

TEST DATA OF MGFW34812

Regulated DC Power Supply
January 10, 2017

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Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi
Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage)	1
2.Input Current (by Load Ratio)	2
3.Input Power (by Load Ratio)	3
4.Efficiency (by Input Voltage)	4
5.Efficiency (by Load Ratio)	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.Switching frequency (by Load Current)	22
19.Figure of Testing Circuitry	23

(Final Page 23)



<p>Model MGFW34812</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																																															
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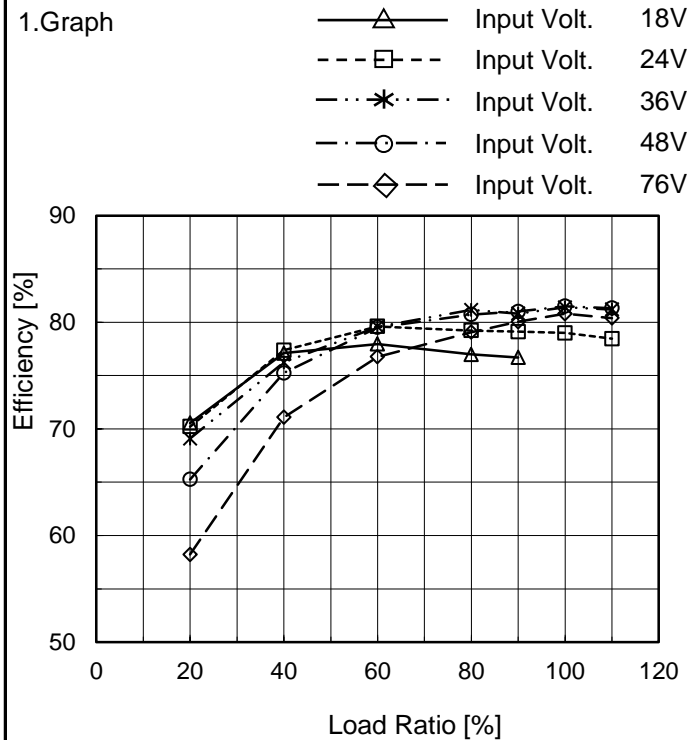


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Model	MGFW34812
Item	Efficiency (by Load Ratio)
Object	_____

Temperature 25°C
Testing Circuitry Figure A



2.Values

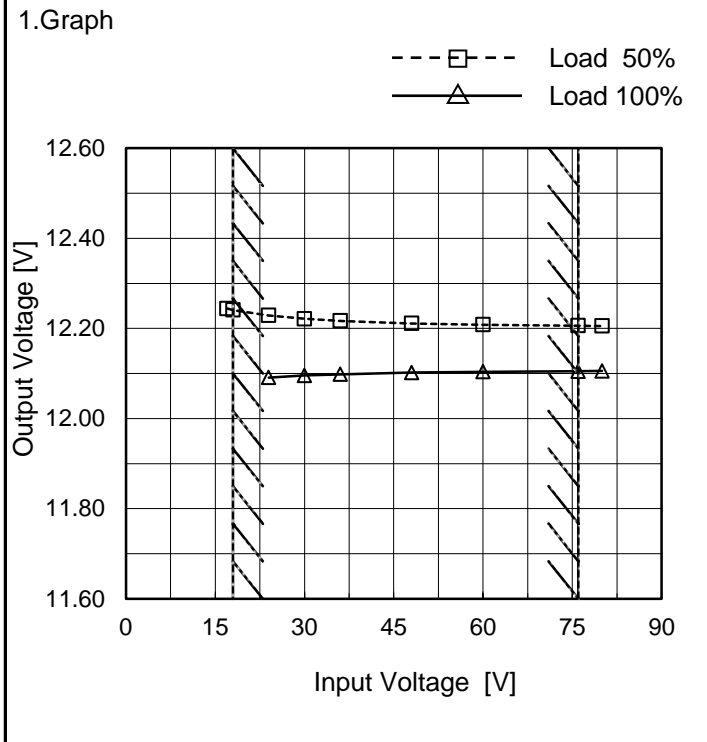
Load Ratio [%]	Efficiency [%]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-	-	-
20	70.5	70.2	69.1	65.3	58.2
40	77.1	77.4	76.2	75.2	71.1
60	78.0	79.6	79.6	79.5	76.8
80	77.0	79.2	81.2	80.7	79.1
90	76.7	79.1	80.8	81.0	80.0
100	- ※	79.0	81.4	81.5	80.8
110	- ※	78.5	81.2	81.3	80.4
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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



Model	MGFW34812
Item	Line Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

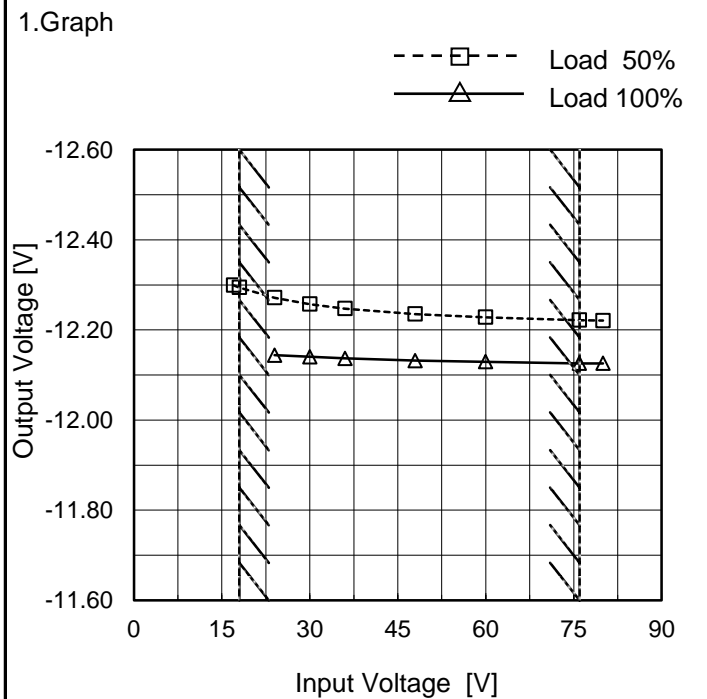


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	12.244	- ※
18	12.241	- ※
24	12.229	12.091
30	12.222	12.096
36	12.217	12.098
48	12.211	12.102
60	12.208	12.104
76	12.206	12.105
80	12.206	12.106

-12V: Rated Load Current

Object	-12V0.13A
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2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	-12.299	- ※
18	-12.294	- ※
24	-12.271	-12.144
30	-12.257	-12.141
36	-12.248	-12.137
48	-12.235	-12.132
60	-12.228	-12.129
76	-12.222	-12.126
80	-12.221	-12.126

+12V: Rated Load Current

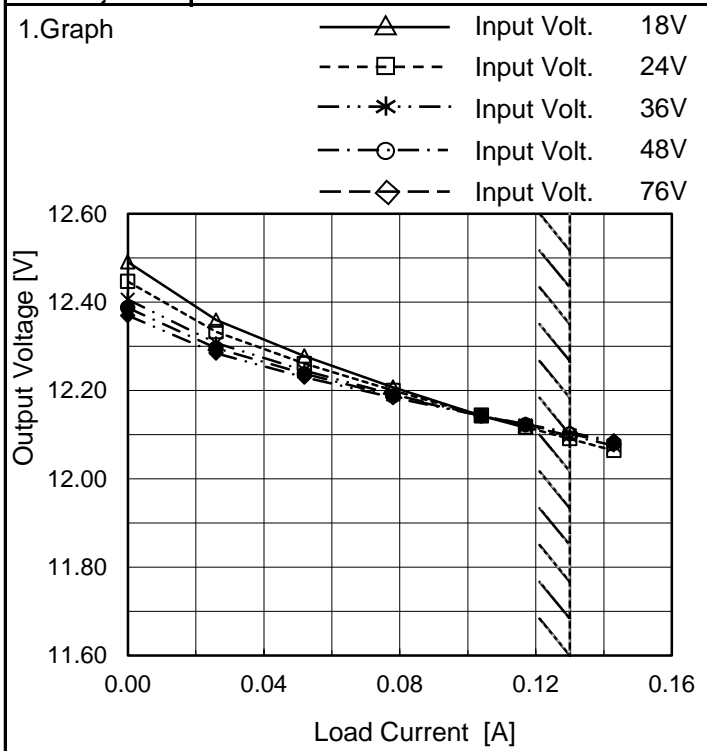
Note: Slanted line shows the range of the rated input voltage.

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



Model	MGFW34812
Item	Load Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

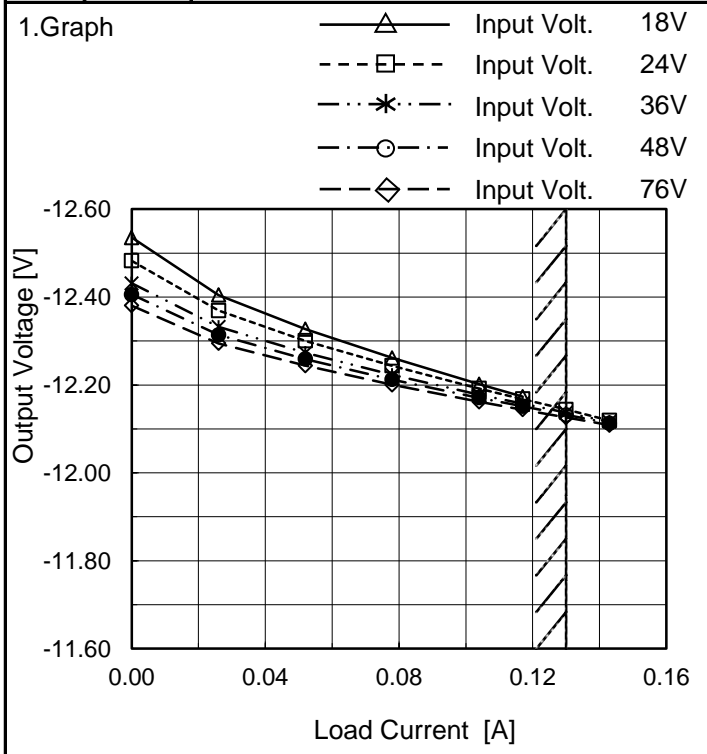


2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	12.491	12.447	12.406	12.387	12.370
0.026	12.360	12.333	12.307	12.296	12.284
0.052	12.278	12.261	12.245	12.238	12.230
0.078	12.208	12.200	12.191	12.188	12.184
0.104	12.143	12.144	12.143	12.143	12.143
0.117	12.116	12.117	12.121	12.122	12.124
0.130	- ※	12.091	12.098	12.102	12.105
0.143	- ※	12.064	12.075	12.080	12.086
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-12V: Rated Load Current

Object	-12V0.13A
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2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	-12.535	-12.483	-12.431	-12.406	-12.381
0.026	-12.405	-12.369	-12.332	-12.314	-12.295
0.052	-12.327	-12.300	-12.273	-12.259	-12.244
0.078	-12.262	-12.243	-12.223	-12.212	-12.200
0.104	-12.202	-12.192	-12.178	-12.171	-12.162
0.117	-12.173	-12.168	-12.158	-12.151	-12.144
0.130	- ※	-12.144	-12.137	-12.132	-12.126
0.143	- ※	-12.119	-12.116	-12.113	-12.109
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+12V: Rated Load Current

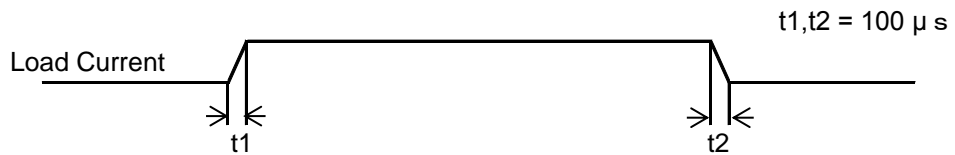
Note: Slanted line shows the range of the rated load current.

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



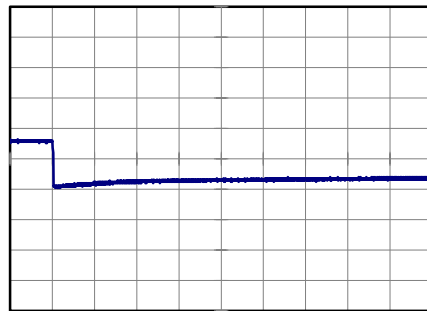
Model	MGFW34812	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V0.13A	

Input Volt. 48 V
-12V:rated load current.
Cycle 100 ms

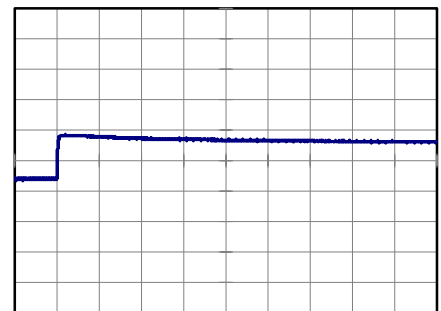


Min.Load (0A) ←→
Load 100% (0.13A)

200 mV/div



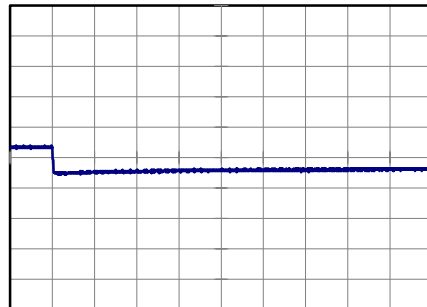
4 ms/div



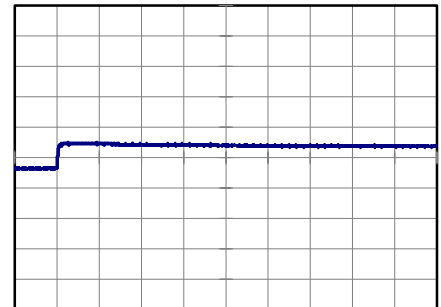
4 ms/div

Min.Load (0A) ←→
Load 50% (0.065A)

200 mV/div



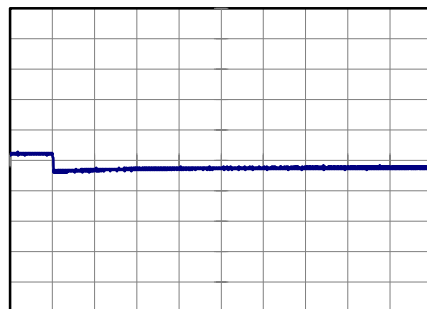
4 ms/div



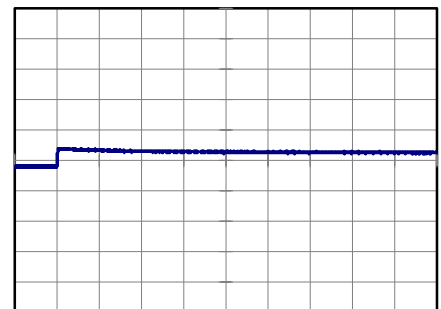
4 ms/div

Load 50% (0.065A) ←→
Load 100% (0.13A)

200 mV/div



4 ms/div



4 ms/div



Model		MGFW34812	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Response	
Object		-12V0.13A	

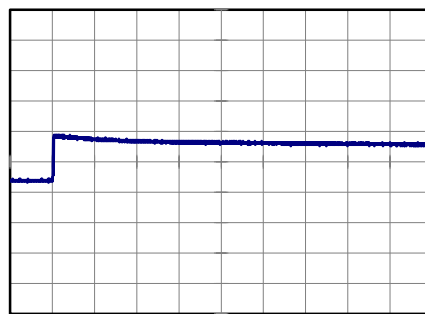
Input Volt. 48 V
+12V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

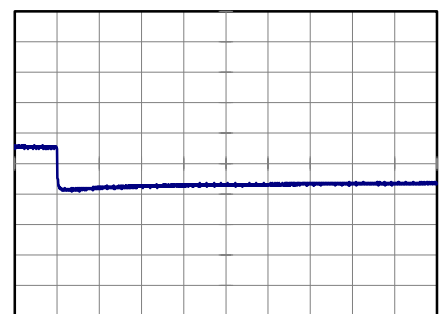


Min.Load (0A) ←→
Load 100% (0.13A)

200 mV/div



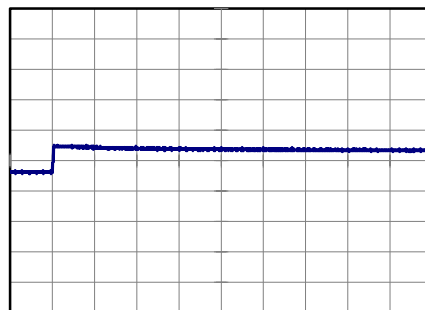
4 ms/div



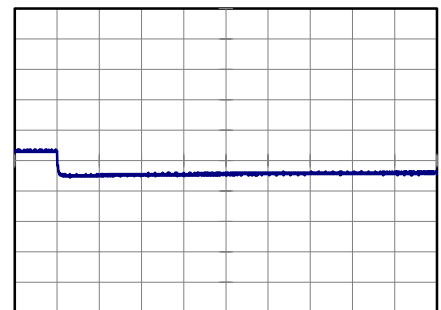
4 ms/div

Min.Load (0A) ←→
Load 50% (0.065A)

200 mV/div



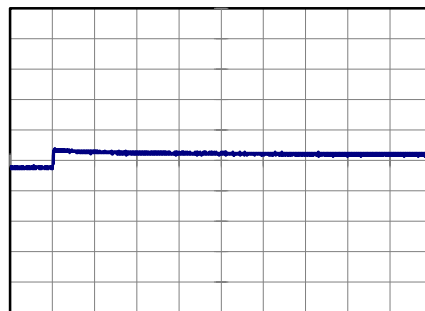
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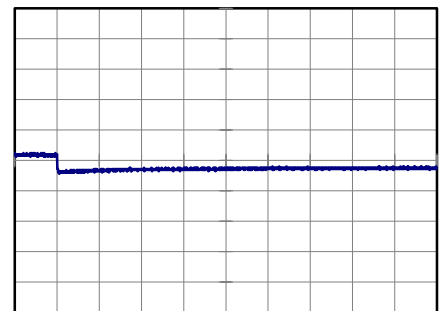
4 ms/div

Load 50% (0.065A) ←→
Load 100% (0.13A)

200 mV/div



4 ms/div



4 ms/div



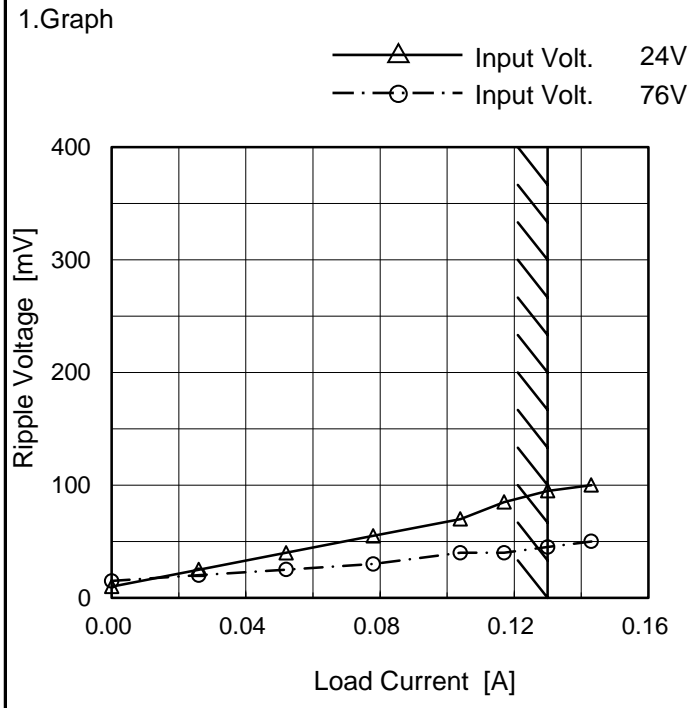
<p>Model MGFW34812</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure B</p>																																						
Item	Ripple Voltage (by Load Current)																																							
Object	+12V0.13A																																							
<p>1.Graph</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>—△— Input Volt. 24V</p> <p>-·-○-·- Input Volt. 76V</p> </div> </div>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 24 [V]</th> <th>Input Volt. 76 [V]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>10</td><td>10</td></tr> <tr><td>0.026</td><td>15</td><td>15</td></tr> <tr><td>0.052</td><td>30</td><td>20</td></tr> <tr><td>0.078</td><td>50</td><td>25</td></tr> <tr><td>0.104</td><td>65</td><td>30</td></tr> <tr><td>0.117</td><td>70</td><td>30</td></tr> <tr><td>0.130</td><td>80</td><td>35</td></tr> <tr><td>0.143</td><td>90</td><td>40</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table> <p style="text-align: center;">-12V: Rated Load Current</p>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 24 [V]	Input Volt. 76 [V]	0.000	10	10	0.026	15	15	0.052	30	20	0.078	50	25	0.104	65	30	0.117	70	30	0.130	80	35	0.143	90	40	--	-	-	--	-	-	--	-	-
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<p>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.</p>																																								
<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																								



<p>Model MGFW34812</p>		<p>Temperature 25°C Testing Circuitry Figure B</p>																																						
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<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																								



Model	MGFW34812	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	+12V0.13A		



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 24 [V]	Input Volt. 76 [V]
0.000	10	15
0.026	25	20
0.052	40	25
0.078	55	30
0.104	70	40
0.117	85	40
0.130	95	45
0.143	100	50
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

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.

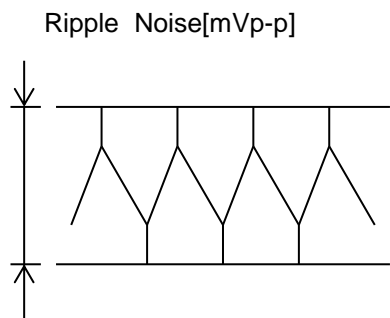
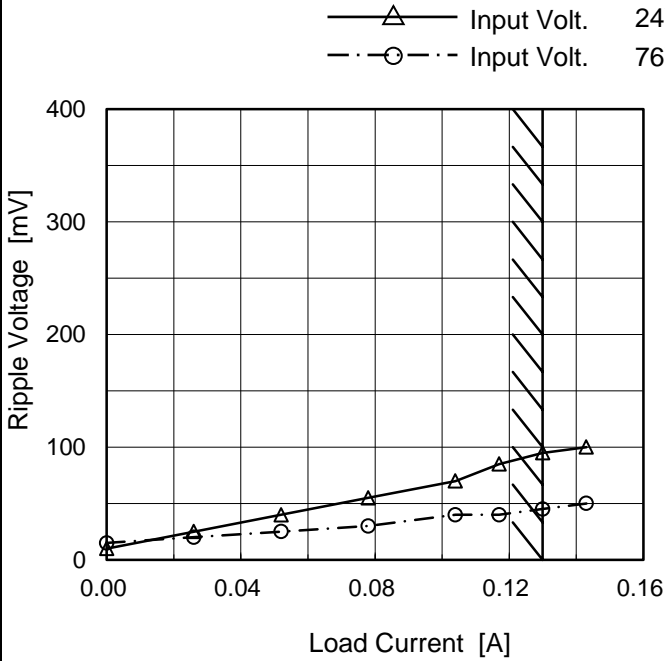


Fig.Complex Ripple Noise Wave Form



Model	MGFW34812	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	-12V0.13A		

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 24 [V]	Input Volt. 76 [V]
0.000	10	15
0.026	25	20
0.052	40	25
0.078	55	30
0.104	70	40
0.117	85	40
0.130	95	45
0.143	100	50
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

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]

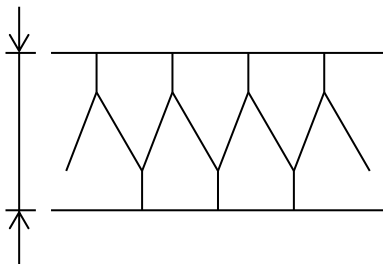


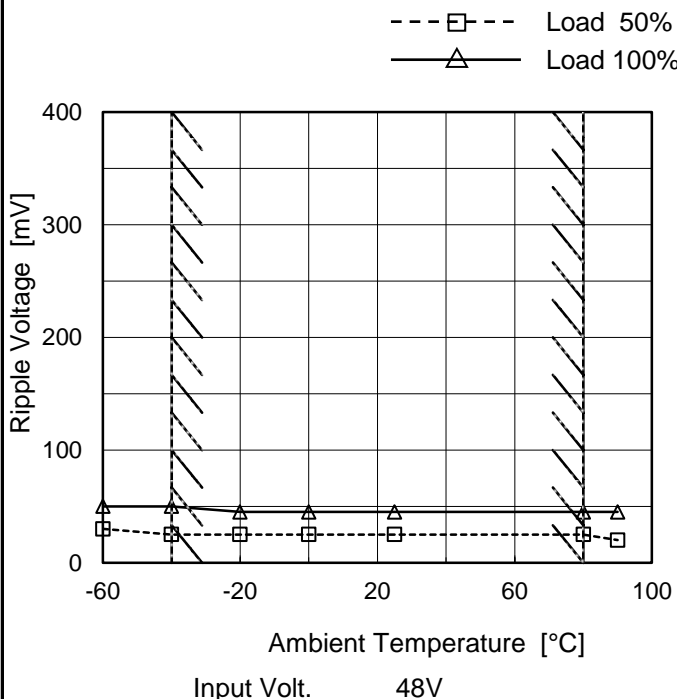
Fig.Complex Ripple Noise Wave Form



COSEL	
Model	MGFW34812
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.13A

Testing Circuitry Figure B

1.Graph



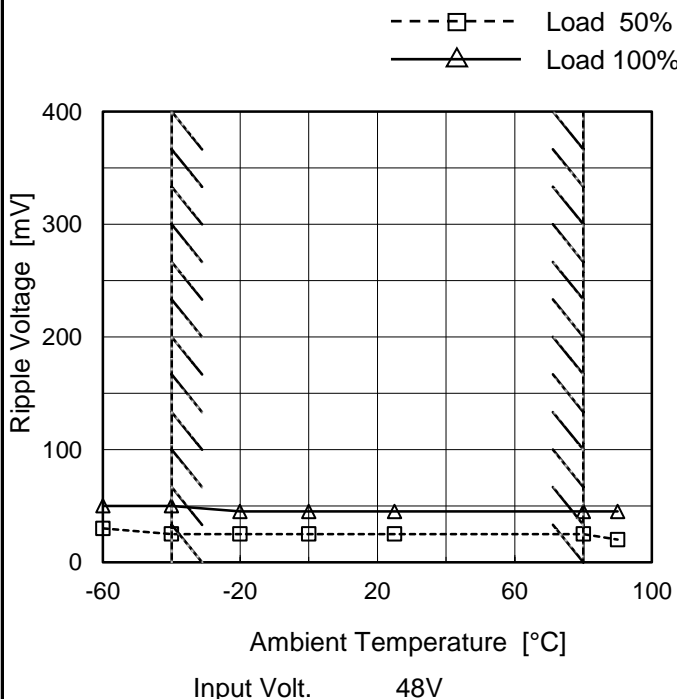
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	50
-40	25	50
-20	25	45
0	25	45
25	25	45
80	25	45
90	20	45
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.13A
--------	-----------

1.Graph



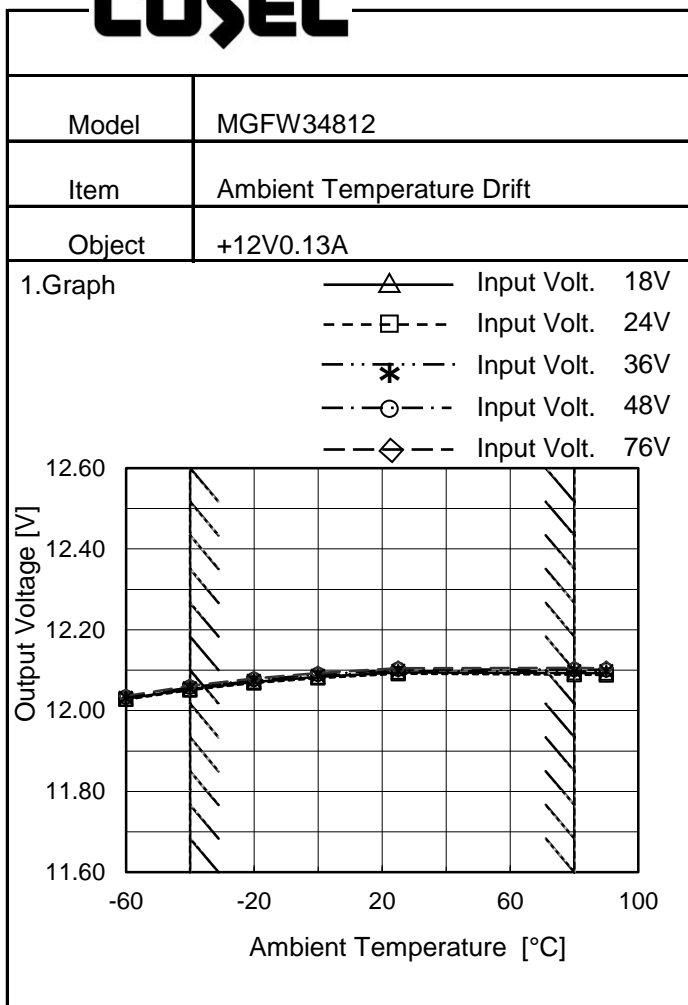
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	50
-40	25	50
-20	25	45
0	25	45
25	25	45
80	25	45
90	20	45
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

Measured by 100 MHz Oscilloscope.

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

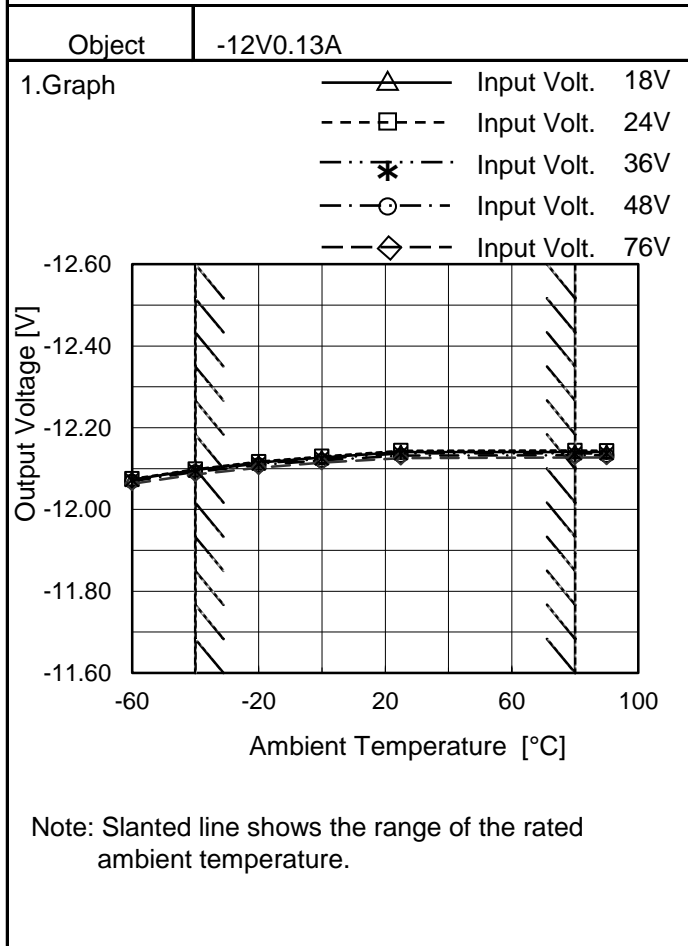


Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	12.029	12.028	12.031	12.033	12.036
-40	12.053	12.051	12.055	12.058	12.061
-20	12.071	12.068	12.074	12.077	12.080
0	12.083	12.080	12.086	12.089	12.093
25	12.095	12.091	12.098	12.102	12.105
80	12.093	12.089	12.097	12.101	12.105
90	12.093	12.088	12.097	12.101	12.105
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-12V: Rated Load Current



2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	-12.073	-12.075	-12.072	-12.069	-12.063
-40	-12.097	-12.099	-12.095	-12.092	-12.086
-20	-12.114	-12.117	-12.112	-12.108	-12.102
0	-12.127	-12.130	-12.124	-12.120	-12.114
25	-12.141	-12.144	-12.137	-12.132	-12.126
80	-12.141	-12.144	-12.137	-12.132	-12.128
90	-12.140	-12.144	-12.137	-12.132	-12.127
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+12V: Rated Load Current

Note: In case of Input Volt. 18V, Load 80%.
Other case Load 100%.



COSEL		Testing Circuitry Figure A
Model	MGFW34812	
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 - 80°C

Input Voltage : 24 - 76V

Load Current (AVR 1) : 0 - 0.13A (AVR 2) : 0 - 0.13A

* 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		+12V0.13A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	24	0	12.463	±362	±3.0
Minimum Voltage	-40	24	0.13	11.740		

Object		-12V0.13A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	24	0	-12.496	±360	±3.0
Minimum Voltage	-40	24	0.13	-11.776		



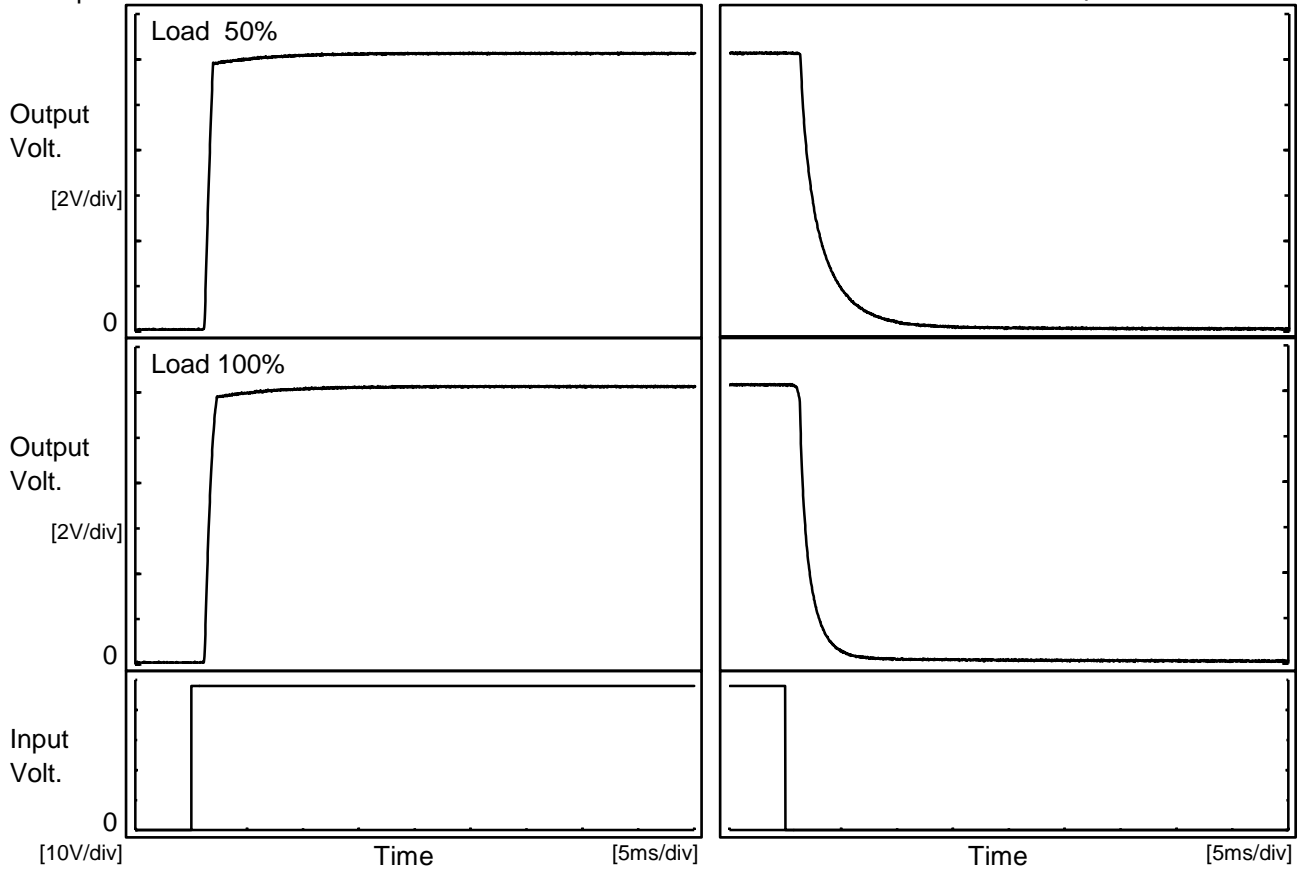
COSEL																									
Model	MGFW34812	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V0.13A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 48V Load 100%</p>		<p>2.Values</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>12.092</td></tr> <tr><td>0.5</td><td>12.094</td></tr> <tr><td>1.0</td><td>12.093</td></tr> <tr><td>2.0</td><td>12.093</td></tr> <tr><td>3.0</td><td>12.093</td></tr> <tr><td>4.0</td><td>12.093</td></tr> <tr><td>5.0</td><td>12.093</td></tr> <tr><td>6.0</td><td>12.093</td></tr> <tr><td>7.0</td><td>12.092</td></tr> <tr><td>8.0</td><td>12.092</td></tr> </tbody> </table> <p style="text-align: center;">-12V: Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	12.092	0.5	12.094	1.0	12.093	2.0	12.093	3.0	12.093	4.0	12.093	5.0	12.093	6.0	12.093	7.0	12.092	8.0	12.092
Time since start [H]	Output Voltage [V]																								
0.0	12.092																								
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Time since start [H]	Output Voltage [V]																								
0.0	-12.131																								
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8.0	-12.135																								



Model	MGFW34812	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.13A		

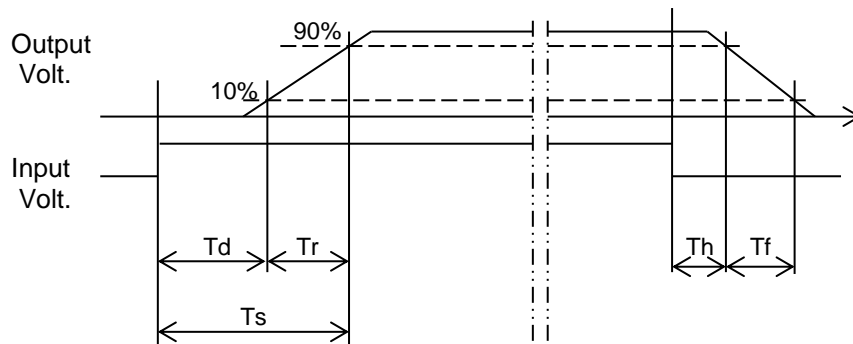
1.Graph

Input Volt. 48 V



2.Values

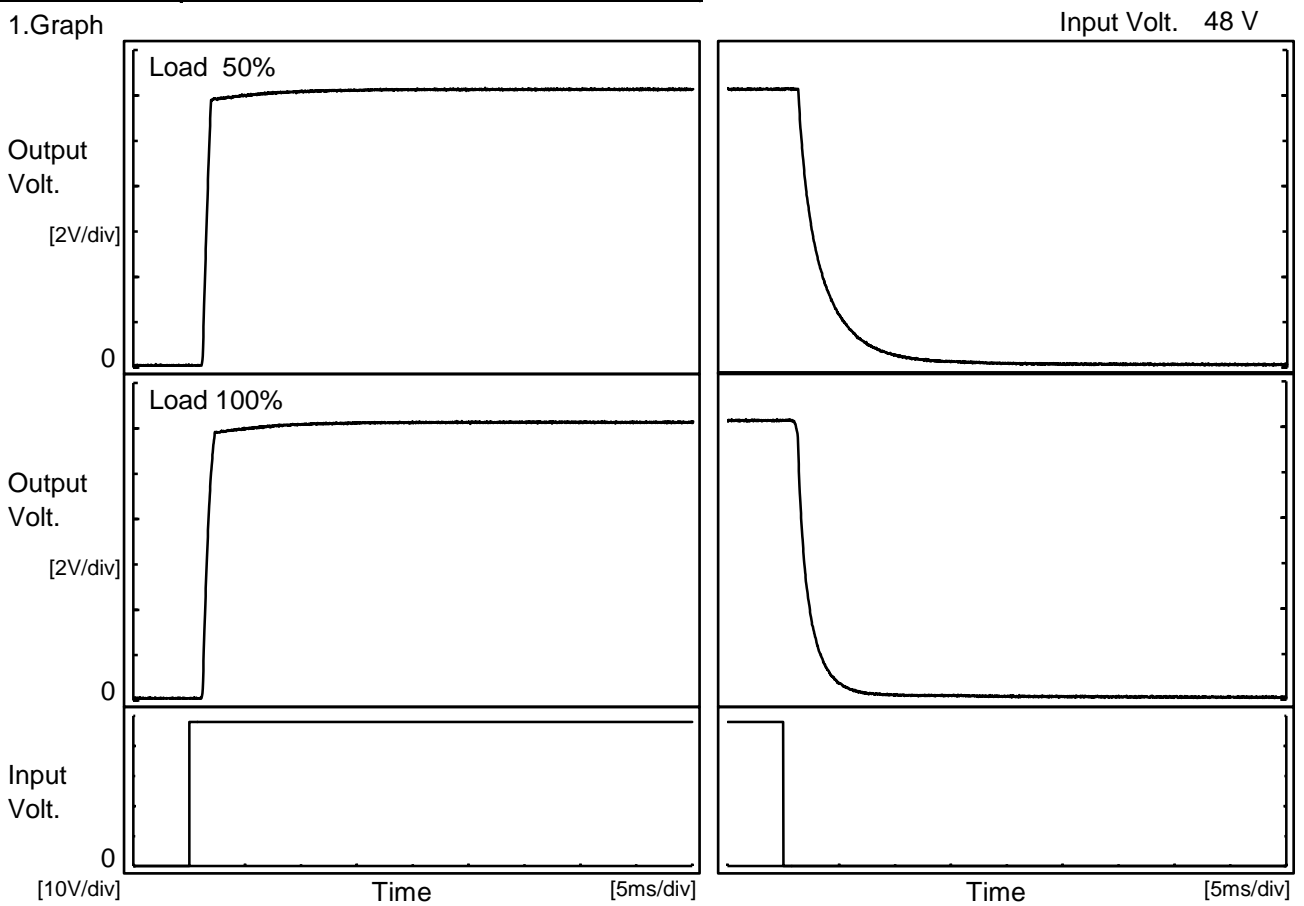
Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.3	0.6	1.9	1.5	4.6
100 %	1.3	0.9	2.2	1.3	2.3





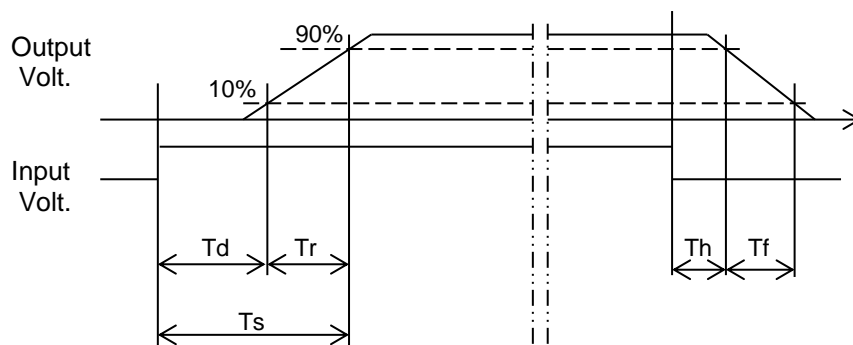
Model	MGFW34812	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.13A		

1.Graph



2.Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		1.3	0.6	1.9	1.5	5.4
100 %		1.3	0.9	2.2	1.3	2.7

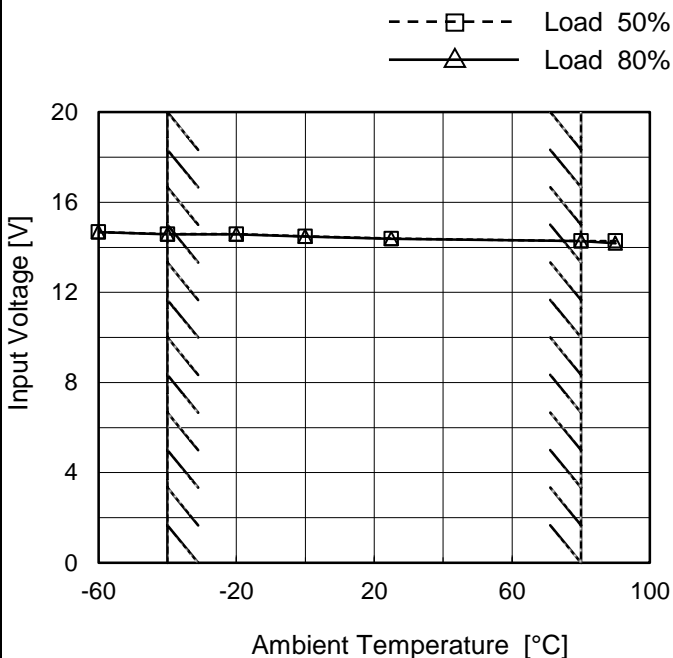




Model	MGFW34812
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph

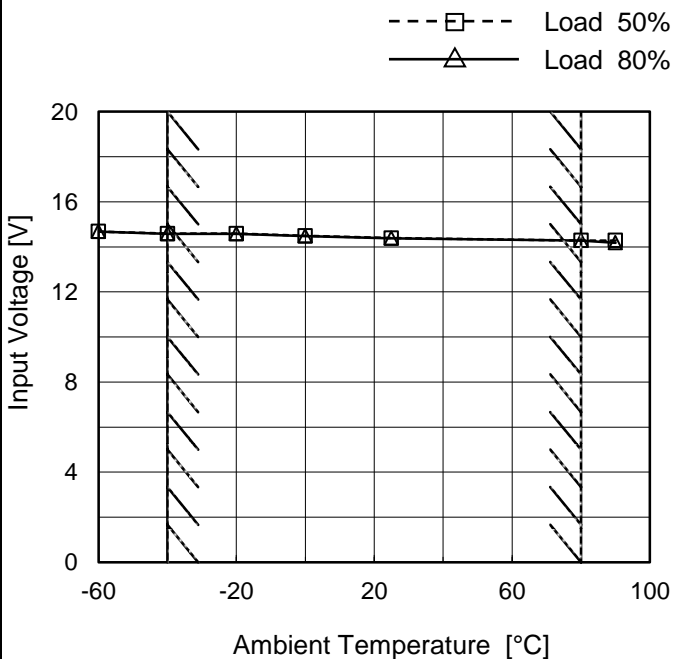


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 80%
-60	14.7	14.7
-40	14.6	14.6
-20	14.6	14.6
0	14.5	14.5
25	14.4	14.4
80	14.3	14.3
90	14.3	14.2
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A
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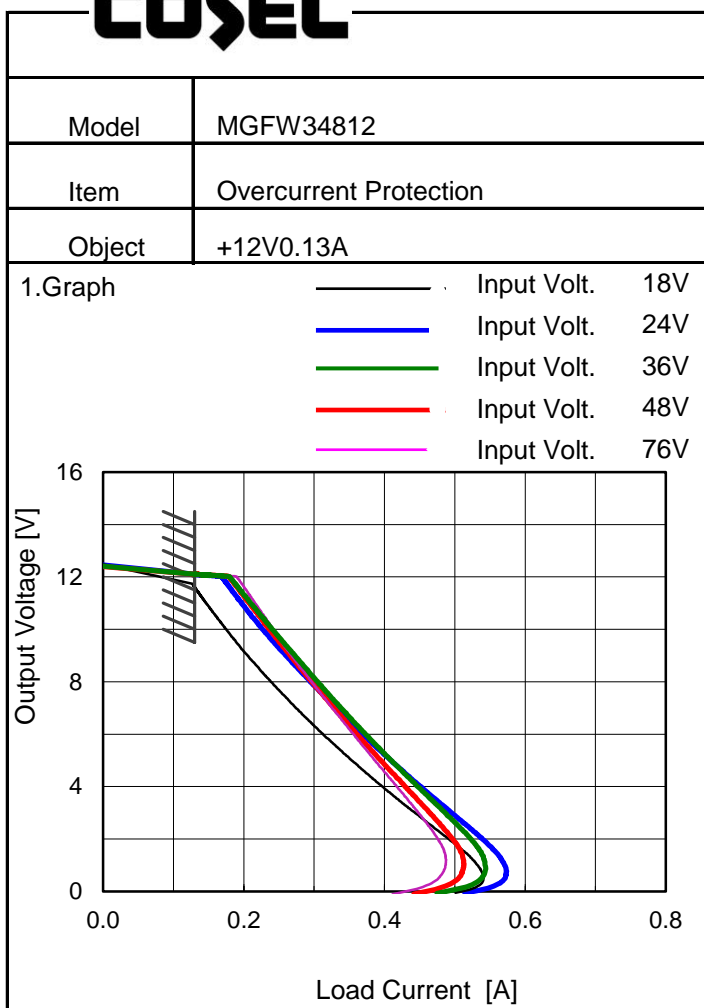
1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 80%
-60	14.7	14.7
-40	14.6	14.6
-20	14.6	14.6
0	14.5	14.5
25	14.4	14.4
80	14.3	14.3
90	14.3	14.2
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Note: Slanted line shows the range of the rated ambient temperature.

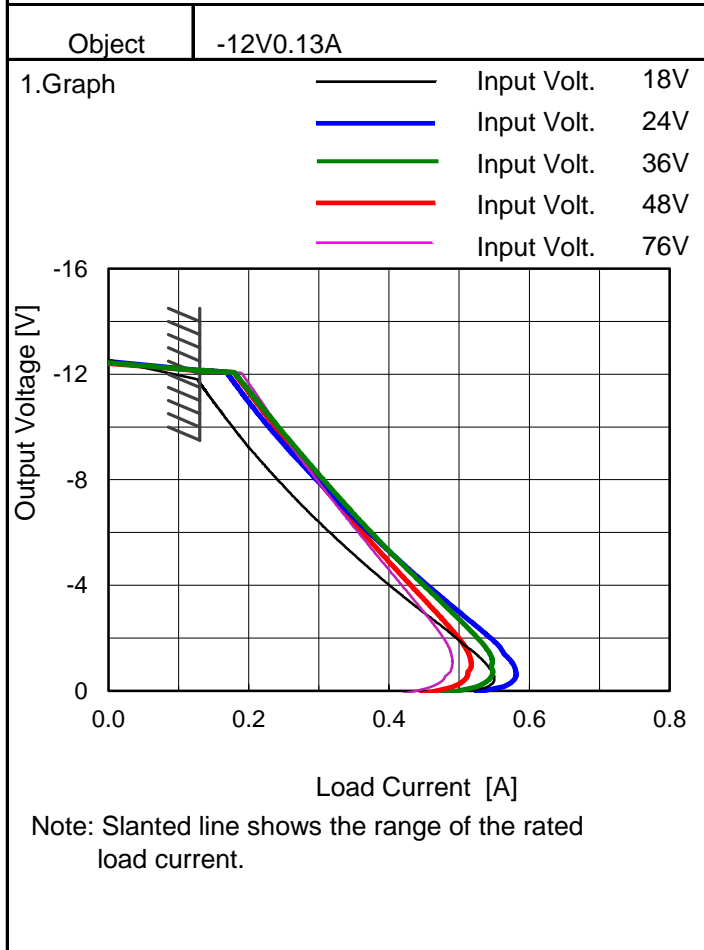


Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
11.4	0.135	0.185	0.198	0.196	0.206
10.8	0.152	0.202	0.216	0.213	0.221
9.6	0.186	0.239	0.253	0.248	0.251
8.4	0.225	0.280	0.291	0.283	0.284
7.2	0.266	0.323	0.331	0.321	0.320
6.0	0.312	0.369	0.373	0.360	0.356
4.8	0.362	0.417	0.416	0.401	0.392
3.6	0.414	0.468	0.463	0.443	0.429
2.4	0.471	0.521	0.508	0.484	0.465
1.2	0.525	0.566	0.542	0.512	0.488
0.0	0.501	0.514	0.475	0.442	0.411
--	-	-	-	-	-

-12V: Rated Load Current



2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-11.4	0.138	0.187	0.199	0.198	0.207
-10.8	0.154	0.204	0.217	0.215	0.222
-9.6	0.188	0.241	0.254	0.249	0.252
-8.4	0.227	0.282	0.293	0.285	0.285
-7.2	0.269	0.326	0.333	0.323	0.320
-6.0	0.314	0.371	0.375	0.361	0.356
-4.8	0.365	0.420	0.418	0.402	0.393
-3.6	0.418	0.472	0.465	0.444	0.430
-2.4	0.477	0.526	0.511	0.486	0.467
-1.2	0.532	0.571	0.547	0.516	0.490
0.0	0.517	0.524	0.475	0.446	0.417
--	-	-	-	-	-

+12V: Rated Load Current

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



Model		MGFW34812		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+/-12V0.13A																																																																																
1.Graph		<p>—△— Input Volt. 18V</p> <p>---□--- Input Volt. 24V</p> <p>-··*·-·- Input Volt. 36V</p> <p>-··○-·- Input Volt. 48V</p> <p>---◇--- Input Volt. 76V</p>		2.Values																																																																														
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="5">Input Current [A]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>446</td><td>511</td><td>593</td><td>638</td><td>709</td></tr> <tr><td>0.026</td><td>310</td><td>377</td><td>466</td><td>519</td><td>581</td></tr> <tr><td>0.052</td><td>235</td><td>296</td><td>381</td><td>433</td><td>500</td></tr> <tr><td>0.078</td><td>188</td><td>243</td><td>322</td><td>372</td><td>439</td></tr> <tr><td>0.104</td><td>155</td><td>206</td><td>279</td><td>326</td><td>391</td></tr> <tr><td>0.117</td><td>144</td><td>192</td><td>262</td><td>308</td><td>371</td></tr> <tr><td>0.130</td><td>- ※</td><td>178</td><td>245</td><td>290</td><td>352</td></tr> <tr><td>0.143</td><td>- ※</td><td>165</td><td>231</td><td>275</td><td>336</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.000	446	511	593	638	709	0.026	310	377	466	519	581	0.052	235	296	381	433	500	0.078	188	243	322	372	439	0.104	155	206	279	326	391	0.117	144	192	262	308	371	0.130	- ※	178	245	290	352	0.143	- ※	165	231	275	336	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-		
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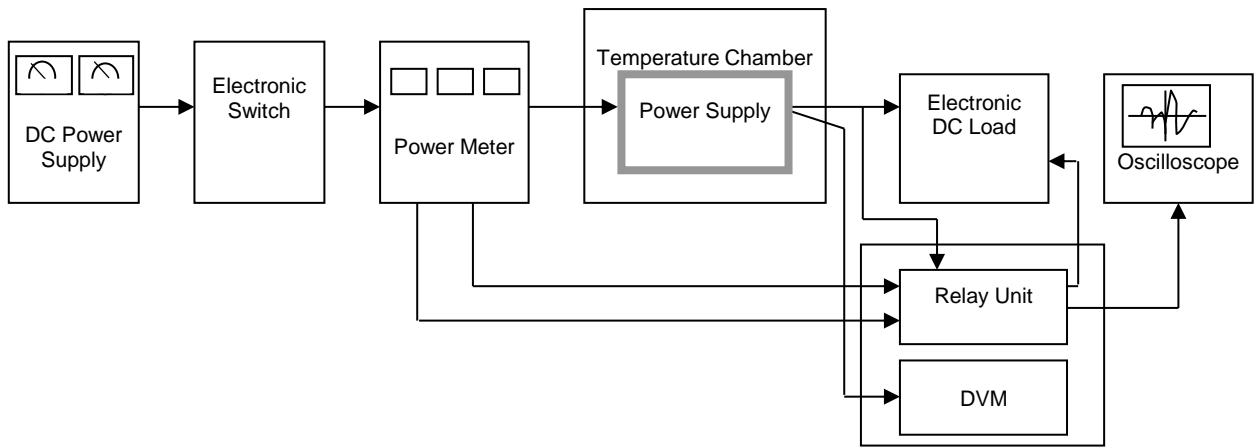


Figure A

Data Acquisition/Control Unit

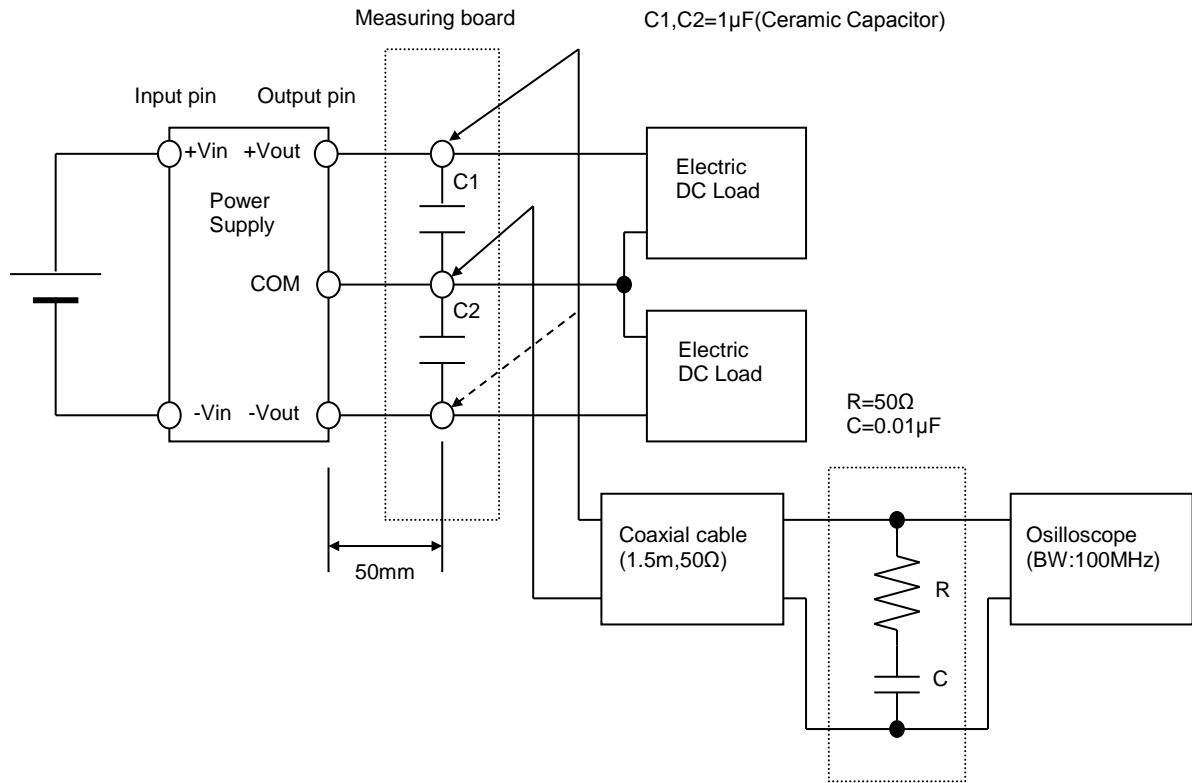


Figure B (Ripple and Ripple noise Characteristic)