

TEST DATA OF MGFW102412

Regulated DC Power Supply
December 16, 2016

Approved by : Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

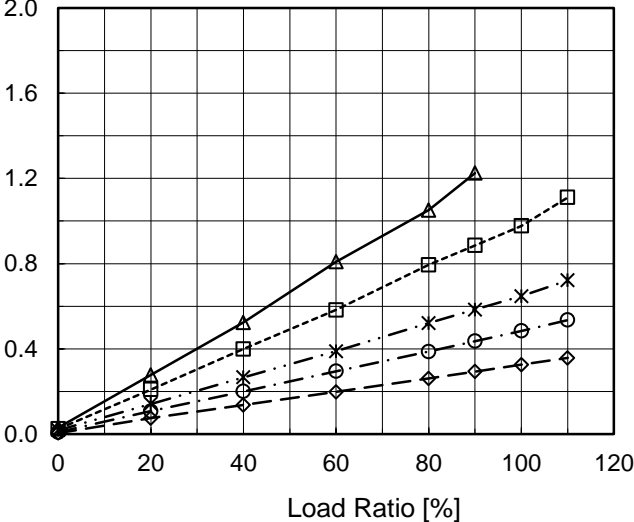
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Model		MGFW102412		Temperature		25°C	
Item		Input Current (by Input Voltage)		Testing Circuitry		Figure A	
Object							
1.Graph				2.Values			
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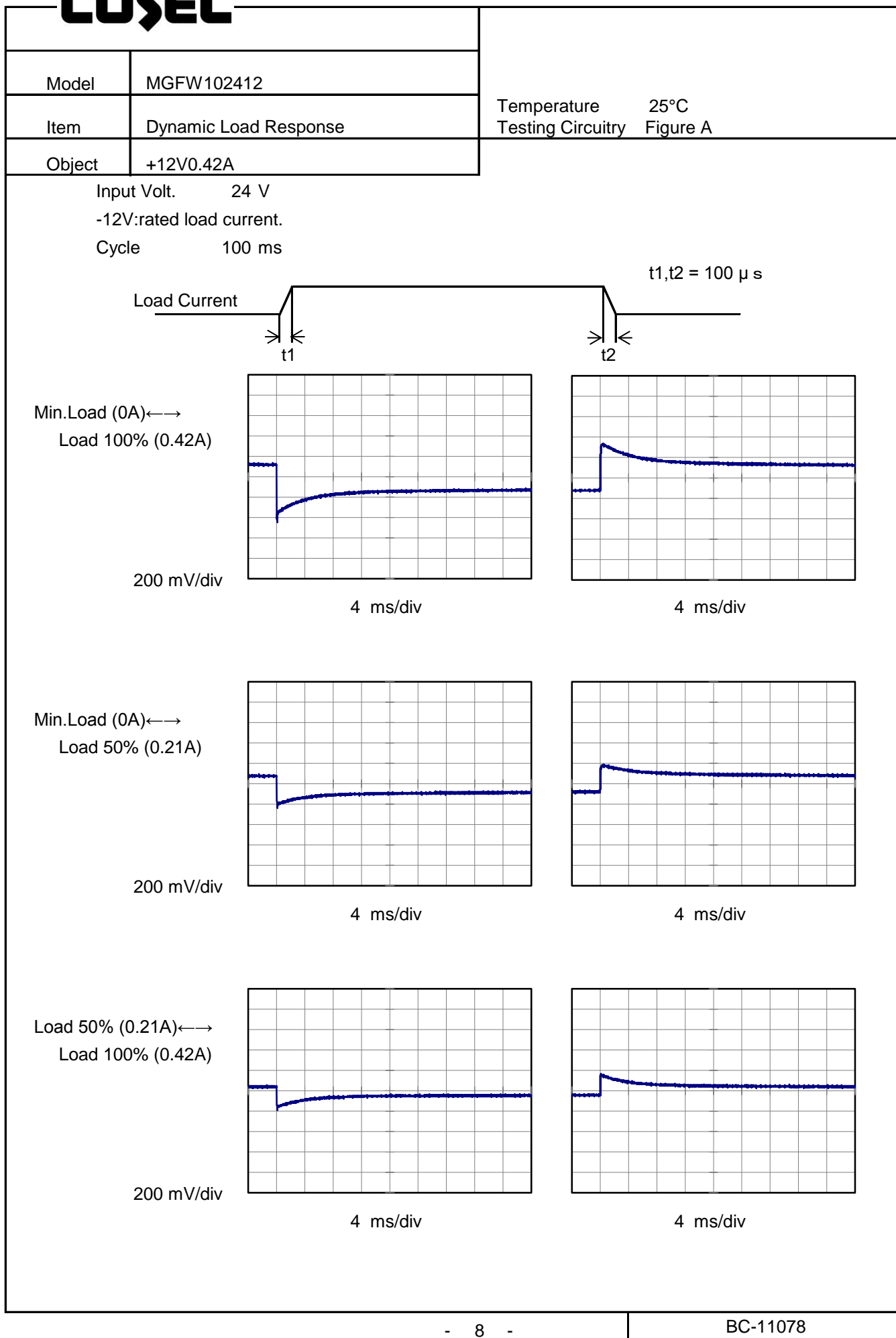
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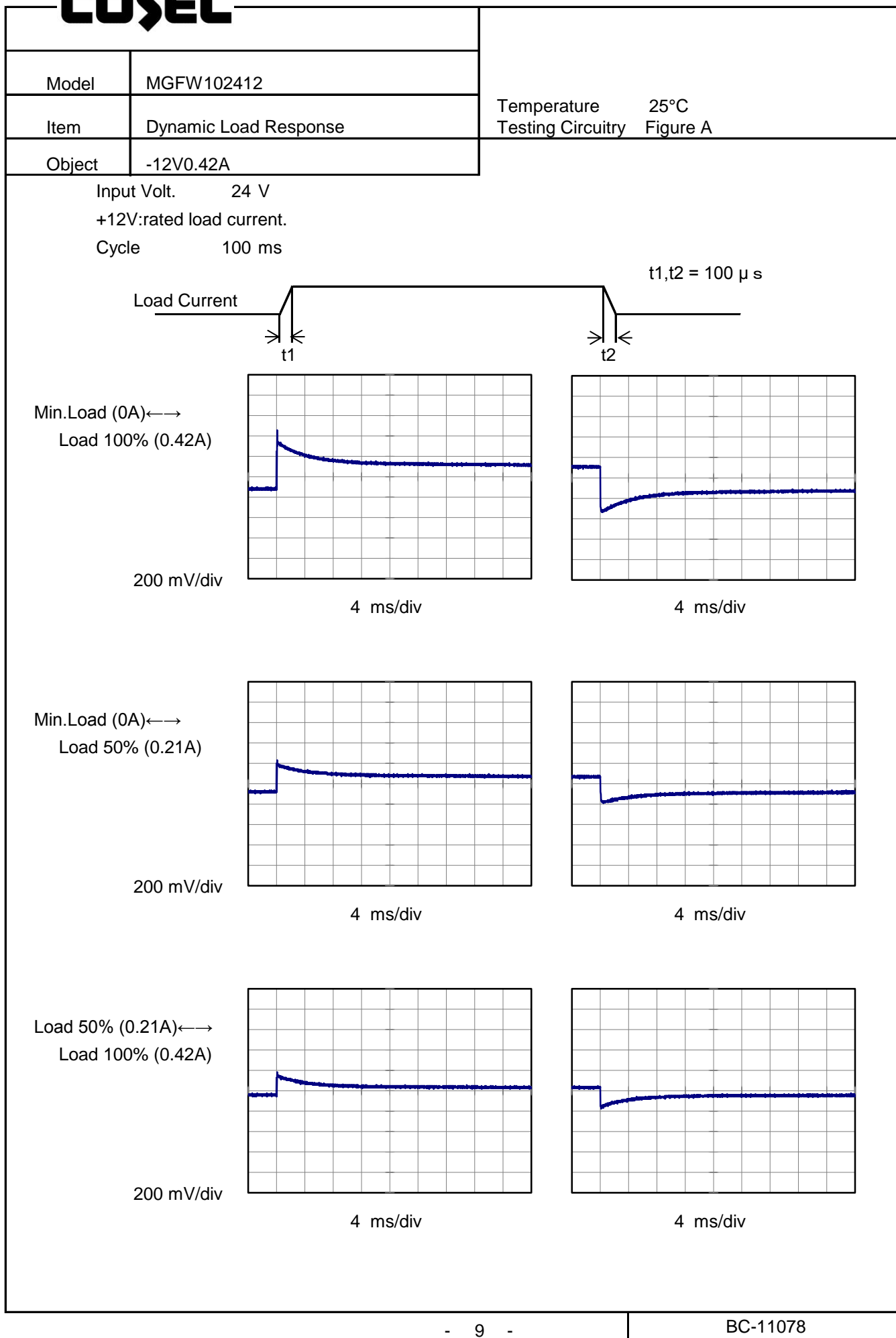
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BC-11078

COSEL



COSEL



Model		MGFW102412		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																							
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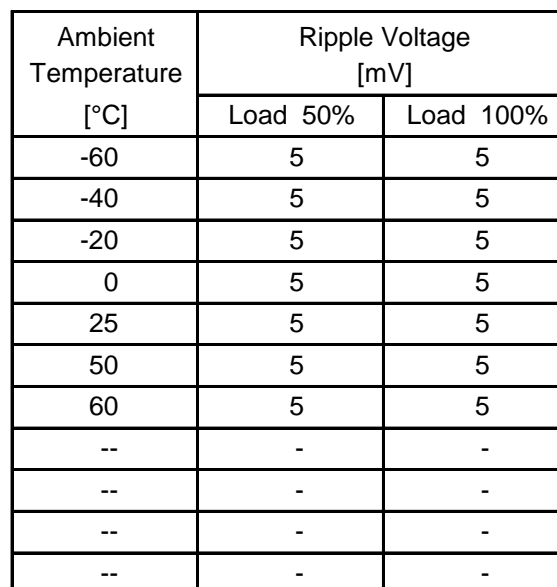
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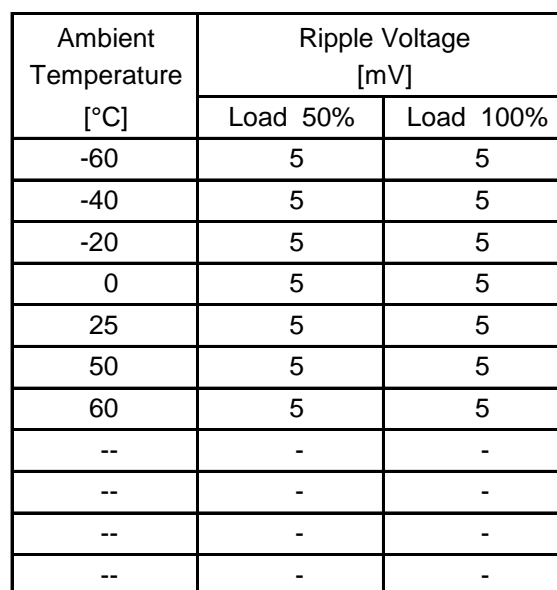
Testing Circuitry Figure B

2.Values



Object	-12V0.42A
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2.Values



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

Model	MGFW102412
Item	Ambient Temperature Drift
Object	+12V0.42A
1.Graph	<div><div><div>—△—</div><div>Input Volt. 9V</div></div><div><div>---□---</div><div>Input Volt. 12V</div></div><div><div>---*---</div><div>Input Volt. 18V</div></div><div><div>---○---</div><div>Input Volt. 24V</div></div><div><div>---◇---</div><div>Input Volt. 36V</div></div></div> <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div>

Object	-12V0.42A
1.Graph	<div><div><div>—△—</div><div>Input Volt. 9V</div></div><div><div>---□---</div><div>Input Volt. 12V</div></div><div><div>---*---</div><div>Input Volt. 18V</div></div><div><div>---○---</div><div>Input Volt. 24V</div></div><div><div>---◇---</div><div>Input Volt. 36V</div></div></div> <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div>
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Testing Circuitry	Figure A																																																																													
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-60	-12.030	-12.031	-12.031	-12.031	-12.032
-40	-12.053	-12.055	-12.054	-12.055	-12.056
-20	-12.072	-12.073	-12.072	-12.072	-12.073
0	-12.084	-12.085	-12.084	-12.084	-12.085
25	-12.094	-12.097	-12.095	-12.094	-12.094
50	-12.097	-12.097	-12.096	-12.095	-12.095
60	-12.096	-12.097	-12.095	-12.095	-12.094
--	-	-	-	-	-
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--	-	-	-	-	-

+12V: Rated Load Current

Note: In case of Input Volt. 9V, Load 80%.
Other case Load 100%.

- 15 -

BC-11078



Model		MGFW102412	Testing Circuitry Figure A
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 - 50°C

Input Voltage : 12 - 36V

Load Current (AVR 1) : 0 - 0.42A (AVR 2) : 0 - 0.42A

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

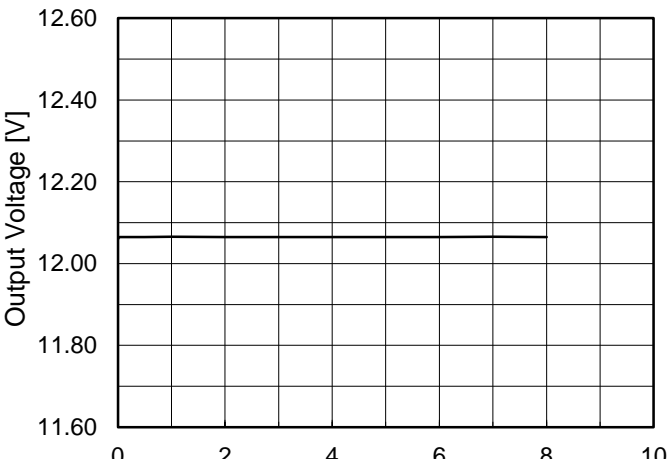
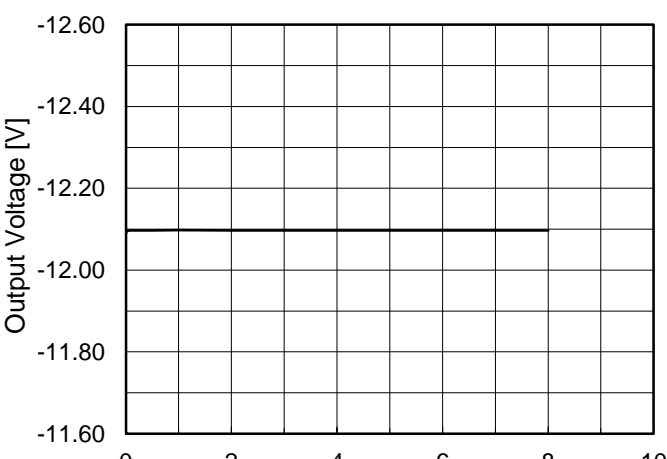
* Output Voltage Accuracy (Ratio) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2. Values

Object		+12V0.42A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	12	0	12.388	±321	±2.7
Minimum Voltage	50	12	0.42	11.746		

Object		-12V0.42A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	12	0	-12.428	±321	±2.7
Minimum Voltage	50	12	0.42	-11.786		

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Model		MGFW102412		Temperature 25°C																							
Item		Time Lapse Drift		Testing Circuitry Figure A																							
Object		+12V0.42A																									
1.Graph				2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</p><p>Load 100%</p></div>				<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.060</td></tr><tr><td>0.5</td><td>12.065</td></tr><tr><td>1.0</td><td>12.065</td></tr><tr><td>2.0</td><td>12.065</td></tr><tr><td>3.0</td><td>12.065</td></tr><tr><td>4.0</td><td>12.065</td></tr><tr><td>5.0</td><td>12.065</td></tr><tr><td>6.0</td><td>12.065</td></tr><tr><td>7.0</td><td>12.065</td></tr><tr><td>8.0</td><td>12.065</td></tr></table> <p>-12V: Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	12.060	0.5	12.065	1.0	12.065	2.0	12.065	3.0	12.065	4.0	12.065	5.0	12.065	6.0	12.065	7.0	12.065	8.0	12.065
Time since start [H]	Output Voltage [V]																										
0.0	12.060																										
0.5	12.065																										
1.0	12.065																										
2.0	12.065																										
3.0	12.065																										
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Object		-12V0.42A																									
1.Graph				2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</p><p>Load 100%</p></div>				<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>-12.090</td></tr><tr><td>0.5</td><td>-12.097</td></tr><tr><td>1.0</td><td>-12.097</td></tr><tr><td>2.0</td><td>-12.097</td></tr><tr><td>3.0</td><td>-12.097</td></tr><tr><td>4.0</td><td>-12.097</td></tr><tr><td>5.0</td><td>-12.097</td></tr><tr><td>6.0</td><td>-12.097</td></tr><tr><td>7.0</td><td>-12.097</td></tr><tr><td>8.0</td><td>-12.097</td></tr></table> <p>+12V: Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	-12.090	0.5	-12.097	1.0	-12.097	2.0	-12.097	3.0	-12.097	4.0	-12.097	5.0	-12.097	6.0	-12.097	7.0	-12.097	8.0	-12.097
Time since start [H]	Output Voltage [V]																										
0.0	-12.090																										
0.5	-12.097																										
1.0	-12.097																										
2.0	-12.097																										
3.0	-12.097																										
4.0	-12.097																										
5.0	-12.097																										
6.0	-12.097																										
7.0	-12.097																										
8.0	-12.097																										

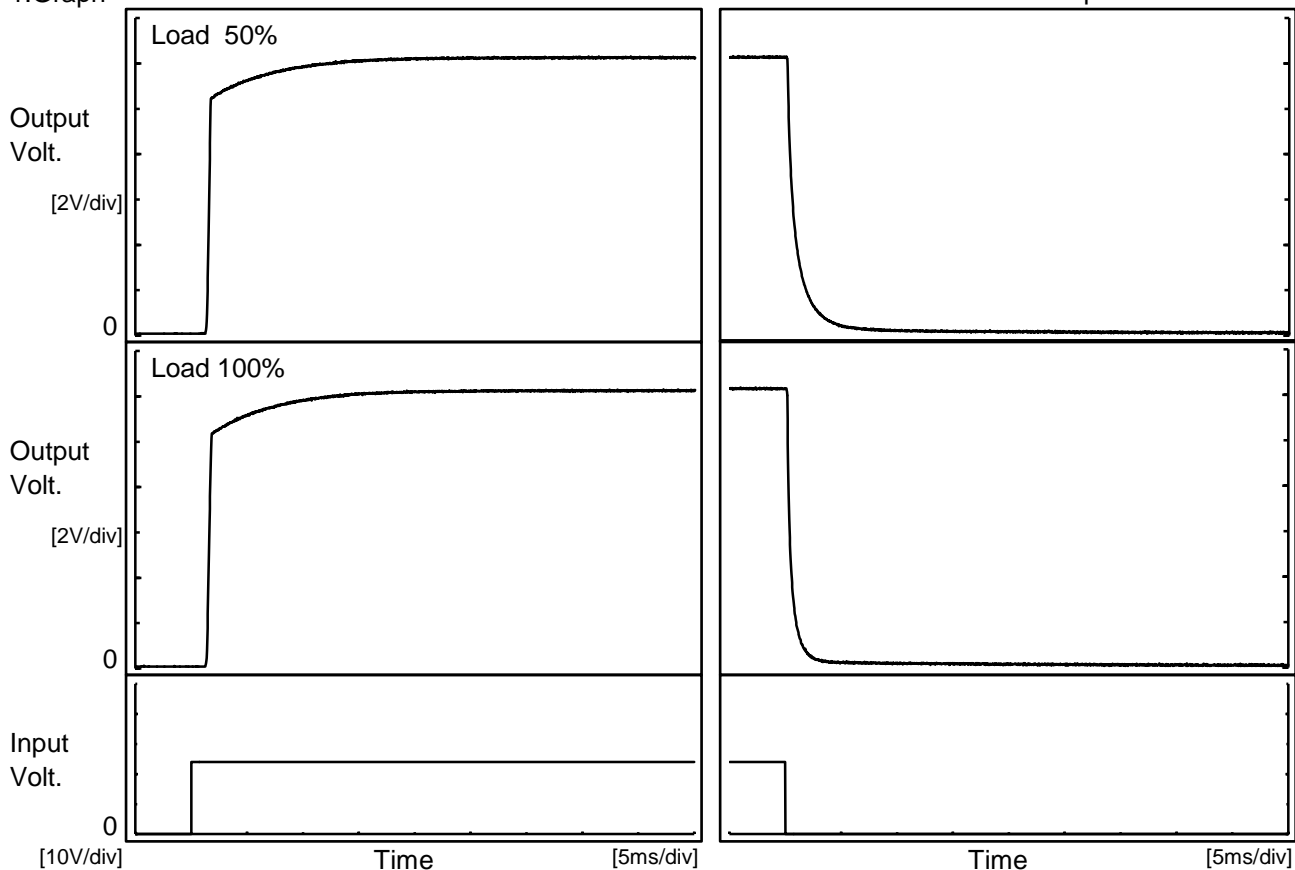
- 17 -

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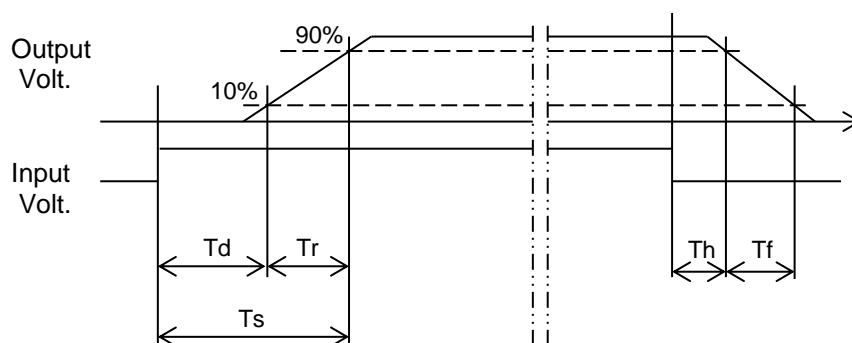
Model	MGFW102412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.42A		

1.Graph



2.Values

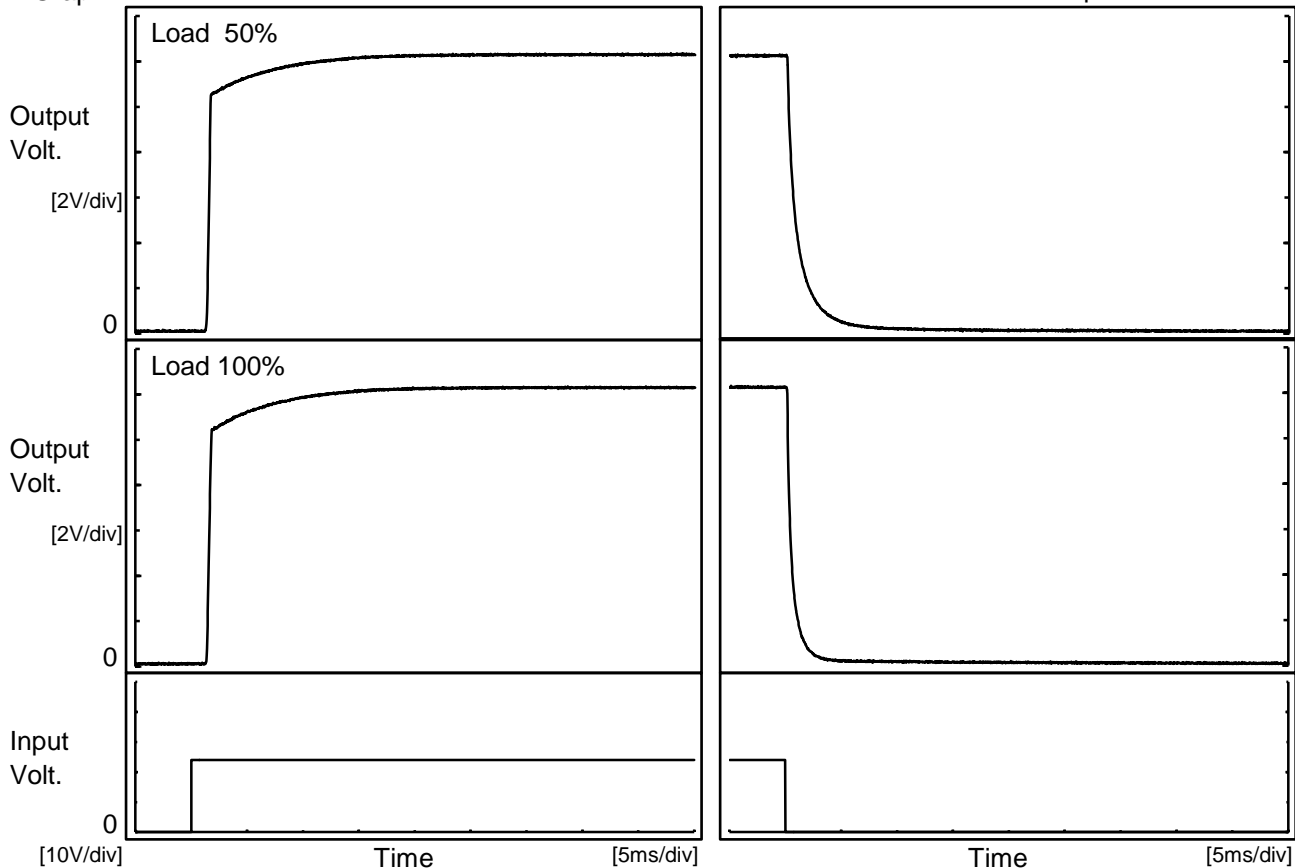
Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.4	1.8	3.2	0.2	2.4
100 %	1.5	2.3	3.8	0.2	1.1





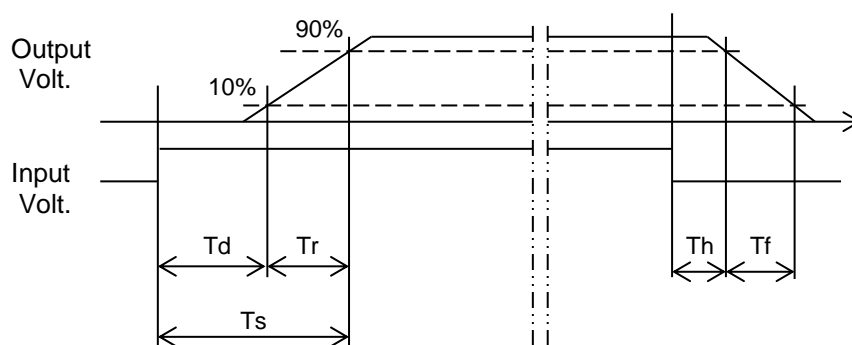
Model	MGFW102412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.42A		

1.Graph



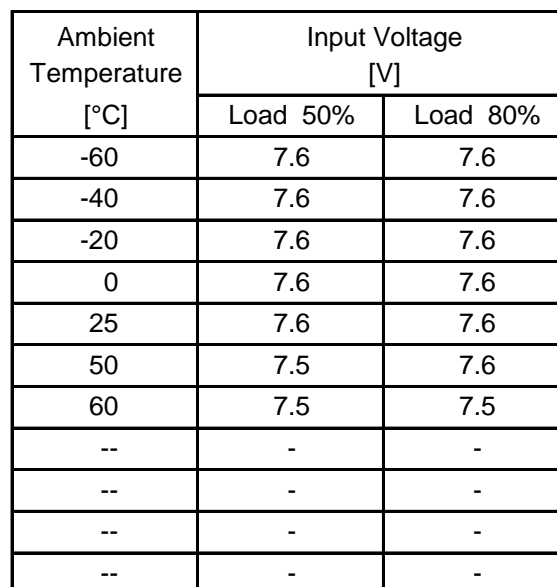
2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.4	1.7	3.1	0.2	2.7
100 %	1.5	2.0	3.5	0.2	1.3

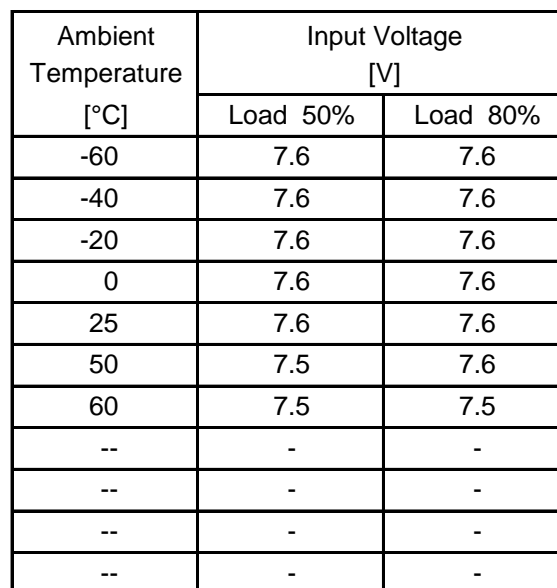


Testing Circuitry Figure A

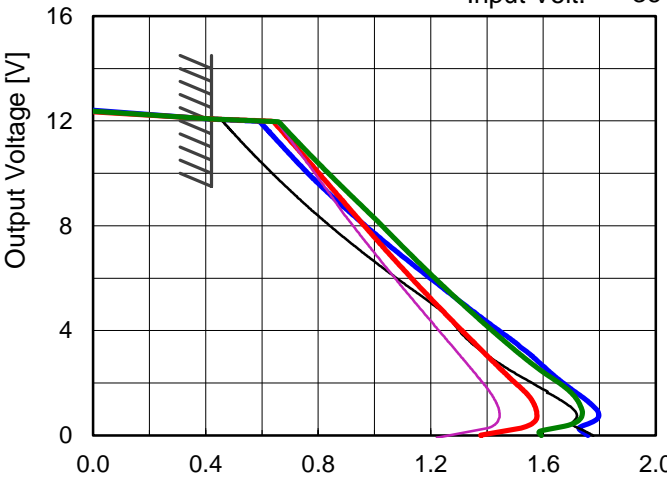
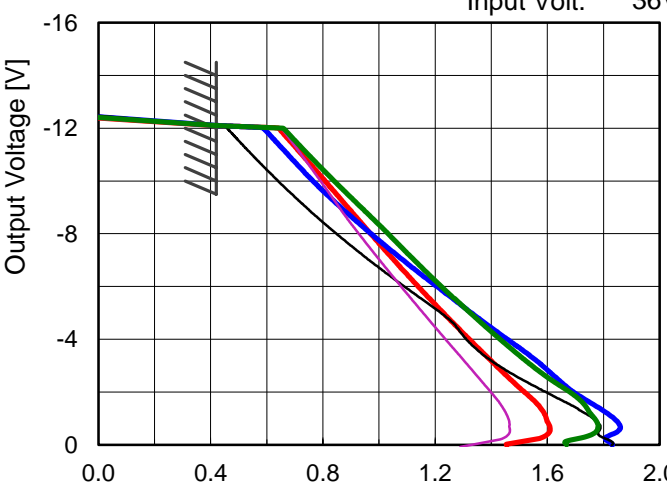
2.Values



2.Values



- 20 -

Model		MGFW102412		Temperature 25°C																																																																																				
Item		Overcurrent Protection		Testing Circuitry Figure A																																																																																				
Object		+12V0.42A		2.Values																																																																																				
1.Graph		<div><div><div></div>Input Volt. 9V</div><div><div></div>Input Volt. 12V</div><div><div></div>Input Volt. 18V</div><div><div></div>Input Volt. 24V</div><div><div></div>Input Volt. 36V</div></div> 				<table><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><tr><td>11.4</td><td>0.509</td><td>0.642</td><td>0.710</td><td>0.689</td><td>0.692</td></tr><tr><td>10.8</td><td>0.562</td><td>0.691</td><td>0.761</td><td>0.735</td><td>0.731</td></tr><tr><td>9.6</td><td>0.673</td><td>0.800</td><td>0.874</td><td>0.832</td><td>0.815</td></tr><tr><td>8.4</td><td>0.794</td><td>0.922</td><td>0.988</td><td>0.929</td><td>0.894</td></tr><tr><td>7.2</td><td>0.931</td><td>1.056</td><td>1.097</td><td>1.027</td><td>0.980</td></tr><tr><td>6.0</td><td>1.076</td><td>1.197</td><td>1.215</td><td>1.129</td><td>1.070</td></tr><tr><td>4.8</td><td>1.230</td><td>1.342</td><td>1.333</td><td>1.235</td><td>1.165</td></tr><tr><td>3.6</td><td>1.335</td><td>1.492</td><td>1.459</td><td>1.346</td><td>1.259</td></tr><tr><td>2.4</td><td>1.494</td><td>1.623</td><td>1.602</td><td>1.460</td><td>1.354</td></tr><tr><td>1.2</td><td>1.681</td><td>1.770</td><td>1.729</td><td>1.566</td><td>1.435</td></tr><tr><td>0.0</td><td>1.778</td><td>1.759</td><td>1.593</td><td>1.379</td><td>1.222</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></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]	11.4	0.509	0.642	0.710	0.689	0.692	10.8	0.562	0.691	0.761	0.735	0.731	9.6	0.673	0.800	0.874	0.832	0.815	8.4	0.794	0.922	0.988	0.929	0.894	7.2	0.931	1.056	1.097	1.027	0.980	6.0	1.076	1.197	1.215	1.129	1.070	4.8	1.230	1.342	1.333	1.235	1.165	3.6	1.335	1.492	1.459	1.346	1.259	2.4	1.494	1.623	1.602	1.460	1.354	1.2	1.681	1.770	1.729	1.566	1.435	0.0	1.778	1.759	1.593	1.379	1.222	--	-	-	-
Output Voltage [V]	Load Current [A]																																																																																							
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Output Voltage [V]	Load Current [A]																																																																																							
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Note: Slanted line shows the range of the rated load current.				-12V: Rated Load Current																																																																																				
				+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.																																																																																				

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Model		MGFW102412		Temperature 25°C																																																																												
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																												
Object		+/-12V0.42A																																																																														
1.Graph		<div><div>—△—</div>Input Volt. 9V</div> <div><div>---□---</div>Input Volt. 12V</div> <div><div>-·-·*-·-</div>Input Volt. 18V</div> <div><div>-·-○-</div>Input Volt. 24V</div> <div><div>--◇--</div>Input Volt. 36V</div>		2.Values																																																																												
<div><div>Switching Frequency [kHz]</div><div><div>10000</div><div>1000</div><div>100</div><div>0.00.10.20.30.40.5</div><div>Load Current [A]</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</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><tr><td>0.000</td><td>785</td><td>910</td><td>1040</td><td>1100</td><td>1250</td></tr><tr><td>0.084</td><td>419</td><td>527</td><td>674</td><td>766</td><td>865</td></tr><tr><td>0.168</td><td>283</td><td>371</td><td>497</td><td>583</td><td>679</td></tr><tr><td>0.252</td><td>211</td><td>286</td><td>394</td><td>470</td><td>558</td></tr><tr><td>0.336</td><td>167</td><td>231</td><td>325</td><td>393</td><td>475</td></tr><tr><td>0.378</td><td>153</td><td>212</td><td>300</td><td>365</td><td>443</td></tr><tr><td>0.420</td><td>- ※</td><td>193</td><td>276</td><td>338</td><td>412</td></tr><tr><td>0.462</td><td>- ※</td><td>178</td><td>257</td><td>315</td><td>387</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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.000	785	910	1040	1100	1250	0.084	419	527	674	766	865	0.168	283	371	497	583	679	0.252	211	286	394	470	558	0.336	167	231	325	393	475	0.378	153	212	300	365	443	0.420	- ※	193	276	338	412	0.462	- ※	178	257	315	387	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Current [A]	Input Current [A]																																																																															
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<div>Note: Slanted line shows the range of the rated load current.</div> <div>When load current is low, MG operates intermittently, so switching frequency would not become constant.</div>				<div>※ Maximum output current at minimum input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.</div>																																																																												

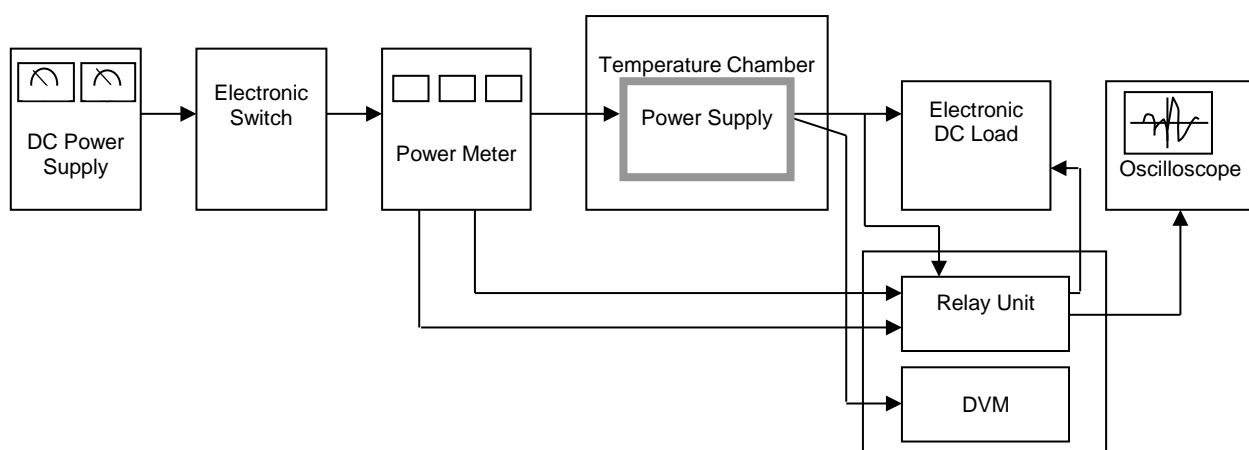


Figure A

Data Acquisition/Control Unit

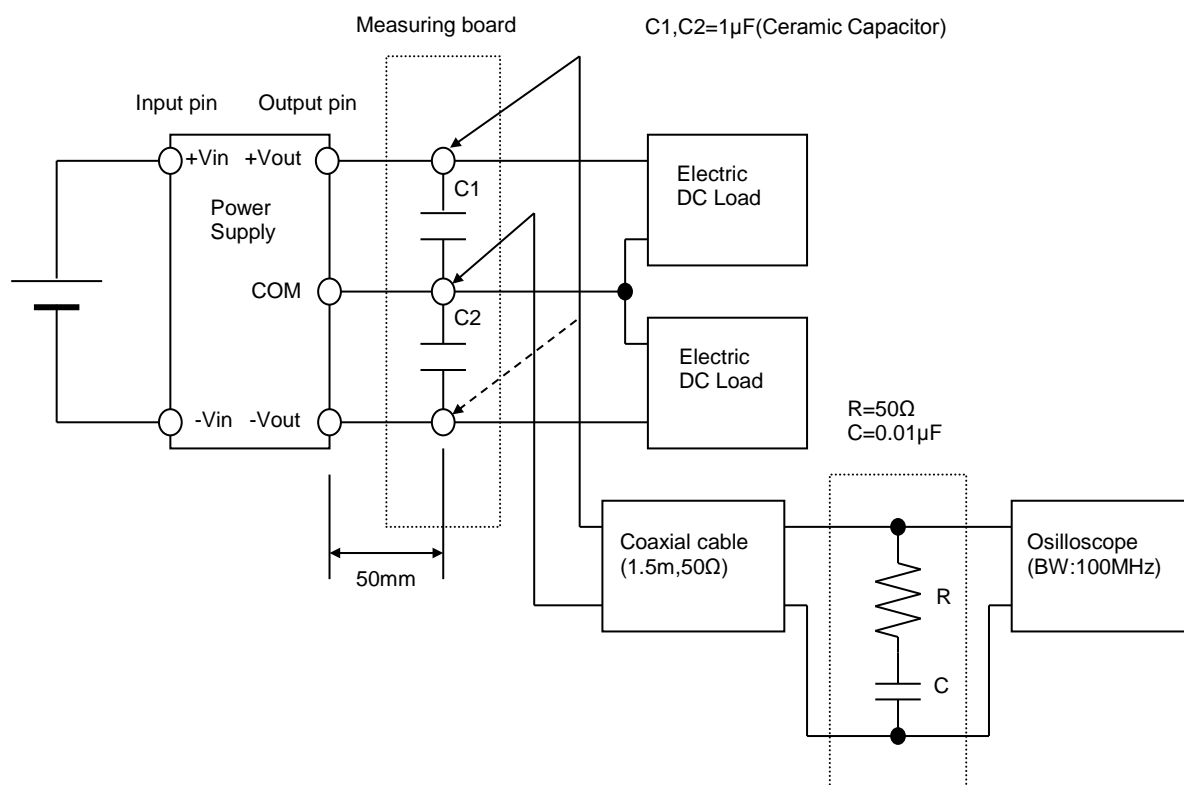


Figure B (Ripple and Ripple noise Characteristic)