

# TEST DATA OF MGFW1R52412

Regulated DC Power Supply  
December 28, 2016

Approved by : Takayuki Fukuda  
Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi  
Takaaki Sekiguchi Design Engineer

**COSEL CO.,LTD.**

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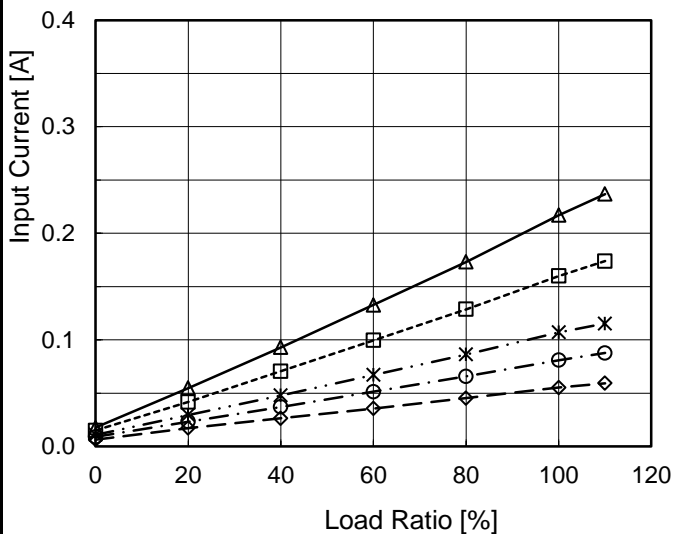
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Model	MGFW1R52412
Item	Input Current (by Load Ratio)
Object	_____

Temperature 25°C  
Testing Circuitry Figure A

- 1.Graph
- △— Input Volt. 9V
  - Input Volt. 12V
  - \*·-·-·- Input Volt. 18V
  - Input Volt. 24V
  - ◇-·-·- Input Volt. 36V



2.Values

Load Ratio [%]	Input Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.018	0.015	0.011	0.009	0.007
20	0.055	0.042	0.030	0.023	0.017
40	0.093	0.071	0.048	0.037	0.026
60	0.133	0.100	0.067	0.051	0.036
80	0.173	0.129	0.086	0.066	0.045
100	0.217	0.160	0.107	0.081	0.055
110	0.237	0.174	0.115	0.088	0.059
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
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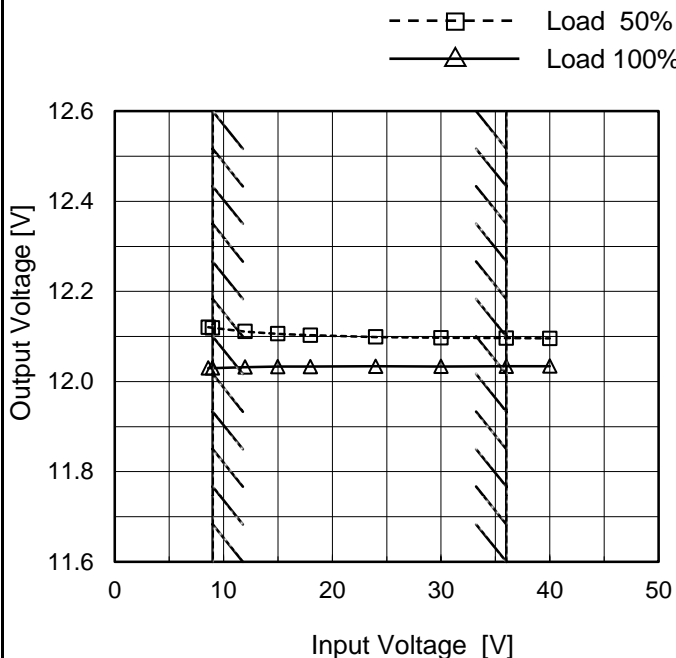
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Model	MGFW1R52412
Item	Line Regulation
Object	+12V0.065A

Temperature 25°C  
Testing Circuitry Figure A

1.Graph



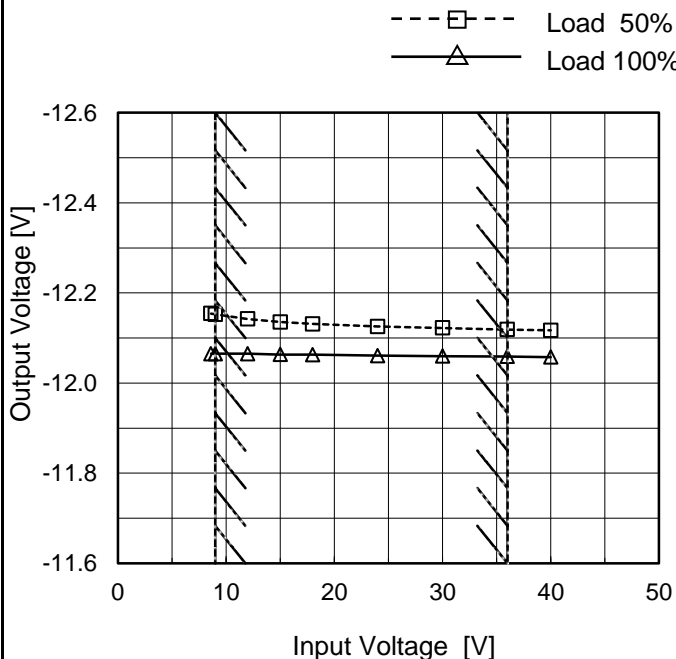
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	12.121	12.030
9.0	12.119	12.030
12.0	12.111	12.032
15.0	12.106	12.033
18.0	12.103	12.033
24.0	12.099	12.034
30.0	12.097	12.034
36.0	12.096	12.034
40.0	12.096	12.034

-12V : Rated Load Current

Object	-12V0.065A
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1.Graph



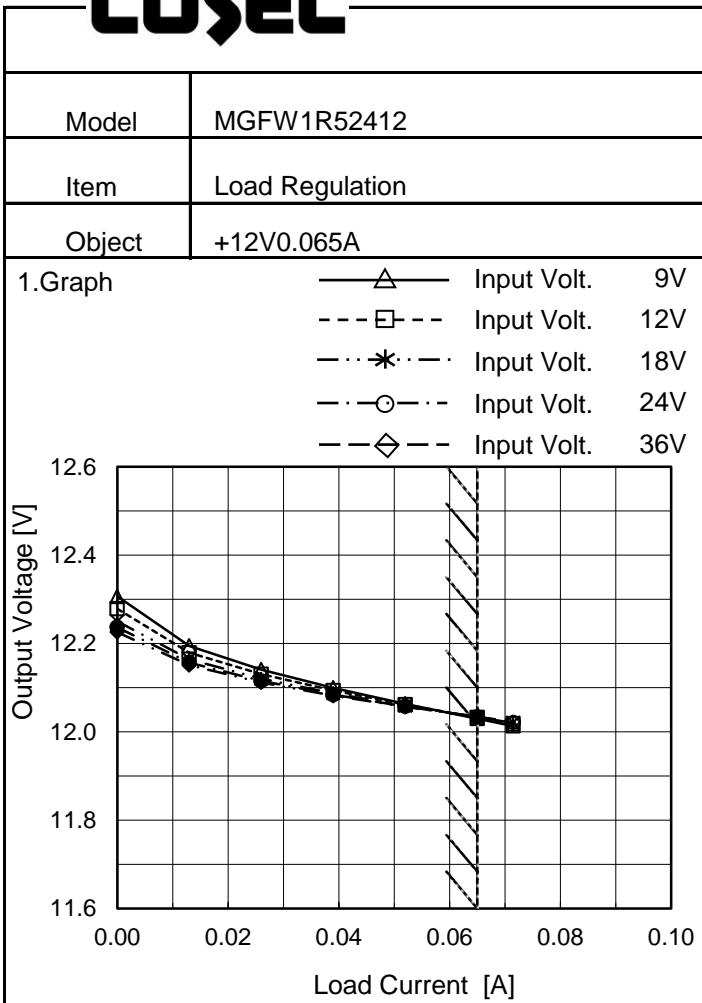
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	-12.154	-12.065
9.0	-12.153	-12.065
12.0	-12.142	-12.065
15.0	-12.135	-12.064
18.0	-12.131	-12.063
24.0	-12.126	-12.061
30.0	-12.122	-12.060
36.0	-12.119	-12.059
40.0	-12.117	-12.058

+12V : Rated Load Current

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



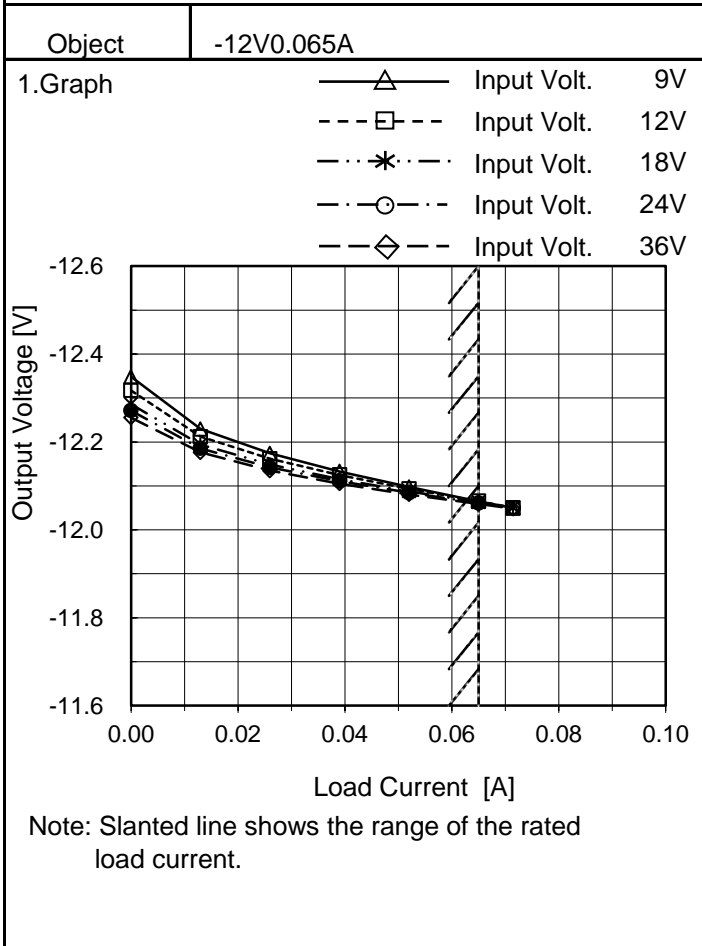


Temperature 25°C  
Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	12.307	12.279	12.250	12.237	12.226
0.013	12.195	12.179	12.164	12.157	12.151
0.026	12.141	12.131	12.120	12.115	12.112
0.039	12.099	12.093	12.087	12.084	12.082
0.052	12.063	12.062	12.059	12.058	12.057
0.065	12.030	12.032	12.033	12.034	12.034
0.072	12.013	12.018	12.020	12.021	12.023
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-12V: Rated Load Current



2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	-12.348	-12.317	-12.286	-12.271	-12.255
0.013	-12.229	-12.212	-12.194	-12.185	-12.176
0.026	-12.174	-12.162	-12.149	-12.142	-12.135
0.039	-12.133	-12.125	-12.115	-12.111	-12.105
0.052	-12.098	-12.093	-12.088	-12.085	-12.081
0.065	-12.065	-12.065	-12.063	-12.061	-12.059
0.072	-12.049	-12.050	-12.050	-12.050	-12.048
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+12V: Rated Load Current



Model	MGFW1R52412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.065A		

Input Volt. 24 V  
 -12V:rated load current.  
 Cycle 100 ms

t1,t2 = 100 μs



Min.Load (0A) ←→  
 Load 100% (0.065A)

200 mV/div

4 ms/div

4 ms/div

Min.Load (0A) ←→  
 Load 50% (0.0325A)

200 mV/div

4 ms/div

4 ms/div

Load 50% (0.0325A) ←→  
 Load 100% (0.065A)

200 mV/div

4 ms/div

4 ms/div



Model	MGFW1R52412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V0.065A		

Input Volt. 24 V  
 +12V:rated load current.  
 Cycle 100 ms

t1,t2 = 100 μs



Min.Load (0A) ←→  
 Load 100% (0.065A)

200 mV/div

4 ms/div

4 ms/div

Min.Load (0A) ←→  
 Load 50% (0.0325A)

200 mV/div

4 ms/div

4 ms/div

Load 50% (0.0325A) ←→  
 Load 100% (0.065A)

200 mV/div

4 ms/div

4 ms/div



<p>Model MGFW1R52412</p> <p>Item Ripple Voltage (by Load Current)</p> <p>Object +12V0.065A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure B</p>																																						
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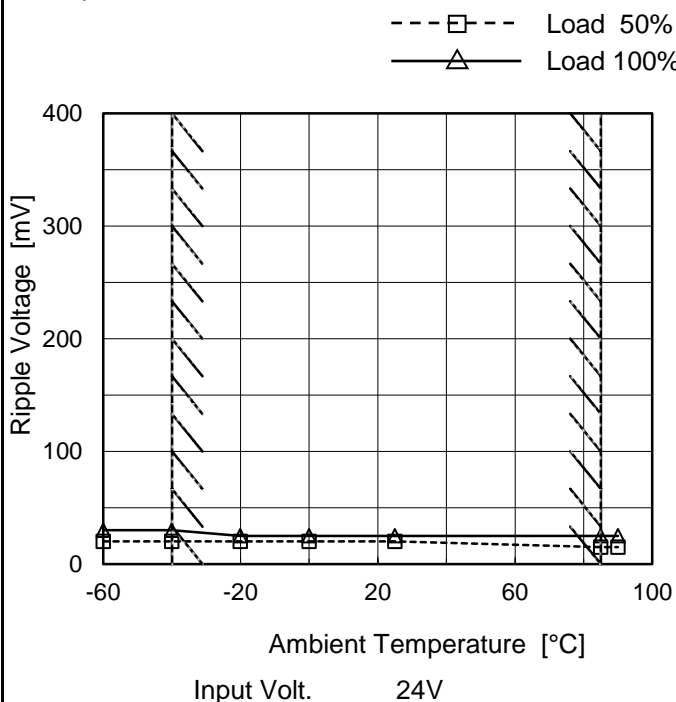
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Model	MGFW1R52412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.065A

Testing Circuitry Figure B

1.Graph



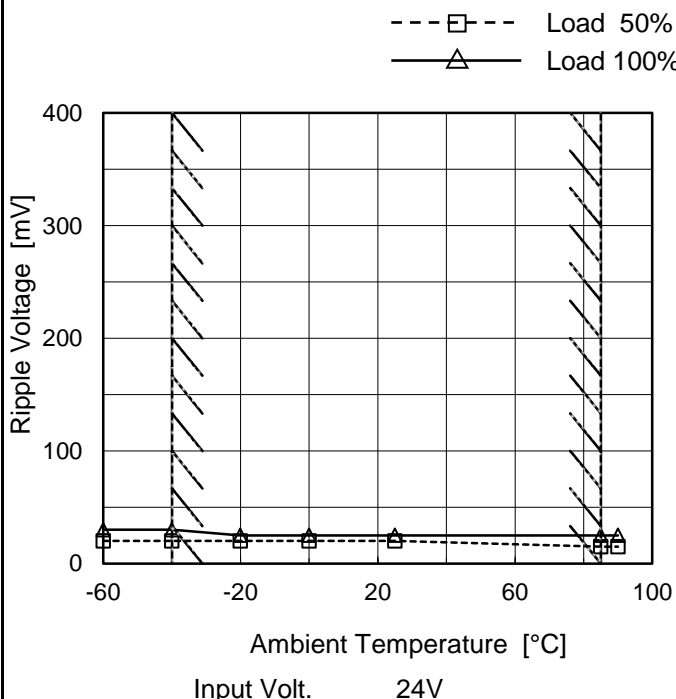
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	20	30
-40	20	30
-20	20	25
0	20	25
25	20	25
85	15	25
90	15	25
--	-	-
--	-	-
--	-	-
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-12V: Rated Load Current

Object	-12V0.065A
--------	------------

1.Graph



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
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+12V: Rated Load Current

Measured by 100 MHz Oscilloscope.

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





Model		MGFW1R52412		Testing Circuitry Figure A																																																																														
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<b>COSEL</b>		Testing Circuitry Figure A
Model	MGFW1R52412	
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 : 9 - 36V

Load Current (AVR 1) : 0 - 0.065A (AVR 2) : 0 - 0.065A

\* 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

Object		+12V0.065A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	9	0	12.339	±313	±2.6
Minimum Voltage	85	9	0.065	11.714		

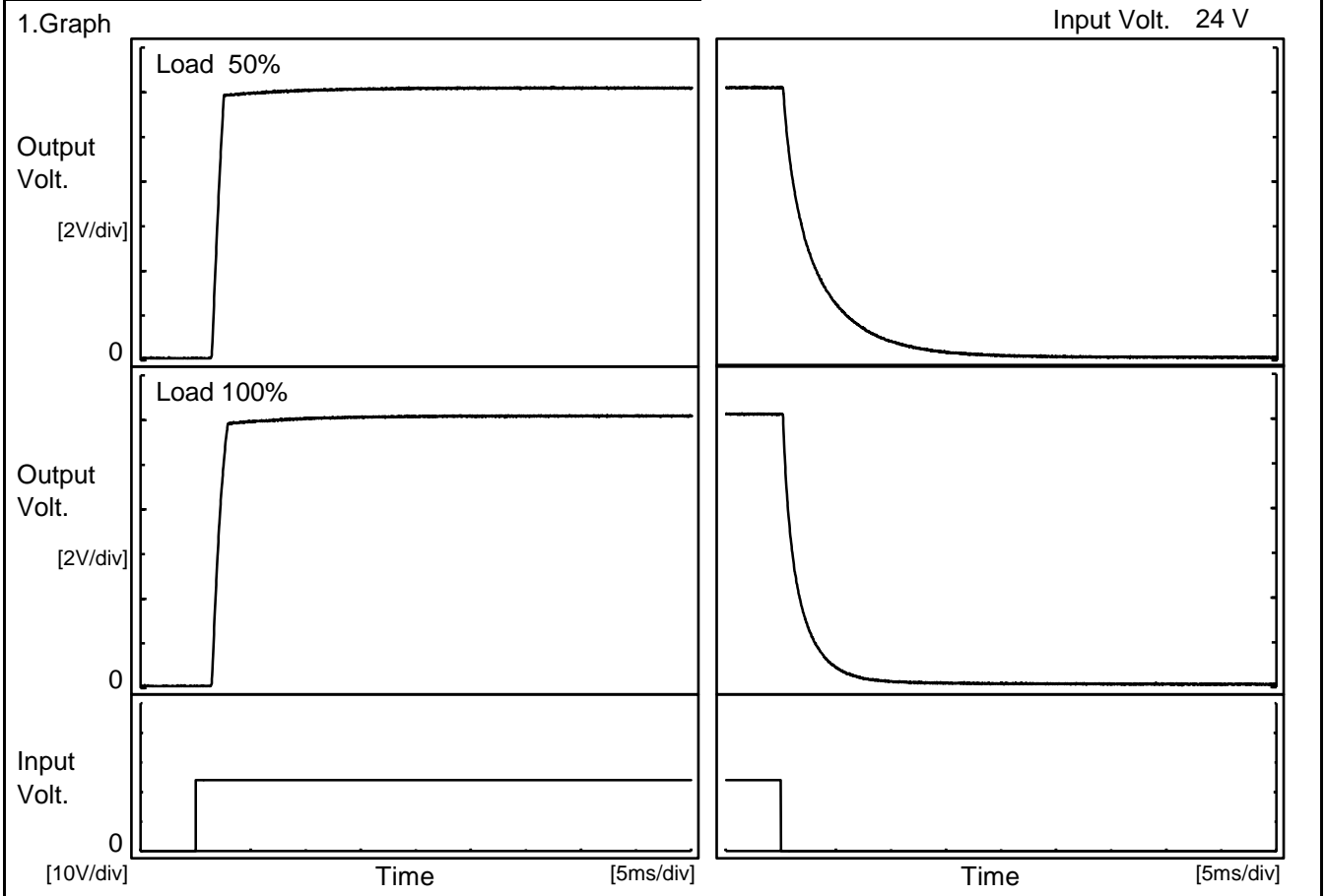
Object		-12V0.065A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	9	0	-12.380	±313	±2.6
Minimum Voltage	85	9	0.065	-11.755		



<b>COSEL</b>																									
Model	MGFW1R52412	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V0.065A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt.     24V 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>12.031</td></tr> <tr><td>0.5</td><td>12.031</td></tr> <tr><td>1.0</td><td>12.031</td></tr> <tr><td>2.0</td><td>12.031</td></tr> <tr><td>3.0</td><td>12.031</td></tr> <tr><td>4.0</td><td>12.030</td></tr> <tr><td>5.0</td><td>12.031</td></tr> <tr><td>6.0</td><td>12.031</td></tr> <tr><td>7.0</td><td>12.030</td></tr> <tr><td>8.0</td><td>12.030</td></tr> </tbody> </table> <p style="text-align: center;">-12V : Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	12.031	0.5	12.031	1.0	12.031	2.0	12.031	3.0	12.031	4.0	12.030	5.0	12.031	6.0	12.031	7.0	12.030	8.0	12.030
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1.0	12.031																								
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4.0	12.030																								
5.0	12.031																								
6.0	12.031																								
7.0	12.030																								
8.0	12.030																								
Object	-12V0.065A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt.     24V 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>-12.062</td></tr> <tr><td>0.5</td><td>-12.062</td></tr> <tr><td>1.0</td><td>-12.062</td></tr> <tr><td>2.0</td><td>-12.062</td></tr> <tr><td>3.0</td><td>-12.062</td></tr> <tr><td>4.0</td><td>-12.062</td></tr> <tr><td>5.0</td><td>-12.062</td></tr> <tr><td>6.0</td><td>-12.063</td></tr> <tr><td>7.0</td><td>-12.063</td></tr> <tr><td>8.0</td><td>-12.063</td></tr> </tbody> </table> <p style="text-align: center;">+12V : Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	-12.062	0.5	-12.062	1.0	-12.062	2.0	-12.062	3.0	-12.062	4.0	-12.062	5.0	-12.062	6.0	-12.063	7.0	-12.063	8.0	-12.063
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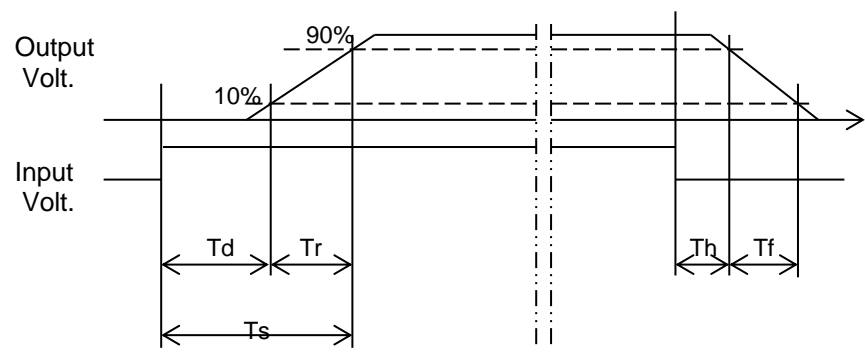
Model		MGFW1R52412	
Item		Rise and Fall Time	
Object		+12V0.065A	
		Temperature	25°C
		Testing Circuitry	Figure A



2.Values

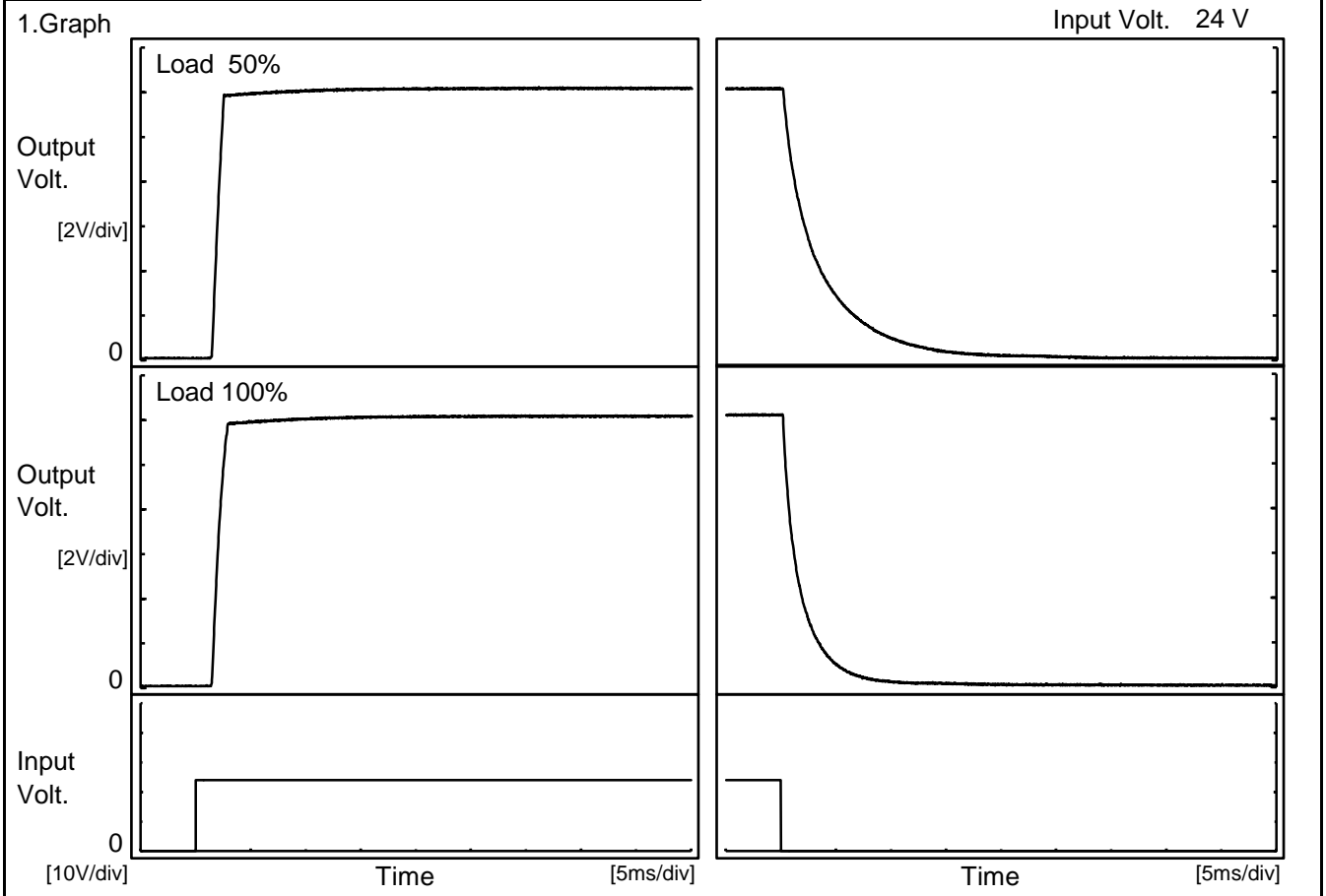
Load	Time	Td	Tr	Ts	Th	Tf
50 %		1.6	0.9	2.5	0.4	7.6
100 %		1.6	1.1	2.7	0.3	3.8

[ms]





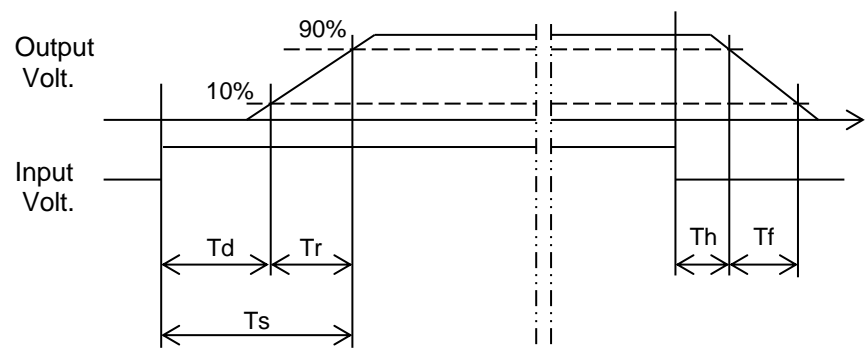
Model		MGFW1R52412	Temperature	25°C
Item		Rise and Fall Time	Testing Circuitry	Figure A
Object		-12V0.065A		



2. Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.6	0.9	2.5	0.4	8.3
100 %	1.6	1.1	2.7	0.3	4.2

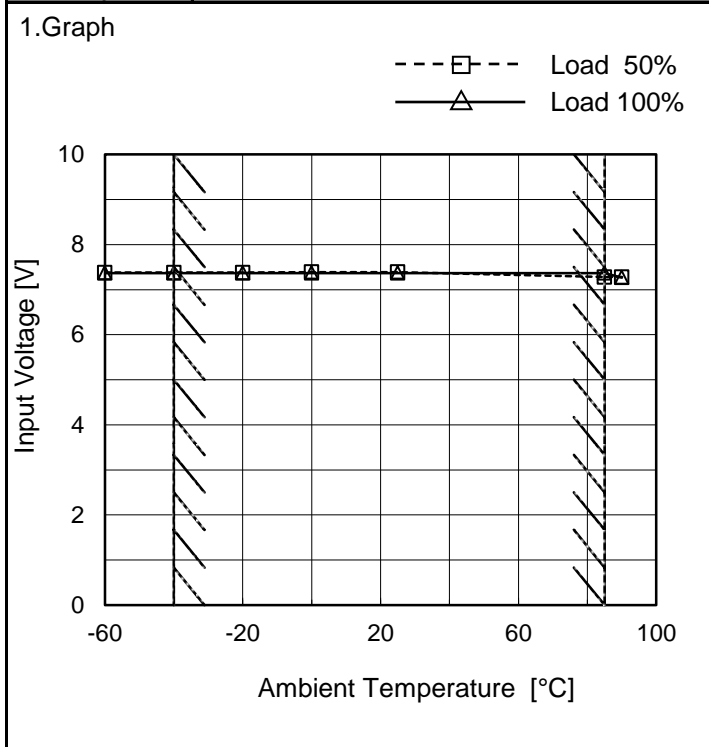
[ms]





Model	MGFW1R52412
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.065A

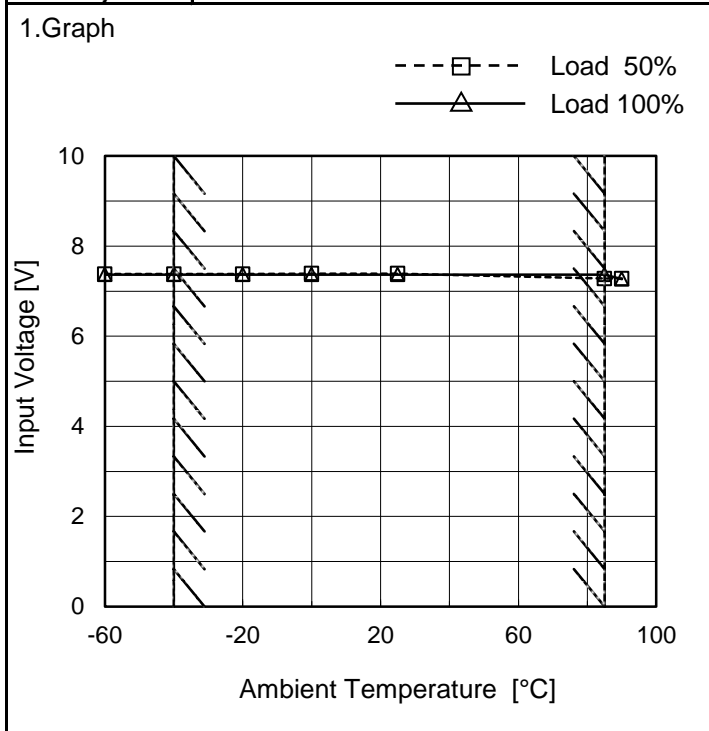
Testing Circuitry Figure A



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.4	7.4
-40	7.4	7.4
-20	7.4	7.4
0	7.4	7.4
25	7.4	7.4
85	7.3	7.4
90	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

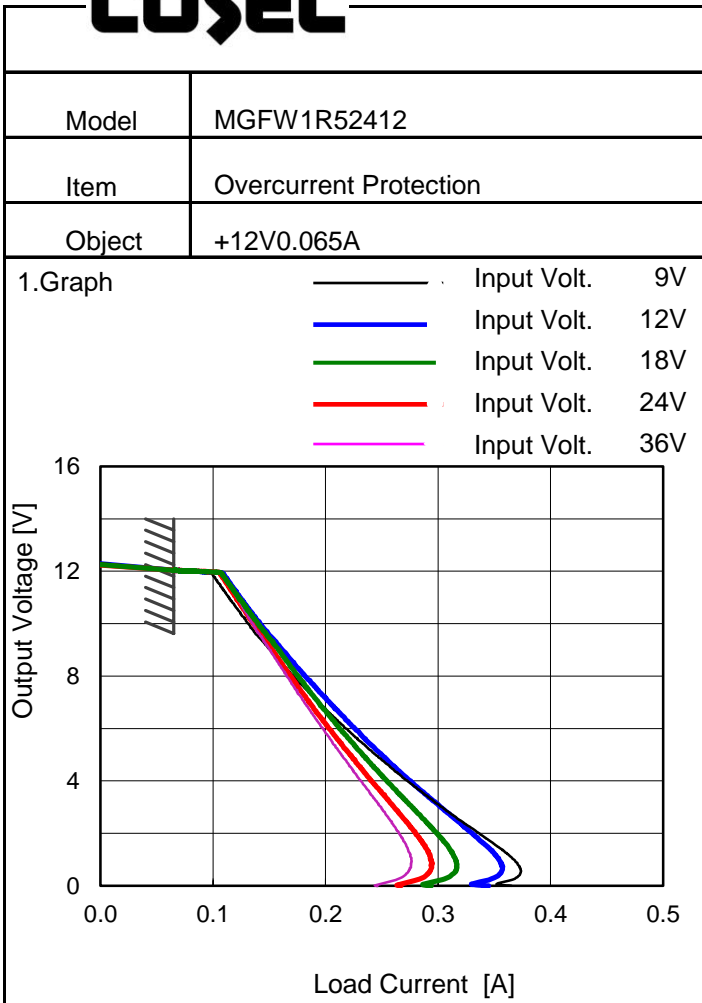
Object	-12V0.065A
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2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.4	7.4
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90	7.3	7.3
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--	-	-
--	-	-
--	-	-

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

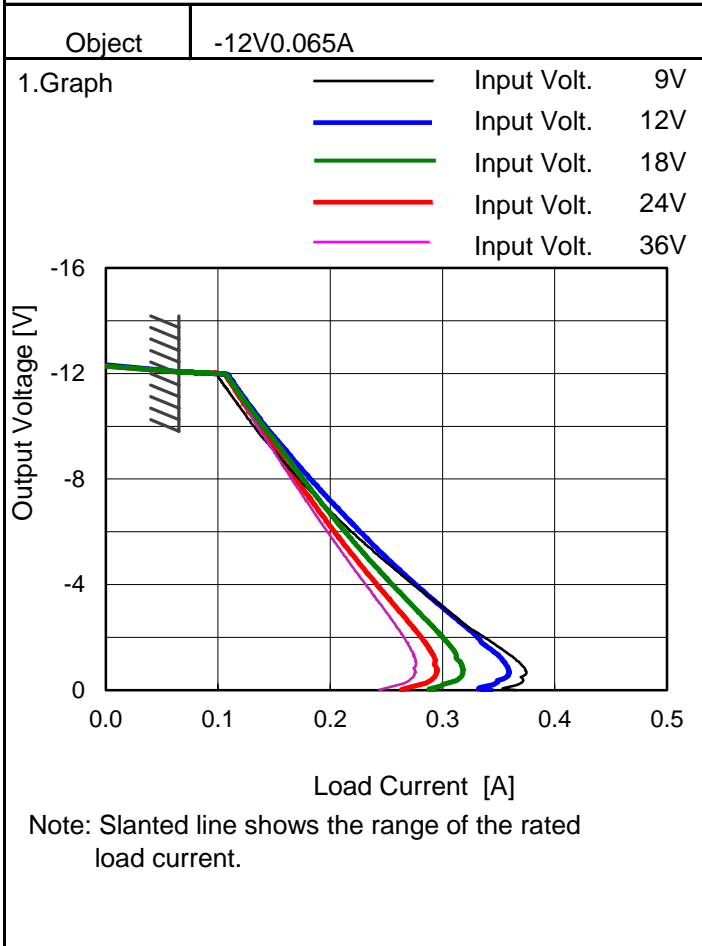


Temperature 25°C  
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
11.4	0.107	0.117	0.116	0.114	0.116
10.8	0.117	0.127	0.126	0.124	0.124
9.6	0.138	0.149	0.147	0.143	0.141
8.4	0.163	0.173	0.168	0.162	0.159
7.2	0.189	0.199	0.190	0.182	0.178
6.0	0.218	0.226	0.212	0.203	0.197
4.8	0.250	0.255	0.237	0.226	0.218
3.6	0.284	0.285	0.263	0.249	0.239
2.4	0.323	0.319	0.290	0.273	0.259
1.2	0.361	0.350	0.313	0.293	0.275
0.0	0.365	0.345	0.294	0.267	0.246
--	-	-	-	-	-

-12V: Rated Load Current



2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-11.4	0.108	0.118	0.116	0.115	0.116
-10.8	0.118	0.128	0.127	0.124	0.124
-9.6	0.139	0.150	0.147	0.143	0.141
-8.4	0.163	0.174	0.169	0.163	0.159
-7.2	0.190	0.199	0.190	0.182	0.178
-6.0	0.218	0.226	0.213	0.203	0.197
-4.8	0.251	0.255	0.238	0.226	0.217
-3.6	0.286	0.287	0.264	0.249	0.238
-2.4	0.322	0.320	0.291	0.273	0.259
-1.2	0.364	0.352	0.312	0.293	0.275
0.0	0.366	0.343	0.292	0.265	0.245
--	-	-	-	-	-

+12V: Rated Load Current



<p>Model MGFW1R52412</p>		<p>Temperature 25°C</p>																																																																														
<p>Item Switching frequency (by Load Current)</p>		<p>Testing Circuitry Figure A</p>																																																																														
<p>Object +/-12V0.065A</p>																																																																																
<p>1.Graph</p> <p>                     —△— Input Volt. 9V                      - - - □ - - - Input Volt. 12V                      - · · * · · - · - Input Volt. 18V                      - · - ○ - · - - Input Volt. 24V                      - - - ◇ - - - Input Volt. 36V                 </p> <p>Switching Frequency [kHz]</p> <p>Load Current [A]</p>		<p>2.Values</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. 9[V]</th> <th>Input Volt. 12[V]</th> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>512</td><td>607</td><td>700</td><td>750</td><td>869</td></tr> <tr><td>0.013</td><td>360</td><td>442</td><td>547</td><td>612</td><td>673</td></tr> <tr><td>0.026</td><td>277</td><td>353</td><td>450</td><td>514</td><td>581</td></tr> <tr><td>0.039</td><td>224</td><td>291</td><td>382</td><td>443</td><td>511</td></tr> <tr><td>0.052</td><td>187</td><td>248</td><td>332</td><td>389</td><td>455</td></tr> <tr><td>0.065</td><td>161</td><td>215</td><td>293</td><td>347</td><td>410</td></tr> <tr><td>0.072</td><td>150</td><td>202</td><td>277</td><td>330</td><td>391</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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.000	512	607	700	750	869	0.013	360	442	547	612	673	0.026	277	353	450	514	581	0.039	224	291	382	443	511	0.052	187	248	332	389	455	0.065	161	215	293	347	410	0.072	150	202	277	330	391	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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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>																																																																																



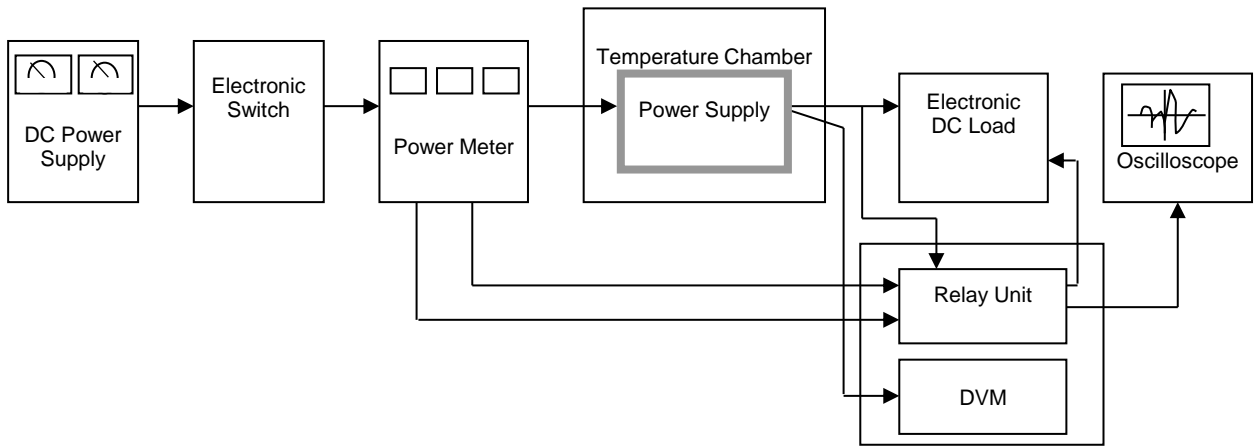


Figure A

Data Acquisition/Control Unit

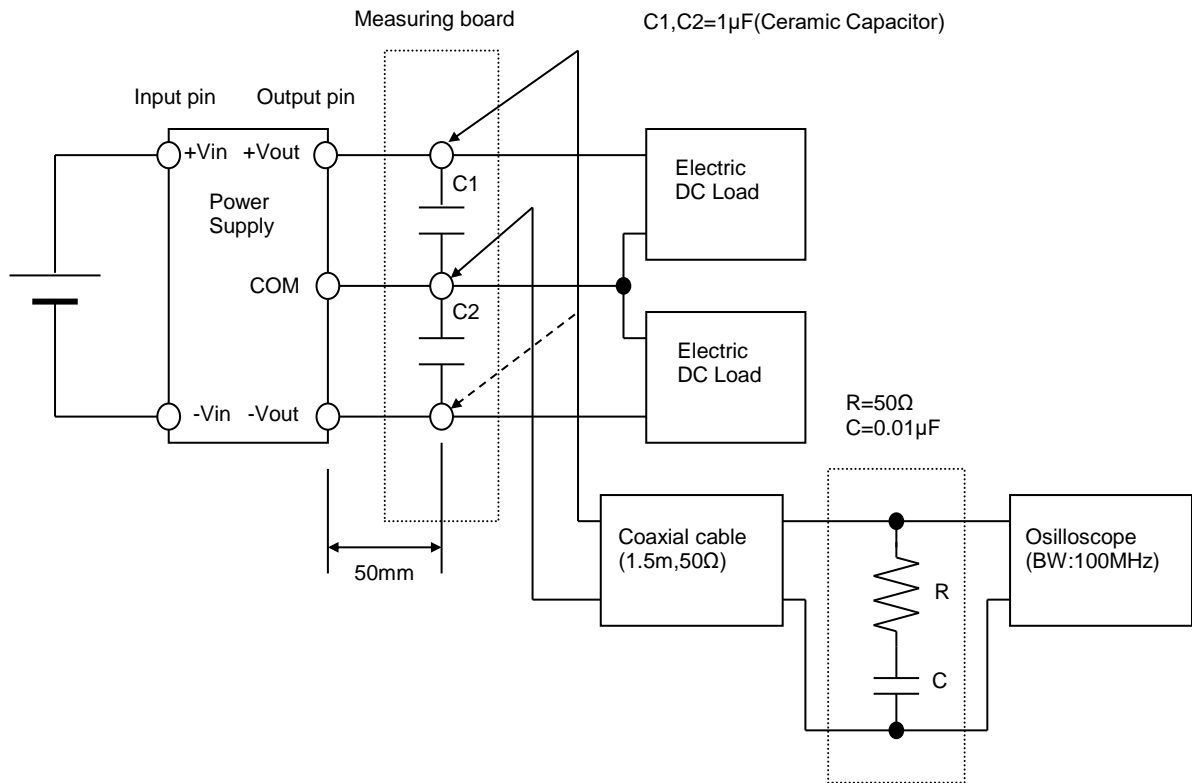


Figure B (Ripple and Ripple noise Characteristic)