

# TEST DATA OF MGFW402412

Regulated DC Power Supply  
November 29, 2018

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Junichi Hatagishi Design Manager

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**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) . . . . .	10
10.Ripple-Noise . . . . .	12
11.Ripple Voltage (by Ambient Temperature) . . . . .	14
12.Ambient Temperature Drift . . . . .	15
13.Output Voltage Accuracy . . . . .	16
14.Time Lapse Drift . . . . .	17
15.Rise and Fall Time . . . . .	18
16.Minimum Input Voltage for Regulated Output Voltage . . . . .	20
17.Overcurrent Protection . . . . .	21
18.Oversvoltage Protection . . . . .	22
19.Switching frequency (by Load Current) . . . . .	23
20.Figure of Testing Circuitry . . . . .	24

(Final Page 24)

Model		MGFW402412		Temperature 25°C	
Item		Input Current (by Input Voltage)		Testing Circuitry Figure A	
Object		_____			
1.Graph				2.Values	
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Model		MGFW402412		Temperature 25°C																																																																												
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																																												
Object																																																																																
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<div><div>Input Current [A]</div><div><div>Load Ratio [%]</div></div></div>		<table><tr><th rowspan="2">Load Ratio [%]</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><tr><td>0</td><td>0.062</td><td>0.049</td><td>0.038</td><td>0.023</td><td>0.017</td></tr><tr><td>20</td><td>1.034</td><td>0.775</td><td>0.520</td><td>0.394</td><td>0.270</td></tr><tr><td>40</td><td>2.011</td><td>1.508</td><td>1.009</td><td>0.760</td><td>0.514</td></tr><tr><td>60</td><td>3.039</td><td>2.251</td><td>1.495</td><td>1.123</td><td>0.756</td></tr><tr><td>80</td><td>- ※1</td><td>3.015</td><td>1.998</td><td>1.495</td><td>1.000</td></tr><tr><td>100</td><td>- ※1</td><td>- ※2</td><td>2.516</td><td>1.875</td><td>1.249</td></tr><tr><td>110</td><td>- ※1</td><td>- ※2</td><td>2.772</td><td>2.071</td><td>1.377</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></table>		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	0.062	0.049	0.038	0.023	0.017	20	1.034	0.775	0.520	0.394	0.270	40	2.011	1.508	1.009	0.760	0.514	60	3.039	2.251	1.495	1.123	0.756	80	- ※1	3.015	1.998	1.495	1.000	100	- ※1	- ※2	2.516	1.875	1.249	110	- ※1	- ※2	2.772	2.071	1.377	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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				<div>※1 Maximum output current at minimum input Voltage is 70% of rated load current.</div> <div>※2 Maximum output current at 12V input Voltage is 80% of rated load current.</div> <div>Refer to instruction manuals for details of input derating.</div>																																																																												

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- 3 -

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1.Graph		2.Values																																	
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30.0	90.3	91.0																																	
36.0	89.6	91.0																																	
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Note: Slanted line shows the range of the rated input voltage.																																			

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				<table><tr><th rowspan="2">Load Ratio [%]</th><th colspan="5">Efficiency [%]</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><tr><td>0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>20</td><td>87.8</td><td>87.8</td><td>87.2</td><td>86.5</td><td>84.2</td></tr><tr><td>40</td><td>90.0</td><td>90.4</td><td>90.2</td><td>89.7</td><td>88.6</td></tr><tr><td>60</td><td>89.6</td><td>90.6</td><td>91.2</td><td>91.3</td><td>90.3</td></tr><tr><td>80</td><td>- ※1</td><td>89.9</td><td>91.0</td><td>91.3</td><td>90.9</td></tr><tr><td>100</td><td>- ※1</td><td>- ※2</td><td>90.5</td><td>91.0</td><td>91.0</td></tr><tr><td>110</td><td>- ※1</td><td>- ※2</td><td>90.1</td><td>90.7</td><td>90.8</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></table>		Load Ratio [%]	Efficiency [%]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	-	-	-	-	-	20	87.8	87.8	87.2	86.5	84.2	40	90.0	90.4	90.2	89.7	88.6	60	89.6	90.6	91.2	91.3	90.3	80	- ※1	89.9	91.0	91.3	90.9	100	- ※1	- ※2	90.5	91.0	91.0	110	- ※1	- ※2	90.1	90.7	90.8	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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				<div>※1 Maximum output current at minimum input Voltage is 70% of rated load current.</div> <div>※2 Maximum output current at 12V input Voltage is 80% of rated load current.</div> <div>Refer to instruction manuals for details of input derating.</div>																																																																														

<div>LOREL</div>			
Model	MGFW402412		
Item	Line Regulation	Temperature	25°C
Object	+12V1.7A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div></div><div><div>—</div><div>△</div><div>—</div></div><div>Load 100%</div></div> <div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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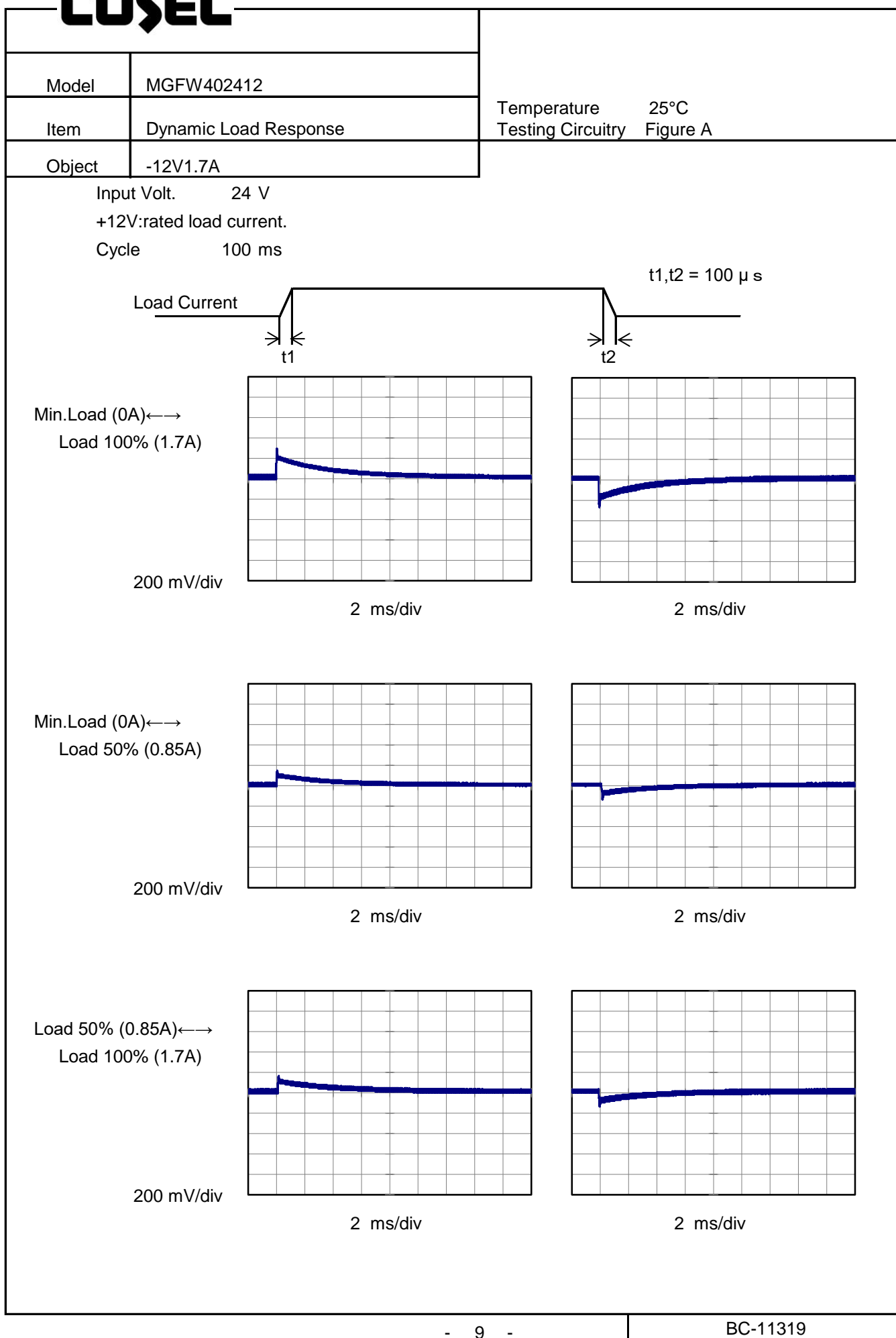




Model MGFW402412		Temperature 25°C																																																																														
Item Load Regulation		Testing Circuitry Figure A																																																																														
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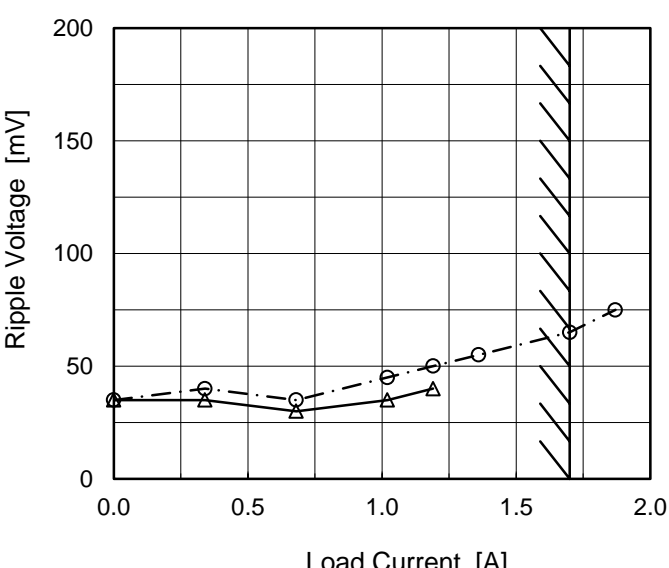
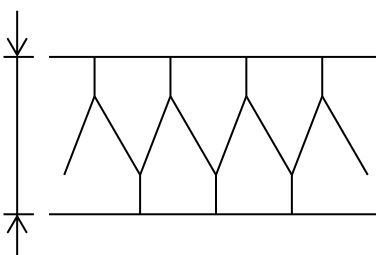


**COSEL**



Model		MGFW402412		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																							
Object		+12V1.7A																																									
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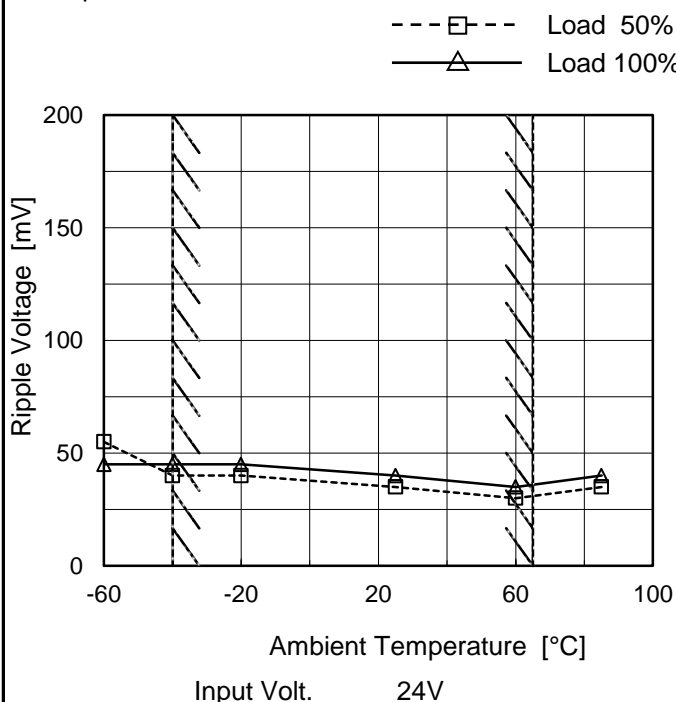
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Model	MGFW402412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V1.7A

### 1.Graph



### Testing Circuitry Figure B

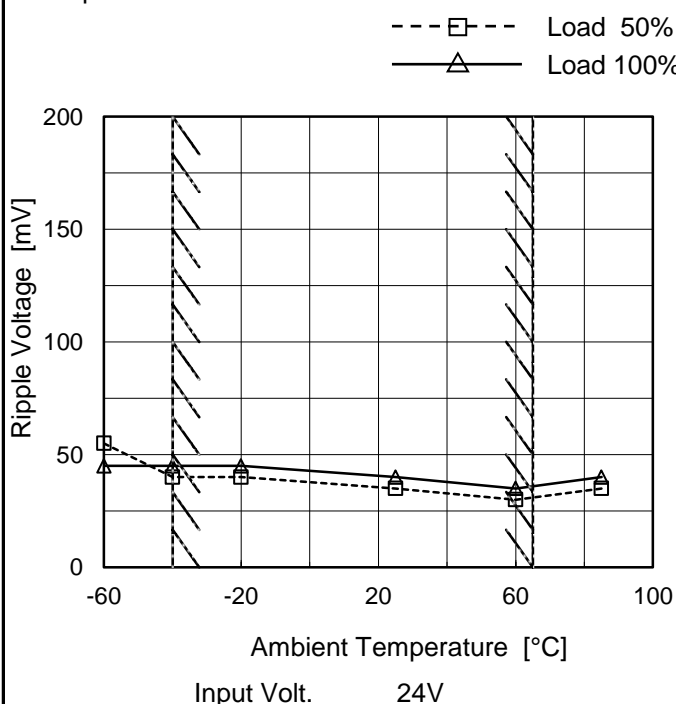
### 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	55	45
-40	40	45
-20	40	45
25	35	40
60	30	35
85	35	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V1.7A
--------	----------

### 1.Graph



Measured by 100 MHz Oscilloscope.

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

### 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	55	45
-40	40	45
-20	40	45
25	35	40
60	30	35
85	35	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current



BC-11319



		Testing Circuitry    Figure A			
Model	MGFW402412				
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 - 65°C

Input Voltage        : 9 - 36V

Load Current (AVR 1) : 0 - 1.7A        (AVR 2) : 0 - 1.7A

\* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

2.Values

Object	+12V1.7A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	65	9	0	12.469	±351	±2.9
Minimum Voltage	65	36	1.7	11.768		

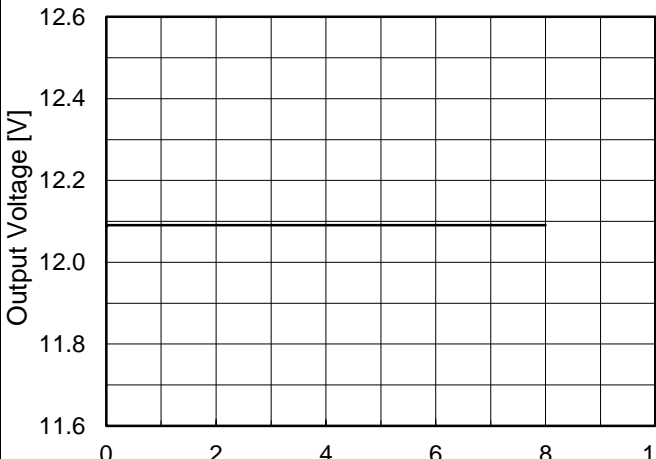
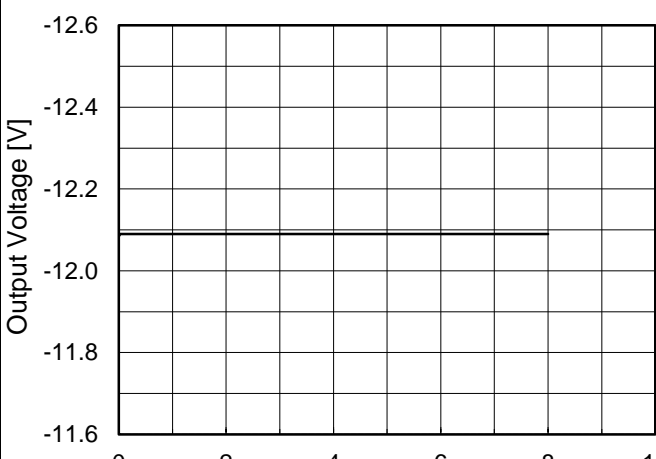
  

Object	-12V1.7A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	65	18	0	-12.422	±354	±3.0
Minimum Voltage	65	9	1.7	-11.715		

- 16 -

BC-11319



Model		MGFW402412		Temperature 25°C																							
Item		Time Lapse Drift		Testing Circuitry Figure A																							
Object		+12V1.7A																									
1.Graph				2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</p><p>Load 100%</p></div>				<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.086</td></tr><tr><td>0.5</td><td>12.091</td></tr><tr><td>1.0</td><td>12.091</td></tr><tr><td>2.0</td><td>12.091</td></tr><tr><td>3.0</td><td>12.091</td></tr><tr><td>4.0</td><td>12.091</td></tr><tr><td>5.0</td><td>12.091</td></tr><tr><td>6.0</td><td>12.091</td></tr><tr><td>7.0</td><td>12.091</td></tr><tr><td>8.0</td><td>12.091</td></tr></table> <p>-12V: Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	12.086	0.5	12.091	1.0	12.091	2.0	12.091	3.0	12.091	4.0	12.091	5.0	12.091	6.0	12.091	7.0	12.091	8.0	12.091
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- 17 -

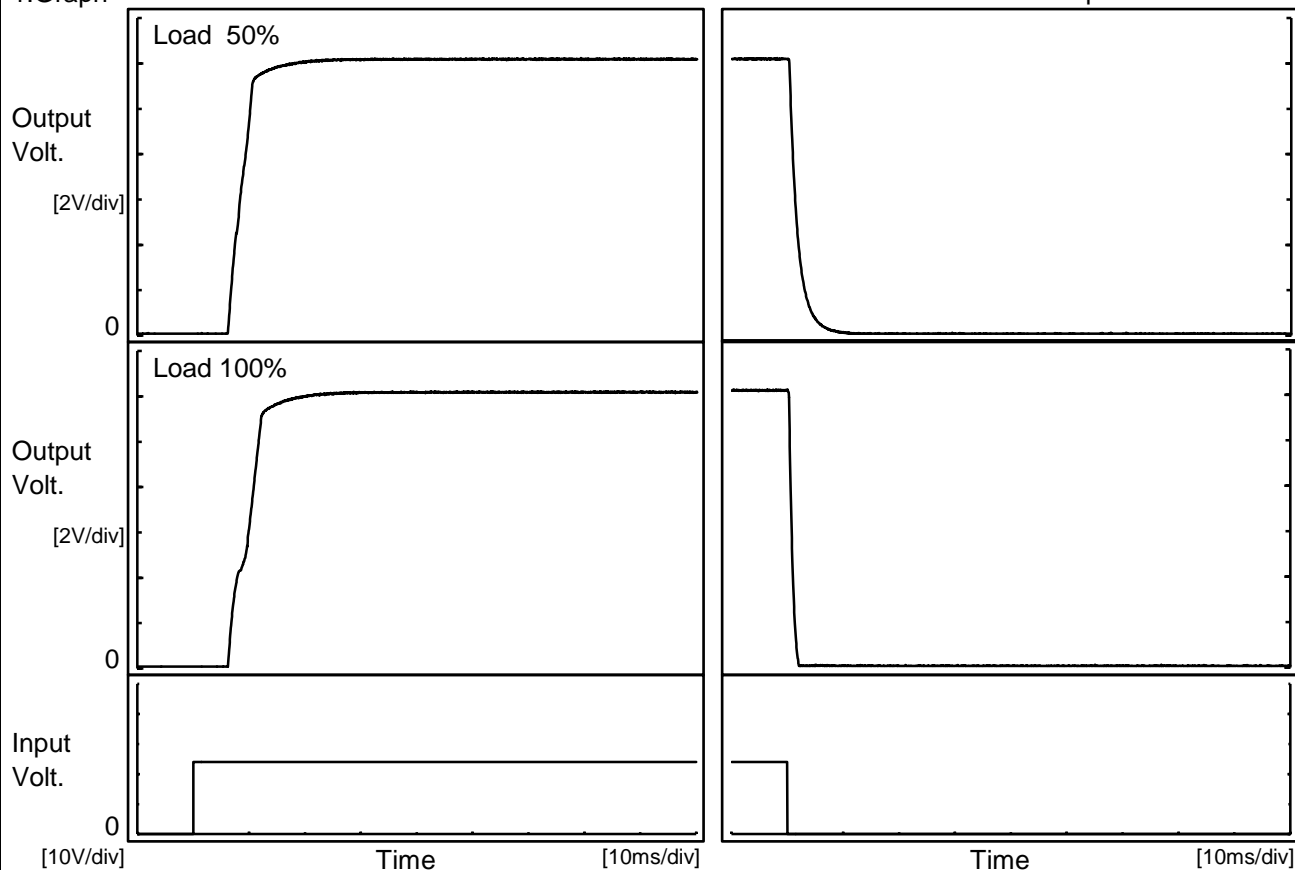
BC-11319



Model	MGFW402412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V1.7A		

# 1.Graph

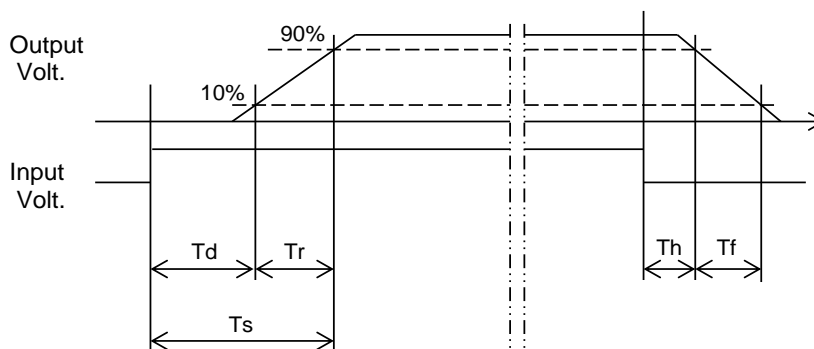
Input Volt. 24 V



# 2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.6	4.0	10.6	0.5	3.3
100 %	6.6	5.6	12.2	0.4	1.2

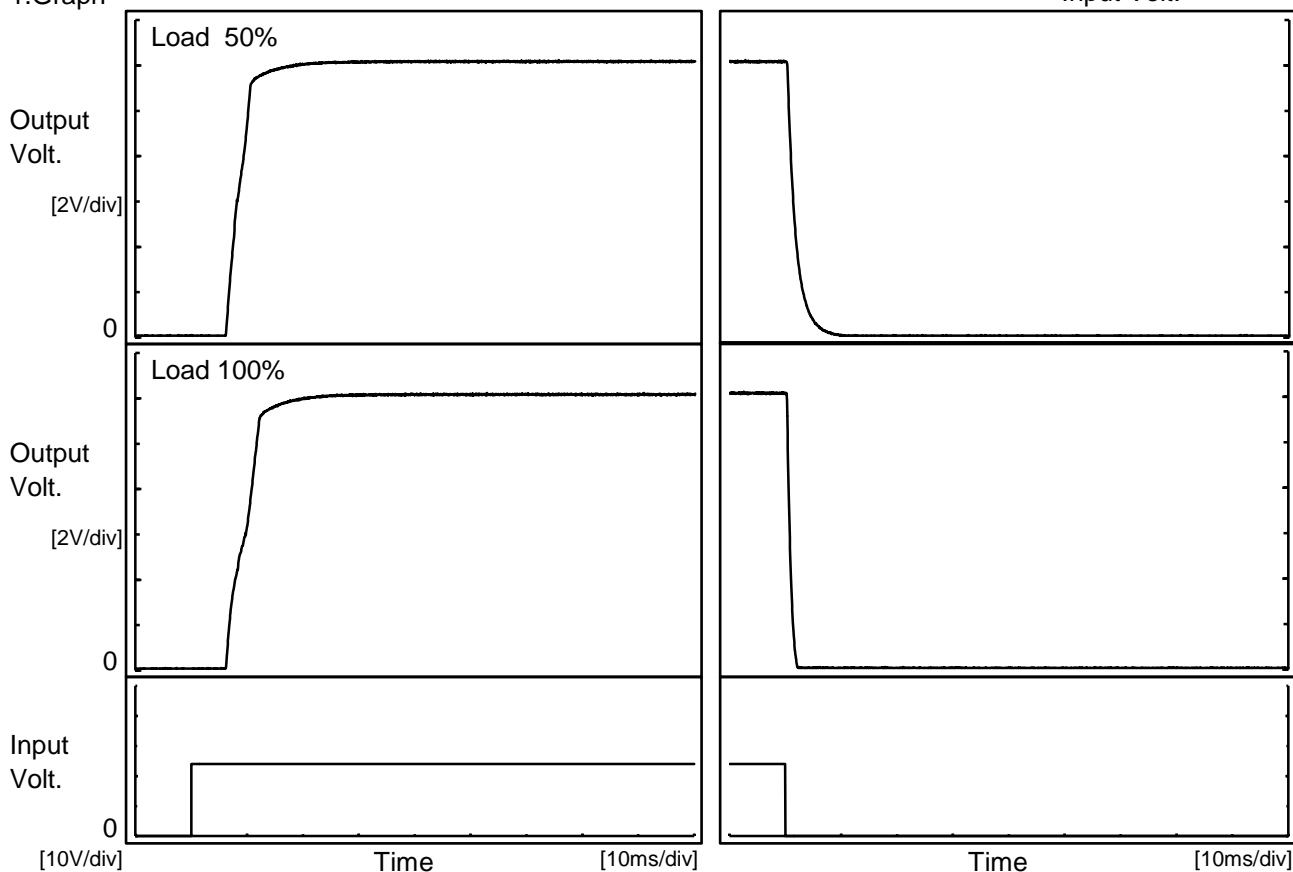




Model	MGFW402412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V1.7A		

# 1.Graph

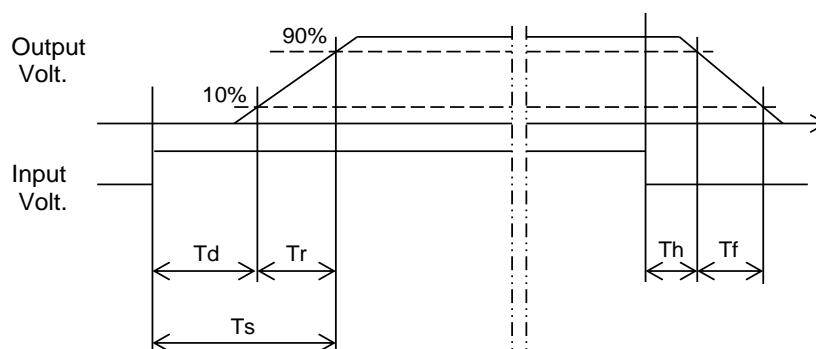
Input Volt. 24 V



# 2.Values

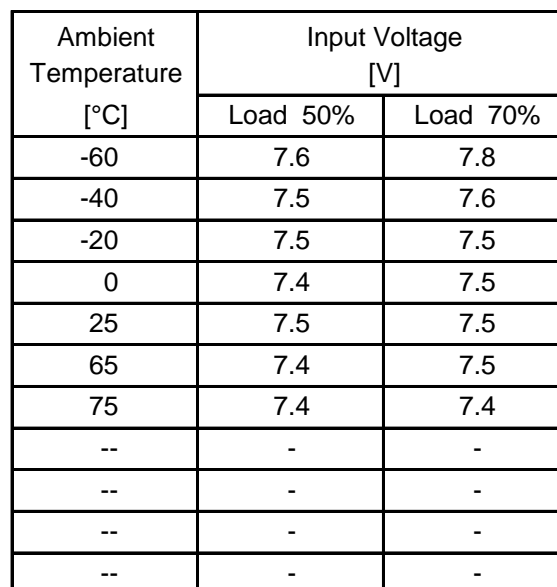
[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.6	4.0	10.6	0.5	3.5
100 %	6.6	5.6	12.2	0.4	1.2



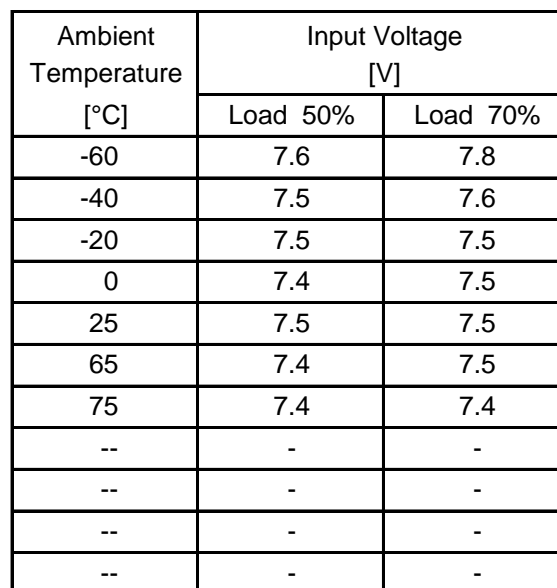
Testing Circuitry Figure A

## 2.Values



Object	-12V1.7A
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## 2.Values



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

BC-11319

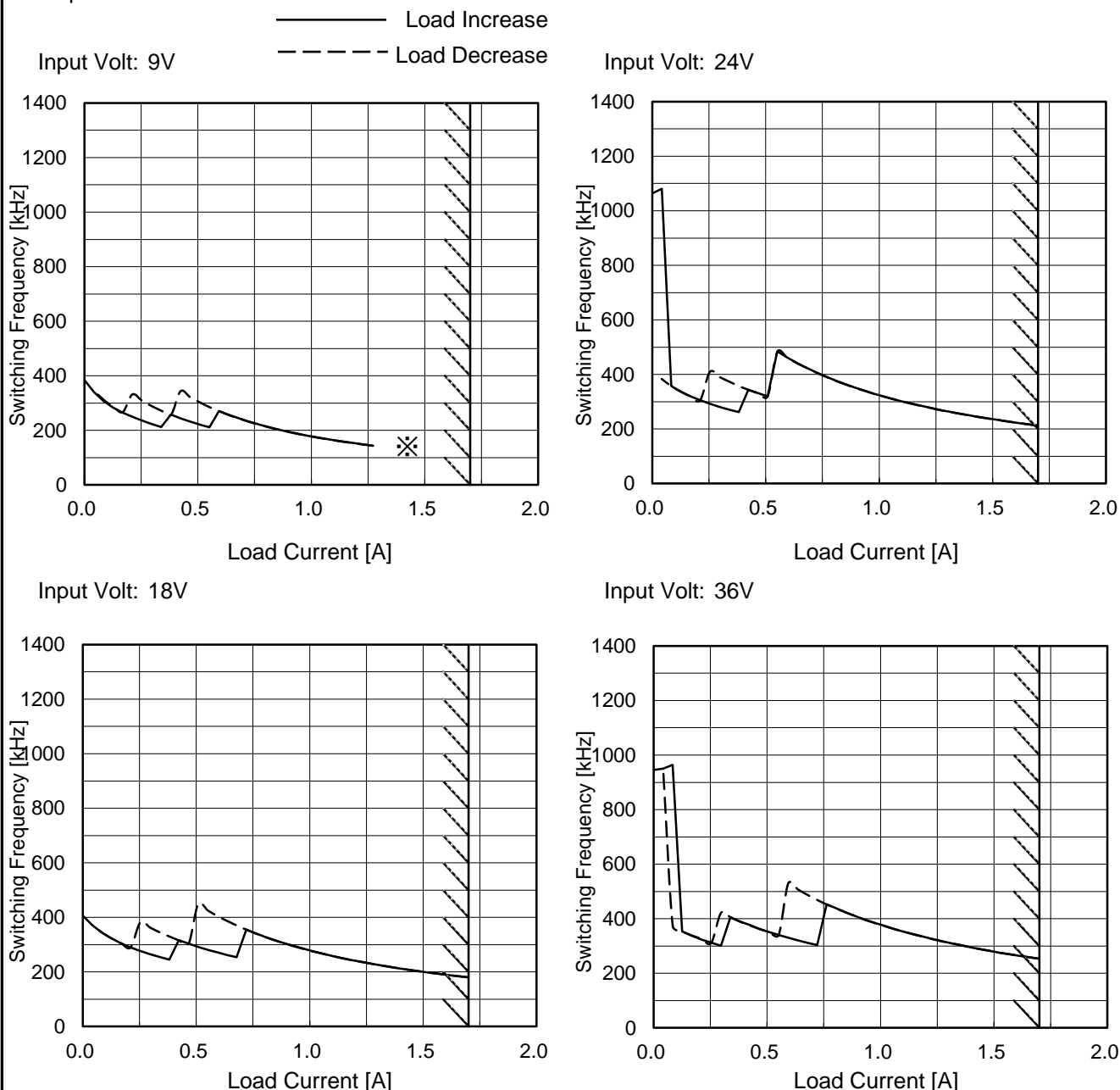
Model		MGFW402412		Temperature 25°C																																																				
Item		Overvoltage Protection		Testing Circuitry Figure A																																																				
Object		+24V1.7A																																																						
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>9V</div></div><div><div>---□---</div><div>Input Volt.</div><div>24V</div></div><div><div>---*---</div><div>Input Volt.</div><div>36V</div></div></div> <div></div>		2.Values																																																				
		<table><tr><th rowspan="2">Load Ratio [%]</th><th colspan="3">Operating Point [%]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0</td><td>133</td><td>132</td><td>133</td></tr><tr><td>10</td><td>128</td><td>127</td><td>127</td></tr><tr><td>20</td><td>128</td><td>127</td><td>127</td></tr><tr><td>30</td><td>128</td><td>128</td><td>128</td></tr><tr><td>40</td><td>128</td><td>127</td><td>127</td></tr><tr><td>50</td><td>128</td><td>127</td><td>127</td></tr><tr><td>60</td><td>129</td><td>127</td><td>126</td></tr><tr><td>70</td><td>128</td><td>127</td><td>126</td></tr><tr><td>80</td><td>- ※</td><td>127</td><td>127</td></tr><tr><td>90</td><td>- ※</td><td>128</td><td>127</td></tr><tr><td>100</td><td>- ※</td><td>128</td><td>127</td></tr></table>				Load Ratio [%]	Operating Point [%]			Input Volt. 9[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	133	132	133	10	128	127	127	20	128	127	127	30	128	128	128	40	128	127	127	50	128	127	127	60	129	127	126	70	128	127	126	80	- ※	127	127	90	- ※	128	127	100	- ※	128	127
Load Ratio [%]	Operating Point [%]																																																							
	Input Volt. 9[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																					
0	133	132	133																																																					
10	128	127	127																																																					
20	128	127	127																																																					
30	128	128	128																																																					
40	128	127	127																																																					
50	128	127	127																																																					
60	129	127	126																																																					
70	128	127	126																																																					
80	- ※	127	127																																																					
90	- ※	128	127																																																					
100	- ※	128	127																																																					
Measured as a single output(+24V).		※During this area, overcurrent protection activates.																																																						





Model	MGFW402412	Temperature	25°C
Item	Switching frequency (by Load Current)	Testing Circuitry	Figure A
Object	+/-12V1.7A		

# 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.

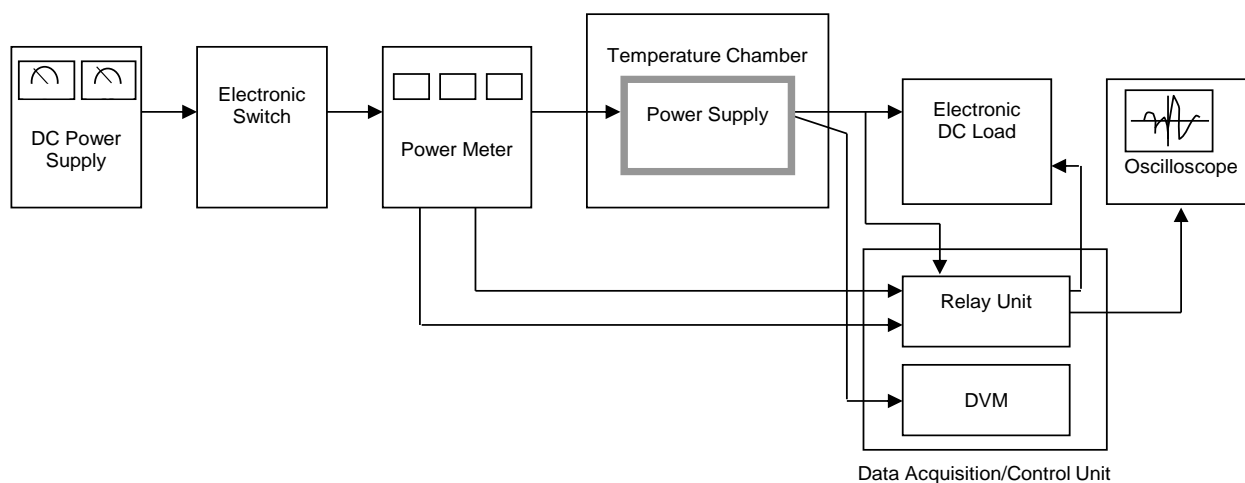


Figure A

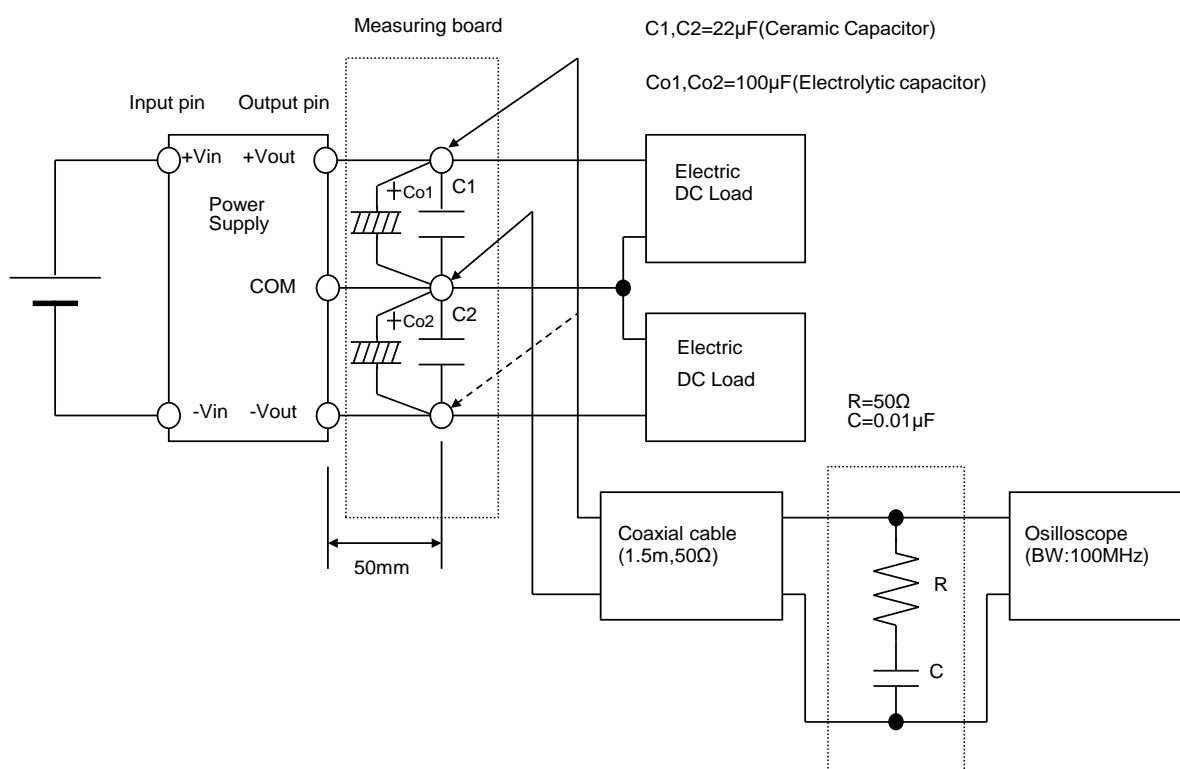


Figure B (Ripple and Ripple noise Characteristic)