

# TEST DATA OF MGFS104812

Regulated DC Power Supply  
December 28, 2016

Approved by : Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi Design Engineer

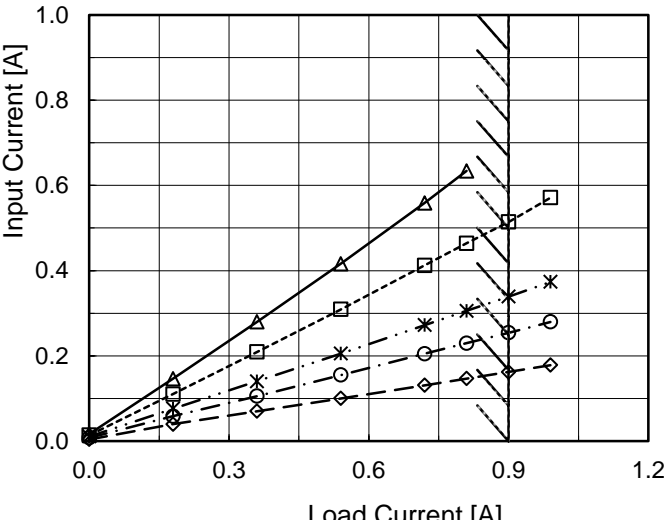
**COSEL CO.,LTD.**

## 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) . . . . .	9
10.Ripple-Noise . . . . .	10
11.Ripple Voltage (by Ambient Temperature) . . . . .	11
12.Ambient Temperature Drift . . . . .	12
13.Output Voltage Accuracy . . . . .	13
14.Time Lapse Drift . . . . .	14
15.Rise and Fall Time . . . . .	15
16.Minimum Input Voltage for Regulated Output Voltage . . . . .	16
17.Overcurrent Protection . . . . .	17
18.Switching frequency (by Load Current) . . . . .	18
19.Figure of Testing Circuitry . . . . .	19

(Final Page 19)

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		<table><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><tr><td>0.00</td><td>0.017</td><td>0.014</td><td>0.011</td><td>0.008</td><td>0.004</td></tr><tr><td>0.18</td><td>0.146</td><td>0.110</td><td>0.076</td><td>0.059</td><td>0.040</td></tr><tr><td>0.36</td><td>0.280</td><td>0.209</td><td>0.140</td><td>0.105</td><td>0.070</td></tr><tr><td>0.54</td><td>0.416</td><td>0.309</td><td>0.206</td><td>0.155</td><td>0.100</td></tr><tr><td>0.72</td><td>0.559</td><td>0.412</td><td>0.272</td><td>0.205</td><td>0.131</td></tr><tr><td>0.81</td><td>0.634</td><td>0.464</td><td>0.306</td><td>0.230</td><td>0.147</td></tr><tr><td>0.90</td><td>- ※</td><td>0.514</td><td>0.339</td><td>0.254</td><td>0.162</td></tr><tr><td>0.99</td><td>- ※</td><td>0.571</td><td>0.374</td><td>0.280</td><td>0.178</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 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]	0.00	0.017	0.014	0.011	0.008	0.004	0.18	0.146	0.110	0.076	0.059	0.040	0.36	0.280	0.209	0.140	0.105	0.070	0.54	0.416	0.309	0.206	0.155	0.100	0.72	0.559	0.412	0.272	0.205	0.131	0.81	0.634	0.464	0.306	0.230	0.147	0.90	- ※	0.514	0.339	0.254	0.162	0.99	- ※	0.571	0.374	0.280	0.178	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-		
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Model		MGFS104812		Temperature 25°C	
Item		Input Power (by Load Current)		Testing Circuitry Figure A	
Object					
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>18V</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><div>Input Volt.</div><div>48V</div></div><div><div>--◇--</div><div>Input Volt.</div><div>76V</div></div></div> <div><div>Input Power [W]</div><div>16.0</div><div>12.0</div><div>8.0</div><div>4.0</div><div>0.0</div><div>0.0</div><div>0.3</div><div>0.6</div><div>0.9</div><div>1.2</div><div>Load Current [A]</div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div></div>			
2.Values					



Model		MGFS104812	
Item		Efficiency (by Input Voltage)	
Object			
1.Graph		2.Values	

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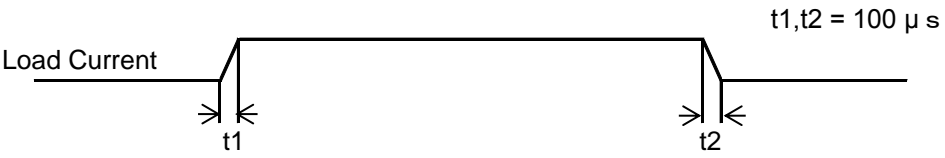


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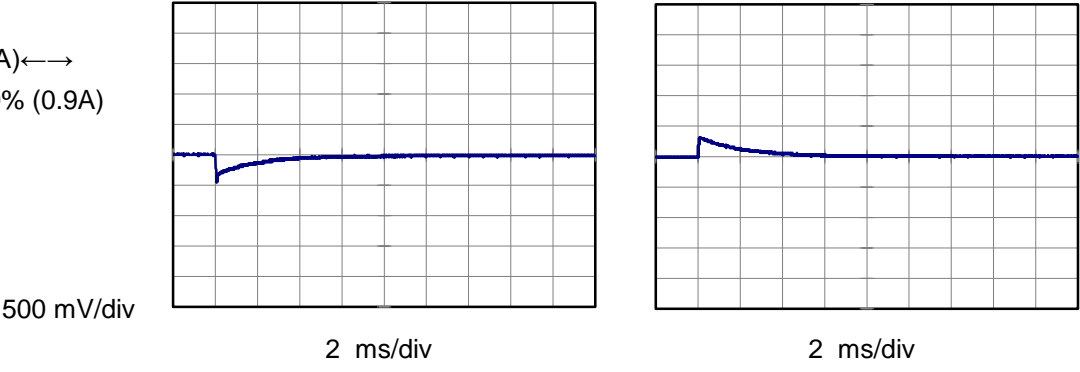


Model	MGFS104812		
Item	Dynamic Load Response	Temperature	25°C
Object	+12V0.9A	Testing Circuitry	Figure A

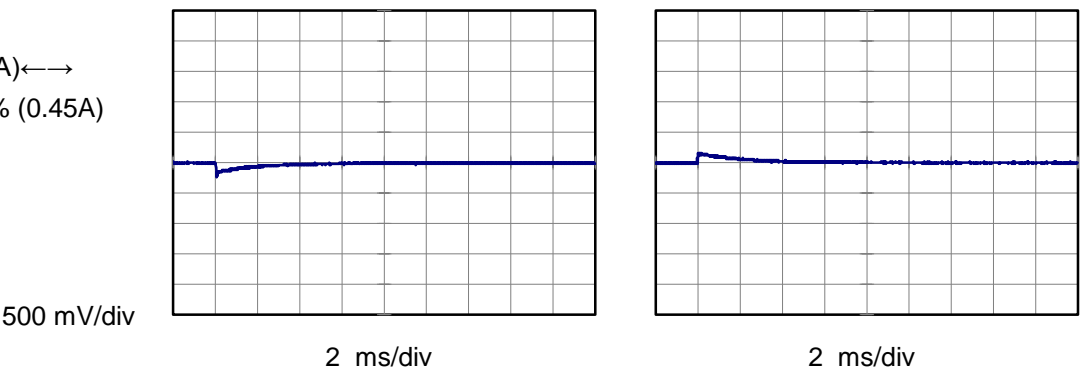
Input Volt. 48 V  
Cycle 100 ms



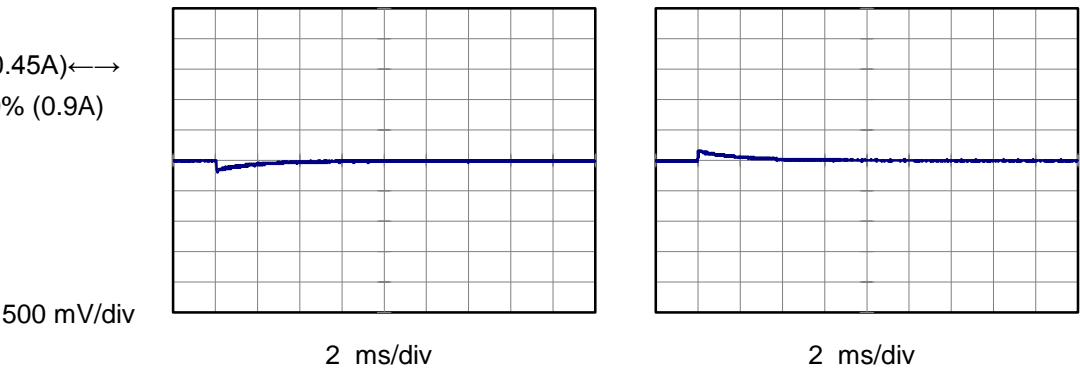
Min.Load (0A) $\longleftrightarrow$   
Load 100% (0.9A)



Min.Load (0A) $\longleftrightarrow$   
Load 50% (0.45A)




Load 50% (0.45A) $\longleftrightarrow$   
Load 100% (0.9A)

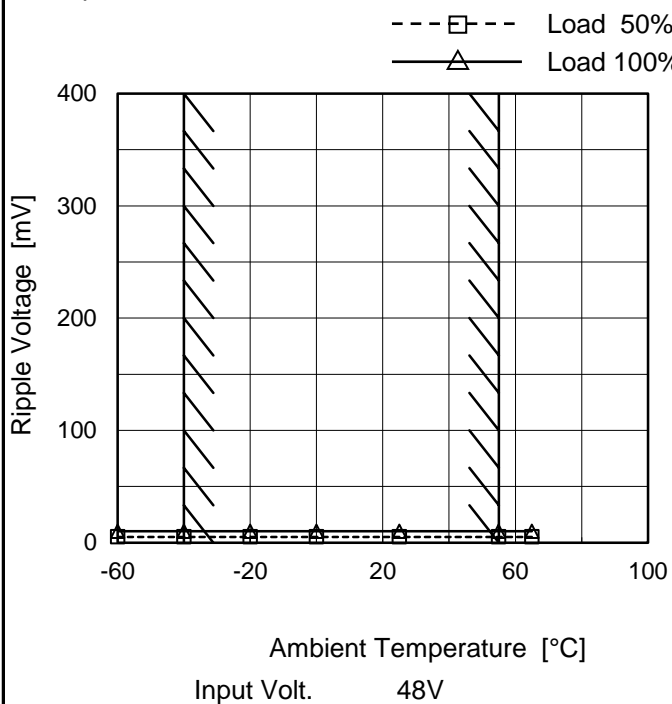


Model		MGFS104812																																							
Item		Ripple Voltage (by Load Current)																																							
Object		+12V0.9A																																							
1.Graph		2.Values																																							
<div><div><div><div>—△—</div><div>Input Volt.</div><div>24V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>76V</div></div></div><div><div><div><div>400</div><div>300</div><div>200</div><div>100</div><div>0</div></div><div><div><div>0.0</div><div>0.3</div><div>0.6</div><div>0.9</div><div>1.2</div></div></div></div><div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div></div></div>		<table><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><tr><td>0.00</td><td>5</td><td>25</td></tr><tr><td>0.18</td><td>5</td><td>5</td></tr><tr><td>0.36</td><td>5</td><td>10</td></tr><tr><td>0.54</td><td>10</td><td>10</td></tr><tr><td>0.72</td><td>15</td><td>10</td></tr><tr><td>0.81</td><td>20</td><td>10</td></tr><tr><td>0.90</td><td>20</td><td>10</td></tr><tr><td>0.99</td><td>30</td><td>10</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 24 [V]	Input Volt. 76 [V]	0.00	5	25	0.18	5	5	0.36	5	10	0.54	10	10	0.72	15	10	0.81	20	10	0.90	20	10	0.99	30	10	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 24 [V]	Input Volt. 76 [V]																																							
0.00	5	25																																							
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0.81	20	10																																							
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<p>Measured by 100 MHz Oscilloscope.</p> <p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>																																									
<div><div><div>Ripple [mVp-p]</div><div><div><div><div><div></div><div></div><div></div><div></div></div></div></div></div><div>Fig.Complex Ripple Wave Form</div></div></div>																																									

Model		MGFS104812	
Item		Ripple-Noise	
Object		+12V0.9A	
1.Graph		2.Values	
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Model	MGFS104812
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.9A

## 1.Graph

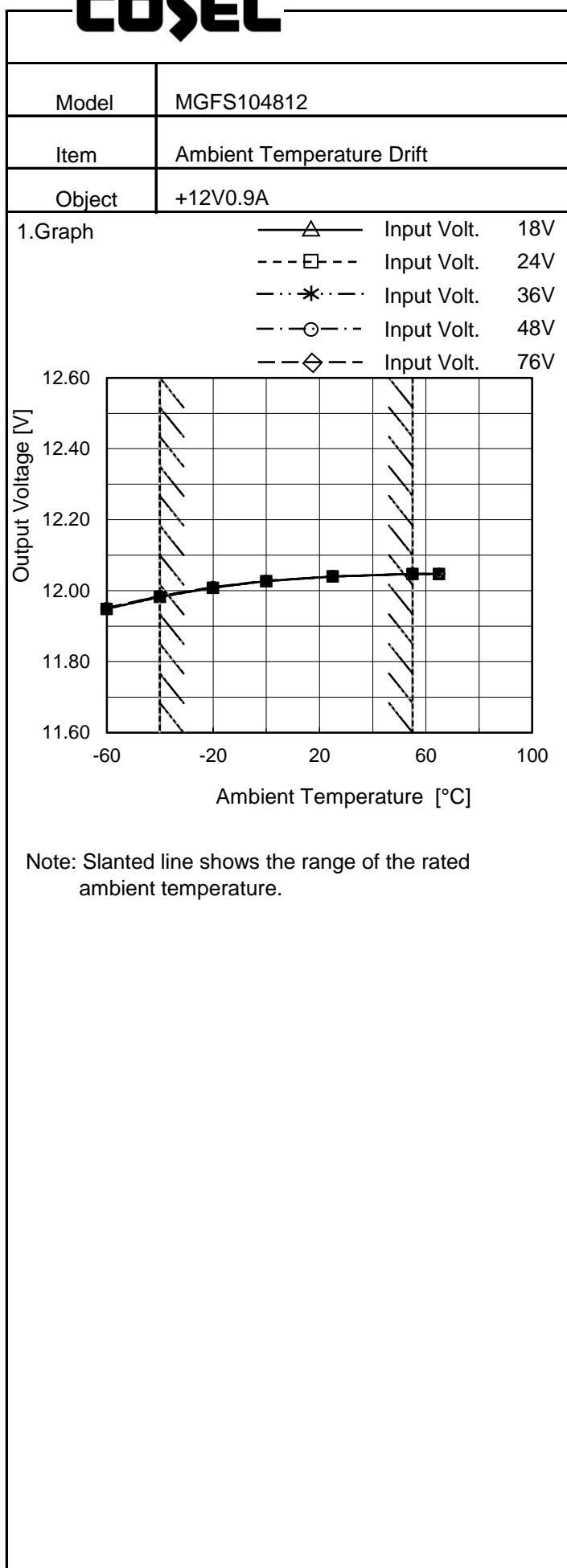


Measured by 100 MHz Oscilloscope.

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

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	10
-40	5	10
-20	5	10
0	5	10
25	5	10
55	5	10
65	5	10
--	-	-
--	-	-
--	-	-
--	-	-



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	11.949	11.948	11.950	11.951	11.952
-40	11.983	11.982	11.984	11.985	11.986
-20	12.009	12.008	12.009	12.010	12.010
0	12.027	12.027	12.027	12.027	12.028
25	12.040	12.040	12.040	12.040	12.040
55	12.047	12.047	12.048	12.047	12.047
65	12.047	12.047	12.047	12.047	12.047
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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



Model		MGFS104812	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+12V0.9A	

## 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 - 55°C

Input Voltage : 24 - 76V

Load Current : 0 - 0.9A

\* 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

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	55	76	0	12.056	±37	±0.3
Minimum Voltage	-40	24	0.9	11.982		

**COSEL**

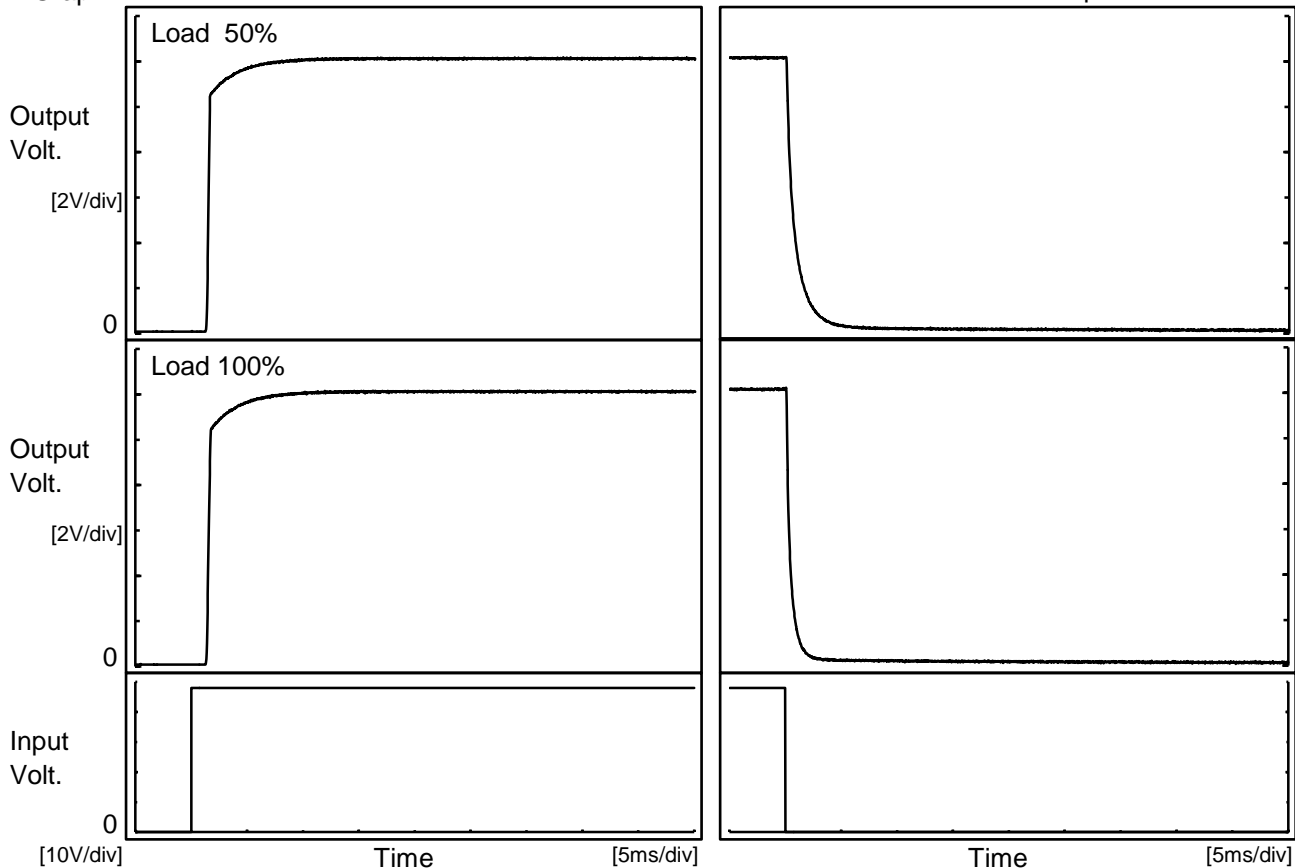
Model		MGFS104812		Temperature25°C Testing CircuitryFigure A
Item		Time Lapse Drift		
Object		+12V0.9A		
1.Graph				2.Values
<div><div><div><div><div>12.60</div><div>12.40</div><div>12.20</div><div>12.00</div><div>11.80</div><div>11.60</div></div><div><div><div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Time [H]</div><div>Input Volt.48V</div><div>Load100%</div></div></div></div><div><div><div><div><div>12.60</div><div>12.40</div><div>12.20</div><div>12.00</div><div>11.80</div><div>11.60</div></div><div><div><div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Time [H]</div><div>Input Volt.48V</div><div>Load100%</div></div></div></div><div><div><div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Time [H]</div><div>Input Volt.48V</div><div>Load100%</div></div></div></div></div></div></div></div></div></div></div></div></div>				
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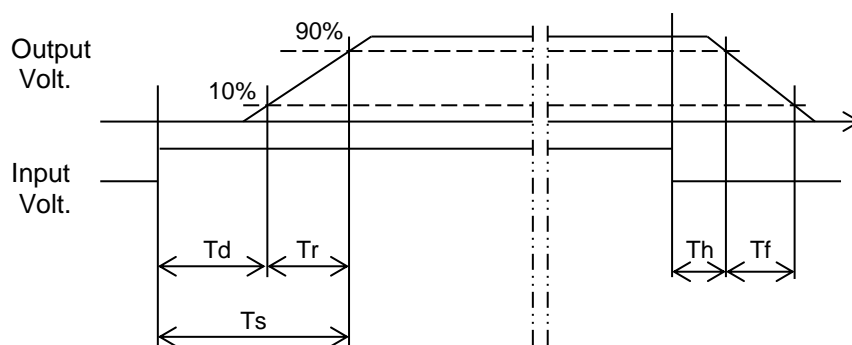
Model	MGFS104812	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.9A		

# 1.Graph



# 2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.4	0.9	2.3	0.2	2.1
100 %	1.4	1.1	2.5	0.1	1.0



Model	MGFS104812																																						
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry    Figure A																																					
Object	+12V0.9A																																						
1.Graph		2.Values																																					
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 80%</div></div></div> <table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50%</th><th>Load 80%</th></tr></thead><tbody><tr><td>-60</td><td>15.0</td><td>15.1</td></tr><tr><td>-40</td><td>14.9</td><td>15.0</td></tr><tr><td>-20</td><td>14.9</td><td>15.0</td></tr><tr><td>0</td><td>14.8</td><td>14.9</td></tr><tr><td>25</td><td>14.8</td><td>14.9</td></tr><tr><td>55</td><td>14.6</td><td>14.8</td></tr><tr><td>65</td><td>14.5</td><td>14.6</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><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		Ambient Temperature [°C]	Load 50%	Load 80%	-60	15.0	15.1	-40	14.9	15.0	-20	14.9	15.0	0	14.8	14.9	25	14.8	14.9	55	14.6	14.8	65	14.5	14.6	--	-	-	--	-	-	--	-	-	--	-	-		
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Model		MGFS104812	
Item		Overcurrent Protection	
Object		+12V0.9A	
1.Graph		2.Values	

	Input Volt.	18V
	Input Volt.	24V
	Input Volt.	36V
	Input Volt.	48V
	Input Volt.	76V

Output Voltage [V]	18[V]	24[V]	36[V]	48[V]	76[V]
11.4	0.981	1.160	1.174	1.152	1.160
10.8	1.024	1.204	1.214	1.187	1.187
9.6	1.120	1.300	1.300	1.259	1.239
8.4	1.233	1.409	1.393	1.334	1.288
7.2	1.360	1.535	1.490	1.416	1.353
6.0	1.409	1.674	1.590	1.507	1.427
4.8	1.523	1.757	1.697	1.594	1.501
3.6	1.661	1.855	1.810	1.688	1.576
2.4	1.907	2.067	1.988	1.832	1.683
1.2	2.044	2.232	2.105	1.931	1.759
0.0	2.437	2.461	2.168	1.934	1.702
--	-	-	-	-	-

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.

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		MGFS104812		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+12V0.9A																																																																																
1.Graph		<div><div><div>—△—</div>Input Volt. 18V</div><div><div>---□---</div>Input Volt. 24V</div><div><div>-·-*·-</div>Input Volt. 36V</div><div><div>-·-○-</div>Input Volt. 48V</div><div><div>--◇--</div>Input Volt. 76V</div></div> <div>Switching Frequency [kHz]</div> <div>Load Current [A]</div>		2.Values																																																																														
		<table><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><tr><td>0.00</td><td>534</td><td>604</td><td>693</td><td>741</td><td>751</td></tr><tr><td>0.18</td><td>328</td><td>402</td><td>500</td><td>561</td><td>629</td></tr><tr><td>0.36</td><td>237</td><td>301</td><td>392</td><td>450</td><td>521</td></tr><tr><td>0.54</td><td>185</td><td>241</td><td>322</td><td>376</td><td>445</td></tr><tr><td>0.72</td><td>151</td><td>200</td><td>273</td><td>322</td><td>388</td></tr><tr><td>0.81</td><td>139</td><td>185</td><td>255</td><td>302</td><td>366</td></tr><tr><td>0.90</td><td>- ※</td><td>171</td><td>237</td><td>282</td><td>345</td></tr><tr><td>0.99</td><td>- ※</td><td>159</td><td>222</td><td>265</td><td>327</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 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]	0.00	534	604	693	741	751	0.18	328	402	500	561	629	0.36	237	301	392	450	521	0.54	185	241	322	376	445	0.72	151	200	273	322	388	0.81	139	185	255	302	366	0.90	- ※	171	237	282	345	0.99	- ※	159	222	265	327	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-		
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Note: Slanted line shows the range of the rated load current.		When load current is low, MG operates intermittently, so switching frequency would not become constant.		※ Maximum output current at minimum input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.																																																																														

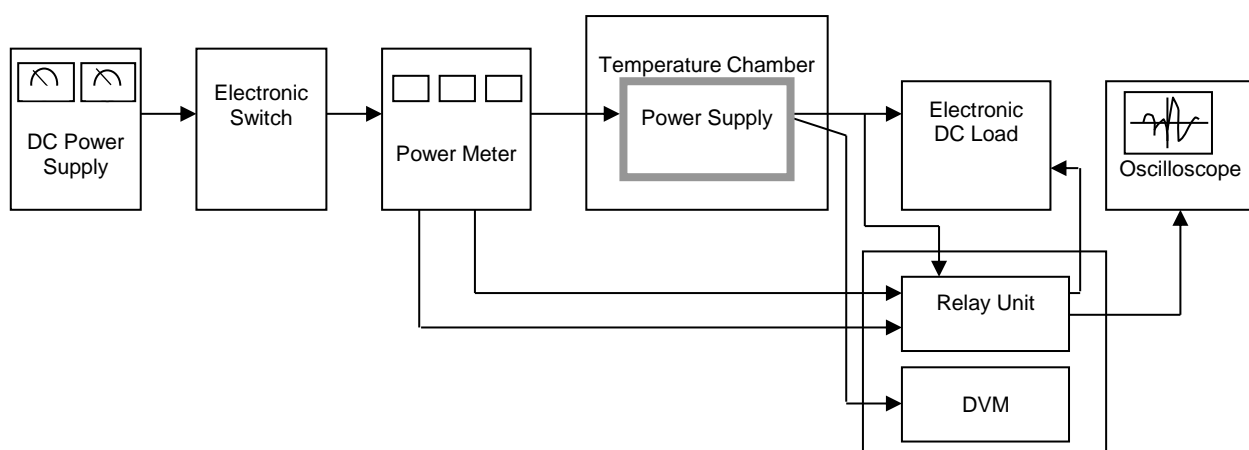


Figure A

Data Acquisition/Control Unit

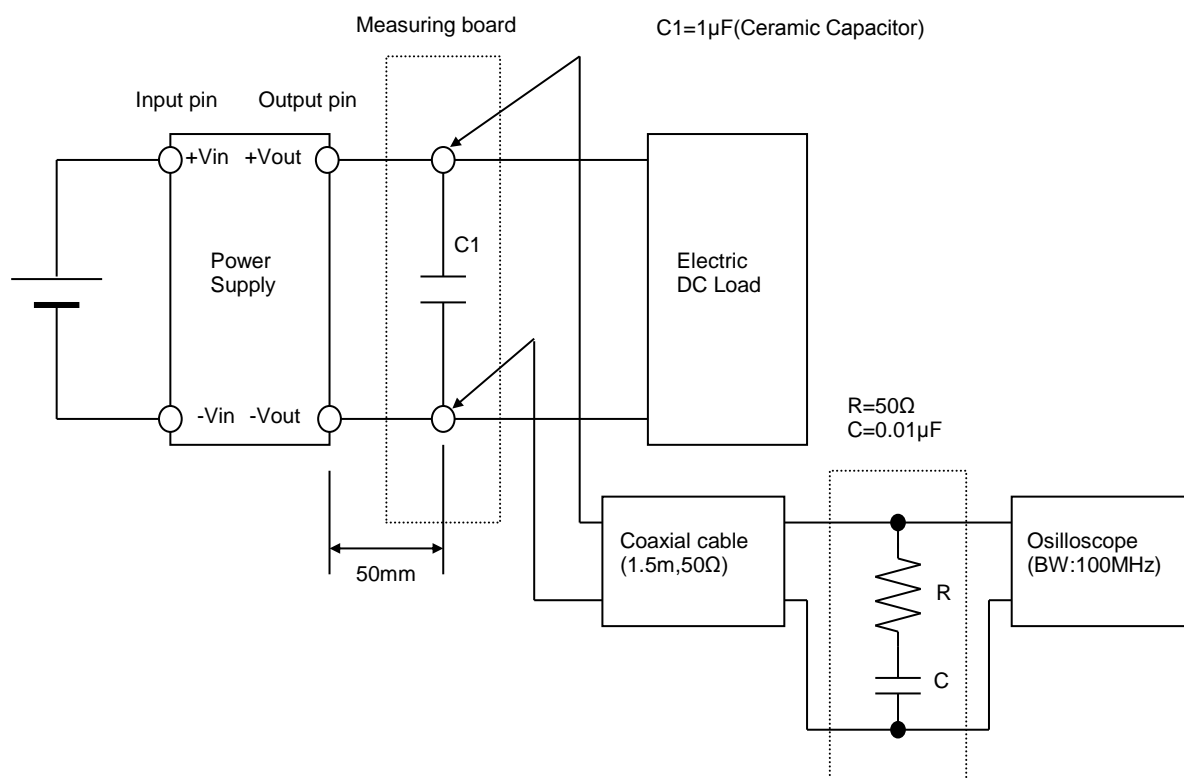


Figure B (Ripple and Ripple noise Characteristic)