



TEST DATA OF MMC50A-4 (100V INPUT)

Regulated DC Power Supply

Date : July 7, 1999

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コーセル株式会社
COSEL CO., LTD.

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Model		MMC50A-4		Temperature		25℃																																				
Item		Line Regulation 静的入力変動		Testing Circuitry		Figure A																																				
Object		+5.0V7.00A		2. Values																																						
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Model		MMC50A-4	
Item		Line Regulation 静的入力変動	
Object		-12.0V0.30A	

1. Graph

-----□----- Load 50%

-----△----- Load 100%

[V]

-11.670

-11.690

-11.710

-11.730

-11.750

-11.770

-11.790

0

Output Voltage

[V]

0

80

90

100

110

120

130

140

150

Input Voltage

[V]

0

80

90

100

110

120

130

140

150

Input Voltage

[V]

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。

2. Values

Input Voltage [V]	Load 50%	Load 100%
	Output Volt. [V]	Output Volt. [V]
75	-11.745	-11.734
80	-11.747	-11.732
85	-11.748	-11.732
90	-11.748	-11.731
100	-11.748	-11.731
110	-11.748	-11.731
120	-11.749	-11.731
132	-11.749	-11.731
140	-11.749	-11.731

—3—

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Model	MMC50A-4																																	
Item	Power Factor (by Input Voltage) 力率 (入力電圧特性)	Temperature 25℃ Testing Circuitry Figure A																																
Object																																		
1. Graph	<div> <div>-----□----- load 50%</div> <div>-----△----- load 100%</div> </div> <p>Power Factor</p> <p>Input Voltage [V]</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>(注)斜線は定格入力電圧範囲を示す。</p>																																	
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Model		MMC50A-4	
Item		Hold-Up Time 出力保持時間	
Object		+5.0V7.00A	
1. Graph		2. Values	

—△—

Load 50%

- -□- -

Load 100%

Hold-Up Time [mS]

1000

100

10

1

08090100110120130140150

Input Voltage [V]

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。

Input Voltage [V]	Load 50%	Load 100%
	Hold-Up Time [mS]	Hold-Up Time [mS]
75	43	24
80	50	29
85	58	34
90	67	40
100	86	52
110	108	66
120	132	82
132	163	103
140	186	118

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Model		MMC50A-4		Temperature		25℃																																	
Item		Hold-Up Time 出力保持時間		Testing Circuitry		Figure A																																	
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Model		MMC50A-4		Temperature		25℃																																	
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Model	MMC50A-4
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5.0V7.00A

1. Graph

—△—

Input Volt. 85V

---□---

Input Volt. 100V

---○---

Input Volt. 132V

[mS]

1000

Instantaneous Compensation Time

100

10

1

0

2

4

6

8

10

Load Current

[A]

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。

Testing Circuitry Figure A

2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
1.0	80	110	173
2.0	63	87	153
3.0	51	69	135
4.0	42	61	121
5.0	35	54	109
6.0	30	48	96
7.0	26	43	85
7.7	23	41	72
—	—	—	—
—	—	—	—

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Model	MMC50A-4
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+12.0V1.00A

1. Graph

△

—

Input Volt. 85V

□

- - -

Input Volt. 100V

○

- - -

Input Volt. 132V

[mS]

1000

100

10

1

Instantaneous Compensation Time

0

0.2

0.4

0.6

0.8

1

1.2

Load Current [A]

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。

Testing Circuitry Figure A

2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
0.2	56	81	145
0.4	48	70	130
0.6	43	64	121
0.8	39	57	113
1.0	36	55	106
1.1	35	53	104
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model		MMC50A-4	
Item		Instantaneous Interruption Compensation 瞬時停電保障	
Object		-12.0V0.30A	

1. Graph

—△—

Input Volt. 85V

- -□- -

Input Volt. 100V

- -○- -

Input Volt. 132V

Instantaneous Compensation Time [mS]

Load Current [A]

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。

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.00	—	—	—
0.06	71	94	147
0.12	54	72	128
0.18	47	65	119
0.24	43	62	114
0.30	39	57	110
0.33	39	56	109
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

2. Values

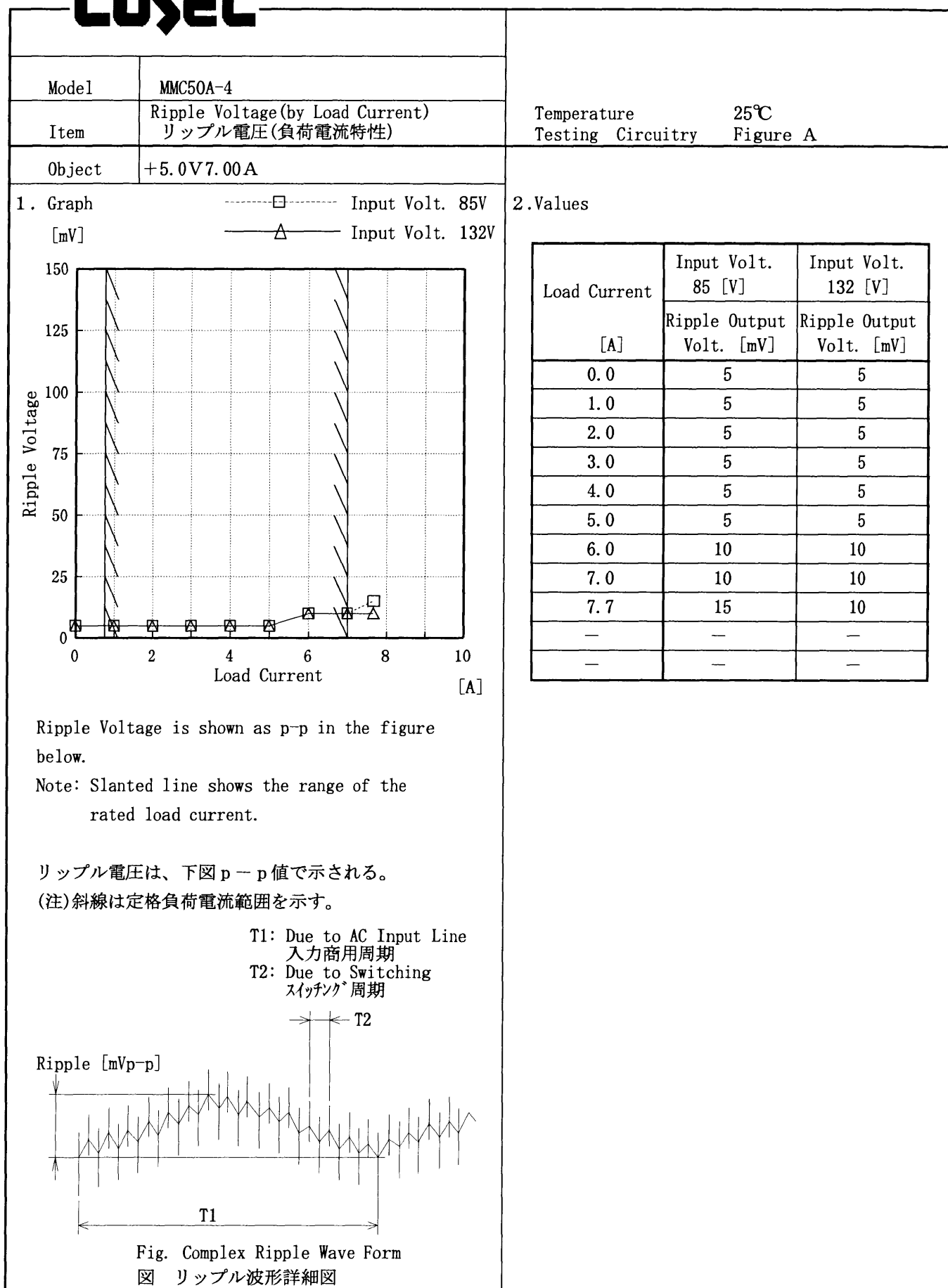
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Model		MMC50A-4		Temperature		25℃	
Item		Load Regulation 静的負荷変動		Testing Circuitry		Figure A	
Object		+5.0V7.00A		2. Values			
1. Graph		<div><div>—△—</div>Input Volt. 85 V</div> <div><div>---□---</div>Input Volt. 100 V</div> <div><div>---○---</div>Input Volt. 132 V</div>					
<div><div>Output Voltage</div><div>[V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><d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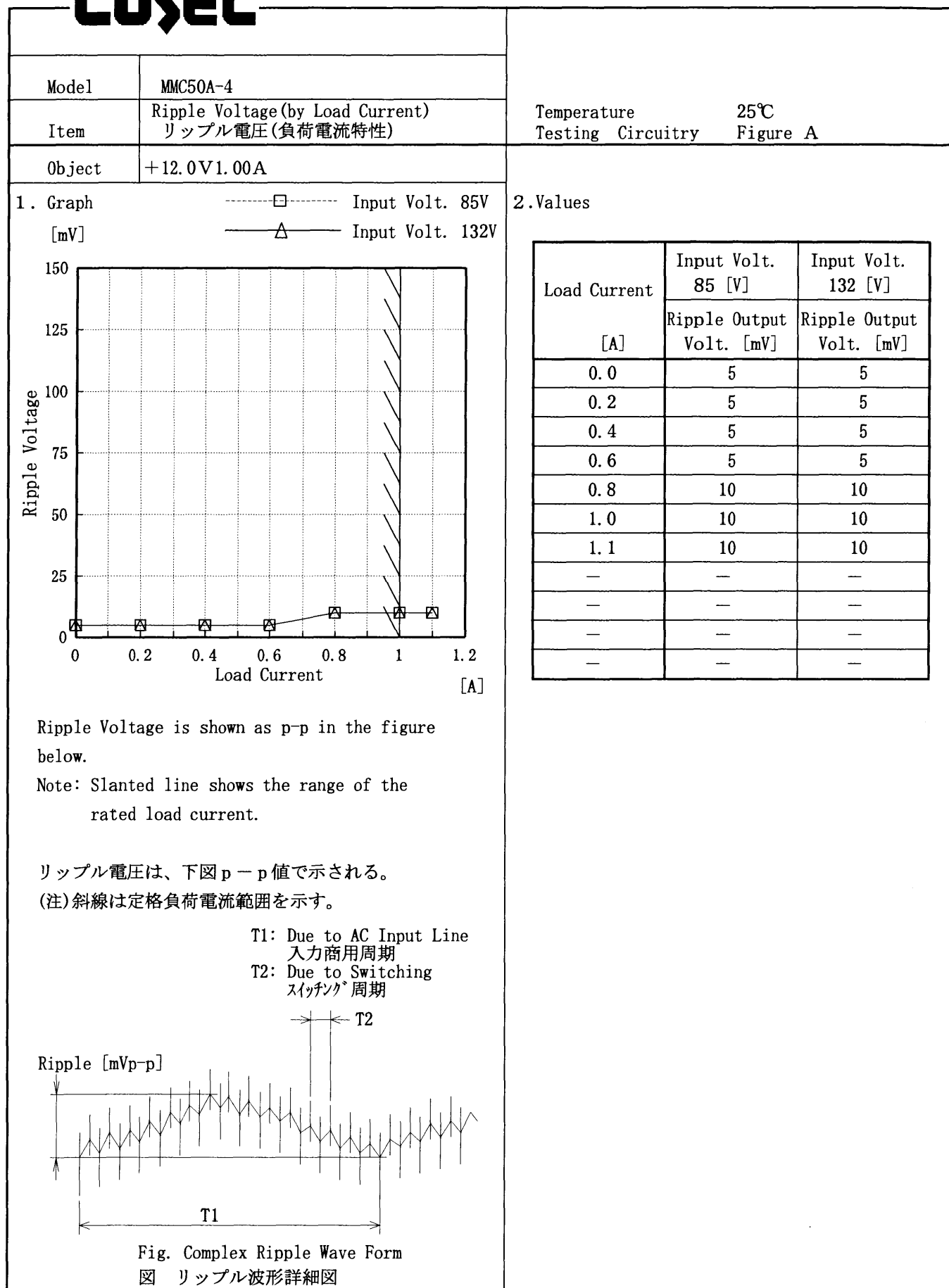
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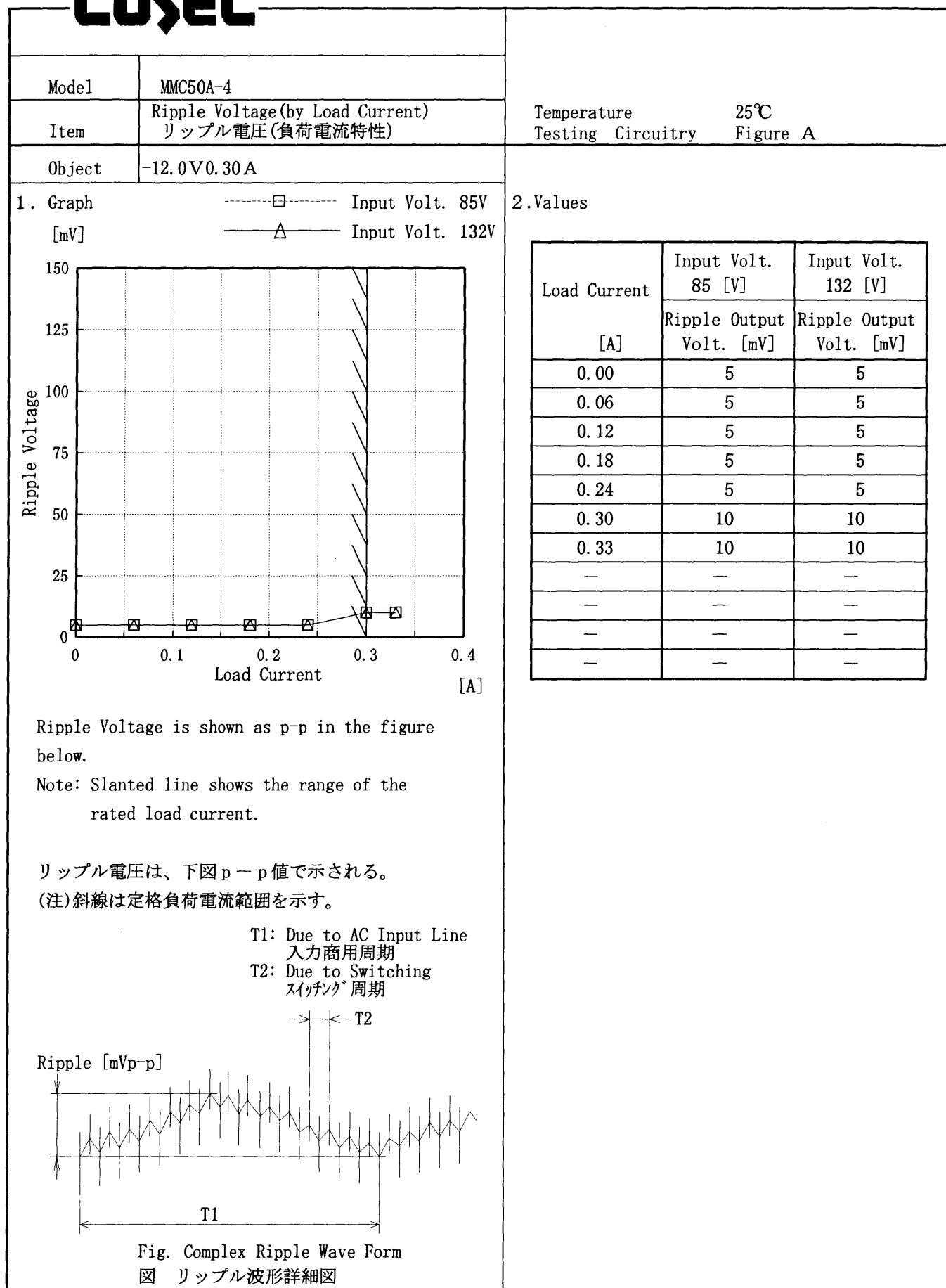
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<div><div><div>△</div><div>Input Volt. 85V</div></div><div><div>□</div><div>Input Volt. 100V</div></div><div><div>○</div><div>Input Volt. 132V</div></div></div> <div><div><div>[V]</div><div>Output Voltage</div><div><div>-11.610</div><div>-11.650</div><div>-11.690</div><div>-11.730</div><div>-11.770</div><div>-11.810</div><div>-11.850</div><div>0</div></div></div><div><div>0</div><div>0.1</div><div>0.2</div><div>0.3</div><div>0.4</div></div><div><div>Load Current</div><div>[A]</div></div></div>				<table><tr><th rowspan="2">Load Current [A]</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><tr><td>0.00</td><td>-11.750</td><td>-11.753</td><td>-11.754</td></tr><tr><td>0.06</td><td>-11.749</td><td>-11.751</td><td>-11.752</td></tr><tr><td>0.12</td><td>-11.747</td><td>-11.749</td><td>-11.750</td></tr><tr><td>0.18</td><td>-11.745</td><td>-11.746</td><td>-11.747</td></tr><tr><td>0.24</td><td>-11.741</td><td>-11.744</td><td>-11.744</td></tr><tr><td>0.30</td><td>-11.739</td><td>-11.739</td><td>-11.741</td></tr><tr><td>0.33</td><td>-11.735</td><td>-11.736</td><td>-11.737</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>				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	-11.750	-11.753	-11.754	0.06	-11.749	-11.751	-11.752	0.12	-11.747	-11.749	-11.750	0.18	-11.745	-11.746	-11.747	0.24	-11.741	-11.744	-11.744	0.30	-11.739	-11.739	-11.741	0.33	-11.735	-11.736	-11.737	—	—	—	—	—	—	—	—	—	—	—	—
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<div>Note: Slanted line shows the range of the rated load current.</div> <div>(注)斜線は定格負荷電流範囲を示す。</div>																																																						

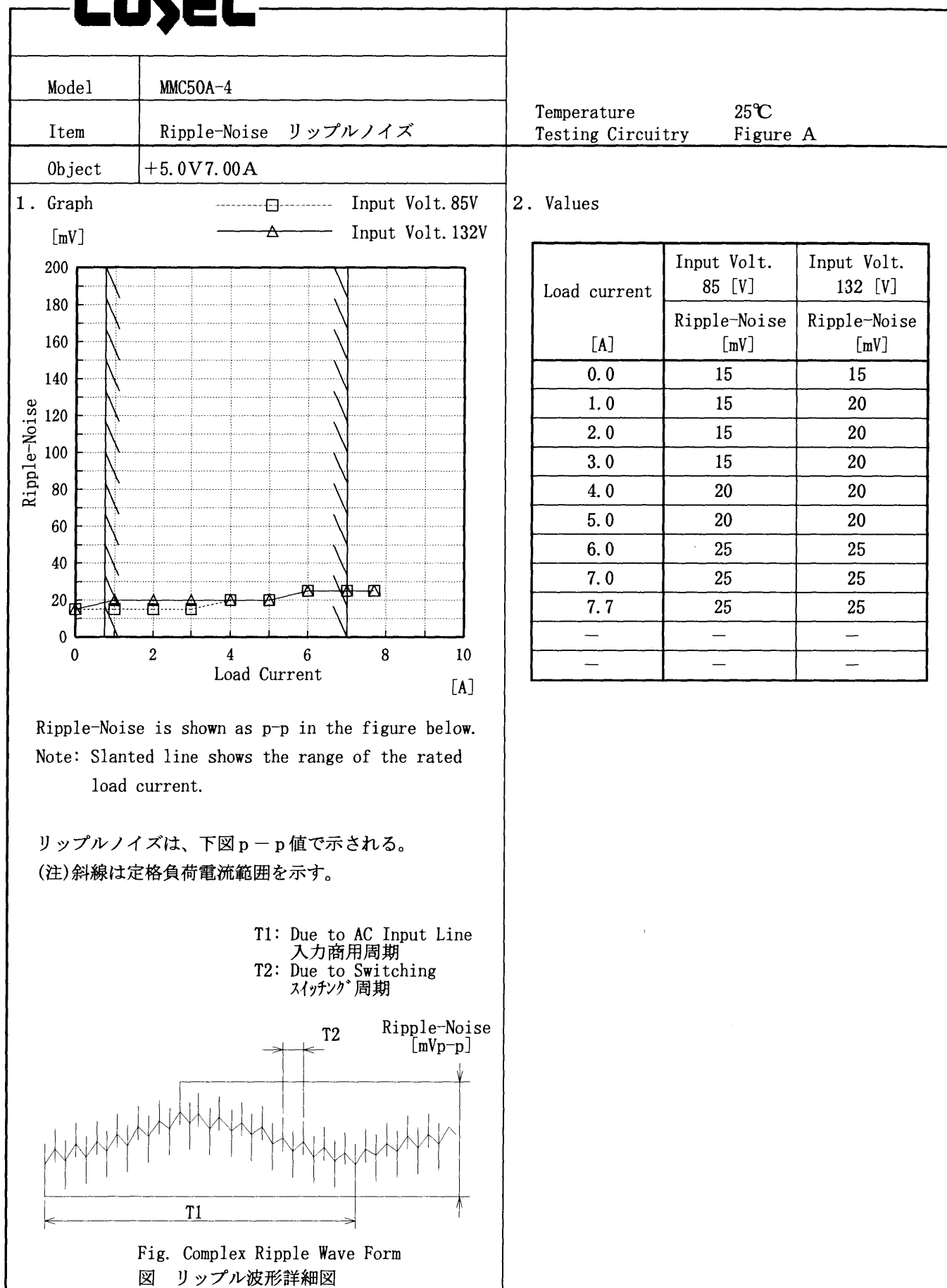
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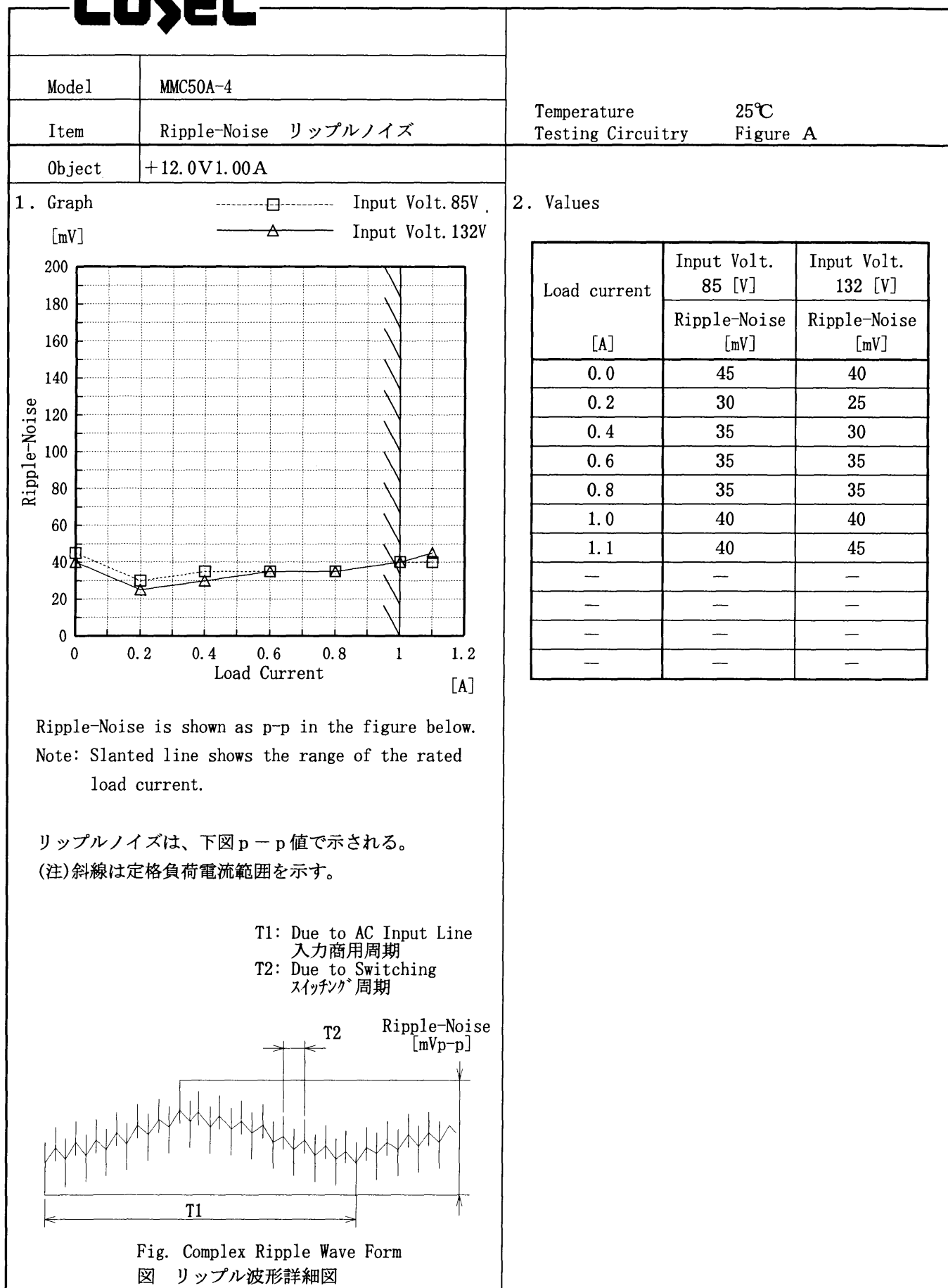
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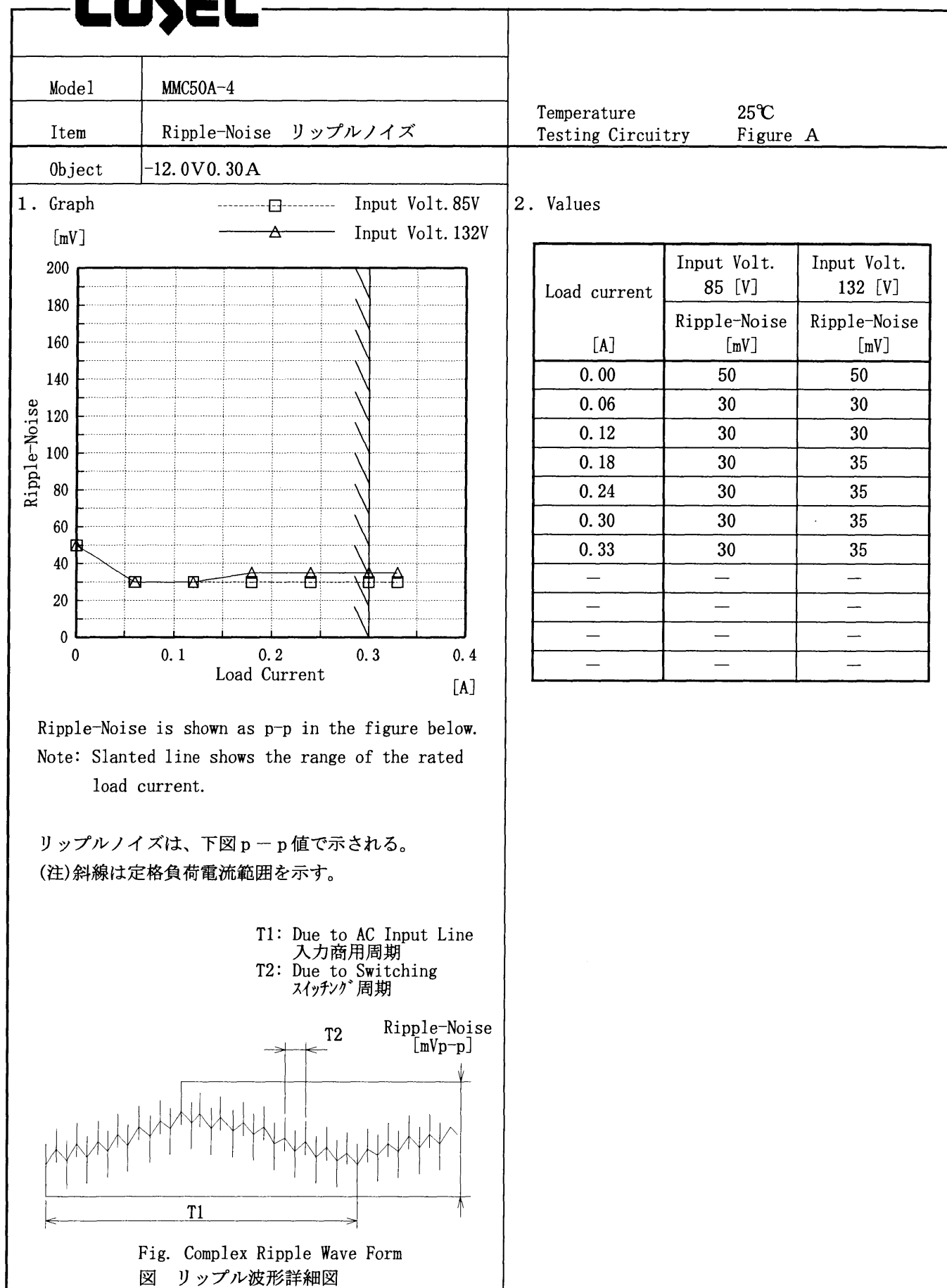
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Model MMC50A-4		Temperature 25°C																																																					
Item Overcurrent Protection 過電流保護		Testing Circuitry Figure A																																																					
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1. Graph <div> <div>Input Volt. 85.0 V</div> <div>Input Volt. 100.0 V</div> <div>Input Volt. 132.0 V</div> </div>		2. Values <table border="1"> <thead> <tr> <th>Output Voltage [V]</th><th>Input Volt. 85.0[V] Load Current [A]</th><th>Input Volt. 100.0[V] Load Current [A]</th><th>Input Volt. 132.0[V] Load Current [A]</th></tr> </thead> <tbody> <tr><td>12.00</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>11.40</td><td>2.814</td><td>2.482</td><td>2.403</td></tr> <tr><td>10.80</td><td>2.830</td><td>2.505</td><td>2.452</td></tr> <tr><td>9.60</td><td>2.871</td><td>2.574</td><td>2.568</td></tr> <tr><td>8.40</td><td>2.901</td><td>2.630</td><td>2.663</td></tr> <tr><td>7.20</td><td>2.910</td><td>2.668</td><td>2.740</td></tr> <tr><td>6.00</td><td>2.909</td><td>2.685</td><td>2.780</td></tr> <tr><td>4.80</td><td>2.901</td><td>2.694</td><td>2.806</td></tr> <tr><td>3.60</td><td>2.890</td><td>2.697</td><td>2.829</td></tr> <tr><td>2.40</td><td>2.880</td><td>2.701</td><td>2.844</td></tr> <tr><td>1.20</td><td>0.645</td><td>0.631</td><td>0.647</td></tr> <tr><td>0.00</td><td>0.224</td><td>0.218</td><td>0.227</td></tr> </tbody> </table>		Output Voltage [V]	Input Volt. 85.0[V] Load Current [A]	Input Volt. 100.0[V] Load Current [A]	Input Volt. 132.0[V] Load Current [A]	12.00	—	—	—	11.40	2.814	2.482	2.403	10.80	2.830	2.505	2.452	9.60	2.871	2.574	2.568	8.40	2.901	2.630	2.663	7.20	2.910	2.668	2.740	6.00	2.909	2.685	2.780	4.80	2.901	2.694	2.806	3.60	2.890	2.697	2.829	2.40	2.880	2.701	2.844	1.20	0.645	0.631	0.647	0.00	0.224	0.218	0.227
Output Voltage [V]	Input Volt. 85.0[V] Load Current [A]	Input Volt. 100.0[V] Load Current [A]	Input Volt. 132.0[V] Load Current [A]																																																				
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Model		MMC50A-4		Temperature 25℃ Testing Circuitry Figure A	
Item		Overcurrent Protection 過電流保護			
Object		-12.0V 0.30A			
1. Graph				2. Values	
<div><div>[V]</div><div><div>Input Volt. 85 V</div><div>Input Volt. 100 V</div><div>Input Volt. 132 V</div></div><div><div><div>Output Voltage [V]</div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div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Model	MMC50A-4
Item	Overvoltage Protection 過電圧保護
Object	+5.0V7.00A

1. Graph

△

Input Volt. 85 V

□

Input Volt. 100 V

○

Input Volt. 132 V

[V]

Ambient Temperature [°C]

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。

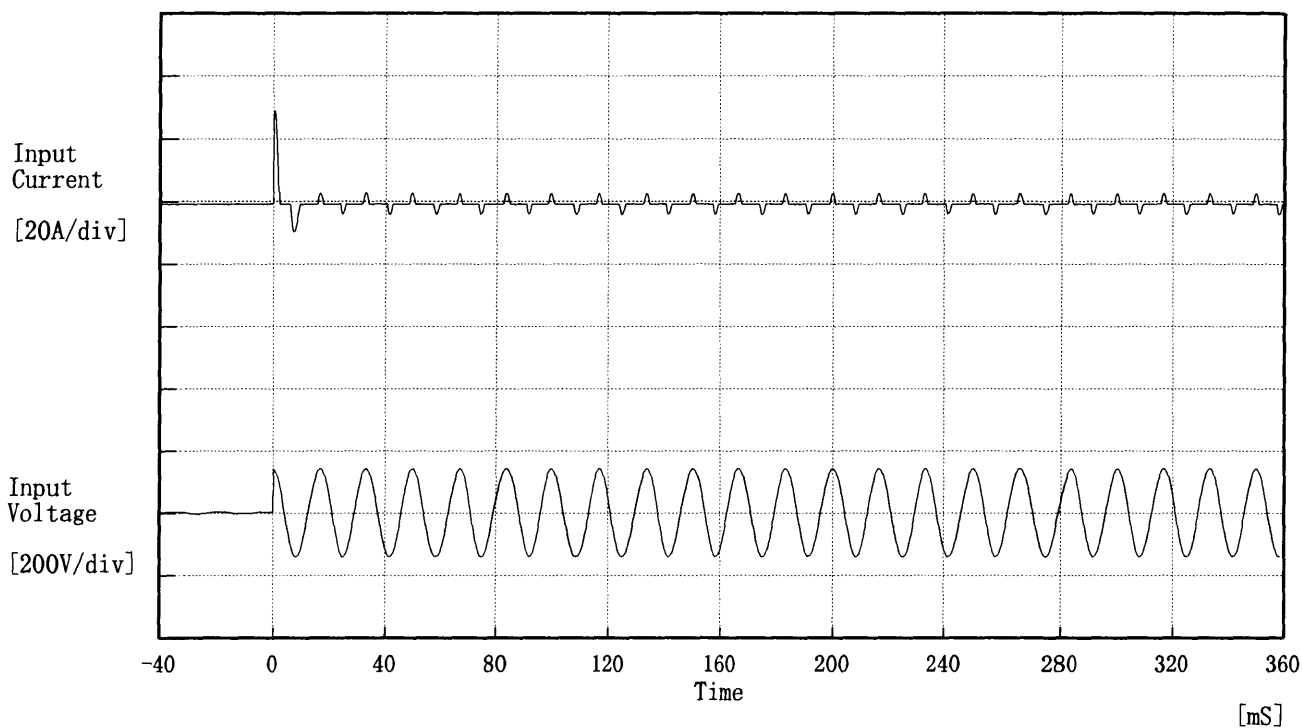
Testing Circuitry Figure A

2. Values

Ambient Temp.	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
[°C]	Operating Point [V]		
-20	6.31	6.31	6.31
-10	6.31	6.31	6.31
0	6.31	6.31	6.31
10	6.31	6.31	6.24
20	6.24	6.24	6.24
25	6.24	6.24	6.24
30	6.24	6.24	6.24
40	6.24	6.24	6.24
50	6.24	6.24	6.24
60	6.17	6.17	6.17
—	—	—	—

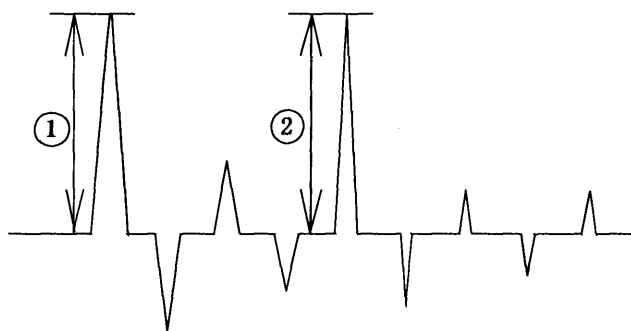
COSEL

Model	MMC50A-4	Temperature 25°C Testing Circuitry Figure A
Item	Inrush Current 突入電流	
Object	_____	



Input Voltage 100 V
Frequency 60 Hz
Load 100 %
Inrush Current

- ① 28.91 [A]
② 4.20 [A]



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Model	MMC50A-4	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+5.0V7.00A		

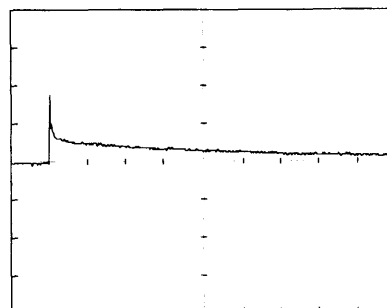
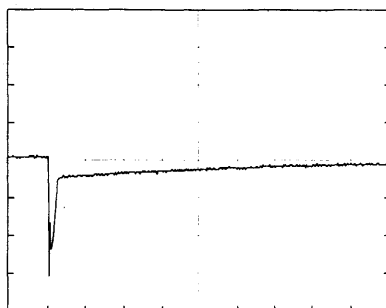
Input Volt. 100 V

Cycle 200 mS

Load Current

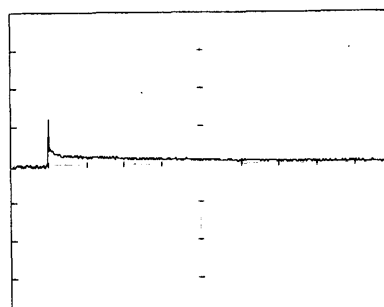
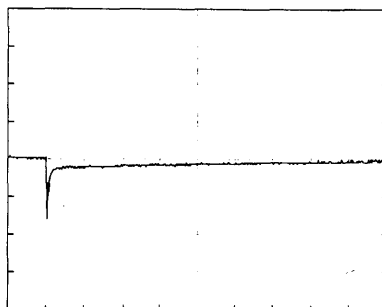
Load 0% ↔

Load 100 %



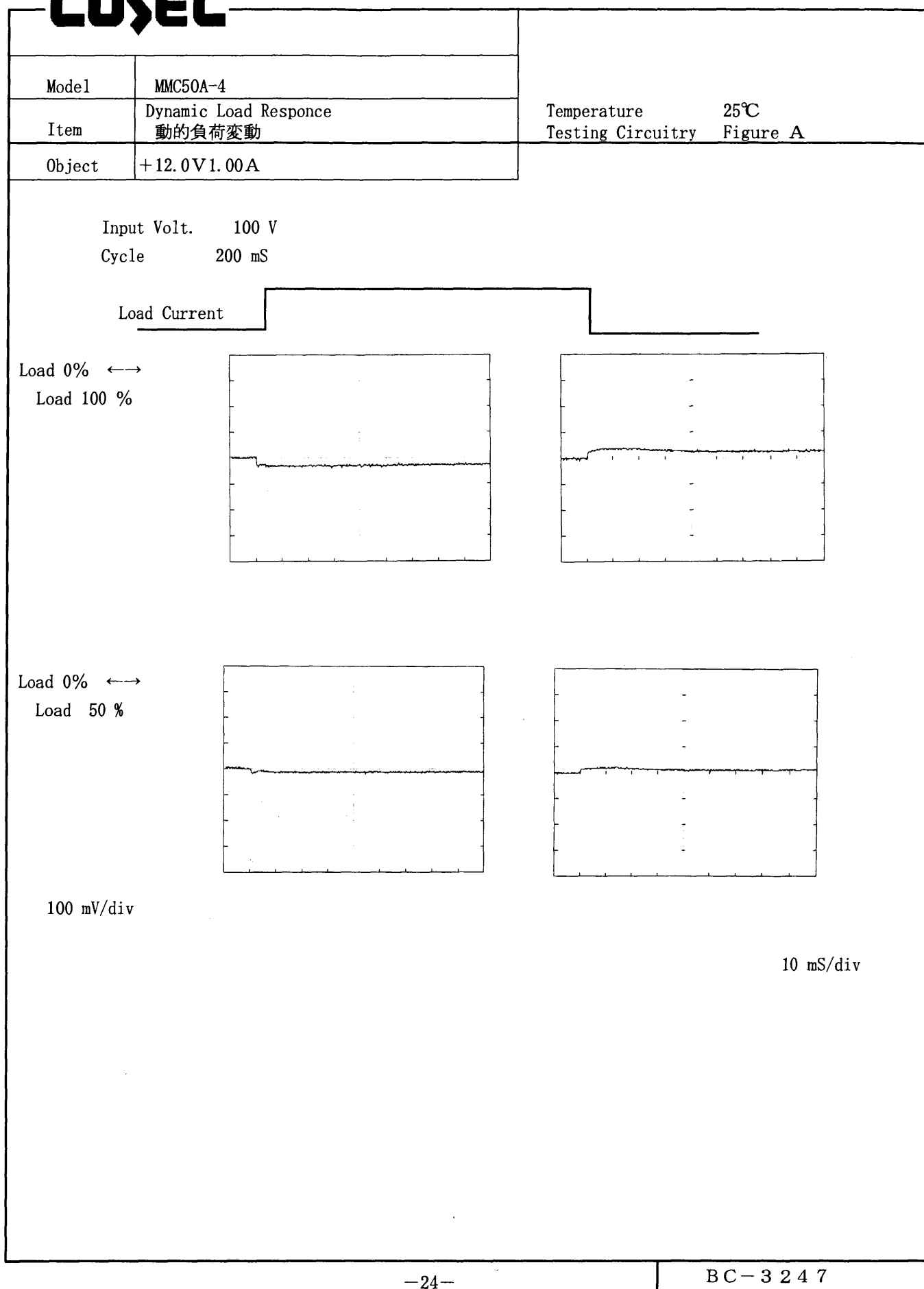
Load 0% ↔

Load 50 %



100 mV/div

10 mS/div

COSEL

COSEL

Model	MMC50A-4	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	-12.0 V 0.30 A	

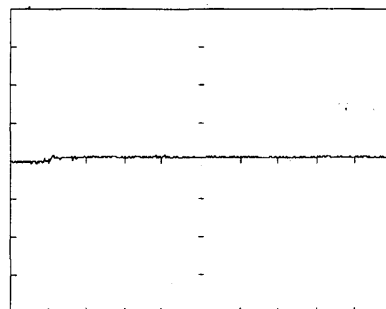
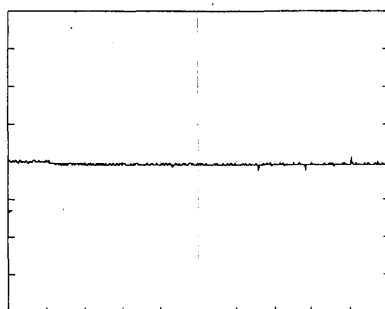
Input Volt. 100 V

Cycle 200 mS

Load Current

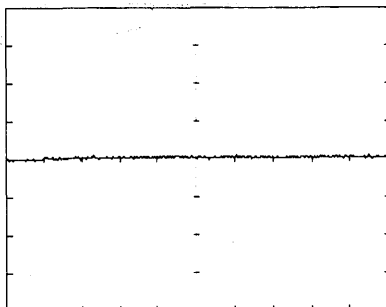
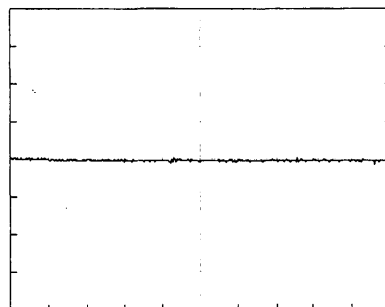
Load 0% ↔

Load 100 %



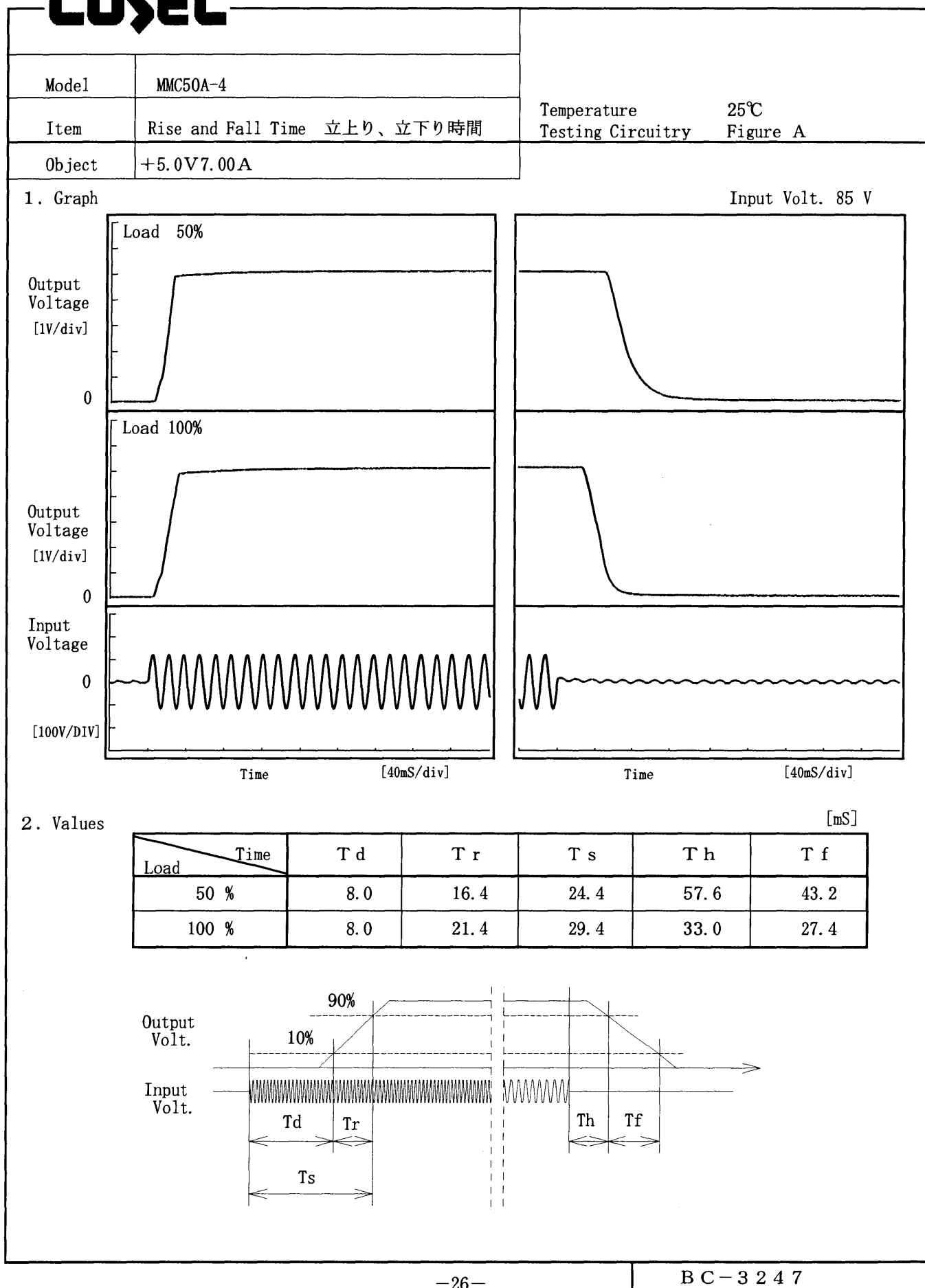
Load 0% ↔

Load 50 %



100 mV/div

10 mS/div

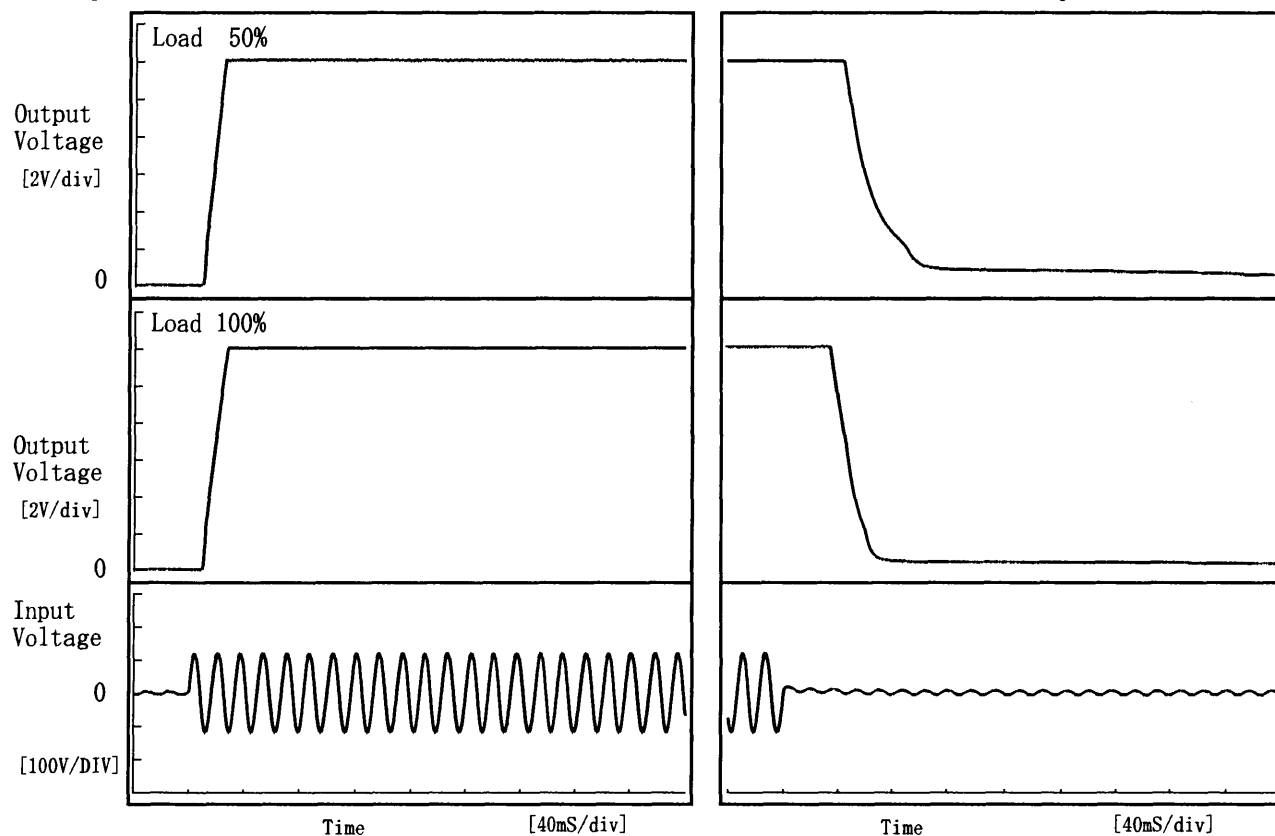
COSEL

COSEL

Model	MMC50A-4	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12.0V1.00A		

1. Graph

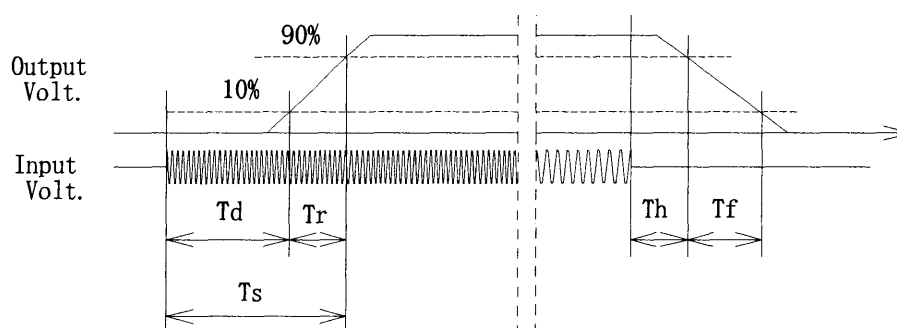
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T _d	T _r	T _s	T _h	T _f
50 %	11.0	12.8	23.8	47.2	52.6
100 %	11.2	14.4	25.6	37.6	27.0

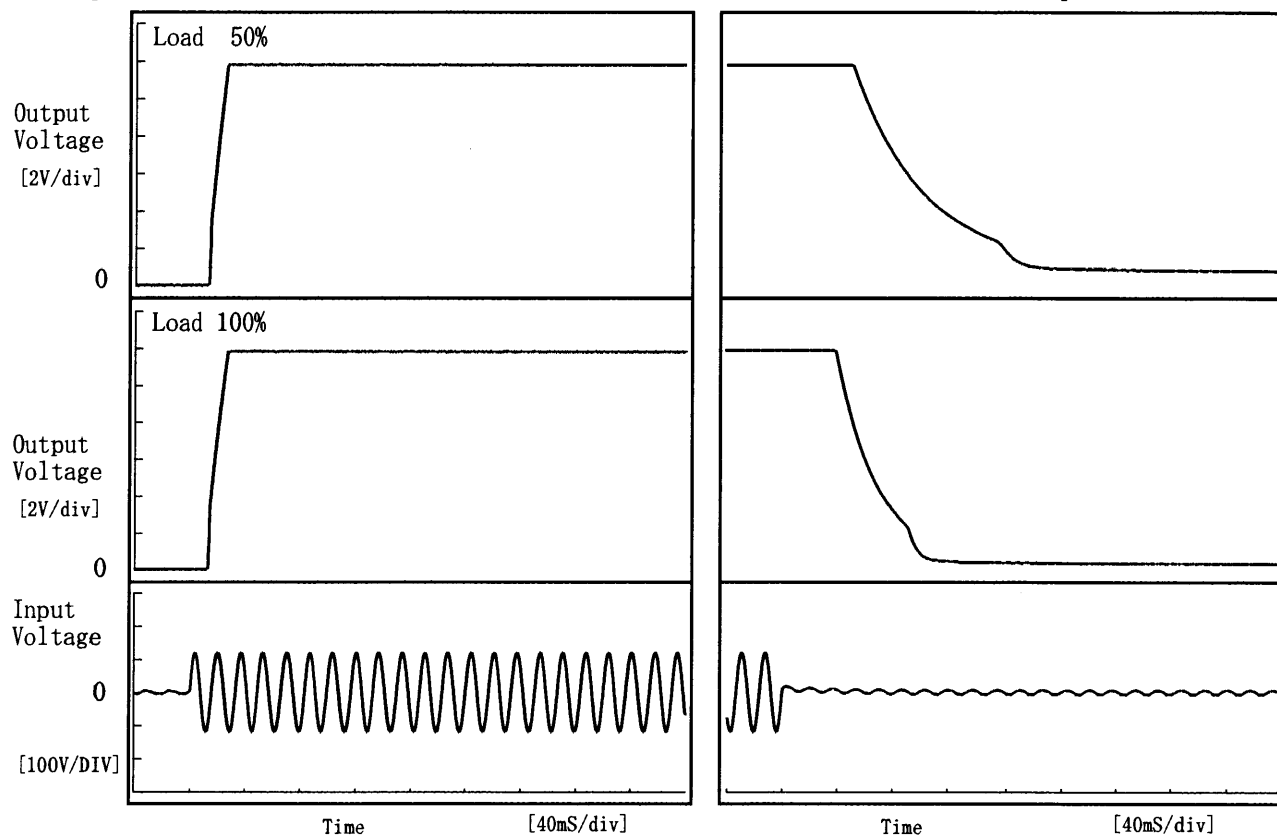


COSEL

Model	MMC50A-4	Temperature	25℃
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	-12.0V0.30A		

1. Graph

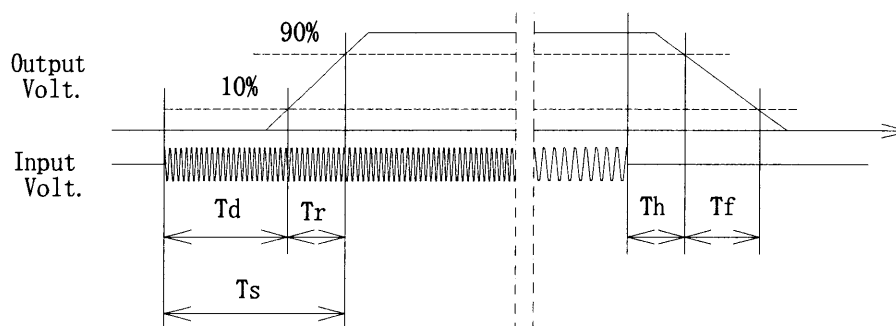
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	14.0	10.8	24.8	56.4	115.8
100 %	13.8	11.6	25.4	42.6	55.6



COSEL

Model		MMC50A-4																																																												
Item		Ambient Temperature Drift 周囲温度変動																																																												
Object		+5.0V7.00A																																																												
1. Graph		2. Values																																																												
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Temperature	Input Volt.	Input Volt.	Input Volt.																																																											
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0	11.979	11.979	11.979																																																											
10	11.972	11.972	11.971																																																											
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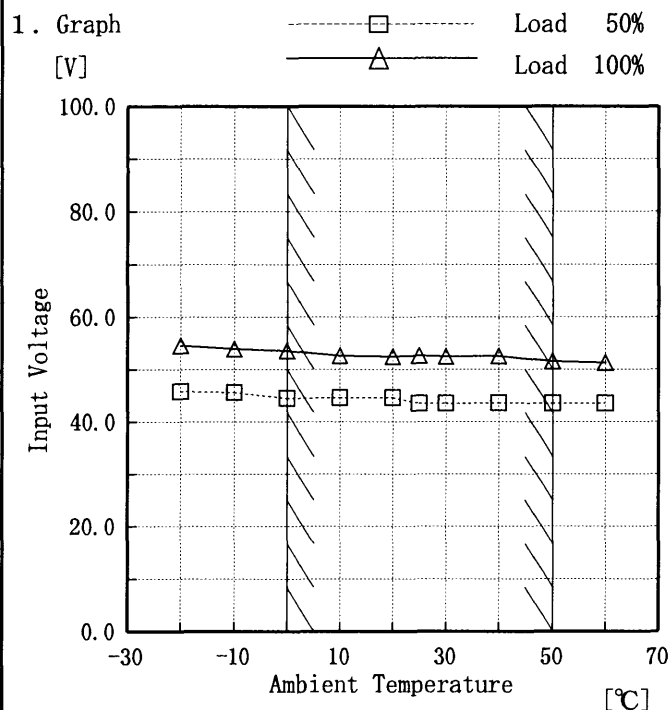
BC-3247

COSEL

COSEL																																																				
Model		MMC50A-4																																																		
Item		Ambient Temperature Drift 周囲温度変動																																																		
Object		-12.0V0.30A																																																		
1. Graph		2. Values																																																		
<div><div><div>△</div><div>Input Volt. 85V</div></div><div><div>□</div><div>Input Volt. 100V</div></div><div><div>○</div><div>Input Volt. 132V</div></div></div> <div><div><div>Output Voltage [V]</div><div><div>-11.61</div><div>-11.65</div><div>-11.69</div><div>-11.73</div><div>-11.77</div><div>-11.81</div><div>-11.85</div><div>0</div></div></div><div><div><div>Ambient Temperature [°C]</div><div><div>-30</div><div>-10</div><div>10</div><div>30</div><div>50</div><div>70</div></div></div></div><div><div>Load 100%</div><div>Note: Slanted line shows the range of the rated ambient temperature.</div><div>(注)斜線は定格周囲温度範囲を示す。</div></div></div> <div><table><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><tr><td>-20</td><td>-11.798</td><td>-11.797</td><td>-11.798</td></tr><tr><td>-10</td><td>-11.793</td><td>-11.792</td><td>-11.792</td></tr><tr><td>0</td><td>-11.782</td><td>-11.782</td><td>-11.782</td></tr><tr><td>10</td><td>-11.769</td><td>-11.769</td><td>-11.769</td></tr><tr><td>20</td><td>-11.753</td><td>-11.753</td><td>-11.753</td></tr><tr><td>25</td><td>-11.744</td><td>-11.743</td><td>-11.743</td></tr><tr><td>30</td><td>-11.733</td><td>-11.733</td><td>-11.732</td></tr><tr><td>40</td><td>-11.717</td><td>-11.716</td><td>-11.716</td></tr><tr><td>50</td><td>-11.697</td><td>-11.697</td><td>-11.697</td></tr><tr><td>60</td><td>-11.677</td><td>-11.677</td><td>-11.676</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table></div>		Temperature [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-20	-11.798	-11.797	-11.798	-10	-11.793	-11.792	-11.792	0	-11.782	-11.782	-11.782	10	-11.769	-11.769	-11.769	20	-11.753	-11.753	-11.753	25	-11.744	-11.743	-11.743	30	-11.733	-11.733	-11.732	40	-11.717	-11.716	-11.716	50	-11.697	-11.697	-11.697	60	-11.677	-11.677	-11.676	—	—	—	—
Temperature [°C]	Input Volt. 85[V]		Input Volt. 100[V]	Input Volt. 132[V]																																																
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10	-11.769	-11.769	-11.769																																																	
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—	—	—	—																																																	

COSEL

Model	MMC50A-4
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5.0V7.00A

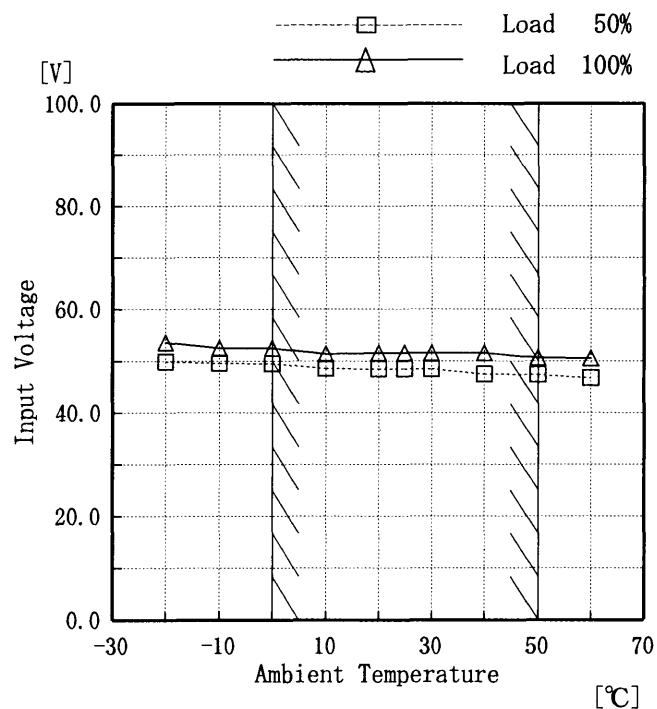


Testing Circuitry Figure A

2. Values

Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	45.8	54.5
-10	45.6	53.9
0	44.5	53.5
10	44.6	52.6
20	44.6	52.4
25	43.5	52.6
30	43.5	52.4
40	43.6	52.5
50	43.5	51.5
60	43.5	51.3
—	—	—

Object	+12.0V1.00A
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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% Input Volt. [V]	Load 100% Input Volt. [V]
-20	49.9	53.6
-10	49.6	52.5
0	49.5	52.5
10	48.6	51.3
20	48.5	51.5
25	48.5	51.5
30	48.5	51.5
40	47.5	51.5
50	47.4	50.6
60	46.7	50.5
—	—	—

COSEL

Model		MMC50A-4																																				
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧																																				
Object		-12.0V0.30A																																				
1. Graph		<div> <div> <div>-----□-----</div> <div>Load 50%</div> </div> <div> <div>-----△-----</div> <div>Load 100%</div> </div> </div> <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>Ambient Temp. [°C]</th><th>Load 50% Input Volt. [V]</th><th>Load 100% Input Volt. [V]</th></tr> </thead> <tbody> <tr><td>-20</td><td>51.6</td><td>53.6</td></tr> <tr><td>-10</td><td>51.5</td><td>52.5</td></tr> <tr><td>0</td><td>50.5</td><td>51.4</td></tr> <tr><td>10</td><td>50.4</td><td>51.6</td></tr> <tr><td>20</td><td>50.5</td><td>51.4</td></tr> <tr><td>25</td><td>50.5</td><td>51.4</td></tr> <tr><td>30</td><td>49.5</td><td>51.5</td></tr> <tr><td>40</td><td>49.5</td><td>50.5</td></tr> <tr><td>50</td><td>49.4</td><td>50.4</td></tr> <tr><td>60</td><td>49.5</td><td>50.7</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]	-20	51.6	53.6	-10	51.5	52.5	0	50.5	51.4	10	50.4	51.6	20	50.5	51.4	25	50.5	51.4	30	49.5	51.5	40	49.5	50.5	50	49.4	50.4	60	49.5	50.7	—	—	—
Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]																																				
-20	51.6	53.6																																				
-10	51.5	52.5																																				
0	50.5	51.4																																				
10	50.4	51.6																																				
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25	50.5	51.4																																				
30	49.5	51.5																																				
40	49.5	50.5																																				
50	49.4	50.4																																				
60	49.5	50.7																																				
—	—	—																																				

COSEL

Model		MMC50A-4																																					
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																					
Object		+5.0V7.00A																																					
1. Graph		2. Values																																					
<div><div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div><div><div><div>[mV]</div><div>150</div><div>125</div><div>100</div><div>75</div><div>50</div><div>25</div><div>0</div></div><div><div>Ripple Voltage</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>-30</div><div>-10</div><div>10</div><div>30</div><div>50</div><div>70</div></div><div><div>Ambient Temperature</div><div>[°C]</div></div></div><div>Input Volt. 100 V</div></div> <table><tr><th>Ambient Temp. [°C]</th><th>Load 50% Ripple Output Volt. [mV]</th><th>Load 100% Ripple Output Volt. [mV]</th></tr><tr><td>-20</td><td>10</td><td>25</td></tr><tr><td>-10</td><td>10</td><td>20</td></tr><tr><td>0</td><td>10</td><td>15</td></tr><tr><td>10</td><td>5</td><td>10</td></tr><tr><td>20</td><td>5</td><td>10</td></tr><tr><td>25</td><td>5</td><td>10</td></tr><tr><td>30</td><td>5</td><td>10</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></table>		Ambient Temp. [°C]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]	-20	10	25	-10	10	20	0	10	15	10	5	10	20	5	10	25	5	10	30	5	10	40	5	5	50	5	5	60	5	5	—	—	—		
Ambient Temp. [°C]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]																																					
-20	10	25																																					
-10	10	20																																					
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10	5	10																																					
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25	5	10																																					
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40	5	5																																					
50	5	5																																					
60	5	5																																					
—	—	—																																					

Object		+12.0V1.00A	
1. Graph		2. Values	
<div><div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div><div><div><div>[mV]</div><div>150</div><div>125</div><div>100</div><div>75</div><div>50</div><div>25</div><div>0</div></div><div><div>Ripple Voltage</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>-30</div><div>-10</div><div>10</div><div>30</div><div>50</div><div>70</div></div><div><div>Ambient Temperature</div><div>[°C]</div></div></div><div>Input Volt. 100 V</div><div>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。</div></div>			

Ambient Temp. [°C]	Load 50% Ripple Output Volt. [mV]	Load 100% 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
—	—	—

—33—

BC-3247

COSEL

Model		MMC50A-4	
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	
Object		-12.0V0.30A	
1. Graph		2. Values	

□

Load 50%

△

Load 100%

150

125

100

75

50

25

0

Ripple Voltage

[mV]

-30

-10

10

30

50

70

Ambient Temperature

[°C]

Input Volt. 100 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。

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
—	—	—

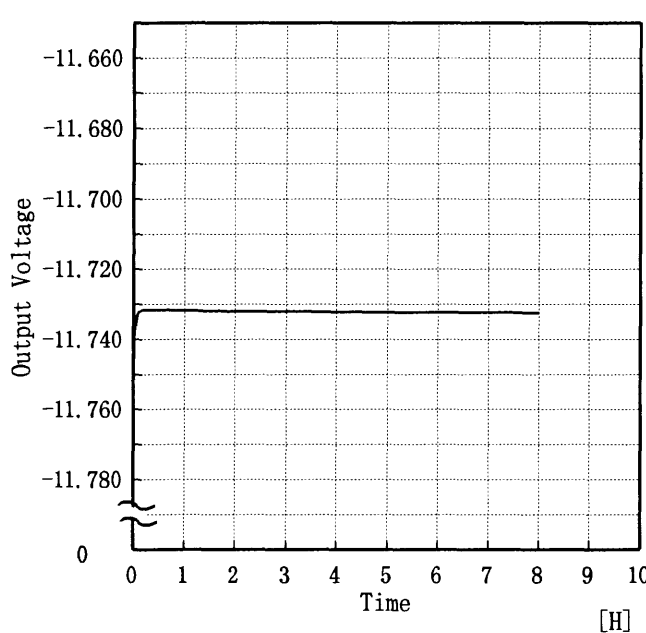
-34-

BC-3247

COSEL

Model		MMC50A-4		Temperature25℃ Testing CircuitryFigure A	
Item		Time Lapse Drift 経時ドリフト			
Object		+5.0V7.00A			
1. Graph				2.Values	
<div><div><div>Output Voltage</div><div>[V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><d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COSEL

COSEL																									
Model	MMC50A-4																								
Item	Time Lapse Drift 経時ドリフト																								
Object	-12.0V0.30A																								
1. Graph		2.Values																							
<div>[V]</div> <div></div> <div>Input Volt. 100V</div> <div>Load 100%</div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>-11.762</td></tr><tr><td>0.5</td><td>-11.732</td></tr><tr><td>1.0</td><td>-11.732</td></tr><tr><td>2.0</td><td>-11.732</td></tr><tr><td>3.0</td><td>-11.732</td></tr><tr><td>4.0</td><td>-11.732</td></tr><tr><td>5.0</td><td>-11.732</td></tr><tr><td>6.0</td><td>-11.732</td></tr><tr><td>7.0</td><td>-11.732</td></tr><tr><td>8.0</td><td>-11.732</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	-11.762	0.5	-11.732	1.0	-11.732	2.0	-11.732	3.0	-11.732	4.0	-11.732	5.0	-11.732	6.0	-11.732	7.0	-11.732	8.0	-11.732
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7.0	-11.732																								
8.0	-11.732																								

COSEL

Model		MMC50A-4	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 : 85~132 V

Load Current (AVR 1) : 0.75~7.00 A (AVR 2) : 0~1 A (AVR 3) : 0~0.3 A

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

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

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 85~132 V

負荷電流 (AVR 1) : 0.75~7.00 A (AVR 2) : 0~1 A (AVR 3) : 0~0.3 A

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

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

Object		+5.0V7.00A				
Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	0	132	0.75	5.093	±17	±0.4
Minimum Voltage	50	85	7.00	5.060		

Object		+12.0V1.00A				
Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	0	85	0	12.012	±39	±0.4
Minimum Voltage	50	132	1	11.935		

Object		-12.0V0.30A				
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	-11.808	±62	±0.6
Minimum Voltage	50	132	0.3	-11.684		

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Model		MMC50A-4	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		+5.0V7.00A		
1. Condensation test				
Testing procedure is as follows.				
① Keeping and cooling the unit in a tank at -10℃ 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℃ 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]		5.069	Input Volt.: 100V, Load Current:7.00A	
Line Regulation [mV]		1	Input Volt.: 85~132V, Load Current:7.00A	
Load Regulation [mV]		15	Input Volt.: 100V, Load Current:0.75~7.00A	

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COSEL

Model		MMC50A-4	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		+12.0V1.00A		
1. Condensation test				
Testing procedure is as follows.				
① Keeping and cooling the unit in a tank at -10℃ 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℃ and the humidity is 40%RH.				
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1. 結露特性試験				
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2. Values				
Item		Data	Testing Conditions	
Output Voltage [V]		11.955	Input Volt.: 100V, Load Current:1A	
Line Regulation [mV]		1	Input Volt.: 85~132V, Load Current:1A	
Load Regulation [mV]		35	Input Volt.: 100V, Load Current:0~1A	

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COSEL

LOREL

Model	MMC50A-4
Item	Condensation 結露特性
Object	-12.0V0.30A

Testing Circuitry Figure A

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ 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℃ 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]	-11.791	Input Volt.: 100V, Load Current:0.3A
Line Regulation [mV]	1	Input Volt.: 85～132V, Load Current:0.3A
Load Regulation [mV]	13	Input Volt.: 100V, Load Current:0.0～0.3A

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Model		MMC50A-4		Temperature 25℃ 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	0.26	0.33
(B) IEC60950	0.22	0.27	0.33

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。

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Model	MMC50A-4	Testing Circuitry Figure D
Item	Conducted Emission 雑音端子電圧	
Object	_____	

1. Graph

Remarks

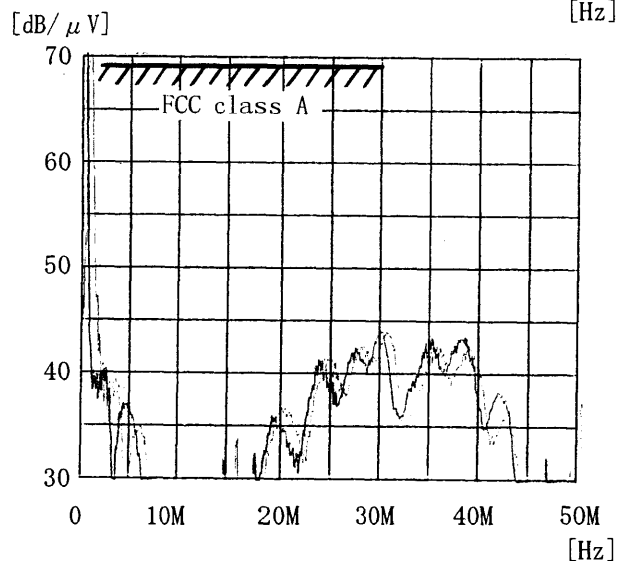
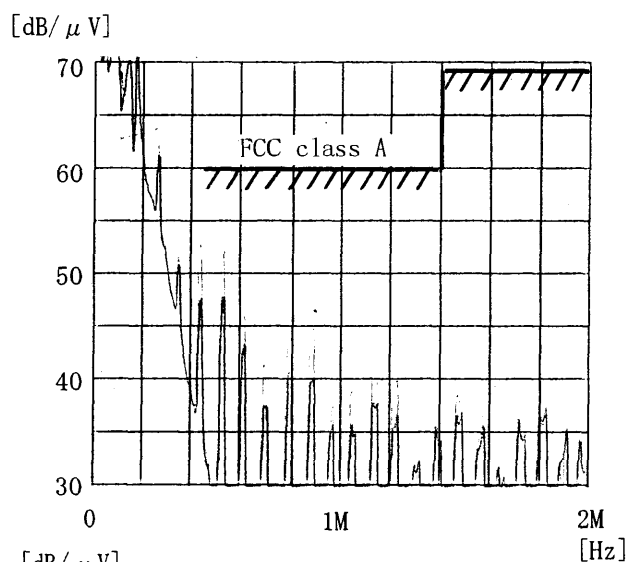
Input Volt. 120 V

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



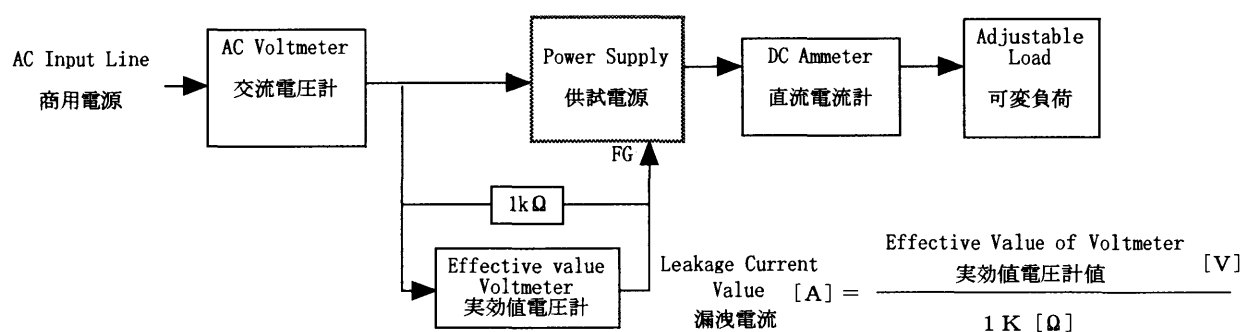
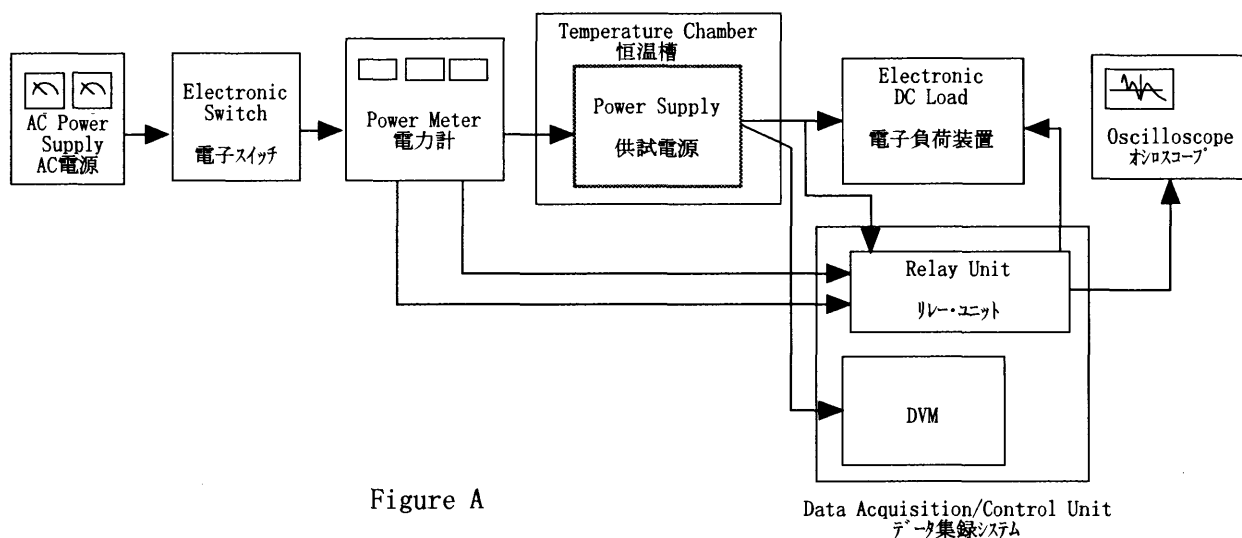


Figure B (DENTORI)

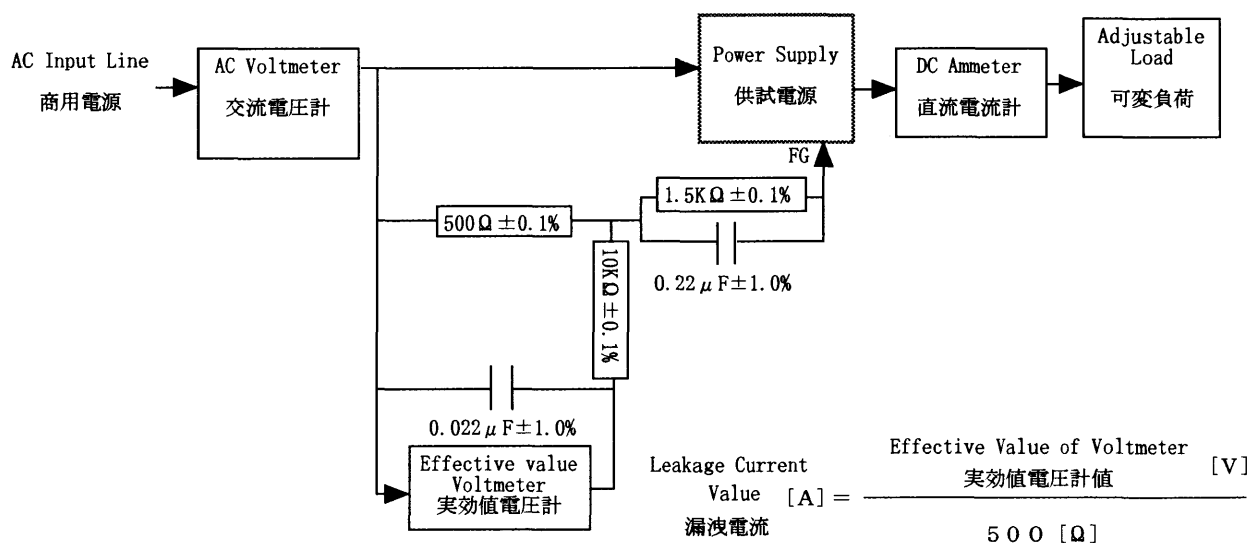


Figure B (IEC 60950)

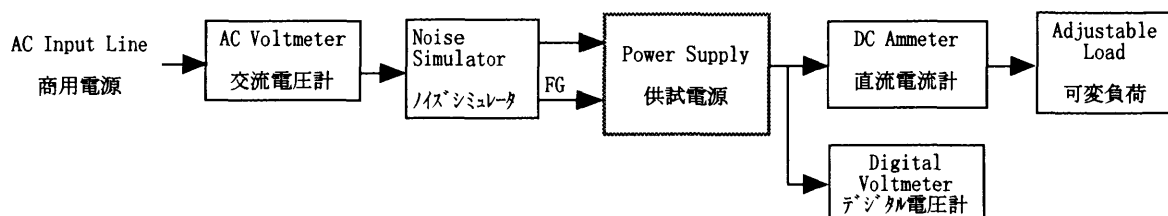


Figure C

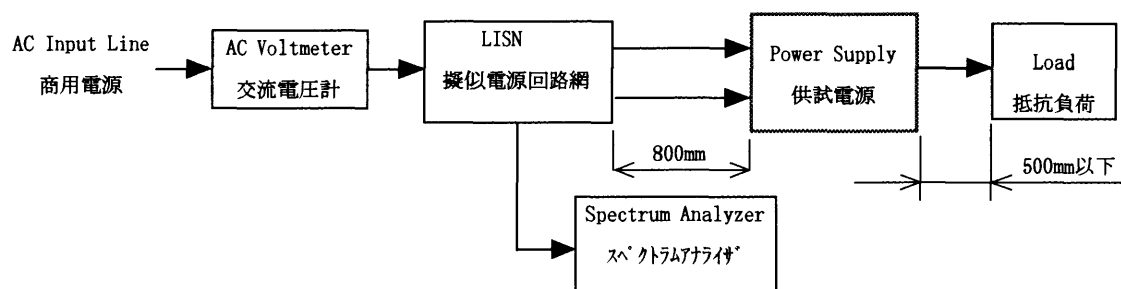


Figure D

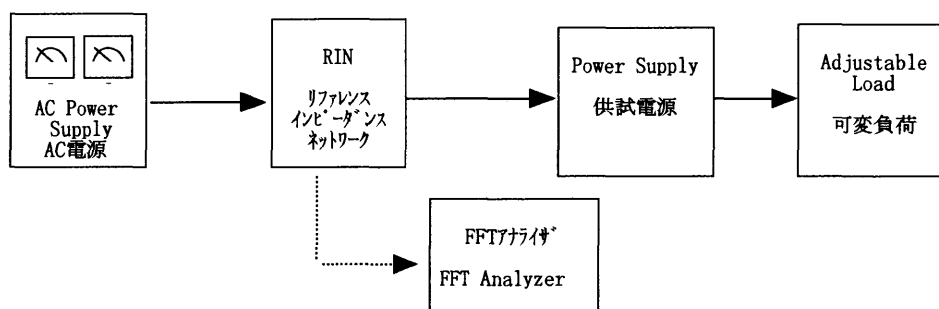


Figure E