

TEST DATA OF MGW34815

Regulated DC Power Supply
November 1, 2016

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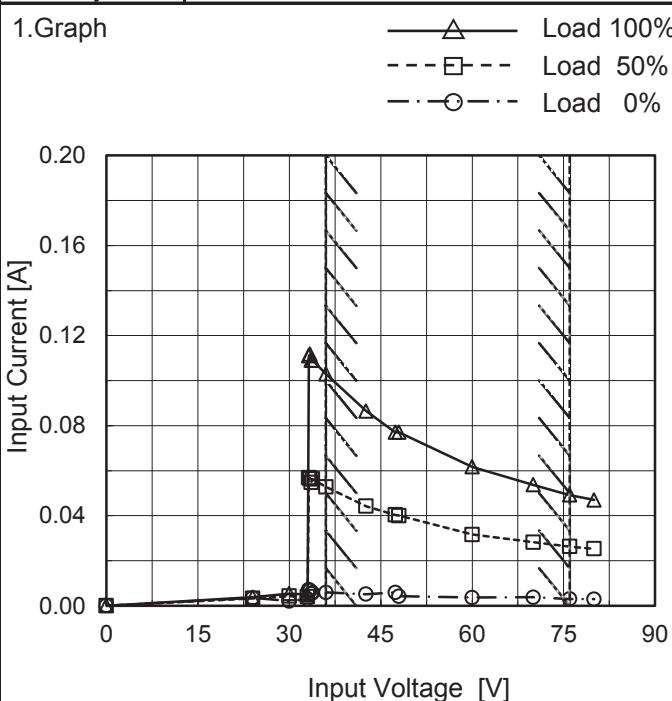
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COSEL

Model	MGW34815
Item	Input Current (by Input Voltage)
Object	_____



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

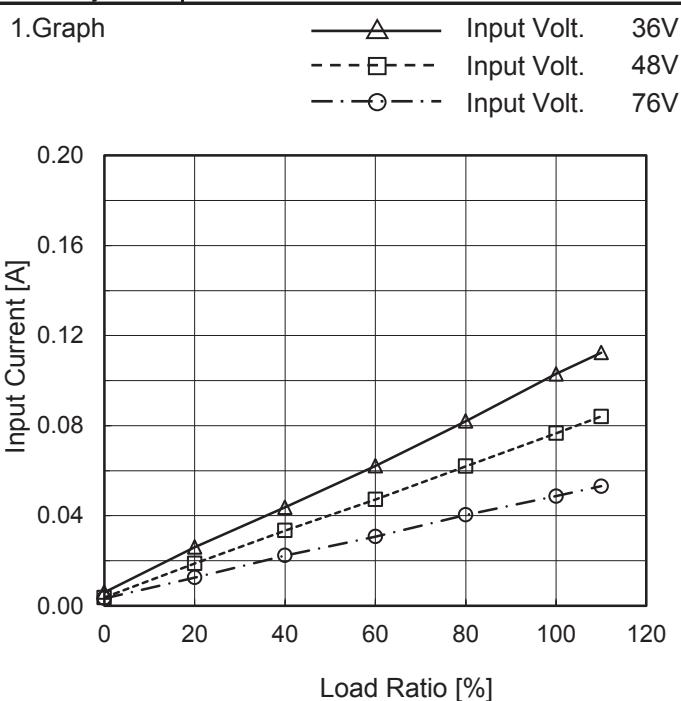
Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
24.0	0.004	0.003	0.004
30.0	0.002	0.004	0.005
33.0	0.003	0.004	0.005
33.2	0.007	0.057	0.111
33.4	0.007	0.057	0.112
33.6	0.005	0.055	0.109
33.8	0.006	0.056	0.109
36.0	0.006	0.053	0.103
42.6	0.005	0.044	0.087
47.4	0.006	0.040	0.077
48.0	0.004	0.040	0.077
60.0	0.004	0.032	0.062
70.0	0.004	0.028	0.054
76.0	0.003	0.026	0.049
80.0	0.003	0.025	0.047
--	-	-	-
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COSEL

Model	MGW34815
Item	Input Current (by Load Ratio)
Object	_____


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

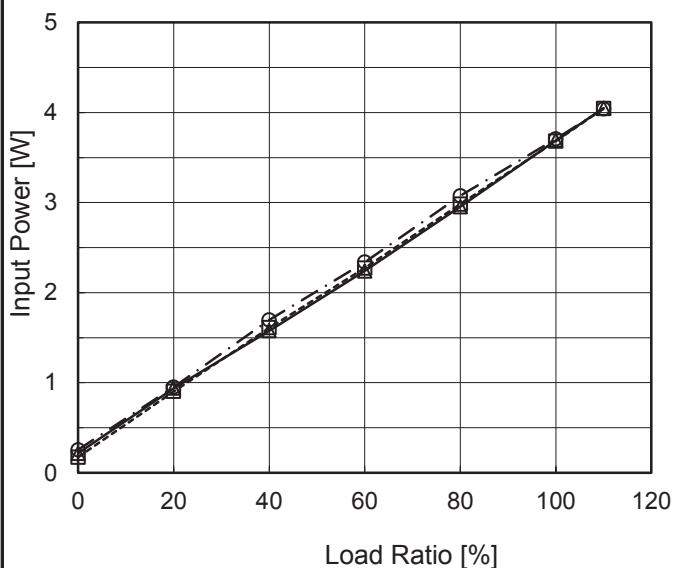
Load Ratio [%]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.006	0.004	0.003
20	0.026	0.019	0.013
40	0.044	0.033	0.022
60	0.062	0.047	0.031
80	0.082	0.062	0.040
100	0.103	0.077	0.049
110	0.112	0.084	0.053
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW34815
Item	Input Power (by Load Ratio)
Object	_____

1.Graph

—△— Input Volt. 36V
 - - - □- - - Input Volt. 48V
 - - ○ - - Input Volt. 76V


 Temperature 25°C
 Testing Circuitry Figure A

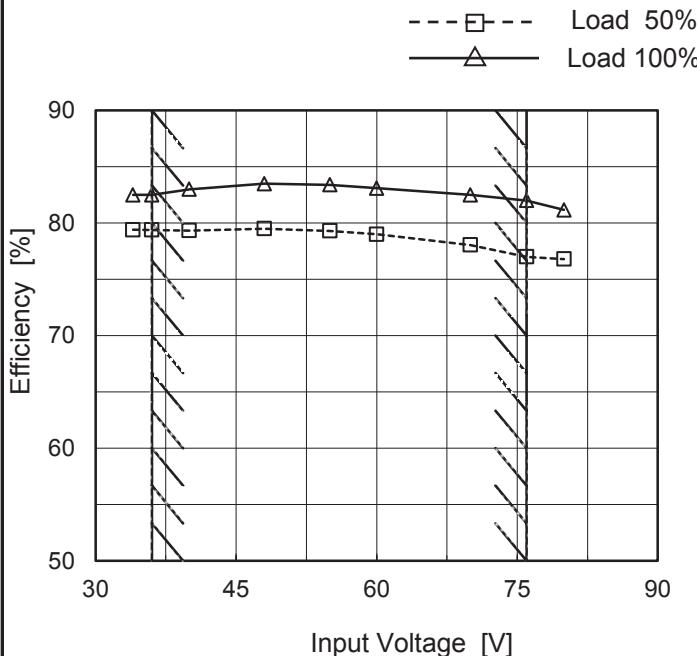
2.Values

Load Ratio [%]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.22	0.17	0.25
20	0.94	0.90	0.95
40	1.58	1.61	1.70
60	2.24	2.27	2.34
80	2.95	2.98	3.08
100	3.69	3.68	3.71
110	4.05	4.04	4.04
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW34815
Item	Efficiency (by Input Voltage)
Object	_____

1.Graph



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

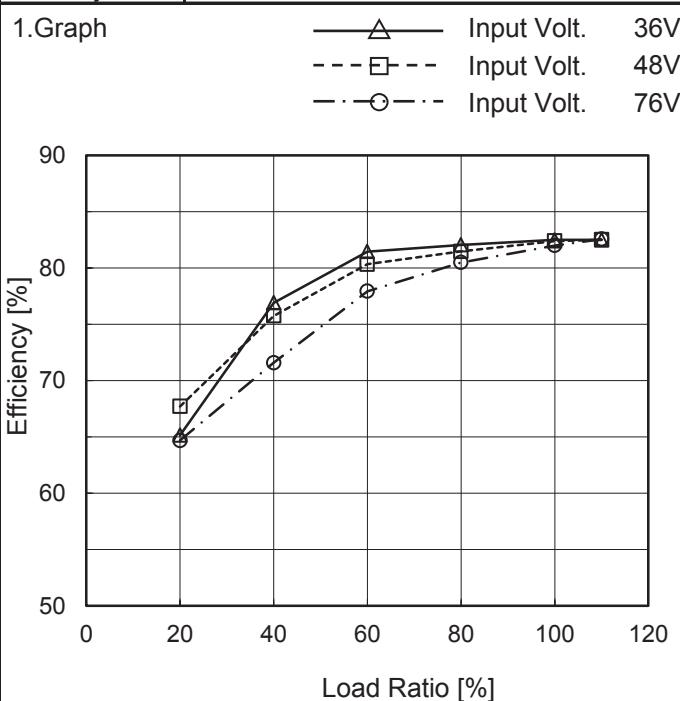
Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
34	79.4	82.5
36	79.4	82.5
40	79.3	83.0
48	79.5	83.5
55	79.3	83.4
60	79.0	83.1
70	78.1	82.5
76	77.0	82.0
80	76.8	81.2

COSEL

Model	MGW34815
Item	Efficiency (by Load Ratio)
Object	_____


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

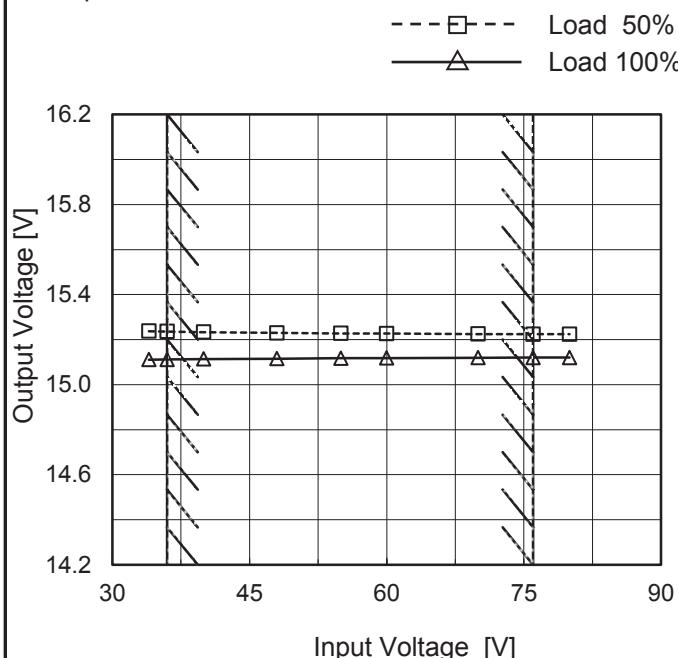
Load Ratio [%]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-
20	65.1	67.7	64.7
40	76.9	75.8	71.6
60	81.5	80.3	77.9
80	82.1	81.5	80.5
100	82.5	82.4	82.0
110	82.5	82.5	82.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW34815
Item	Line Regulation
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



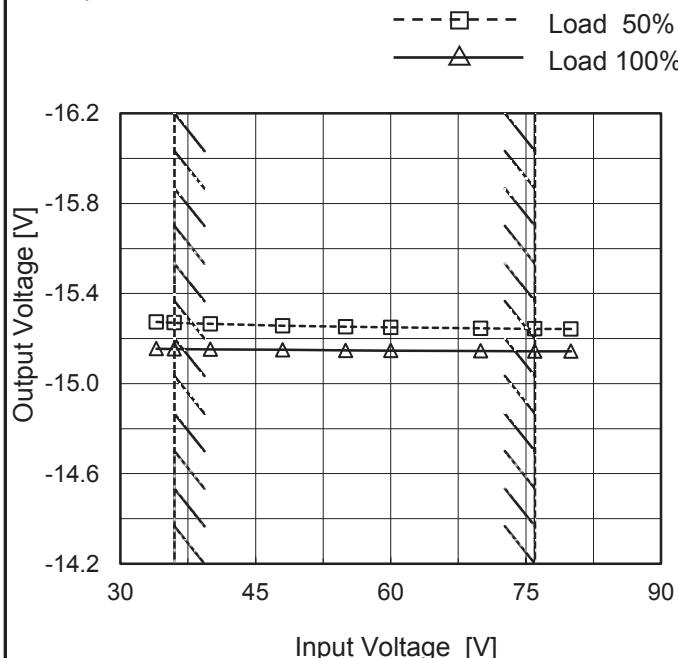
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
34	15.237	15.111
36	15.236	15.112
40	15.233	15.114
48	15.230	15.115
55	15.228	15.117
60	15.227	15.118
70	15.225	15.120
76	15.224	15.120
80	15.224	15.120

-15V: Rated Load Current

Object -15V0.1A

1.Graph

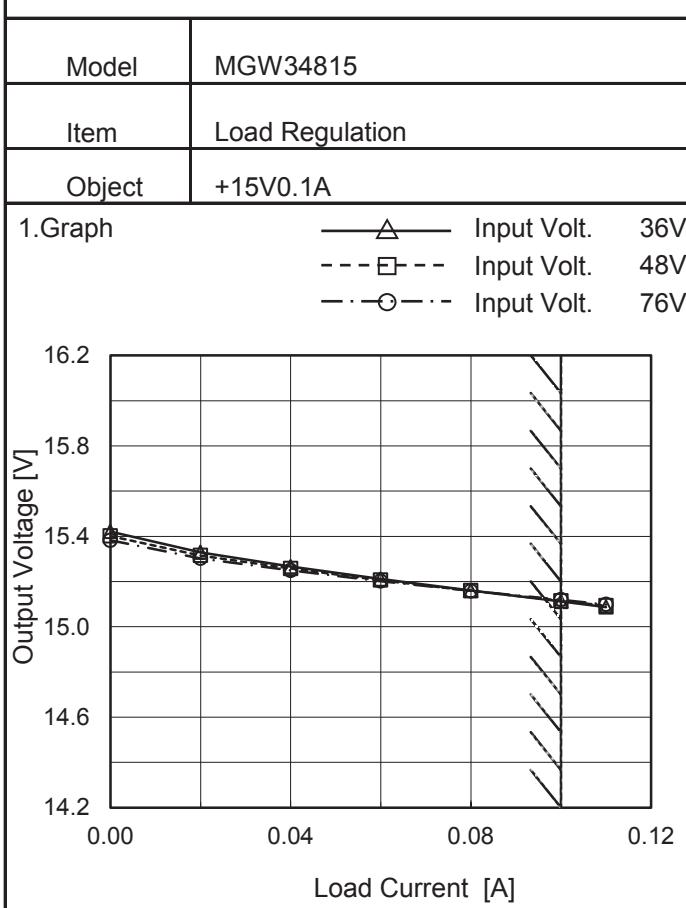


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
34	-15.274	-15.155
36	-15.270	-15.154
40	-15.265	-15.152
48	-15.257	-15.150
55	-15.252	-15.148
60	-15.249	-15.147
70	-15.245	-15.145
76	-15.243	-15.144
80	-15.242	-15.143

+15V: Rated Load Current

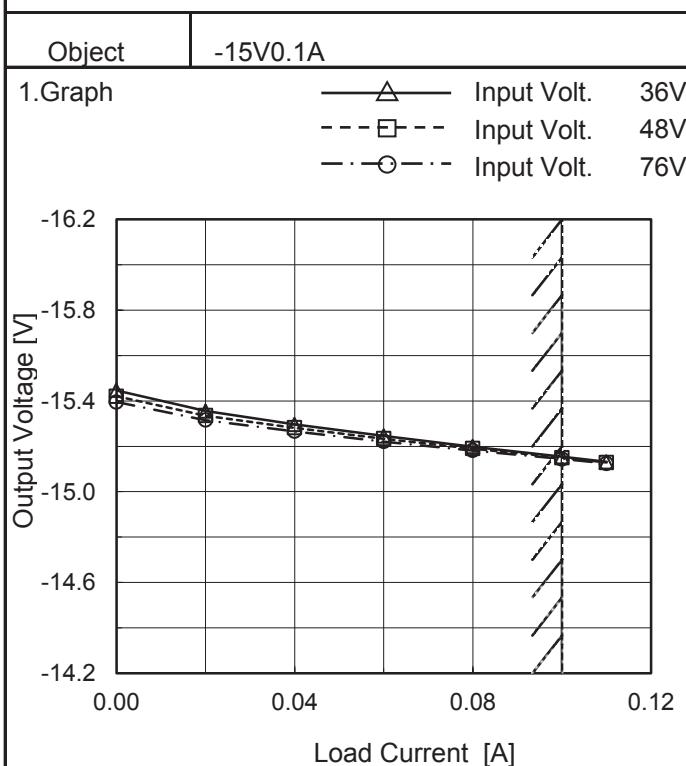
Note: Slanted line shows the range of the rated input voltage.

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 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	15.421	15.401	15.382
0.02	15.329	15.315	15.302
0.04	15.266	15.258	15.249
0.06	15.211	15.207	15.202
0.08	15.160	15.160	15.159
0.10	15.112	15.115	15.120
0.11	15.088	15.093	15.099
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--	-	-	-
--	-	-	-

-15V: Rated Load Current

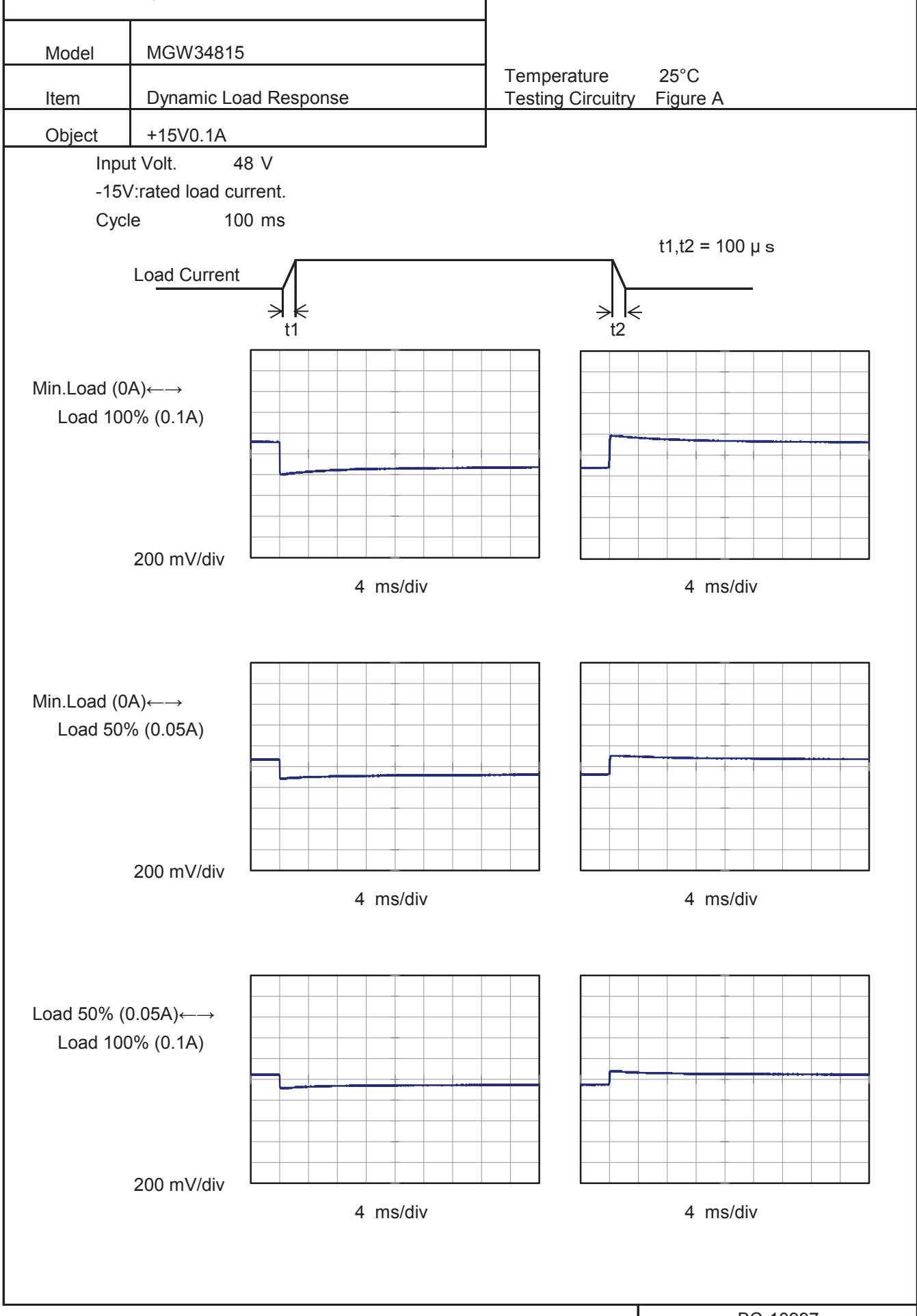


2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	-15.446	-15.421	-15.395
0.02	-15.355	-15.336	-15.316
0.04	-15.297	-15.281	-15.266
0.06	-15.246	-15.234	-15.221
0.08	-15.198	-15.190	-15.181
0.10	-15.154	-15.150	-15.144
0.11	-15.132	-15.129	-15.124
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

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

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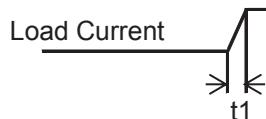
Model	MGW34815	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-15V0.1A		

Input Volt. 48 V

+15V:rated load current.

Cycle 100 ms

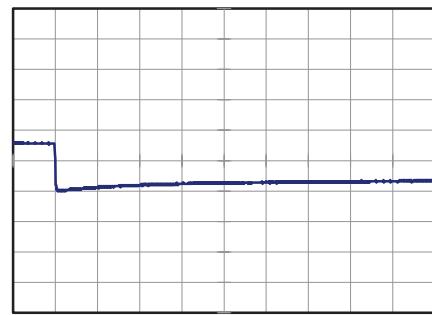
t1,t2 = 100 μ s

Load Current


Min.Load (0A)↔
Load 100% (0.1A)

200 mV/div

4 ms/div

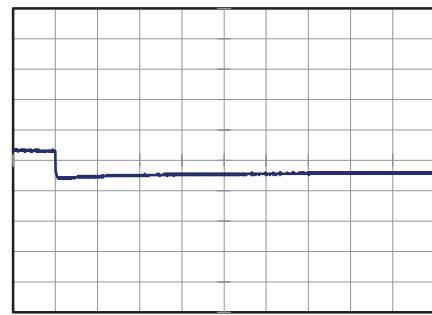


4 ms/div

Min.Load (0A)↔
Load 50% (0.05A)

200 mV/div

4 ms/div

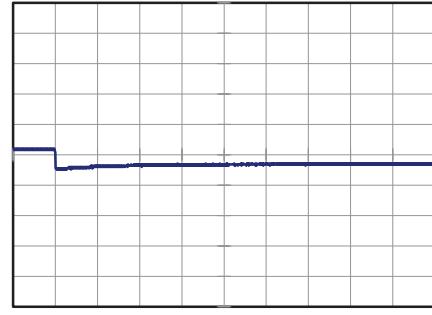


4 ms/div

Load 50% (0.05A)↔
Load 100% (0.1A)

200 mV/div

4 ms/div



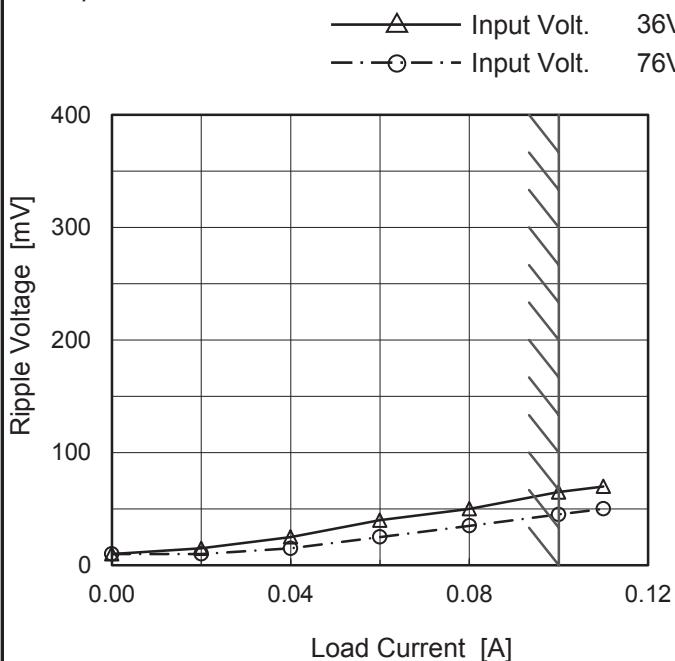
4 ms/div

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Model	MGW34815
Item	Ripple Voltage (by Load Current)
Object	+15V0.1A

 Temperature 25°C
 Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	10	10
0.02	15	10
0.04	25	15
0.06	40	25
0.08	50	35
0.10	65	45
0.11	70	50
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

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]

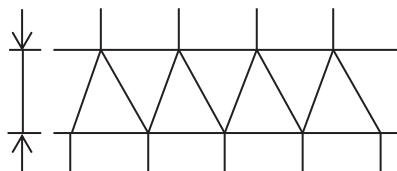


Fig.Complex Ripple Wave Form

COSEL

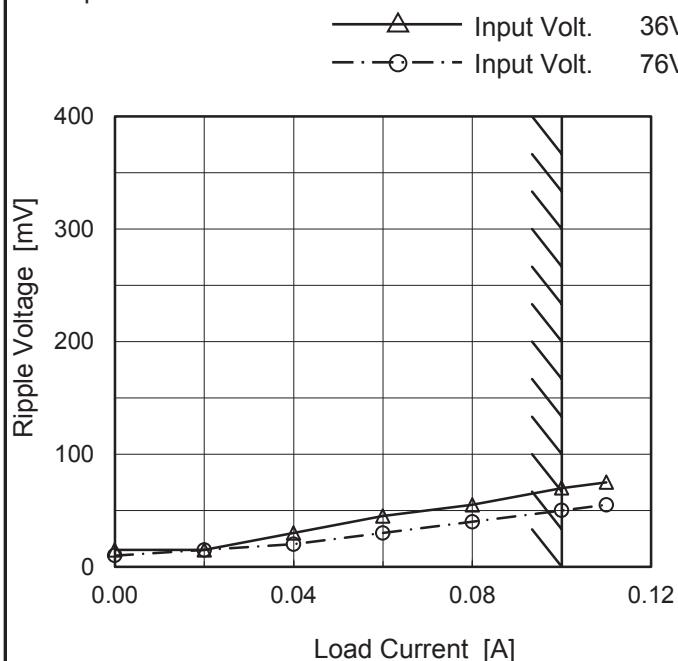
Model	MGW34815																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	-15V0.1A																																							
1.Graph																																								
2.Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 36 [V]</th> <th>Input Volt. 76 [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>10</td><td>10</td></tr> <tr><td>0.02</td><td>15</td><td>10</td></tr> <tr><td>0.04</td><td>25</td><td>15</td></tr> <tr><td>0.06</td><td>40</td><td>25</td></tr> <tr><td>0.08</td><td>50</td><td>35</td></tr> <tr><td>0.10</td><td>65</td><td>45</td></tr> <tr><td>0.11</td><td>70</td><td>50</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 Voltage [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.00	10	10	0.02	15	10	0.04	25	15	0.06	40	25	0.08	50	35	0.10	65	45	0.11	70	50	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 36 [V]	Input Volt. 76 [V]																																						
0.00	10	10																																						
0.02	15	10																																						
0.04	25	15																																						
0.06	40	25																																						
0.08	50	35																																						
0.10	65	45																																						
0.11	70	50																																						
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+15V: Rated Load Current																																								
<p>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.</p>																																								
<p>Ripple [mVp-p]</p>																																								
<p>Fig.Complex Ripple Wave Form</p>																																								

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Model	MGW34815
Item	Ripple-Noise
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	15	10
0.02	15	15
0.04	30	20
0.06	45	30
0.08	55	40
0.10	70	50
0.11	75	55
--	-	-
--	-	-
--	-	-
--	-	-

-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]

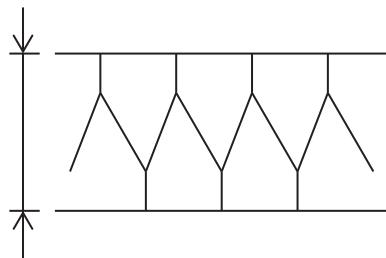


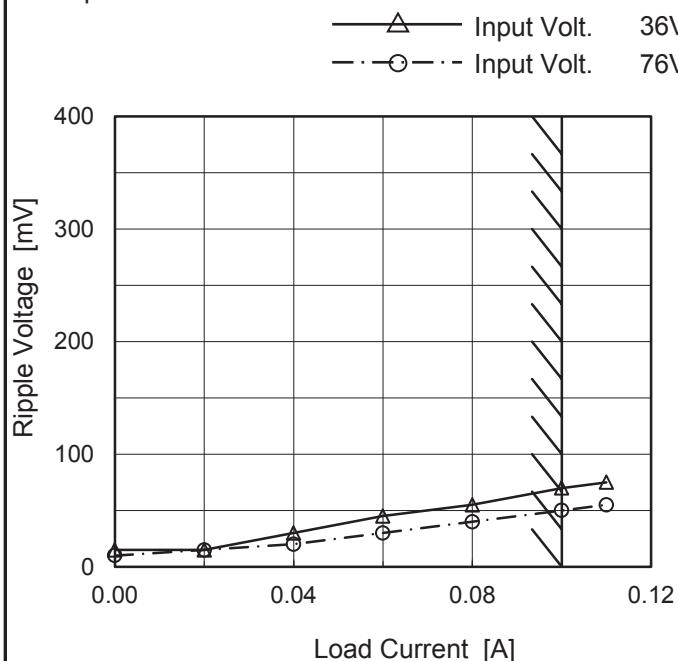
Fig.Complex Ripple Noise Wave Form

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Model	MGW34815
Item	Ripple-Noise
Object	-15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	15	10
0.02	15	15
0.04	30	20
0.06	45	30
0.08	55	40
0.10	70	50
0.11	75	55
--	-	-
--	-	-
--	-	-
--	-	-

+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]

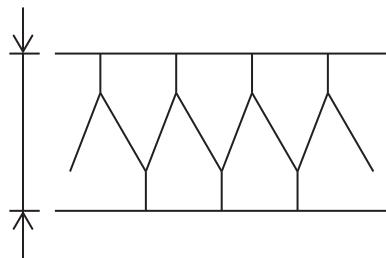
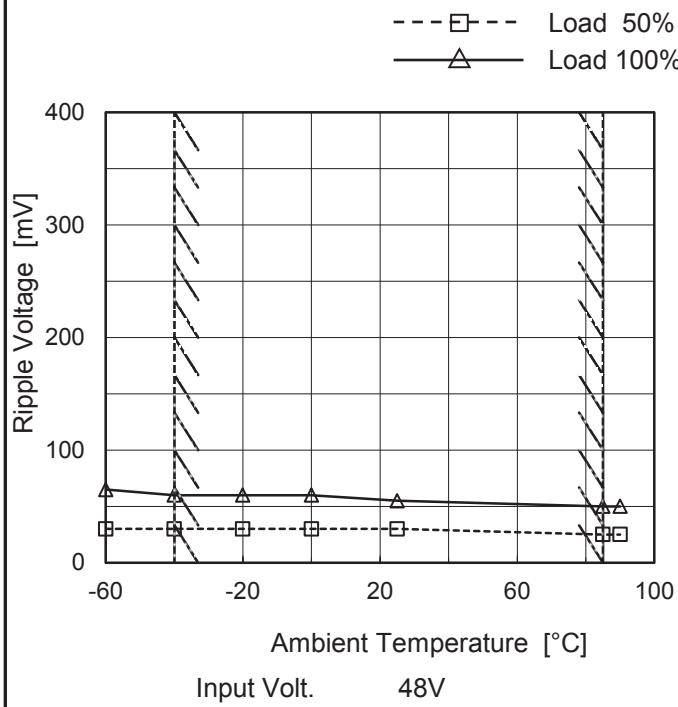


Fig.Complex Ripple Noise Wave Form

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Model	MGW34815
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.1A

1.Graph



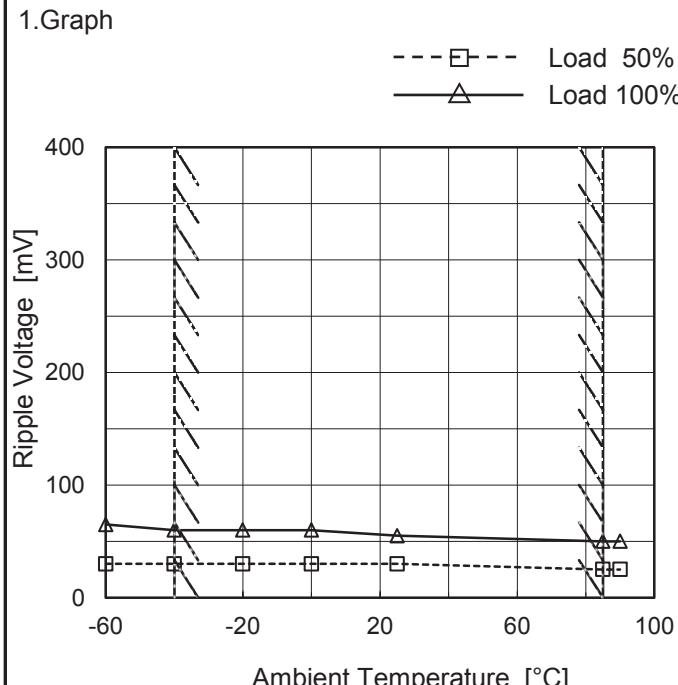
Testing Circuitry Figure B

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	65
-40	30	60
-20	30	60
0	30	60
25	30	55
85	25	50
90	25	50
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

1.Graph



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	65
-40	30	60
-20	30	60
0	30	60
25	30	55
85	25	50
90	25	50
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

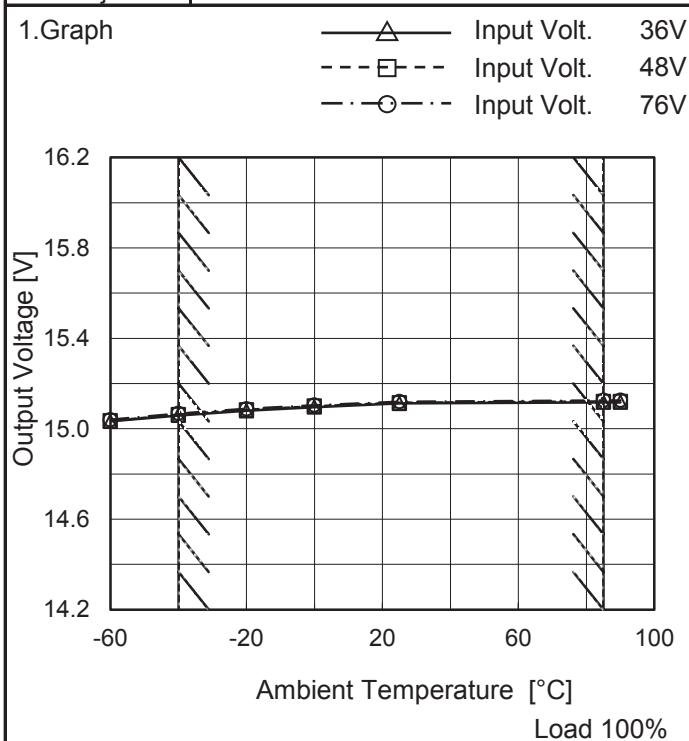
+15V: Rated Load Current

Measured by 100 MHz Oscilloscope.

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

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Model	MGW34815
Item	Ambient Temperature Drift
Object	+15V0.1A

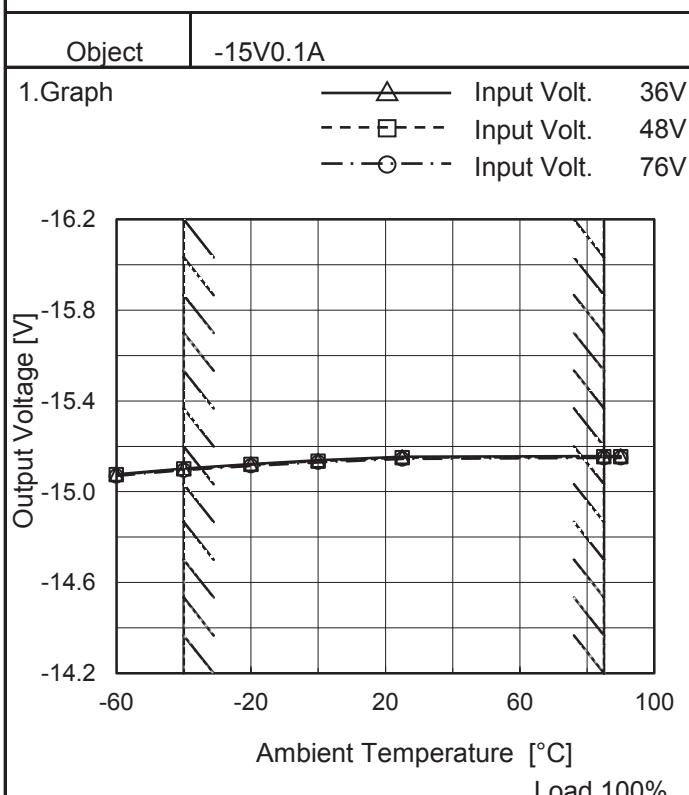


Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	15.033	15.035	15.040
-40	15.059	15.062	15.067
-20	15.079	15.084	15.088
0	15.096	15.100	15.104
25	15.112	15.115	15.120
85	15.117	15.121	15.125
90	15.117	15.121	15.126
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	-15.077	-15.074	-15.069
-40	-15.102	-15.100	-15.095
-20	-15.123	-15.120	-15.114
0	-15.138	-15.135	-15.129
25	-15.154	-15.150	-15.144
85	-15.158	-15.153	-15.149
90	-15.158	-15.153	-15.149
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

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



Model	MGW34815	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 - 85°C

Input Voltage : 36 - 76V

Load Current (AVR 1) : 0 - 0.1A (AVR 2) : 0 - 0.1A

* 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	+15V0.1A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	36	0	15.446		±323	±2.2
Minimum Voltage	-40	36	0.1	14.801			

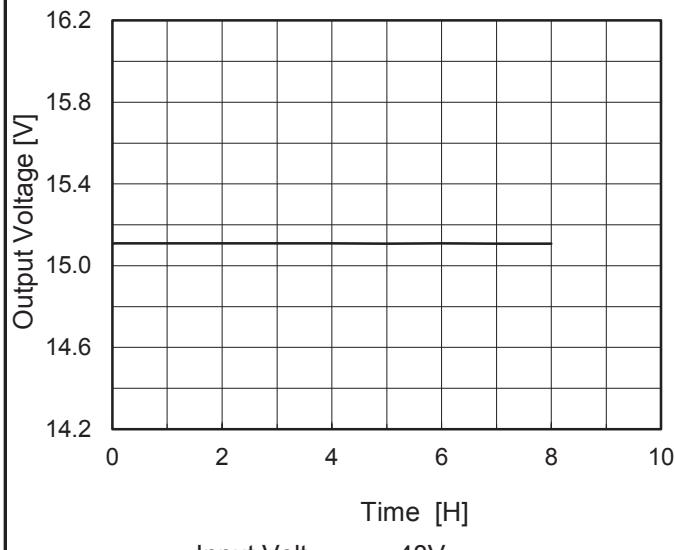
Object	-15V0.1A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	36	0	-15.469		±319	±2.1
Minimum Voltage	-40	36	0.1	-14.831			

COSEL

Model	MGW34815
Item	Time Lapse Drift
Object	+15V0.1A

 Temperature 25°C
 Testing Circuitry Figure A

1.Graph

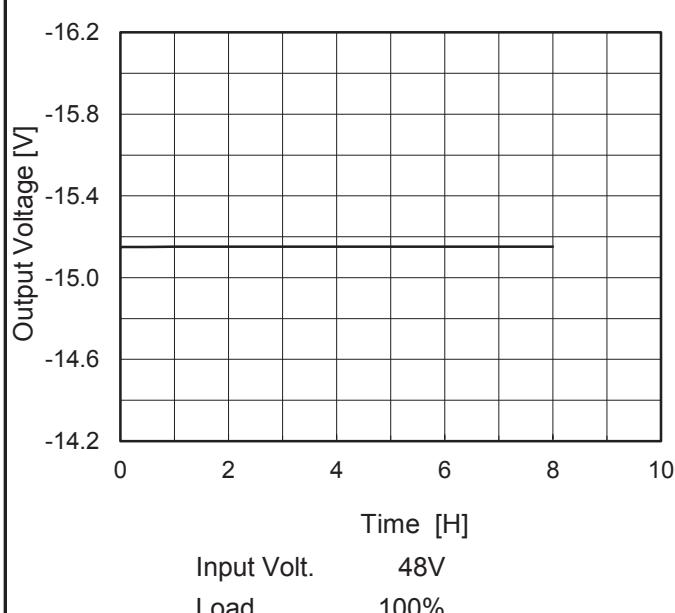


2.Values

Time since start [H]	Output Voltage [V]
0.0	15.106
0.5	15.109
1.0	15.109
2.0	15.109
3.0	15.109
4.0	15.109
5.0	15.109
6.0	15.109
7.0	15.109
8.0	15.109

-15V: Rated Load Current

1.Graph



2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.146
0.5	-15.151
1.0	-15.151
2.0	-15.151
3.0	-15.151
4.0	-15.151
5.0	-15.151
6.0	-15.151
7.0	-15.151
8.0	-15.152

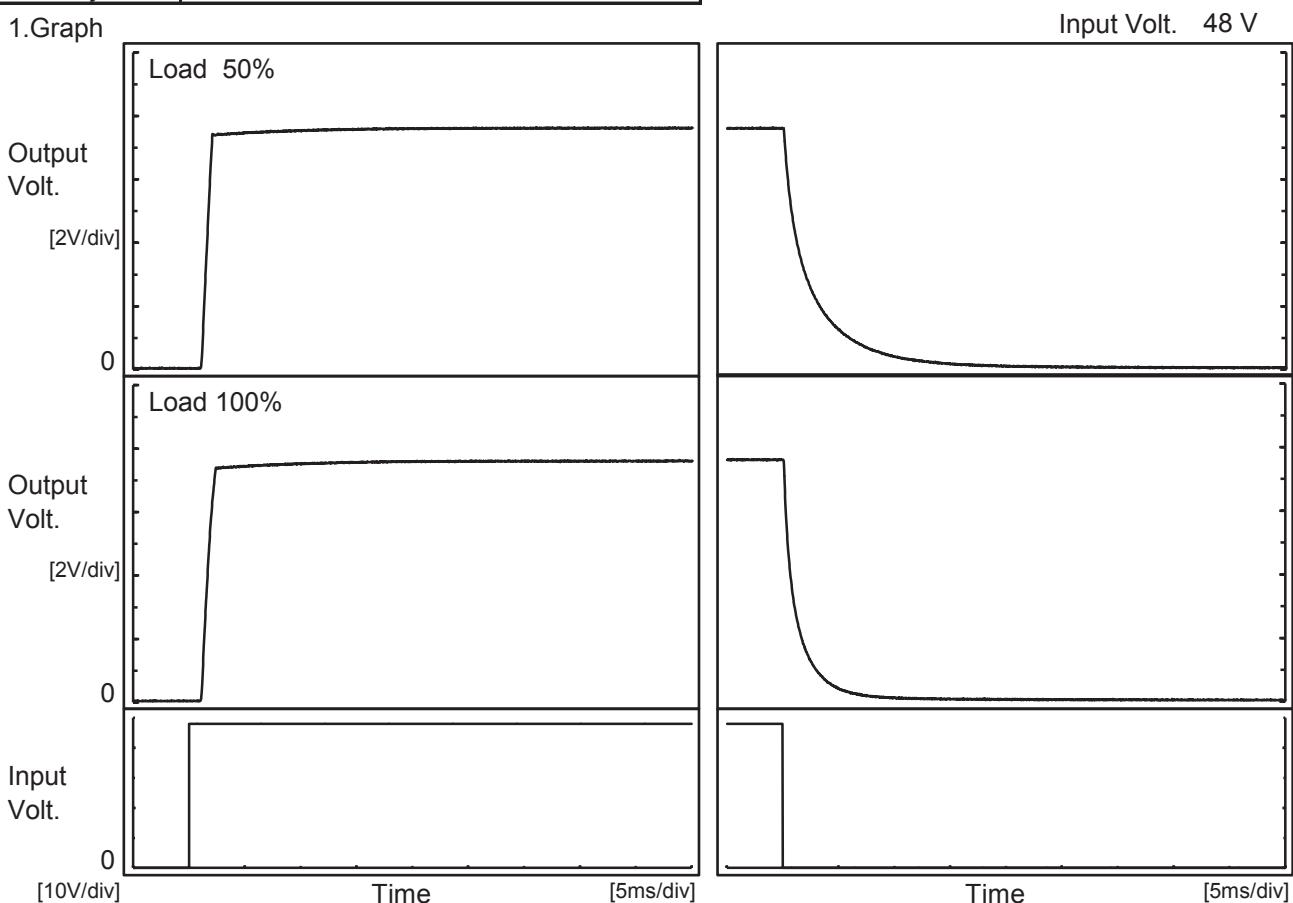
+15V: Rated Load Current

COSEL

Model	MGW34815
Item	Rise and Fall Time
Object	+15V0.1A

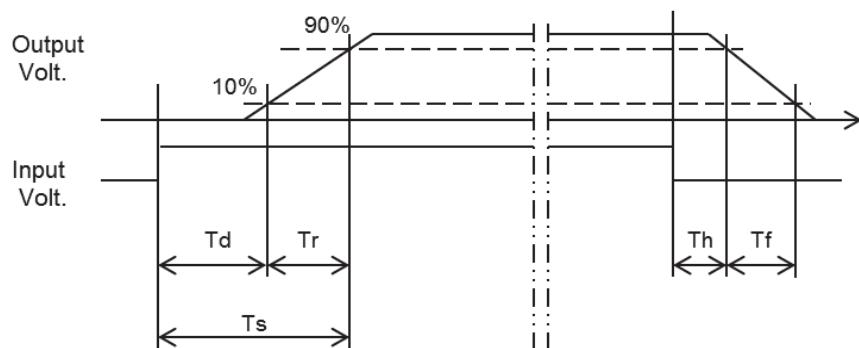
Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		1.2	0.8	2.0	0.3	6.8	
100 %		1.2	1.0	2.2	0.2	3.4	

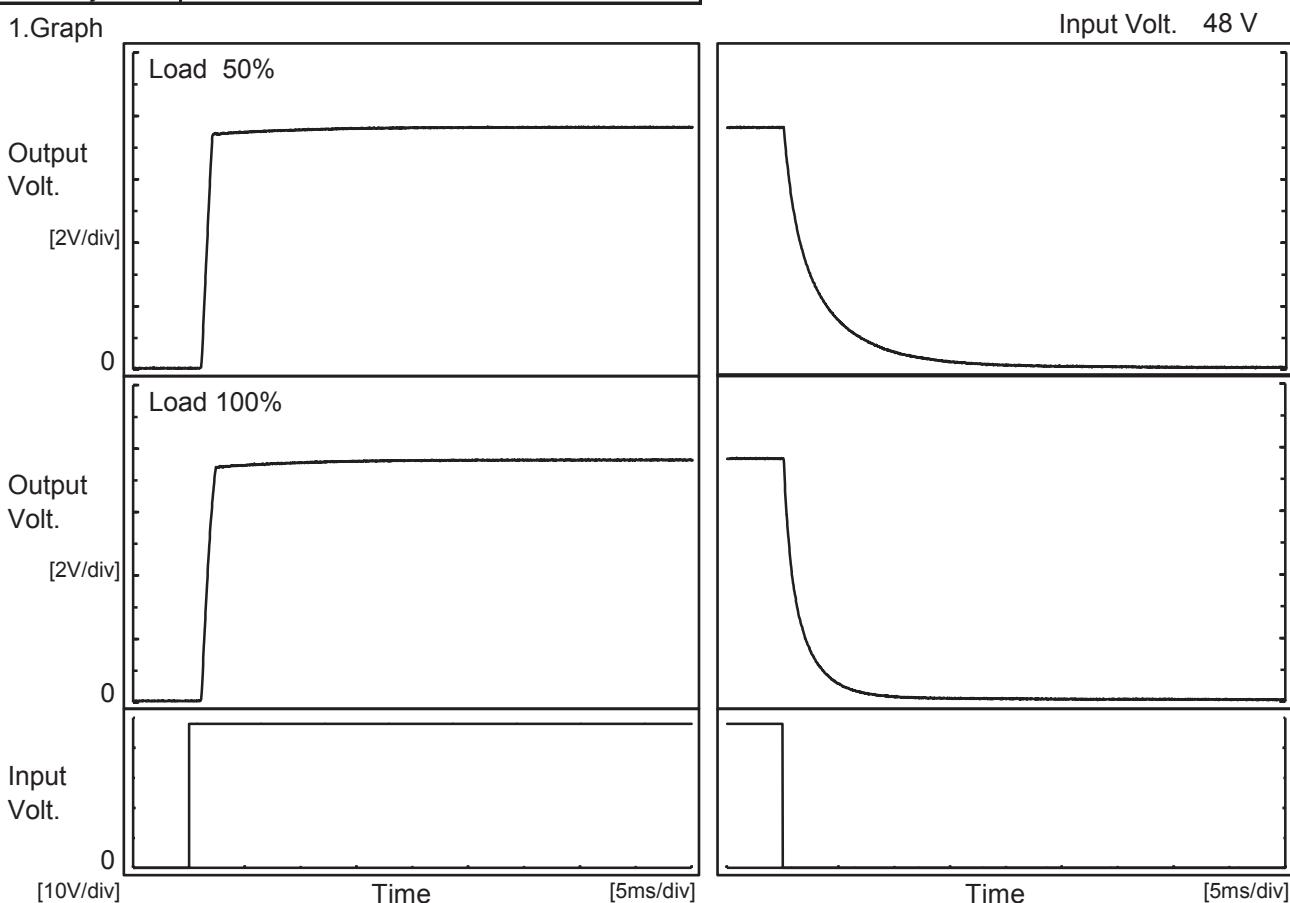


COSEL

Model	MGW34815
Item	Rise and Fall Time
Object	-15V0.1A

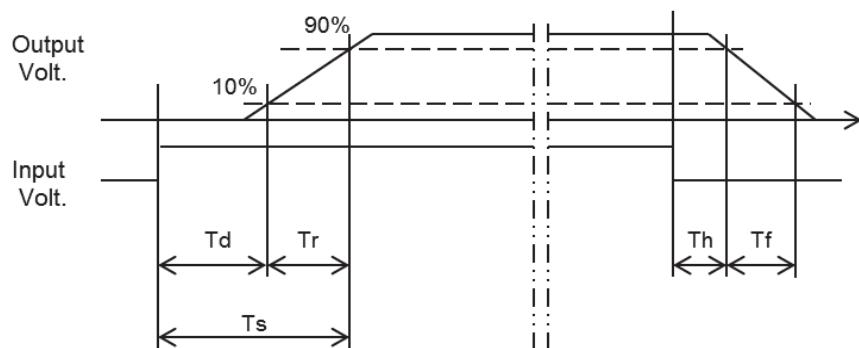
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

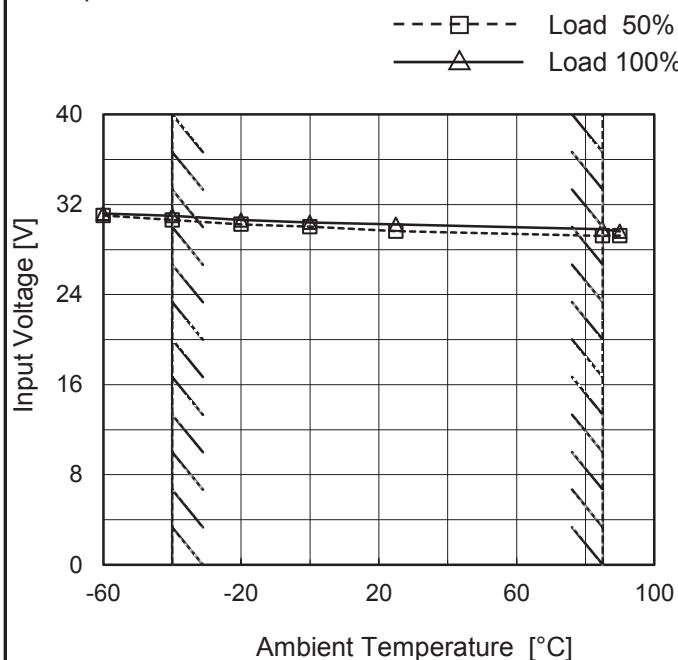
Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		1.2	0.8	2.0	0.3	8.1	
100 %		1.2	1.0	2.2	0.2	3.9	



COSEL

Model	MGW34815
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.1A

1.Graph



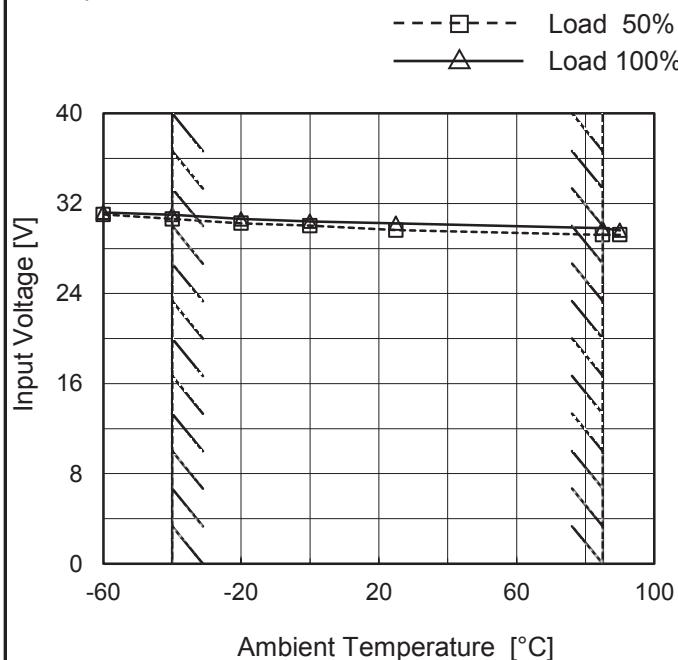
Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	31.1	31.3
-40	30.7	31.1
-20	30.3	30.7
0	30.1	30.5
25	29.7	30.3
85	29.3	29.9
90	29.3	29.7
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.1A
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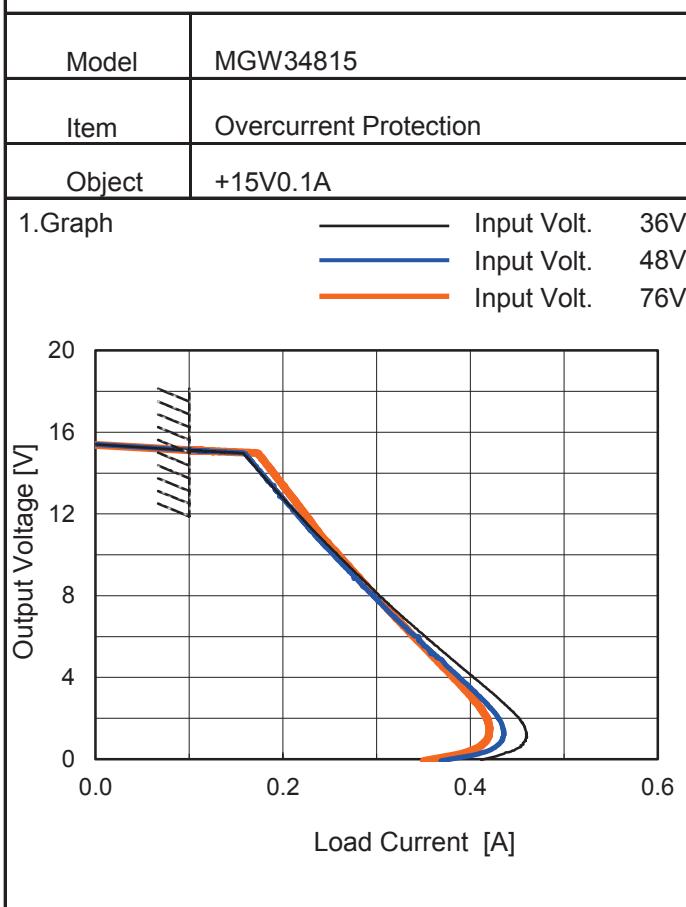
1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	31.1	31.2
-40	30.7	31.1
-20	30.3	30.7
0	30.1	30.4
25	29.7	30.3
85	29.3	29.9
90	29.3	29.7
--	-	-
--	-	-
--	-	-
--	-	-

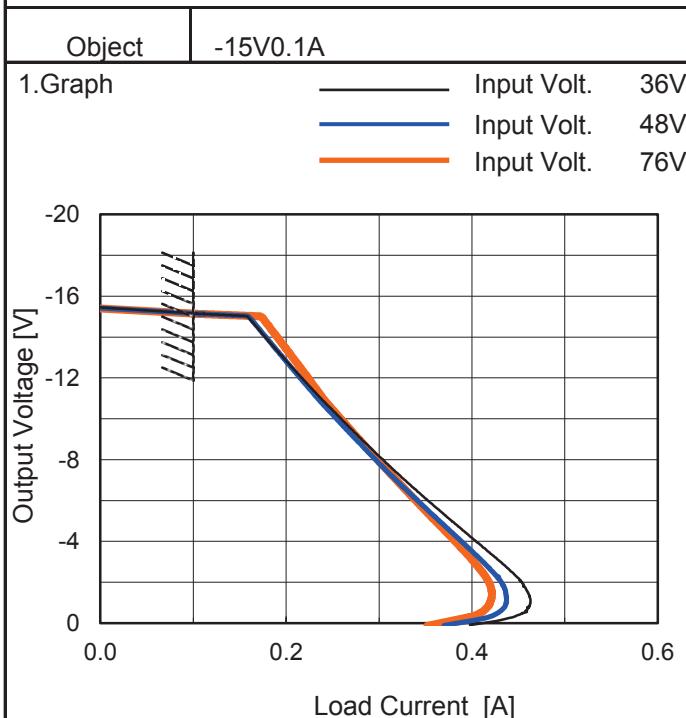
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt.	36[V]	48[V]
76[V]			
14.25	0.17	0.17	0.19
13.50	0.19	0.19	0.20
12.00	0.22	0.21	0.22
10.50	0.25	0.24	0.25
9.00	0.28	0.28	0.28
7.50	0.31	0.31	0.31
6.00	0.35	0.34	0.34
4.50	0.39	0.38	0.37
3.00	0.43	0.41	0.40
1.50	0.46	0.43	0.42
0.00	0.41	0.37	0.35
--	-	-	-

-15V: Rated Load Current



2.Values

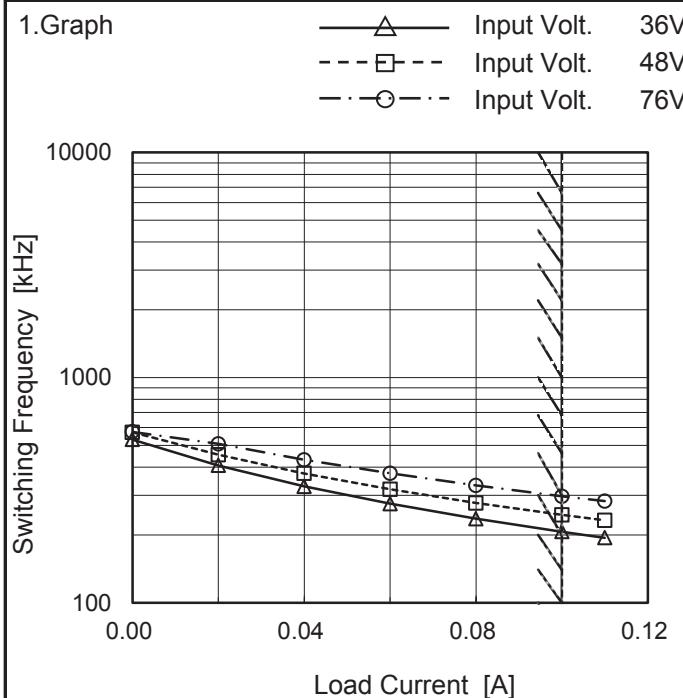
Output Voltage [V]	Load Current [A]		
	Input Volt.	36[V]	48[V]
76[V]			
-14.25	0.17	0.17	0.19
-13.50	0.19	0.19	0.20
-12.00	0.22	0.21	0.22
-10.50	0.25	0.24	0.25
-9.00	0.28	0.27	0.28
-7.50	0.32	0.31	0.31
-6.00	0.35	0.34	0.34
-4.50	0.39	0.38	0.37
-3.00	0.43	0.41	0.40
-1.50	0.46	0.44	0.42
0.00	0.40	0.37	0.35
--	-	-	-

+15V: Rated Load Current

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

COSEL

Model	MGW34815
Item	Switching Frequency (by Load Current)
Object	+/-15V0.1A


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Frequency [kHz]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	531	571	574
0.02	407	454	508
0.04	329	375	431
0.06	275	319	376
0.08	236	277	332
0.10	207	246	297
0.11	194	232	283
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

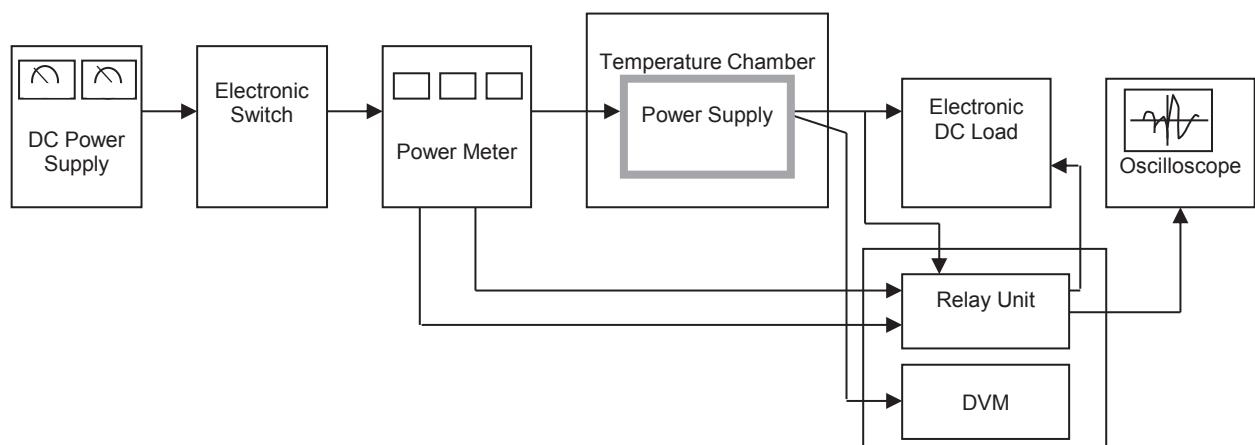


Figure A

Data Acquisition/Control Unit

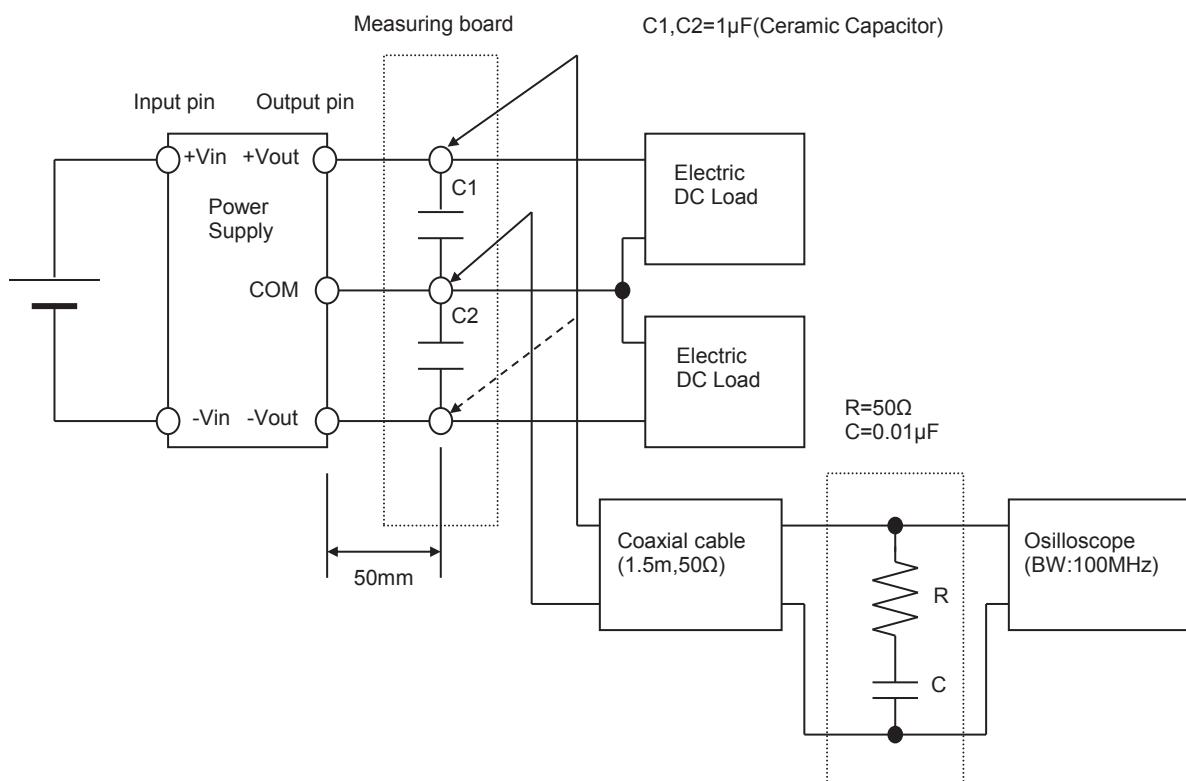


Figure B (Ripple and Ripple noise Characteristic)