

TEST DATA OF MHFW61212

Regulated DC Power Supply
October 27, 2021

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Design Manager

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Design Engineer

COSEL CO.,LTD.

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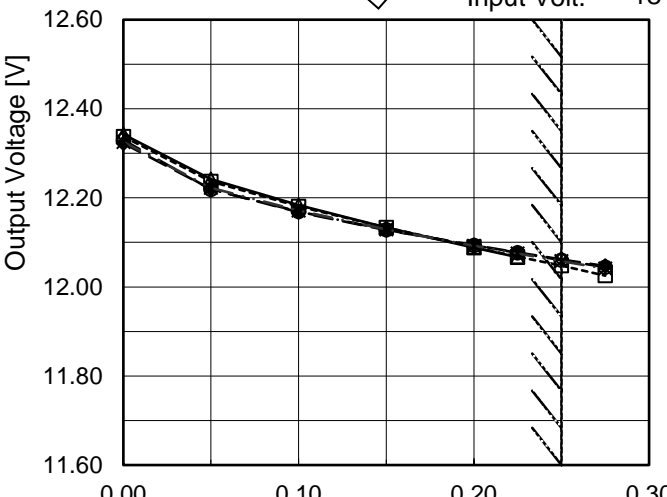
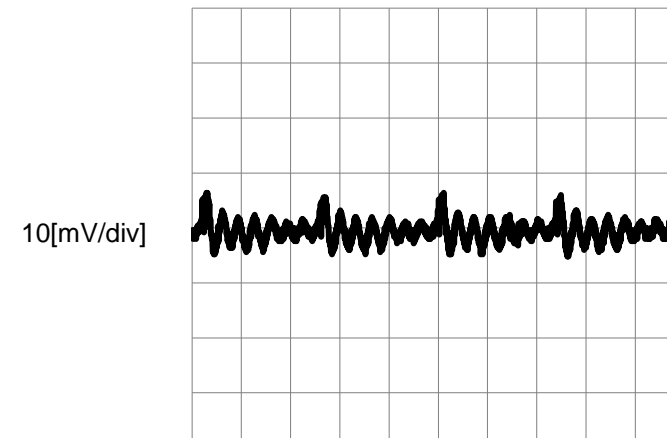
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1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>4.5V</div></div><div><div>---□---</div><div>Input Volt.</div><div>5V</div></div><div><div>---*---</div><div>Input Volt.</div><div>9V</div></div><div><div>---○---</div><div>Input Volt.</div><div>12V</div></div><div><div>---◇---</div><div>Input Volt.</div><div>18V</div></div></div> <div><p>Note: Slanted line shows the range of the rated load current.</p></div>	2.Values																																																																													
		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Output Voltage [V]</th></tr><tr><th>Input Volt. 4.5[V]</th><th>Input Volt. 5[V]</th><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>0.00</td><td>12.343</td><td>12.338</td><td>12.326</td><td>12.330</td><td>12.323</td></tr><tr><td>0.05</td><td>12.242</td><td>12.237</td><td>12.222</td><td>12.219</td><td>12.219</td></tr><tr><td>0.10</td><td>12.184</td><td>12.181</td><td>12.171</td><td>12.169</td><td>12.168</td></tr><tr><td>0.15</td><td>12.134</td><td>12.133</td><td>12.129</td><td>12.129</td><td>12.127</td></tr><tr><td>0.20</td><td>12.088</td><td>12.090</td><td>12.092</td><td>12.093</td><td>12.094</td></tr><tr><td>0.23</td><td>12.067</td><td>12.068</td><td>12.075</td><td>12.076</td><td>12.077</td></tr><tr><td>0.25</td><td>*1</td><td>12.048</td><td>12.058</td><td>12.060</td><td>12.062</td></tr><tr><td>0.28</td><td>*1</td><td>12.025</td><td>12.041</td><td>12.044</td><td>12.047</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]	Output Voltage [V]					Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.00	12.343	12.338	12.326	12.330	12.323	0.05	12.242	12.237	12.222	12.219	12.219	0.10	12.184	12.181	12.171	12.169	12.168	0.15	12.134	12.133	12.129	12.129	12.127	0.20	12.088	12.090	12.092	12.093	12.094	0.23	12.067	12.068	12.075	12.076	12.077	0.25	*1	12.048	12.058	12.060	12.062	0.28	*1	12.025	12.041	12.044	12.047	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Current [A]	Output Voltage [V]																																																																															
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]																																																																											
0.00	12.343	12.338	12.326	12.330	12.323																																																																											
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Object		+12V0.25A	Testing CircuitryFigure B																																																																													
1.Graph		<div><div><div>Input Voltage12V</div><div>Load100%</div></div><div><p>10[mV/div]</p><p>1[μs/div]</p></div></div>																																																																														
		-12V:Rated Load Current																																																																														

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Model		MHFW61212	Temperature25°C																																																																														
Item		Cross Regulation	Testing CircuitryFigure A																																																																														
Object		-12V0.25A																																																																															
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>4.5V</div></div><div><div>---□---</div><div>Input Volt.</div><div>5V</div></div><div><div>-·-*·-</div><div>Input Volt.</div><div>9V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>12V</div></div><div><div>--◇--</div><div>Input Volt.</div><div>18V</div></div></div> <div><p>Note: Slanted line shows the range of the rated load current.</p></div>	2.Values																																																																														
			<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Output Voltage [V]</th></tr><tr><th>Input Volt. 4.5[V]</th><th>Input Volt. 5[V]</th><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>0.00</td><td>-12.369</td><td>-12.359</td><td>-12.341</td><td>-12.347</td><td>-12.336</td></tr><tr><td>0.05</td><td>-12.266</td><td>-12.257</td><td>-12.232</td><td>-12.227</td><td>-12.227</td></tr><tr><td>0.10</td><td>-12.212</td><td>-12.204</td><td>-12.182</td><td>-12.177</td><td>-12.175</td></tr><tr><td>0.15</td><td>-12.165</td><td>-12.161</td><td>-12.142</td><td>-12.138</td><td>-12.134</td></tr><tr><td>0.20</td><td>-12.127</td><td>-12.120</td><td>-12.107</td><td>-12.104</td><td>-12.101</td></tr><tr><td>0.23</td><td>-12.104</td><td>-12.103</td><td>-12.091</td><td>-12.088</td><td>-12.086</td></tr><tr><td>0.25</td><td>*1</td><td>-12.083</td><td>-12.075</td><td>-12.073</td><td>-12.071</td></tr><tr><td>0.28</td><td>*1</td><td>-12.065</td><td>-12.060</td><td>-12.058</td><td>-12.056</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> <div>+12V:Rated Load Current</div> <div>*1 Maximum output current at 4.5V input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.</div>		Load Current [A]	Output Voltage [V]					Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.00	-12.369	-12.359	-12.341	-12.347	-12.336	0.05	-12.266	-12.257	-12.232	-12.227	-12.227	0.10	-12.212	-12.204	-12.182	-12.177	-12.175	0.15	-12.165	-12.161	-12.142	-12.138	-12.134	0.20	-12.127	-12.120	-12.107	-12.104	-12.101	0.23	-12.104	-12.103	-12.091	-12.088	-12.086	0.25	*1	-12.083	-12.075	-12.073	-12.071	0.28	*1	-12.065	-12.060	-12.058	-12.056	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Current [A]	Output Voltage [V]																																																																																
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Item		Ripple-Noise	Temperature25°C																																																																														
Object		-12V0.25A	Testing CircuitryFigure B																																																																														
1.Graph		<div><div><div>Input Voltage</div><div>12V</div></div><div><div>Load</div><div>100%</div></div></div> <div><p>+12V:Rated Load Current</p></div>																																																																															

- 5 -

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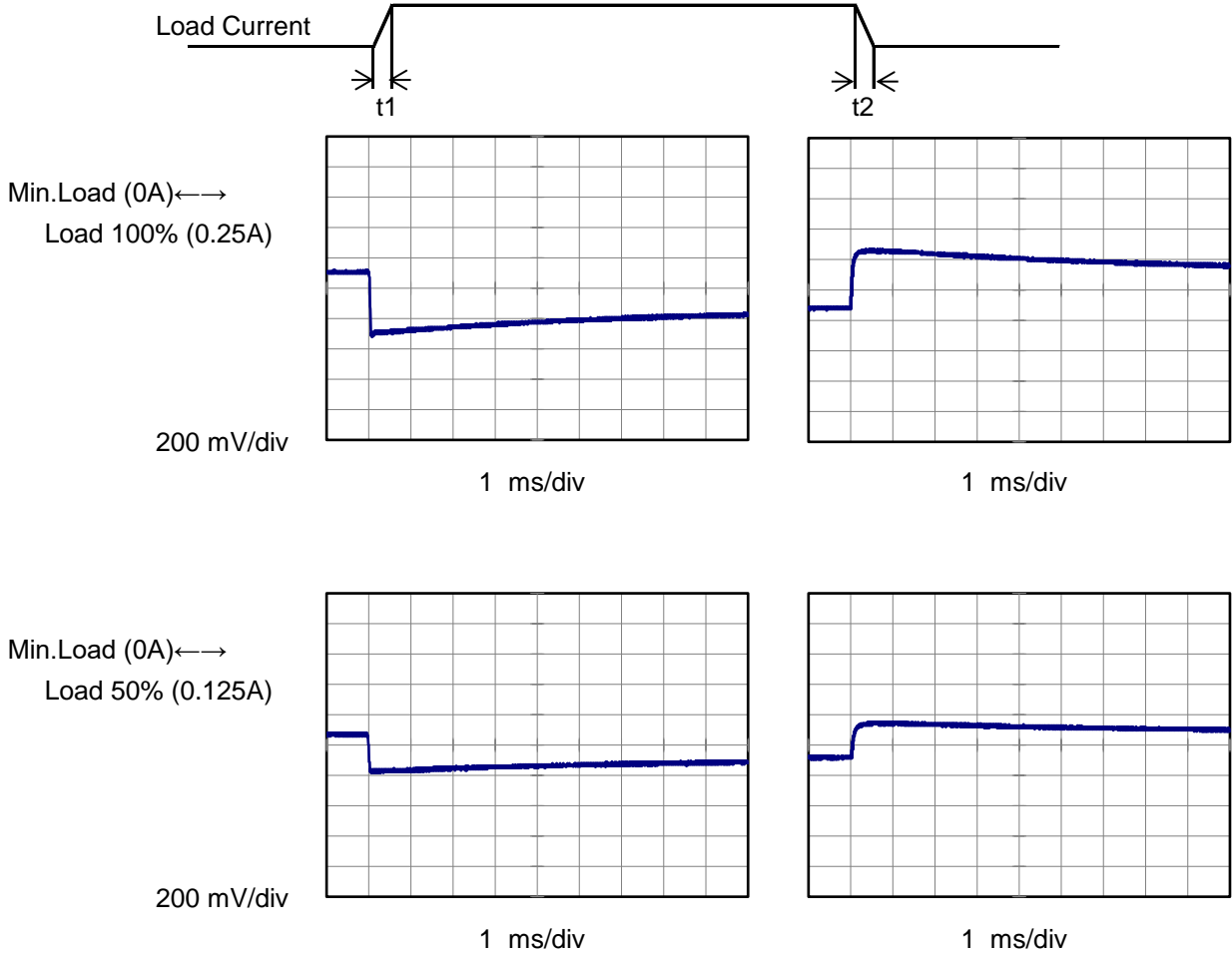
Model	MHFW61212		
Item	Dynamic Load Response	Temperature	25°C
		Testing Circuitry	Figure A
Object	+12V0.25A		

Input Volt. 12 V

-12V:rated load current.

Cycle 100 ms

Response. $t_1=t_2=50\mu\text{s}$. Typ



COSEL

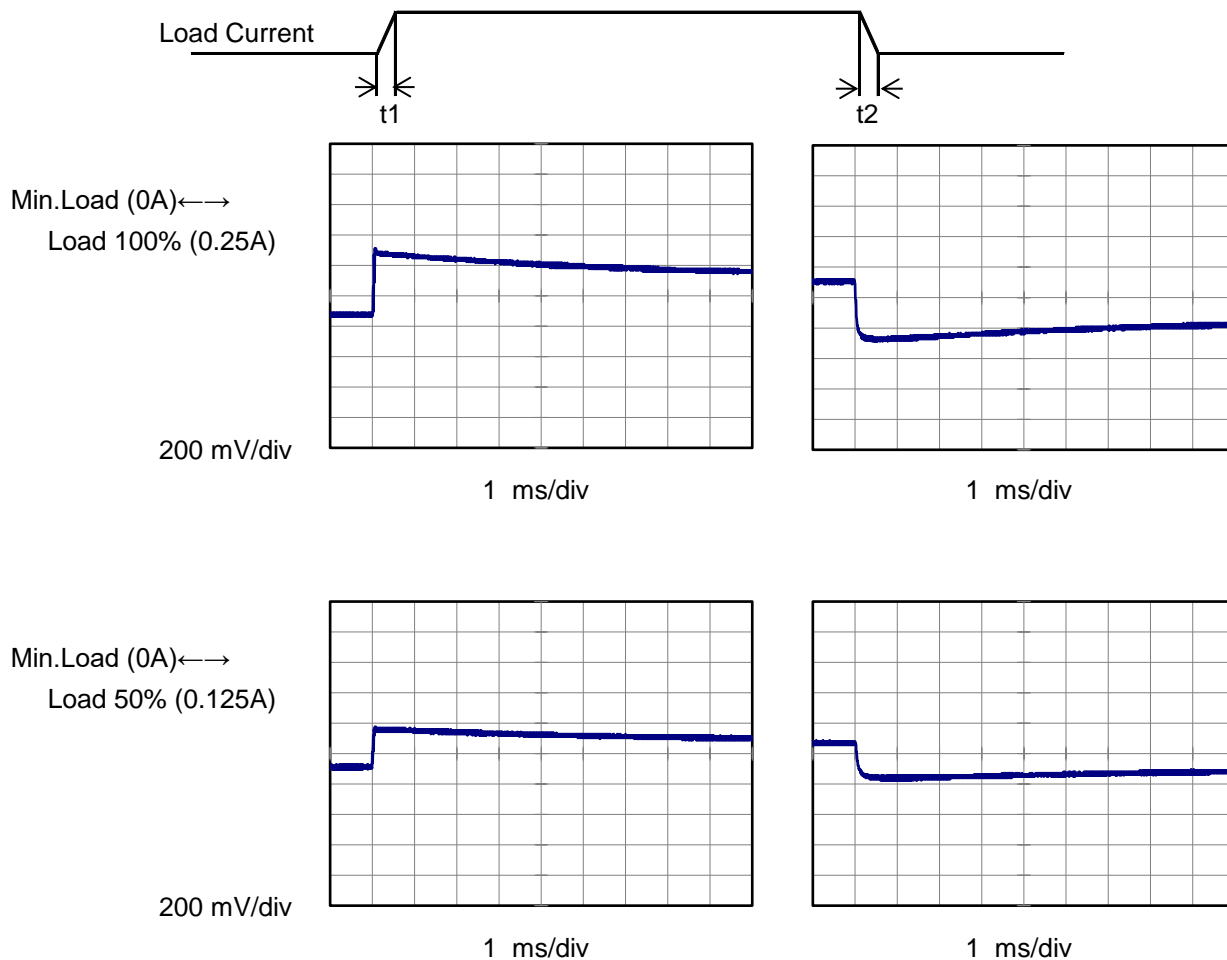
Model	MHFW61212	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	-12V0.25A	

Input Volt. 12 V

+12V:rated load current.

Cycle 100 ms

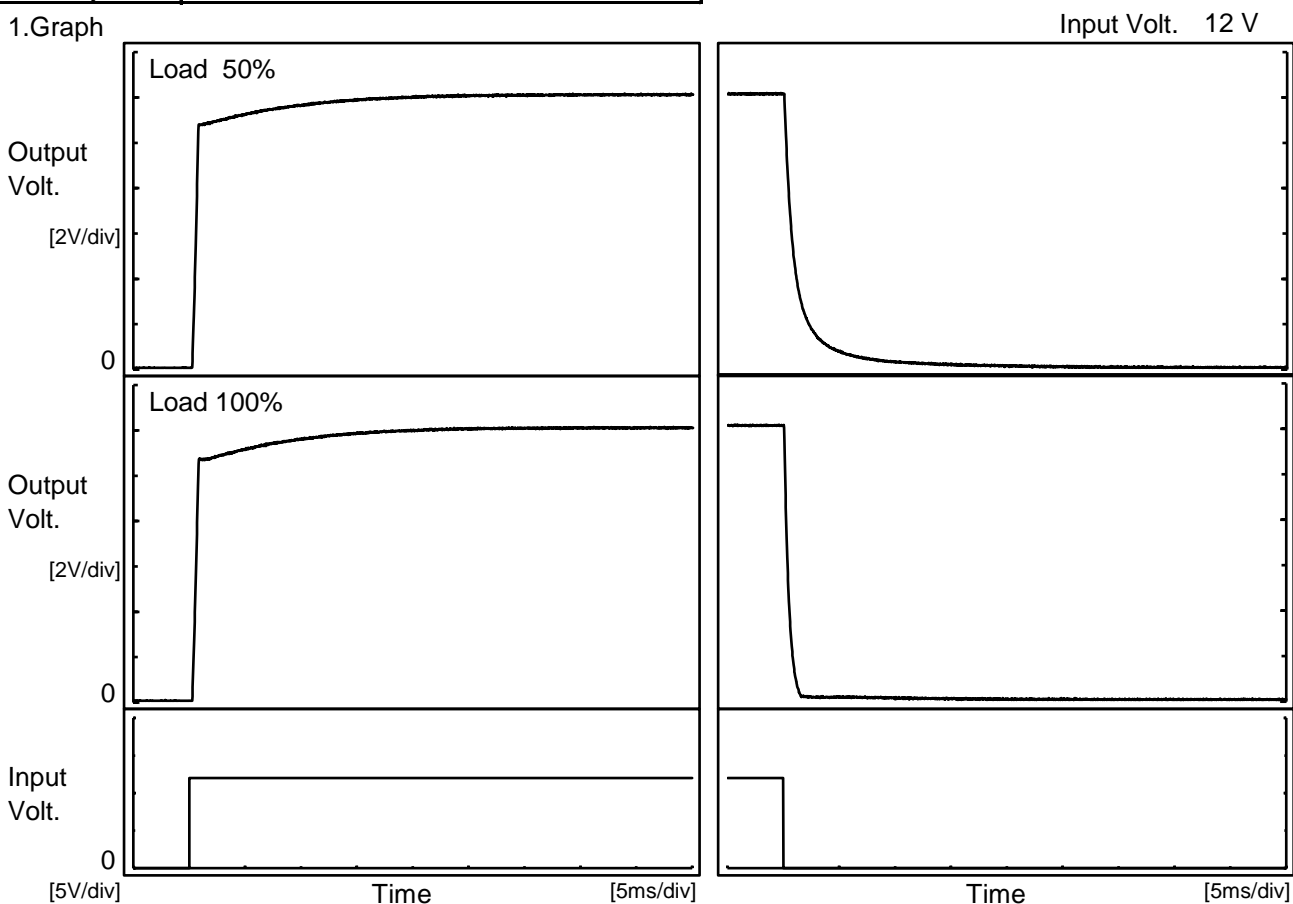
Response. $t_1=t_2=50\mu\text{s}$. Typ





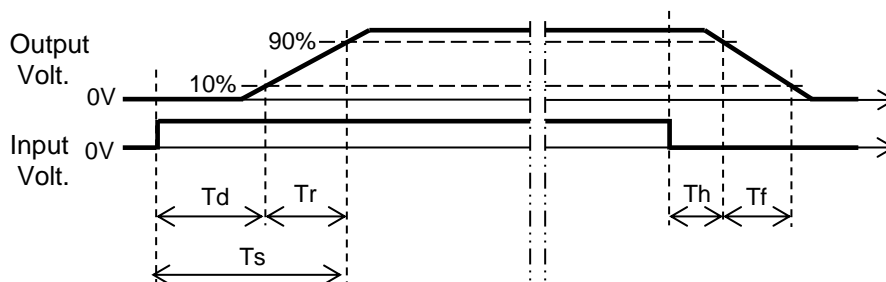
Model	MHFW61212	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.25A		

1.Graph



2.Values

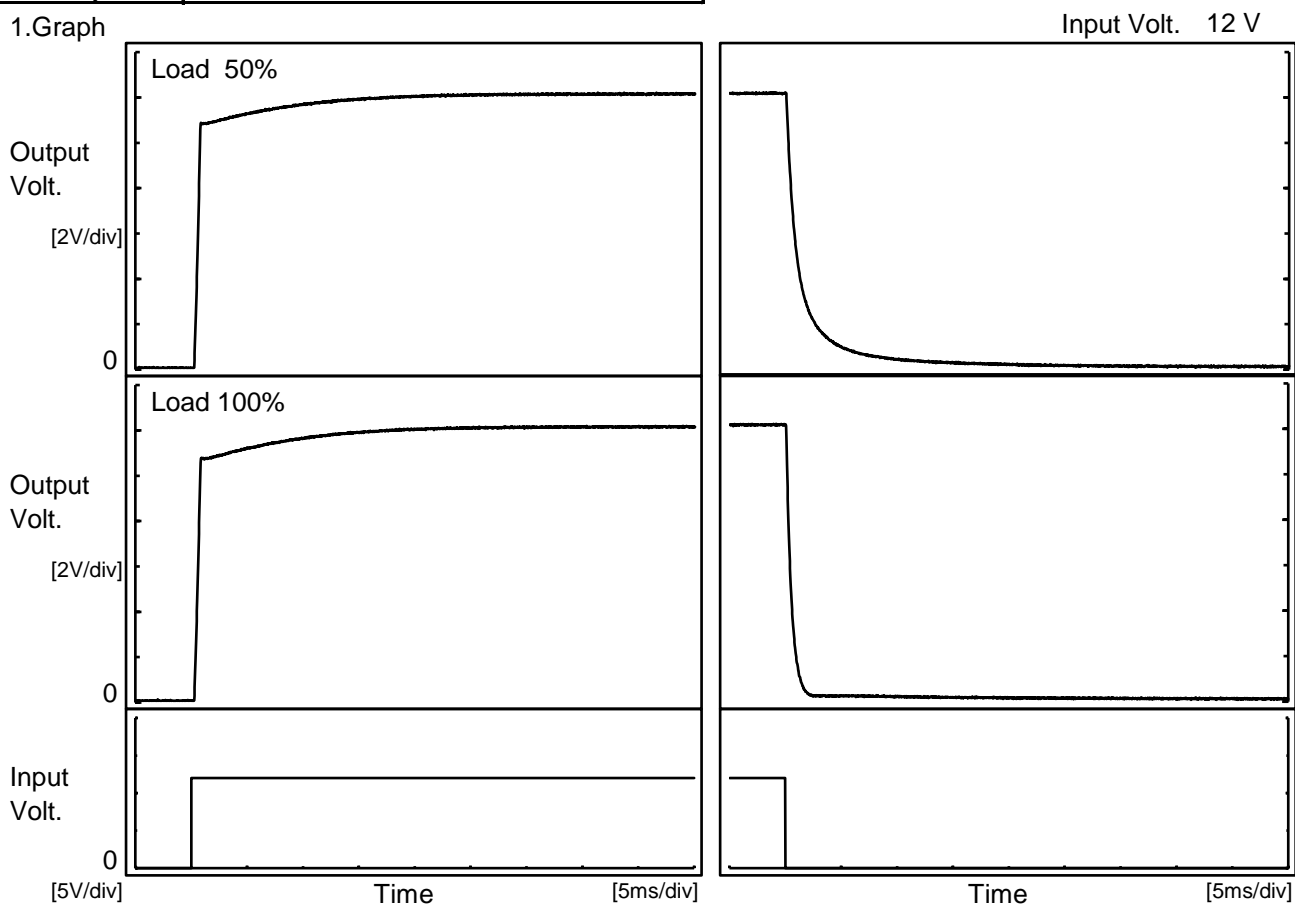
		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		0.4	1.3	1.7	0.2	3.2
100 %		0.4	2.3	2.7	0.1	0.9





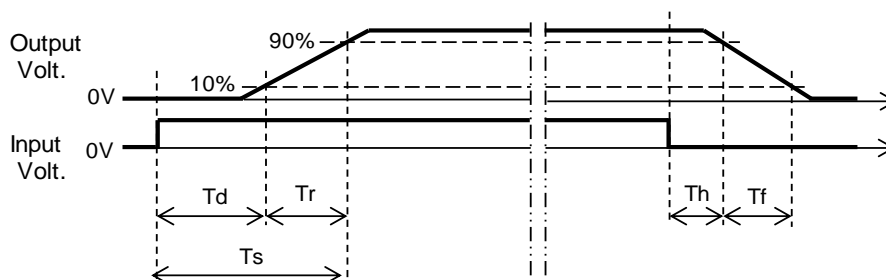
Model	MHFW61212	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.25A		

1.Graph

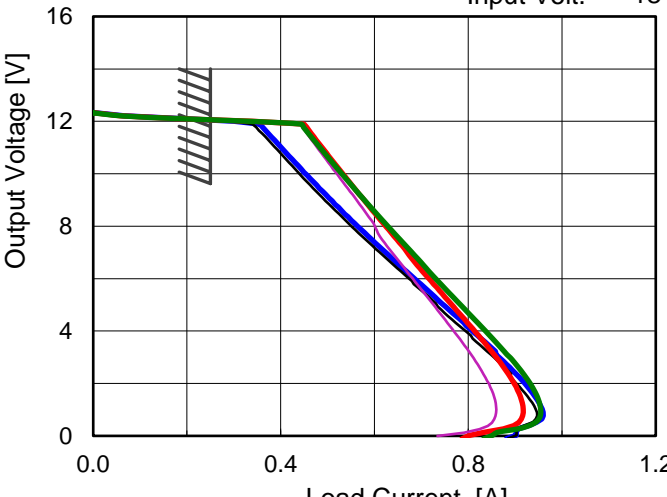
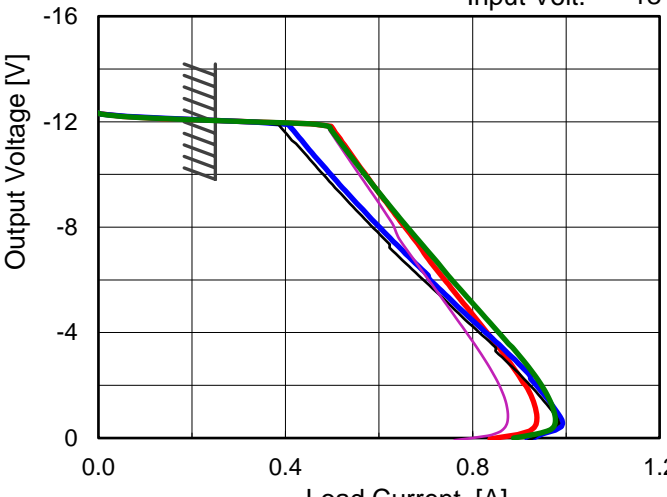


2.Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		0.4	0.5	0.9	0.2	3.9
100 %		0.4	2.0	2.4	0.1	1.1





Model		MHFW61212		Temperature 25°C	
Item		Overcurrent Protection		Testing Circuitry Figure A	
Object		+12V0.25A		2.Values	
1.Graph		<div><div><div></div><div>Input Volt. 4.5V</div></div><div><div></div><div>Input Volt. 5V</div></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> 			
Object		-12V0.25A		2.Values	
1.Graph		<div><div><div></div><div>Input Volt. 4.5V</div></div><div><div></div><div>Input Volt. 5V</div></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> 			
		Note: Slanted line shows the range of the rated load current.		Maximum output current at 4.5V input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.	

Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
11.4	0.368	0.380	0.465	0.471	0.461
10.8	0.294	0.300	0.335	0.339	0.481
9.6	0.456	0.470	0.545	0.546	0.533
8.4	0.524	0.537	0.605	0.602	0.584
7.2	0.596	0.608	0.667	0.659	0.627
6.0	0.672	0.683	0.729	0.715	0.681
4.8	0.742	0.759	0.794	0.774	0.729
3.6	0.809	0.828	0.852	0.828	0.782
2.4	0.885	0.895	0.913	0.881	0.829
1.2	0.936	0.951	0.952	0.915	0.859
0.0	0.885	0.882	0.833	0.786	0.735

-12V:Rated Load Current

Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-11.4	0.408	0.429	0.512	0.517	0.503
-10.8	0.440	0.457	0.532	0.536	0.252
-9.6	0.500	0.516	0.584	0.585	0.572
-8.4	0.563	0.578	0.639	0.636	0.617
-7.2	0.622	0.643	0.696	0.688	0.656
-6.0	0.693	0.707	0.753	0.738	0.705
-4.8	0.763	0.776	0.812	0.792	0.754
-3.6	0.836	0.849	0.872	0.846	0.802
-2.4	0.898	0.917	0.929	0.895	0.845
-1.2	0.959	0.969	0.969	0.933	0.873
0.0	0.918	0.916	0.888	0.837	0.761

+12V:Rated Load Current

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COSEL

		Testing Circuitry Figure A
Model	MHFW61212	
Item	Ambient Temperature Drift	
Object	+12V0.25A	

1.Values

Load 100%

Ambient Temperature[°C]	Output Voltage [V]				
	Input Volt. 4.5V*1	Input Volt. 5V	Input Volt. 9V	Input Volt. 12V	Input Volt. 18V
-40	12.003	12.004	12.013	12.017	12.019
25	12.053	12.048	12.058	12.060	12.062
55	12.049	12.044	12.055	12.057	12.058

*1 Load 80%

-12V:Rated Load Current

Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A
Object	+12V0.25A	

1.Values

Ambient Temperature[°C]	Input Voltage [V]	
	Load 50%	Load 80%
-40	3.6	3.6
25	3.5	3.7
55	3.5	3.6

COSEL

		Testing Circuitry Figure A
Model	MHFW61212	
Item	Ambient Temperature Drift	
Object	-12V0.25A	

1.Values

Load 100%

Ambient Temperature[°C]	Output Voltage [V]				
	Input Volt. 4.5V*1	Input Volt. 5V	Input Volt. 9V	Input Volt. 12V	Input Volt. 18V
-40	-12.031	-12.037	-12.032	-12.031	-12.030
25	-12.080	-12.083	-12.075	-12.073	-12.071
55	-12.079	-12.079	-12.071	-12.068	-12.066

*1 Load 80%

+12V:Rated Load Current

Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A
Object	-12V0.25A	

1.Values

Ambient Temperature[°C]	Input Voltage [V]	
	Load 50%	Load 80%
-40	3.6	3.6
25	3.5	3.8
55	3.5	3.6

Model		MHFW61212	Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)	Testing Circuitry Figure A																																																																														
Object		+/-12V0.25A																																																																															
1.Graph		<div><div><div>—△—</div>Input Volt. 4.5V</div><div><div>---□---</div>Input Volt. 5V</div><div><div>-·-*·-</div>Input Volt. 9V</div><div><div>-·-○-</div>Input Volt. 12V</div><div><div>--◇--</div>Input Volt. 18V</div></div> <p>Switching Frequency [kHz]</p> <p>Load Current [A]</p>	2.Values																																																																														
			<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Switching Frequency [kHz]</th></tr><tr><th>Input Volt. 4.5[V]</th><th>Input Volt. 5[V]</th><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>0.00</td><td>1121</td><td>1155</td><td>1233</td><td>1151</td><td>1095</td></tr><tr><td>0.05</td><td>610</td><td>639</td><td>839</td><td>904</td><td>959</td></tr><tr><td>0.10</td><td>413</td><td>444</td><td>629</td><td>692</td><td>765</td></tr><tr><td>0.15</td><td>307</td><td>337</td><td>500</td><td>564</td><td>636</td></tr><tr><td>0.20</td><td>245</td><td>270</td><td>417</td><td>477</td><td>545</td></tr><tr><td>0.23</td><td>221</td><td>244</td><td>384</td><td>443</td><td>509</td></tr><tr><td>0.25</td><td>*1</td><td>223</td><td>356</td><td>413</td><td>477</td></tr><tr><td>0.28</td><td>*1</td><td>205</td><td>332</td><td>387</td><td>450</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]	Switching Frequency [kHz]					Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.00	1121	1155	1233	1151	1095	0.05	610	639	839	904	959	0.10	413	444	629	692	765	0.15	307	337	500	564	636	0.20	245	270	417	477	545	0.23	221	244	384	443	509	0.25	*1	223	356	413	477	0.28	*1	205	332	387	450	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Current [A]	Switching Frequency [kHz]																																																																																
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]																																																																												
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Note: Slanted line shows the range of the rated load current.																																																																																	
When load current is low, MH operates intermittently, so switching frequency would not become constant.																																																																																	
				<p>*1 Maximum output current at 4.5V input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.</p>																																																																													

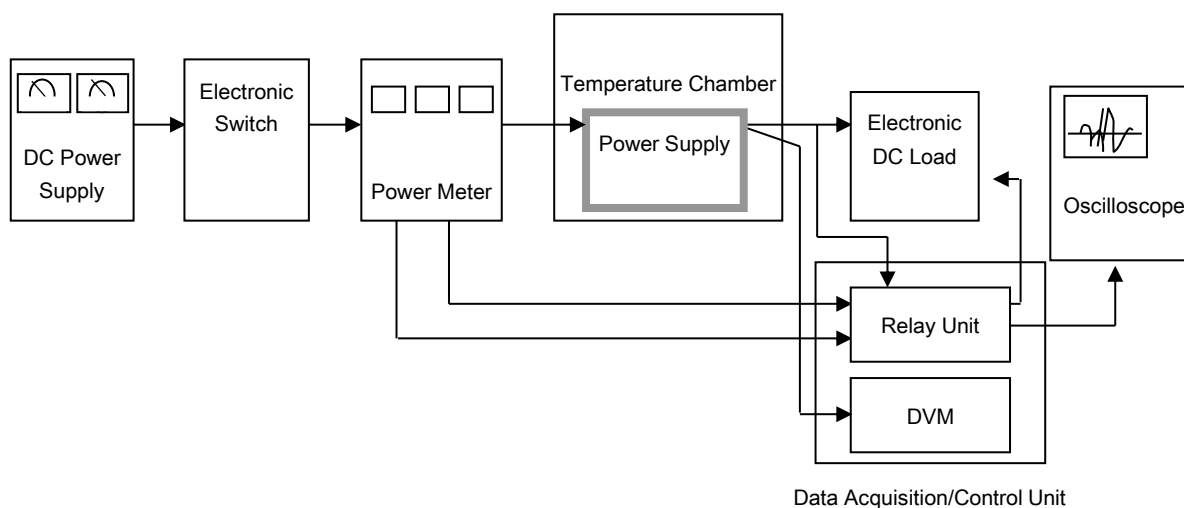


Figure A

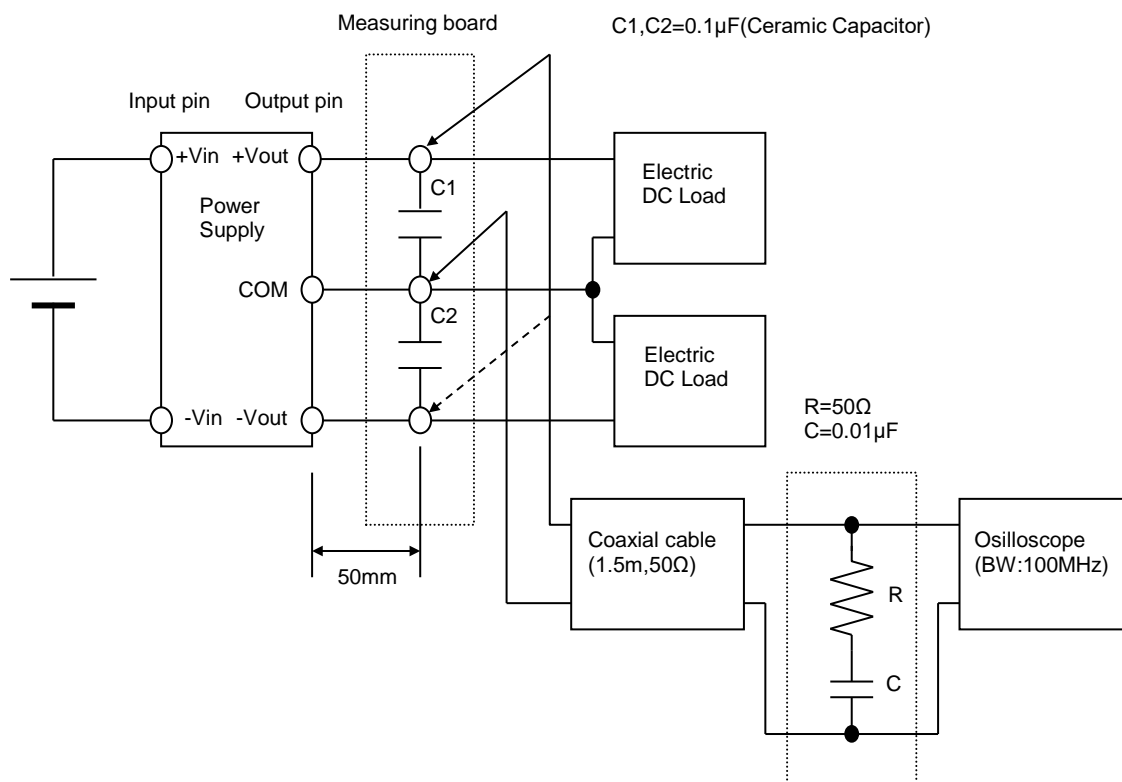


Figure B