

# TEST DATA OF MGFS402405

Regulated DC Power Supply  
December 5, 2018

Approved by : Junichi Hatagishi  
Junichi Hatagishi Design Manager

Prepared by : Shohei Mukaide  
Shohei Mukaide Design Engineer

**COSEL CO.,LTD.**



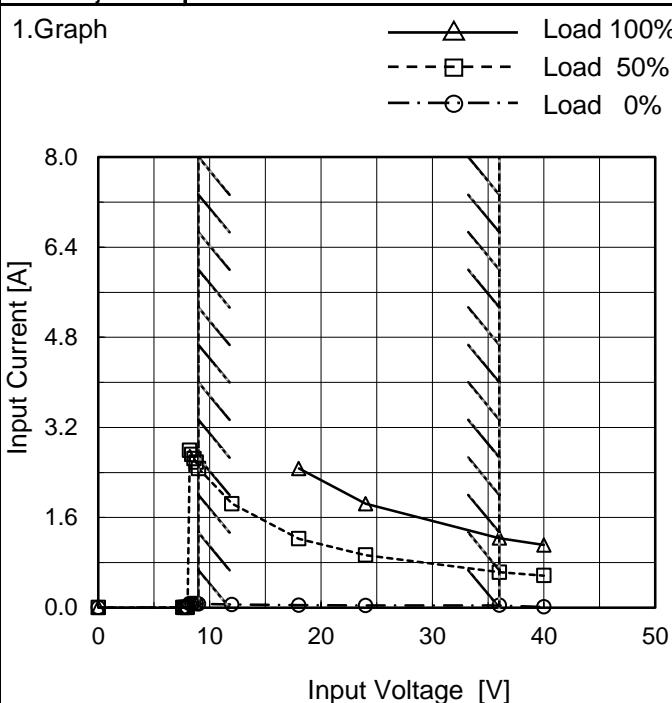
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(Final Page 20)

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Model	MGFS402405
Item	Input Current (by Input Voltage)
Object	_____



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

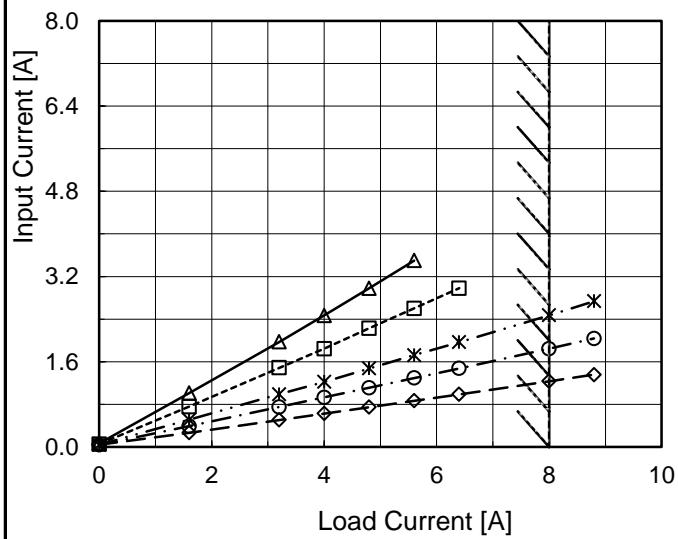
Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
7.6	0.004	0.004	-
7.8	0.004	0.004	-
8.0	0.004	0.004	-
8.2	0.072	2.795	-
8.4	0.070	2.716	-
8.6	0.069	2.647	-
8.8	0.068	2.581	-
9.0	0.067	2.469	-
12.0	0.054	1.844	-
18.0	0.043	1.223	2.471
24.0	0.038	0.932	1.845
36.0	0.040	0.627	1.235
40.0	0.013	0.568	1.112
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

※During this area, overcurrent protection activates and power supply operates in hiccup mode.

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Model	MGFS402405	Temperature Testing Circuitry	25°C Figure A																																																																														
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Object	_____																																																																																
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※1 Maximum output current at minimum input Voltage is 70% of rated load current.

※2 Maximum output current at 12V input Voltage is 80% of rated load current.

Refer to instruction manuals for details of input derating.

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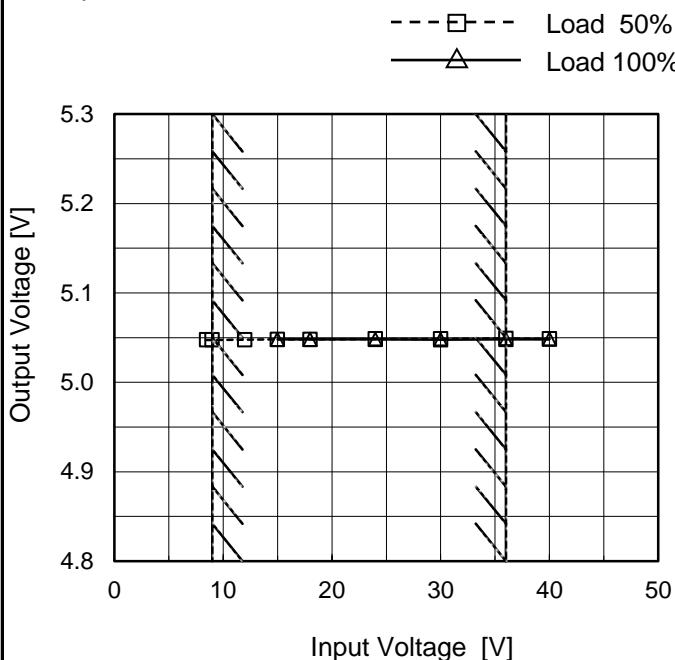
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**COSEL**

Model	MGFS402405	Temperature	25°C
Item	Line Regulation	Testing Circuitry	Figure A
Object	+5V8A		

## 1.Graph



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

## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.5	5.047	-
9.0	5.048	-
12.0	5.048	-
15.0	5.048	5.048
18.0	5.048	5.048
24.0	5.049	5.048
30.0	5.049	5.048
36.0	5.049	5.048
40.0	5.049	5.048

※1 Maximum output current at minimum input Voltage is 70% of rated load current.

※2 Maximum output current at 12V input Voltage is 80% of rated load current.

Refer to instruction manuals for details of input derating.

**COSEL**

Model	MGFS402405																																																																																	
Item	Load Regulation																																																																																	
Object	+5V8A																																																																																	
1.Graph	<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>Input Volt. 9V</li> <li>Input Volt. 12V</li> <li>Input Volt. 18V</li> <li>Input Volt. 24V</li> <li>Input Volt. 36V</li> </ul>																																																																																	
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2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="5">Output Voltage [V]</th> </tr> <tr> <th>9[V]</th> <th>12[V]</th> <th>18[V]</th> <th>24[V]</th> <th>36[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>5.050</td> <td>5.049</td> <td>5.050</td> <td>5.051</td> <td>5.051</td> </tr> <tr> <td>1.6</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> <td>5.050</td> <td>5.050</td> </tr> <tr> <td>3.2</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>4.0</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>4.8</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>5.6</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.049</td> </tr> <tr> <td>6.4</td> <td>-※1</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> <td>5.049</td> </tr> <tr> <td>8.0</td> <td>-※1</td> <td>-※2</td> <td>5.048</td> <td>5.048</td> <td>5.048</td> </tr> <tr> <td>8.8</td> <td>-※1</td> <td>-※2</td> <td>5.048</td> <td>5.048</td> <td>5.048</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]					9[V]	12[V]	18[V]	24[V]	36[V]	0.0	5.050	5.049	5.050	5.051	5.051	1.6	5.049	5.049	5.049	5.050	5.050	3.2	5.048	5.048	5.048	5.049	5.049	4.0	5.048	5.048	5.048	5.049	5.049	4.8	5.048	5.048	5.048	5.049	5.049	5.6	5.048	5.048	5.048	5.048	5.049	6.4	-※1	5.048	5.048	5.048	5.049	8.0	-※1	-※2	5.048	5.048	5.048	8.8	-※1	-※2	5.048	5.048	5.048	--	-	-	-	-	-	--	-	-	-	-	-
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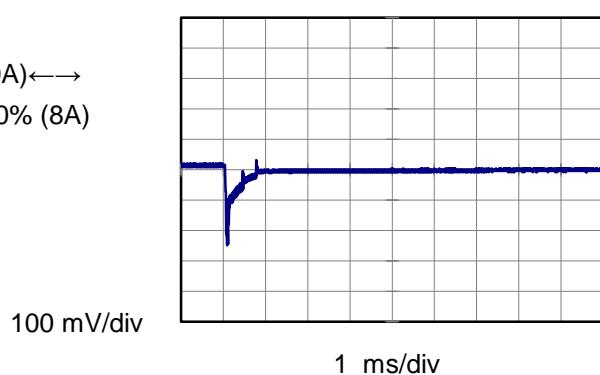
**COSEL**

Model	MGFS402405	Temperature Testing Circuitry Figure A	25°C
Item	Dynamic Load Response		Figure A
Object	+5V8A		

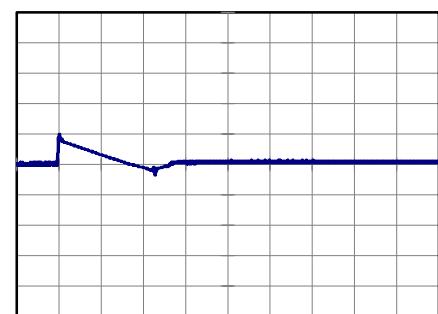
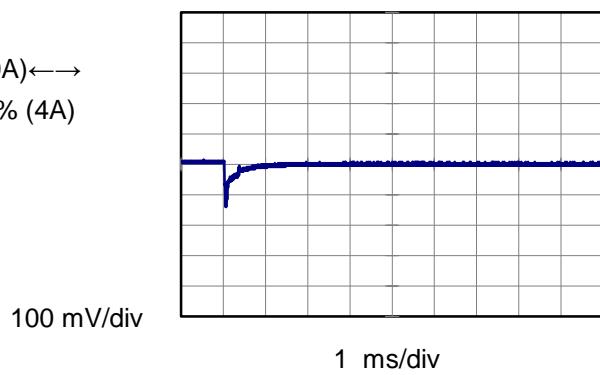
Input Volt. 24 V  
 Cycle 100 ms



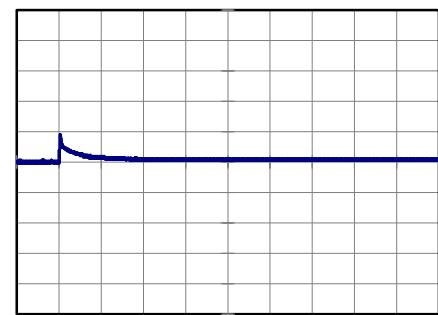
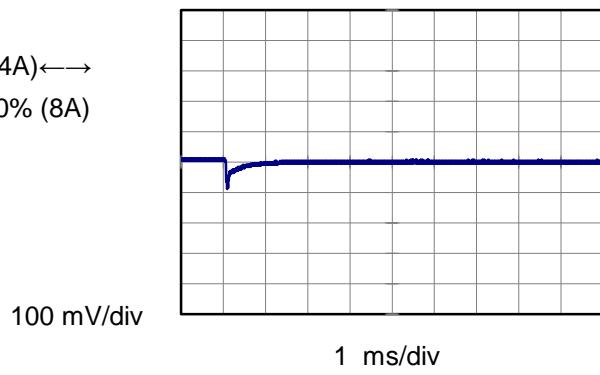
Min.Load (0A)↔  
 Load 100% (8A)



Min.Load (0A)↔  
 Load 50% (4A)



Load 50% (4A)↔  
 Load 100% (8A)

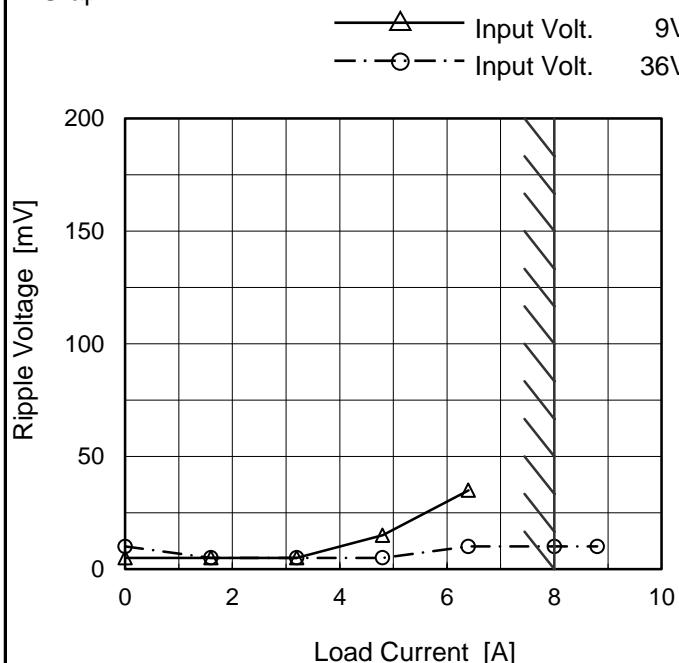


**COSEL**

Model	MGFS402405
Item	Ripple Voltage (by Load Current)
Object	+5V8A

Temperature 25°C  
Testing Circuitry Figure B

## 1.Graph



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.

## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	10
1.6	5	5
3.2	5	5
4.8	15	5
6.4	35	10
8.0	-	10
8.8	-	10
--	-	-
--	-	-
--	-	-
--	-	-

※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.

Ripple [mVp-p]

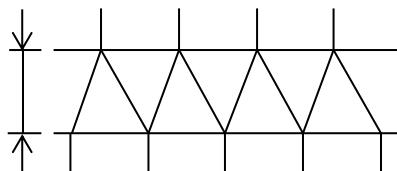


Fig.Complex Ripple Wave Form

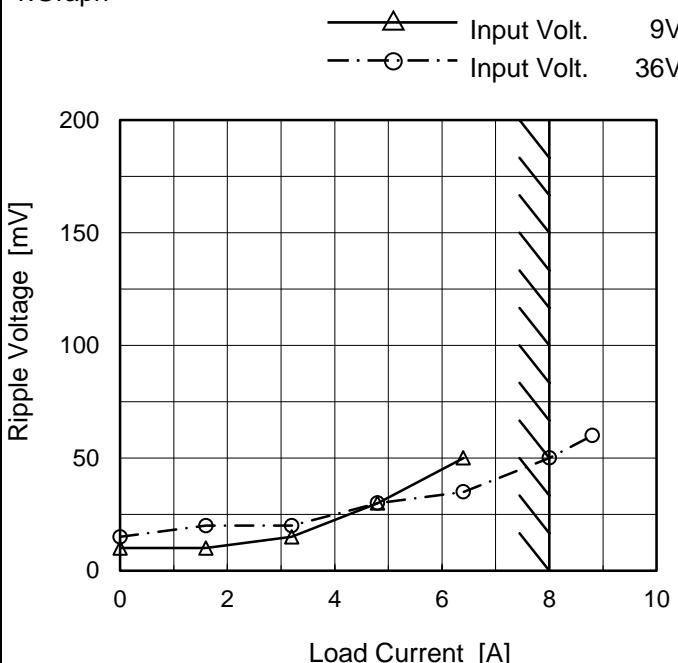
**COSEL**

Model MGFS402405

Item Ripple-Noise

Object +5V8A

## 1. Graph



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]

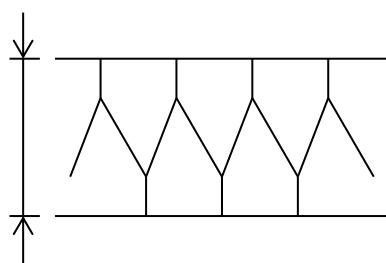


Fig.Complex Ripple Noise Wave Form

Temperature 25°C  
Testing Circuitry Figure B

## 2. Values

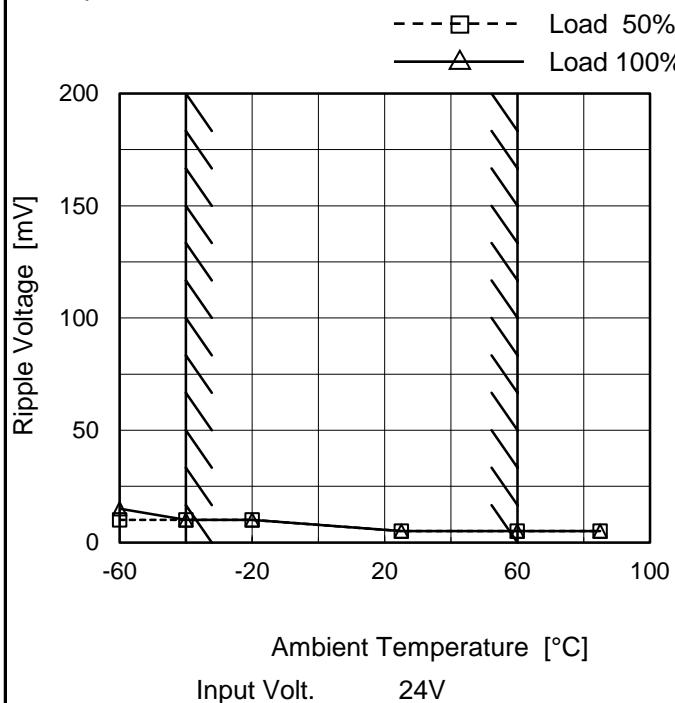
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	10	15
1.6	10	20
3.2	15	20
4.8	30	30
6.4	50	35
8.0	-	50
8.8	-	60
--	-	-
--	-	-
--	-	-
--	-	-

※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.

**COSEL**

Model	MGFS402405
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V8A

## 1. Graph



Measured by 100 MHz Oscilloscope.

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

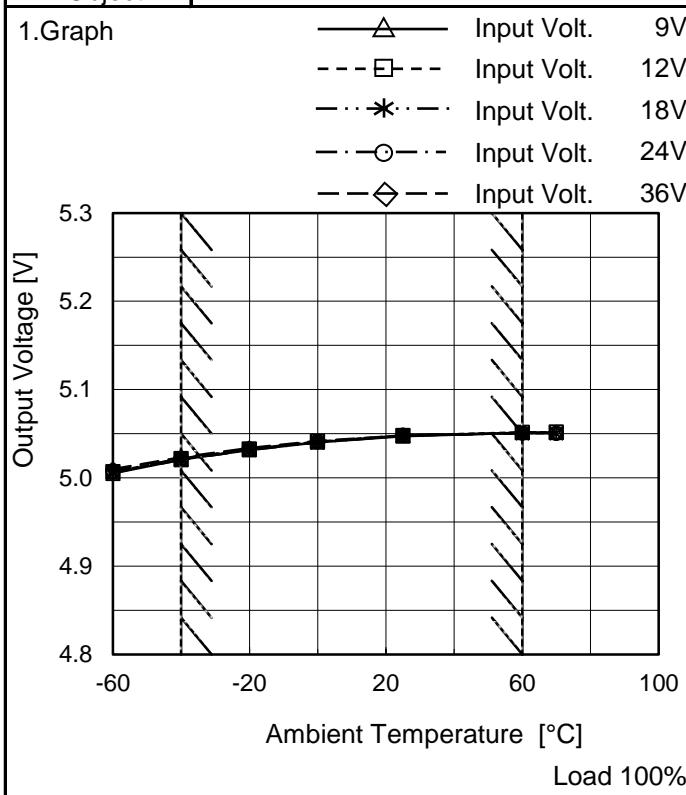
Testing Circuitry Figure B

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	15
-40	10	10
-20	10	10
25	5	5
60	5	5
85	5	5
--	--	--
--	--	--
--	--	--
--	--	--
--	--	--

**COSEL**

Model	MGFS402405
Item	Ambient Temperature Drift
Object	+5V8A



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

### Testing Circuitry Figure A

#### 2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	9[V]	12[V]	18[V]	24[V]	36[V]
-60	5.005	5.007	5.006	5.008	5.010
-40	5.021	5.022	5.020	5.022	5.023
-20	5.032	5.032	5.031	5.033	5.034
0	5.040	5.041	5.040	5.041	5.042
25	5.047	5.048	5.048	5.048	5.048
60	5.051	5.051	5.050	5.051	5.051
70	5.051	5.052	5.050	5.050	5.050
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Note: In case of input Volt.9V, Load 70%.  
12V, Load 80%.  
Other case Load 100%.



Model	MGFS402405	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+5V8A	

### 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 - 60°C

Input Voltage : 9 - 36V

Load Current : 0 - 8A

\* 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	60	9	0	5.054	±17	±0.3
Minimum Voltage	-40	18	8	5.020		

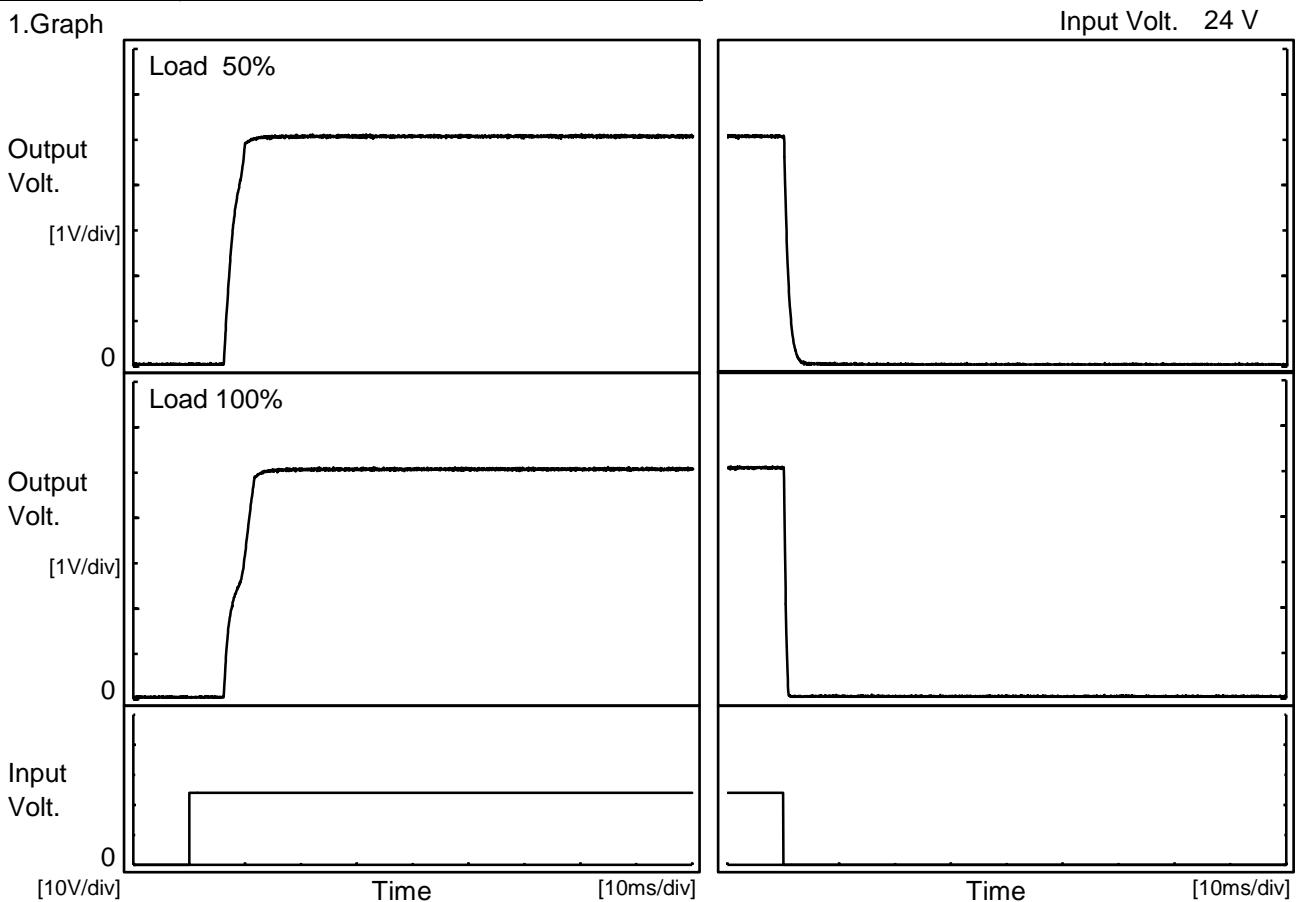
**COSEL**

Model	MGFS402405	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+5V8A																								
1. Graph			2. Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 24V Load 100%</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>5.048</td></tr> <tr><td>0.5</td><td>5.051</td></tr> <tr><td>1.0</td><td>5.051</td></tr> <tr><td>2.0</td><td>5.051</td></tr> <tr><td>3.0</td><td>5.051</td></tr> <tr><td>4.0</td><td>5.051</td></tr> <tr><td>5.0</td><td>5.051</td></tr> <tr><td>6.0</td><td>5.051</td></tr> <tr><td>7.0</td><td>5.051</td></tr> <tr><td>8.0</td><td>5.051</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	5.048	0.5	5.051	1.0	5.051	2.0	5.051	3.0	5.051	4.0	5.051	5.0	5.051	6.0	5.051	7.0	5.051	8.0	5.051
Time since start [H]	Output Voltage [V]																								
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**COSEL**

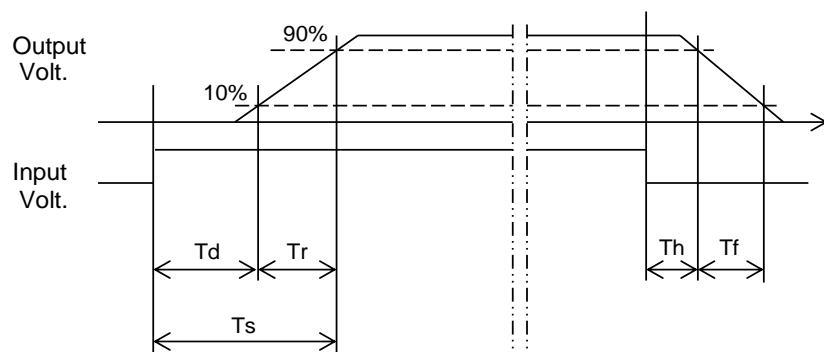
Model	MGFS402405	Temperature Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+5V8A	

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		6.4	3.3	9.7	0.2	1.6	
100 %		6.4	4.9	11.3	0.2	0.6	

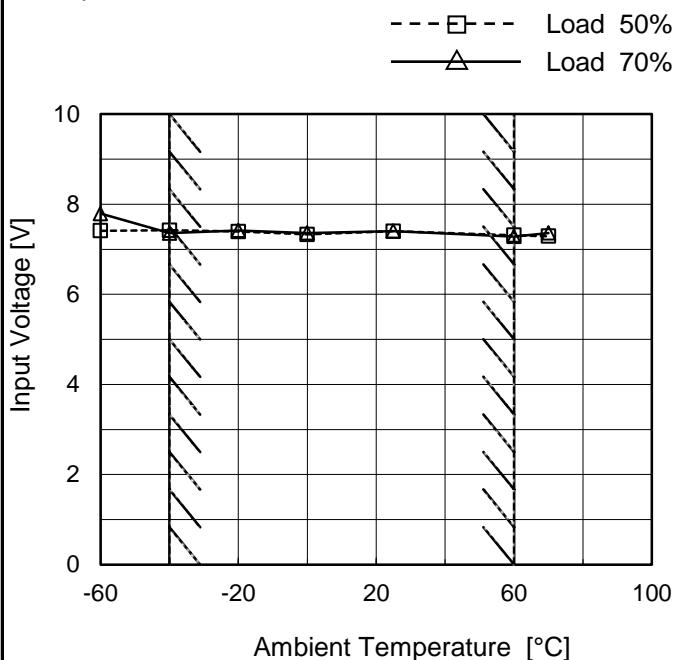


**COSEL**

Model	MGFS402405
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V8A

Testing Circuitry Figure A

## 1. Graph



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

## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 70%
-60	7.5	7.8
-40	7.5	7.4
-20	7.4	7.5
0	7.4	7.4
25	7.4	7.4
60	7.4	7.3
70	7.3	7.4
--	-	-
--	-	-
--	-	-
--	-	-



Model	MGFS402405	Temperature Testing Circuitry	25°C Figure A																																																																																			
Item	Overcurrent Protection																																																																																					
Object	+5V8A																																																																																					
1.Graph		<p>—△— Input Volt. 9V            —□— Input Volt. 12V            —*— Input Volt. 18V            —○— Input Volt. 24V            —◇— Input Volt. 36V</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>Intermittent operation activates when overcurrent protection is activated.</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>9[V]</th> <th>12[V]</th> <th>18[V]</th> <th>24[V]</th> <th>36[V]</th> </tr> </thead> <tbody> <tr><td>5.00</td><td>6.575</td><td>7.821</td><td>9.465</td><td>9.644</td><td>9.645</td></tr> <tr><td>4.75</td><td>-</td><td>※1</td><td>※2</td><td>-</td><td>-</td></tr> <tr><td>4.50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>4.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>3.50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>3.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2.50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Output Voltage [V]	Load Current [A]					9[V]	12[V]	18[V]	24[V]	36[V]	5.00	6.575	7.821	9.465	9.644	9.645	4.75	-	※1	※2	-	-	4.50	-	-	-	-	-	4.00	-	-	-	-	-	3.50	-	-	-	-	-	3.00	-	-	-	-	-	2.50	-	-	-	-	-	2.00	-	-	-	-	-	1.50	-	-	-	-	-	1.00	-	-	-	-	-	0.50	-	-	-	-	-	0.00	-	-	-	-	-
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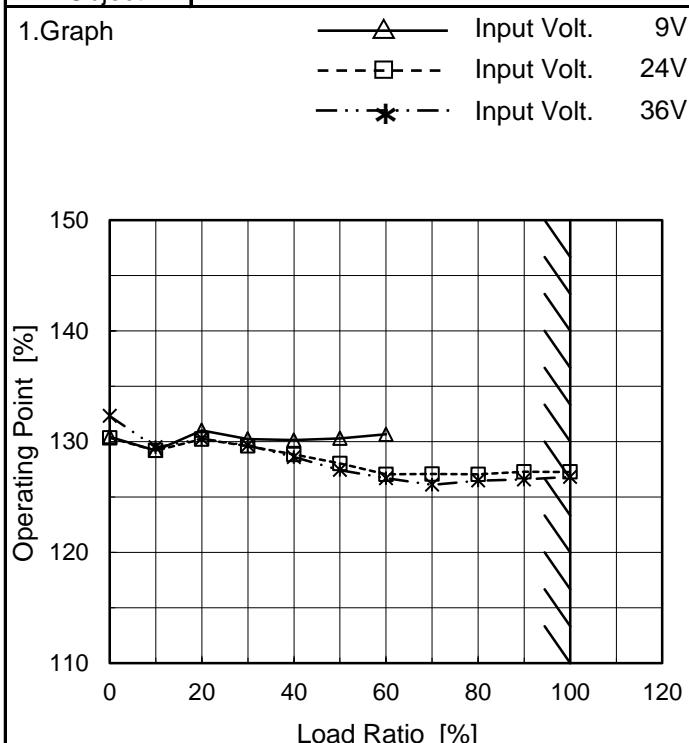
※1 Maximum output current at minimum input Voltage is 70% of rated load current.

※2 Maximum output current at 12V input Voltage is 80% of rated load current.

Refer to instruction manuals for details of input derating.

**COSEL**

Model	MGFS402405
Item	Overvoltage Protection
Object	+5V8A


 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

Load Ratio [%]	Operating Point [%]		
	Input Volt. 9[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	130	130	132
10	129	129	129
20	131	130	130
30	130	130	130
40	130	129	129
50	130	128	127
60	131	127	127
70	- ※	127	126
80	- ※	127	126
90	- ※	127	127
100	- ※	127	127

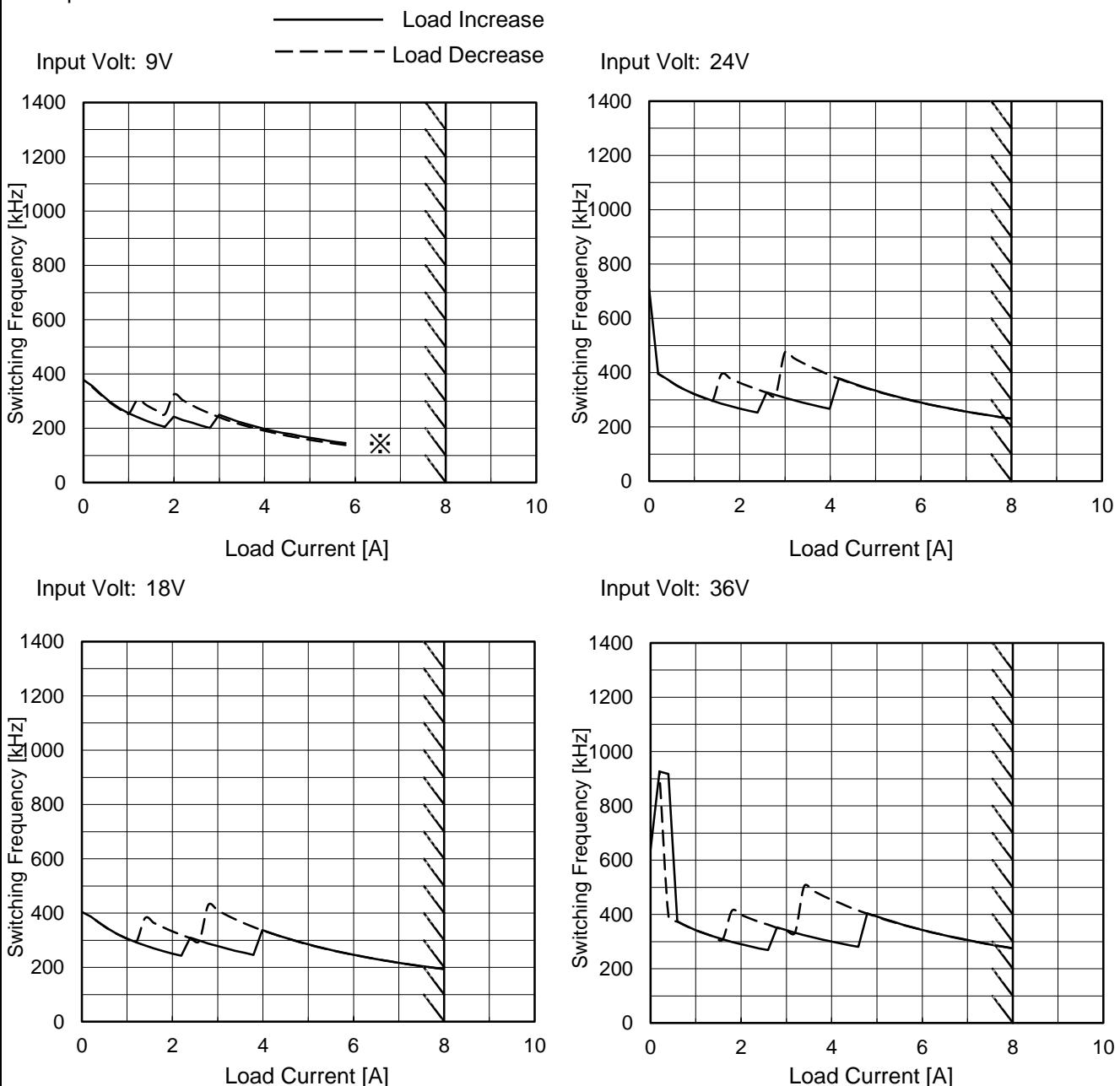
※During this area, overcurrent protection activates.

**COSEL**

Model	MGFS402405
Item	Switching frequency (by Load Current)
Object	+5V8A

Temperature 25°C  
Testing Circuitry Figure A

### 1. Graph



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

-switching frequency of MG40 changes depending on load current and input voltage.

When load current is low, switching frequency becomes high and step down to low frequency at certain point. There is hysteresis, so characteristic is different between load increase (sweep from 0% to 100%) and load decrease (sweep from 100% to 0%).

-When load current is low, MG40 operates intermittently, so switching frequency can not be stable.

※ Maximum output current at minimum input Voltage is 70% of rated load current.

Refer to instruction manuals for details of input derating.

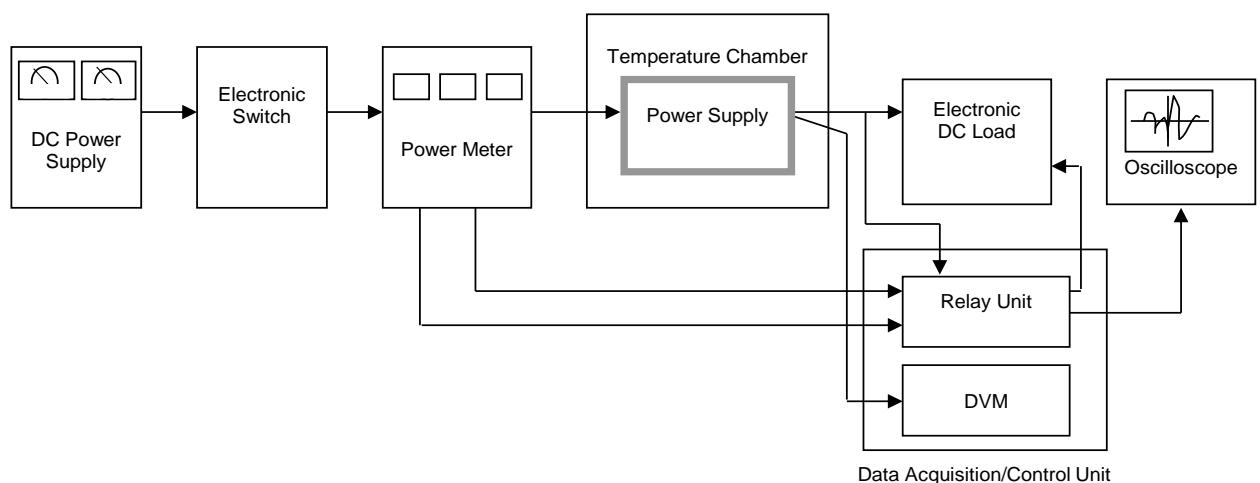


Figure A

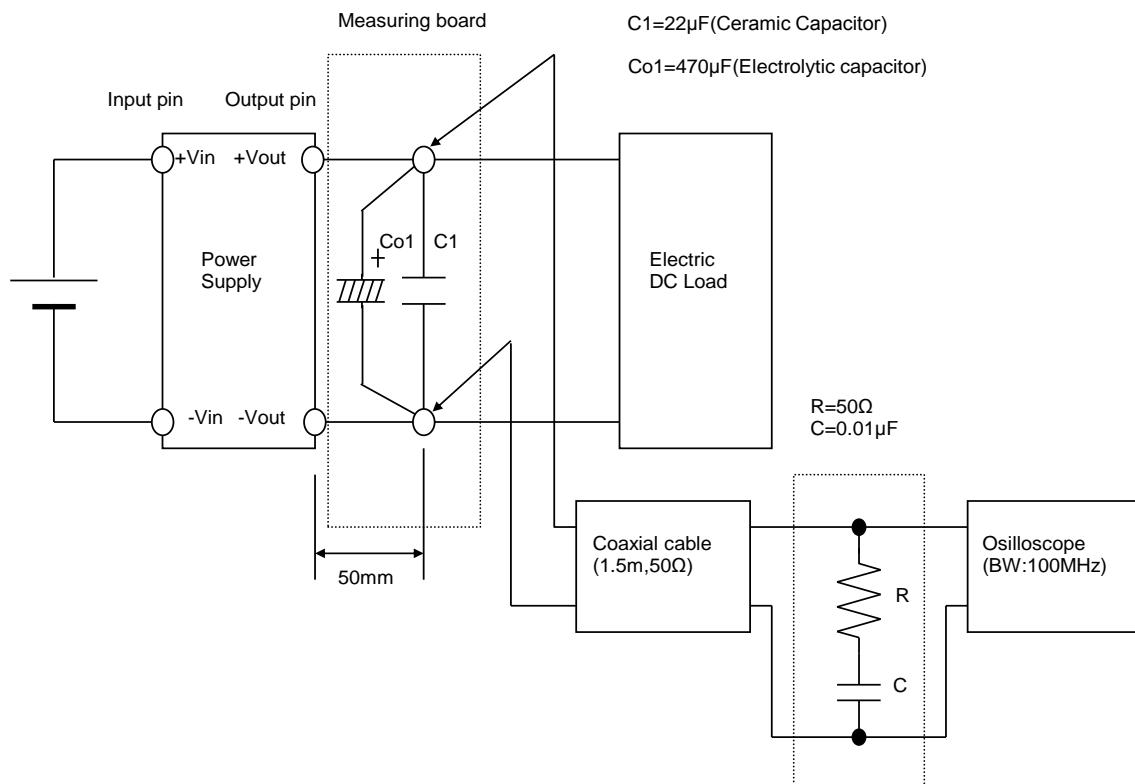


Figure B (Ripple and Ripple noise Characteristic)