参考資料

TEST DATA OF MGFW802412

Regulated DC Power Supply
April 10, 2019

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COSEL CO.,LTD.

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CONTENTS

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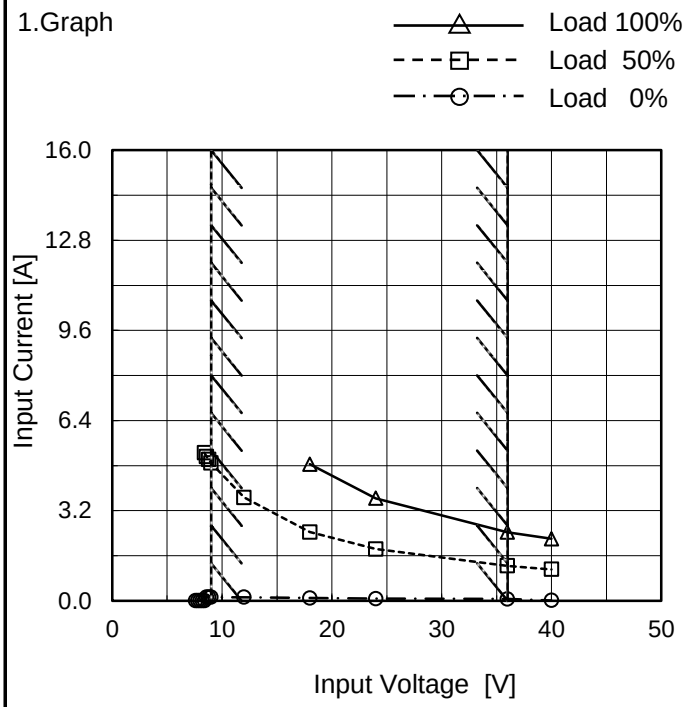
Model	MGFW802412
Item	Input Current (by Input Voltage)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
7.6	0.001	0.001	- ※
7.8	0.001	0.001	- ※
8.0	0.001	0.001	- ※
8.2	0.001	0.001	- ※
8.4	0.132	5.253	- ※
8.6	0.130	5.117	- ※
8.8	0.127	5.015	- ※
9.0	0.125	4.887	- ※
12.0	0.099	3.667	- ※
18.0	0.074	2.438	4.852
24.0	0.062	1.837	3.640
36.0	0.014	1.239	2.435
40.0	0.014	1.115	2.202
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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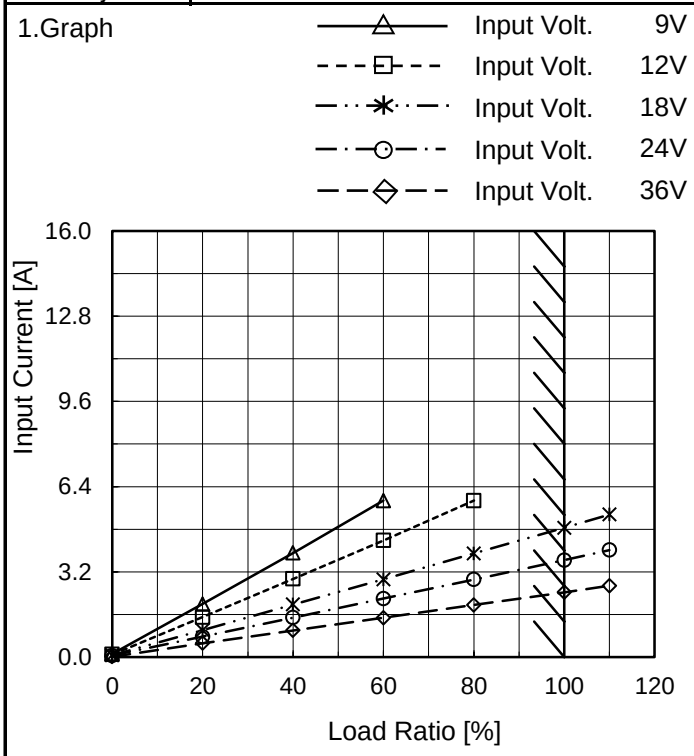
Model	MGFW802412
Item	Input Current (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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	0.125	0.099	0.074	0.062	0.014
20	1.992	1.499	1.010	0.766	0.522
40	3.912	2.938	1.974	1.482	1.001
60	5.875	4.377	2.920	2.198	1.478
80	- ※1	5.873	3.891	2.914	1.956
100	- ※1	- ※2	4.852	3.640	2.435
110	- ※1	- ※2	5.352	4.016	2.680
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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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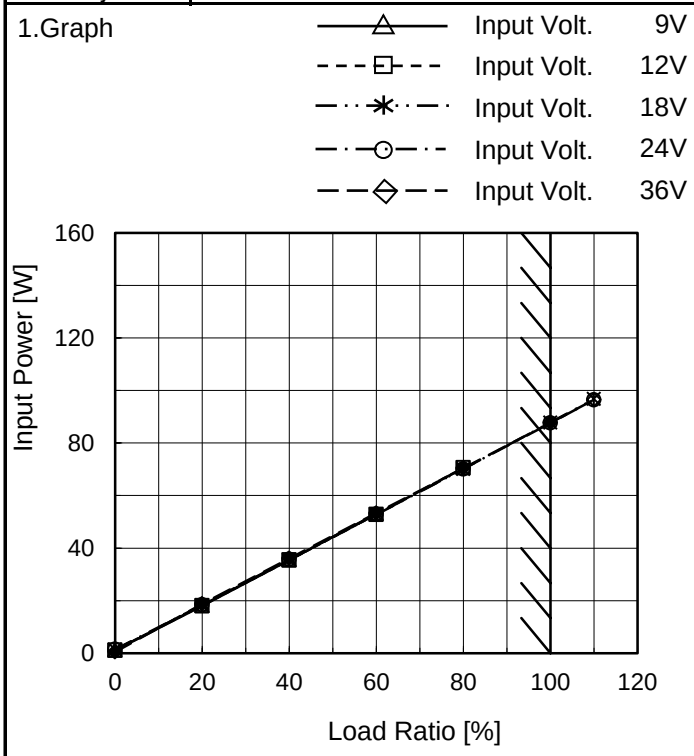
Model	MGFW802412
Item	Input Power (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Input Power [W]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	1.14	1.20	1.33	1.49	0.52
20	18.07	18.11	18.22	18.42	18.80
40	35.46	35.45	35.54	35.69	36.07
60	53.11	52.82	52.76	52.92	53.34
80	- ※1	70.57	70.14	70.15	70.46
100	- ※1	- ※2	87.79	87.61	87.76
110	- ※1	- ※2	96.78	96.45	96.50
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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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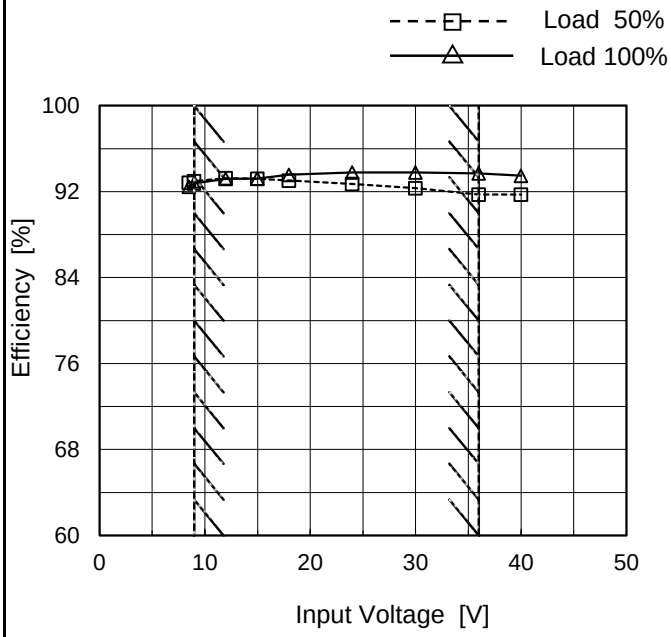
Model	MGFW802412
Item	Efficiency (by Input Voltage)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.5	92.8	92.5 ※1
9.0	93.0	92.8 ※1
12.0	93.2	93.2 ※2
15.0	93.2	93.2
18.0	93.0	93.6
24.0	92.7	93.8
30.0	92.3	93.8
36.0	91.7	93.7
40.0	91.7	93.5

※1：Load 70%
※2：Load 80%

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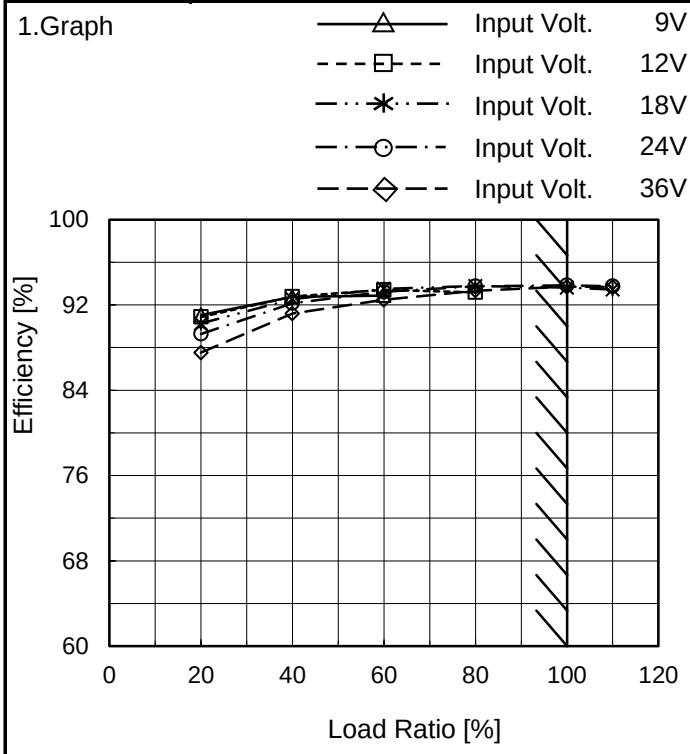
Model	MGFW802412
Item	Efficiency (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

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	91.1	90.9	90.3	89.3	87.5
40	92.8	92.8	92.6	92.2	91.2
60	92.9	93.4	93.5	93.2	92.5
80	- ※1	93.2	93.8	93.7	93.3
100	- ※1	- ※2	93.6	93.8	93.7
110	- ※1	- ※2	93.4	93.8	93.7
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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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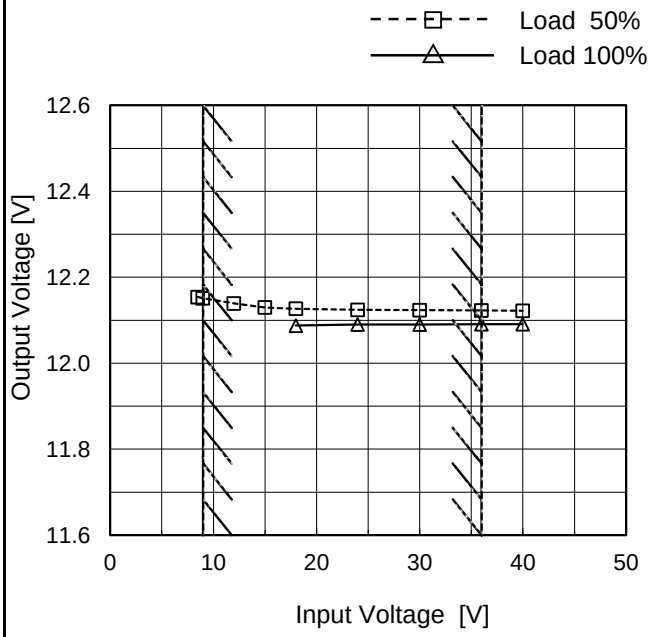
Model	MGFW802412
Item	Line Regulation
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



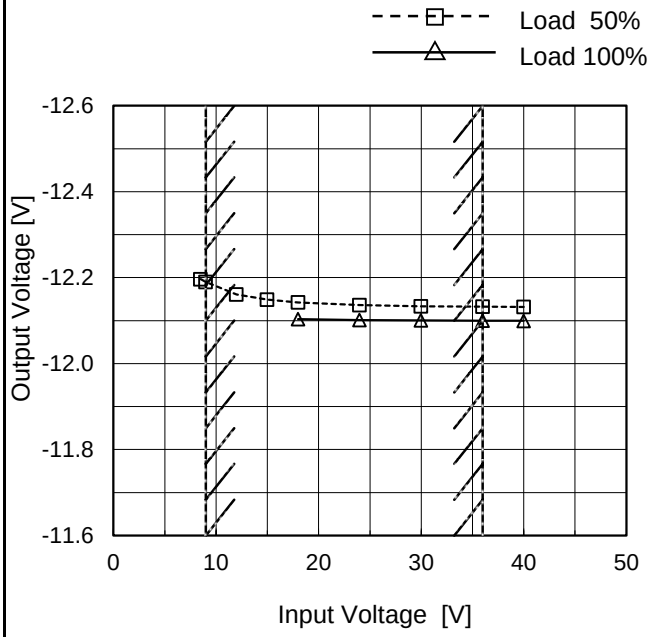
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.5	12.154	- ※1
9.0	12.151	- ※1
12.0	12.139	- ※2
15.0	12.130	12.084
18.0	12.127	12.088
24.0	12.124	12.090
30.0	12.123	12.090
36.0	12.122	12.091
40.0	12.122	12.091

-12V: Rated Load Current

Object	-12V3.4A

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	-12.196	- ※1
9.0	-12.190	- ※1
12.0	-12.161	- ※2
15.0	-12.149	-12.106
18.0	-12.142	-12.103
24.0	-12.136	-12.101
30.0	-12.133	-12.100
36.0	-12.132	-12.100
40.0	-12.132	-12.100

+12V: Rated Load Current

※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

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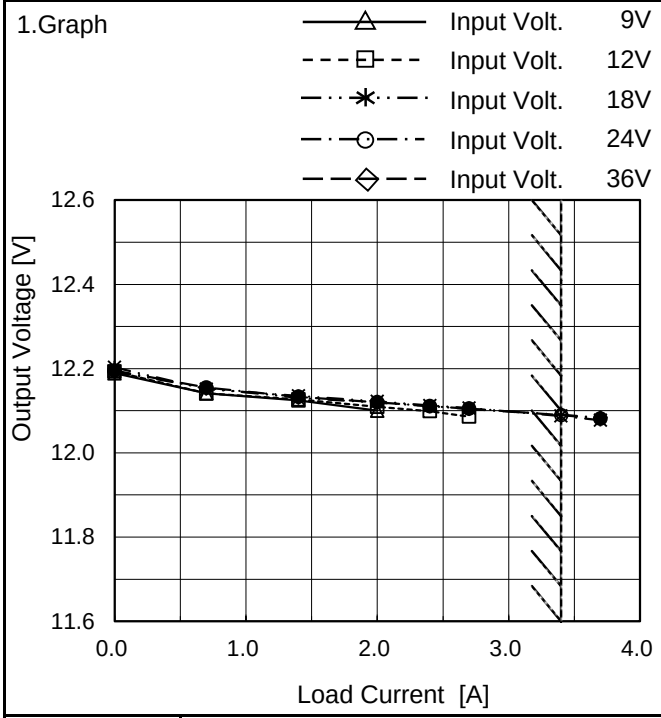
Model	MGFW802412
Item	Load Regulation
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



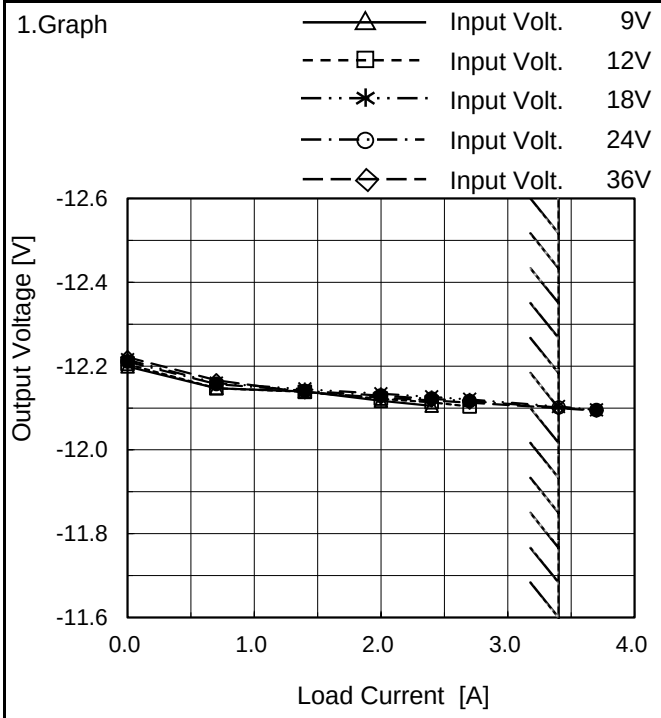
2.Values

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]
0.0	12.189	12.193	12.203	12.195	12.193
0.7	12.141	12.141	12.151	12.155	12.153
1.4	12.125	12.127	12.135	12.133	12.131
2.0	12.100	12.109	12.122	12.120	12.119
2.4	12.085	12.099	12.112	12.111	12.111
2.7	- ※1	12.086	12.107	12.105	12.104
3.4	- ※1	- ※2	12.088	12.090	12.091
3.7	- ※1	- ※2	12.078	12.081	12.083
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-12V: Rated Load Current

Object	-12V3.4A

1.Graph



Note: Slanted line shows the range of the 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]
0.0	-12.199	-12.205	-12.215	-12.211	-12.221
0.7	-12.147	-12.147	-12.159	-12.157	-12.166
1.4	-12.140	-12.138	-12.145	-12.141	-12.137
2.0	-12.117	-12.122	-12.134	-12.129	-12.125
2.4	-12.105	-12.113	-12.126	-12.122	-12.118
2.7	- ※1	-12.104	-12.121	-12.116	-12.113
3.4	- ※1	- ※2	-12.103	-12.101	-12.100
3.7	- ※1	- ※2	-12.095	-12.095	-12.094
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+12V: Rated Load Current

※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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Model	MGFW802412	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+12V3.4A	

Input Volt. 24 V

-12V:rated load current.

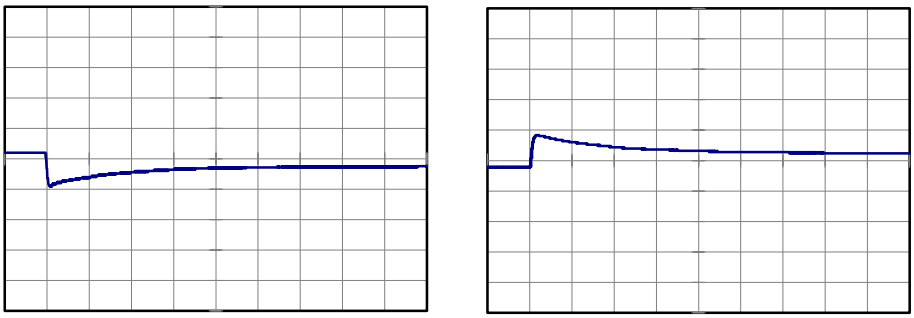
Cycle 100 ms

t1,t2 = 100 μ s

Load Current

t1 t2

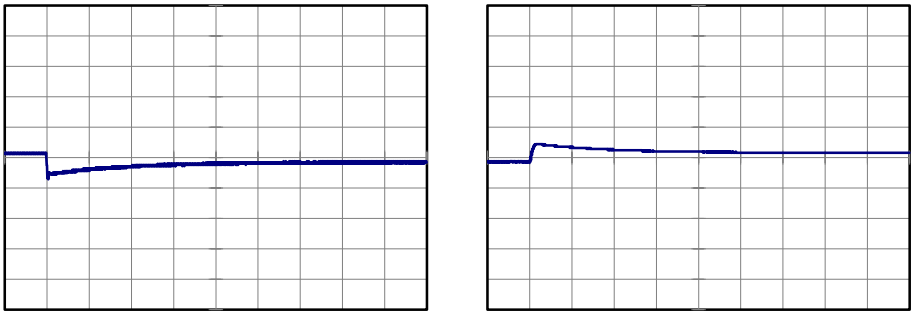
Min.Load (0A)←→
Load 100% (3.4A)



200 mV/div

2 ms/div 2 ms/div

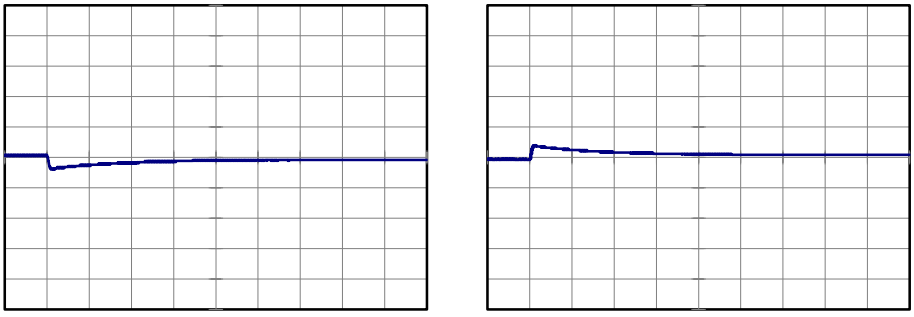
Min.Load (0A)←→
Load 50% (1.7A)



200 mV/div

2 ms/div 2 ms/div

Load 50% (1.7A)←→
Load 100% (3.4A)



200 mV/div

2 ms/div 2 ms/div

COSEL

Model	MGFW802412
Item	Dynamic Load Response
Object	-12V3.4A

Temperature 25°C
Testing Circuitry Figure A

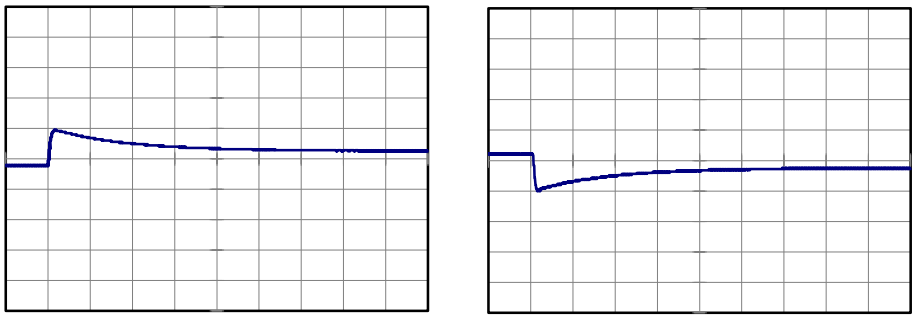
Input Volt. 24 V
+12V:rated load current.
Cycle 100 ms

t1,t2 = 100 μ s

Load Current

t1 t2

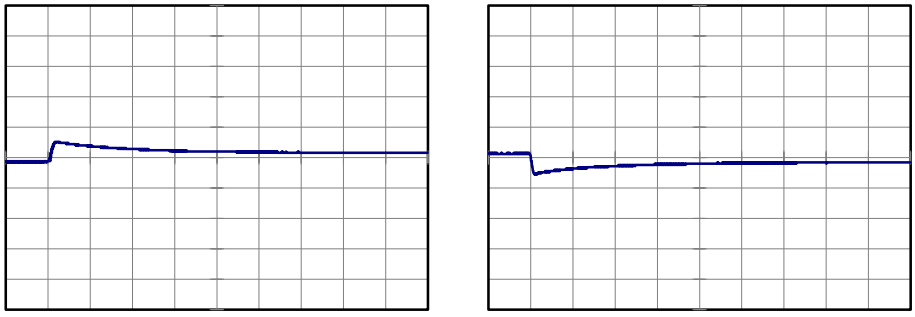
Min.Load (0A)←→
Load 100% (3.4A)



200 mV/div

2 ms/div 2 ms/div

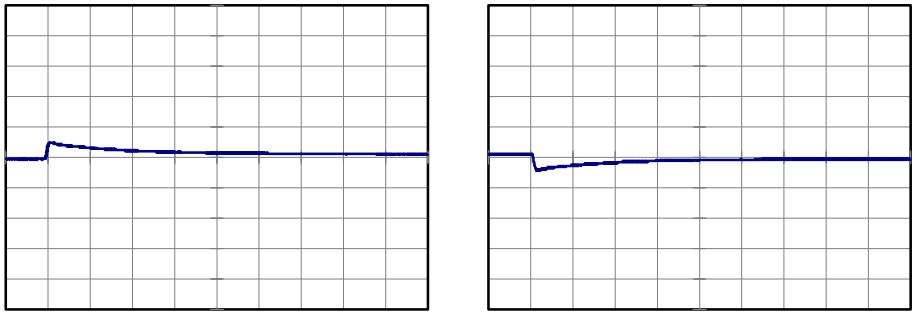
Min.Load (0A)←→
Load 50% (1.7A)



200 mV/div

2 ms/div 2 ms/div

Load 50% (1.7A)←→
Load 100% (3.4A)



200 mV/div

2 ms/div 2 ms/div

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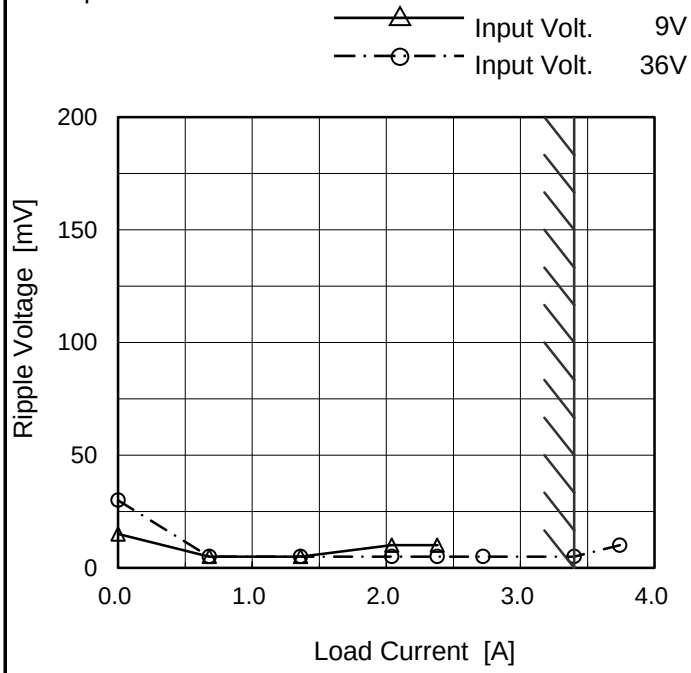
Model	MGFW802412
Item	Ripple Voltage (by Load Current)
Object	+12V3.4A

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.

Ripple [mVp-p]

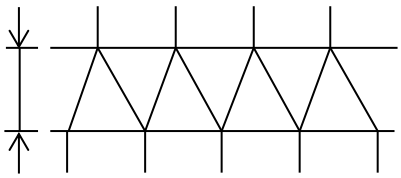


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV] Input Volt. 9 [V]	Ripple Voltage [mV] Input Volt. 36 [V]
0.0	15	30
0.7	5	5
1.4	5	5
2.0	10	5
2.4	10	5
2.7	- ※	5
3.4	- ※	5
3.7	- ※	10
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

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

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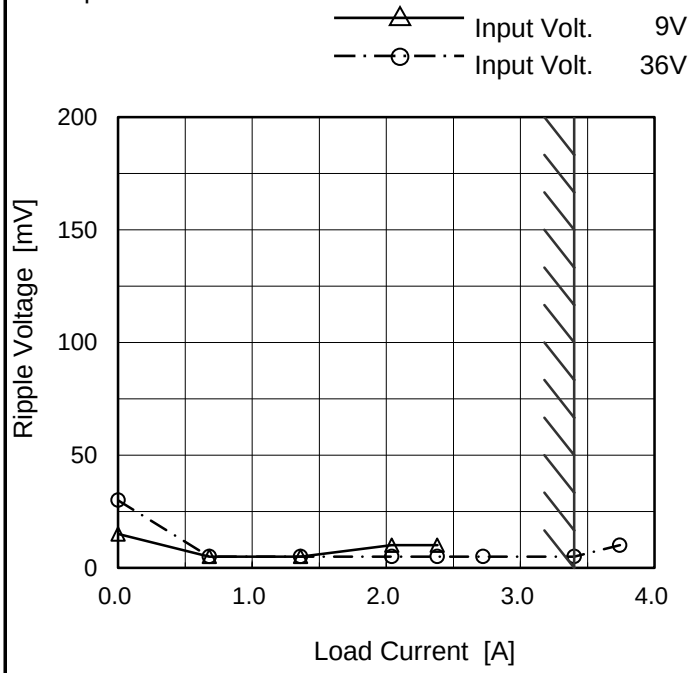
Model	MGFW802412
Item	Ripple Voltage (by Load Current)
Object	-12V3.4A

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.

Ripple [mVp-p]

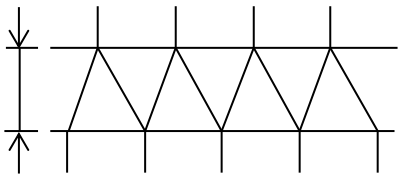


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV] Input Volt. 9 [V]	Ripple Voltage [mV] Input Volt. 36 [V]
0.0	15	30
0.7	5	5
1.4	5	5
2.0	10	5
2.4	10	5
2.7	- ※	5
3.4	- ※	5
3.7	- ※	10
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

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

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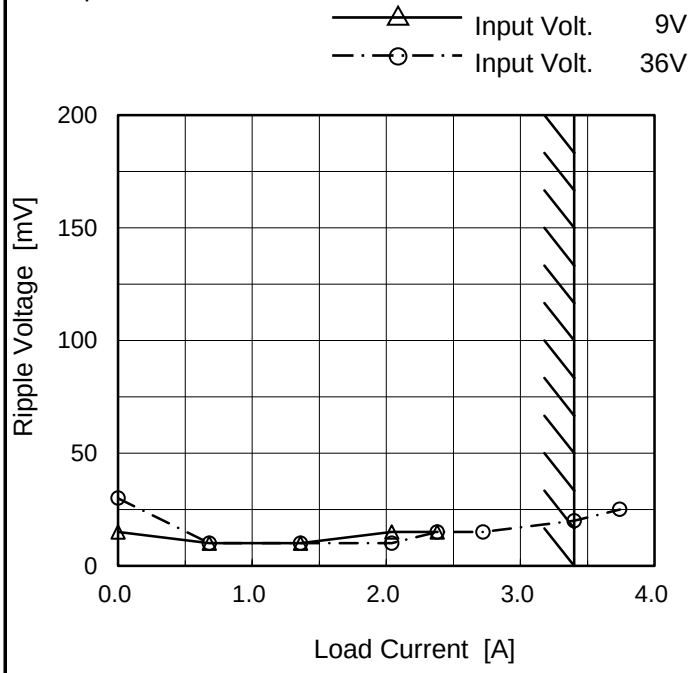
Model	MGFW802412
Item	Ripple-Noise
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure B

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]

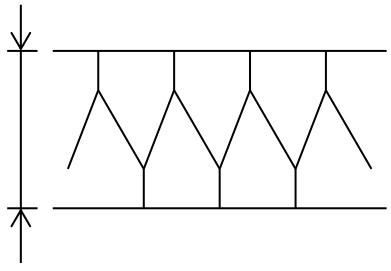


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.0	15	30
0.7	10	10
1.4	10	10
2.0	15	10
2.4	15	15
2.7	- ※	15
3.4	- ※	20
3.7	- ※	25
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

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

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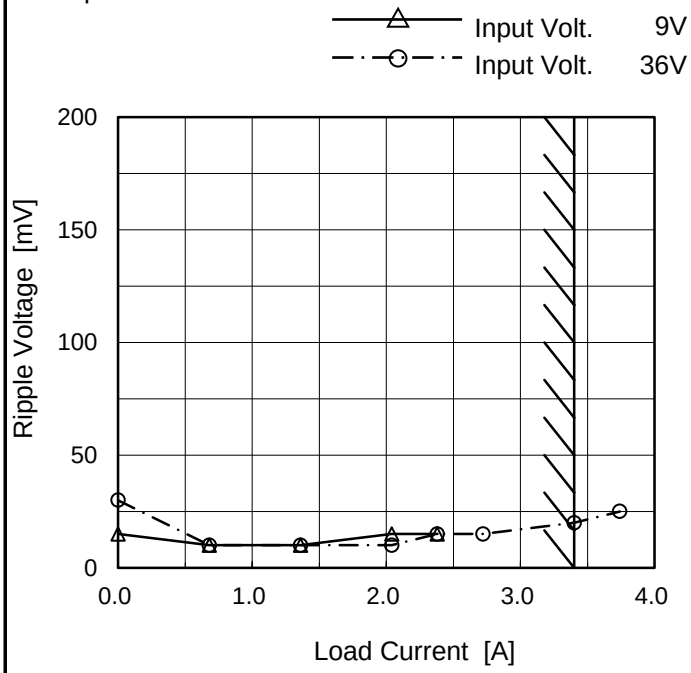
Model	MGFW802412
Item	Ripple-Noise
Object	-12V3.4A

Temperature 25°C
Testing Circuitry Figure B

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]

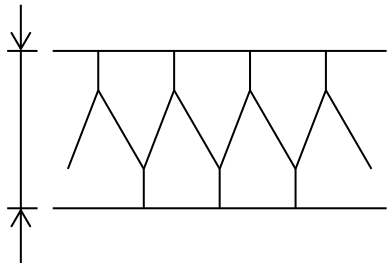


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.0	15	30
0.7	10	10
1.4	10	10
2.0	15	10
2.4	15	15
2.7	- ※	15
3.4	- ※	20
3.7	- ※	25
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

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

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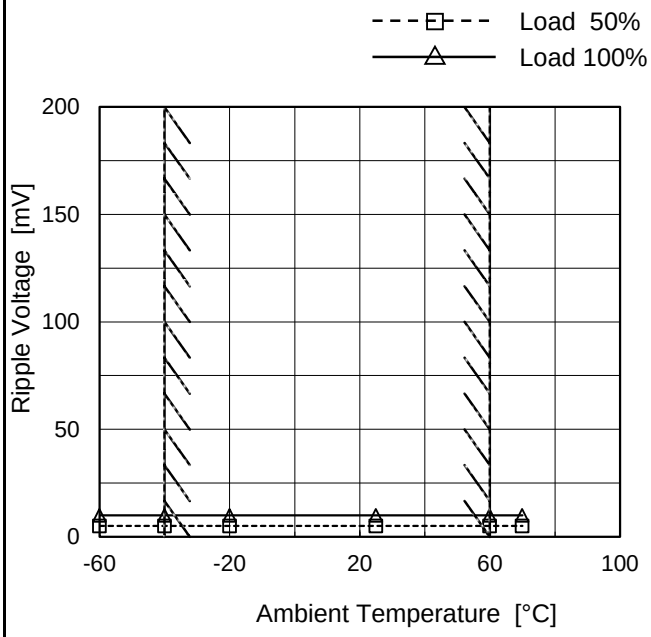
Model	MGFW802412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V3.4A

Testing Circuitry Figure B

1.Graph



Input Volt. 24V

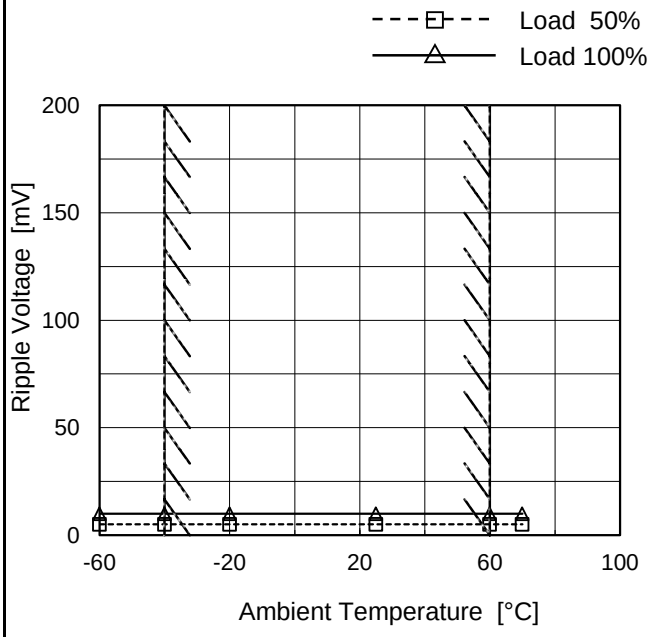
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	10
-40	5	10
-20	5	10
25	5	10
60	5	10
70	5	10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V3.4A

1.Graph



Input Volt. 24V

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	5	10
-40	5	10
-20	5	10
25	5	10
60	5	10
70	5	10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

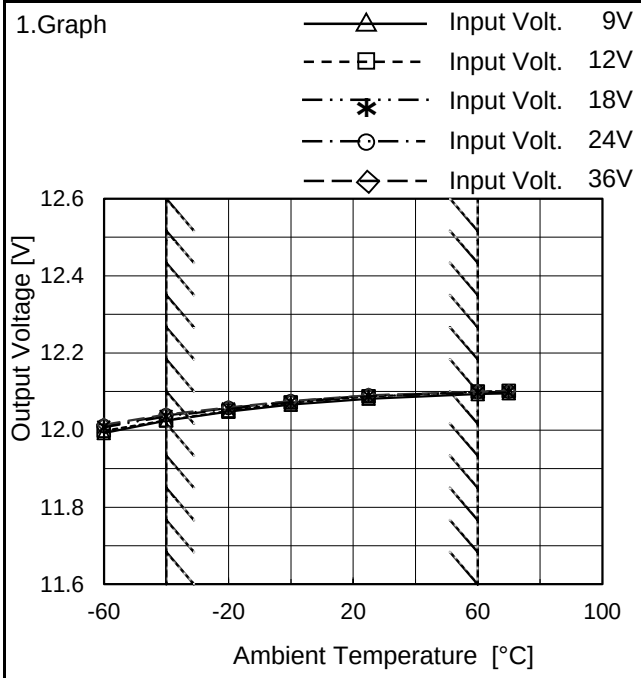
+12V: Rated Load Current

COSEL

Model	MGFW802412
Item	Ambient Temperature Drift
Object	+12V3.4A

Testing Circuitry Figure A

1.Graph

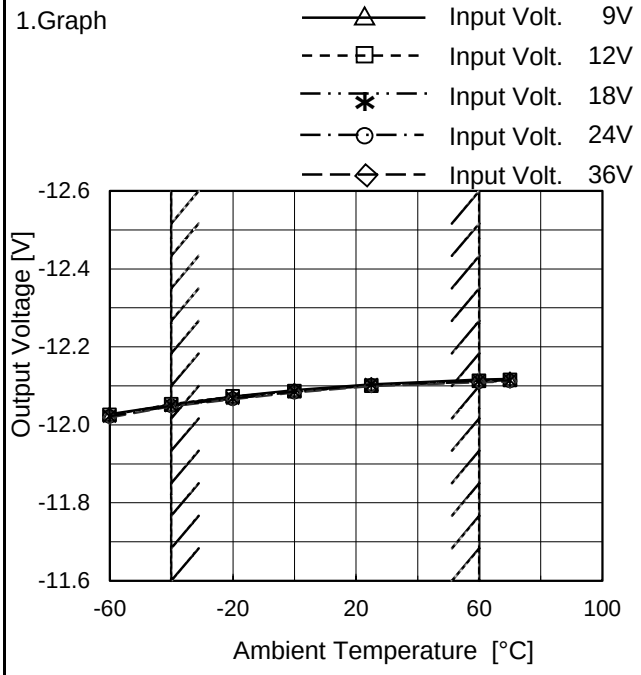


2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	11.993	11.998	12.007	12.011	12.014
-40	12.025	12.026	12.035	12.038	12.041
-20	12.048	12.050	12.054	12.057	12.059
0	12.066	12.071	12.072	12.074	12.076
25	12.081	12.087	12.088	12.090	12.091
60	12.093	12.099	12.097	12.099	12.100
70	12.095	12.102	12.098	12.100	12.101
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Object	-12V3.4A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-12.028	-12.025	-12.022	-12.021	-12.019
-40	-12.052	-12.053	-12.050	-12.049	-12.047
-20	-12.073	-12.073	-12.068	-12.067	-12.066
0	-12.089	-12.086	-12.086	-12.084	-12.083
25	-12.104	-12.101	-12.103	-12.101	-12.100
60	-12.116	-12.113	-12.113	-12.111	-12.109
70	-12.118	-12.115	-12.114	-12.112	-12.111
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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

BC-11371

Model	MGFW802412	
Item	Output Voltage Accuracy	Testing Circuitry Figure A

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 (AVR 1) : 0 - 3.4A (AVR 2) : 0 - 3.4A

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

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

2.Values

Object	+12V3.4A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	60	9	0	12.228	±102	±0.9
Minimum Voltage	-40	9	2.4	12.025		

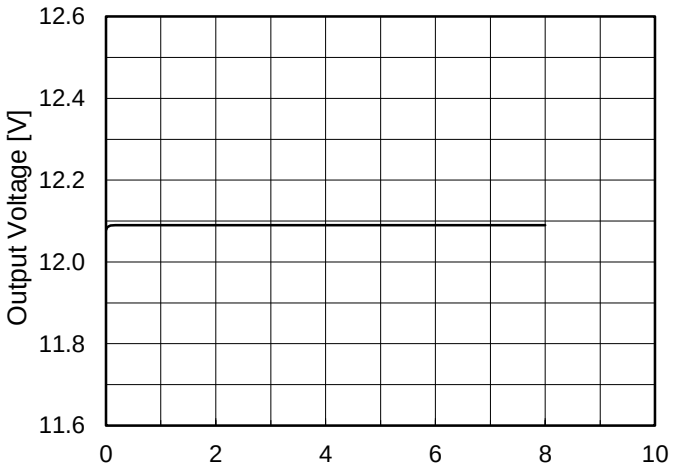
Object	-12V3.4A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	60	36	0	-12.245	±99	±0.8
Minimum Voltage	-40	36	3.4	-12.047		

COSEL

Model	MGFW802412
Item	Time Lapse Drift
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 24V
Load 100%

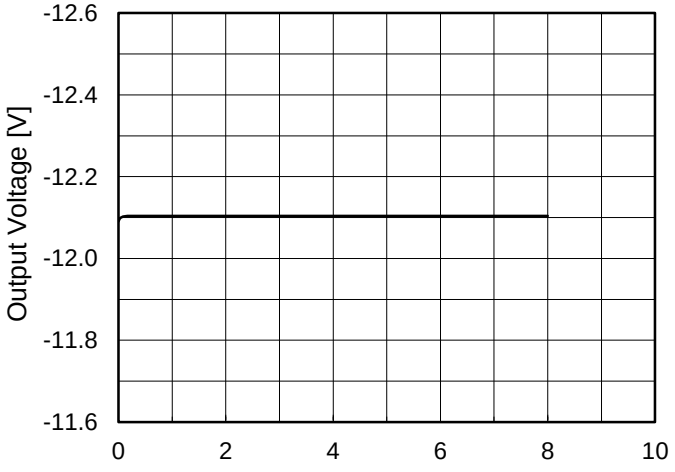
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.078
0.5	12.090
1.0	12.090
2.0	12.090
3.0	12.090
4.0	12.090
5.0	12.090
6.0	12.090
7.0	12.090
8.0	12.090

-12V: Rated Load Current

Object	-12V3.4A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.091
0.5	-12.104
1.0	-12.104
2.0	-12.104
3.0	-12.104
4.0	-12.104
5.0	-12.104
6.0	-12.104
7.0	-12.104
8.0	-12.104

+12V: Rated Load Current

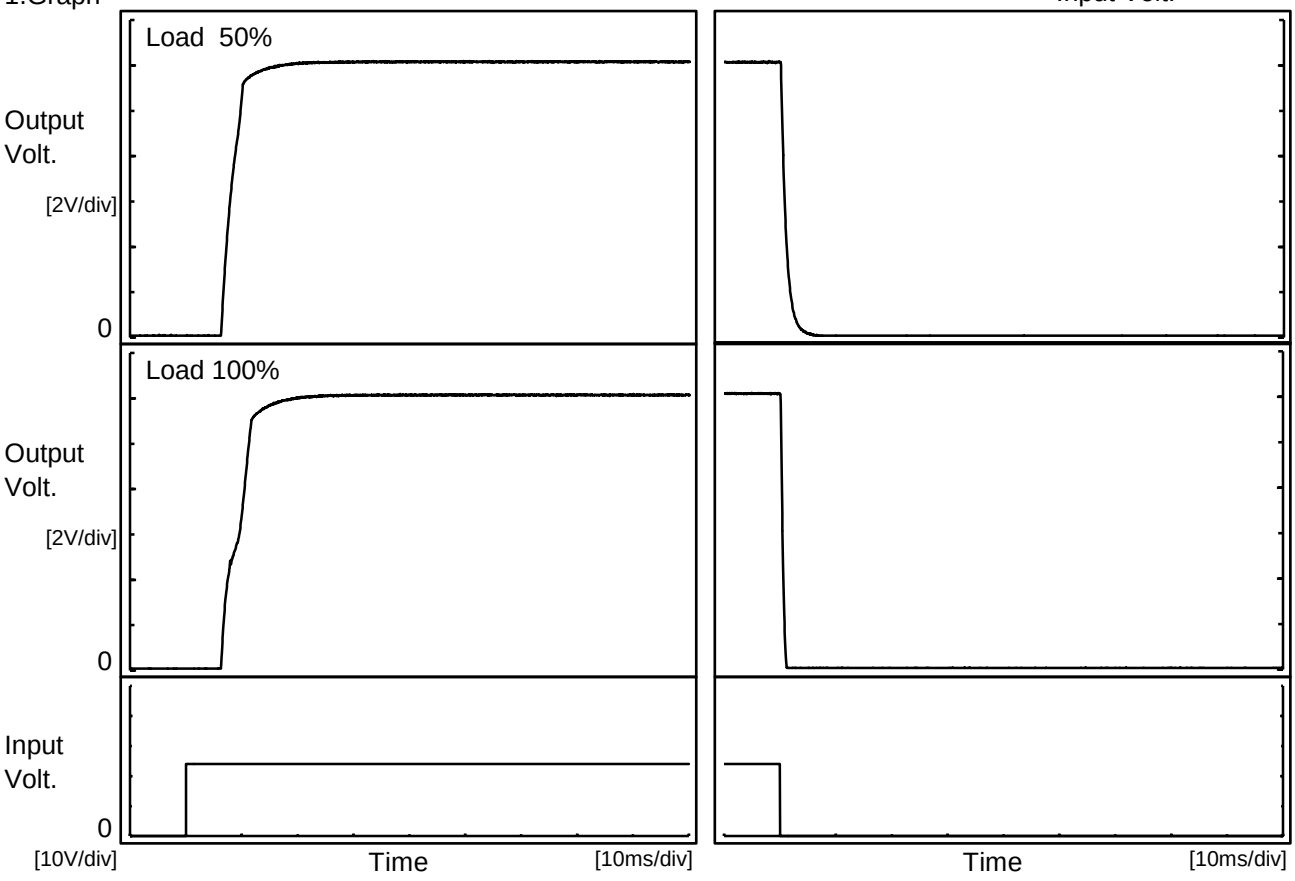
COSEL

Model	MGFW802412
Item	Rise and Fall Time
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

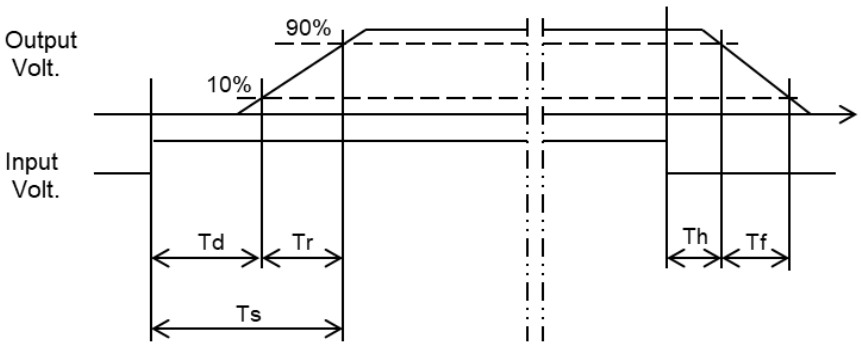
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.6	3.6	10.2	0.3	2.0
100 %	6.6	5.1	11.7	0.2	0.7



BC-11371

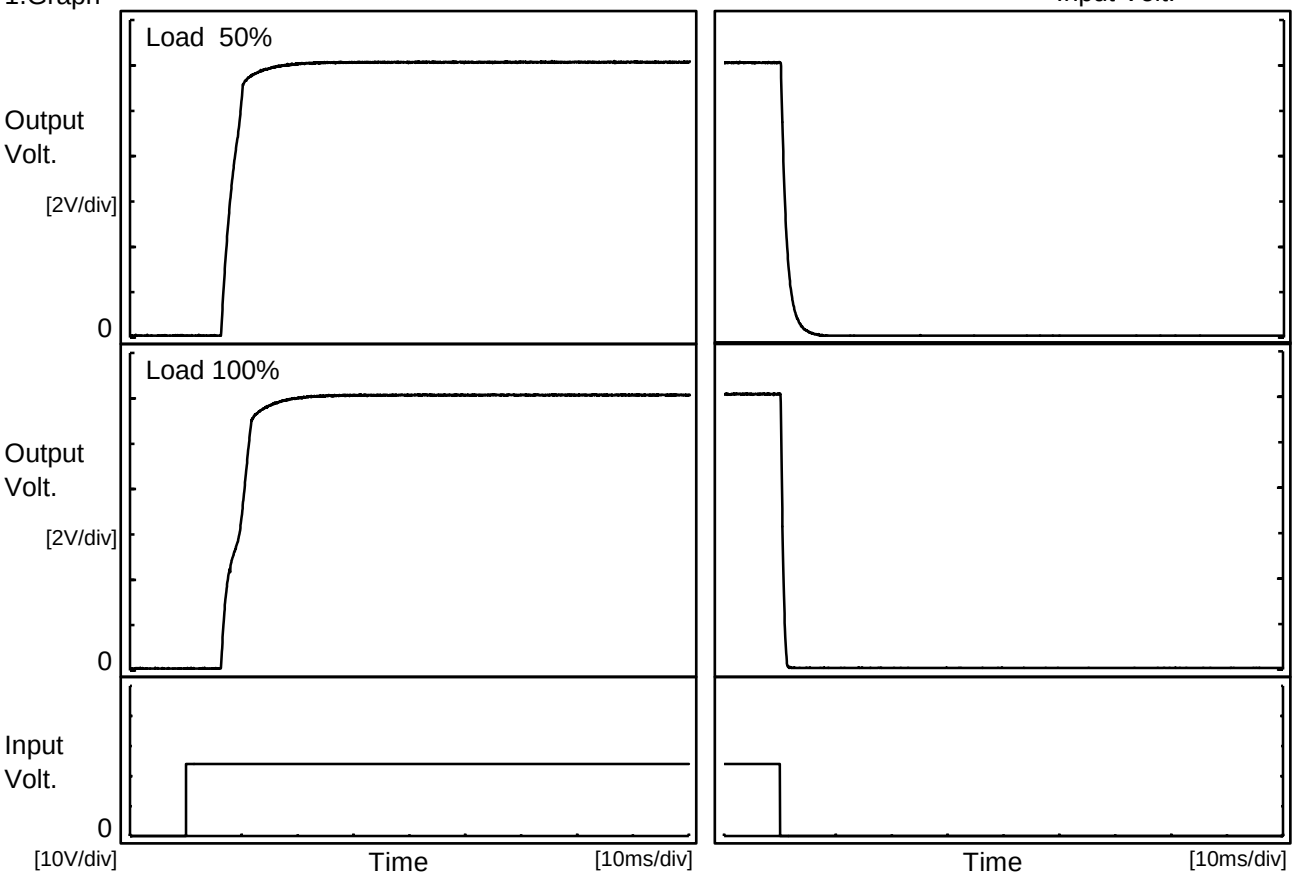
COSEL

Model	MGFW802412
Item	Rise and Fall Time
Object	-12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

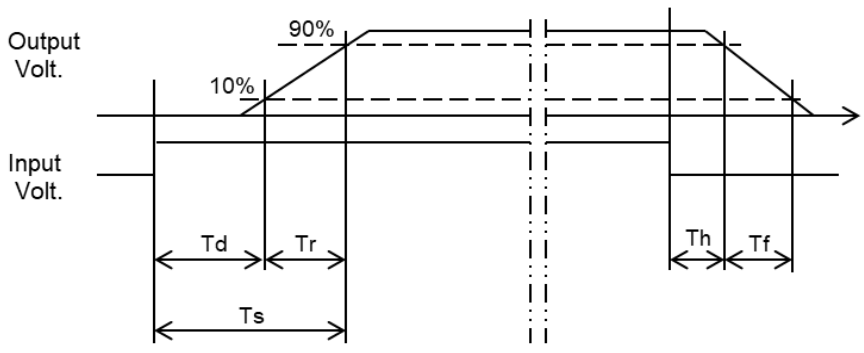
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.6	3.6	10.2	0.3	2.3
100 %	6.6	5.1	11.7	0.2	0.8



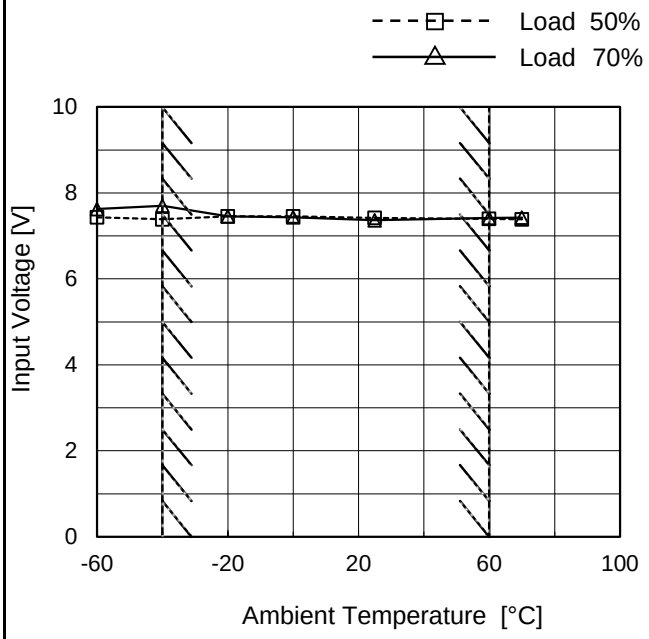
BC-11371

COSEL

Model	MGFW802412
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V3.4A

Testing Circuitry Figure A

1.Graph



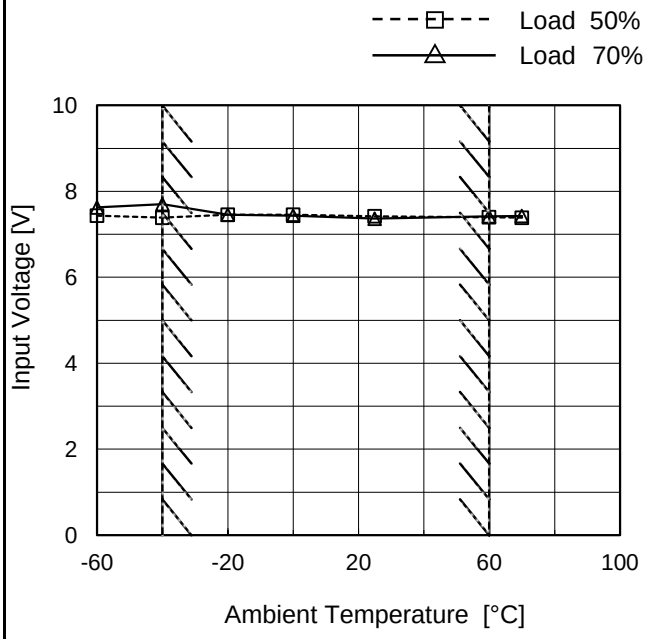
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 70%
-60	7.5	7.7
-40	7.4	7.7
-20	7.5	7.5
0	7.5	7.5
25	7.5	7.4
60	7.4	7.5
70	7.4	7.5
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Load Current is same as well as +12V

Object	-12V3.4A

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	7.7
-40	7.4	7.7
-20	7.5	7.5
0	7.5	7.5
25	7.5	7.4
60	7.4	7.5
70	7.4	7.5
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Load Current is same as well as -12V

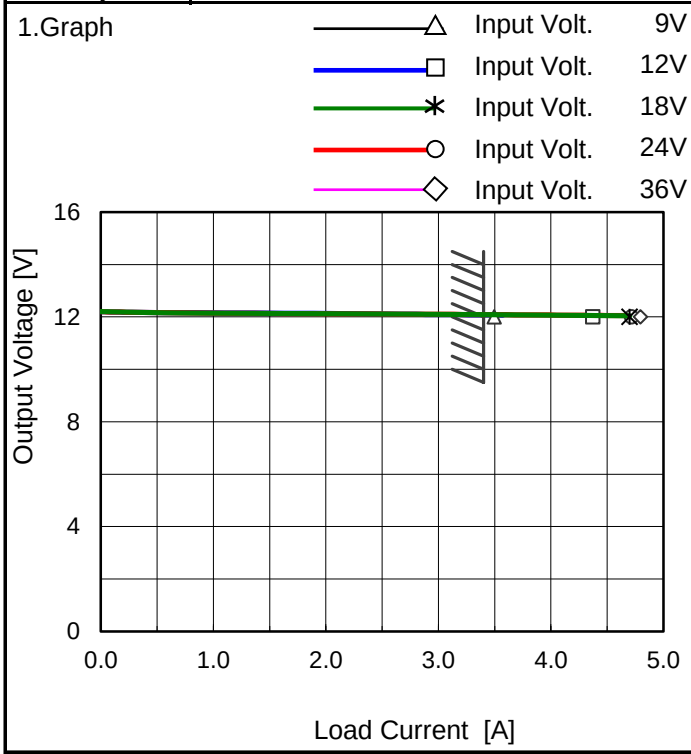
BC-11371

COSEL

Model	MGFW802412
Item	Overcurrent Protection
Object	+12V3.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



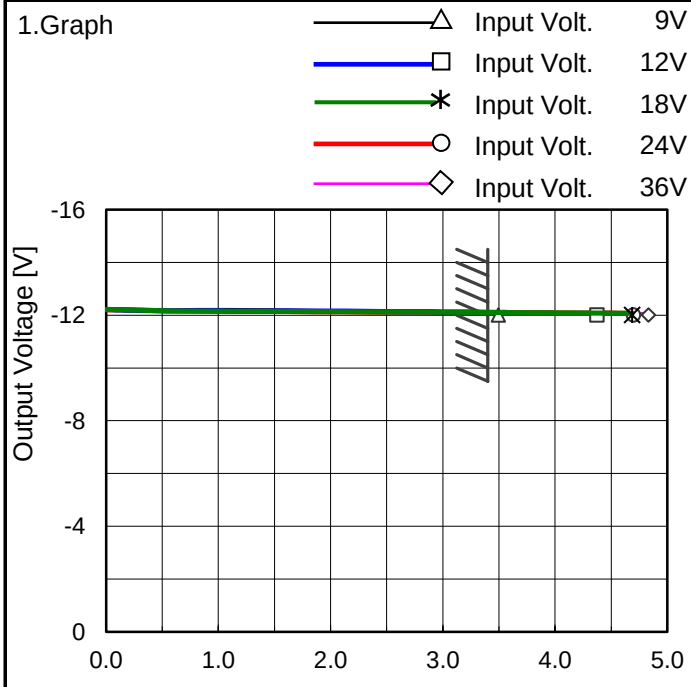
2.Values

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]
12.0	3.495	4.373	4.701	4.719	4.797
11.4	- ※1	- ※2	-	-	-
10.8	-	-	-	-	-
9.6	-	-	-	-	-
8.4	-	-	-	-	-
7.2	-	-	-	-	-
6.0	-	-	-	-	-
4.8	-	-	-	-	-
3.6	-	-	-	-	-
0.0	-	-	-	-	-

-12V: Rated Load Current

Object	-12V3.4A

1.Graph



Note: Slanted line shows the range of the rated load current.
Intermittent operation occurs when overcurrent protection is activated.

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]
-12.0	3.495	4.373	4.688	4.699	4.834
-11.4	- ※1	- ※2	-	-	-
-10.8	-	-	-	-	-
-9.6	-	-	-	-	-
-8.4	-	-	-	-	-
-7.2	-	-	-	-	-
-6.0	-	-	-	-	-
-4.8	-	-	-	-	-
-3.6	-	-	-	-	-
0.0	-	-	-	-	-

+12V: Rated Load Current

※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

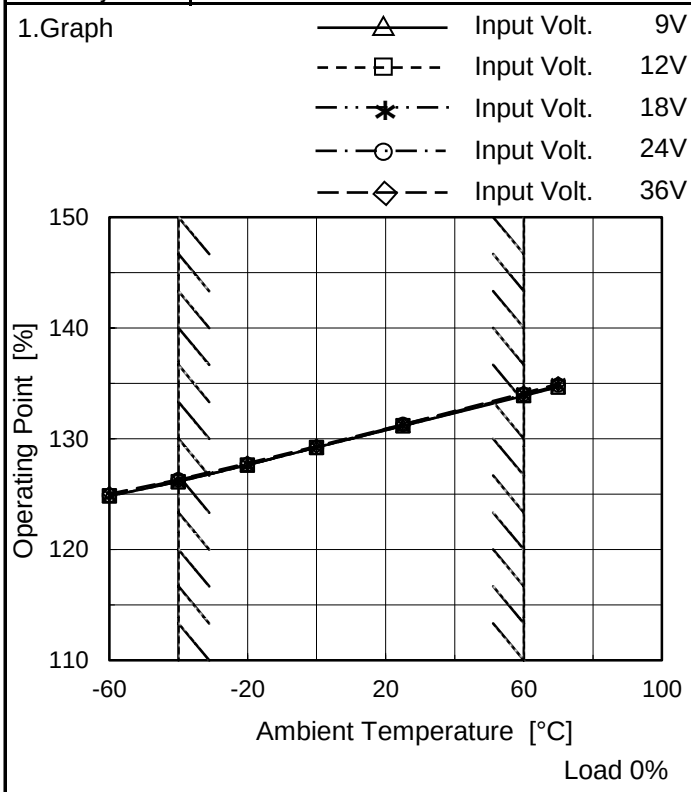
BC-11371

COSEL

Model	MGFW802412
Item	Overvoltage Protection
Object	+24V3.4A

Testing Circuitry Figure A

1.Graph



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

Measured as a single output (+24V).

2.Values

Ambient Temperature [°C]	Operating Point [%] Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	125	125	125	125	125
-40	126	126	126	126	126
-20	128	128	128	128	128
0	129	129	129	129	129
25	131	131	131	131	131
60	134	134	134	134	134
70	135	135	135	135	135
0	-	-	-	-	-
0	-	-	-	-	-
0	-	-	-	-	-
0	-	-	-	-	-

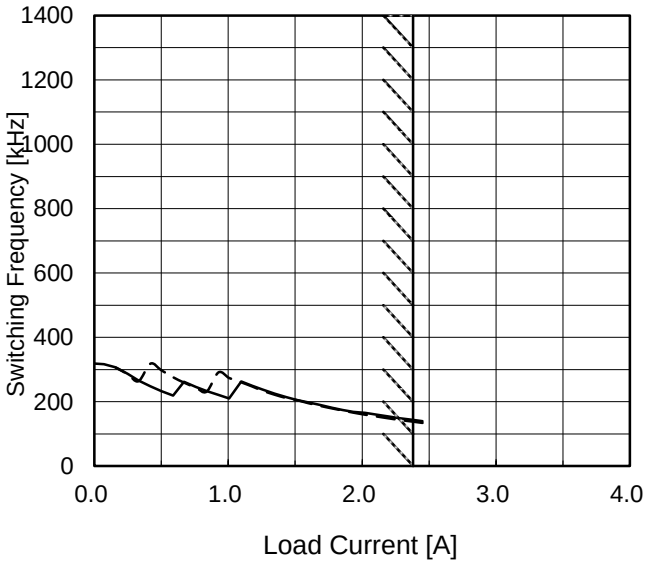
COSEL

Model	MGFW802412	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	+/-12V3.4A	

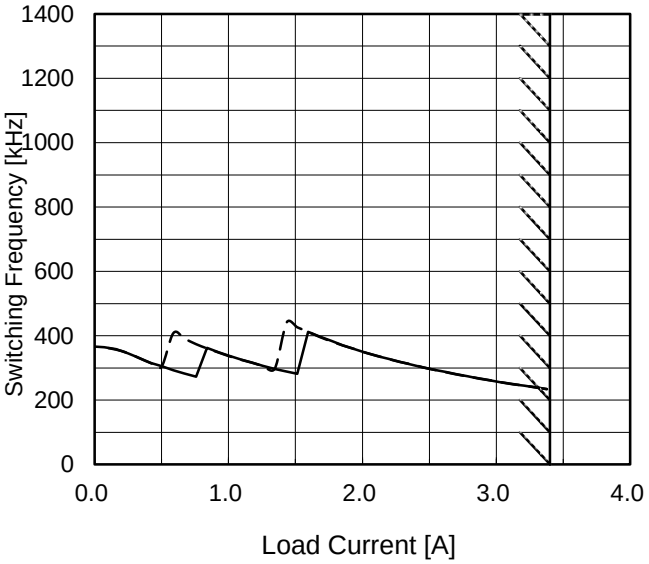
1.Graph

Load Increase
Load Decrease

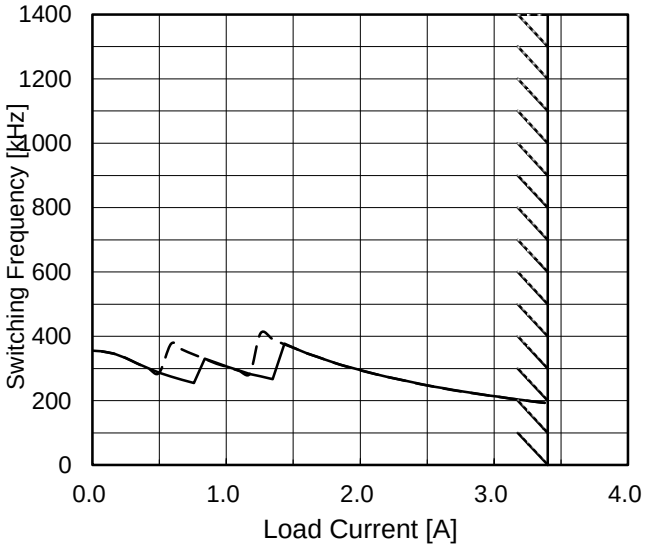
Input Volt: 9V



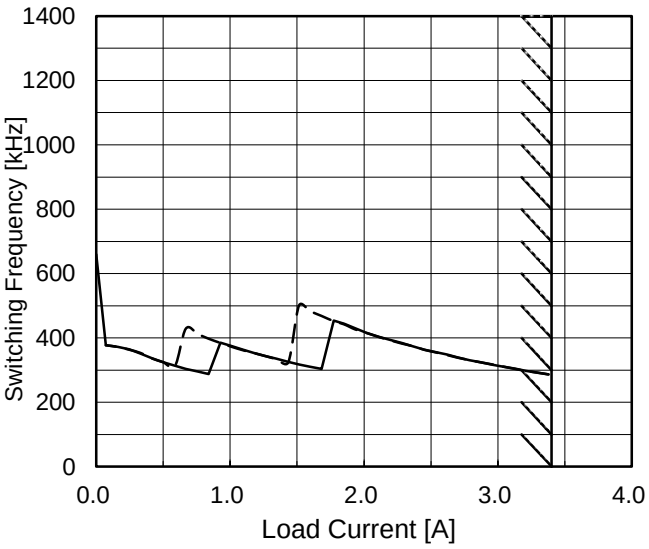
Input Volt: 24V



Input Volt: 18V



Input Volt: 36V



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

-switching frequency of MG80 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, MG80 operates intermittently, so switching frequency would not become constant.
※ Maximum output current at minimum input Voltage is 70% of rated load current.
Refer to instruction manuals for details of input derating.

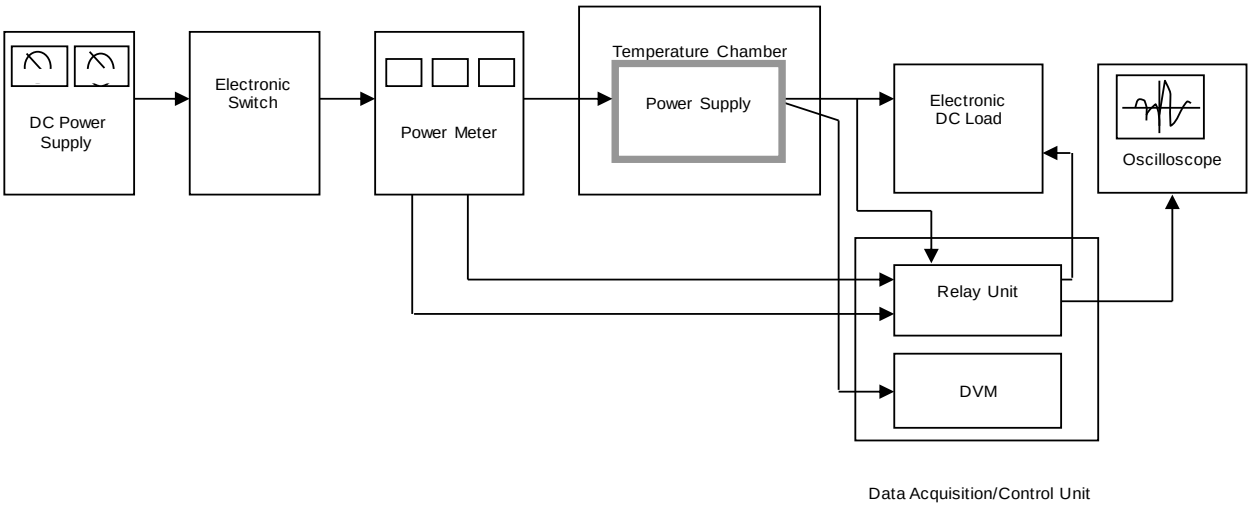


Figure A

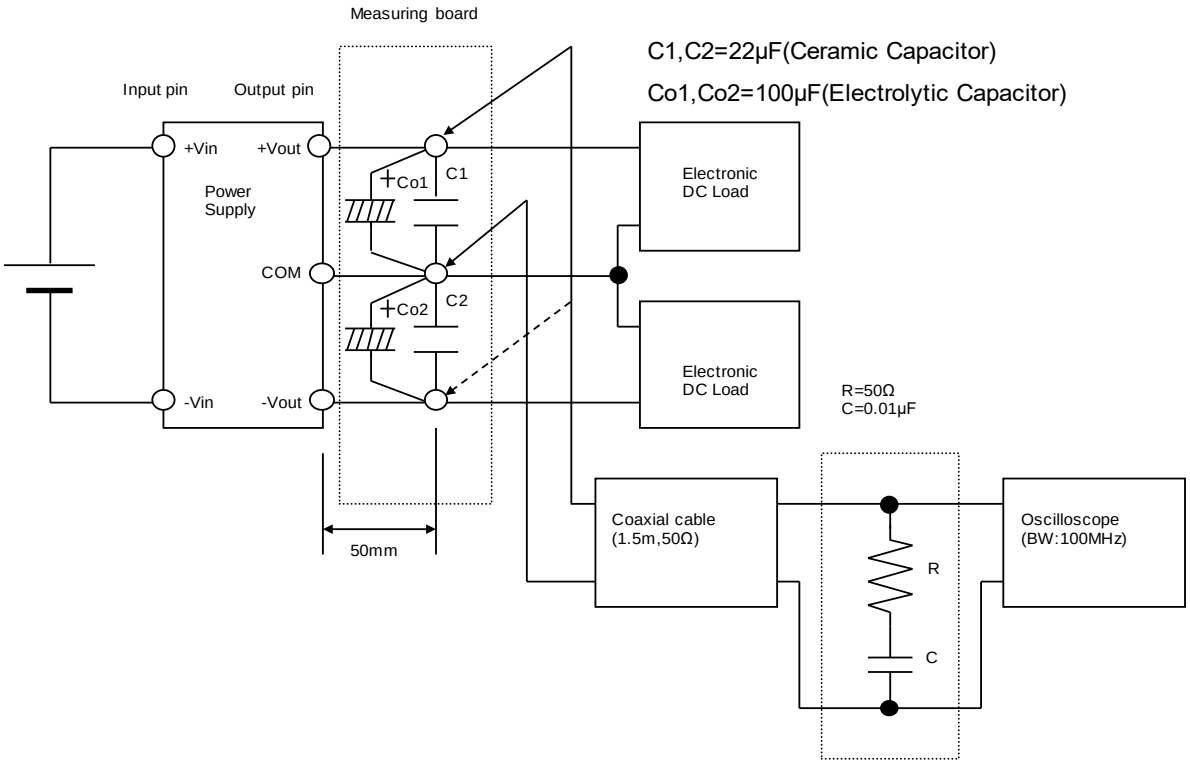


Figure B（Ripple and Ripple noise Characteristic）