

TEST DATA OF MGFW104815

Regulated DC Power Supply
December 26, 2016

Approved by : Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

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Model		MGFW104815		Temperature 25°C																																																																																
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		<table><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><tr><td>0.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>16.0</td><td>0.003</td><td>0.003</td><td>0.004</td></tr><tr><td>16.2</td><td>0.004</td><td>0.003</td><td>0.003</td></tr><tr><td>16.4</td><td>0.003</td><td>0.003</td><td>0.003</td></tr><tr><td>16.6</td><td>0.015</td><td>0.358</td><td>0.672</td></tr><tr><td>16.8</td><td>0.014</td><td>0.353</td><td>0.668</td></tr><tr><td>17.0</td><td>0.014</td><td>0.350</td><td>0.665</td></tr><tr><td>18.0</td><td>0.013</td><td>0.329</td><td>0.648</td></tr><tr><td>24.0</td><td>0.010</td><td>0.245</td><td>0.494</td></tr><tr><td>36.0</td><td>0.009</td><td>0.163</td><td>0.325</td></tr><tr><td>48.0</td><td>0.007</td><td>0.123</td><td>0.243</td></tr><tr><td>60.0</td><td>0.006</td><td>0.100</td><td>0.196</td></tr><tr><td>76.0</td><td>0.004</td><td>0.079</td><td>0.154</td></tr><tr><td>80.0</td><td>0.003</td><td>0.076</td><td>0.148</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><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>				Input Voltage [V]	Input Current [A]			Load 0%	Load 50%	Load 100%	0.0	0.000	0.000	0.000	16.0	0.003	0.003	0.004	16.2	0.004	0.003	0.003	16.4	0.003	0.003	0.003	16.6	0.015	0.358	0.672	16.8	0.014	0.353	0.668	17.0	0.014	0.350	0.665	18.0	0.013	0.329	0.648	24.0	0.010	0.245	0.494	36.0	0.009	0.163	0.325	48.0	0.007	0.123	0.243	60.0	0.006	0.100	0.196	76.0	0.004	0.079	0.154	80.0	0.003	0.076	0.148	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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BC-11081



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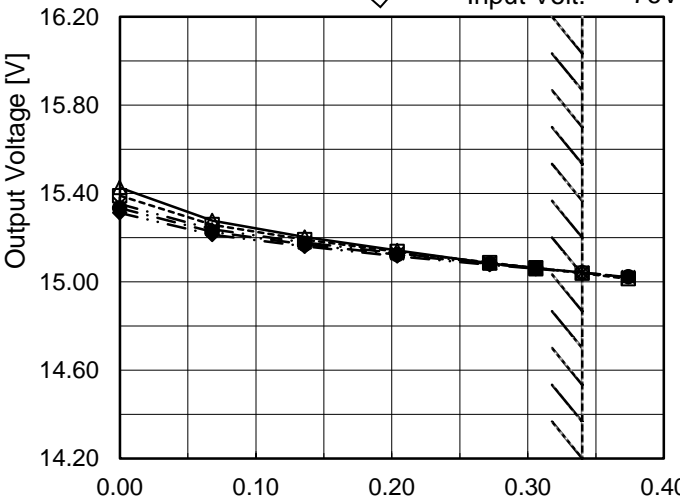
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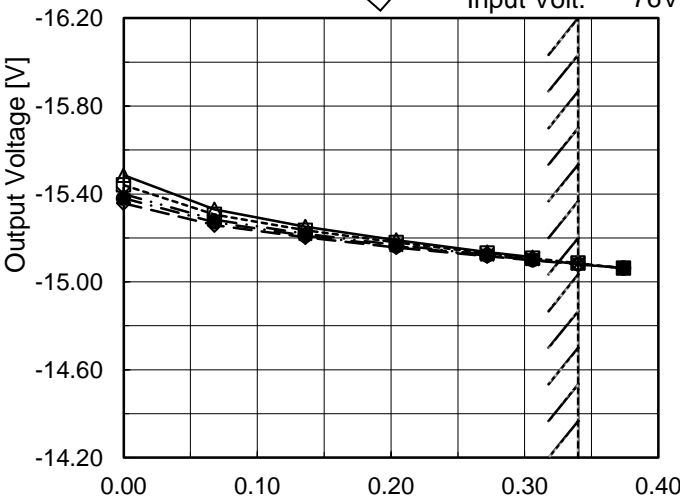
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Model		MGFW104815		Temperature 25°C																																																																														
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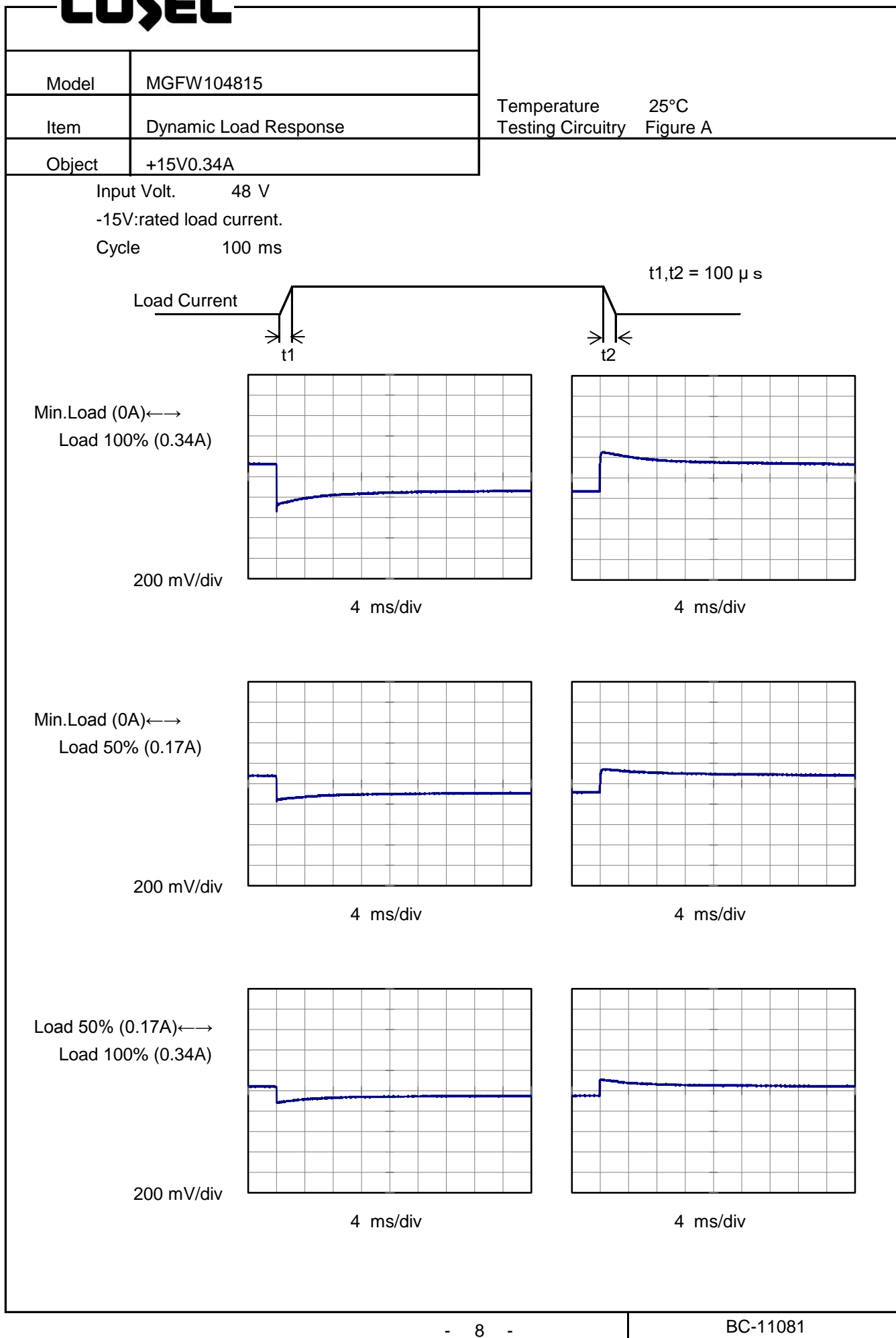
Note: Slanted line shows the range of the rated load current.

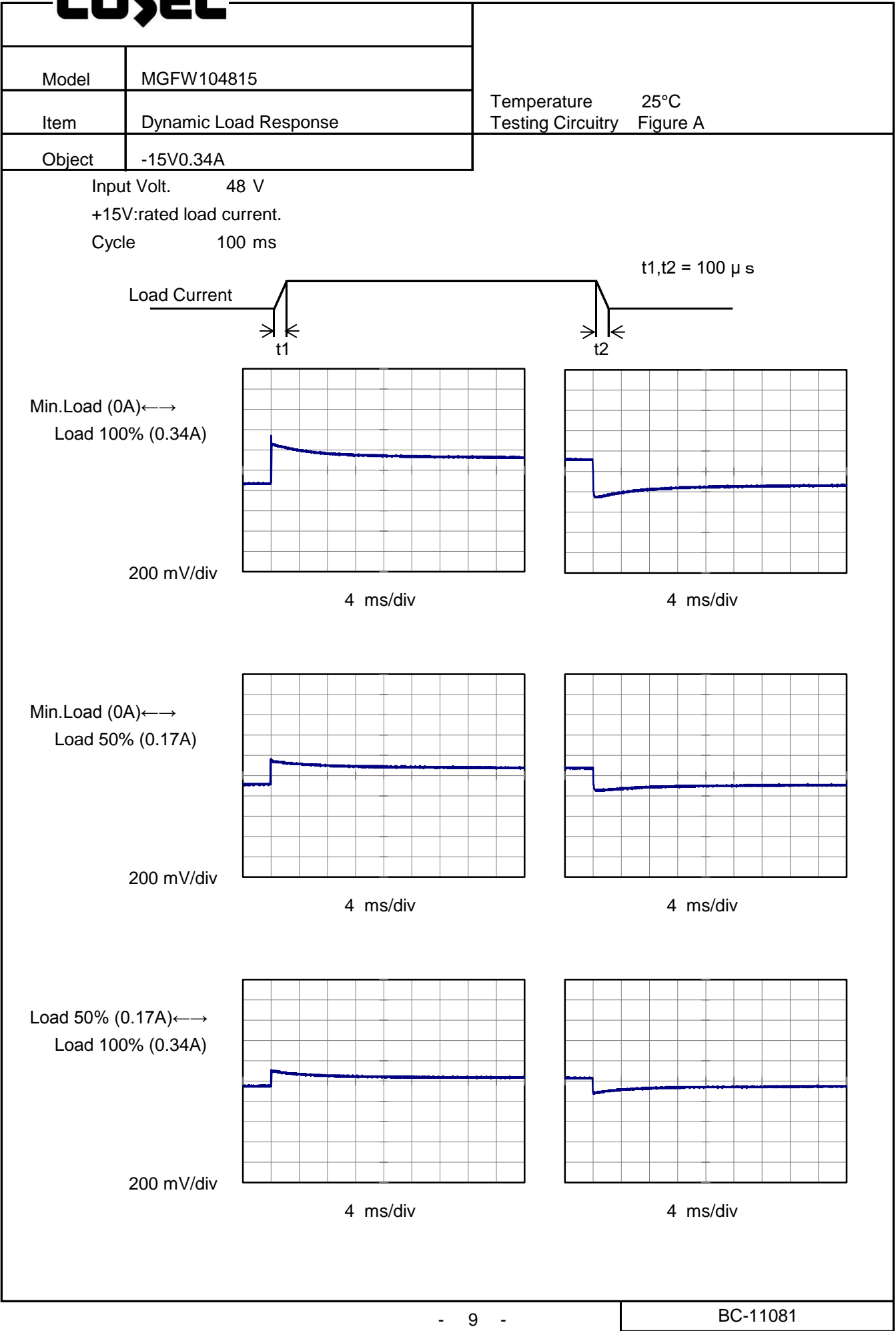
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Model		MGFW104815	Temperature 25°C Testing Circuitry Figure B																																						
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<p>Measured by 100 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p> <div><div><div><div></div><div></div></div><div>Ripple [mVp-p]</div><div></div></div></div> <div><p>Fig.Complex Ripple Wave Form</p></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>0.000</td><td>5</td><td>5</td></tr><tr><td>0.068</td><td>5</td><td>5</td></tr><tr><td>0.136</td><td>5</td><td>5</td></tr><tr><td>0.204</td><td>10</td><td>5</td></tr><tr><td>0.272</td><td>15</td><td>5</td></tr><tr><td>0.306</td><td>20</td><td>5</td></tr><tr><td>0.340</td><td>25</td><td>5</td></tr><tr><td>0.374</td><td>30</td><td>5</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> <p>-15V: Rated Load Current</p>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 24 [V]	Input Volt. 76 [V]	0.000	5	5	0.068	5	5	0.136	5	5	0.204	10	5	0.272	15	5	0.306	20	5	0.340	25	5	0.374	30	5	--	-	-	--	-	-	--	-	-
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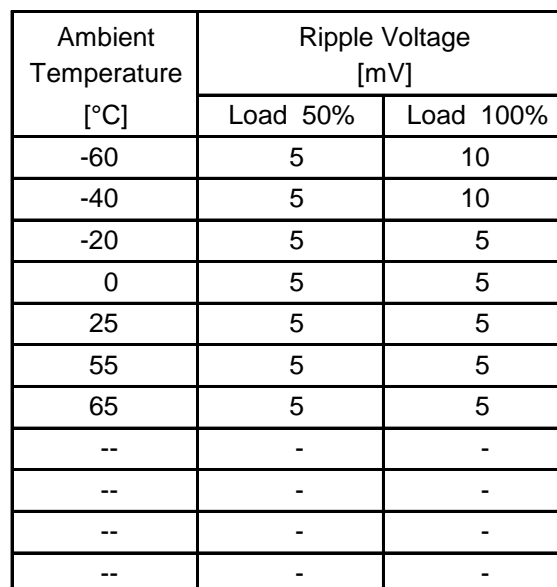
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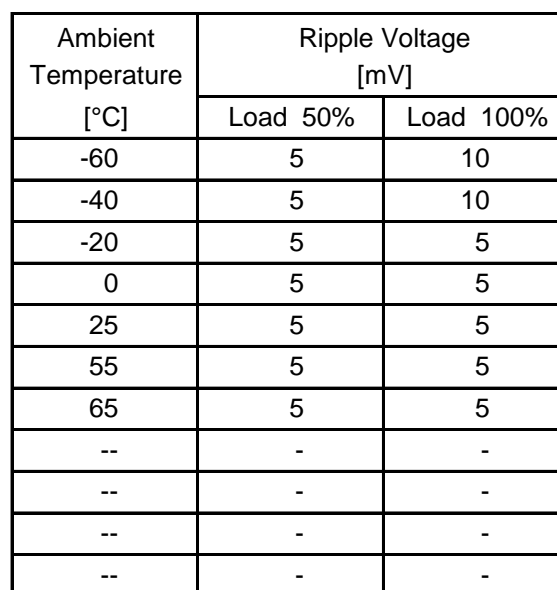
Testing Circuitry Figure B

2.Values



Object	-15V0.34A
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2.Values



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

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Model		MGFW104815	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 - 55°C

Input Voltage : 24 - 76V

Load Current (AVR 1) : 0 - 0.34A (AVR 2) : 0 - 0.34A

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

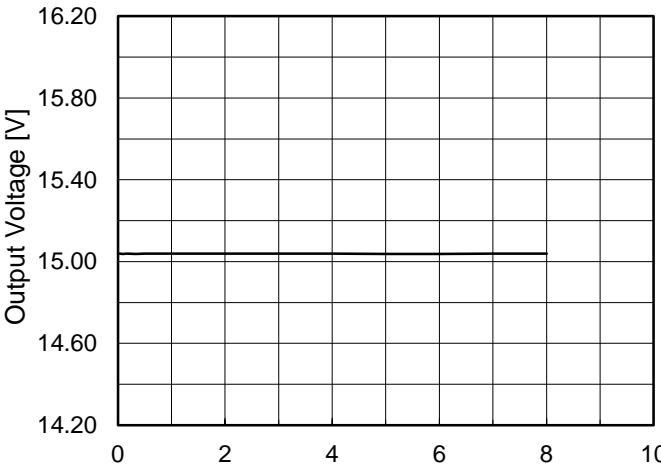
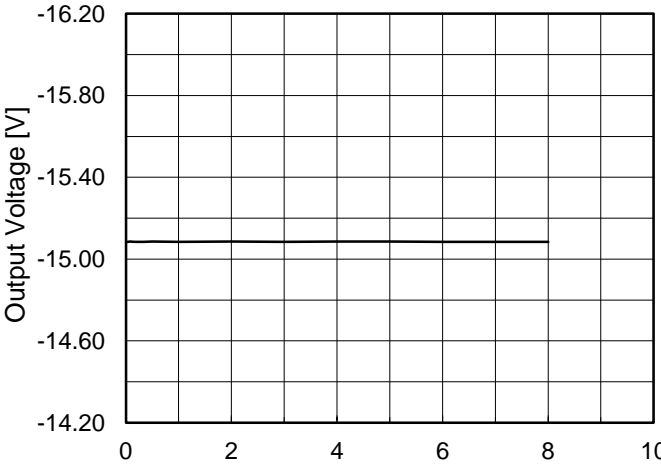
* Output Voltage Accuracy (Ratio) =
$$\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Object		+15V0.34A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	55	24	0	15.393	±352	±2.3
Minimum Voltage	55	24	0.34	14.689		

Object		-15V0.34A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	55	24	0	-15.444	±352	±2.3
Minimum Voltage	55	24	0.34	-14.740		

COSEL

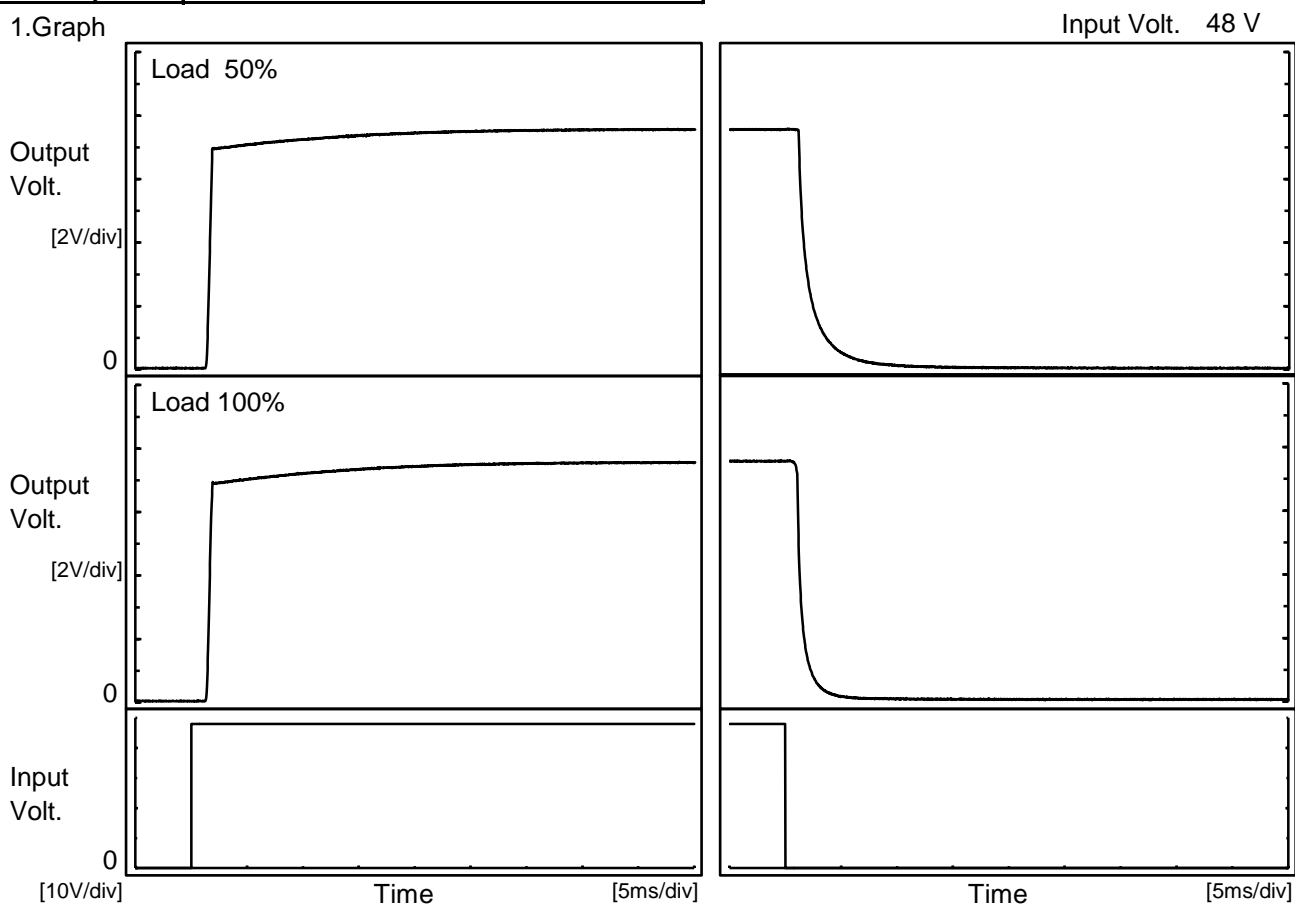
COSEL																									
Model	MGFW104815																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+15V0.34A																								
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<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 48V</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>15.039</td></tr><tr><td>0.5</td><td>15.039</td></tr><tr><td>1.0</td><td>15.038</td></tr><tr><td>2.0</td><td>15.038</td></tr><tr><td>3.0</td><td>15.038</td></tr><tr><td>4.0</td><td>15.039</td></tr><tr><td>5.0</td><td>15.038</td></tr><tr><td>6.0</td><td>15.038</td></tr><tr><td>7.0</td><td>15.038</td></tr><tr><td>8.0</td><td>15.038</td></tr></table> <p>-15V: Rated Load Current</p>		Time since start [H]	Output Voltage [V]	0.0	15.039	0.5	15.039	1.0	15.038	2.0	15.038	3.0	15.038	4.0	15.039	5.0	15.038	6.0	15.038	7.0	15.038	8.0	15.038
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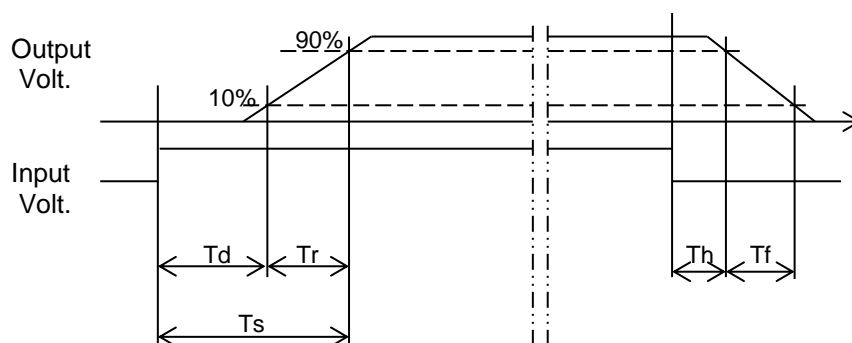
Model	MGFW104815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V0.34A		

1.Graph



2.Values

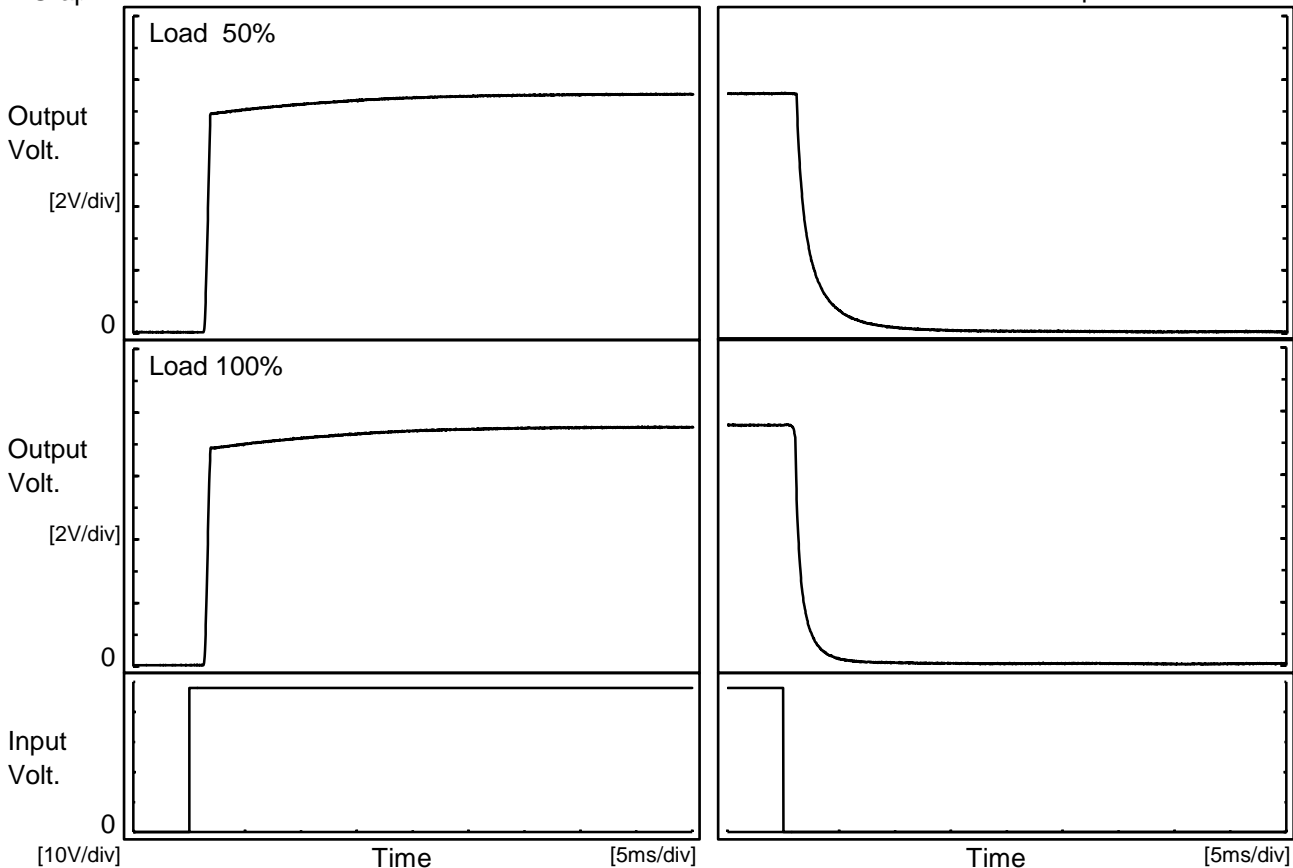
		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		1.5	0.4	1.9	1.2	2.9
100 %		1.5	0.5	2.0	1.1	1.4





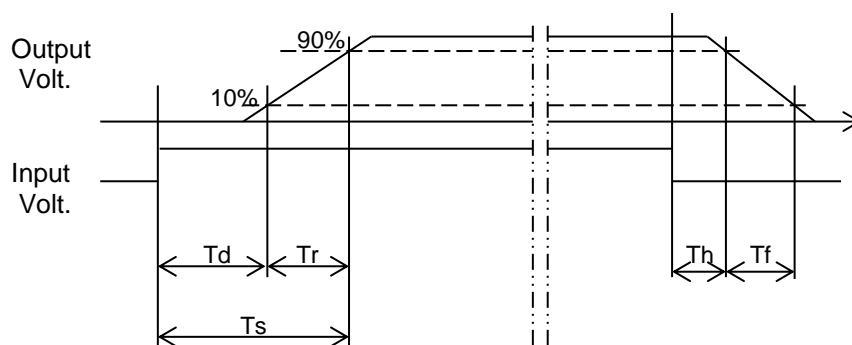
Model	MGFW104815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-15V0.34A		

1.Graph



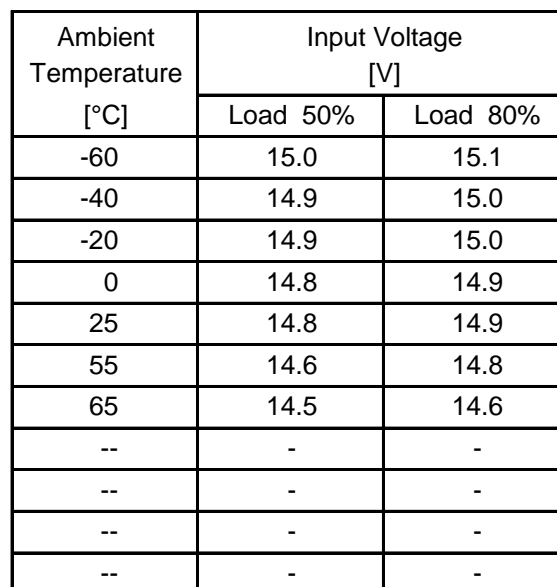
2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.4	1.9	1.2	3.5
100 %	1.5	0.5	2.0	1.1	1.7

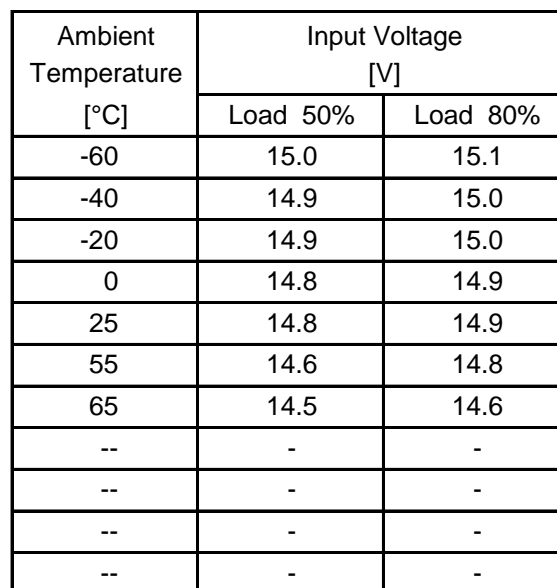


Testing Circuitry Figure A

2.Values



2.Values

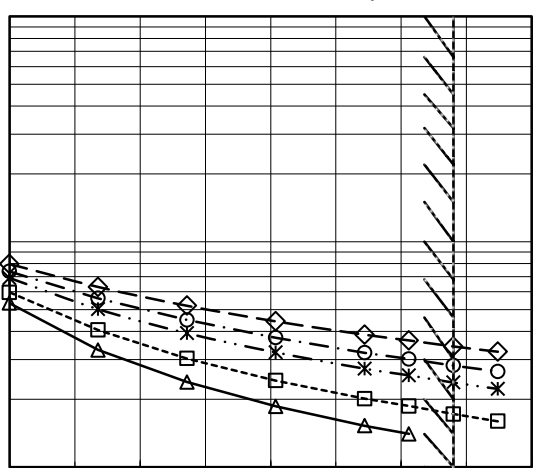


- 20 -

Model		MGFW104815		Temperature 25°C																																																																																				
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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>		2.Values																																																																																				
<div><div>Output Voltage [V]</div><div>20</div><div>16</div><div>12</div><div>8</div><div>4</div><div>0</div></div> <div><div>0.0</div><div>0.4</div><div>0.8</div><div>1.2</div><div>1.6</div></div> <div>Load Current [A]</div>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="5">Load 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>14.3</td><td>0.362</td><td>0.474</td><td>0.499</td><td>0.479</td><td>0.478</td></tr><tr><td>13.5</td><td>0.407</td><td>0.518</td><td>0.542</td><td>0.520</td><td>0.515</td></tr><tr><td>12.0</td><td>0.499</td><td>0.612</td><td>0.634</td><td>0.604</td><td>0.585</td></tr><tr><td>10.5</td><td>0.602</td><td>0.712</td><td>0.725</td><td>0.687</td><td>0.659</td></tr><tr><td>9.0</td><td>0.712</td><td>0.823</td><td>0.823</td><td>0.777</td><td>0.743</td></tr><tr><td>7.5</td><td>0.836</td><td>0.946</td><td>0.926</td><td>0.874</td><td>0.829</td></tr><tr><td>6.0</td><td>0.960</td><td>1.075</td><td>1.039</td><td>0.976</td><td>0.918</td></tr><tr><td>4.5</td><td>1.040</td><td>1.185</td><td>1.160</td><td>1.082</td><td>1.012</td></tr><tr><td>3.0</td><td>1.211</td><td>1.316</td><td>1.305</td><td>1.202</td><td>1.107</td></tr><tr><td>1.5</td><td>1.377</td><td>1.460</td><td>1.391</td><td>1.282</td><td>1.176</td></tr><tr><td>0.0</td><td>1.438</td><td>1.451</td><td>1.306</td><td>1.173</td><td>1.045</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	14.3	0.362	0.474	0.499	0.479	0.478	13.5	0.407	0.518	0.542	0.520	0.515	12.0	0.499	0.612	0.634	0.604	0.585	10.5	0.602	0.712	0.725	0.687	0.659	9.0	0.712	0.823	0.823	0.777	0.743	7.5	0.836	0.946	0.926	0.874	0.829	6.0	0.960	1.075	1.039	0.976	0.918	4.5	1.040	1.185	1.160	1.082	1.012	3.0	1.211	1.316	1.305	1.202	1.107	1.5	1.377	1.460	1.391	1.282	1.176	0.0	1.438	1.451	1.306	1.173	1.045	--	-	-	-	-	-	-15V: Rated Load Current	
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<div><div>Output Voltage [V]</div><div>-20</div><div>-16</div><div>-12</div><div>-8</div><div>-4</div><div>0</div></div> <div><div>0.0</div><div>0.4</div><div>0.8</div><div>1.2</div><div>1.6</div></div> <div>Load Current [A]</div>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="5">Load 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>-14.3</td><td>0.367</td><td>0.479</td><td>0.501</td><td>0.480</td><td>0.482</td></tr><tr><td>-13.5</td><td>0.411</td><td>0.522</td><td>0.544</td><td>0.522</td><td>0.517</td></tr><tr><td>-12.0</td><td>0.505</td><td>0.615</td><td>0.637</td><td>0.606</td><td>0.588</td></tr><tr><td>-10.5</td><td>0.608</td><td>0.718</td><td>0.732</td><td>0.693</td><td>0.662</td></tr><tr><td>-9.0</td><td>0.720</td><td>0.833</td><td>0.828</td><td>0.783</td><td>0.747</td></tr><tr><td>-7.5</td><td>0.847</td><td>0.957</td><td>0.935</td><td>0.879</td><td>0.834</td></tr><tr><td>-6.0</td><td>0.950</td><td>1.090</td><td>1.047</td><td>0.982</td><td>0.923</td></tr><tr><td>-4.5</td><td>1.054</td><td>1.197</td><td>1.171</td><td>1.091</td><td>1.019</td></tr><tr><td>-3.0</td><td>1.239</td><td>1.337</td><td>1.319</td><td>1.214</td><td>1.117</td></tr><tr><td>-1.5</td><td>1.427</td><td>1.509</td><td>1.420</td><td>1.304</td><td>1.194</td></tr><tr><td>0.0</td><td>1.488</td><td>1.506</td><td>1.350</td><td>1.202</td><td>1.061</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-14.3	0.367	0.479	0.501	0.480	0.482	-13.5	0.411	0.522	0.544	0.522	0.517	-12.0	0.505	0.615	0.637	0.606	0.588	-10.5	0.608	0.718	0.732	0.693	0.662	-9.0	0.720	0.833	0.828	0.783	0.747	-7.5	0.847	0.957	0.935	0.879	0.834	-6.0	0.950	1.090	1.047	0.982	0.923	-4.5	1.054	1.197	1.171	1.091	1.019	-3.0	1.239	1.337	1.319	1.214	1.117	-1.5	1.427	1.509	1.420	1.304	1.194	0.0	1.488	1.506	1.350	1.202	1.061	--	-	-	-	-	-	+15V: Rated Load Current	
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- 21 -

BC-11081

Model		MGFW104815		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure 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>																																																																														

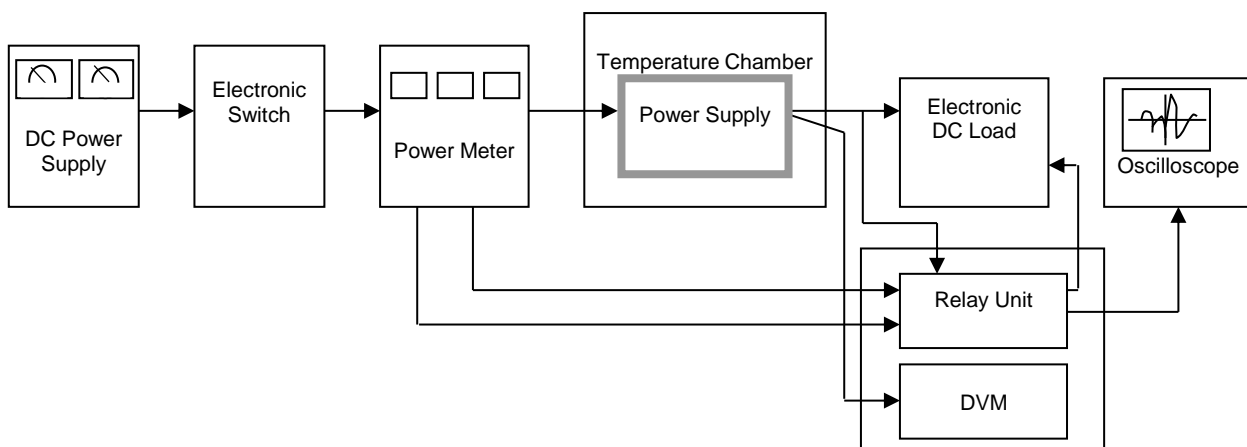


Figure A

Data Acquisition/Control Unit

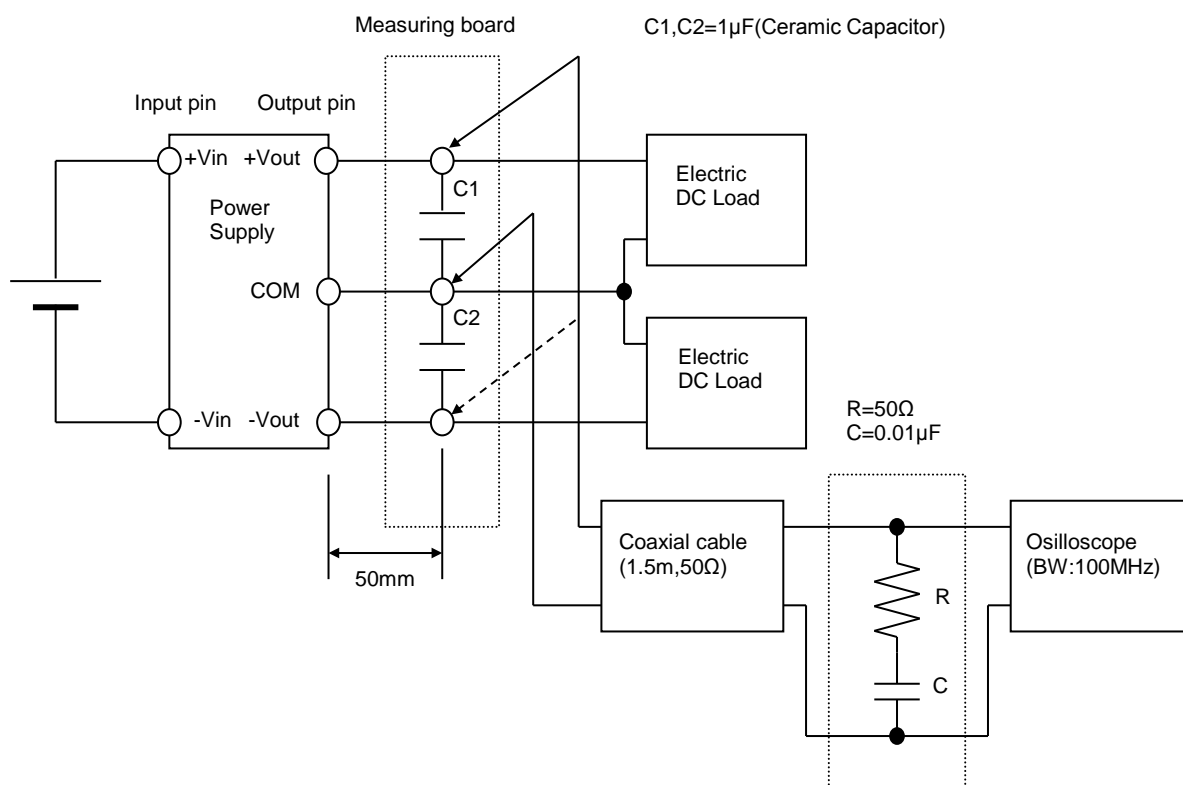


Figure B (Ripple and Ripple noise Characteristic)