50	0.39	0.39	0.38
-12.00	0.44	0.43	0.42
-10.50	0.50	0.48	0.46
-9.00	0.55	0.54	0.51
-7.50	0.62	0.59	0.56
-6.00	0.68	0.65	0.61
-4.50	0.75	0.71	0.66
-3.00	0.82	0.77	0.71
-1.50	0.87	0.83	0.75
0.00	0.84	0.77	0.68
--	-	-	-

+15V: Rated Load Current

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

COSEL

Model	MGW62415	Temperature	25°C																																																			
Item	Switching Frequency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	+/-15V0.2A																																																					
1.Graph	<p>—△— Input Volt. 18V - - - □ - - Input Volt. 24V - - ○ - - Input Volt. 36V</p>																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Frequency [kHz]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>836</td><td>888</td><td>893</td></tr> <tr><td>0.04</td><td>558</td><td>628</td><td>704</td></tr> <tr><td>0.08</td><td>418</td><td>485</td><td>559</td></tr> <tr><td>0.12</td><td>334</td><td>394</td><td>465</td></tr> <tr><td>0.16</td><td>279</td><td>332</td><td>397</td></tr> <tr><td>0.20</td><td>239</td><td>288</td><td>347</td></tr> <tr><td>0.22</td><td>223</td><td>269</td><td>327</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Frequency [kHz]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	836	888	893	0.04	558	628	704	0.08	418	485	559	0.12	334	394	465	0.16	279	332	397	0.20	239	288	347	0.22	223	269	327	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Frequency [kHz]																																																					
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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.																																																						

COSEL

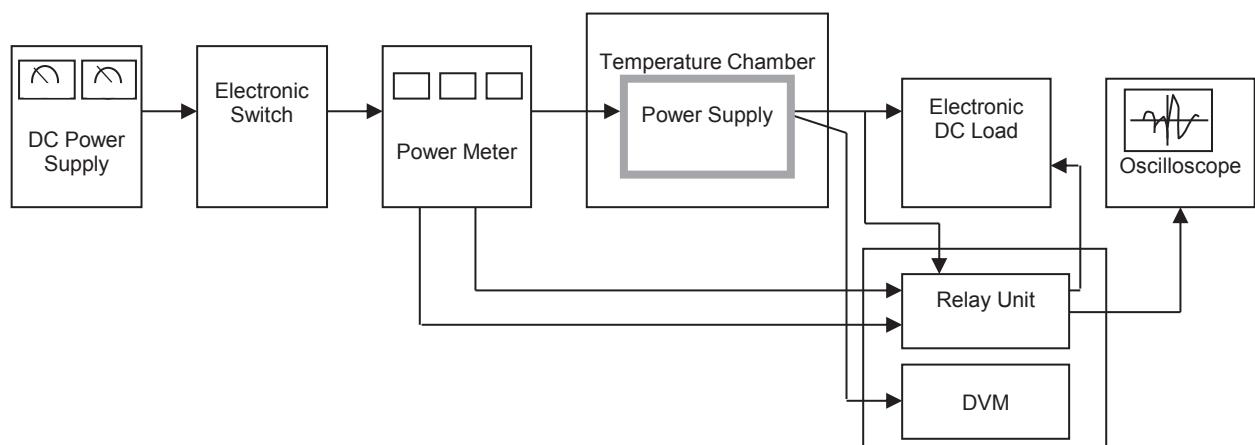


Figure A

Data Acquisition/Control Unit

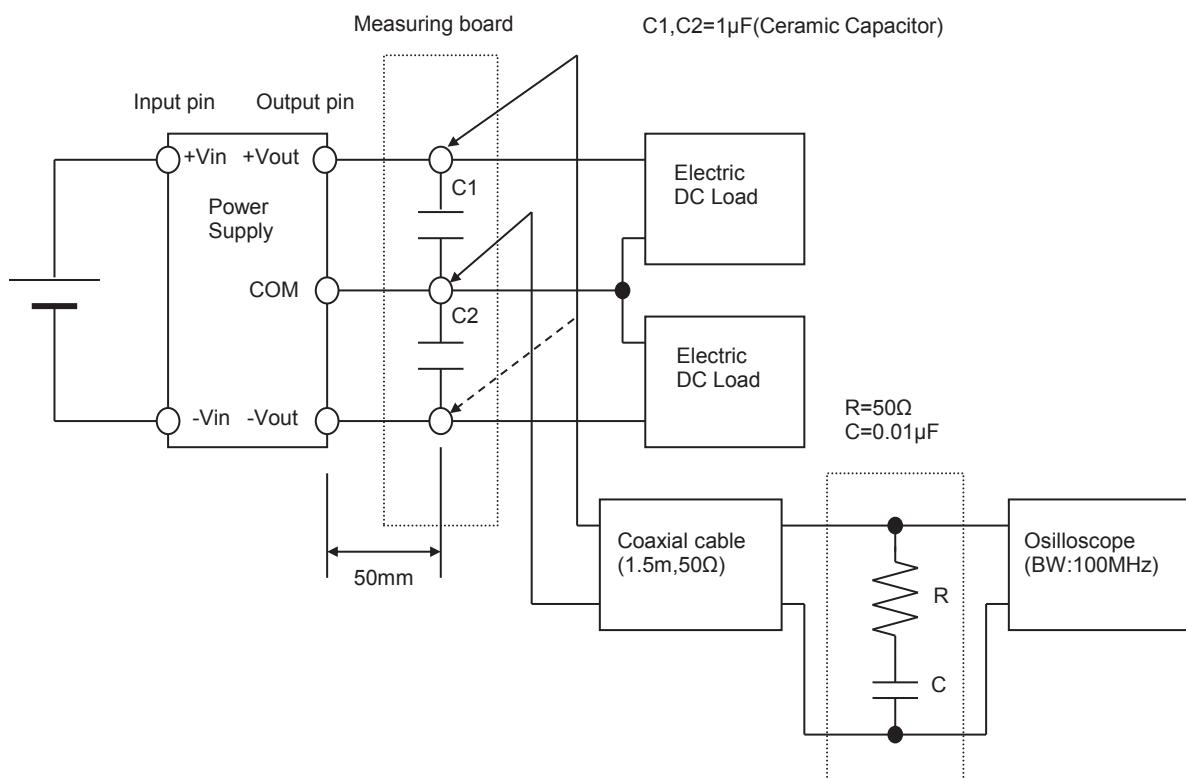


Figure B (Ripple and Ripple noise Characteristic)