COSEL

TEST DATA OF MGFS802412

Regulated DC Power Supply
April 5, 2019

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COSEL CO.,LTD.

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Model	MGFS802412
Item	Input Current (by Input Voltage)
Object	

Temperature　　25°C
Testing Circuitry　　Figure A

1.Graph

△ Load 100%
□ Load 50%
○ Load 0%

Input Current [A] vs Input Voltage [V]

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	0.102	5.233	- ※
8.6	0.100	5.084	- ※
8.8	0.098	4.978	- ※
9.0	0.096	4.849	- ※
12.0	0.077	3.626	- ※
18.0	0.058	2.407	4.779
24.0	0.058	1.809	3.576
36.0	0.013	1.212	2.381
40.0	0.013	1.095	2.144
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	MGFS802412
Item	Input Current (by Load Current)
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

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

2.Values

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]
0.0	0.096	0.077	0.058	0.058	0.013
1.3	1.899	1.424	0.963	0.730	0.496
2.7	3.851	2.898	1.940	1.463	0.991
4.0	5.749	4.265	2.845	2.147	1.442
4.7	6.766	5.064	3.334	2.509	1.686
5.4	- ※1	5.808	3.828	2.874	1.927
6.7	- ※1	- ※2	4.779	3.576	2.381
7.4	- ※1	- ※2	5.277	3.938	2.630
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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	MGFS802412
Item	Input Power (by Load Current)
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

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

2.Values

Load Current [A]	Input Power [W]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	0.87	0.93	1.07	0.80	0.46
1.3	17.18	17.22	17.38	17.53	17.90
2.7	35.00	34.99	35.08	35.23	35.70
4.0	51.75	51.49	51.47	51.60	52.06
4.7	60.97	60.52	60.30	60.37	60.77
5.4	- ※1	69.62	69.19	69.20	69.52
6.7	- ※1	- ※2	85.88	85.72	85.89
7.4	- ※1	- ※2	95.02	94.68	94.77
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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	MGFS802412
Item	Efficiency (by Input Voltage)
Object	

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
——— △ ——— Load 100%

Efficiency [%] vs Input Voltage [V]

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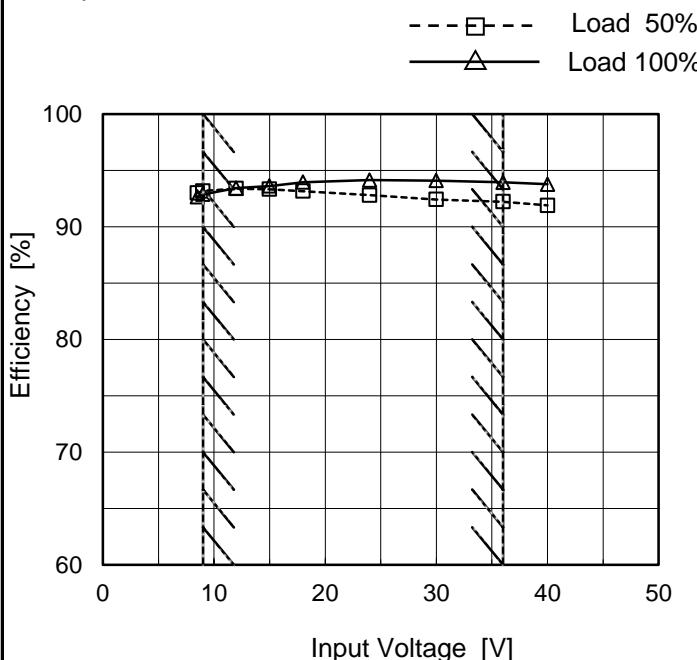
2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.5	93.0	92.7 ※1
9.0	93.2	92.9 ※1
12.0	93.4	93.4 ※2
15.0	93.3	93.6
18.0	93.2	94.0
24.0	92.8	94.1
30.0	92.4	94.1
36.0	92.2	94.0
40.0	91.9	93.8

※1：Load 70%
※2：Load 80%

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Model	MGFS802412
Item	Efficiency (by Load Current)
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

Efficiency [%] vs Load Current [A]

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

2.Values

Load Current [A]	Efficiency [%]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	-	-	-	-	-
1.3	91.1	91.1	90.2	89.4	87.5
2.7	92.9	93.0	92.7	92.3	91.1
4.0	93.1	93.6	93.7	93.4	92.6
4.7	92.9	93.5	93.9	93.8	93.2
5.4	- ※1	93.4	94.0	94.0	93.6
6.7	- ※1	- ※2	94.0	94.1	94.0
7.4	- ※1	- ※2	93.8	94.1	94.0
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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	MGFS802412
Item	Line Regulation
Object	+12V6.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph
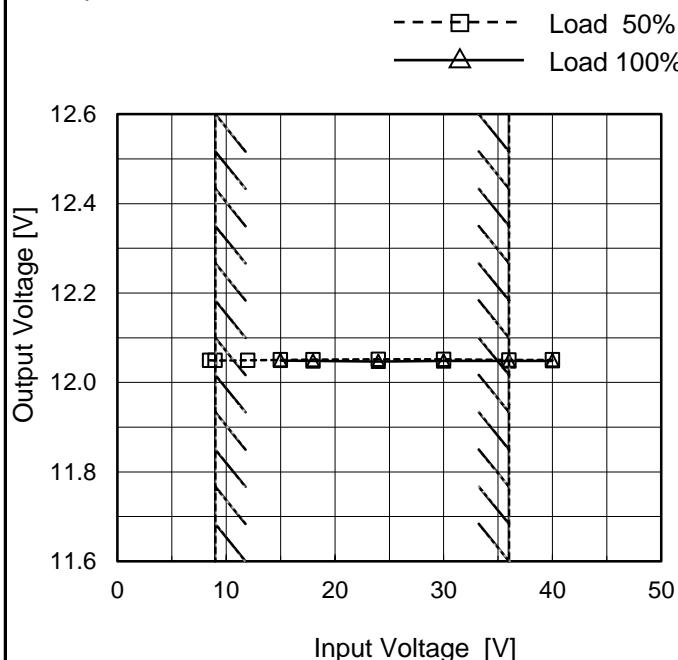
Load 50%
Load 100%

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	12.049	- ※1
9.0	12.049	- ※1
12.0	12.050	- ※2
15.0	12.051	12.049
18.0	12.051	12.048
24.0	12.051	12.047
30.0	12.051	12.048
36.0	12.050	12.048
40.0	12.051	12.048

※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.

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Model	MGFS802412
Item	Load Regulation
Object	+12V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

	Input Volt.	9V
— △ —	Input Volt.	9V
– – – ⊟ – – –	Input Volt.	12V
— ·· ✳ ·· — ·	Input Volt.	18V
— · — ○ — ·· —	Input Volt.	24V
— — ◇ — —	Input Volt.	36V

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

2.Values

Load Current	Output Voltage [V]				
	Input Volt.	Input Volt.	Input Volt.	Input Volt.	Input Volt.
[A]	9[V]	12[V]	18[V]	24[V]	36[V]
0.0	12.053	12.054	12.055	12.057	12.059
1.3	12.050	12.051	12.052	12.053	12.055
2.7	12.048	12.049	12.050	12.052	12.053
4.0	12.048	12.047	12.050	12.051	12.052
4.7	12.048	12.047	12.048	12.050	12.051
5.4	- ※1	12.048	12.047	12.049	12.051
6.7	- ※1	- ※2	12.048	12.047	12.048
7.4	- ※1	- ※2	12.047	12.046	12.048
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※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.

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Model	MGFS802412
Item	Dynamic Load Response
Object	+12V6.7A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 24 V
Cycle 100 ms
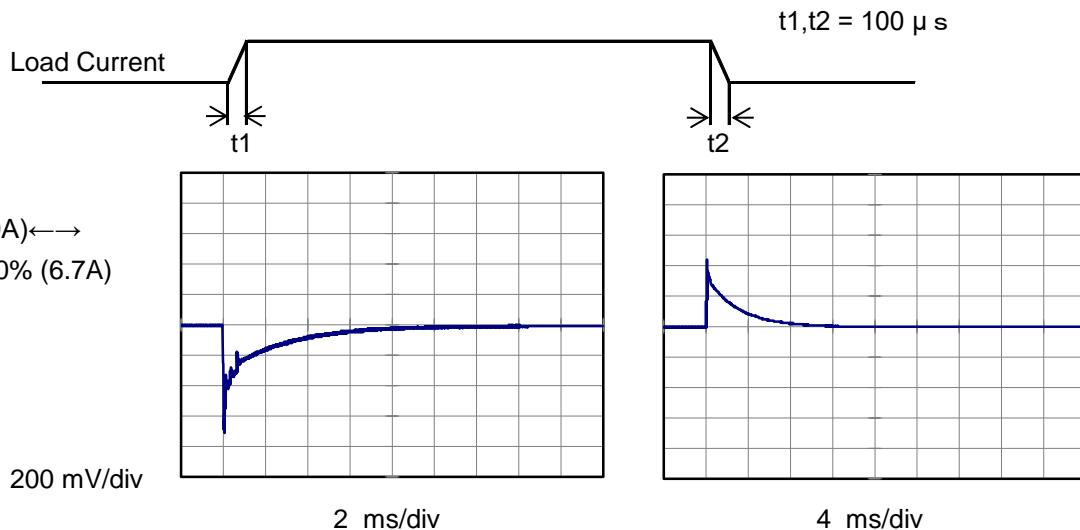
t1,t2 = 100 μ s

Load Current

t1   t2

Min.Load (0A)←→
Load 100% (6.7A)

200 mV/div

2 ms/div   4 ms/div

Min.Load (0A)←→
Load 50% (3.35A)

200 mV/div

2 ms/div   4 ms/div

Load 50% (3.35A)←→
Load 100% (6.7A)

200 mV/div

2 ms/div   4 ms/div

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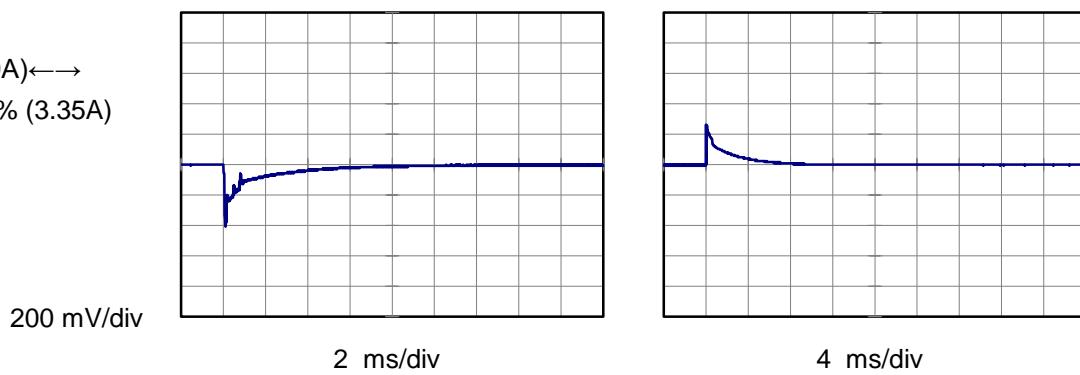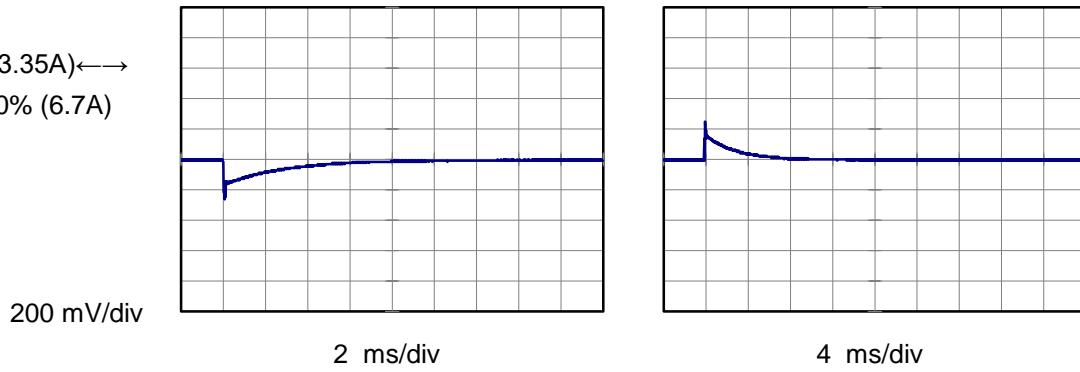
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Model	MGFS802412
Item	Ripple Voltage (by Load Current)
Object	+12V6.7A

Temperature   25°C
Testing Circuitry   Figure B

1.Graph

———△——— Input Volt.   9V
—·—○—·— Input Volt.   36V

Ripple Voltage [mV] vs Load Current [A]
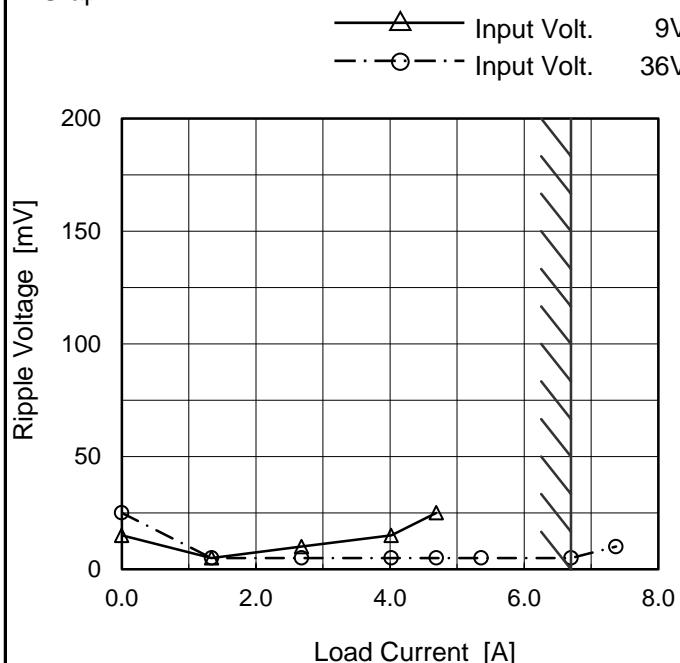
Load Current [A]

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]	Input Volt. 36 [V]
0.0	15	25
1.3	5	5
2.7	10	5
4.0	15	5
4.7	25	5
5.4	- ※	5
6.7	- ※	5
7.4	- ※	10
--	-	-
--	-	-
--	-	-

※ 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	MGFS802412
Item	Ripple-Noise
Object	+12V6.7A

Temperature   25℃
Testing Circuitry   Figure B

1.Graph

Input Volt.   9V
Input Volt.   36V

Ripple Voltage [mV] vs Load Current [A]
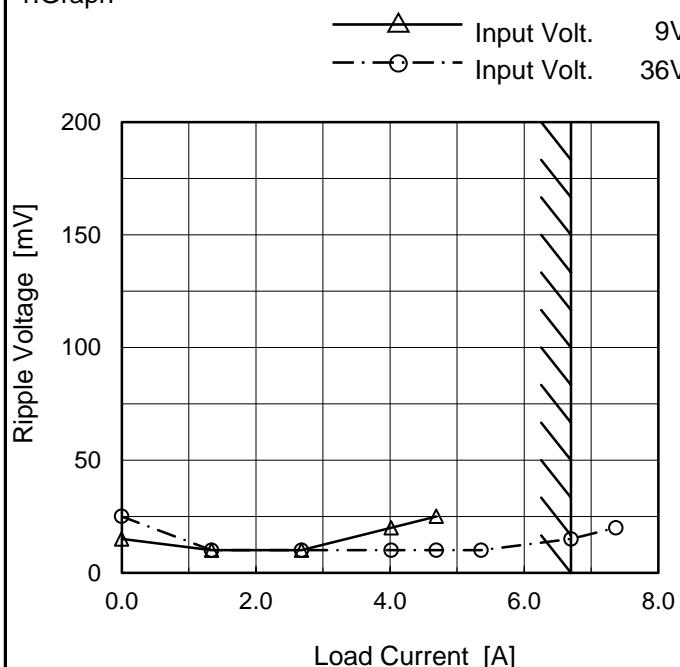
Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
     load current.

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	25
1.3	10	10
2.7	10	10
4.0	20	10
4.7	25	10
5.4	- ※	10
6.7	- ※	15
7.4	- ※	20
--	-	-
--	-	-
--	-	-

※ 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	MGFS802412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V6.7A

Testing Circuitry   Figure B

1.Graph

Load 50%
Load 100%

Ambient Temperature [°C]

Input Volt.   24V

Measured by 100 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
         ambient temperature.
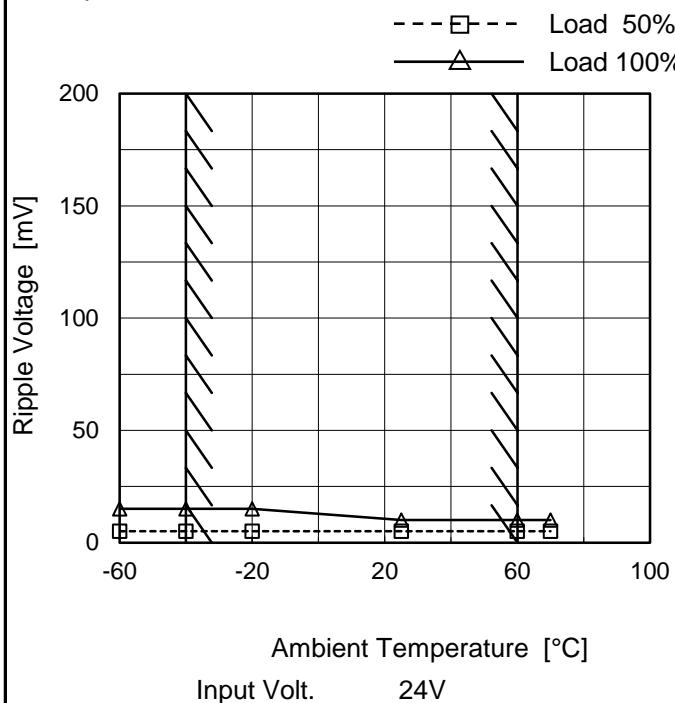
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	15
-40	5	15
-20	5	15
25	5	10
60	5	10
70	5	10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	MGFS802412
Item	Ambient Temperature Drift
Object	+12V6.7A
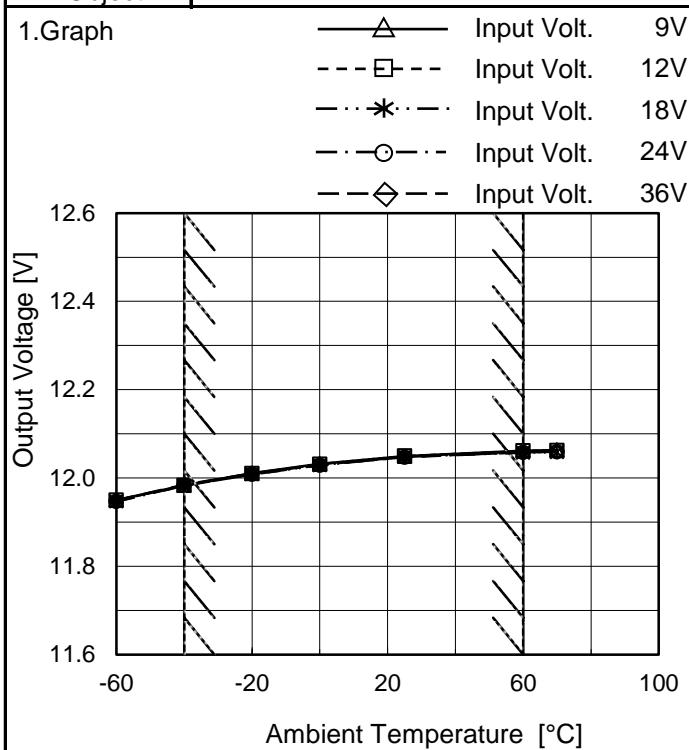
Testing Circuitry   Figure A

1.Graph

—△—	Input Volt.	9V
- - -⊟- - -	Input Volt.	12V
—··✳··—·	Input Volt.	18V
—·—○—··	Input Volt.	24V
— —◇— —	Input Volt.	36V

Output Voltage [V] vs Ambient Temperature [°C]

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	11.950	11.949	11.947	11.947	11.949
-40	11.984	11.983	11.982	11.983	11.985
-20	12.011	12.010	12.008	12.008	12.010
0	12.032	12.031	12.029	12.029	12.030
25	12.049	12.050	12.048	12.047	12.048
60	12.062	12.061	12.057	12.058	12.058
70	12.063	12.062	12.058	12.059	12.059
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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

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Model	MGFS802412
Item	Output Voltage Accuracy
Object	+12V6.7A

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　:　0　-　6.7A

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

  * Output Voltage Accuracy (Ratio) = $\dfrac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}}$ × 100

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	60	24	0	12.071	±45	±0.4
Minimum Voltage	-40	18	6.7	11.982		

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COSEL

Model	MGFS802412
Item	Time Lapse Drift
Object	+12V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Output Voltage [V] vs Time [H]

Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.041
0.5	12.053
1.0	12.053
2.0	12.053
3.0	12.053
4.0	12.053
5.0	12.053
6.0	12.053
7.0	12.053
8.0	12.053

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Model	MGFS802412
Item	Rise and Fall Time
Object	+12V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 24 V

Load 50%

Output Volt.

[2V/div]

0

Load 100%

Output Volt.

[2V/div]

0

Input Volt.

0

[10V/div]

Time [10ms/div]

Time [10ms/div]
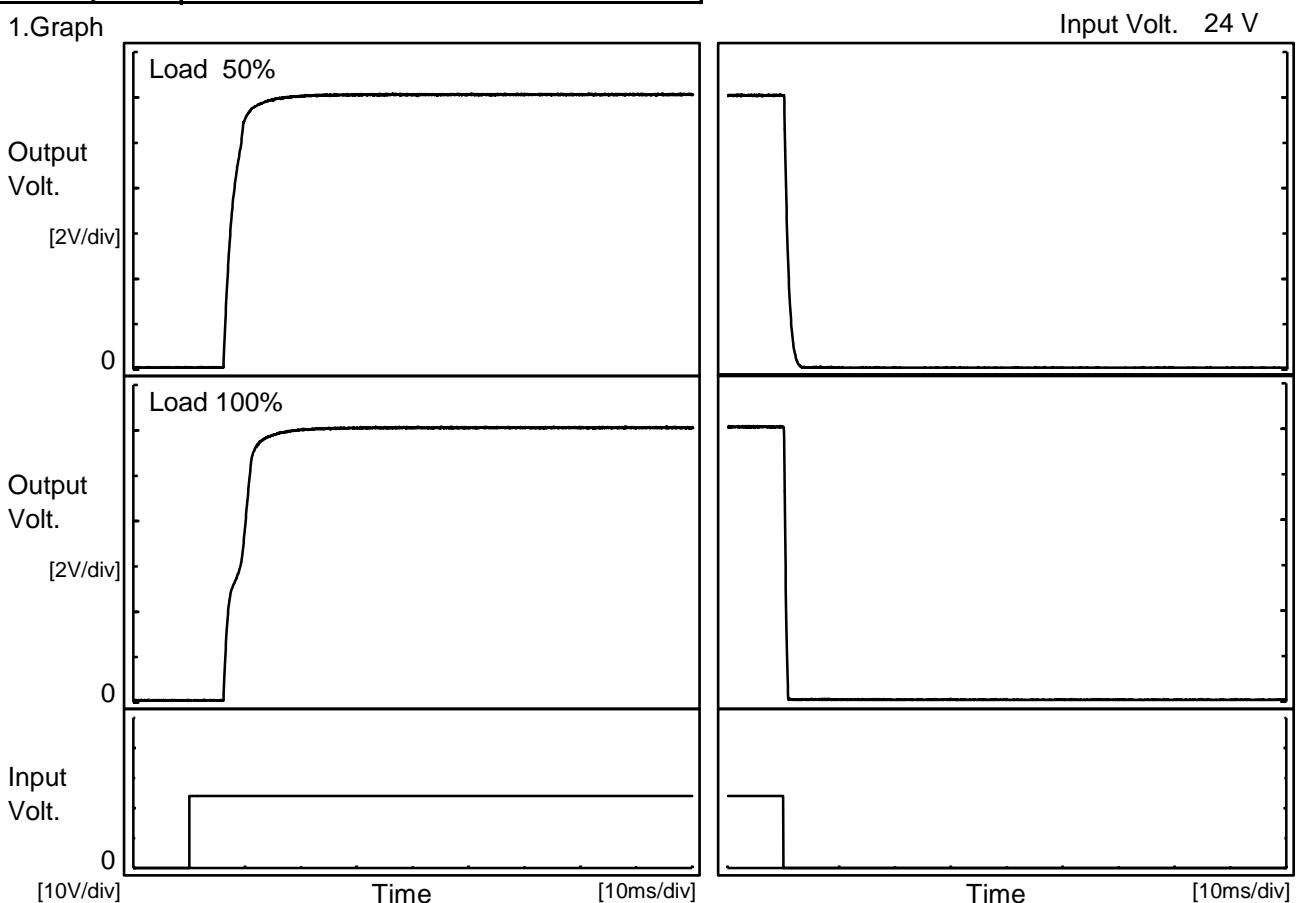
2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.3	3.4	9.7	0.2	1.4
100 %	6.3	5.0	11.3	0.2	0.5

Output Volt.
90%
10%

Input Volt.

Td Tr   Th Tf

Ts

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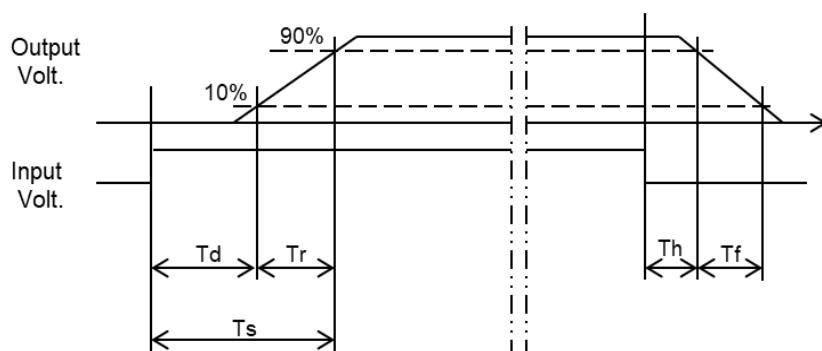
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Model	MGFS802412
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V6.7A

Testing Circuitry   Figure A

1.Graph

--□-- Load 50%
--△-- Load 100%

Input Voltage [V] vs Ambient Temperature [°C]

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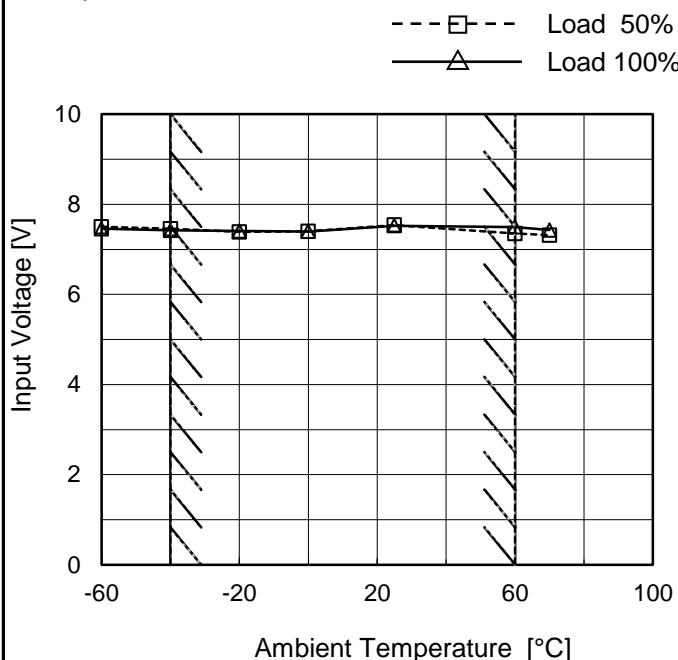
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.5	7.5
-40	7.5	7.5
-20	7.4	7.4
0	7.4	7.4
25	7.6	7.6
60	7.4	7.5
70	7.4	7.5
--	-	-
--	-	-
--	-	-
--	-	-

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Model	MGFS802412
Item	Overcurrent Protection
Object	+12V6.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

— △ Input Volt. 9V
— □ Input Volt. 12V
— ✳ Input Volt. 18V
— ○ Input Volt. 24V
— ◇ Input Volt. 36V

Load Current [A]

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	5.306	6.870	7.779	8.007	8.008
11.4	- ※1	- ※2	-	-	-
10.8	-	-	-	-	-
9.6	-	-	-	-	-
8.4	-	-	-	-	-
7.2	-	-	-	-	-
6.0	-	-	-	-	-
4.8	-	-	-	-	-
3.6	-	-	-	-	-
2.4	-	-	-	-	-
1.2	-	-	-	-	-
0.0	-	-	-	-	-

※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	MGFS802412		
Item	Overvoltage Protection	Testing Circuitry	Figure A
Object	+12V6.7A		

1.Graph

—△—	Input Volt.	9V
---⊟---	Input Volt.	12V
—··—✳—·—	Input Volt.	18V
—·—○—··	Input Volt.	24V
——◇——	Input Volt.	36V

Ambient Temperature [°C]

Load 0%

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

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	123	123	123	123	123
-40	124	124	124	124	123
-20	124	124	124	124	124
0	124	124	124	124	124
25	124	124	124	124	124
60	125	125	125	125	124
70	125	125	125	125	124
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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Model	MGFS802412
Item	Switching frequency (by Load Current)
Object	+12V6.7A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——————— Load Increase
– – – – – Load Decrease

Input Volt: 9V

Input Volt: 24V

Input Volt: 18V
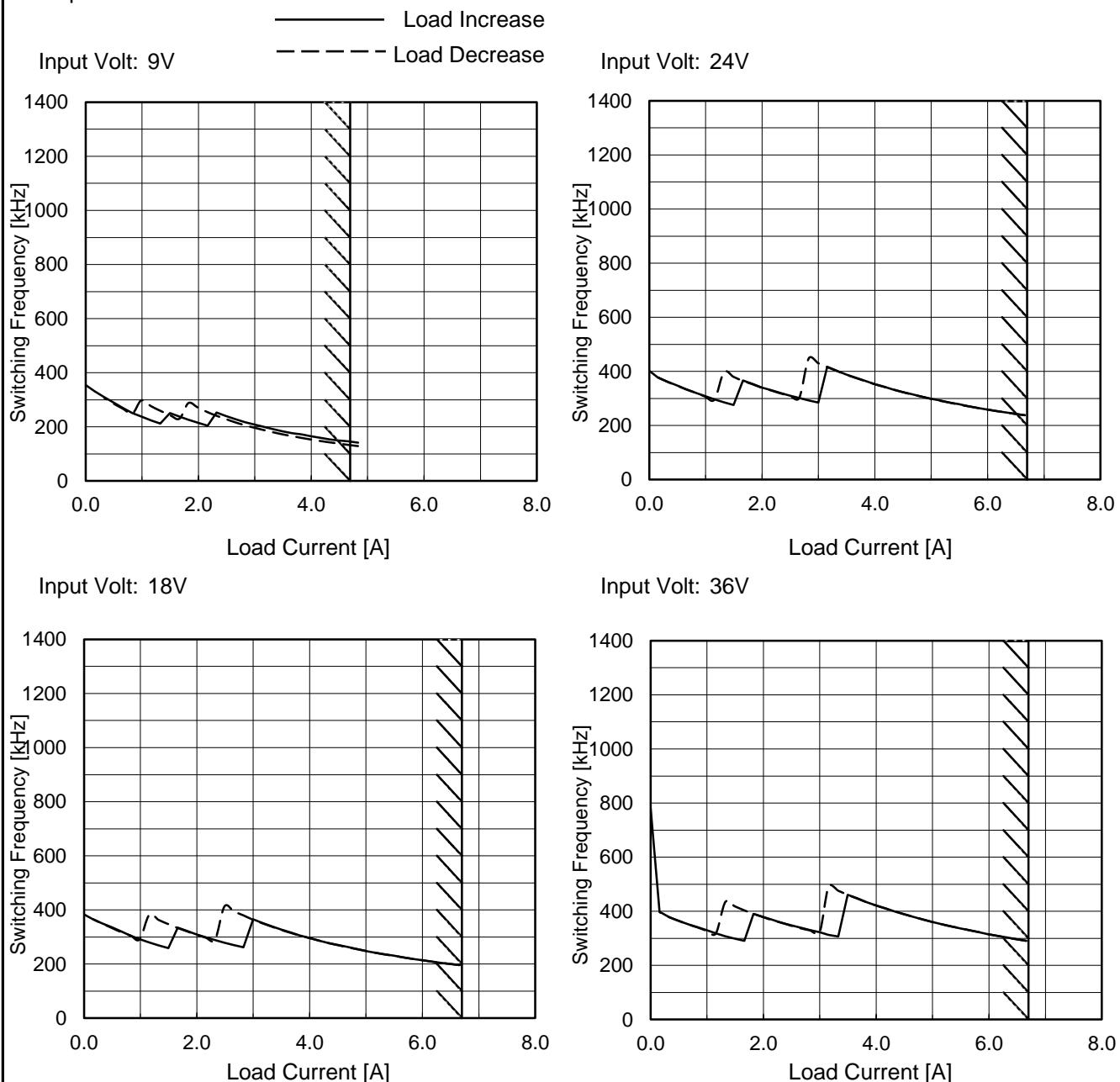
Input Volt: 36V

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.

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CO$EL

Temperature Chamber

DC Power Supply → Electronic Switch → Power Meter → Power Supply → Electronic DC Load → Oscilloscope

Relay Unit

DVM

Data Acquisition/Control Unit

Figure A

C1=22μF(Ceramic Capacitor)
Co1=150μF(Electrolytic Capacitor)

Measuring board

Input pin   Output pin

+Vin +Vout

Power Supply

Co1 C1

Electronic DC Load

-Vin -Vout

50mm

R=50Ω
C=0.01μF

Coaxial cable (1.5m,50Ω)

Oscilloscope (BW:100MHz)

R

C

Figure B（Ripple and Ripple noise Characteristic）

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