



TEST DATA OF MMC50A-1  
(100V INPUT)

Regulated DC Power Supply

Date : July 7, 1999

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Design Manager

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Design Engineer

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COSEL CO., LTD.

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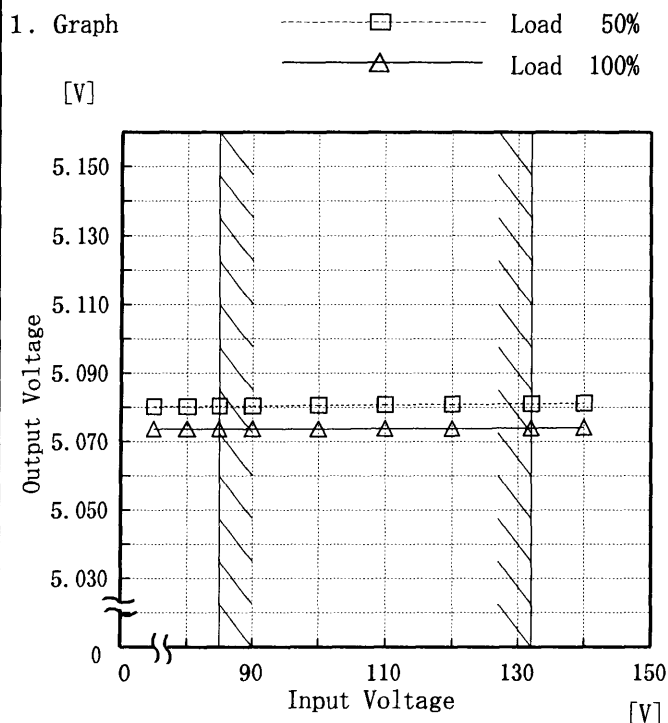
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Model	MMC50A-1
Item	Line Regulation 静的入力変動
Object	+5.0V5.00A

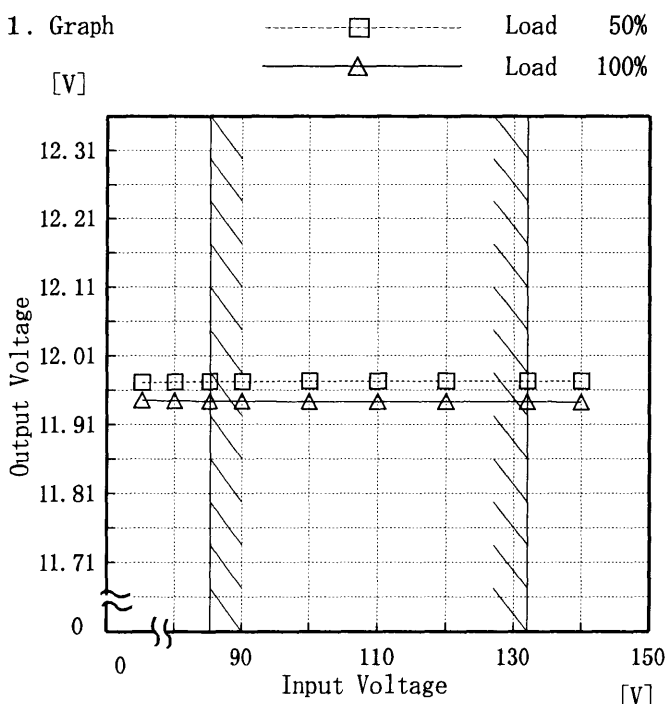
Temperature 25°C  
Testing Circuitry Figure A



2. Values

Input Voltage [V]	Load 50%	Load 100%
	Output Volt. [V]	Output Volt. [V]
75	5.080	5.074
80	5.080	5.074
85	5.080	5.074
90	5.080	5.074
100	5.081	5.074
110	5.081	5.074
120	5.081	5.074
132	5.081	5.074
140	5.081	5.074
—	—	—
—	—	—
—	—	—

Object	+12.0V1.50A
--------	-------------



2. Values

Input Voltage [V]	Load 50%	Load 100%
	Output Volt. [V]	Output Volt. [V]
75	11.972	11.946
80	11.972	11.945
85	11.973	11.944
90	11.973	11.944
100	11.973	11.944
110	11.973	11.943
120	11.973	11.943
132	11.974	11.943
140	11.974	11.943
—	—	—
—	—	—
—	—	—

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

(注)斜線は定格入力電圧範囲を示す。



Model		MMC50A-1		Temperature		25°C																																	
Item		Line Regulation 静的入力変動		Testing Circuitry		Figure A																																	
Object		-12.0V0.50A																																					
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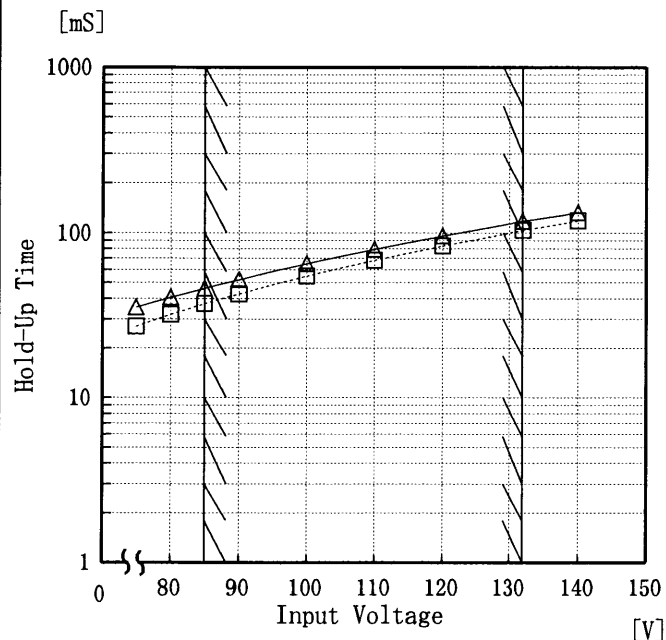




Model	MMC50A-1
Item	Hold-Up Time 出力保持時間
Object	-12.0V0.50A

Temperature 25°C  
Testing Circuitry Figure A

1. Graph —△— Load 50%  
- -□- - Load 100%



2. Values

Input Voltage [V]	Load 50%	Load 100%
	Hold-Up Time [mS]	Hold-Up Time [mS]
75	35	27
80	41	32
85	46	37
90	52	43
100	65	55
110	80	68
120	96	83
132	117	104
140	133	118

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

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

出力保持時間とは、入力電圧断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。

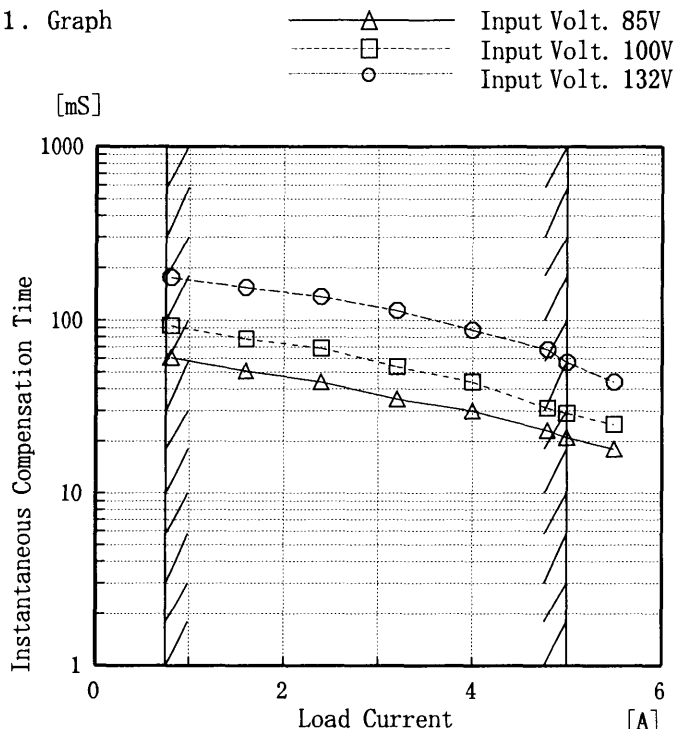
(注)斜線は定格入力電圧範囲を示す。



Model	MMC50A-1
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5.0V5.00A

Testing Circuitry Figure A

1. Graph



2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
0.8	61	93	177
1.6	51	78	154
2.4	44	69	137
3.2	35	54	114
4.0	30	44	88
4.8	23	31	68
5.0	21	29	57
5.5	18	25	44
—	—	—	—
—	—	—	—

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

Note: Slanted line shows the range of the rated load current.

瞬時停電保障時間とは、出力電圧が定電圧精度の規格範囲を保持している瞬時停電時間をいう。

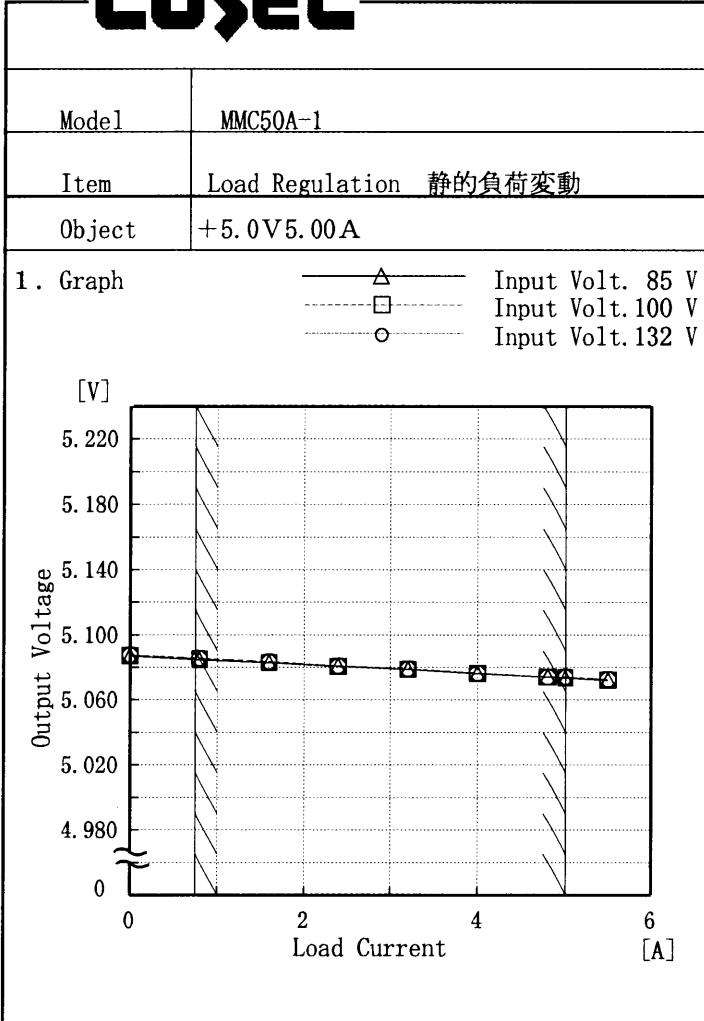
(注) 斜線は定格負荷電流範囲を示す。



<p>Model      MMC50A-1</p> <p>Item        Instantaneous Interruption Compensation              瞬時停電保障</p> <p>Object      +12.0V1.50A</p>		<p>Testing Circuitry    Figure A</p>																																																			
<p>1. Graph</p>	<p>—△—      Input Volt. 85V - - -□- - -    Input Volt. 100V - - -○- - -    Input Volt. 132V</p>		<p>2. Values</p>																																																		
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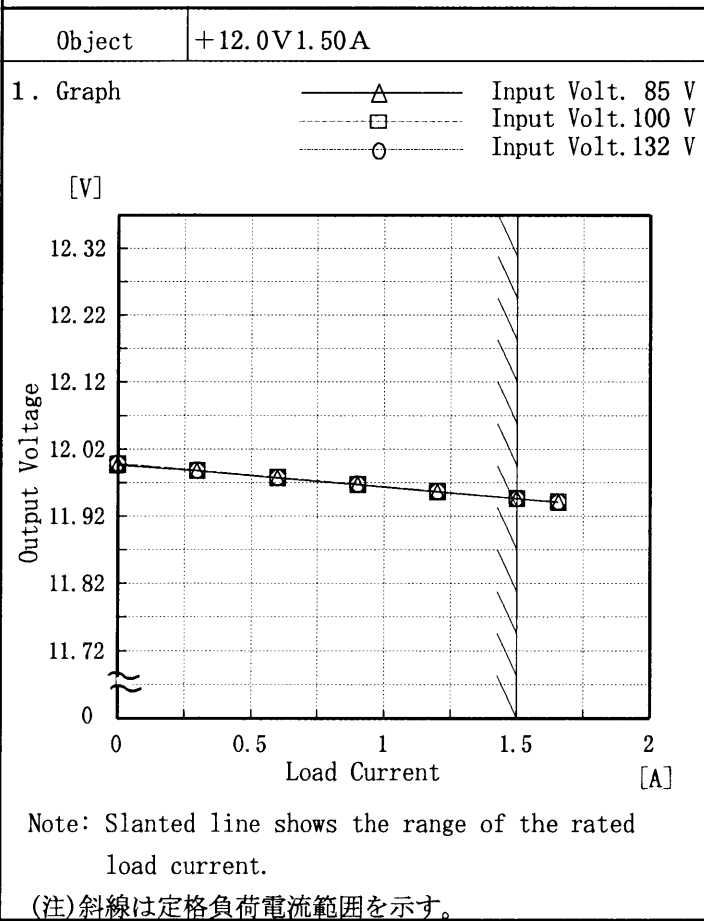
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瞬時停電保障時間とは、出力電圧が定電圧精度の規格範囲を保持している瞬時停電時間をいう。 (注)斜線は定格負荷電流範囲を示す。																																																							



Temperature 25°C  
Testing Circuitry Figure A

2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
0.00	5.087	5.087	5.088
0.80	5.085	5.085	5.086
1.60	5.083	5.083	5.083
2.40	5.081	5.081	5.081
3.20	5.079	5.079	5.079
4.00	5.076	5.077	5.076
4.80	5.074	5.074	5.074
5.00	5.074	5.074	5.074
5.50	5.072	5.072	5.073
—	—	—	—



2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
0.00	11.996	11.997	11.998
0.30	11.988	11.988	11.988
0.60	11.977	11.978	11.978
0.90	11.967	11.967	11.968
1.20	11.956	11.957	11.957
1.50	11.946	11.947	11.947
1.65	11.941	11.941	11.941
—	—	—	—
—	—	—	—
—	—	—	—



Model		MMC50A-1		Temperature		25°C																																																				
Item		Load Regulation 静的負荷変動		Testing Circuitry		Figure A																																																				
Object		-12.0V0.50A																																																								
1. Graph				2. Values																																																						
<p> <span style="border-bottom: 1px solid black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> △ Input Volt. 85V  <span style="border-bottom: 1px dashed black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> □ Input Volt. 100V  <span style="border-bottom: 1px dotted black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> ○ Input Volt. 132V                 </p>				<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th>Input Volt.</th> <th>Input Volt.</th> <th>Input Volt.</th> </tr> <tr> <th>85[V]</th> <th>100[V]</th> <th>132[V]</th> </tr> <tr> <th></th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-11.837</td><td>-11.839</td><td>-11.840</td></tr> <tr><td>0.08</td><td>-11.835</td><td>-11.836</td><td>-11.838</td></tr> <tr><td>0.16</td><td>-11.832</td><td>-11.833</td><td>-11.835</td></tr> <tr><td>0.24</td><td>-11.828</td><td>-11.830</td><td>-11.831</td></tr> <tr><td>0.32</td><td>-11.825</td><td>-11.825</td><td>-11.827</td></tr> <tr><td>0.40</td><td>-11.821</td><td>-11.821</td><td>-11.822</td></tr> <tr><td>0.48</td><td>-11.816</td><td>-11.816</td><td>-11.816</td></tr> <tr><td>0.50</td><td>-11.812</td><td>-11.813</td><td>-11.814</td></tr> <tr><td>0.55</td><td>-11.808</td><td>-11.809</td><td>-11.810</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Load Current [A]	Input Volt.	Input Volt.	Input Volt.	85[V]	100[V]	132[V]		Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	0.00	-11.837	-11.839	-11.840	0.08	-11.835	-11.836	-11.838	0.16	-11.832	-11.833	-11.835	0.24	-11.828	-11.830	-11.831	0.32	-11.825	-11.825	-11.827	0.40	-11.821	-11.821	-11.822	0.48	-11.816	-11.816	-11.816	0.50	-11.812	-11.813	-11.814	0.55	-11.808	-11.809	-11.810	—	—	—	—
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# COSEL

Model		MMC50A-1		Temperature		25°C																																							
Item		Ripple Voltage (by Load Current) リップル電圧 (負荷電流特性)		Testing Circuitry		Figure A																																							
Object		+5.0V 5.00A		2. Values																																									
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Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																											
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Model		MMC50A-1		Temperature		25°C	
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)		Testing Circuitry		Figure A	
Object		+12.0V 1.50A					
1. Graph				2. Values			
		-----□----- Input Volt. 85V					
[mV]		———△——— Input Volt. 132V					
Ripple Voltage		150					
125		100					
75		50					
25		0					
0		0					
Load Current		0.5					
		1					
		1.5					
		2					
		[A]					
Ripple Voltage is shown as p-p in the figure below.							
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Ripple [mVp-p]							
T1							
T2							
Fig. Complex Ripple Wave Form							
図 リップル波形詳細図							

Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.00	5	5
0.30	5	5
0.60	5	5
0.90	5	5
1.20	10	10
1.50	10	10
1.65	10	10
—	—	—
—	—	—
—	—	—





Model		MMC50A-1		Temperature		25°C																																							
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)		Testing Circuitry		Figure A																																							
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Model		MMC50A-1		Temperature		25°C																																							
Item		Ripple-Noise リップルノイズ		Testing Circuitry		Figure A																																							
Object		+5.0V5.00A																																											
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Model		MMC50A-1		Temperature		25°C																																							
Item		Ripple-Noise リップルノイズ		Testing Circuitry		Figure A																																							
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Model		MMC50A-1		Temperature		25°C																																							
Item		Ripple-Noise リップルノイズ		Testing Circuitry		Figure A																																							
Object		-12.0V0.50A																																											
<p>1. Graph</p> <p>-----□----- Input Volt. 85V                  -----△----- Input Volt. 132V</p>				<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load current [A]</th> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> <tr> <th>Ripple-Noise [mV]</th> <th>Ripple-Noise [mV]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>45</td><td>45</td></tr> <tr><td>0.08</td><td>30</td><td>35</td></tr> <tr><td>0.16</td><td>30</td><td>35</td></tr> <tr><td>0.24</td><td>30</td><td>35</td></tr> <tr><td>0.32</td><td>30</td><td>35</td></tr> <tr><td>0.40</td><td>30</td><td>35</td></tr> <tr><td>0.48</td><td>30</td><td>35</td></tr> <tr><td>0.50</td><td>30</td><td>35</td></tr> <tr><td>0.55</td><td>30</td><td>35</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]	Ripple-Noise [mV]	Ripple-Noise [mV]	0.00	45	45	0.08	30	35	0.16	30	35	0.24	30	35	0.32	30	35	0.40	30	35	0.48	30	35	0.50	30	35	0.55	30	35	—	—	—	—	—	—
Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																											
	Ripple-Noise [mV]	Ripple-Noise [mV]																																											
0.00	45	45																																											
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0.55	30	35																																											
—	—	—																																											
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<p>Ripple-Noise is shown as p-p in the figure below.                  Note: Slanted line shows the range of the rated load current.</p> <p>リップルノイズは、下図 p-p 値で示される。                  (注)斜線は定格負荷電流範囲を示す。</p> <p>T1: Due to AC Input Line                  入力商用周期                  T2: Due to Switching                  スイッチング周期</p> <p>Fig. Complex Ripple Wave Form                  図 リップル波形詳細図</p>																																													

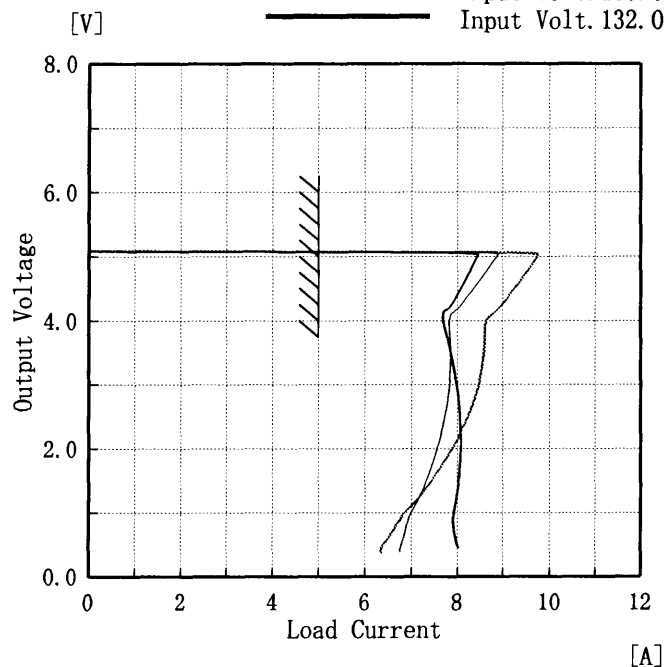
# COSEL

Model	MMC50A-1
Item	Overcurrent Protection 過電流保護
Object	+5.0V 5.00A

Temperature 25°C  
Testing Circuitry Figure A

1. Graph

Input Volt. 85.0 V  
 Input Volt. 100.0 V  
 Input Volt. 132.0 V



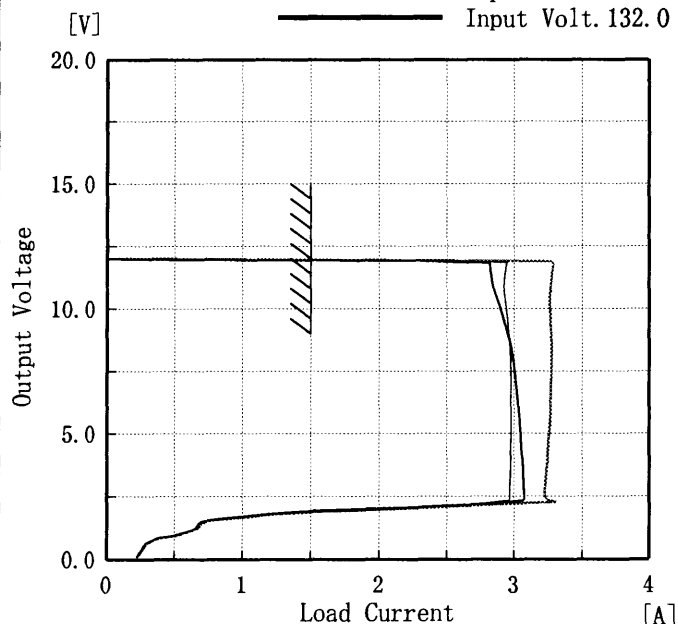
2. Values

Output Voltage [V]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]
	Load Current [A]	Load Current [A]	Load Current [A]
5.00	—	—	—
4.75	9.767	8.853	8.405
4.50	9.220	8.302	8.056
4.00	8.636	7.820	7.708
3.50	8.585	7.847	7.861
3.00	8.457	7.818	7.984
2.50	8.228	7.713	8.057
2.00	7.865	7.549	8.068
1.50	7.434	7.312	8.017
1.00	6.807	6.958	7.920
0.50	6.392	6.782	8.012
0.00	6.363	6.753	8.030

Object	+12.0V 1.50A
--------	--------------

1. Graph

Input Volt. 85.0 V  
 Input Volt. 100.0 V  
 Input Volt. 132.0 V



2. Values

Output Voltage [V]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]
	Load Current [A]	Load Current [A]	Load Current [A]
12.00	—	—	—
11.40	3.276	2.932	2.830
10.80	3.263	2.921	2.848
9.60	3.265	2.951	2.923
8.40	3.271	2.968	2.979
7.20	3.270	2.974	3.009
6.00	3.265	2.975	3.032
4.80	3.251	2.972	3.050
3.60	3.236	2.972	3.065
2.40	3.244	2.968	3.075
1.20	0.643	0.612	0.627
0.00	0.218	0.205	0.212

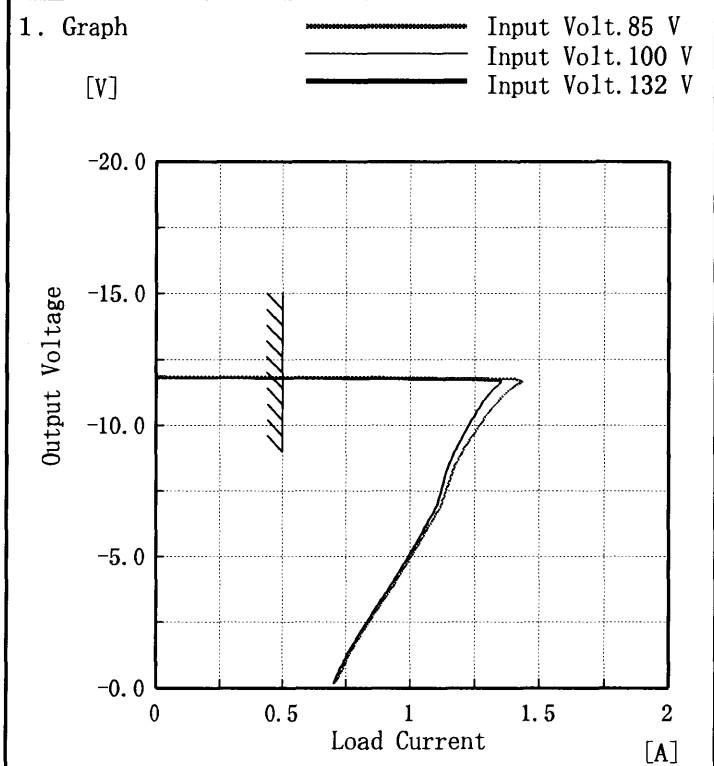
Note: Slanted line shows the range of the rated load current.

(注) 斜線は定格負荷電流範囲を示す。



Model	MMC50A-1
Item	Overcurrent Protection 過電流保護
Object	-12.0V0.50A

Temperature 25°C  
Testing Circuitry Figure A



2. Values

Output Voltage [V]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Load Current [A]	Load Current [A]	Load Current [A]
-12.00	—	—	—
-11.40	1.40	1.33	1.33
-10.80	1.33	1.27	1.27
-9.60	1.24	1.20	1.20
-8.40	1.17	1.14	1.14
-7.20	1.13	1.11	1.11
-6.00	1.06	1.05	1.05
-4.80	0.99	0.98	0.98
-3.60	0.91	0.90	0.90
-2.40	0.83	0.82	0.82
-1.20	0.76	0.75	0.75
0.00	0.71	0.70	0.70

Note: Slanted line shows the range of the rated load current.

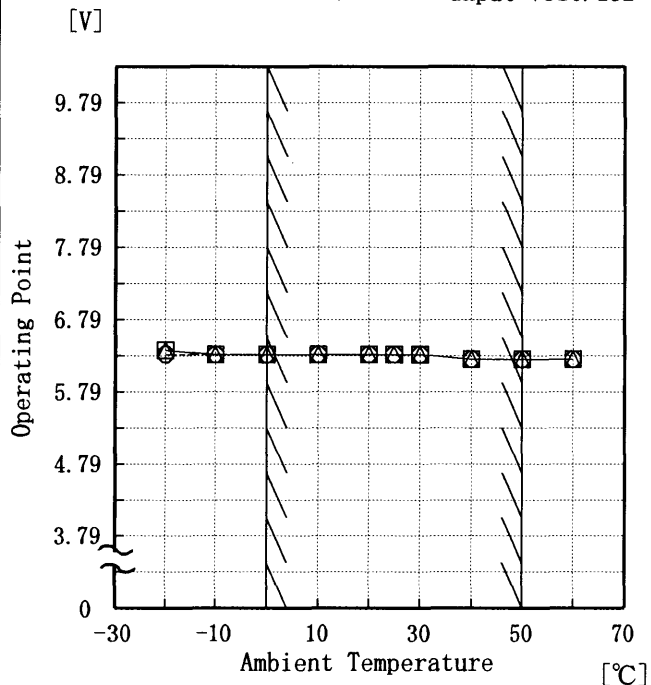
(注) 斜線は定格負荷電流範囲を示す。



Model	MMC50A-1
Item	Overvoltage Protection 過電圧保護
Object	+5.0V5.00A

Testing Circuitry Figure A

1. Graph
- △— Input Volt. 85 V
  - - -□- - - Input Volt. 100 V
  - - -○- - - Input Volt. 132 V



2. Values

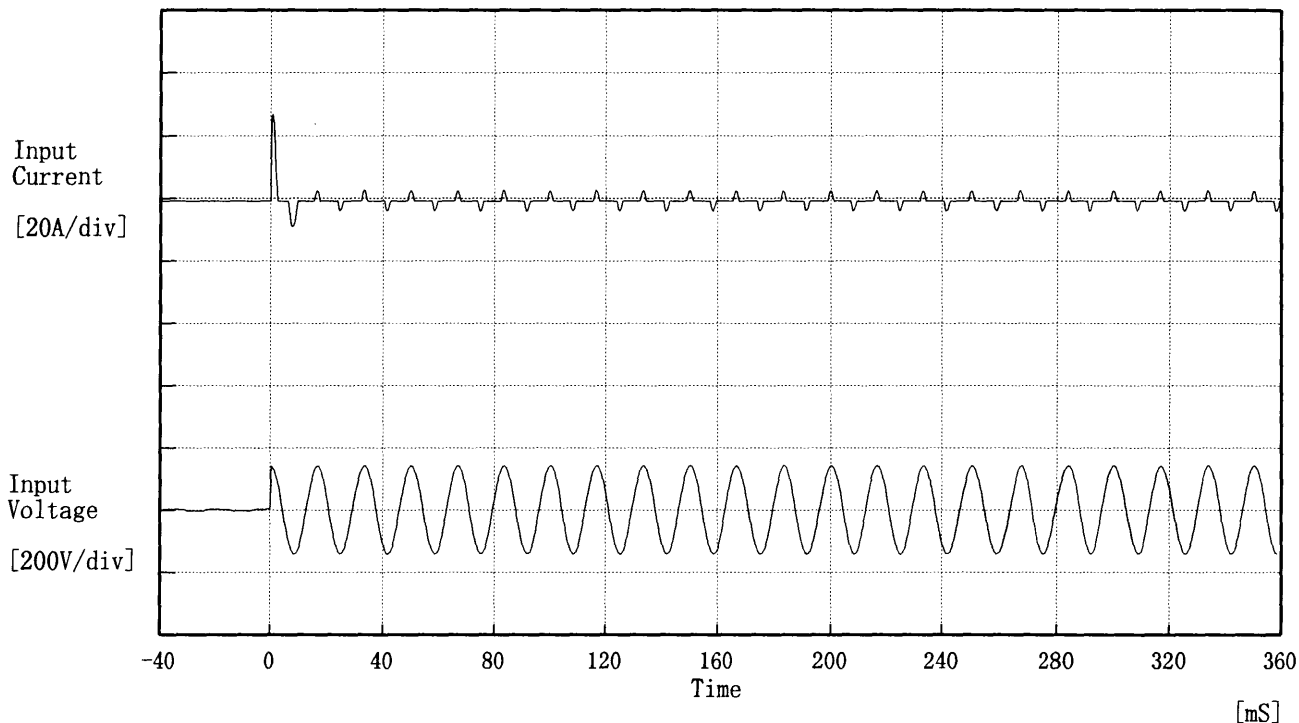
Ambient Temp. [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	6.37	6.37	6.31
-10	6.31	6.31	6.31
0	6.31	6.31	6.31
10	6.31	6.31	6.31
20	6.31	6.31	6.31
25	6.31	6.31	6.31
30	6.31	6.31	6.31
40	6.24	6.24	6.24
50	6.24	6.24	6.24
60	6.24	6.24	6.24
—	—	—	—

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

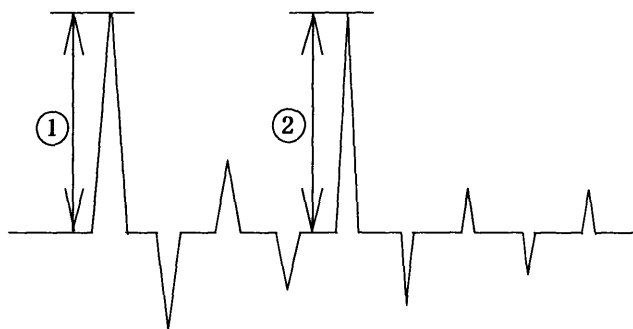
(注) 斜線は定格周囲温度範囲を示す。

# COSEL

Model	MMC50A-1	Temperature	25°C
Item	Inrush Current 突入電流	Testing Circuitry	Figure A
Object	_____		



Input Voltage 100 V  
 Frequency 60 Hz  
 Load 100 %  
 Inrush Current  
 ① 26.76 [A]  
 ② 4.10 [A]





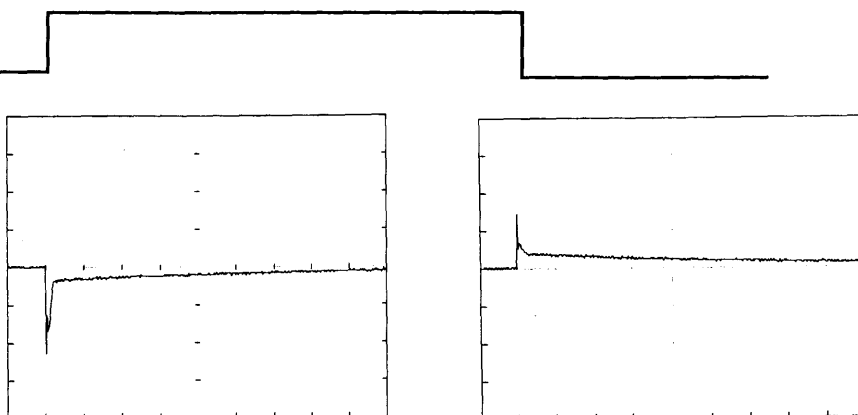


Model		MMC50A-1	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Responce 動的負荷変動	
Object		+5.0V5.00A	

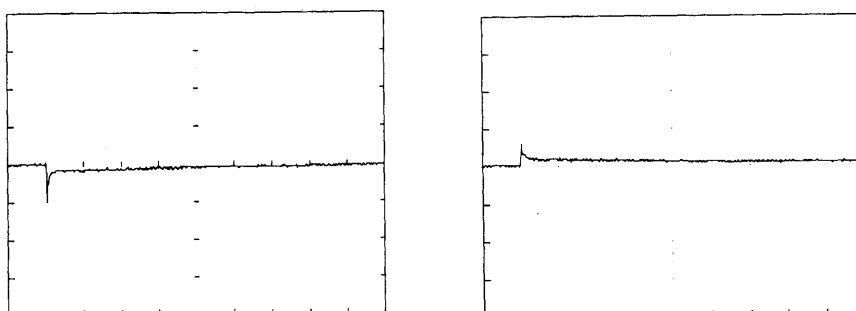
Input Volt. 100 V  
Cycle 200 mS

Load Current

Load 0% ←→  
Load 100 %



Load 0% ←→  
Load 50 %



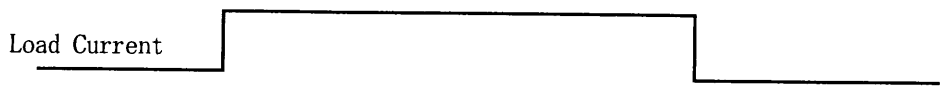
100 mV/div

10 mS/div

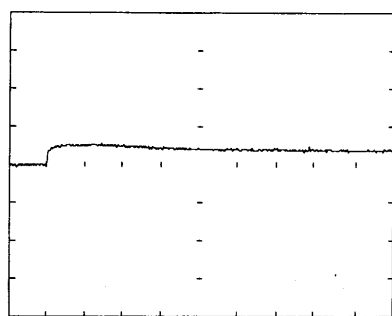
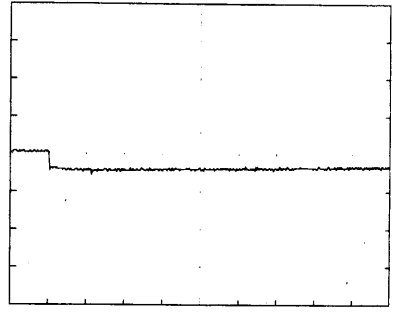
# COSEL

Model	MMC50A-1	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	+12.0V1.50A	

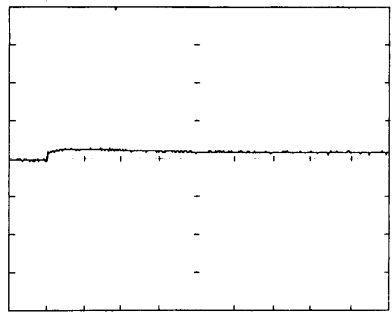
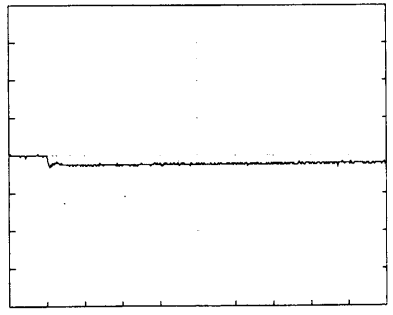
Input Volt. 100 V  
Cycle 200 mS



Load 0% ↔  
Load 100 %



Load 0% ↔  
Load 50 %



100 mV/div

10 mS/div



Model	MMC50A-1	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	-12.0V0.50A	

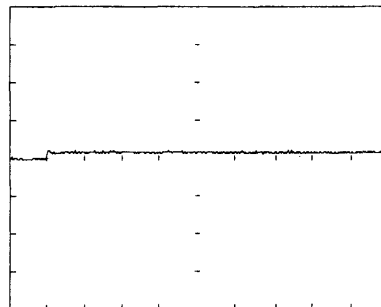
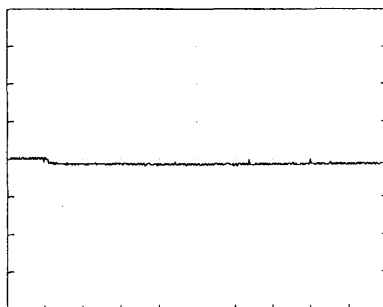
Input Volt. 100 V

Cycle 200 mS

Load Current

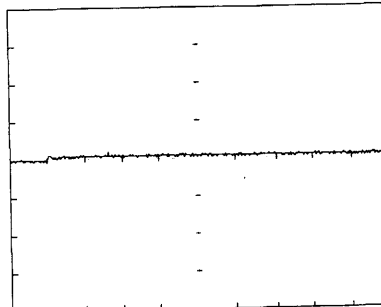
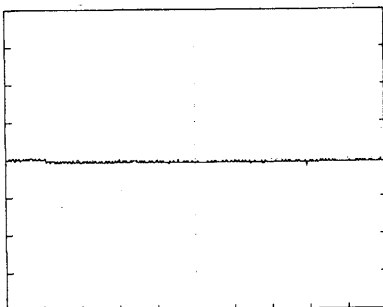
Load 0% ←→

Load 100 %



Load 0% ←→

Load 50 %



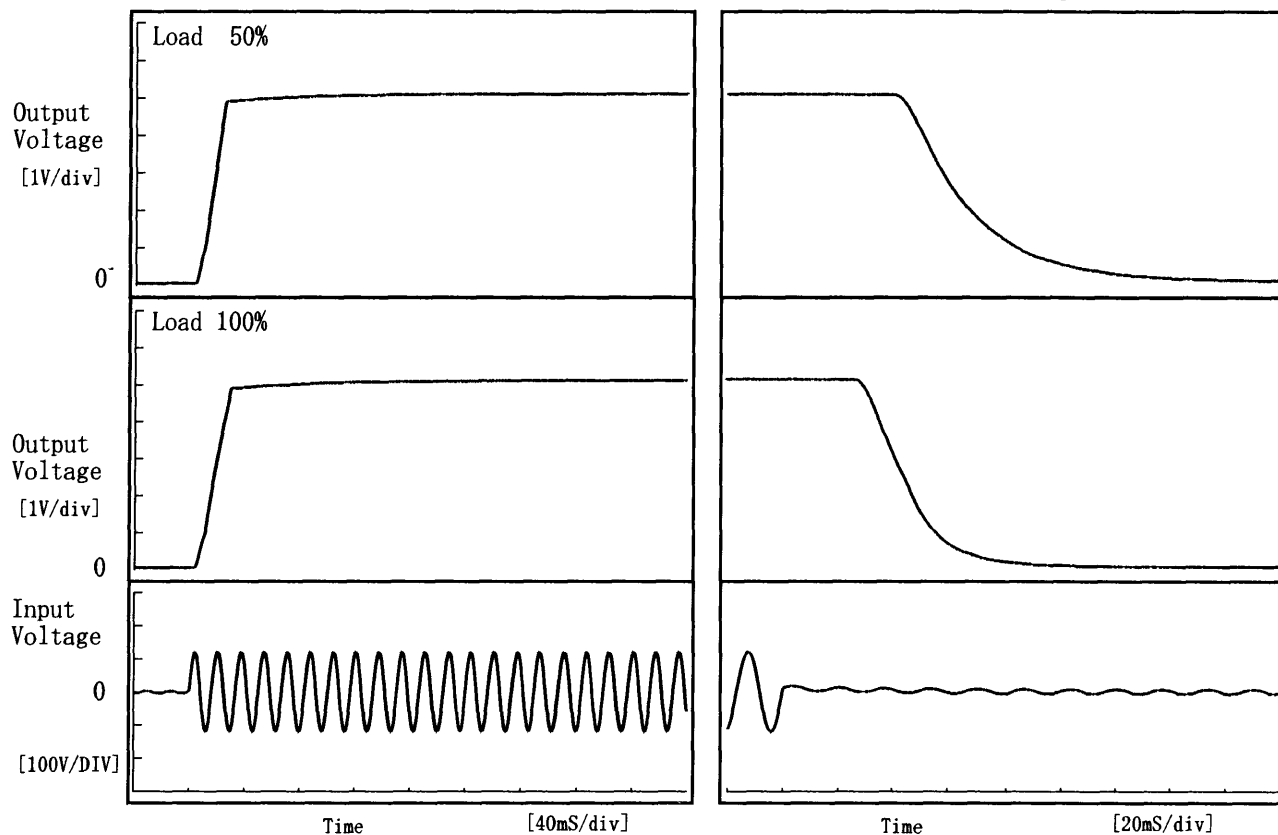
100 mV/div

10 mS/div

# COSEL

Model	MMC50A-1	
Item	Rise and Fall Time 立上り、立下り時間	Temperature 25°C Testing Circuitry Figure A
Object	+5.0V 5.00A	

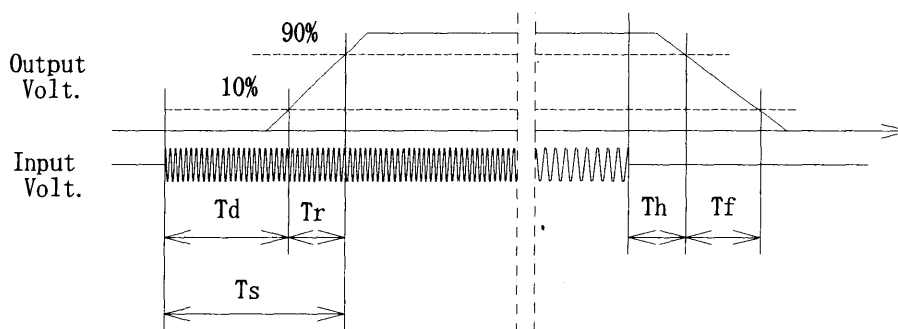
1. Graph



2. Values

Load \ Time	$T_d$	$T_r$	$T_s$	$T_h$	$T_f$
50 %	7.4	16.4	23.8	47.4	55.4
100 %	7.8	20.2	28.0	32.4	32.2

[mS]

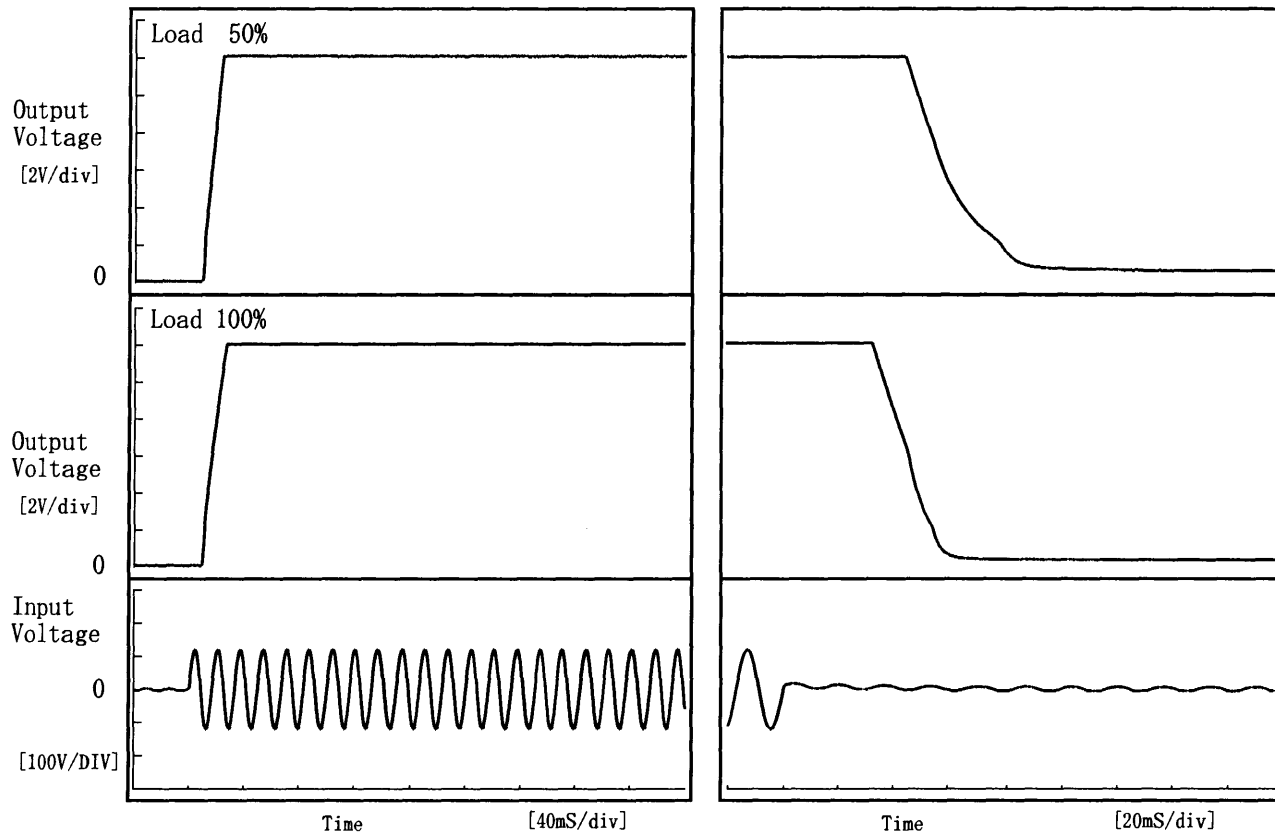


# COSEL

Model	MMC50A-1		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25°C
Object	+12.0V1.50A	Testing Circuitry	Figure A

1. Graph

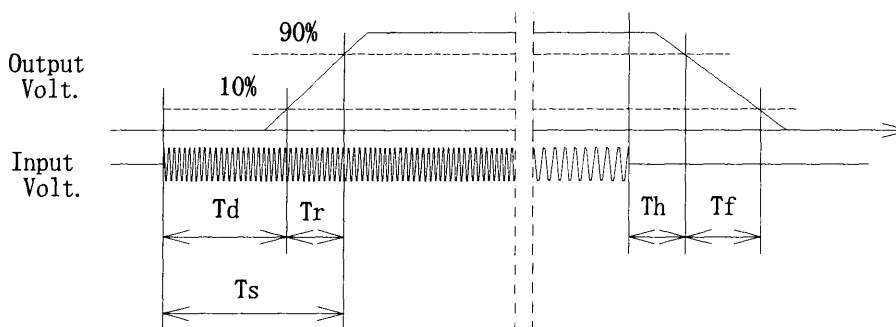
Input Volt. 85 V



2. Values

[mS]

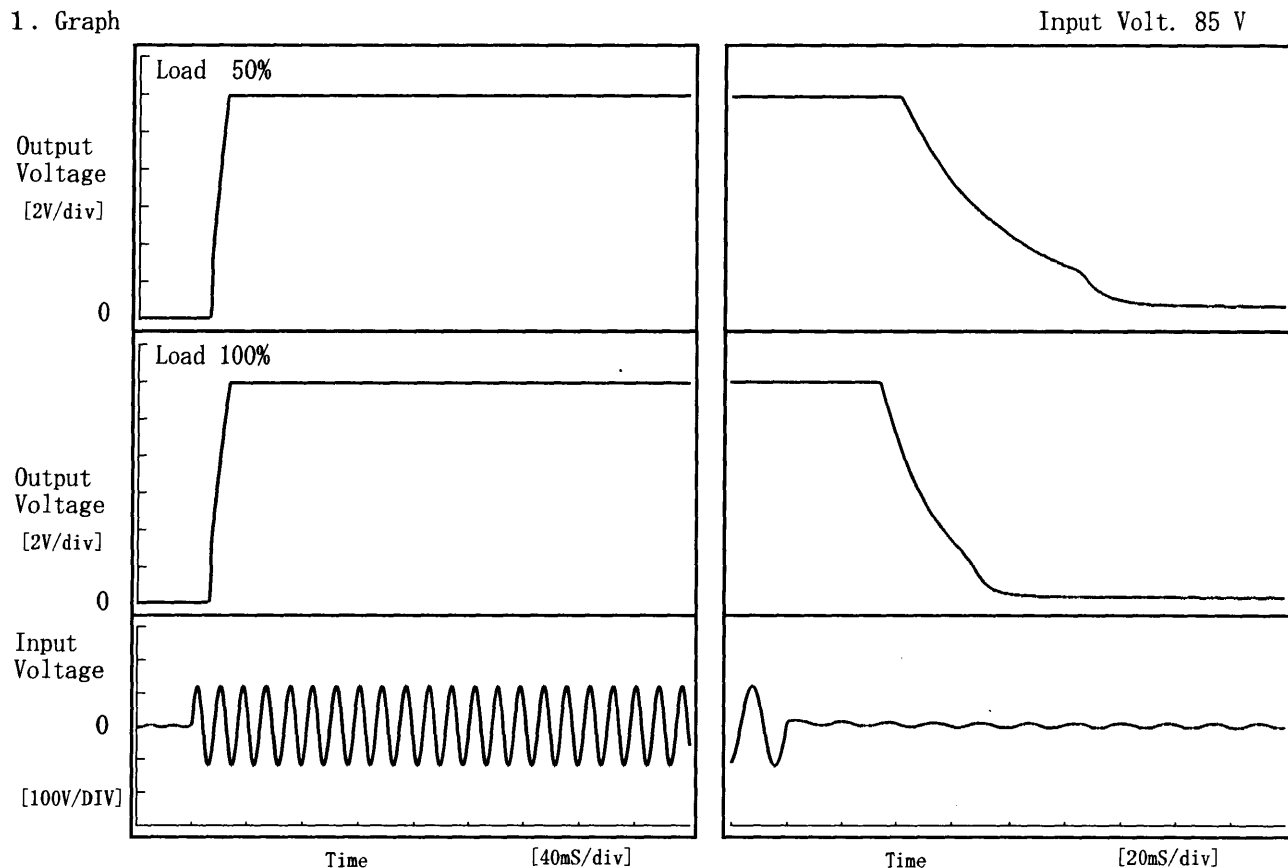
Load \ Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>
50 %	10.0	12.2	22.2	47.3	35.4
100 %	10.4	14.4	24.8	35.4	21.6



# COSEL

Model	MMC50A-1	
Item	Rise and Fall Time 立上り、立下り時間	Temperature 25°C Testing Circuitry Figure A
Object	-12.0V 0.50A	

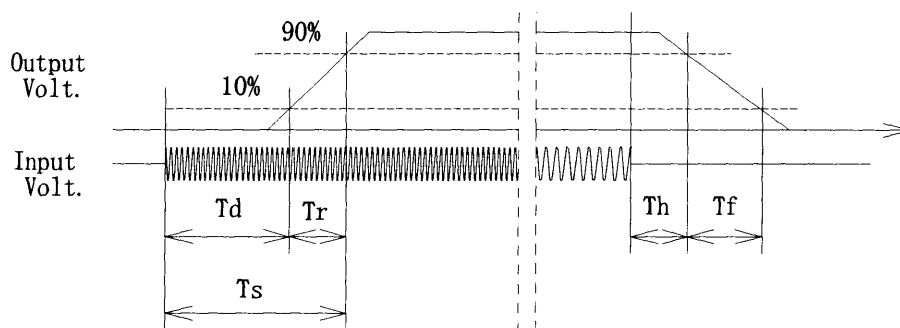
1. Graph



2. Values

Load \ Time	$T_d$	$T_r$	$T_s$	$T_h$	$T_f$
50 %	13.0	10.6	23.6	45.5	70.5
100 %	13.4	11.4	24.8	36.6	34.7

[mS]





<b>COSEL</b>																																																						
Model	MMC50A-1																																																					
Item	Ambient Temperature Drift 周囲温度変動	Testing Circuitry Figure A																																																				
Object	+5.0V5.00A																																																					
<p>1. Graph</p> <p>—△— Input Volt. 85.0V - - -□- - - Input Volt. 100.0V - - -○- - - Input Volt. 132.0V</p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th>Input Volt. 85.0[V]</th> <th>Input Volt. 100.0[V]</th> <th>Input Volt. 132.0[V]</th> </tr> <tr> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>5.086</td><td>5.086</td><td>5.086</td></tr> <tr><td>-10</td><td>5.085</td><td>5.085</td><td>5.085</td></tr> <tr><td>0</td><td>5.082</td><td>5.082</td><td>5.082</td></tr> <tr><td>10</td><td>5.081</td><td>5.081</td><td>5.081</td></tr> <tr><td>20</td><td>5.077</td><td>5.077</td><td>5.077</td></tr> <tr><td>25</td><td>5.075</td><td>5.075</td><td>5.075</td></tr> <tr><td>30</td><td>5.073</td><td>5.074</td><td>5.074</td></tr> <tr><td>40</td><td>5.068</td><td>5.068</td><td>5.068</td></tr> <tr><td>50</td><td>5.065</td><td>5.066</td><td>5.066</td></tr> <tr><td>60</td><td>5.061</td><td>5.061</td><td>5.061</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-20	5.086	5.086	5.086	-10	5.085	5.085	5.085	0	5.082	5.082	5.082	10	5.081	5.081	5.081	20	5.077	5.077	5.077	25	5.075	5.075	5.075	30	5.073	5.074	5.074	40	5.068	5.068	5.068	50	5.065	5.066	5.066	60	5.061	5.061	5.061	-	-	-	-
Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]																																																			
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60	5.061	5.061	5.061																																																			
-	-	-	-																																																			
<p>Object +12.0V1.50A</p> <p>1. Graph</p> <p>—△— Input Volt. 85.0V - - -□- - - Input Volt. 100.0V - - -○- - - Input Volt. 132.0V</p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th>Input Volt. 85.0[V]</th> <th>Input Volt. 100.0[V]</th> <th>Input Volt. 132.0[V]</th> </tr> <tr> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>11.989</td><td>11.988</td><td>11.988</td></tr> <tr><td>-10</td><td>11.979</td><td>11.979</td><td>11.979</td></tr> <tr><td>0</td><td>11.970</td><td>11.970</td><td>11.970</td></tr> <tr><td>10</td><td>11.961</td><td>11.961</td><td>11.961</td></tr> <tr><td>20</td><td>11.953</td><td>11.952</td><td>11.952</td></tr> <tr><td>25</td><td>11.948</td><td>11.948</td><td>11.948</td></tr> <tr><td>30</td><td>11.943</td><td>11.943</td><td>11.943</td></tr> <tr><td>40</td><td>11.934</td><td>11.934</td><td>11.934</td></tr> <tr><td>50</td><td>11.926</td><td>11.925</td><td>11.925</td></tr> <tr><td>60</td><td>11.917</td><td>11.917</td><td>11.917</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-20	11.989	11.988	11.988	-10	11.979	11.979	11.979	0	11.970	11.970	11.970	10	11.961	11.961	11.961	20	11.953	11.952	11.952	25	11.948	11.948	11.948	30	11.943	11.943	11.943	40	11.934	11.934	11.934	50	11.926	11.925	11.925	60	11.917	11.917	11.917	-	-	-	-
Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]																																																			
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-10	11.979	11.979	11.979																																																			
0	11.970	11.970	11.970																																																			
10	11.961	11.961	11.961																																																			
20	11.953	11.952	11.952																																																			
25	11.948	11.948	11.948																																																			
30	11.943	11.943	11.943																																																			
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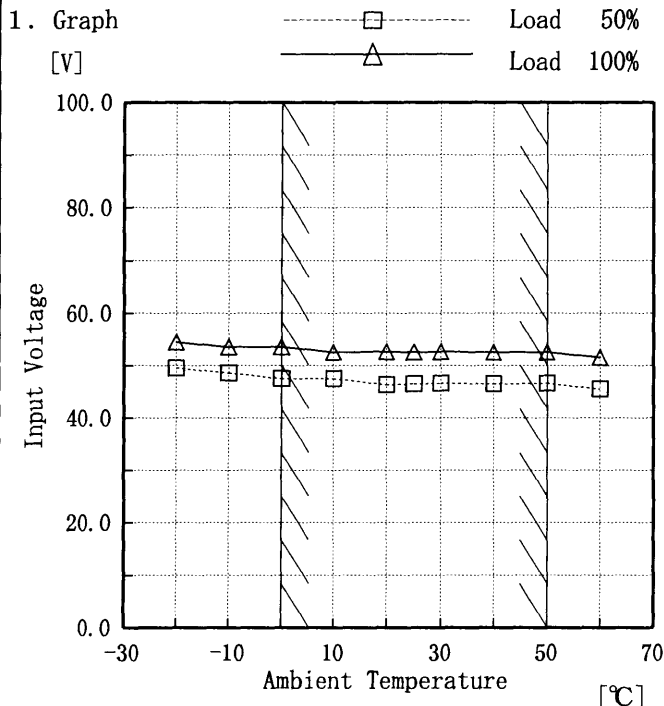
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Item	Ambient Temperature Drift 周囲温度変動	Testing Circuitry Figure A																																																			
Object	-12.0V0.50A																																																				
1. Graph	<p> <span style="display: inline-block; width: 1em; border-bottom: 1px solid black; margin-right: 0.5em;"></span>△ Input Volt. 85V  <span style="display: inline-block; width: 1em; border-bottom: 1px dashed black; margin-right: 0.5em;"></span>□ Input Volt. 100V  <span style="display: inline-block; width: 1em; border-bottom: 1px dotted black; margin-right: 0.5em;"></span>○ Input Volt. 132V                 </p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: right;">Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注)斜線は定格周囲温度範囲を示す。</p>	2. Values																																																			
		<table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> <tr> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>-11.868</td><td>-11.868</td><td>-11.868</td></tr> <tr><td>-10</td><td>-11.860</td><td>-11.859</td><td>-11.859</td></tr> <tr><td>0</td><td>-11.849</td><td>-11.849</td><td>-11.849</td></tr> <tr><td>10</td><td>-11.835</td><td>-11.835</td><td>-11.835</td></tr> <tr><td>20</td><td>-11.820</td><td>-11.820</td><td>-11.820</td></tr> <tr><td>25</td><td>-11.812</td><td>-11.812</td><td>-11.811</td></tr> <tr><td>30</td><td>-11.802</td><td>-11.802</td><td>-11.801</td></tr> <tr><td>40</td><td>-11.786</td><td>-11.785</td><td>-11.785</td></tr> <tr><td>50</td><td>-11.767</td><td>-11.766</td><td>-11.766</td></tr> <tr><td>60</td><td>-11.747</td><td>-11.746</td><td>-11.746</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Temperature [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-20	-11.868	-11.868	-11.868	-10	-11.860	-11.859	-11.859	0	-11.849	-11.849	-11.849	10	-11.835	-11.835	-11.835	20	-11.820	-11.820	-11.820	25	-11.812	-11.812	-11.811	30	-11.802	-11.802	-11.801	40	-11.786	-11.785	-11.785	50	-11.767	-11.766	-11.766	60	-11.747	-11.746	-11.746	—	—	—	—
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Model	MMC50A-1
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5.0V5.00A

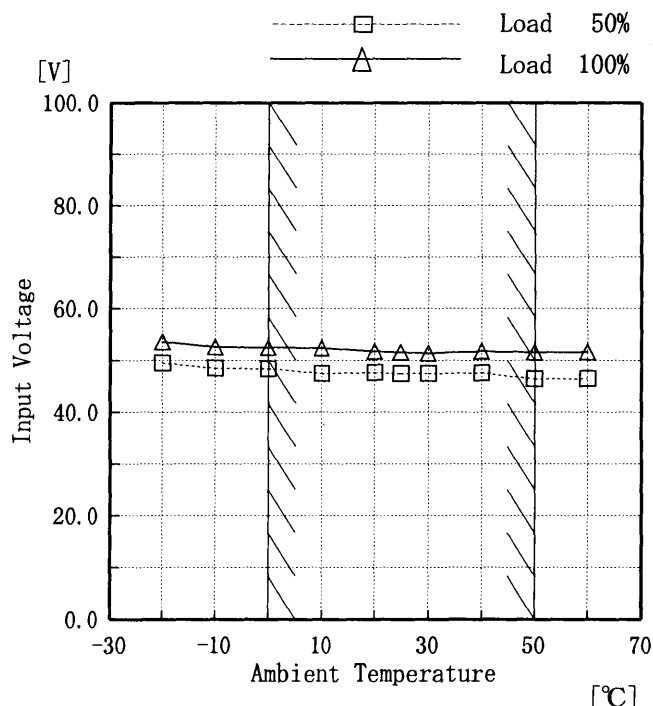
Testing Circuitry Figure A



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-20	49.5	54.4
-10	48.6	53.5
0	47.5	53.5
10	47.5	52.5
20	46.4	52.6
25	46.5	52.5
30	46.6	52.6
40	46.5	52.5
50	46.6	52.5
60	45.5	51.5
-	-	-

Object	+12.0V1.50A
--------	-------------



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-20	49.5	53.6
-10	48.5	52.6
0	48.4	52.5
10	47.5	52.4
20	47.7	51.7
25	47.5	51.5
30	47.5	51.4
40	47.6	51.7
50	46.5	51.5
60	46.5	51.5
-	-	-

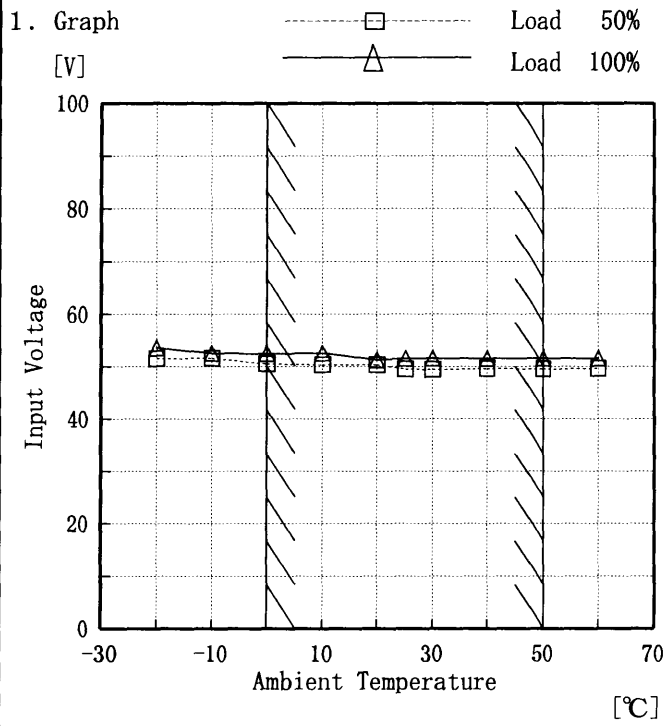
Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。



Model	MMC50A-1
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	-12.0V0.50A

Testing Circuitry Figure A



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-20	51.5	53.5
-10	51.6	52.5
0	50.5	52.4
10	50.4	52.5
20	50.4	51.3
25	49.5	51.5
30	49.4	51.5
40	49.6	51.5
50	49.5	51.5
60	49.6	51.5
—	—	—

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

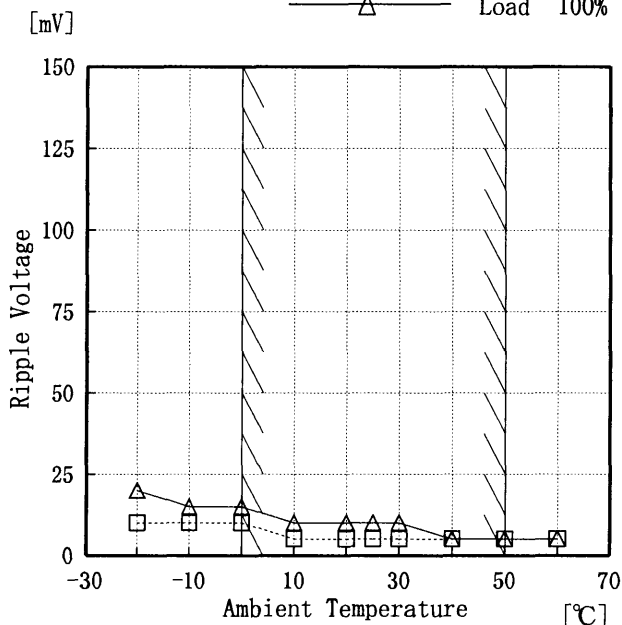
(注)斜線は定格周囲温度範囲を示す。



Model	MMC50A-1
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+5.0V5.00A

Testing Circuitry Figure A

1. Graph -----□----- Load 50%  
-----△----- Load 100%



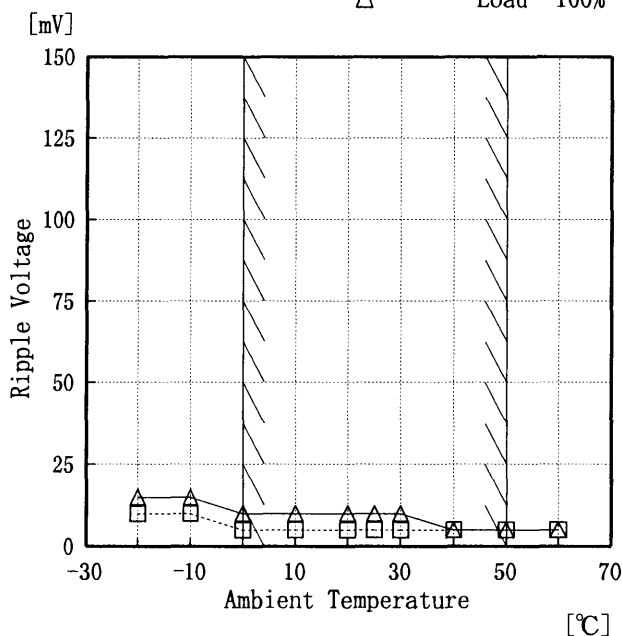
Input Volt. 85 V

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	10	20
-10	10	15
0	10	15
10	5	10
20	5	10
25	5	10
30	5	10
40	5	5
50	5	5
60	5	5
—	—	—

Object	+12.0V1.50A
--------	-------------

1. Graph -----□----- Load 50%  
-----△----- Load 100%



Input Volt. 85 V

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

(注)斜線は定格周囲温度範囲を示す。

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	10	15
-10	10	15
0	5	10
10	5	10
20	5	10
25	5	10
30	5	10
40	5	5
50	5	5
60	5	5
—	—	—



Model		MMC50A-1		Testing Circuitry Figure A																																							
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																									
Object		-12.0V 0.50A																																									
1. Graph		<p>-----□----- Load 50%</p> <p>-----△----- Load 100%</p>		2. Values																																							
<p>[mV]</p> <p>Ripple Voltage</p> <p>Ambient Temperature [°C]</p> <p>Input Volt. 85 V</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注)斜線は定格周囲温度範囲を示す。</p>		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temp. [°C]</th> <th>Load 50%</th> <th>Load 100%</th> </tr> <tr> <th>Ripple Output Volt. [mV]</th> <th>Ripple Output Volt. [mV]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>5</td><td>10</td></tr> <tr><td>-10</td><td>5</td><td>10</td></tr> <tr><td>0</td><td>5</td><td>5</td></tr> <tr><td>10</td><td>5</td><td>5</td></tr> <tr><td>20</td><td>5</td><td>5</td></tr> <tr><td>25</td><td>5</td><td>5</td></tr> <tr><td>30</td><td>5</td><td>5</td></tr> <tr><td>40</td><td>5</td><td>5</td></tr> <tr><td>50</td><td>5</td><td>5</td></tr> <tr><td>60</td><td>5</td><td>5</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Ambient Temp. [°C]	Load 50%	Load 100%	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	-20	5	10	-10	5	10	0	5	5	10	5	5	20	5	5	25	5	5	30	5	5	40	5	5	50	5	5	60	5	5	—	—	—		
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<p>Model           MMC50A-1</p>		<p>Temperature           25 °C Testing Circuitry   Figure A</p>																						
<p>Item            Time Lapse Drift 経時ドリフト</p>																								
<p>Object         +5.0V5.00A</p>																								
<p>1. Graph</p> <p>Input Volt.    100.0V 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>5.082</td></tr> <tr><td>0.5</td><td>5.079</td></tr> <tr><td>1.0</td><td>5.079</td></tr> <tr><td>2.0</td><td>5.079</td></tr> <tr><td>3.0</td><td>5.079</td></tr> <tr><td>4.0</td><td>5.079</td></tr> <tr><td>5.0</td><td>5.079</td></tr> <tr><td>6.0</td><td>5.079</td></tr> <tr><td>7.0</td><td>5.079</td></tr> <tr><td>8.0</td><td>5.079</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	5.082	0.5	5.079	1.0	5.079	2.0	5.079	3.0	5.079	4.0	5.079	5.0	5.079	6.0	5.079	7.0	5.079	8.0	5.079
Time since start [H]	Output Voltage [V]																							
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7.0	11.942																							
8.0	11.942																							



<b>COSEL</b>																								
Model	MMC50A-1																							
Item	Time Lapse Drift 経時ドリフト	Temperature 25 °C Testing Circuitry Figure A																						
Object	-12.0V0.50A																							
<p>1. Graph</p> <p>[V]</p> <p>Output Voltage [V]</p> <p>Time [H]</p> <p>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>-11.832</td></tr> <tr><td>0.5</td><td>-11.804</td></tr> <tr><td>1.0</td><td>-11.804</td></tr> <tr><td>2.0</td><td>-11.804</td></tr> <tr><td>3.0</td><td>-11.804</td></tr> <tr><td>4.0</td><td>-11.804</td></tr> <tr><td>5.0</td><td>-11.804</td></tr> <tr><td>6.0</td><td>-11.804</td></tr> <tr><td>7.0</td><td>-11.804</td></tr> <tr><td>8.0</td><td>-11.804</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	-11.832	0.5	-11.804	1.0	-11.804	2.0	-11.804	3.0	-11.804	4.0	-11.804	5.0	-11.804	6.0	-11.804	7.0	-11.804	8.0	-11.804
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8.0	-11.804																							



Model		MMC50A-1	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度		

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 : 85.0~132.0 V

Load Current (AVR 1) : 0.75~5.00 A (AVR 2) : 0.00~1.50 A (AVR 3) : 0.00~0.50 A

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

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

定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 0~50 °C

入力電圧 85.0~132.0 V

負荷電流 (AVR 1) 0.75~5.00 A (AVR 2) : 0.00~1.50 A (AVR 3) : 0.00~0.50 A

\* 定電圧精度(変動値) =  $\pm (\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

$$* \text{ 定電圧精度(変動率) } = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Object	+5.0V5.00A					
Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	0	132.0	0.750	5.093	±14	±0.3
Minimum Voltage	50	85.0	5.000	5.065		

Object	+12.0V1.50A					
Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	0	100.0	0.00	12.021	±50	±0.5
Minimum Voltage	50	132.0	1.50	11.921		

Object	-12.0V0.50A					
Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	0	132.0	0.00	-11.888	±64	±0.6
Minimum Voltage	50	132.0	0.50	-11.760		



<b>COSEL</b>		
Model	MMC50A-1	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+5.0V5.00A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

1. 結露特性試験

入力を切った状態で、恒温槽で-10℃に冷却しておき、約1時間後に恒温槽から取り出し、室温25℃、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	5.073	Input Volt. : 100V, Load Current:5.00A
Line Regulation [mV]	1	Input Volt. : 85~132V, Load Current:5.00A
Load Regulation [mV]	11	Input Volt. : 100V, Load Current:0.75~5.00A





<b>COSEL</b>		
Model	MMC50A-1	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+12.0V1.50A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
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1. 結露特性試験

入力を切った状態で、恒温槽で-10℃に冷却しておき、約1時間後に恒温槽から取り出し、室温25℃、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	11.944	Input Volt. : 100V, Load Current:1.5A
Line Regulation [mV]	1	Input Volt. : 85~132V, Load Current:1.5A
Load Regulation [mV]	49	Input Volt. : 100V, Load Current:0.0~1.5A



<b>COSEL</b>		
Model	MMC50A-1	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	-12.0V0.50A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

1. 結露特性試験

入力を切った状態で、恒温槽で-10℃に冷却しておき、約1時間後に恒温槽から取り出し、室温25℃、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	-11.806	Input Volt. : 100V, Load Current:0.5A
Line Regulation [mV]	1	Input Volt. : 85~132V, Load Current:0.5A
Load Regulation [mV]	29	Input Volt. : 100V, Load Current:0.0~0.5A



Model		MMC50A-1	Temperature 25°C Testing Circuitry Figure A
Item		Leakage Current 漏洩電流	
Object		_____	

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.24	0.27	0.33
(B) IEC60950	0.22	0.26	0.34

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

2. Condition

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

交流入力 of 両相について測定し、その大きい方を漏洩電流測定値とする。



Model		MMC50A-1	Testing Circuitry	Figure D
Item		Conducted Emission 雑音端子電圧		
Object		_____		

1. Graph

Remarks

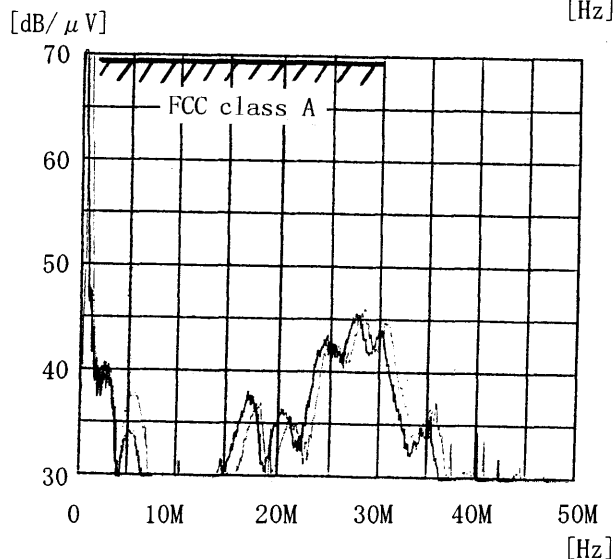
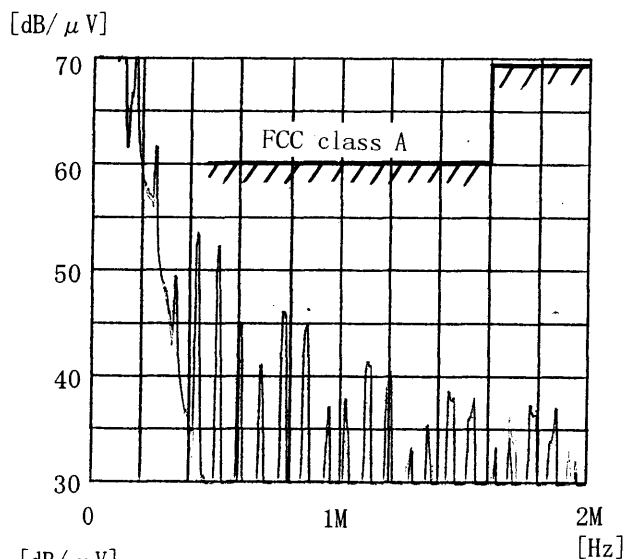
Input Volt. 120 V

Load 100 %

Note: Slanted line shows the range of Tolerance.

(注)斜線は許容値を示す。

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB/μV]
1	FCC class A	○	0.45~1.6	60
			1.6~30	69.5
2	FCC class B		0.45~30	48
3	VCCI class A		0.15~0.5	79
			0.5~30	73
4	VCCI class B		0.15~0.5	66-56
			0.5~5	56
			5~30	60
5	CISPR Pub. 22 class A (EN55022)		0.15~0.5	79
			0.5~30	73
6	CISPR Pub. 22 class B (EN55022)		0.15~0.5	66-56
			0.5~5	56
			5~30	60



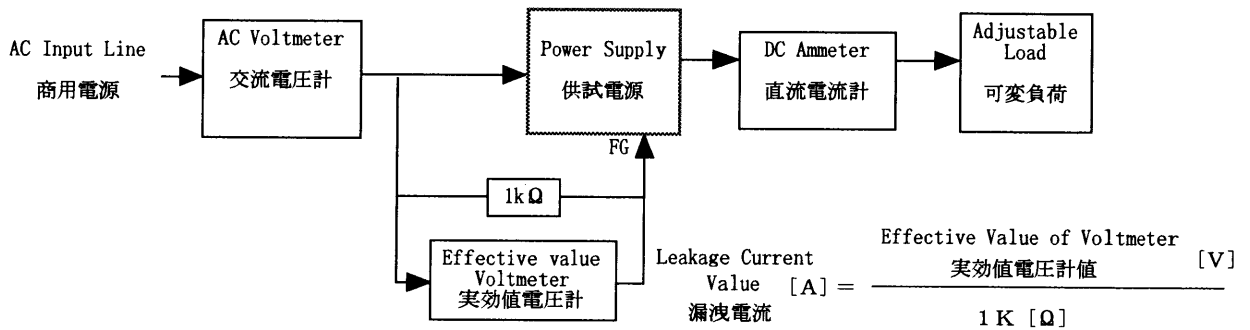
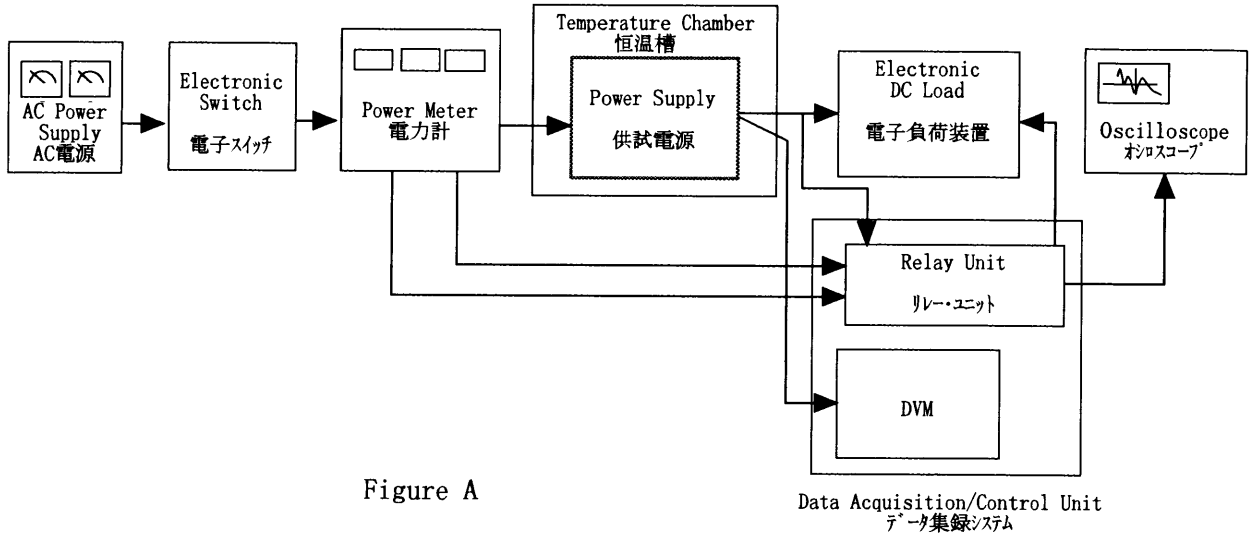


Figure B (DENTORI)

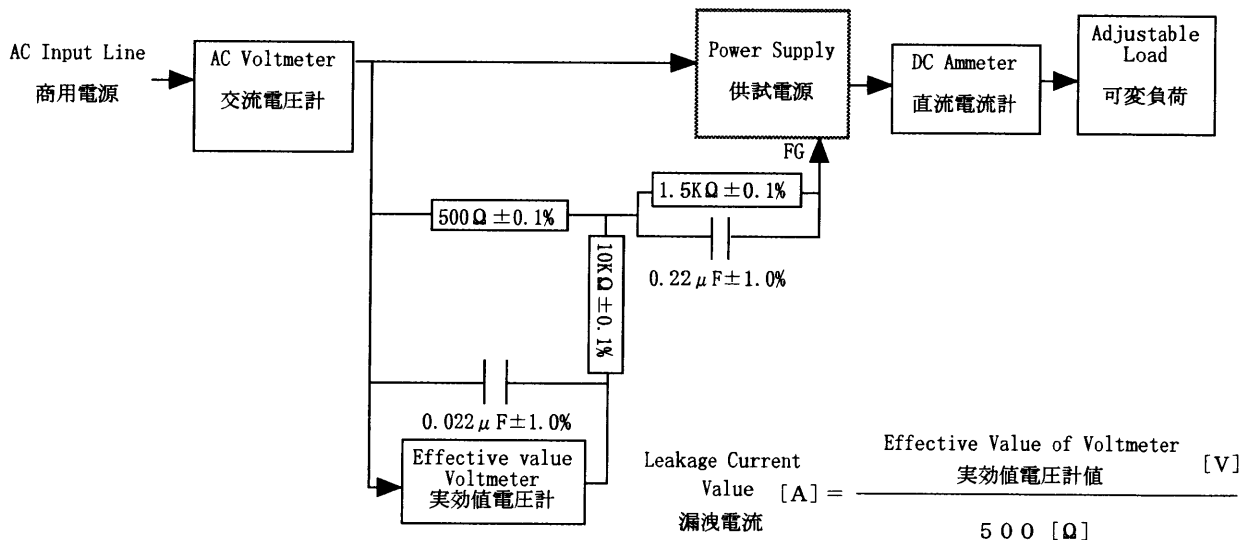


Figure B (IEC 60950)

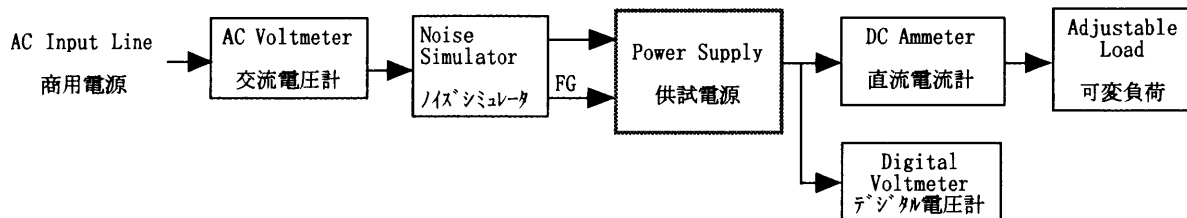


Figure C

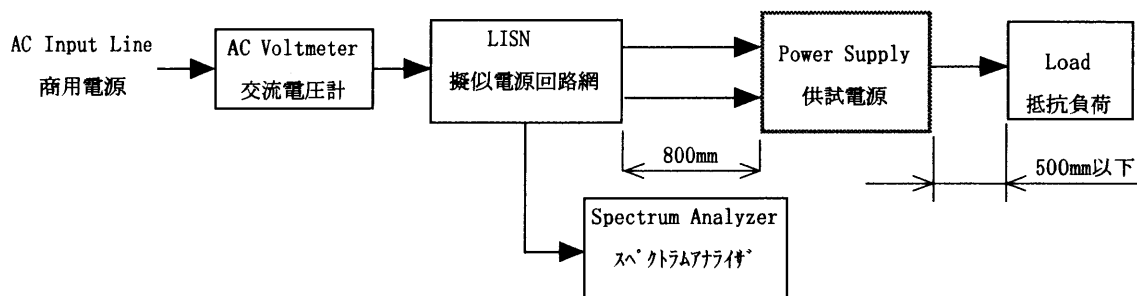


Figure D

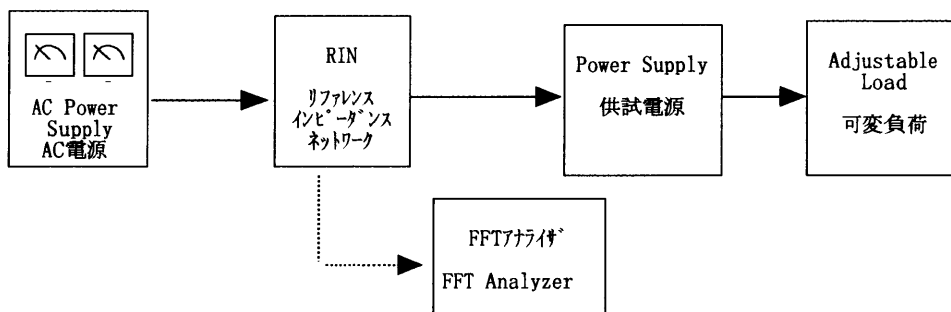


Figure E