

TEST DATA OF MGFW302412

Regulated DC Power Supply
November 19, 2010

Approved by : Kazunari Asano
Kazunari Asano Design Manager

Prepared by : Masashi Ueda
Masashi Ueda 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)	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.Overvoltage Protection	22
19.Figure of Testing Circuitry	23

(Final Page 23)



COSEL																																																																																		
Model	MGFW302412	Temperature	25°C																																																																															
Item	Input Current (by Input Voltage)	Testing Circuitry	Figure A																																																																															
Object	_____																																																																																	
<p>1.Graph</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> </div> <div style="width: 35%;"> <p>—△— Load 100%</p> <p>- - -□- - Load 50%</p> <p>- · -○- · - Load 0%</p> </div> </div>		<p>2.Values</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Load 0%</th> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr> <tr><td>2.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr> <tr><td>4.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr> <tr><td>6.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>7.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>8.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>8.4</td><td>0.044</td><td>2.027</td><td>4.157</td></tr> <tr><td>8.5</td><td>0.044</td><td>1.998</td><td>4.100</td></tr> <tr><td>8.8</td><td>0.044</td><td>1.920</td><td>3.992</td></tr> <tr><td>9.0</td><td>0.044</td><td>1.873</td><td>3.894</td></tr> <tr><td>12.0</td><td>0.041</td><td>1.409</td><td>2.883</td></tr> <tr><td>18.0</td><td>0.037</td><td>0.951</td><td>1.932</td></tr> <tr><td>24.0</td><td>0.028</td><td>0.724</td><td>1.458</td></tr> <tr><td>36.0</td><td>0.025</td><td>0.504</td><td>0.996</td></tr> <tr><td>40.0</td><td>0.025</td><td>0.460</td><td>0.905</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Input Voltage [V]	Input Current [A]			Load 0%	Load 50%	Load 100%	0.0	0.000	0.000	0.000	2.0	0.000	0.000	0.000	4.0	0.000	0.000	0.000	6.0	0.002	0.002	0.002	7.0	0.002	0.002	0.002	8.0	0.002	0.002	0.002	8.4	0.044	2.027	4.157	8.5	0.044	1.998	4.100	8.8	0.044	1.920	3.992	9.0	0.044	1.873	3.894	12.0	0.041	1.409	2.883	18.0	0.037	0.951	1.932	24.0	0.028	0.724	1.458	36.0	0.025	0.504	0.996	40.0	0.025	0.460	0.905	--	-	-	-	--	-	-	-	--	-	-	-
Input Voltage [V]	Input Current [A]																																																																																	
	Load 0%	Load 50%	Load 100%																																																																															
0.0	0.000	0.000	0.000																																																																															
2.0	0.000	0.000	0.000																																																																															
4.0	0.000	0.000	0.000																																																																															
6.0	0.002	0.002	0.002																																																																															
7.0	0.002	0.002	0.002																																																																															
8.0	0.002	0.002	0.002																																																																															
8.4	0.044	2.027	4.157																																																																															
8.5	0.044	1.998	4.100																																																																															
8.8	0.044	1.920	3.992																																																																															
9.0	0.044	1.873	3.894																																																																															
12.0	0.041	1.409	2.883																																																																															
18.0	0.037	0.951	1.932																																																																															
24.0	0.028	0.724	1.458																																																																															
36.0	0.025	0.504	0.996																																																																															
40.0	0.025	0.460	0.905																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																																																																		



Model		MGFW302412		Temperature 25°C																																																																													
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																																													
Object		_____																																																																															
1.Graph		<p> —△— Input Volt. 9V - - - □ - - Input Volt. 12V - · · * · · - Input Volt. 18V - · · ○ · · - Input Volt. 24V - - ◇ - - Input Volt. 36V </p>		2.Values																																																																													
		<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</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> </thead> <tbody> <tr><td>0</td><td>0.044</td><td>0.040</td><td>0.036</td><td>0.030</td><td>0.026</td></tr> <tr><td>20</td><td>0.779</td><td>0.594</td><td>0.407</td><td>0.310</td><td>0.222</td></tr> <tr><td>40</td><td>1.525</td><td>1.138</td><td>0.772</td><td>0.592</td><td>0.414</td></tr> <tr><td>60</td><td>2.258</td><td>1.692</td><td>1.145</td><td>0.868</td><td>0.601</td></tr> <tr><td>80</td><td>3.034</td><td>2.280</td><td>1.520</td><td>1.153</td><td>0.791</td></tr> <tr><td>100</td><td>3.836</td><td>2.842</td><td>1.904</td><td>1.438</td><td>0.983</td></tr> <tr><td>110</td><td>4.224</td><td>3.152</td><td>2.104</td><td>1.586</td><td>1.082</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> </tbody> </table>		Load Ration [%]	Input Current [A]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	0.044	0.040	0.036	0.030	0.026	20	0.779	0.594	0.407	0.310	0.222	40	1.525	1.138	0.772	0.592	0.414	60	2.258	1.692	1.145	0.868	0.601	80	3.034	2.280	1.520	1.153	0.791	100	3.836	2.842	1.904	1.438	0.983	110	4.224	3.152	2.104	1.586	1.082	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	
Load Ration [%]	Input Current [A]																																																																																
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																																												
0	0.044	0.040	0.036	0.030	0.026																																																																												
20	0.779	0.594	0.407	0.310	0.222																																																																												
40	1.525	1.138	0.772	0.592	0.414																																																																												
60	2.258	1.692	1.145	0.868	0.601																																																																												
80	3.034	2.280	1.520	1.153	0.791																																																																												
100	3.836	2.842	1.904	1.438	0.983																																																																												
110	4.224	3.152	2.104	1.586	1.082																																																																												
--	-	-	-	-	-																																																																												
--	-	-	-	-	-																																																																												
--	-	-	-	-	-																																																																												
--	-	-	-	-	-																																																																												



<p>Model MGFW302412</p>		<p>Temperature 25°C</p>																																																																														
<p>Item Input Power (by Load Current)</p>		<p>Testing Circuitry Figure A</p>																																																																														
<p>Object _____</p>																																																																																
<p>1.Graph</p> <p> —△— Input Volt. 9V - - - □ - - - Input Volt. 12V ···*··· Input Volt. 18V - · - ○ - · - - Input Volt. 24V - - ◇ - - - Input Volt. 36V </p> <p>Input Power [W]</p> <p>Load Ratio [%]</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="5">Input Power [W]</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> </thead> <tbody> <tr><td>0</td><td>0.40</td><td>0.49</td><td>0.65</td><td>0.71</td><td>0.93</td></tr> <tr><td>20</td><td>7.03</td><td>7.11</td><td>7.28</td><td>7.41</td><td>7.98</td></tr> <tr><td>40</td><td>13.58</td><td>13.63</td><td>13.87</td><td>14.15</td><td>14.89</td></tr> <tr><td>60</td><td>20.31</td><td>20.29</td><td>20.50</td><td>20.79</td><td>21.59</td></tr> <tr><td>80</td><td>27.21</td><td>27.15</td><td>27.26</td><td>27.55</td><td>28.38</td></tr> <tr><td>100</td><td>34.32</td><td>34.17</td><td>34.30</td><td>34.46</td><td>35.40</td></tr> <tr><td>110</td><td>38.01</td><td>37.74</td><td>37.80</td><td>37.99</td><td>38.90</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> </tbody> </table>		Load Ration [%]	Input Power [W]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	0.40	0.49	0.65	0.71	0.93	20	7.03	7.11	7.28	7.41	7.98	40	13.58	13.63	13.87	14.15	14.89	60	20.31	20.29	20.50	20.79	21.59	80	27.21	27.15	27.26	27.55	28.38	100	34.32	34.17	34.30	34.46	35.40	110	38.01	37.74	37.80	37.99	38.90	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Ration [%]	Input Power [W]																																																																															
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																																											
0	0.40	0.49	0.65	0.71	0.93																																																																											
20	7.03	7.11	7.28	7.41	7.98																																																																											
40	13.58	13.63	13.87	14.15	14.89																																																																											
60	20.31	20.29	20.50	20.79	21.59																																																																											
80	27.21	27.15	27.26	27.55	28.38																																																																											
100	34.32	34.17	34.30	34.46	35.40																																																																											
110	38.01	37.74	37.80	37.99	38.90																																																																											
--	-	-	-	-	-																																																																											
--	-	-	-	-	-																																																																											
--	-	-	-	-	-																																																																											
--	-	-	-	-	-																																																																											



COSEL																																			
Model	MGFW302412	Temperature	25°C																																
Item	Efficiency (by Input Voltage)	Testing Circuitry	Figure A																																
Object																																			
<p>1.Graph</p> <p style="text-align: right;"> ---□--- Load 50% —△— Load 100% </p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>8.5</td><td>88.9</td><td>87.9</td></tr> <tr><td>9.0</td><td>89.4</td><td>88.3</td></tr> <tr><td>12.0</td><td>89.3</td><td>88.7</td></tr> <tr><td>15.0</td><td>88.8</td><td>88.7</td></tr> <tr><td>18.0</td><td>88.2</td><td>88.3</td></tr> <tr><td>24.0</td><td>86.8</td><td>87.9</td></tr> <tr><td>30.0</td><td>85.0</td><td>86.9</td></tr> <tr><td>36.0</td><td>83.0</td><td>85.6</td></tr> <tr><td>40.0</td><td>81.7</td><td>84.9</td></tr> </tbody> </table>		Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	8.5	88.9	87.9	9.0	89.4	88.3	12.0	89.3	88.7	15.0	88.8	88.7	18.0	88.2	88.3	24.0	86.8	87.9	30.0	85.0	86.9	36.0	83.0	85.6	40.0	81.7	84.9
Input Voltage [V]	Efficiency [%]																																		
	Load 50%	Load 100%																																	
8.5	88.9	87.9																																	
9.0	89.4	88.3																																	
12.0	89.3	88.7																																	
15.0	88.8	88.7																																	
18.0	88.2	88.3																																	
24.0	86.8	87.9																																	
30.0	85.0	86.9																																	
36.0	83.0	85.6																																	
40.0	81.7	84.9																																	
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

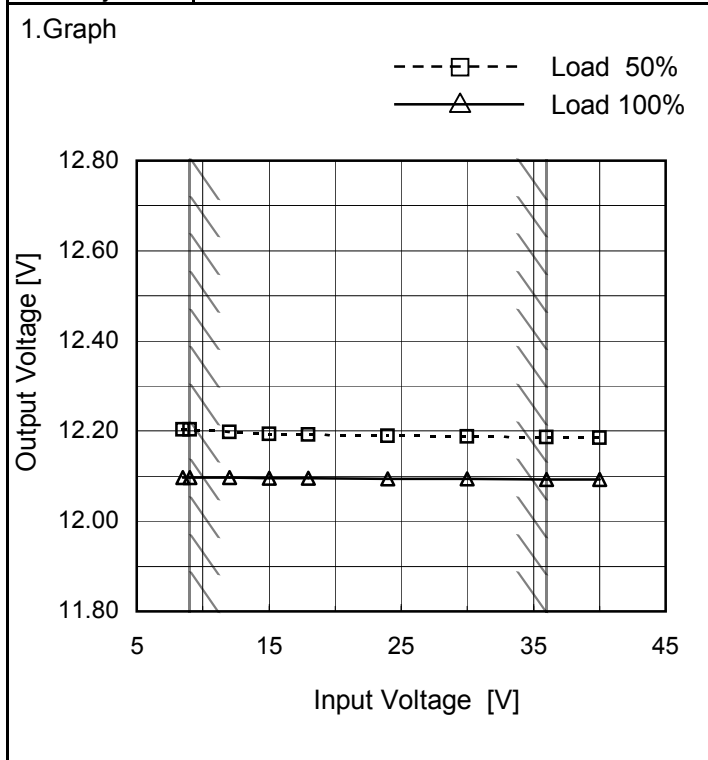


Model		MGFW302412		Temperature 25°C																																																																														
Item		Efficiency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		_____																																																																																
1.Graph		<p> —△— Input Volt. 9V - - - □ - - Input Volt. 12V - · · * · · - · - Input Volt. 18V - · - ○ - · - Input Volt. 24V - - ◇ - - Input Volt. 36V </p>		2.Values																																																																														
				<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</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> </thead> <tbody> <tr><td>0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>20</td><td>86.2</td><td>85.2</td><td>83.2</td><td>81.7</td><td>75.9</td></tr> <tr><td>40</td><td>89.2</td><td>88.9</td><td>87.3</td><td>85.6</td><td>81.4</td></tr> <tr><td>60</td><td>89.5</td><td>89.6</td><td>88.7</td><td>87.4</td><td>84.2</td></tr> <tr><td>80</td><td>89.1</td><td>89.3</td><td>88.9</td><td>88.0</td><td>85.4</td></tr> <tr><td>100</td><td>88.3</td><td>88.7</td><td>88.4</td><td>87.9</td><td>85.6</td></tr> <tr><td>110</td><td>87.7</td><td>88.3</td><td>88.2</td><td>87.7</td><td>85.7</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> </tbody> </table>		Load Ration [%]	Efficiency [%]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	-	-	-	-	-	20	86.2	85.2	83.2	81.7	75.9	40	89.2	88.9	87.3	85.6	81.4	60	89.5	89.6	88.7	87.4	84.2	80	89.1	89.3	88.9	88.0	85.4	100	88.3	88.7	88.4	87.9	85.6	110	87.7	88.3	88.2	87.7	85.7	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Ration [%]	Efficiency [%]																																																																																	
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																																													
0	-	-	-	-	-																																																																													
20	86.2	85.2	83.2	81.7	75.9																																																																													
40	89.2	88.9	87.3	85.6	81.4																																																																													
60	89.5	89.6	88.7	87.4	84.2																																																																													
80	89.1	89.3	88.9	88.0	85.4																																																																													
100	88.3	88.7	88.4	87.9	85.6																																																																													
110	87.7	88.3	88.2	87.7	85.7																																																																													
--	-	-	-	-	-																																																																													
--	-	-	-	-	-																																																																													
--	-	-	-	-	-																																																																													
--	-	-	-	-	-																																																																													



Model	MGFW302412
Item	Line Regulation
Object	+12V1.25A

Temperature 25°C
Testing Circuitry Figure A

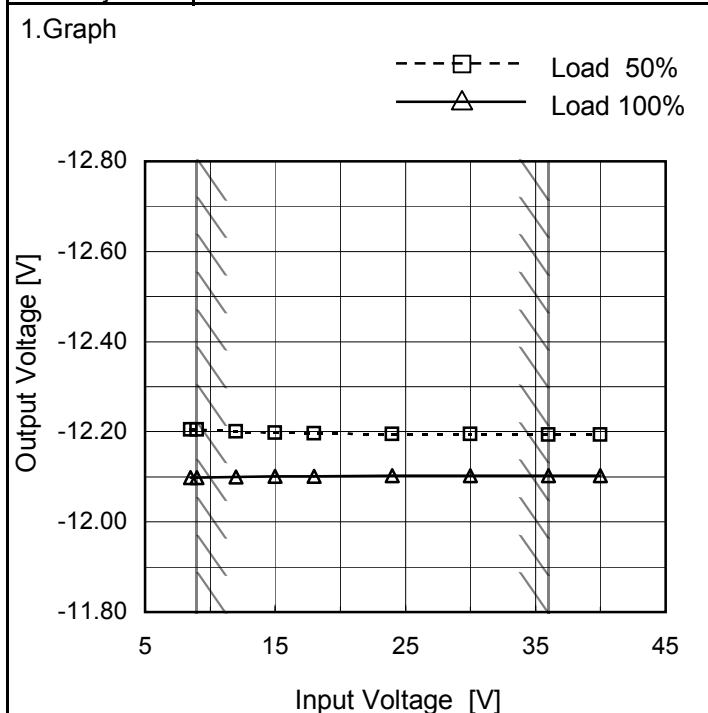


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.5	12.204	12.097
9.0	12.204	12.097
12.0	12.198	12.096
15.0	12.194	12.096
18.0	12.192	12.095
24.0	12.189	12.094
30.0	12.187	12.094
36.0	12.186	12.093
40.0	12.185	12.093

-12V: Rated output current

Object	-12V1.25A
--------	-----------

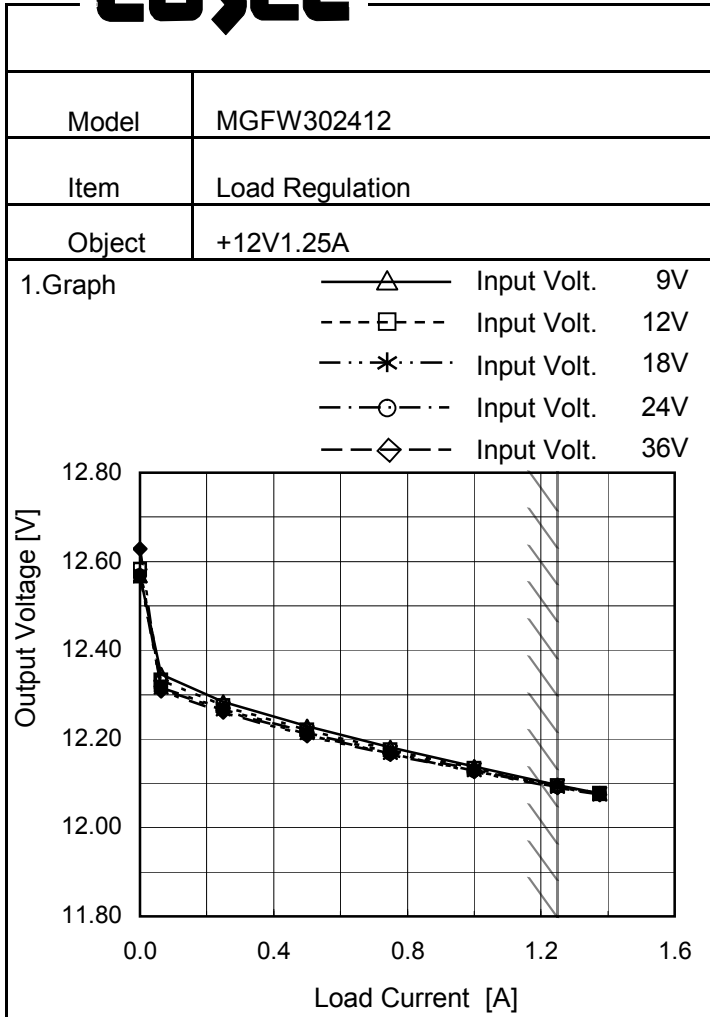


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.5	-12.205	-12.099
9.0	-12.205	-12.099
12.0	-12.200	-12.100
15.0	-12.198	-12.101
18.0	-12.197	-12.101
24.0	-12.195	-12.102
30.0	-12.194	-12.103
36.0	-12.194	-12.103
40.0	-12.194	-12.103

+12V: Rated output current

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

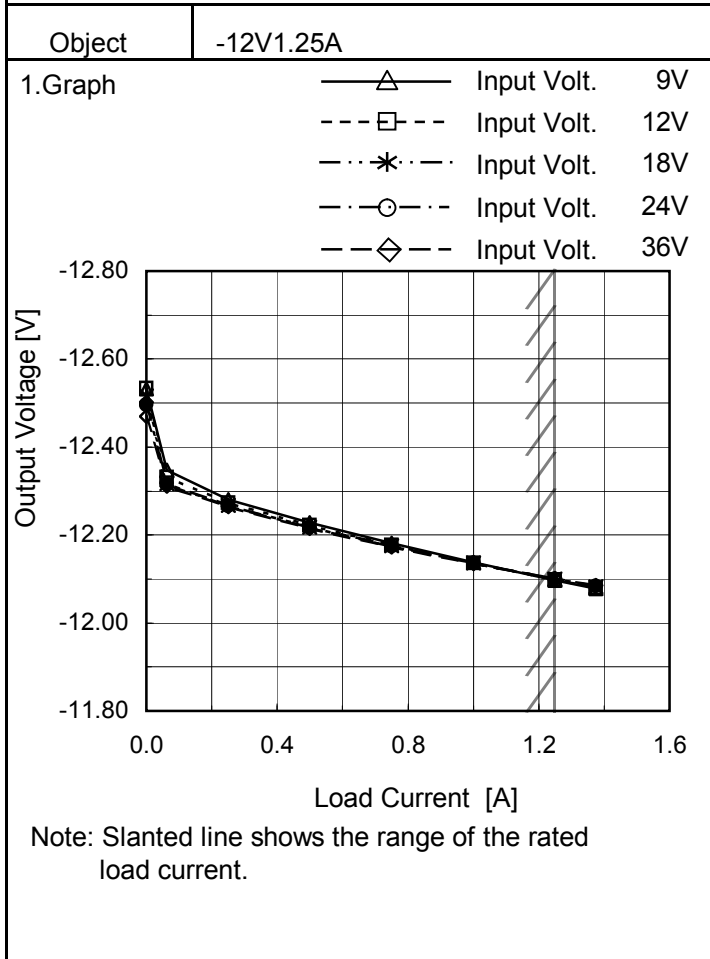


Temperature 25°C
Testing Circuitry Figure A

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]
0.000	12.568	12.583	12.567	12.568	12.628
0.063	12.346	12.332	12.317	12.314	12.308
0.250	12.284	12.274	12.267	12.264	12.261
0.500	12.229	12.221	12.214	12.210	12.207
0.750	12.181	12.175	12.170	12.167	12.164
1.000	12.137	12.134	12.130	12.128	12.126
1.250	12.096	12.095	12.093	12.092	12.091
1.375	12.077	12.077	12.076	12.075	12.074
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-12V: Rated output current



2.Values

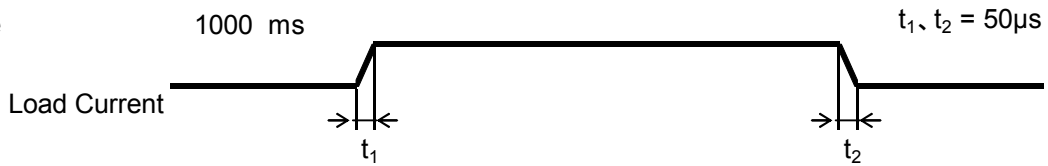
Load Current [A]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	-12.533	-12.533	-12.516	-12.496	-12.469
0.063	-12.348	-12.332	-12.317	-12.315	-12.311
0.250	-12.281	-12.273	-12.268	-12.266	-12.265
0.500	-12.228	-12.222	-12.218	-12.216	-12.215
0.750	-12.181	-12.178	-12.175	-12.174	-12.173
1.000	-12.138	-12.137	-12.136	-12.136	-12.135
1.250	-12.097	-12.098	-12.100	-12.101	-12.101
1.375	-12.078	-12.080	-12.083	-12.084	-12.085
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+12V: Rated output current

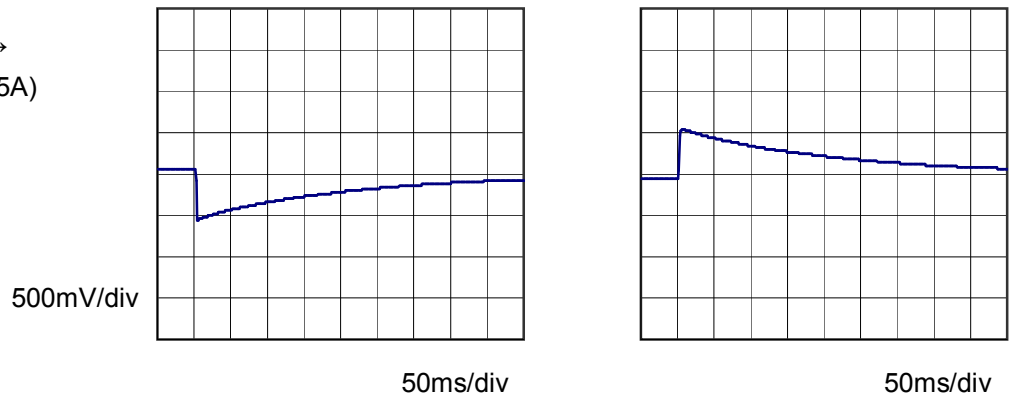


Model	MGFW302412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V1.25A		

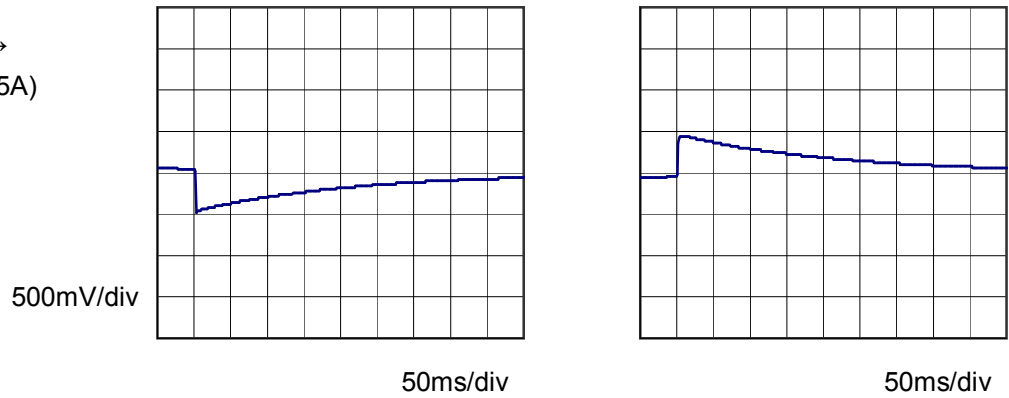
Input Volt. 24 V
 Other output current rated
 Cycle 1000 ms



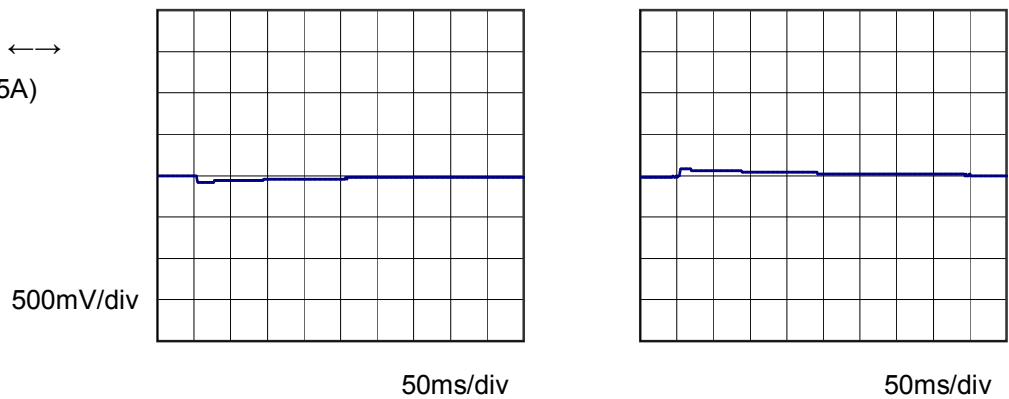
Min. Load (0A) ←→
 Load 100% (1.25A)



Min. Load (0A) ←→
 Load 50% (0.625A)



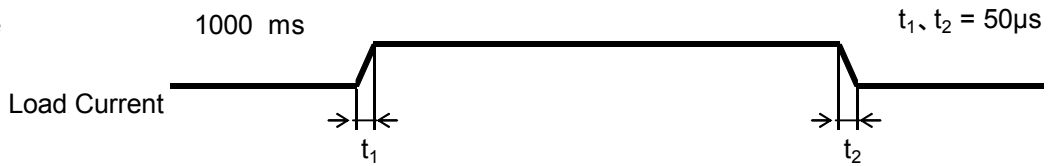
Load 50% (0.625A) ←→
 Load 100% (1.25A)



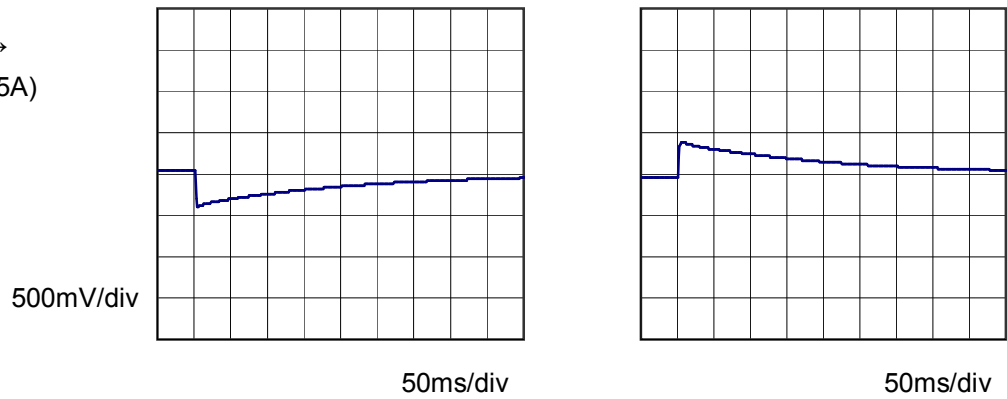


Model	MGFW302412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V1.25A		

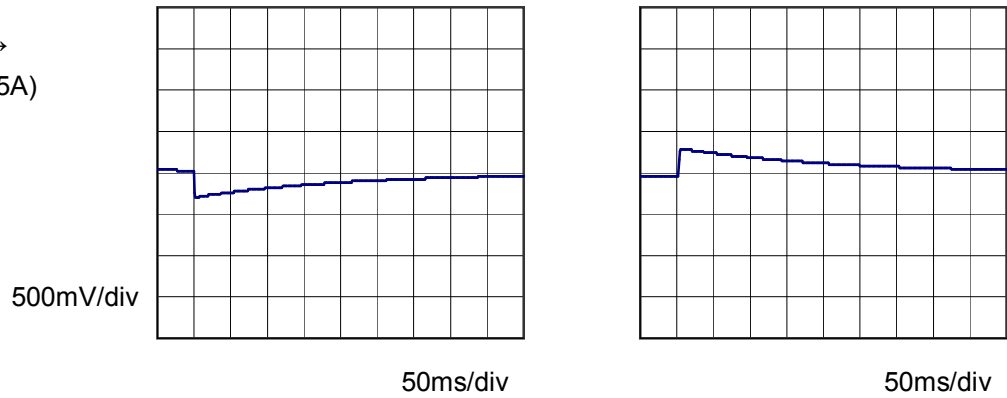
Input Volt. 24 V
 Other output current rated
 Cycle 1000 ms



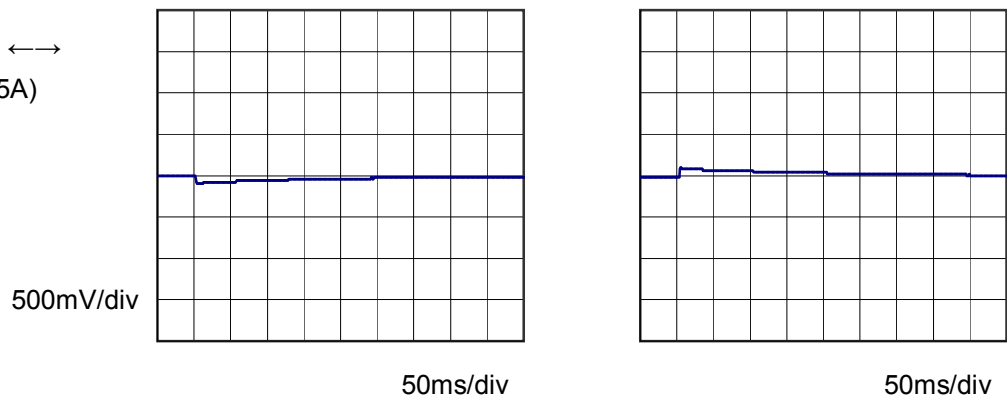
Min. Load (0A) ←→
 Load 100% (1.25A)



Min. Load (0A) ←→
 Load 50% (0.625A)



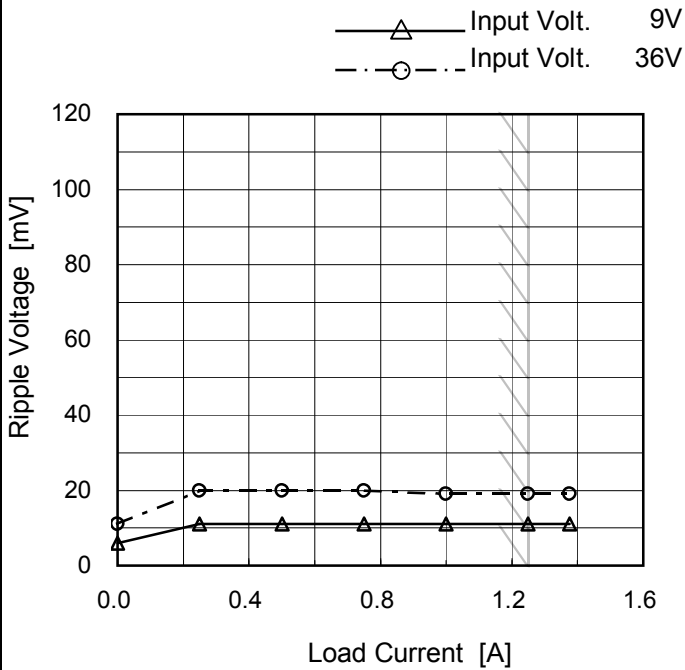
Load 50% (0.625A) ←→
 Load 100% (1.25A)





Model	MGFW302412	
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B
Object	+12V1.25A	

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	6	11
0.250	11	20
0.500	11	20
0.750	11	20
1.000	11	19
1.250	11	19
1.375	11	19
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated output current

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]

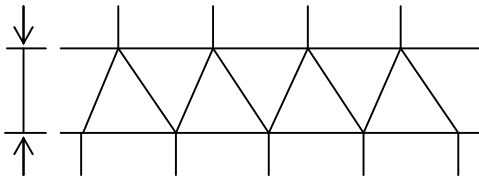
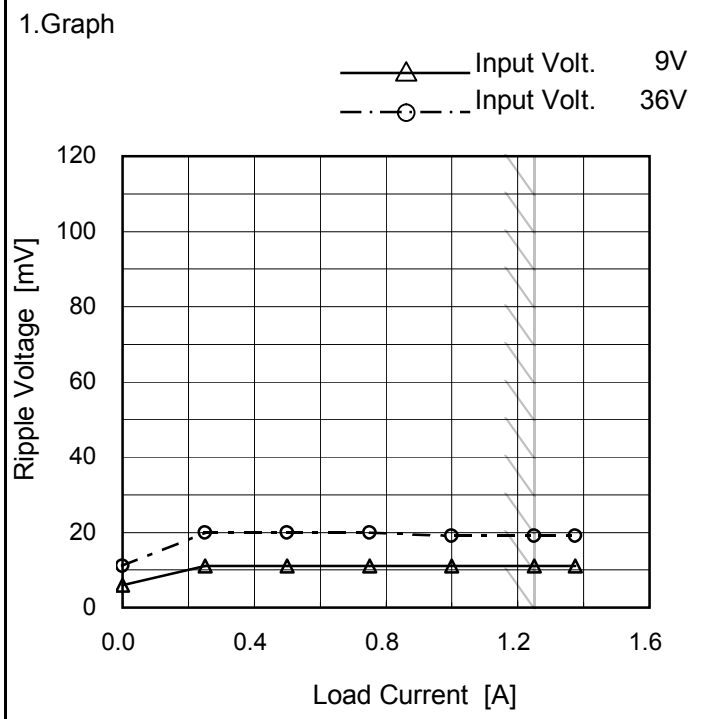


Fig. Complex Ripple Wave Form



Model	MGFW302412	
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B
Object	-12V1.25A	



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	7	14
0.250	8	17
0.500	8	17
0.750	8	17
1.000	8	17
1.250	8	17
1.375	8	17
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated output current

Ripple Voltage is shown as p-p in the figure below.
 Note: Slanted line shows the range of the rated load current.

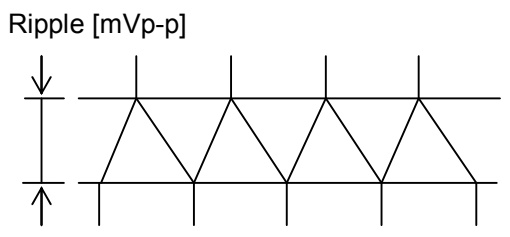
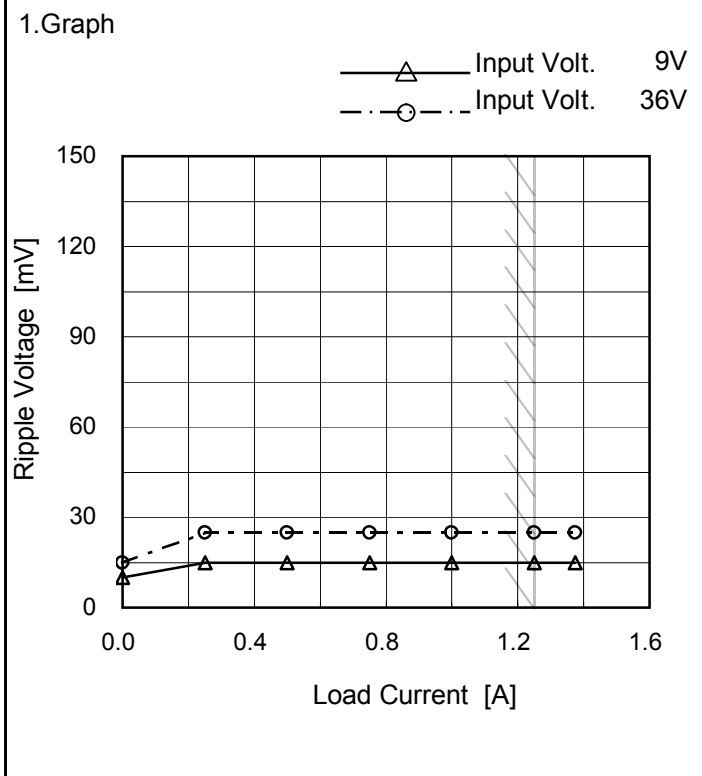


Fig. Complex Ripple Wave Form



Model	MGFW302412	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	+12V1.25A		



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	15
0.250	15	25
0.500	15	25
0.750	15	25
1.000	15	25
1.250	15	25
1.375	15	25
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated output current

Ripple-Noise is shown as p-p in the figure below.
 Note: Slanted line shows the range of the rated load current.

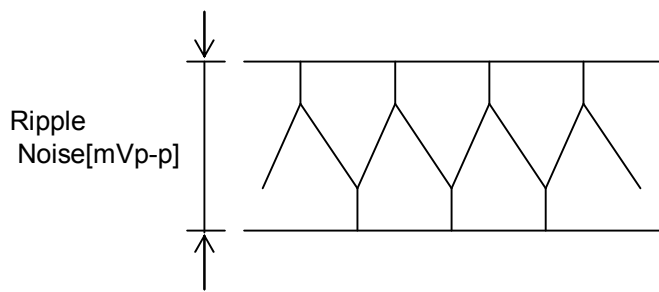
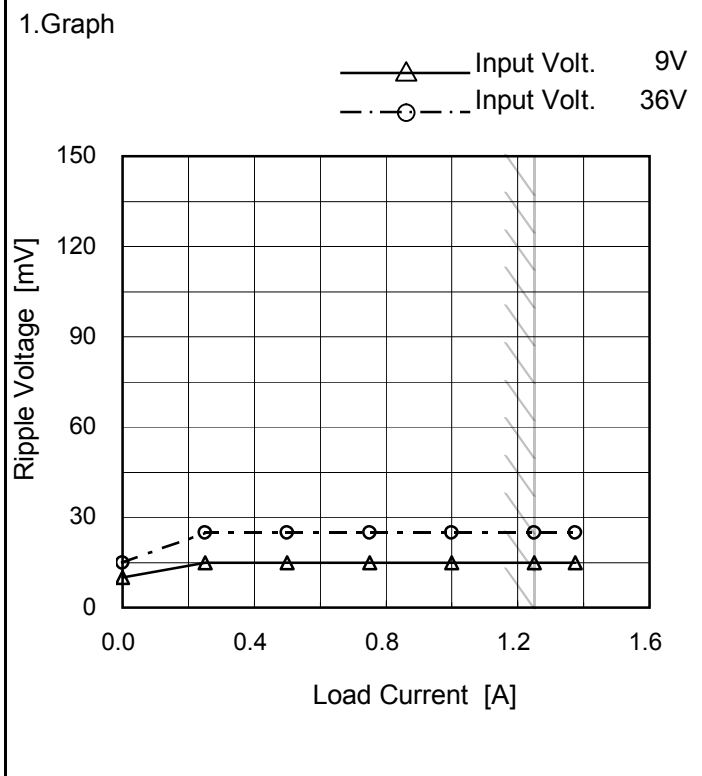


Fig.Complex Ripple Noise Wave Form



Model	MGFW302412	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	-12V1.25A		



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	15
0.250	15	20
0.500	15	20
0.750	15	20
1.000	15	20
1.250	15	20
1.375	15	20
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated output current

Ripple-Noise is shown as p-p in the figure below.
 Note: Slanted line shows the range of the rated load current.

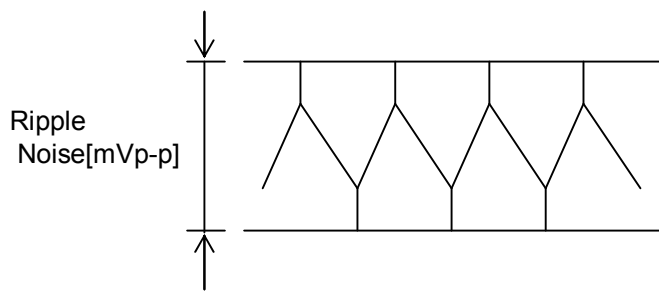


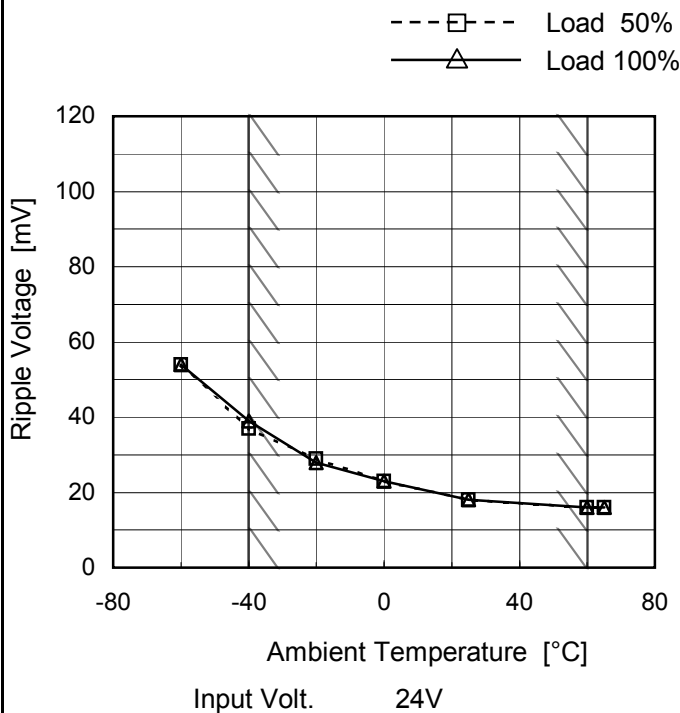
Fig.Complex Ripple Noise Wave Form



Model	MGFW302412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V1.25A

Testing Circuitry Figure A

1.Graph



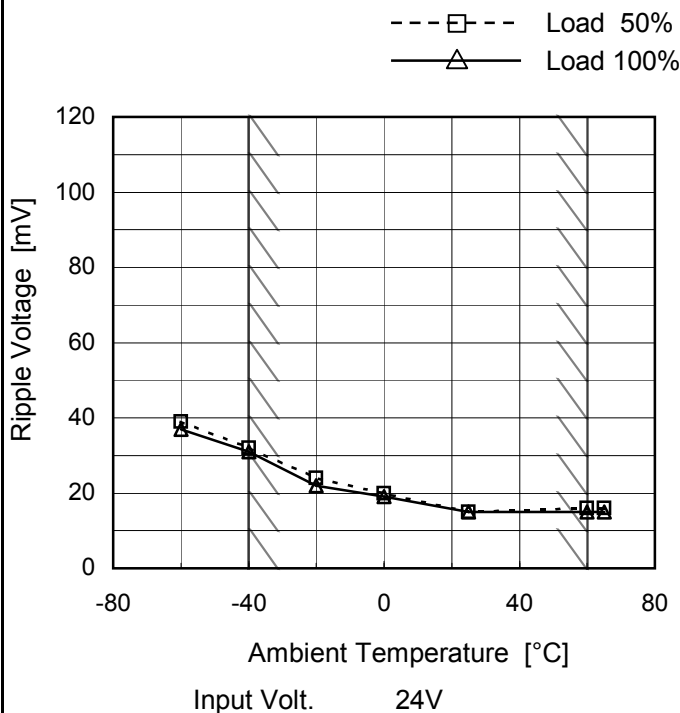
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	54	54
-40	37	39
-20	29	28
0	23	23
25	18	18
60	16	16
65	16	16
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated output current

Object	-12V1.25A
--------	-----------

1.Graph



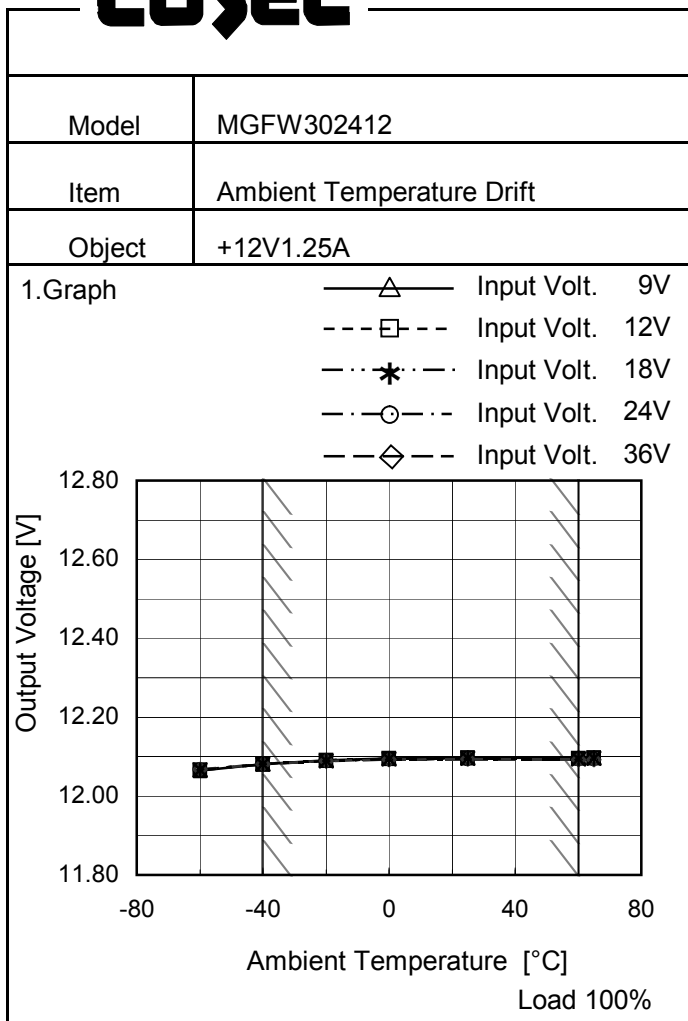
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	39	37
-40	32	31
-20	24	22
0	20	19
25	15	15
60	16	15
65	16	15
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated output current

Measured by 100 MHz Oscilloscope.

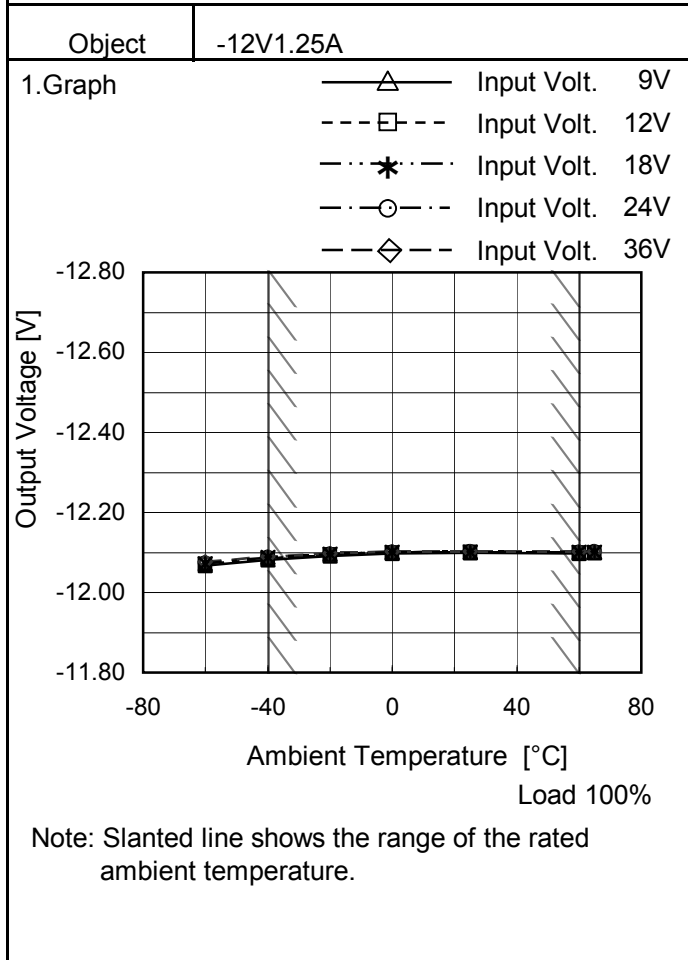
Note: Slanted line shows the range of the rated ambient temperature.



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	12.065	12.067	12.066	12.067	12.068
-40	12.080	12.081	12.081	12.081	12.081
-20	12.090	12.090	12.090	12.089	12.089
0	12.096	12.095	12.094	12.094	12.093
25	12.098	12.097	12.095	12.095	12.094
60	12.097	12.096	12.094	12.094	12.092
65	12.098	12.097	12.095	12.094	12.092
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-



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	-12.067	-12.070	-12.072	-12.074	-12.077
-40	-12.082	-12.084	-12.087	-12.089	-12.090
-20	-12.092	-12.094	-12.096	-12.097	-12.098
0	-12.097	-12.099	-12.100	-12.101	-12.102
25	-12.099	-12.100	-12.102	-12.102	-12.103
60	-12.098	-12.099	-12.101	-12.102	-12.102
65	-12.099	-12.100	-12.101	-12.102	-12.102
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-



COSEL		
Model	MGFW302412	
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 - 1.25A (AVR 2) : 0 - 1.25A

* Other Output : Rated Load

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Object		+12V1.25A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	36	0	12.625	±273	±2.3
Minimum Voltage	-40	9	1.25	12.080		

Object		-12V1.25A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	12	0	-12.531	±225	±1.9
Minimum Voltage	-40	9	1.25	-12.082		



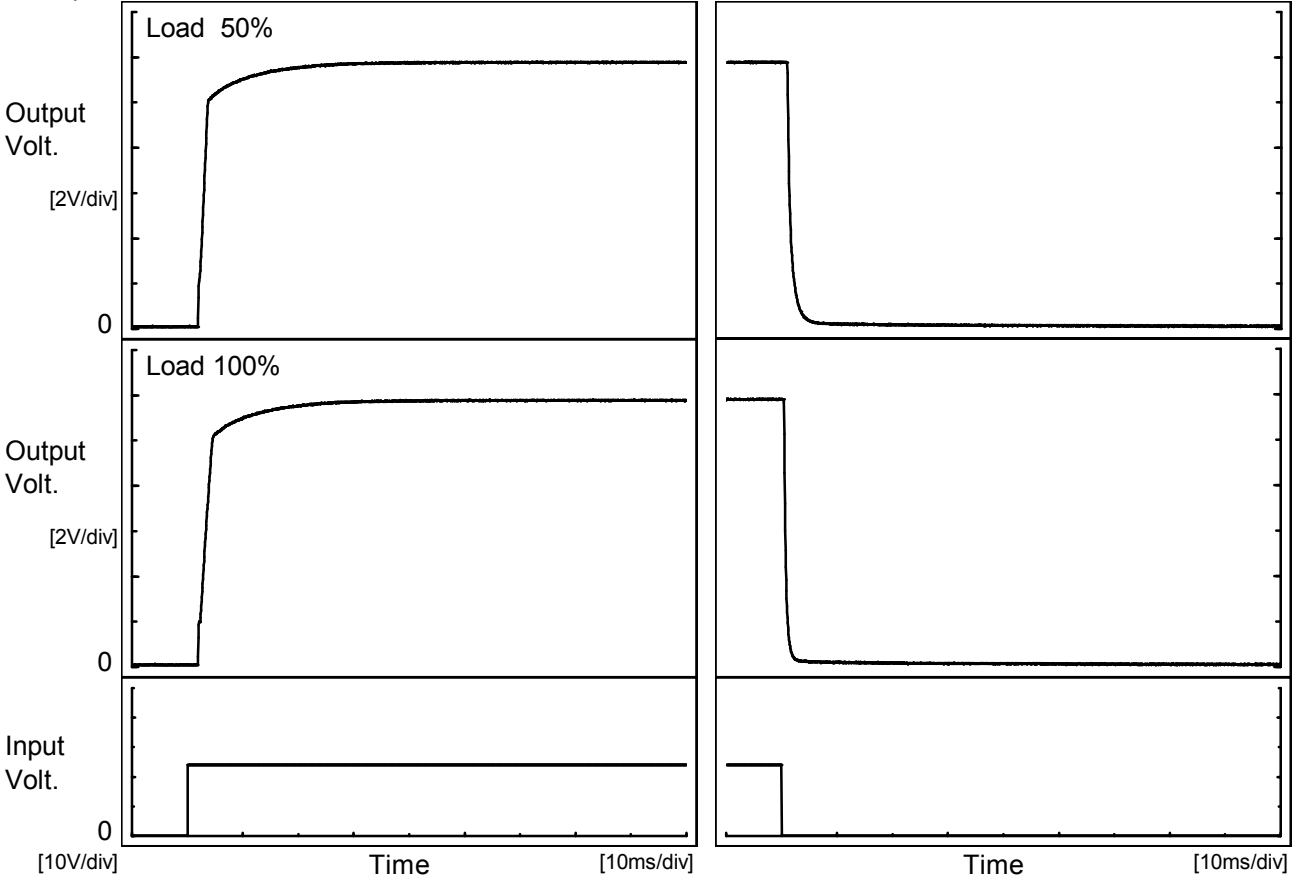
COSEL																									
Model	MGFW302412	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V1.25A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 24V 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>12.092</td></tr> <tr><td>1.0</td><td>12.092</td></tr> <tr><td>2.0</td><td>12.092</td></tr> <tr><td>3.0</td><td>12.092</td></tr> <tr><td>4.0</td><td>12.092</td></tr> <tr><td>5.0</td><td>12.092</td></tr> <tr><td>6.0</td><td>12.092</td></tr> <tr><td>7.0</td><td>12.092</td></tr> <tr><td>8.0</td><td>12.092</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	12.092	0.5	12.092	1.0	12.092	2.0	12.092	3.0	12.092	4.0	12.092	5.0	12.092	6.0	12.092	7.0	12.092	8.0	12.092
Time since start [H]	Output Voltage [V]																								
0.0	12.092																								
0.5	12.092																								
1.0	12.092																								
2.0	12.092																								
3.0	12.092																								
4.0	12.092																								
5.0	12.092																								
6.0	12.092																								
7.0	12.092																								
8.0	12.092																								
Object	-12V1.25A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 24V 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>-12.101</td></tr> <tr><td>0.5</td><td>-12.103</td></tr> <tr><td>1.0</td><td>-12.103</td></tr> <tr><td>2.0</td><td>-12.103</td></tr> <tr><td>3.0</td><td>-12.103</td></tr> <tr><td>4.0</td><td>-12.103</td></tr> <tr><td>5.0</td><td>-12.103</td></tr> <tr><td>6.0</td><td>-12.103</td></tr> <tr><td>7.0</td><td>-12.103</td></tr> <tr><td>8.0</td><td>-12.103</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	-12.101	0.5	-12.103	1.0	-12.103	2.0	-12.103	3.0	-12.103	4.0	-12.103	5.0	-12.103	6.0	-12.103	7.0	-12.103	8.0	-12.103
Time since start [H]	Output Voltage [V]																								
0.0	-12.101																								
0.5	-12.103																								
1.0	-12.103																								
2.0	-12.103																								
3.0	-12.103																								
4.0	-12.103																								
5.0	-12.103																								
6.0	-12.103																								
7.0	-12.103																								
8.0	-12.103																								



Model		MGFW302412	Temperature 25°C Testing Circuitry Figure A
Item		Rise and Fall Time	
Object		+12V1.25A	

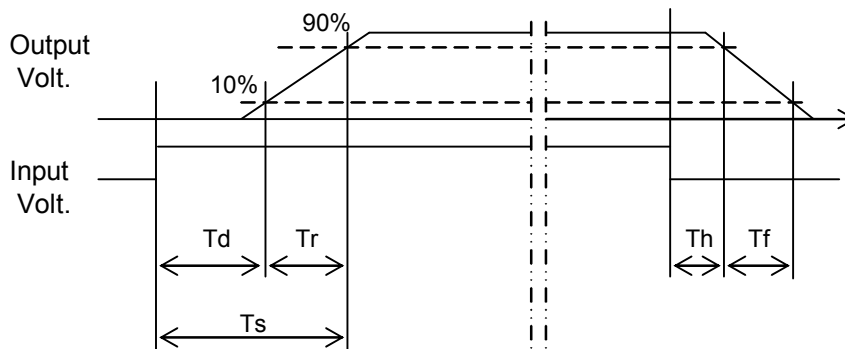
1. Graph

Input Volt. 24 V



2. Values

		[ms]				
Load \ Time	Time	Td	Tr	Ts	Th	Tf
50 %		2.0	6.4	8.4	1.0	1.7
100 %		2.0	6.8	8.8	0.5	0.8

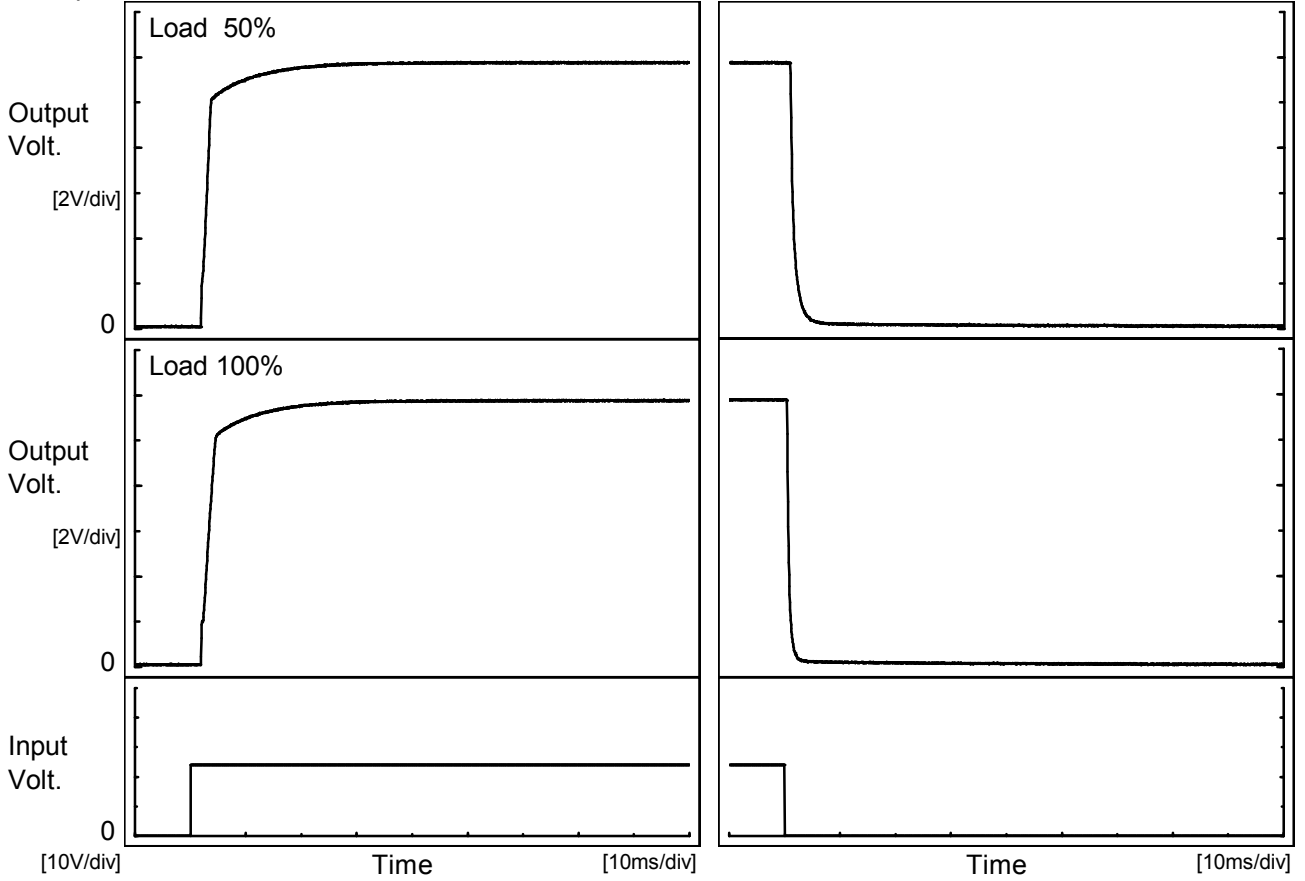




Model		MGFW302412	Temperature 25°C Testing Circuitry Figure A
Item		Rise and Fall Time	
Object		-12V1.25A	

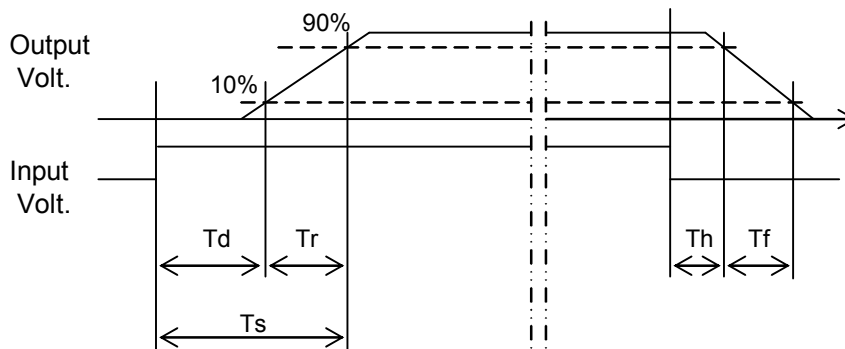
1. Graph

Input Volt. 24 V



2. Values

		[ms]				
Load \ Time	Time	Td	Tr	Ts	Th	Tf
50 %		2.0	6.4	8.4	1.0	1.8
100 %		2.0	7.0	9.0	0.5	0.9





Model		MGFW302412		Testing Circuitry Figure A																																					
Item		Minimum Input Voltage for Regulated Output Voltage																																							
Object		+12V1.25A																																							
1.Graph				2.Values																																					
<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-60</td><td>8.2</td><td>8.3</td></tr> <tr><td>-40</td><td>8.2</td><td>8.2</td></tr> <tr><td>-20</td><td>8.1</td><td>8.2</td></tr> <tr><td>0</td><td>8.1</td><td>8.2</td></tr> <tr><td>25</td><td>8.1</td><td>8.2</td></tr> <tr><td>60</td><td>8.1</td><td>8.1</td></tr> <tr><td>65</td><td>8.1</td><td>8.1</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>				Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-60	8.2	8.3	-40	8.2	8.2	-20	8.1	8.2	0	8.1	8.2	25	8.1	8.2	60	8.1	8.1	65	8.1	8.1	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-60	8.2	8.3																																							
-40	8.2	8.2																																							
-20	8.1	8.2																																							
0	8.1	8.2																																							
25	8.1	8.2																																							
60	8.1	8.1																																							
65	8.1	8.1																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
Object		-12V1.25A		2.Values																																					
<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-60</td><td>8.0</td><td>8.2</td></tr> <tr><td>-40</td><td>8.0</td><td>8.1</td></tr> <tr><td>-20</td><td>8.0</td><td>8.1</td></tr> <tr><td>0</td><td>8.0</td><td>8.1</td></tr> <tr><td>25</td><td>8.0</td><td>8.1</td></tr> <tr><td>60</td><td>8.0</td><td>8.1</td></tr> <tr><td>65</td><td>8.0</td><td>8.0</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>				Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-60	8.0	8.2	-40	8.0	8.1	-20	8.0	8.1	0	8.0	8.1	25	8.0	8.1	60	8.0	8.1	65	8.0	8.0	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-60	8.0	8.2																																							
-40	8.0	8.1																																							
-20	8.0	8.1																																							
0	8.0	8.1																																							
25	8.0	8.1																																							
60	8.0	8.1																																							
65	8.0	8.0																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																									



<p>Model MGFW302412</p>		<p>Temperature 25°C</p>																																																																																				
<p>Item Overcurrent Protection</p>		<p>Testing Circuitry Figure A</p>																																																																																				
<p>Object +12V1.25A</p>																																																																																						
<p>1.Graph</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="5">Load 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> </thead> <tbody> <tr><td>12.0</td><td>1.735</td><td>2.085</td><td>2.342</td><td>2.307</td><td>1.957</td></tr> <tr><td>11.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>10.8</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>9.6</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>8.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>7.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>6.0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>4.8</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>3.6</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		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	1.735	2.085	2.342	2.307	1.957	11.4	-	-	-	-	-	10.8	-	-	-	-	-	9.6	-	-	-	-	-	8.4	-	-	-	-	-	7.2	-	-	-	-	-	6.0	-	-	-	-	-	4.8	-	-	-	-	-	3.6	-	-	-	-	-	2.4	-	-	-	-	-	1.2	-	-	-	-	-	0.0	-	-	-	-	-
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	1.735	2.085	2.342	2.307	1.957																																																																																	
11.4	-	-	-	-	-																																																																																	
10.8	-	-	-	-	-																																																																																	
9.6	-	-	-	-	-																																																																																	
8.4	-	-	-	-	-																																																																																	
7.2	-	-	-	-	-																																																																																	
6.0	-	-	-	-	-																																																																																	
4.8	-	-	-	-	-																																																																																	
3.6	-	-	-	-	-																																																																																	
2.4	-	-	-	-	-																																																																																	
1.2	-	-	-	-	-																																																																																	
0.0	-	-	-	-	-																																																																																	
<p>Object -12V1.25A</p>																																																																																						
<p>1.Graph</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="5">Load 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> </thead> <tbody> <tr><td>-12.0</td><td>1.685</td><td>2.058</td><td>2.319</td><td>2.318</td><td>1.966</td></tr> <tr><td>-11.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-10.8</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-9.6</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-8.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-7.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-6.0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-4.8</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-3.6</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-2.4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-1.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		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	1.685	2.058	2.319	2.318	1.966	-11.4	-	-	-	-	-	-10.8	-	-	-	-	-	-9.6	-	-	-	-	-	-8.4	-	-	-	-	-	-7.2	-	-	-	-	-	-6.0	-	-	-	-	-	-4.8	-	-	-	-	-	-3.6	-	-	-	-	-	-2.4	-	-	-	-	-	-1.2	-	-	-	-	-	0.0	-	-	-	-	-
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	1.685	2.058	2.319	2.318	1.966																																																																																	
-11.4	-	-	-	-	-																																																																																	
-10.8	-	-	-	-	-																																																																																	
-9.6	-	-	-	-	-																																																																																	
-8.4	-	-	-	-	-																																																																																	
-7.2	-	-	-	-	-																																																																																	
-6.0	-	-	-	-	-																																																																																	
-4.8	-	-	-	-	-																																																																																	
-3.6	-	-	-	-	-																																																																																	
-2.4	-	-	-	-	-																																																																																	
-1.2	-	-	-	-	-																																																																																	
0.0	-	-	-	-	-																																																																																	
<p>Note: Slanted line shows the range of the rated load current. Intermittent operation occurs when overcurrent protection is activated.</p>																																																																																						



COSEL																																								
Model	MGFW302412																																							
Item	Overvoltage Protection	Testing Circuitry Figure A																																						
Object	+24V1.25A																																							
<p>1.Graph</p> <div style="text-align: right;"> <p>—△— Input Volt. 24V</p> <p>---□--- Input Volt. 36V</p> </div> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: right;">Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>Measured as a single output(+24V).</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>-60</td><td>31.98</td><td>31.98</td></tr> <tr><td>-40</td><td>31.99</td><td>31.99</td></tr> <tr><td>-20</td><td>31.99</td><td>31.99</td></tr> <tr><td>0</td><td>32.14</td><td>32.14</td></tr> <tr><td>25</td><td>32.79</td><td>32.79</td></tr> <tr><td>60</td><td>33.64</td><td>33.64</td></tr> <tr><td>65</td><td>33.78</td><td>33.78</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>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 24[V]	Input Volt. 36[V]	-60	31.98	31.98	-40	31.99	31.99	-20	31.99	31.99	0	32.14	32.14	25	32.79	32.79	60	33.64	33.64	65	33.78	33.78	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																							
	Input Volt. 24[V]	Input Volt. 36[V]																																						
-60	31.98	31.98																																						
-40	31.99	31.99																																						
-20	31.99	31.99																																						
0	32.14	32.14																																						
25	32.79	32.79																																						
60	33.64	33.64																																						
65	33.78	33.78																																						
--	-	-																																						
--	-	-																																						
--	-	-																																						
--	-	-																																						

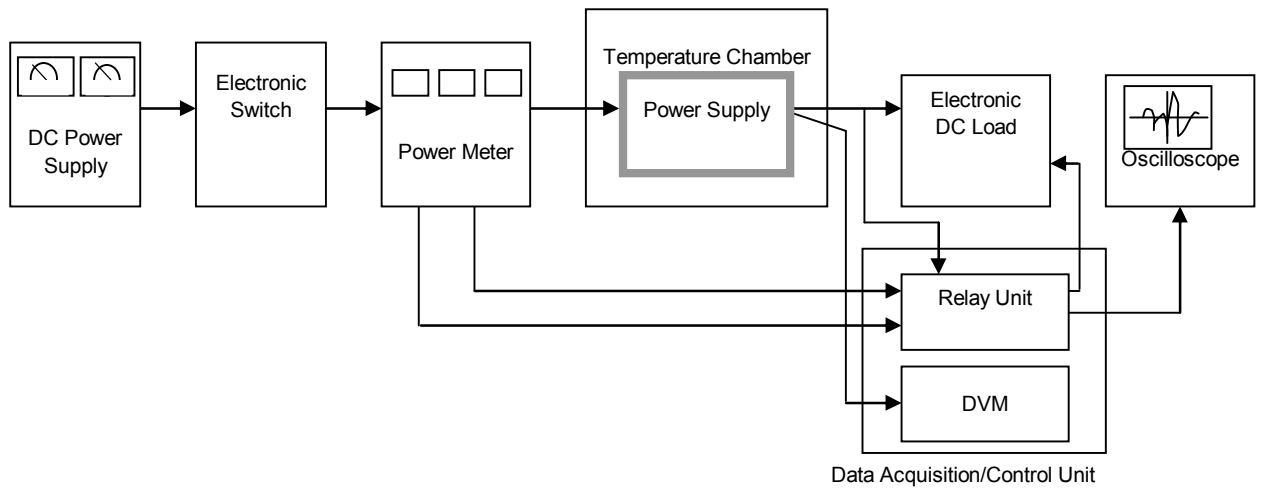


Figure A

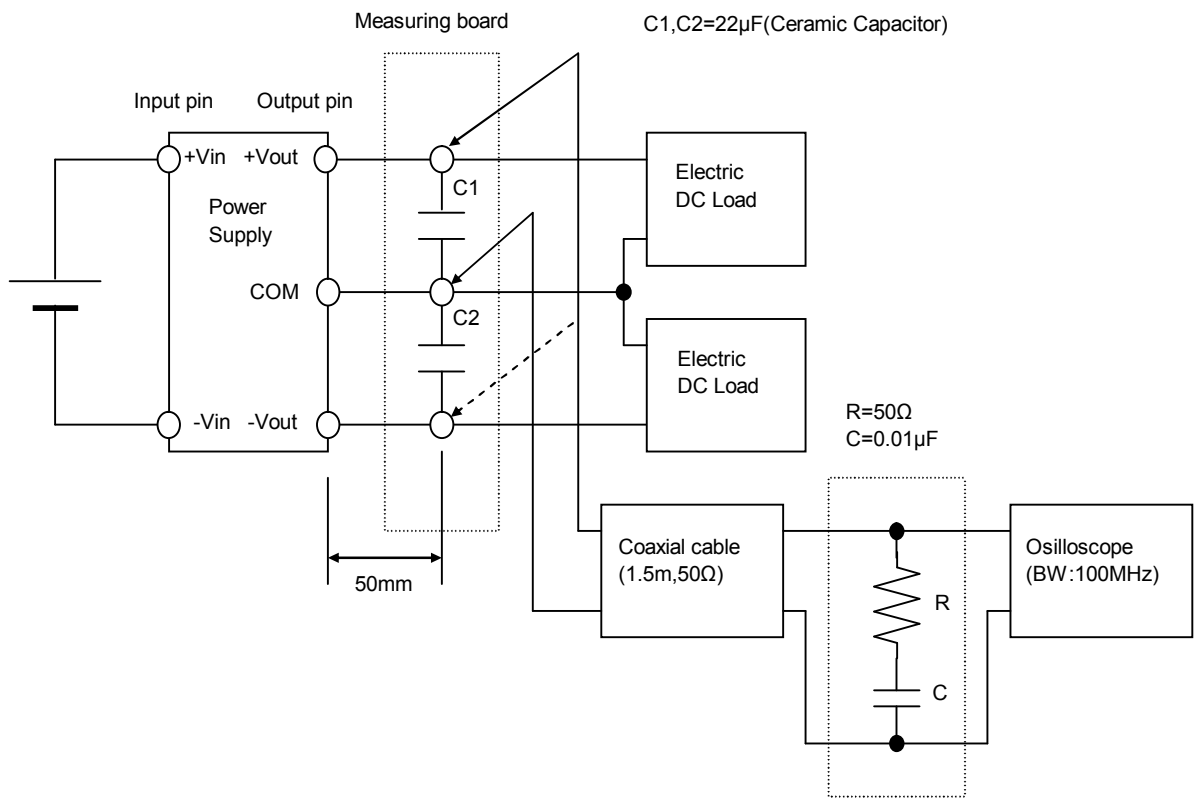


Figure B (Ripple and Ripple noise Characteristic)