

TEST DATA OF MGFS64815

Regulated DC Power Supply
December 6, 2016

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi
Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage) 1

2.Input Current (by Load Current) 2

3.Input Power (by Load Current) 3

4.Efficiency (by Input Voltage) 4

5.Efficiency (by Load Current) 5

6.Line Regulation 6

7.Load Regulation 7

8.Dynamic Load Response 8

9.Ripple Voltage (by Load Current) 9

10.Ripple-Noise 10

11.Ripple Voltage (by Ambient Temperature) 11

12.Ambient Temperature Drift 12

13.Output Voltage Accuracy 13

14.Time Lapse Drift 14

15.Rise and Fall Time 15

16.Minimum Input Voltage for Regulated Output Voltage 16

17.Overcurrent Protection 17

18.Switching frequency (by Load Current) 18

19.Figure of Testing Circuitry 19

(Final Page 19)



Model		MGFS64815		Temperature	25°C																																																																															
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<p>1.Graph</p> <p> —△— Input Volt. 18V ---□--- Input Volt. 24V -·-·*·-·-·- Input Volt. 36V -·-·○-·-·- Input Volt. 48V -·-·◇-·-·- Input Volt. 76V </p> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="5">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>15.107</td> <td>15.107</td> <td>15.106</td> <td>15.106</td> <td>15.108</td> </tr> <tr> <td>0.08</td> <td>15.106</td> <td>15.105</td> <td>15.104</td> <td>15.104</td> <td>15.103</td> </tr> <tr> <td>0.16</td> <td>15.104</td> <td>15.103</td> <td>15.103</td> <td>15.102</td> <td>15.101</td> </tr> <tr> <td>0.24</td> <td>15.102</td> <td>15.102</td> <td>15.101</td> <td>15.101</td> <td>15.099</td> </tr> <tr> <td>0.32</td> <td>15.100</td> <td>15.100</td> <td>15.100</td> <td>15.099</td> <td>15.098</td> </tr> <tr> <td>0.40</td> <td>15.098</td> <td>15.098</td> <td>15.097</td> <td>15.097</td> <td>15.096</td> </tr> <tr> <td>0.44</td> <td>15.098</td> <td>15.097</td> <td>15.097</td> <td>15.097</td> <td>15.096</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>		Load Current [A]	Output Voltage [V]					Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.00	15.107	15.107	15.106	15.106	15.108	0.08	15.106	15.105	15.104	15.104	15.103	0.16	15.104	15.103	15.103	15.102	15.101	0.24	15.102	15.102	15.101	15.101	15.099	0.32	15.100	15.100	15.100	15.099	15.098	0.40	15.098	15.098	15.097	15.097	15.096	0.44	15.098	15.097	15.097	15.097	15.096	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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Model	MGFS64815	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.4A		

Input Volt. 48 V
Cycle 100 ms

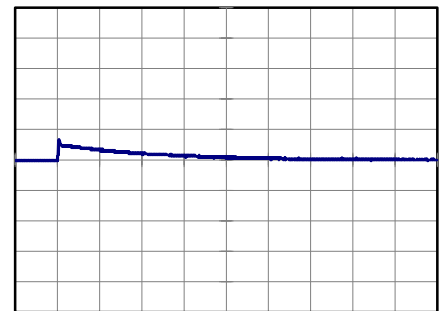
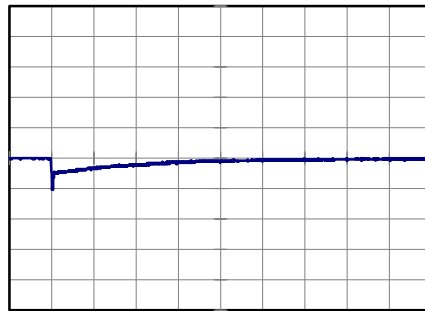
t1,t2 = 100 μs



Min.Load (0A) ←→
Load 100% (0.4A)

500 mV/div

2 ms/div

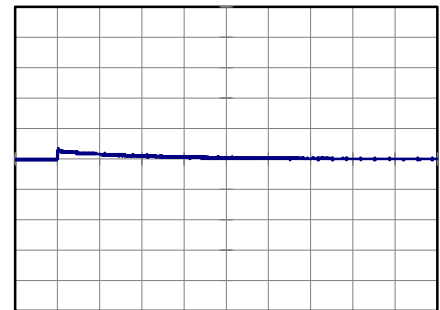
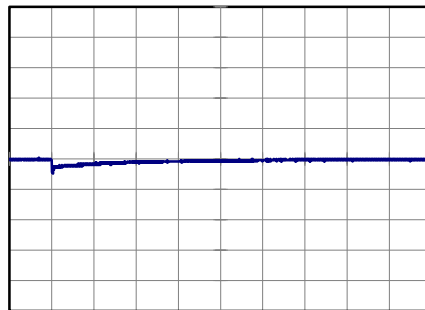


2 ms/div

Min.Load (0A) ←→
Load 50% (0.2A)

500 mV/div

2 ms/div

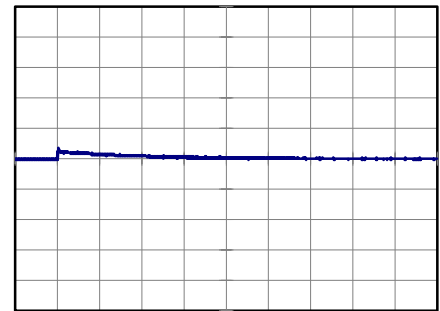
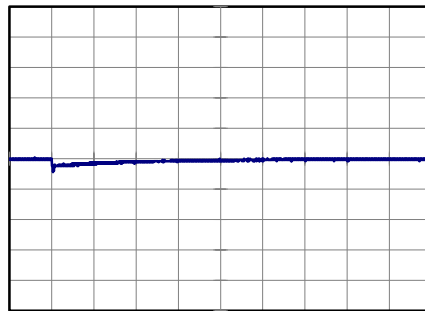


2 ms/div

Load 50% (0.2A) ←→
Load 100% (0.4A)

500 mV/div

2 ms/div



2 ms/div



COSEL																																									
Model	MGFS64815	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B																																						
Object	+15V0.4A																																								
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COSEL																																								
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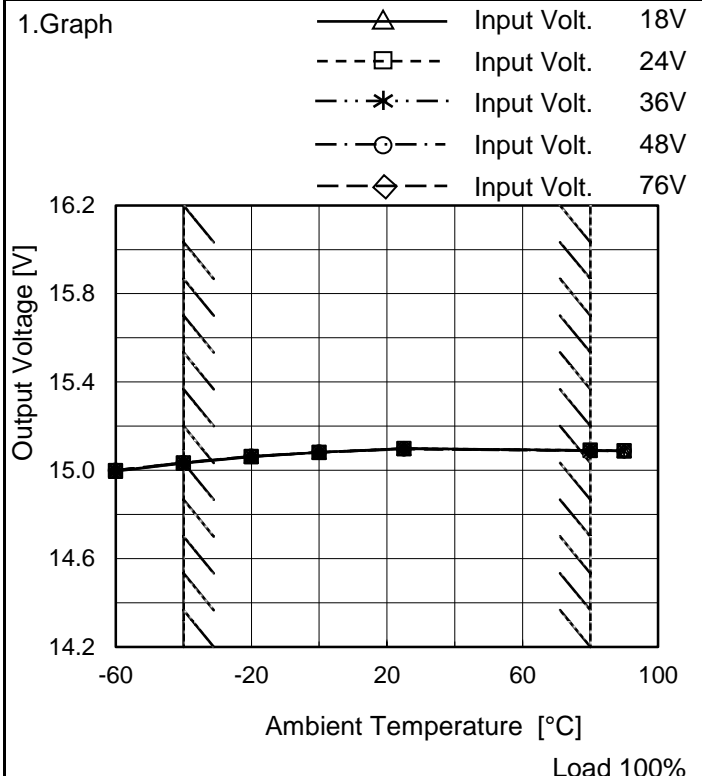


COSEL																																								
Model	MGFS64815																																							
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure B																																						
Object	+15V0.4A																																							
<p>1.Graph</p> <p style="text-align: center;">Ambient Temperature [°C] Input Volt. 48V</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-60</td><td>5</td><td>5</td></tr> <tr><td>-40</td><td>5</td><td>5</td></tr> <tr><td>-20</td><td>5</td><td>5</td></tr> <tr><td>0</td><td>5</td><td>5</td></tr> <tr><td>25</td><td>5</td><td>5</td></tr> <tr><td>80</td><td>5</td><td>5</td></tr> <tr><td>90</td><td>5</td><td>5</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>	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	--	-	-	--	-	-	--	-	-	--	-	-
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Model	MGFS64815
Item	Ambient Temperature Drift
Object	+15V0.4A

Testing Circuitry Figure A



2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	14.996	14.997	14.999	15.000	15.000
-40	15.032	15.033	15.034	15.035	15.034
-20	15.062	15.062	15.063	15.064	15.062
0	15.081	15.081	15.082	15.082	15.081
25	15.098	15.098	15.097	15.097	15.096
80	15.090	15.090	15.090	15.089	15.088
90	15.088	15.088	15.088	15.087	15.087
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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



COSEL		
Model	MGFS64815	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
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 : 18 - 76V

Load Current : 0 - 0.4A

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

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

2. Values

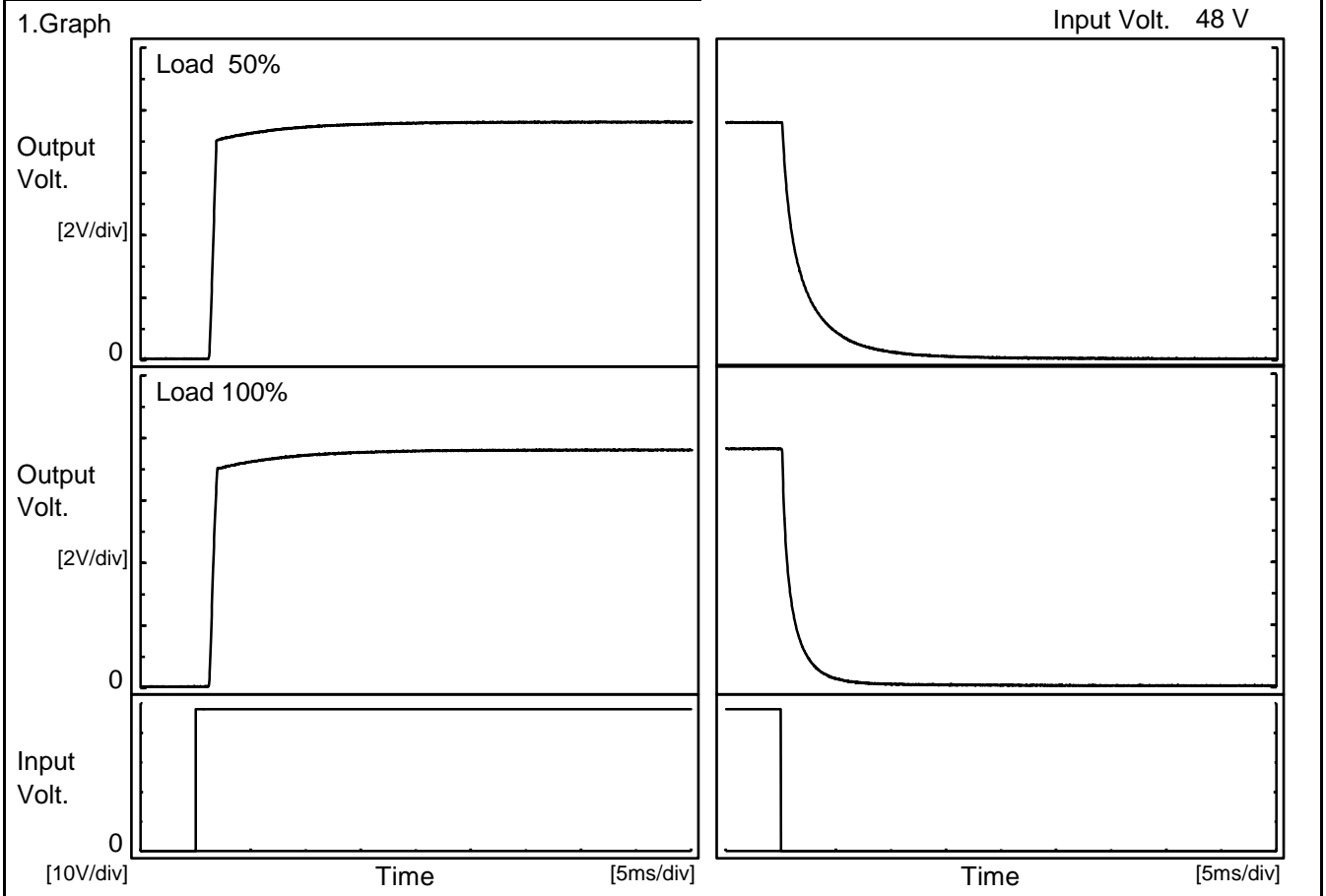
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	76	0	15.106	±37	±0.2
Minimum Voltage	-40	18	0.4	15.032		



COSEL																								
Model	MGFS64815																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+15V0.4A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 48V Load 100%</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>15.095</td></tr> <tr><td>0.5</td><td>15.098</td></tr> <tr><td>1.0</td><td>15.098</td></tr> <tr><td>2.0</td><td>15.098</td></tr> <tr><td>3.0</td><td>15.098</td></tr> <tr><td>4.0</td><td>15.098</td></tr> <tr><td>5.0</td><td>15.099</td></tr> <tr><td>6.0</td><td>15.099</td></tr> <tr><td>7.0</td><td>15.099</td></tr> <tr><td>8.0</td><td>15.099</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	15.095	0.5	15.098	1.0	15.098	2.0	15.098	3.0	15.098	4.0	15.098	5.0	15.099	6.0	15.099	7.0	15.099	8.0	15.099
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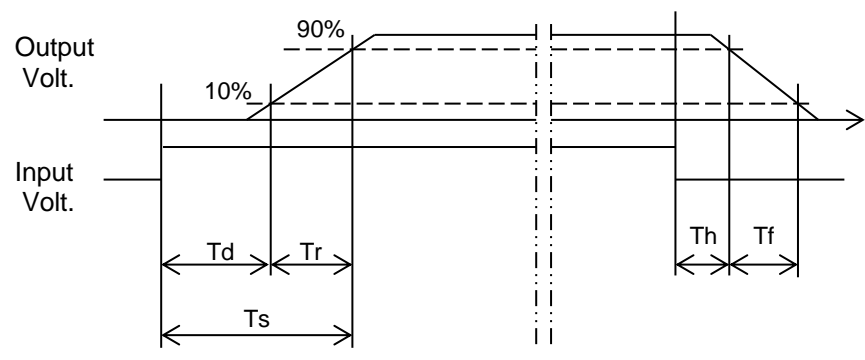
Model		MGFS64815	Temperature 25°C	
Item		Rise and Fall Time	Testing Circuitry Figure A	
Object		+15V0.4A		



2.Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		1.3	0.6	1.9	0.2	5.3
100 %		1.3	0.6	1.9	0.2	2.6

[ms]

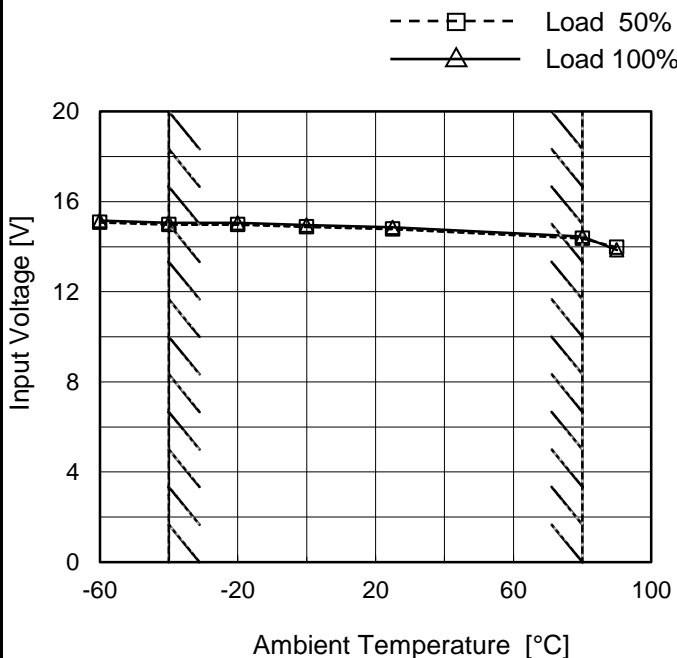




Model	MGFS64815
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.4A

Testing Circuitry Figure A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.1	15.2
-40	15.0	15.1
-20	15.0	15.1
0	14.9	15.0
25	14.8	14.9
80	14.4	14.5
90	14.0	13.9
--	-	-
--	-	-
--	-	-
--	-	-

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



<p>Model MGFS64815</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																																																			
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<p>1.Graph</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>— Input Volt. 18V</p> <p>— Input Volt. 24V</p> <p>— Input Volt. 36V</p> <p>— Input Volt. 48V</p> <p>— Input Volt. 76V</p> </div> </div> <p style="text-align: center;">Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="5">Load Current [A]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>14.3</td><td>0.546</td><td>0.550</td><td>0.552</td><td>0.568</td><td>0.602</td></tr> <tr><td>13.5</td><td>0.571</td><td>0.571</td><td>0.573</td><td>0.587</td><td>0.618</td></tr> <tr><td>12.0</td><td>0.624</td><td>0.619</td><td>0.621</td><td>0.628</td><td>0.646</td></tr> <tr><td>10.5</td><td>0.687</td><td>0.677</td><td>0.669</td><td>0.669</td><td>0.682</td></tr> <tr><td>9.0</td><td>0.761</td><td>0.740</td><td>0.719</td><td>0.715</td><td>0.722</td></tr> <tr><td>7.5</td><td>0.839</td><td>0.809</td><td>0.774</td><td>0.764</td><td>0.767</td></tr> <tr><td>6.0</td><td>0.911</td><td>0.887</td><td>0.835</td><td>0.821</td><td>0.812</td></tr> <tr><td>4.5</td><td>1.010</td><td>0.986</td><td>0.905</td><td>0.882</td><td>0.862</td></tr> <tr><td>3.0</td><td>1.146</td><td>1.089</td><td>0.985</td><td>0.946</td><td>0.910</td></tr> <tr><td>1.5</td><td>1.296</td><td>1.185</td><td>1.052</td><td>0.998</td><td>0.949</td></tr> <tr><td>0.0</td><td>1.379</td><td>1.219</td><td>1.036</td><td>0.962</td><td>0.892</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]					Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	14.3	0.546	0.550	0.552	0.568	0.602	13.5	0.571	0.571	0.573	0.587	0.618	12.0	0.624	0.619	0.621	0.628	0.646	10.5	0.687	0.677	0.669	0.669	0.682	9.0	0.761	0.740	0.719	0.715	0.722	7.5	0.839	0.809	0.774	0.764	0.767	6.0	0.911	0.887	0.835	0.821	0.812	4.5	1.010	0.986	0.905	0.882	0.862	3.0	1.146	1.089	0.985	0.946	0.910	1.5	1.296	1.185	1.052	0.998	0.949	0.0	1.379	1.219	1.036	0.962	0.892	--	-	-	-	-	-
Output Voltage [V]	Load Current [A]																																																																																				
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14.3	0.546	0.550	0.552	0.568	0.602																																																																																
13.5	0.571	0.571	0.573	0.587	0.618																																																																																
12.0	0.624	0.619	0.621	0.628	0.646																																																																																
10.5	0.687	0.677	0.669	0.669	0.682																																																																																
9.0	0.761	0.740	0.719	0.715	0.722																																																																																
7.5	0.839	0.809	0.774	0.764	0.767																																																																																
6.0	0.911	0.887	0.835	0.821	0.812																																																																																
4.5	1.010	0.986	0.905	0.882	0.862																																																																																
3.0	1.146	1.089	0.985	0.946	0.910																																																																																
1.5	1.296	1.185	1.052	0.998	0.949																																																																																
0.0	1.379	1.219	1.036	0.962	0.892																																																																																
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Model		MGFS64815		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+15V0.4A																																																																																
1.Graph		<p> —△— Input Volt. 18V - - - □ - - - Input Volt. 24V - · · * · · - · - Input Volt. 36V - · · ○ · · - · - Input Volt. 48V - - - ◇ - - - Input Volt. 76V </p>		2.Values																																																																														
<p>Switching Frequency [kHz]</p> <p>Load Current [A]</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="5">Input Current [A]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>507</td><td>579</td><td>670</td><td>719</td><td>776</td></tr> <tr><td>0.08</td><td>352</td><td>426</td><td>526</td><td>585</td><td>652</td></tr> <tr><td>0.16</td><td>269</td><td>336</td><td>429</td><td>490</td><td>560</td></tr> <tr><td>0.24</td><td>217</td><td>277</td><td>364</td><td>420</td><td>491</td></tr> <tr><td>0.32</td><td>181</td><td>236</td><td>315</td><td>368</td><td>437</td></tr> <tr><td>0.40</td><td>156</td><td>205</td><td>278</td><td>327</td><td>394</td></tr> <tr><td>0.44</td><td>146</td><td>193</td><td>262</td><td>310</td><td>375</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Input Current [A]					Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.00	507	579	670	719	776	0.08	352	426	526	585	652	0.16	269	336	429	490	560	0.24	217	277	364	420	491	0.32	181	236	315	368	437	0.40	156	205	278	327	394	0.44	146	193	262	310	375	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-		
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<p>Note: Slanted line shows the range of the rated load current.</p> <p>When load current is low, MG operates intermittently, so switching frequency would not become constant.</p>																																																																																		

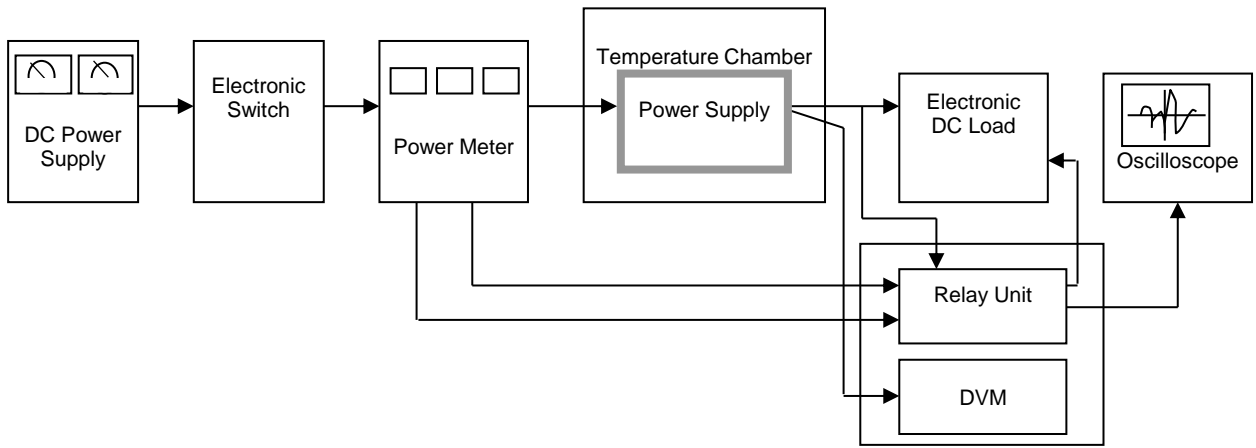


Figure A

Data Acquisition/Control Unit

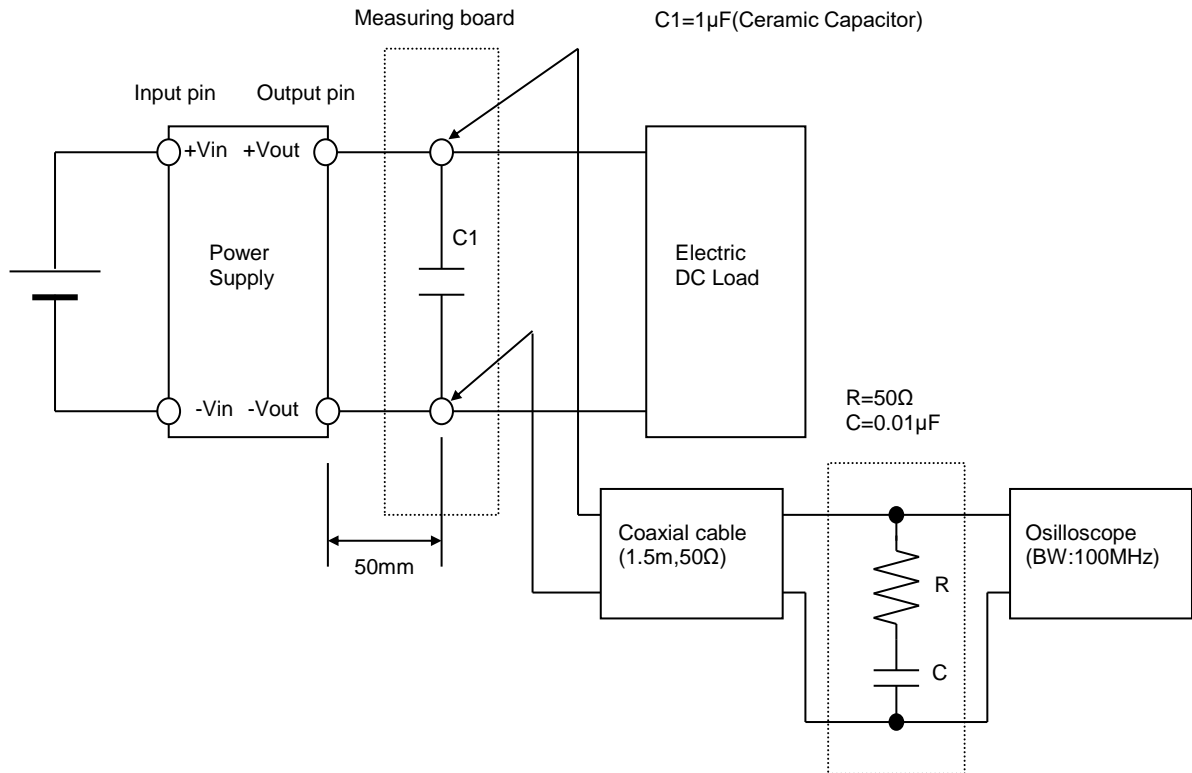


Figure B (Ripple and Ripple noise Characteristic)