

TEST DATA OF MMC100B-2

Regulated DC Power Supply
April 5, 2011

Approved by : Naoki Tonami
Naoki Tonami Design Manager

Prepared by : Hironobu Shimizu
Hironobu Shimizu Design Engineer

COSEL CO.,LTD.

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Model		MMC100B-2		Temperature 25°C																																																				
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
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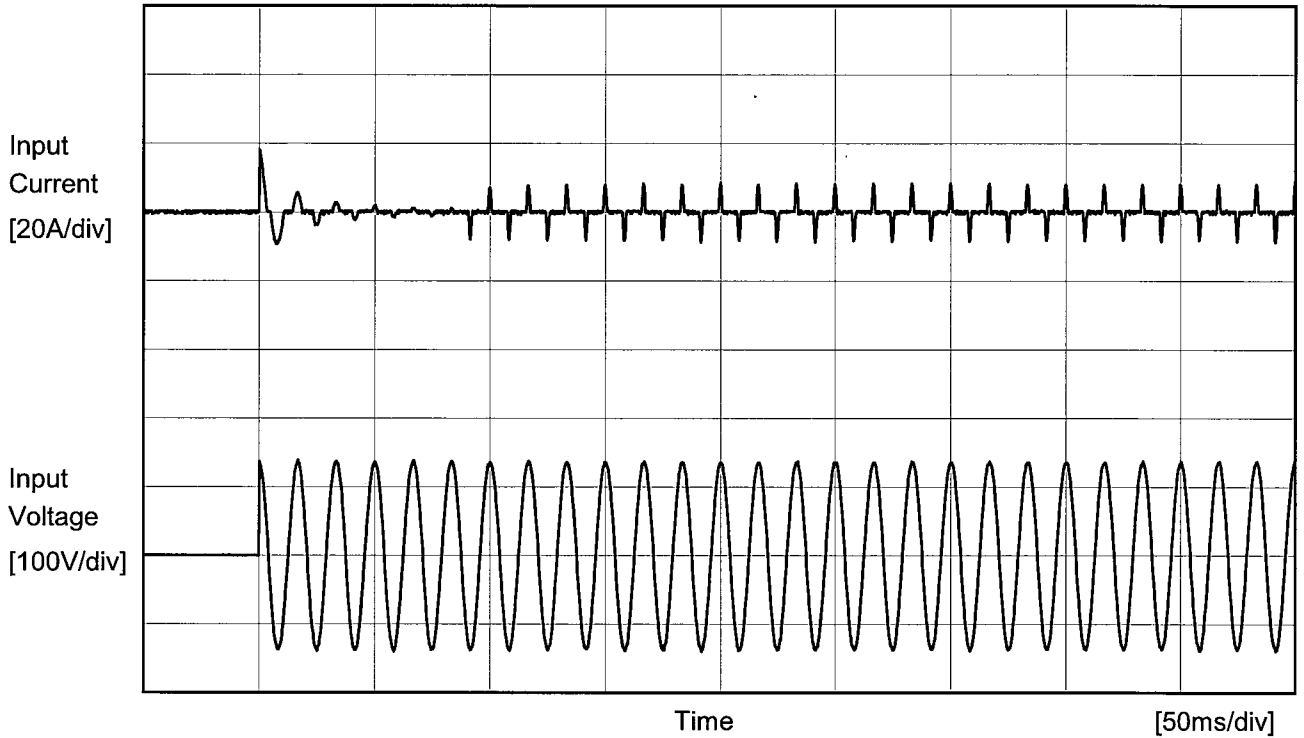
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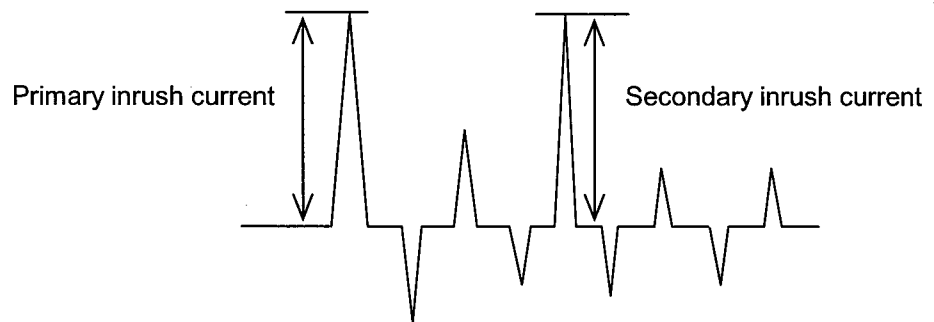


Model		MMC100B-2	
Item		Temperature	25°C
Object		Testing Circuitry	Figure A



Input Voltage 100 V
 Frequency 60 Hz
 Load 100 %

Primary inrush current 17.9 A
 Secondary inrush current 8.7 A





COSEL		
Model	MMC100B-2	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	_____	

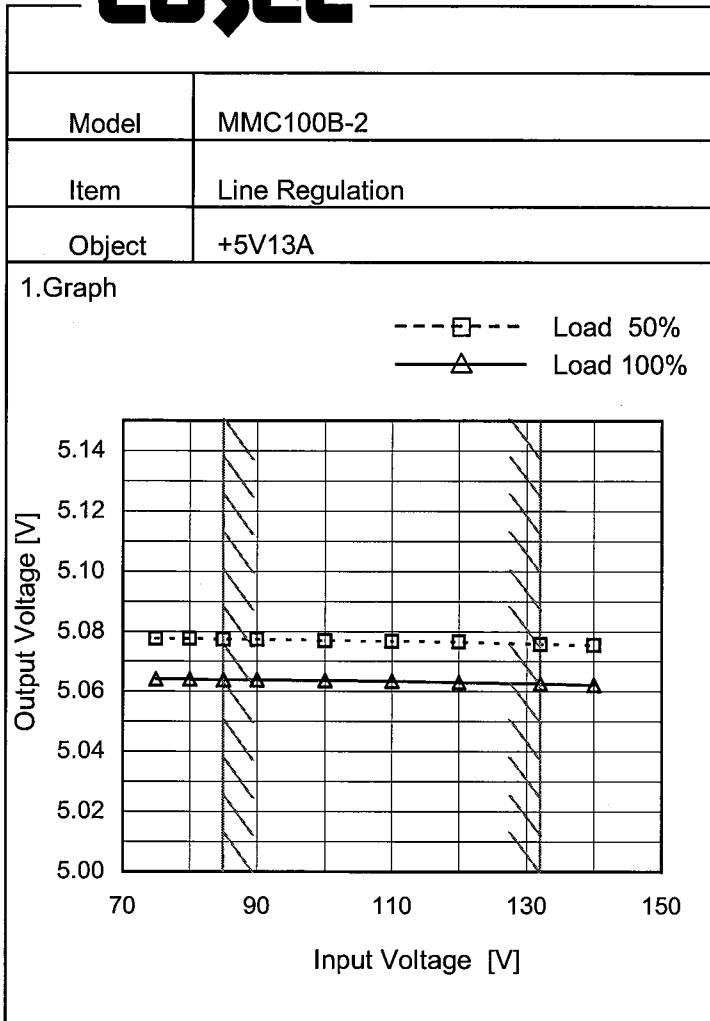
1.Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A)DEN-AN	0.15	0.18	0.22
(B)IEC60950-1	0.15	0.19	0.25

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B)IEC60950-1	-	-	-

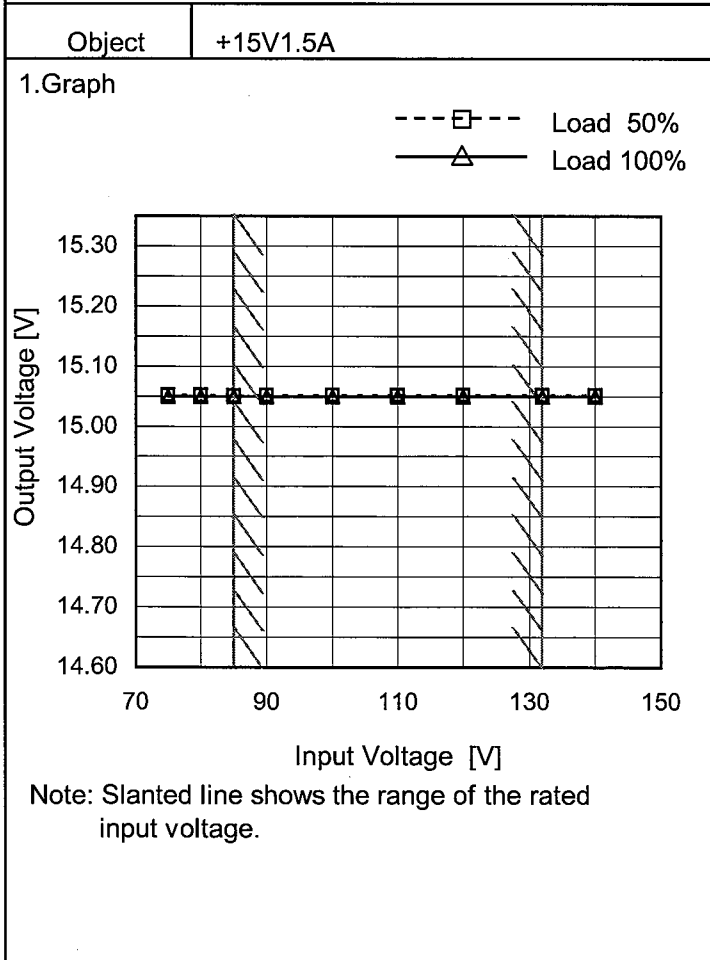
2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.



2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	5.078	5.064
80	5.078	5.064
85	5.077	5.064
90	5.077	5.064
100	5.077	5.064
110	5.077	5.063
120	5.076	5.063
132	5.076	5.063
140	5.075	5.062



2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	15.051	15.050
80	15.051	15.050
85	15.051	15.050
90	15.051	15.050
100	15.051	15.050
110	15.052	15.050
120	15.051	15.050
132	15.051	15.050
140	15.051	15.050



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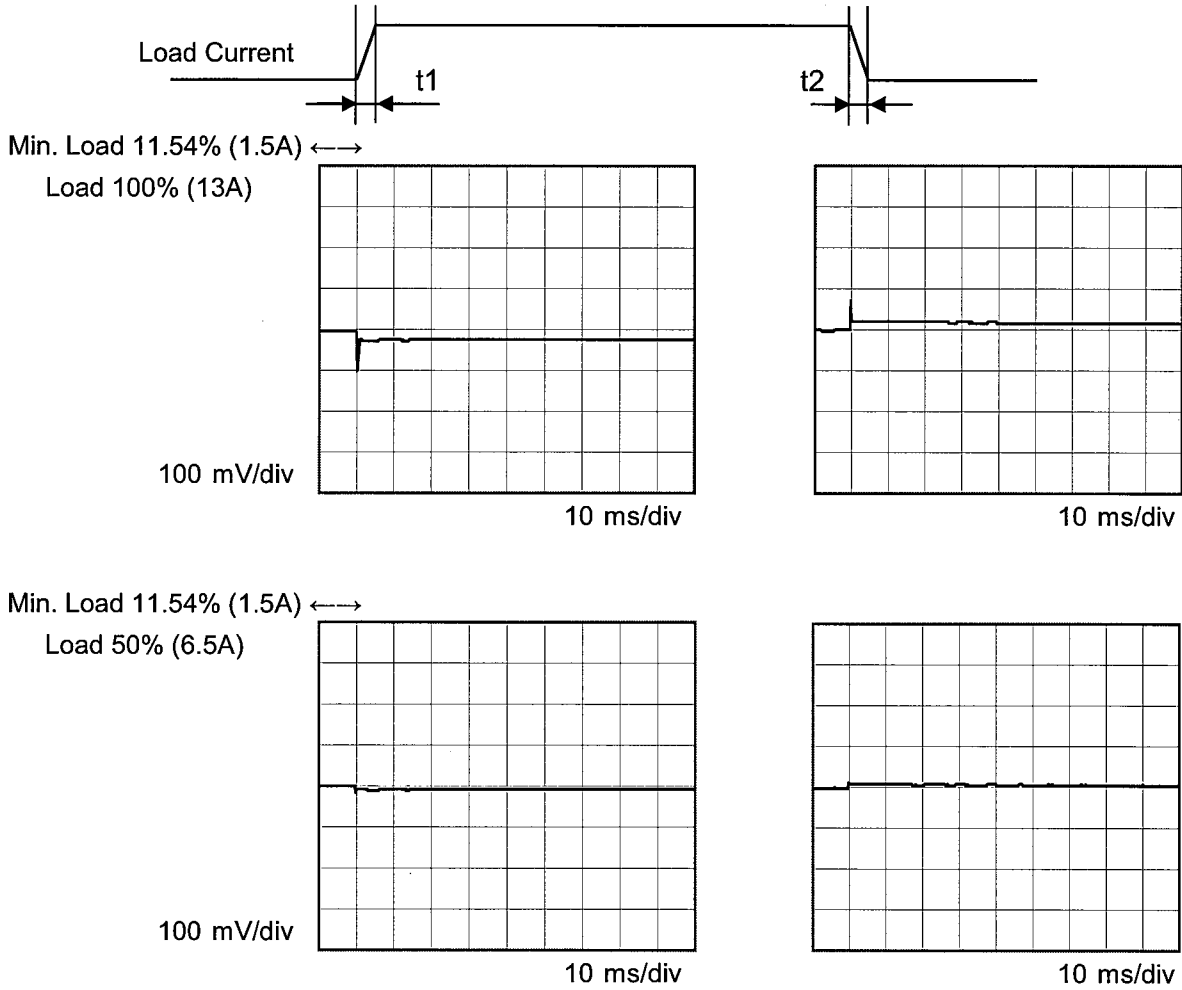
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Model	MMC100B-2	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+5V13A		

Input Volt. 100 V
Cycle 200 ms

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





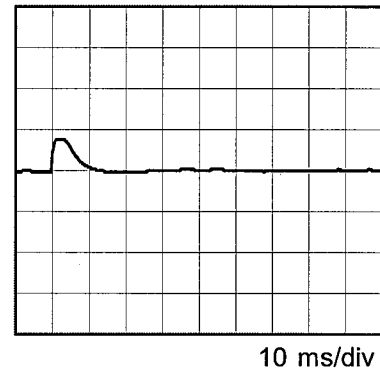
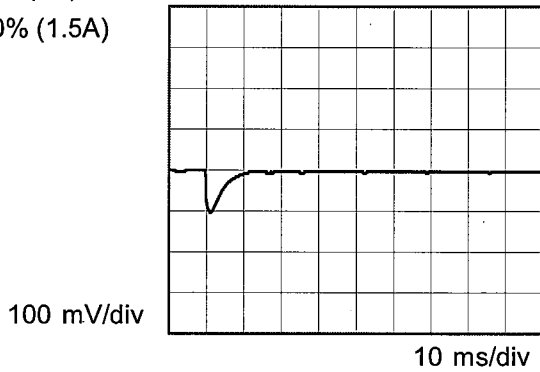
Model	MMC100B-2	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V1.5A		

Input Volt. 100 V
Cycle 200 ms

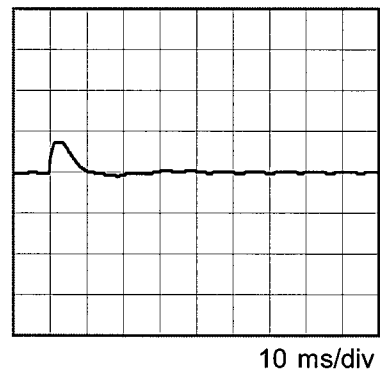
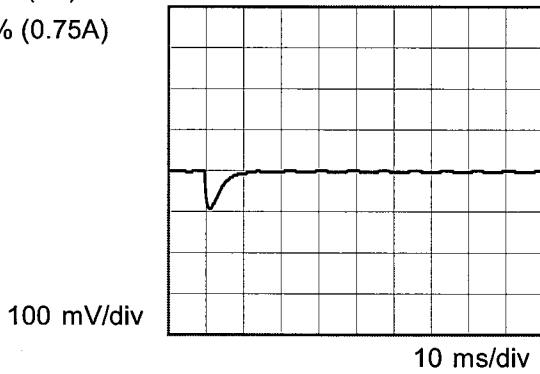
Response. $t_1=t_2=50\mu\text{s}$. Typ



Min. Load 0% (0A) \longleftrightarrow
Load 100% (1.5A)



Min. Load 0% (0A) \longleftrightarrow
Load 50% (0.75A)

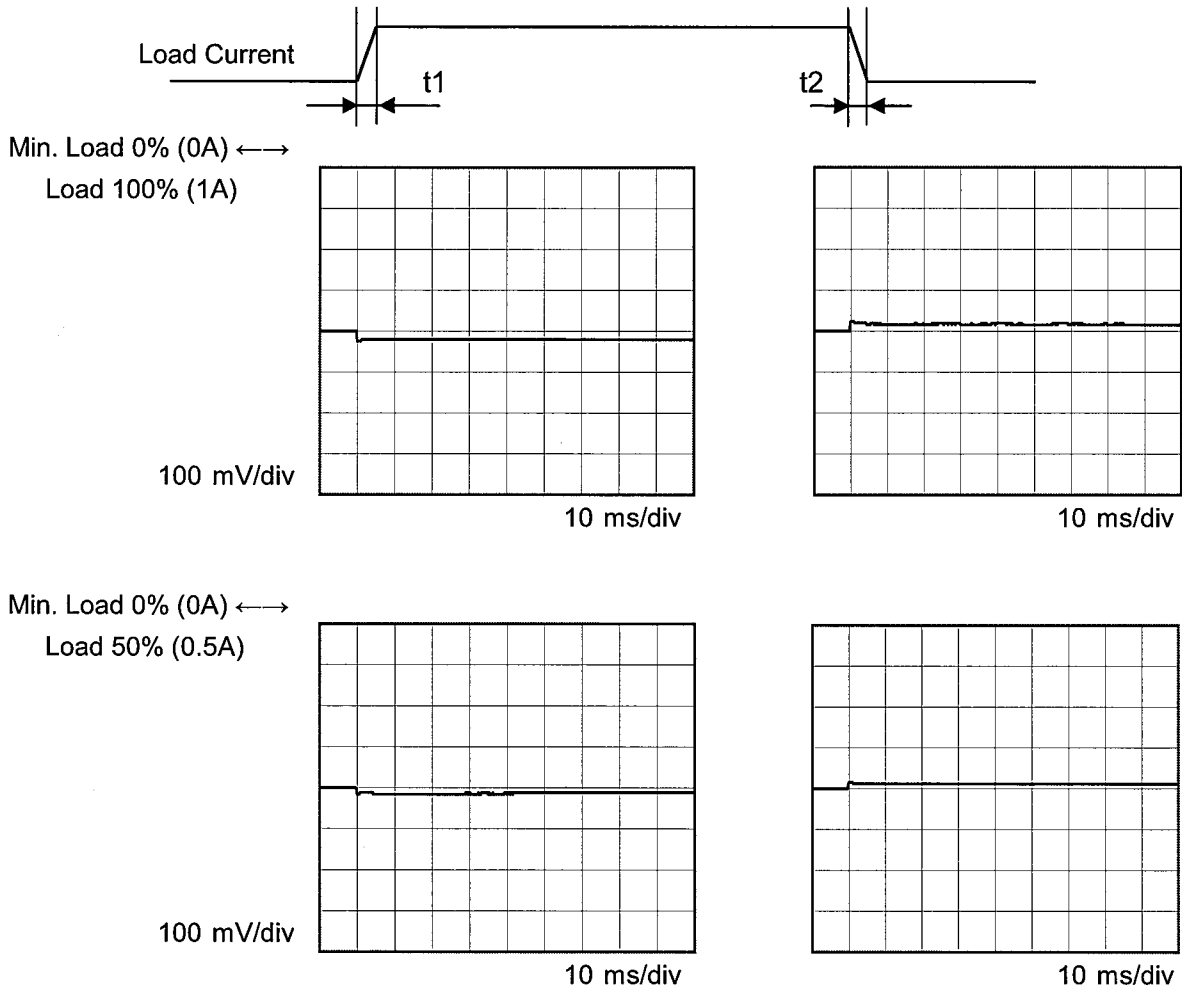




Model	MMC100B-2	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-15V1A		

Input Volt. 100 V
Cycle 200 ms

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





Model		MMC100B-2																																							
Item		Ripple Voltage (by Load Current)																																							
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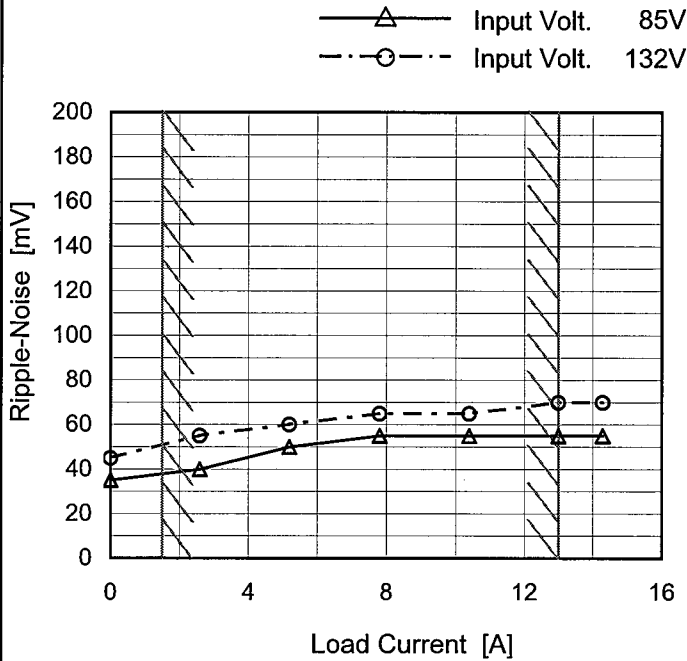


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Model	MMC100B-2	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure A
Object	+5V13A		

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0.0	35	45
2.6	40	55
5.2	50	60
7.8	55	65
10.4	55	65
13.0	55	70
14.3	55	70
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.
 Ripple-Noise is shown as p-p in the figure below.
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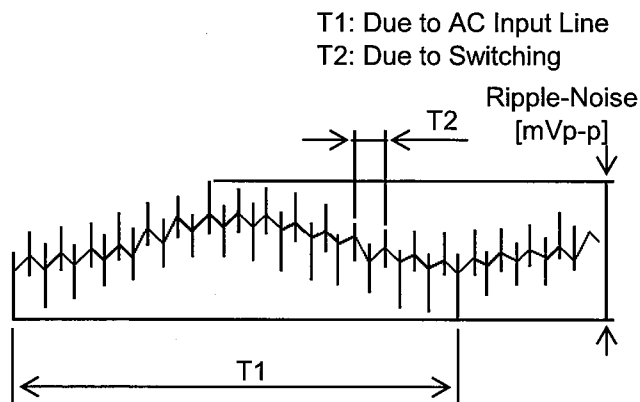


Fig. Complex Ripple Wave Form



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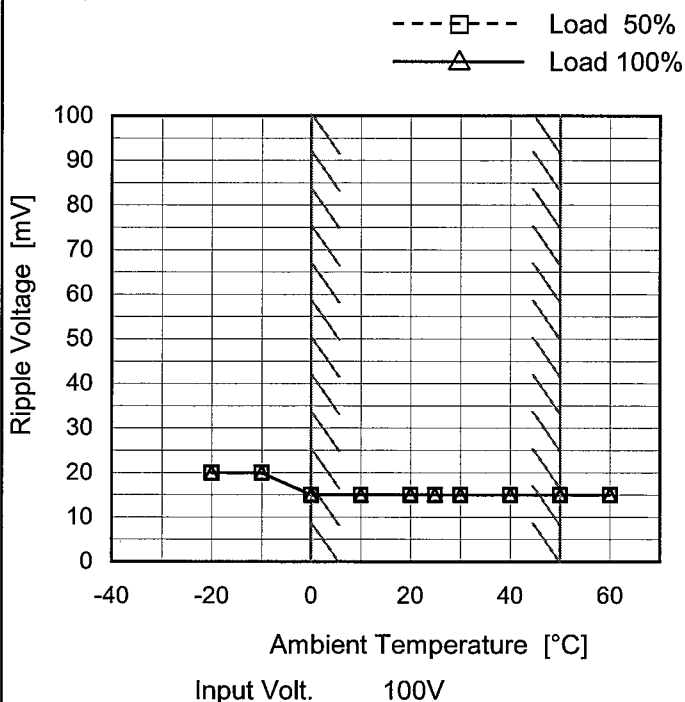
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Model	MMC100B-2
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V13A

Testing Circuitry Figure A

1.Graph

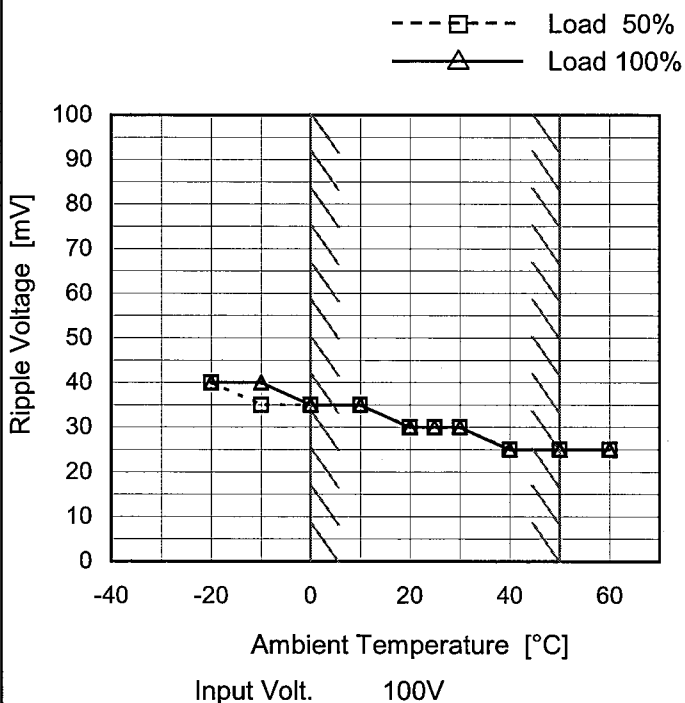


2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	20	20
-10	20	20
0	15	15
10	15	15
20	15	15
25	15	15
30	15	15
40	15	15
50	15	15
60	15	15
--	-	-

Object	+15V1.5A
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1.Graph



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	40	40
-10	35	40
0	35	35
10	35	35
20	30	30
25	30	30
30	30	30
40	25	25
50	25	25
60	25	25
--	-	-

Measured by 20 MHz Oscilloscope.

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



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COSEL		Testing Circuitry Figure A
Model	MMC100B-2	
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 : 0 - 50°C

Input Voltage : 85 - 132V

Load Current (AVR 1) : 1.5 - 13A (AVR 2) : 0 - 1.5A (AVR 3) : 0 - 1A

* 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	+5V13A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
			Maximum Voltage	40		
Minimum Voltage	0	132	13	5.062		

Object	+15V1.5A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
			Maximum Voltage	50		
Minimum Voltage	0	100	1.5	15.030		

Object	-15V1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
			Maximum Voltage	50		
Minimum Voltage	0	132	0	-14.870		



COSEL																									
Model	MMC100B-2	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+5V13A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 100V 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>5.064</td></tr> <tr><td>0.5</td><td>5.064</td></tr> <tr><td>1.0</td><td>5.064</td></tr> <tr><td>2.0</td><td>5.064</td></tr> <tr><td>3.0</td><td>5.064</td></tr> <tr><td>4.0</td><td>5.064</td></tr> <tr><td>5.0</td><td>5.064</td></tr> <tr><td>6.0</td><td>5.064</td></tr> <tr><td>7.0</td><td>5.064</td></tr> <tr><td>8.0</td><td>5.064</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	5.064	0.5	5.064	1.0	5.064	2.0	5.064	3.0	5.064	4.0	5.064	5.0	5.064	6.0	5.064	7.0	5.064	8.0	5.064
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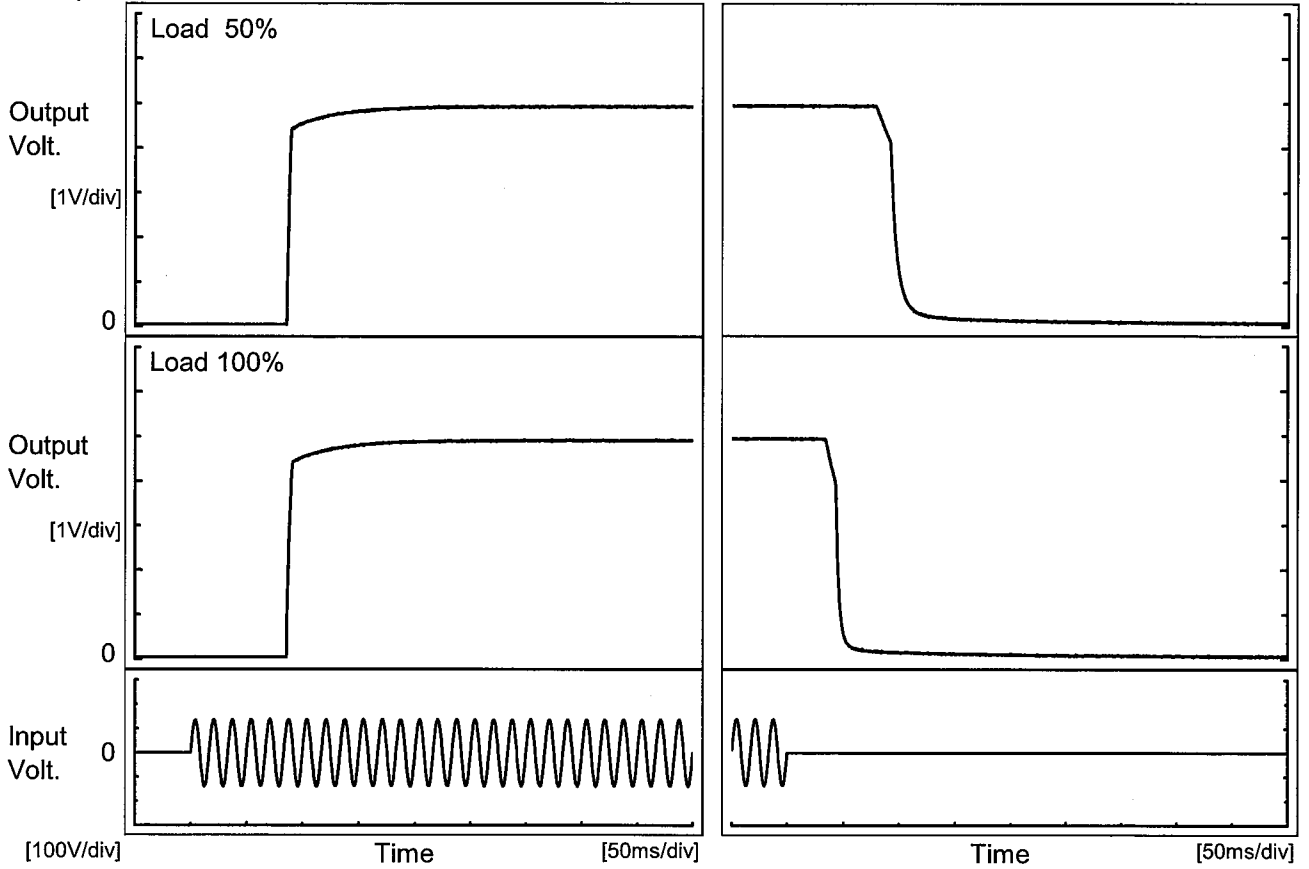
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Model	MMC100B-2	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+5V13A		

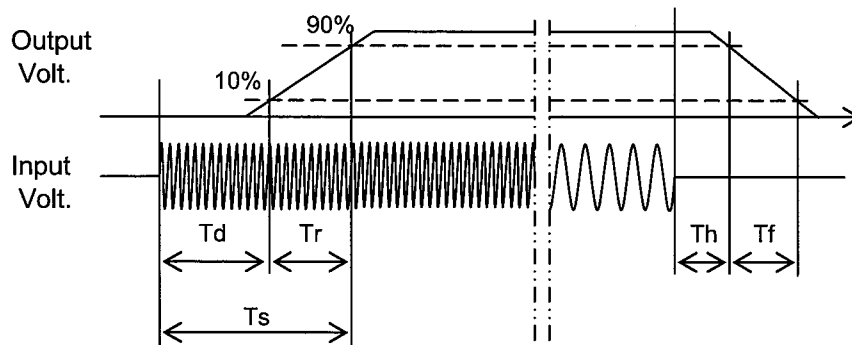
1. Graph

Input Volt. 100 V



2. Values

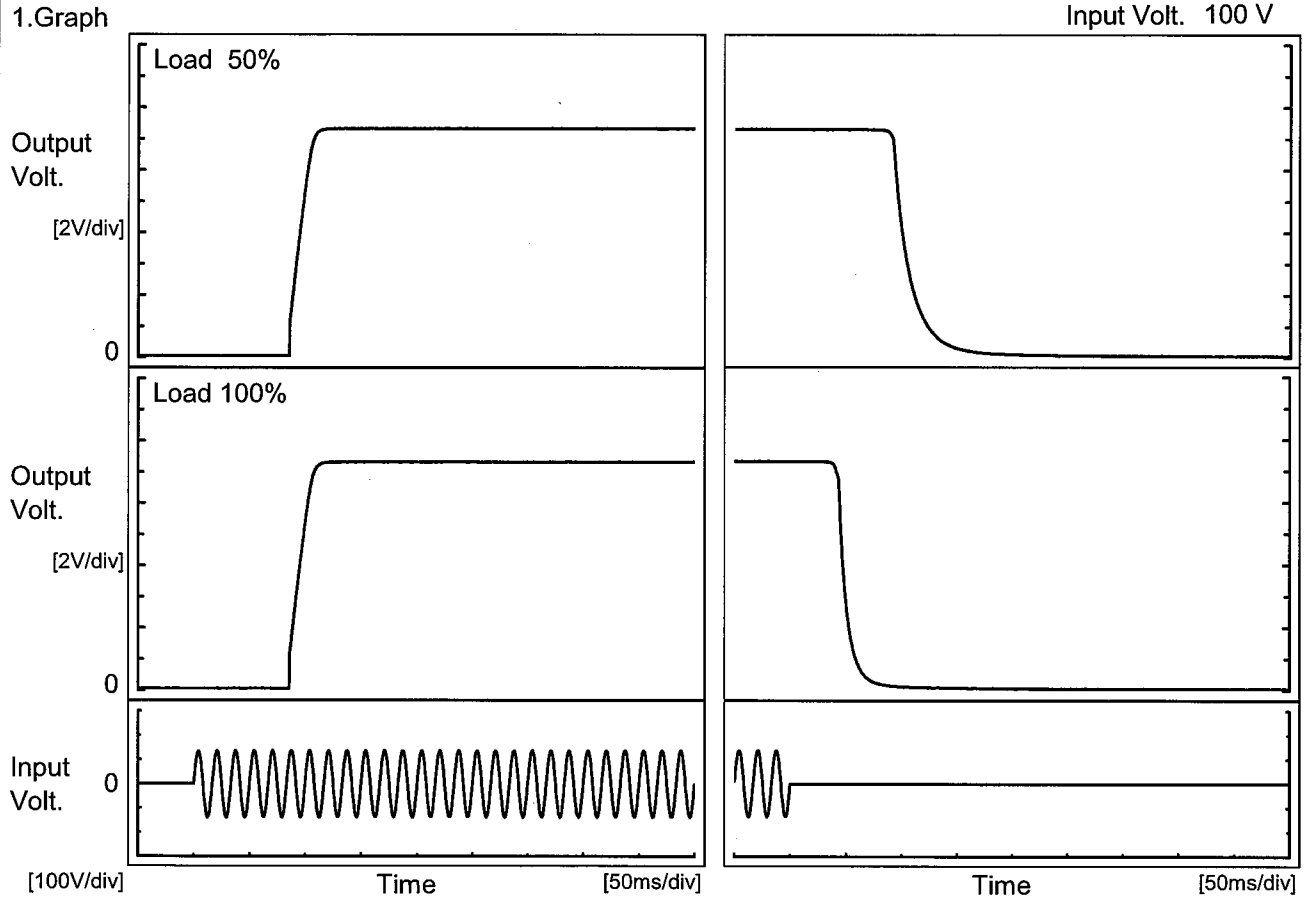
Load \ Time	Td	Tr	Ts	Th	Tf
50 %	86.0	13.0	99.0	84.8	22.3
100 %	86.0	14.0	100.0	37.3	13.0





Model	MMC100B-2	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V1.5A		

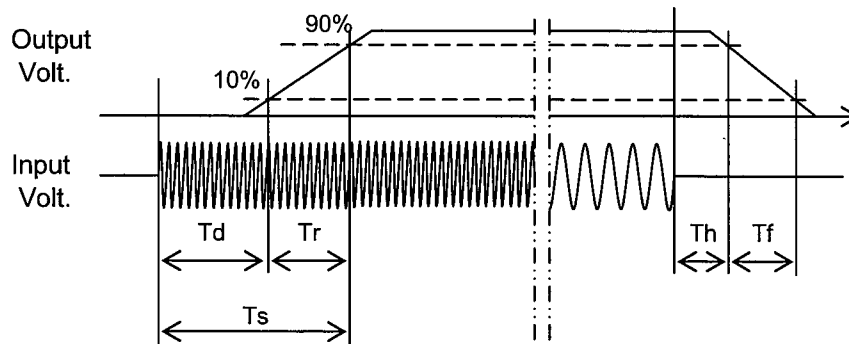
1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		86.0	20.3	106.3	92.3	35.5
100 %		86.0	20.5	106.5	43.0	18.3

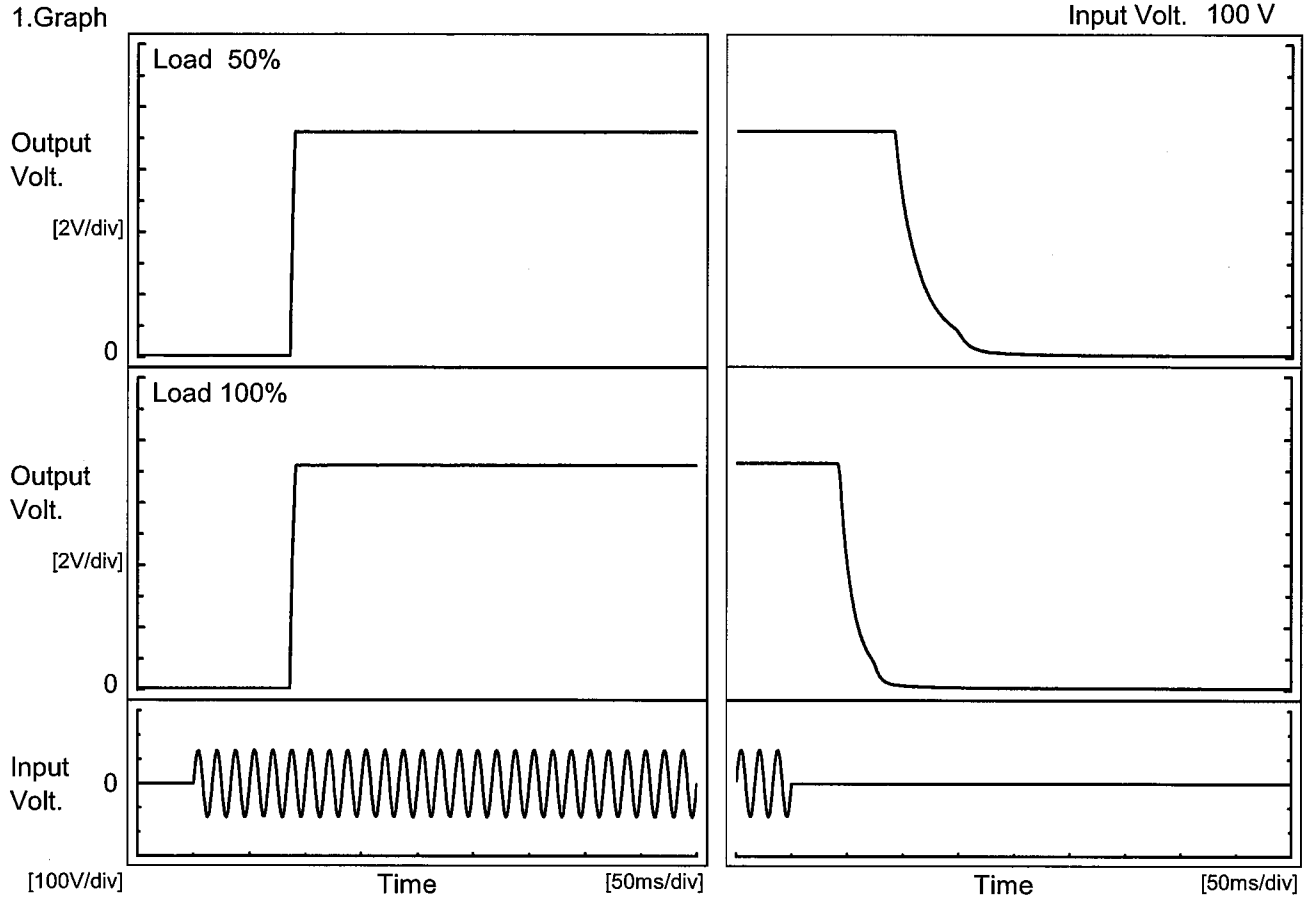
[ms]





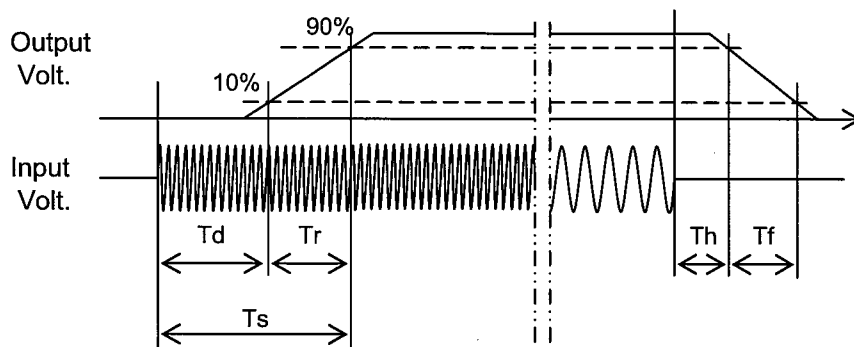
Model	MMC100B-2	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-15V1A		

1. Graph



2. Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		86.3	3.3	89.6	93.3	56.3
100 %		86.3	4.3	90.6	43.5	31.5





Model		MMC100B-2																																	
Item		Hold-Up Time																																	
Object		+5V13A																																	
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Input Voltage [V]	Hold-Up Time [ms]																																		
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<p>Model MMC100B-2</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
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<p>1.Graph</p> <p> Input Volt. 85V Input Volt. 100V Input Volt. 132V </p> <p style="text-align: center;">Load Current [A]</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</th> </tr> <tr> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2.0</td><td>54</td><td>91</td><td>190</td></tr> <tr><td>4.0</td><td>42</td><td>74</td><td>156</td></tr> <tr><td>6.0</td><td>35</td><td>61</td><td>132</td></tr> <tr><td>8.0</td><td>29</td><td>52</td><td>113</td></tr> <tr><td>10.0</td><td>22</td><td>44</td><td>99</td></tr> <tr><td>12.0</td><td>21</td><td>39</td><td>87</td></tr> <tr><td>13.0</td><td>19</td><td>36</td><td>82</td></tr> <tr><td>14.3</td><td>13</td><td>33</td><td>76</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	Time [ms]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.0	-	-	-	2.0	54	91	190	4.0	42	74	156	6.0	35	61	132	8.0	29	52	113	10.0	22	44	99	12.0	21	39	87	13.0	19	36	82	14.3	13	33	76	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
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Model		MMC100B-2		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		+15V1.5A																																																						
1.Graph		<p>—△— Input Volt. 85V</p> <p>- - □ - - Input Volt. 100V</p> <p>- · - ○ - · - Input Volt. 132V</p>		2.Values																																																				
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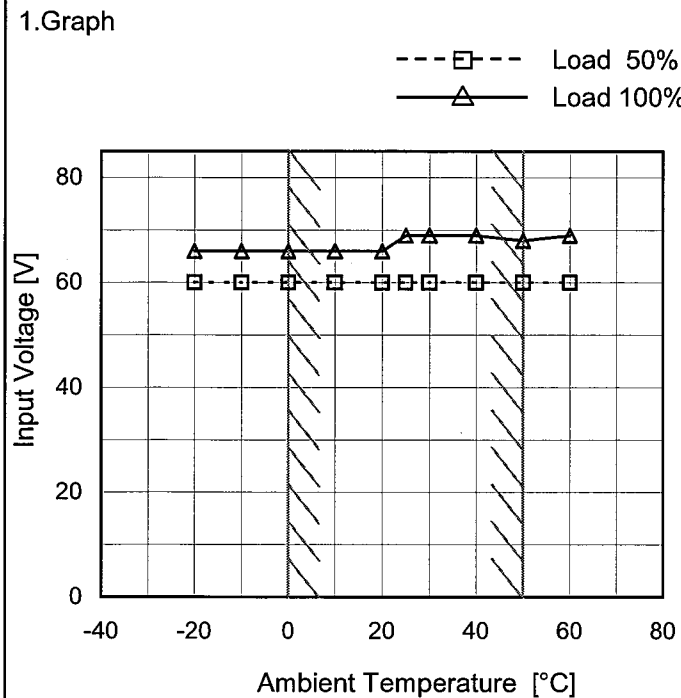


Model		MMC100B-2		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		-15V1A																																																						
1.Graph		<p>—△— Input Volt. 85V</p> <p>- - -□- - Input Volt. 100V</p> <p>- · -○- · - Input Volt. 132V</p>		2.Values																																																				
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Model	MMC100B-2
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V13A

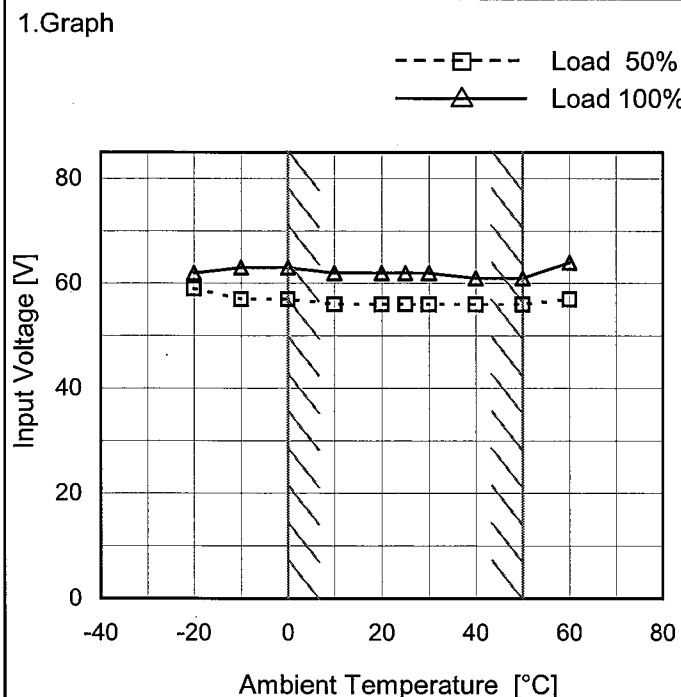
Testing Circuitry Figure A



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	60	66
-10	60	66
0	60	66
10	60	66
20	60	66
25	60	69
30	60	69
40	60	69
50	60	68
60	60	69
--	-	-

Object	+15V1.5A
--------	----------



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	59	62
-10	57	63
0	57	63
10	56	62
20	56	62
25	56	62
30	56	62
40	56	61
50	56	61
60	57	64
--	-	-

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



Model		MMC100B-2	Testing Circuitry Figure A																																						
Item		Minimum Input Voltage for Regulated Output Voltage																																							
Object		-15V1A																																							
1.Graph		<p>---□--- Load 50%</p> <p>—△— Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>	2.Values																																						
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COSEL																																																										
Model	MMC100B-2	Temperature	25°C																																																							
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<p>Model MMC100B-2</p> <p>Item Overcurrent Protection</p> <p>Object -15V1A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																							
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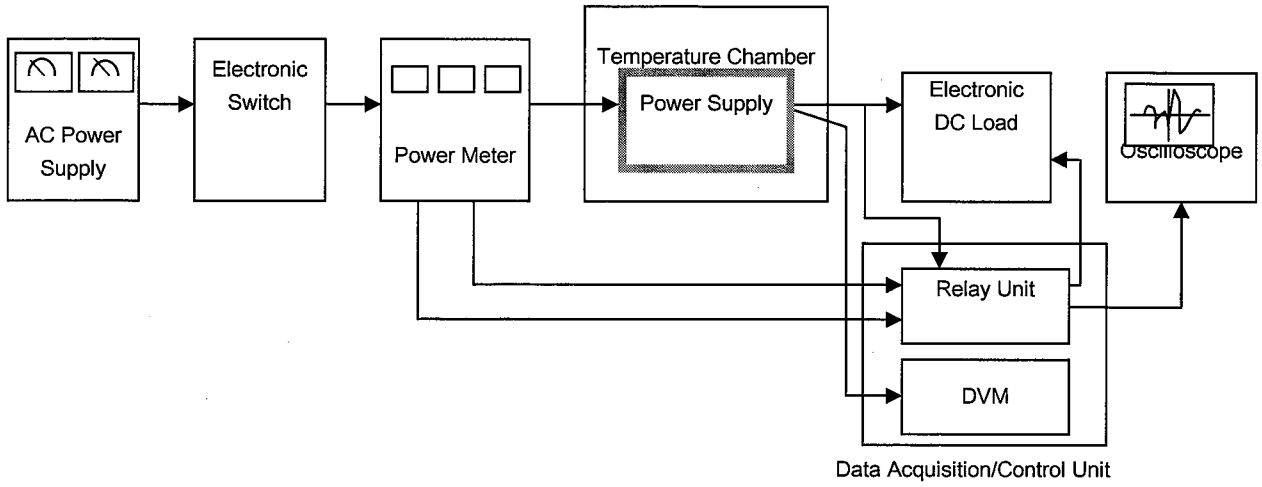


Figure A

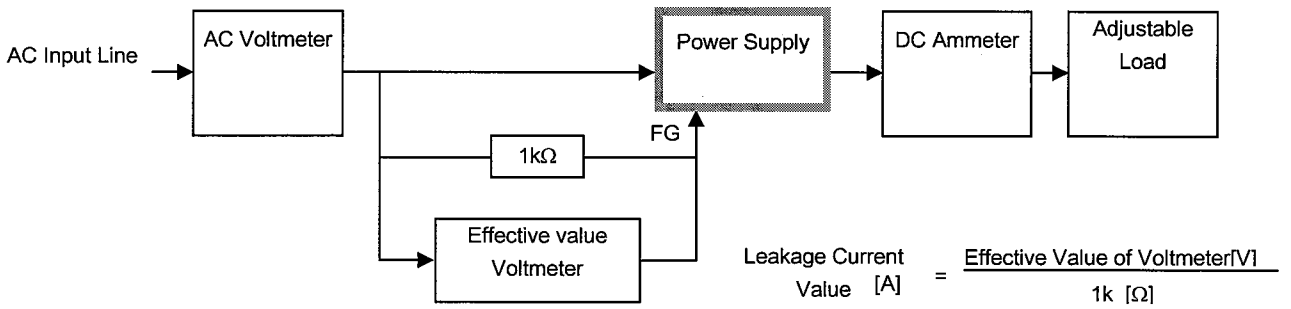


Figure B (DEN-AN)

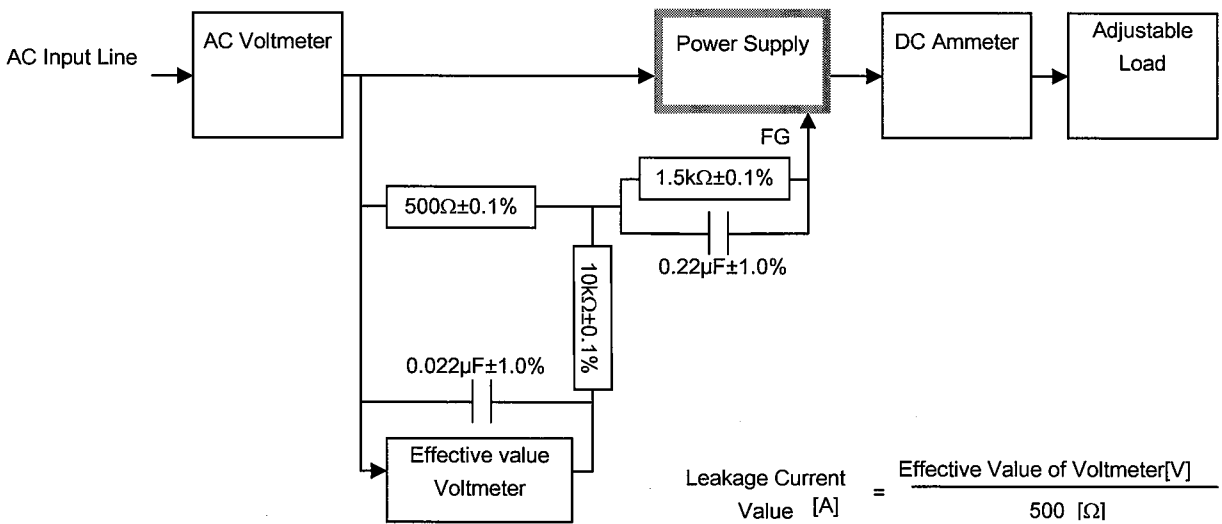


Figure B (IEC60950-1)